







TRANSACTIONS  
OF THE  
NATURAL HISTORY SOCIETY  
OF  
NORTHUMBRIA

Editor:

B J SELMAN

Assistant Editors:

D C NOBLE-ROLLIN

M A PATTERSON

Volume 60

THE NATURAL HISTORY SOCIETY OF NORTHUMBRIA  
THE HANCOCK MUSEUM  
NEWCASTLE UPON TYNE NE2 4PT

1999-2001



ISSN 0144-221X

©The Natural History Society of Northumbria, 2001.  
This publication is copyright. It may not be  
reproduced in whole or in part without the  
Society's permission.

Printed by Pattinson and Sons, Newcastle upon Tyne.



## CONTENTS

Page

### PART 1

**Annual Report 1999**

1

### PART 2

**Birds on the Farne Islands in 1999**

37

compiled by J WALTON, edited by M A PATTERSON

### PART 3

**An ecological evaluation method for regional butterfly faunas**

59

by S ELLIS

**The vegetation of Gosforth Park Nature Reserve**

74

by D N MITCHELL and J A BAKER

**Building stones of the district around Alnwick, Northumberland**

101

by D E JACKSON

Short Communications

**The Heslop-Harrisons: a dynasty of Northumbrian naturalists**

115

by B J SELMAN

Book Review

***A Rum Affair* by Karl Sabbah**

116

by A J RICHARDS



AMERICAN MEDICAL ASSOCIATION

PUBLISHED WEEKLY

CHICAGO, ILL., U.S.A.

VOLUME 10, NUMBER 1, JANUARY 1917

Page 1

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

CHICAGO, ILL., U.S.A.

PUBLISHED WEEKLY

CHICAGO, ILL., U.S.A.

VOLUME 10, NUMBER 1, JANUARY 1917

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

CHICAGO, ILL., U.S.A.

PUBLISHED WEEKLY

CHICAGO, ILL., U.S.A.

PUBLISHED WEEKLY

CHICAGO, ILL., U.S.A.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

CHICAGO, ILL., U.S.A.

PUBLISHED WEEKLY

CHICAGO, ILL., U.S.A.



TRANSACTIONS  
OF THE  
NATURAL HISTORY SOCIETY  
OF  
NORTHUMBRIA

Editor:

B. J. SELMAN

Assistant Editors:

M. A. PATTERSON

D. C. NOBLE-ROLLIN

Volume 60

Part 1

THE NATURAL HISTORY SOCIETY OF NORTHUMBRIA

THE HANCOCK MUSEUM

NEWCASTLE UPON TYNE NE2 4PT

1999

**ISSN 0144-221X**

© The Natural History Society of Northumbria, 1999

This publication is copyright. It may not be reproduced in whole or in part without the Society's permission.

Printed by Pattinson and Sons, Newcastle upon Tyne.



**ANNUAL REPORT  
OF THE  
COUNCIL AND TRUSTEES  
FOR THE  
YEAR ENDED 31 JULY 1999**

## **THE NATURAL HISTORY SOCIETY OF NORTHUMBRIA**

**PRESIDENT** The Viscount Ridley

### **VICE PRESIDENTS**

A H Dickinson	Dr G A L Johnson	I D Moorhouse	E Slack
R W T Thorp	D F McGuire	Mrs M A Patterson	Professor R Bailey
M J Hudson	D R Shannon	Dr A G Lunn	Dr J M Jones
J Alder	D P Walton	A M Tynan	R Wilkin

### **COUNCIL**

#### **(1) Elected by members:**

1996 - M D Anthony, J S North Lewis

1997 - Ms L Kerslake, Dr D N Mitchell

1998 - S Lowe

#### **(2) Nominated by sections:**

Dr D Gardner-Medwin (Chairman of Council, publications ), Dr A G Lunn (botany), Dr G A L Johnson (geology), I D Moorhouse (Gosforth Park), H H Chambers (library), Dr C P F Redfern (ornithology), Mrs J Simkin (lichenology)

#### **(3) University representatives:**

P S Davis, Dr A J Richards, Dr B J Selman

### **TRUSTEES**

H H Chambers, Dr D Gardner-Medwin, Dr A G Lunn, I D Moorhouse, J S North Lewis, Mrs M A Patterson, Dr B J Selman, D R Shannon, E Slack

**TREASURER** N A Furness FCA (appointed April 1999)

**SECRETARY** D C Noble-Rollin

**SOLICITORS** Dickinson Dees, St Ann's Wharf, 112 Quayside, Newcastle upon Tyne

**BANK** Lloyds TSB Bank plc, 102 Grey Street, Newcastle upon Tyne

### **FINANCIAL ADVISERS**

Brewin Dolphin Securities Ltd, 39 Pilgrim Street, Newcastle upon Tyne

### **INDEPENDENT EXAMINERS**

PricewaterhouseCoopers, 89 Sandyford Road, Newcastle upon Tyne

### **GENERAL PURPOSES COMMITTEE**

P S Davis, Dr D Gardner-Medwin, Dr A G Lunn, N A Furness, J S North Lewis

### **SOCIETY REPRESENTATIVES**

**Coquet Island Advisory Management Committee:** I D Moorhouse, D C Noble-Rollin

**Coquet Island Research Sub-Committee:** Dr C P F Redfern, D C Noble-Rollin

### **Lindisfarne National Nature Reserve:**

**Advisory Committee:** D G Bell

**Wildfowl Panel:** D C Noble-Rollin

**Museum Management Committee:** Dr D Gardner-Medwin, D C Noble-Rollin, E Slack, Dr R H Stobart

**STAFF** Mrs H Dalrymple, Ms P Hammock, Mrs J Jones, L J McDougall, Dr A Westerberg

**GOSFORTH PARK NATURE RESERVE** Warden: P Drummond

**THE HANCOCK MUSEUM** Senior Curator and Principal Keeper: A Coles  
Curator and Senior Keeper, Natural Sciences: S McLean



## ANNUAL REPORT OF THE COUNCIL AND TRUSTEES FOR THE YEAR ENDED 31 JULY 1999

The Natural History Society of Northumbria is a registered charity and is governed by the rules of the Charity Commission. The Trust Deed dated 30 December 1965 was last updated after the annual meeting on 28 November 1997. A list of the present trustees is given opposite with the other officers of the Society. Our rules state that 'The objects of the Society shall be the encouragement by every means of the study of natural history in all its branches; the protection of the local flora and fauna; the maintenance and extension of the Society's library and collections; the publication of *Transactions* and other scientific papers, the organisation of lectures, discussions and field meetings and co-operation with other scientific societies or associations with similar objects'. The Annual Report outlines the main achievements of the year in relation to the charity's objects.

### INTRODUCTION

The many activities in which the Society has been involved during the year are described in the pages that follow by several different writers. I am particularly grateful to them, Graham Bell, Hugh Chambers, Alec Coles, Andrew Hooton, Angus Lunn, Dave Mitchell, Ian Moorhouse, Neville Furness, Ken C Patterson, Chris Redfern, Janet Simkin, Bob Wilkin and especially to David Noble-Rollin who masterminds the report each year and writes a major part of it. In this introduction I shall mention only some of the important matters.

Last year we strengthened the Society's cadre of Trustees and this year we renewed the permanent component of our Council by electing three new Vice Presidents at the Annual Meeting in November 1998, Professor Richard Bailey, Dr Mick Jones and Mr Bob Wilkin. All of them have made very important contributions to the success of the Society in the past; we warmly welcome them to Council. But at the end of the year one of our most active and valued Vice Presidents, Mr Don McGuire, resigned because of ill health. Don has been an invaluable member of Council for nearly thirty years and we relied heavily upon his wisdom, experience and enthusiasm, especially at times when difficult decisions had to be made. We thank him for this and for all he has done for the Society and wish him well.

For a large part of this year we functioned without an honorary treasurer because no candidate emerged for the position at the 1998 Annual Meeting. Eddie Slack most generously returned to oversee our financial activities while David Noble-Rollin, Rita Wolland and Lindsay McDougall kept the books straight in the interim. Then, in April, Eddie Slack and John North Lewis suggested to Council the appointment of a Treasurer as a member of staff and proposed Mr Neville Furness for the post. Council gratefully accepted the suggestion and Mr Furness was duly appointed for the period up to the next Annual Meeting, when the principle of appointing a treasurer to the staff will be put to the membership and an election held. We welcome Neville to the Society and are most grateful for the efficient and helpful way in which he has prepared the accounts for this report.

One of the very pleasant occasions of the year was the Society's visit to Blagdon in July by invitation of our President, Viscount Ridley, and Lady Ridley. It combined in a delightful way a social gathering of members and their families with a most interesting opportunity to explore the estate which has been actively managed with wildlife conservation in mind for many years.

Conservation matters have concerned us again this year. Work has continued actively on the documentation and protection of the wildlife corridor that runs northwards from Gosforth Park; mention of this will be found in the Ringing Report below. Judith Baker, David Mitchell and Lisa Kerslake have contributed in a major way to the groundwork and a most impressive and successful collaboration has been achieved between the four local councils involved and the many 'non-statutory organisations', including the Society, who have been working on the Action Plan for the corridor. In the spring of 1999 we were represented again at the Otterburn Inquiry which was reopened to consider matters raised by the government's Strategic Defence Review. The outcome of the Inquiry is likely to be known towards the end of the year. Next year we may have to appear at the Public Inquiry concerning the North Tyneside Urban Development Plan to defend our interests in that area.

The museum has had an active and successful year, described below by Alec Coles. As the period of this report came to an end we awaited the Conservation Report on the museum, effectively the basis on which our plans for the extension and restoration of the museum will be made. The year 1999-2000 is likely to be an exciting one as we try to envisage the best way to prepare for the future of our collections, our handsome building, our members' interests and the people of the North-East and not least the wildlife of our region and we hope that you, our members, will contribute important ideas and help of other kinds in this process.

## MEMBERSHIP

The total membership on 31 July 1999 (with 1998 figures in brackets) was 859 (859). This was made up of 7 (7) honorary members, 40 (40) life members, 519 (514) members who receive *Transactions*, 262 (266) members who do not receive *Transactions*, 21 (23) associate members, 0 (1) school and 10 (8) complimentary members. Several people make payments under long-standing banker's orders ranging from £1 to £12, made when these amounts were the current subscription rates, and they are regarded as donors and not members.

The Council reports with much regret the death during the year of Mr J C Benson, who was elected as a member in June 1951, Emeritus Professor G E M Hallett, elected in July 1956, and Mrs C J Napier, elected in October 1994.

## COUNCIL

At the Annual Meeting on 27 November, the Society re-elected Lord Ridley as its President and also elected three new Vice Presidents. Professor Richard Bailey had recently retired as Pro Vice Chancellor of Newcastle University and Chairman of the Hancock Museum Management Committee; he was also instrumental in the smooth changeover to Tyne & Wear Museums Services at a very difficult time for the Society. Dr Mick Jones is Chairman of the Geology Section and has been a valued member of Council for many years as a University representative. The third new Vice President is Mr Bob Wilkin, who has been involved in the Society since the 1950s and has been elected to Council on several occasions. He leads many of the mammal field trips and has given lectures to the Society. All three were elected unanimously.

One member was elected to Council, Mr Steve Lowe, the Conservation Manager for Durham Wildlife Trust. Mr Hugh Chambers and Mr Allen Creedy retired by rotation. Mr Chambers, of course, remains on Council as Chairman of the Library Committee.

## PUBLICATIONS

This year's *Transactions* consists of four issues, the last two of which are to appear after the end of the financial year, but should be in members' hands by the time of this annual report. In the past numbering of volumes has been rather anomalous, even capricious, and the current plan is to make the annual report part 1 of each volume and to issue a volume every year of about three parts, including the Farne Islands bird report which this year was issued in April (Volume 59, part 2). On this occasion Mr Michael Maher, National Trust Seasonal Head Warden, joined the regular authors Mr John Walton, Dr Chris Redfern and the editor, Mrs Margaret Patterson. Volume 59, part 3 is a bulky issue containing six scientific papers, three with historical and ornithological themes, two respectively on the butterflies and on the mosses and liverworts of the Magnesian Limestone of County Durham, and one on the exceptional local rainfall of June 1996. Volume 59, part 4 will be a short update of the the *Red Data Book for Northumberland*, expanding the information on fishes and updating the botanical section in the light of the new edition of the British Red Data book for vascular plants. We should mention here also the ever more attractive and professional appearance of the Society's Bulletin. The 'in house' preparation of both the Bulletin and the *Transactions* for the printer are increasingly under the direction of David Noble Rollin – quite an arduous part of his duties as Secretary: we are very grateful to him.



## OFFICE MANAGEMENT

The Society has had a number of major changes towards the end of last year and during the current year as far as staff and volunteers are concerned. The continued smooth running of the office and membership affairs was greatly assisted during the changeover from Margaret Patterson to Anne Westerberg because they were able to work together for a period, enabling the Society to function efficiently during this difficult time. Margaret had been with the Society for twenty-three years and her knowledge and expertise is still being sought in her capacity as a volunteer. Added to this was the departure of our Honorary Treasurer, Richard Slack, to take up a new position coaching students for their accountancy exams. This placed a greater burden on the office in terms of the daily work connected with the financial side of the Society. In this respect we are greatly indebted to Eddie Slack for his advice and particularly to Rita Wolland for her continued voluntary work in regularly dealing with the books and checking that they are up to date and accurate.

### Staff

**Mrs Helen Dalrymple** Apart from her normal office duties, Helen mainly deals with the exchanges and the binding of the journals. The Society receives approximately a hundred different publications per year and these all require binding into volumes. Helen prepares the material to go to the binders, checking the returned books with the librarians and writing to exchange members all over the world, making sure that we have the necessary title pages and indices to go with each volume.

**Mr Neville Furness** At the April meeting Council agreed to the appointment of Neville as treasurer. He had just retired from Dickinson Dees and was able to start dealing with the accounts soon after being appointed..

**Ms Tricia Hammock** Tricia continues her studies at Durham University and in her spare time looks after the covenants and prepares the *Transactions* that go to our exchange partners. She now takes the minutes at Council and GPC and works on maintaining the accuracy of the membership database.

**Mrs Joyce Jones** Joyce continues her general office duties including typing and membership queries and renewals.

**Mr Lindsay McDougall** Lindsay came into the office one day a week in order to help with the running of the financial side of the office during the time when we had no treasurer. This was of great assistance in keeping the general financial affairs running.

**Dr Anne Westerberg** Anne took over as Office Manager from Margaret Patterson in September and they worked together during the next two months. Because of this the office continued to operate smoothly and Anne has now established herself as Office Manager with control over the day-to-day running of the Society. She has also taken on the task of organising the survey work done by members in different parts of Northumberland and Durham. Apart from her office skills she is also of great assistance in dealing with ornithological enquiries, thus reducing the pressure on the Secretary.

### Volunteers

**Mrs Janet Angel** Janet has continued to analyse the members' log sheets from Gosforth Park and although she only makes infrequent visits to the office, her work in keeping this task up to date is greatly appreciated.

**Mr and Mrs Hugh Chambers** Hugh and Stella have continued to be a major force within the Society, running the library efficiently and looking after the many students and members who visit to use its resources. As usual they are also on hand to help in the organisation of any of the various activities that occur during the year that require extra help and work. Council would like to thank them both for their excellent service to the Society during this year.

**Miss Barbara Harbottle** Barbara continues to put the backlog of ringing returns into the computer and has particularly concentrated on checking and updating the arctic tern records. This is very time consuming and tedious work and we are grateful to her for her time.

**Mrs Joan Holding** Joan has become an invaluable voluntary member of the staff, having worked for many years both illustrating and undertaking the necessary improvements to diagrams destined for the *Transactions*. During this year she has worked closely with the Secretary in learning the new technology required for creating leaflets and posters to advertise the Society. This has been slow but the results look encouraging and it is hoped that within the next financial year colourful posters and leaflets will become part of the Society's advertising programme.

**Mrs June Holmes** June continues to produce the catalogue of manuscripts and other archival papers held within the Hancock Museum. This work is very time consuming but is beginning to bear fruit in our much greater knowledge of this part of the collections. Apart from the work on the collections, she continues to be the museum's expert on matters concerning Thomas Bewick and deals with enquiries and visiting scholars. As her knowledge of the collections increases, she is asked to be 'an expert' on other parts of the collections, having to deal with queries on many other important aspects of the Society's past.

**Mrs Margaret Patterson** As mentioned in the last annual report Margaret retired from her office duties and to mark her retirement the staff and volunteers who had worked with her had a small party. Margaret was presented with a gift which included a red pen. This had two purposes, one as a keepsake of her years in the Society office but also to remind her that she had agreed to continue her editing role. To this end Margaret still edits the *Transactions*, in particular 'Birds on the Farne Islands', helps with the bulletin and programme editing and continues to be secretary to the Gosforth Park Management Committee.

**Ms Ann Stephenson** Ann is currently working on the large collection of archival letters, preparing and sorting them for cataloguing by June Holmes and also picking out any useful information and cross-references within the letters. She has during the year gone through a great deal of the correspondence concerning seals on the Farne Islands and a number of other collections of letters and manuscripts.

**Mr Gary Stephenson** Gary volunteered during the year to come into the office and has begun to prepare historical data to be accessed into 'Recorder', the county species record database. This is just the beginning of a long-term project to incorporate early records to make the database more complete.

**Dr Anne Wilson** Anne continues to work through Russell Goddard's and Grace Hickling's diaries concerning the Farne Islands. She is hunting for early records of numbers of birds on the islands and details of their behaviour. This information is being collected on a database and will be used to prepare a paper on the history of the islands as far as bird numbers are concerned.

**Mrs Rita Wolland** Rita has been invaluable this year; as already mentioned she has put in a great deal of time in overseeing the financial records of the Society. As we did not have a treasurer from October until the end of April, her work in checking the accounts and maintaining their accuracy is greatly appreciated. Apart from this she has continued to put records into the database on the ringing recoveries on the Farnes and to update the recoveries and sight records of the wardens.

#### MUSEUM MANAGEMENT COMMITTEE

Professor A R Archibald, Pro-Vice-Chancellor of the University of Newcastle, has succeeded Professor Richard Bailey as Chairman. This important committee, with representation from the Society, Tyne & Wear Museums and the University provides a vital component of the management of the museum and its collections. The most difficult decision this year was to charge members of the Society for admission to special 'blockbuster' exhibitions though not, of course, for admission to our own collections.



## HANCOCK MUSEUM

Given the popularity of *Dinosaurs* and other 'blockbuster' exhibitions at the museum in recent years, the challenge faced by the Hancock this year has been to continue to attract large numbers of visitors through exciting and innovative exhibitions. However, even though the main exhibitions of the year have been very popular, visitor attendance is considerably lower than last year at 104,402. It is inevitable that visitor figures fluctuate from one year to the next, and last year was somewhat unusual in that all of the three 'blockbuster' exhibitions fell within the 1997/98 academic year. The total, of course, depends on the exact period of counting, so the count for the museum's financial year 1998-99 was a much healthier 120,000.

### Major Exhibitions

The year included the last month of *Monster Creepy Crawlies* over the summer period which ran until 6 September. This was followed by *Venom*, on tour from the Yorkshire Museum. Both exhibitions attracted large numbers of visitors. *Venom*, was particularly popular because of the live Asian cobra and western diamondback rattlesnake which took up residence at the museum during the exhibition, and of course the happy event of the birth of eleven baby boa constrictors. We must record our thanks to Joan and Jim Malligan of the Wallsend Reptilian Society who did so much for us during the exhibition, and who gave literally thousands of visitors the opportunity to meet snakes face to face! *Venom* attracted 55,550 visitors to the museum. A further attraction, over the Christmas period, was *Wild Christmas*, an exhibition exploring the plant and animal links of Christmas such as holly, mistletoe, Christmas trees, reindeer and robins.

This year's summer exhibition was *Movie Magic*, which brought costumes, models, props and other movie memorabilia from major blockbuster films to the museum. The inclusion of material from Star Wars and the Alien films proved to be particularly popular. Most of the visitors for this exhibition, however, will be recorded in next year's figures.

### Art Programme

The popular 'blockbuster' exhibitions have been augmented by a series of art exhibitions presenting interpretation of natural science themes using a variety of media and featuring mainly local artists.

Exhibitions included a spectacular stained glass butterfly installation by Bridget Kennedy based on her observations of displays at the Hancock. This was followed by a very successful selling exhibition of works by local sculptor Andy McDermott entitled *Insects, Shells and other Fragments*. During the period between *Monster Creepy Crawlies* and *Venom* the main exhibition gallery was given over to *ZOO*, an exhibition celebrating animals through decorative and contemporary art and craft representations. This exhibition was on tour from Manchester City Art Galleries.

Early in 1999 the museum hosted an exhibition of photographs entitled *Out of Darkness* by Simon Gregory and participated in a collaboration with the Newcastle Royal Grammar School to show their innovative exhibition of re-cycled animal sculptures by Year 10 students, entitled *Creatures*. The Hancock was also pleased to host Chris Yeats' modern *Bestiary* in association with the Visual Arts North East (VANE) Festival and *Seen: Unseen* by Helen Smith which represented the culmination of an environmental improvement and art project that took place in Quaking Houses, County Durham, under the auspices of the Artists' Agency.

### Temporary Major Exhibitions

*Monster Creepy Crawlies* - 21 May - 6 September 1998

Sponsored by Magic Radio - Supported by The Sponsors Club, NEMS, Nexus

*Wild Christmas* - 19 November 1998 - 24 January 1999

*Venom* - 19 December 1998 - 6 June 1999 - Supported by Nexus, NEMS

*Movie Magic* - 3 July 1999 - 12 September 1999

Supported by Warner Village Cinemas, Nexus, NEMS, Film NOVA Production

### Temporary Art Exhibitions

**Bridget Kennedy: *Observations*** - 12 June – 4 October 1998:

Artist supported by: Northern Arts

**Chris Yeats: *The Bestiary*** - October 1998

**ZOO** - 12 October – 12 December 1998

Supported by The Crafts Council, North West Arts.

**Andy McDermott: *Insects, Shells and other Fragments*** - 21 October 1998–21 February 1999

Supported by Northern Arts, Shepherds Scrap Metal, Morley

***Seen and Unseen*** - 12 November 1998 – 8 January 1999

Supported by a wide range of public and private organisations and individuals.

**BG Wildlife Photographer of the Year 1998** - 12 December 1998 – 24 January 1999

Sponsored by: British Gas

**Simon Gregory: *Out of Darkness*** - 26 February – 16 May 1999

***Creatures*** - 15 March – 22 May 1999

**Gillie Cawthorne: *Cloudscape*** - 22 May – 25 July 1999

**The Tony Hillman Collection** - 3 July – 12 September 1999

**Caroline Coode: *Impressions: Ammonites to Himalayas*** - 31 July – 17 October 1999

### Education Activities - Schools

**Living History** The Hancock has had another successful year working in partnership with TTHIA (Time Travellers History in Action). Living History programmes based on the Key Stage 2 study units of ancient Egypt and ancient Greece ran for a total of sixteen weeks attracting over 9,000 children. There has been no discernible drop in attendance to these events following the introduction of the literacy hour into English primary schools.

**Venom** A number of nursery groups and primary classes thoroughly enjoyed snake-handling sessions provided by Joan and Jim Malligan.

**Hands-on Natural History** These activity sessions were available to schools every Tuesday and Thursday throughout the summer term on the following themes: *Tracks and Trails*, *Food Chains*, *Rocks and Fossils* and *Minibeasts*. The sessions attracted over 500 children and are currently being evaluated and developed with the view to creating Hands-On Discovery boxes. The summer programme for schools also included storytelling and craft workshops on an animal theme provided by Red Umbrella Arts.

### Education Activities - Informal Activities

A quiz was launched in late spring as part of a revised Family Fun programme. Staffed activities now take place on the first Sunday in every month and *Little Spotted Owl's Quiz* is available for visitors on every other Sunday with a prize draw at the end of each month.

The programme of drop-in activities for families over the year has supported various temporary exhibitions as well as the permanent galleries, and has included: *Observations* with artist Bridget Kennedy, 5 August 1998; *Feely Bugs*, 12 August; *Moving Minibeasts*, 19 August; *Bug T-shirts, models and mobiles*, 26 August; *Snakes and Spiders*, 24 and 25 October; *Zoo Screen Printing*, 26 and 27 October; *Animal Magic with Mr Windbags*, 28 October; *Birds of Prey*, 29 October; *Geology Gems*, 30 October; *Snake Handling*, January 17, 24 and 31 and Feb 7, 18 and 20 1999; *Cobra the Gladiator*, 15 February 1999; *Snake T-shirts and Printed Pictures*, 16 February; *Frieze Fun*, 19 February; *Egg cups and Easter Bonnets*, 4 March; *Snake Handling*, March 30, April 1, 6, 8, 13 and 15; *Nile Style*, 7 April; *Plains Indians*, 2 May and 1 June; and *Greek Myths and Monsters Frieze*, 6 June 1999.

### Adult Education and Training

A number of Hancock staff were involved in teaching both undergraduate and postgraduate courses in the University; these included a module entitled 'Museology' for third year zoology



students, four sessions on 'Bird Conservation' for first year biologists and a range of core subjects as the Postgraduate Museums Studies Course.

Steve McLean organised a study visit, on behalf of the UK Geological Curators' Group, to numerous museums in The Netherlands, including Naturalis (The National Museum of Natural History in Leiden), The Maastricht Museum of Natural History and Teyler's Museum of Natural History.

### **Collections Management and Research**

***Oceanic Ethnography catalogue*** Perhaps one of the most important achievements of the year has been the publication of a catalogue of the Oceanic Ethnography collections held at the Hancock, jointly funded by NEMS, MGC and the Jerwood Foundation. The catalogue (*No Contemptible Workmanship*), researched and written by Les Jessop and Janet Starkey (Durham University) represents an enormous amount of work by the authors. The catalogue is available for purchase (£12.00) and can also be seen on the Hancock website. The Ethnography collections will also be the subject of a new Designation application to the MGC.

***Backlog cataloguing projects*** The NEMS-funded cataloguing projects came to an end at the end of March. These projects have been a great success with 2600 individual botanical specimens being re-mounted, re-stored and catalogued. 7268 geological specimens (1933 individual records) have been fully computer catalogued and, in many cases, re-stored. This project has considerably improved the quantity and quality of documented specimens within the Hancock collections. However, with an estimated 200,000 specimen backlog there is still a long way to go.

***New NEMS Ethnography project*** NEMS have been successful in their bid to secure funding from the Heritage Lottery's Access Fund (revenue funding) to appoint a peripatetic ethnography curator. This post will be, in part, based at the Hancock Museum. The project promises to be of mutual benefit; the museum will provide accommodation and day-to-day supervision, whilst the curator will be on hand to work on the collections and answer enquiries. The post will also bring a small 'dowry' to cover the purchase of equipment and basic office costs. The project is due to start later this year.

***Ethnography stores*** Through the generous support of a £7,500 grant from NEMS it has been possible to complete the refurbishment of the ethnography stores. This has allowed the improvement of the first-floor store by extension to provide additional accommodation, exclusion of daylight through large sash windows and direct heat from hot-water pipes, and by installation of a mobile racking system and additional shelving. In addition, the ground-floor store has been re-configured and textile storage facilities have been added.

***Spirit collections*** Work has begun on the refurbishment of an existing room within the museum building which will allow the spirit collections, presently housed in an unsuitable external building, to be moved into the main building. Special fire-proof storage is currently being investigated.

***Insurance valuation*** At the request of the University of Newcastle, staff at the Hancock have completed a detailed insurance valuation of the entire collection.

***New database*** The long awaited MODES for Windows (Museum Object Data Entry System) has now been installed at the museum and all relevant staff have completed training in order to operate this new database. The new system allows far greater searching facilities and will clearly be of great benefit to the continued management of the Hancock's extensive collections.

***Continuing curation*** Needless to say, the dedicated volunteer team of Paddy Cottam (Osteology), Roger Stobbart (Bird, Ethnography and Entomology collections) and Ron Cook (Botany) have continued excellent work on ensuring the ongoing improvements of curation of a range of collections. In addition, particular heroics have been performed by Sarah Carr (35mm transparencies) and Trevor Bridges and his team (Mineralogy curation). These have



been the most constant of a huge number of volunteers listed below without whom the museum could certainly not function.

**Other collection projects** Key volunteers have begun work on the reorganisation of the fossil fish and plant collections and a student from Koblenz University has begun detailed research into the history of the mineral collections. Researchers for Aberdeen University completed work on the collections of Middle Devonian fossil fishes and a further researcher from University College London has re-identified the museum's holdings of fossil mammoth and straight-tusked elephant bones and teeth.

**Environmental records** The great majority of effort in this area has been expended on trying to get the botanical database for vice county 66 (Co. Durham and south Tyne and Wear) up to date in time for submission for the Atlas 2000 project. There has been much checking of existing data, the entry of almost another 50,000 records, not to mention fieldwork (strictly evenings and weekends, I am afraid!).

Special thanks are due to all the people who have contributed. Particular mention is due to Nicola McNicholas who spent long hours making sense of the Cleveland records; to John Durkin who entered a large number of the 50,000 new records noted above (in the hours when he was not being paid to work on the herbarium!); and to Gordon Young whose patience and meticulous work helped verify (or otherwise) huge numbers of existing records.

In addition, there have been movements in the 'squirrel' sphere, with a renewed impetus to collect further data for the forthcoming autumn. Finally, running between the NHS and our slightly temperamental computer network, is Gary Stephenson who is entering all of George Bolam's bird records onto the database.

**Touring exhibitions** The Hancock's touring exhibition *Claws!* appeared at The Yorkshire Museum, Peterborough Museum and Art Gallery, and at South Shields Museum and Art Gallery where it was one of the most successful exhibitions ever staged. Despite the fact that the exhibition is six years old and was planned to complete its tour in 1999, it is still attracting interest from other venues.

### Staffing

Helen Fothergill, formerly assistant Keeper of Geology, left us in April this year to take up her new post of Keeper of Natural History at Plymouth City Museum. Helen's contribution over the last five years has been immense and her input into important projects and exhibitions in Sunderland Museum and the Hancock will be greatly missed. We of course wish her every success in her new job in Plymouth. Gavin Lockey, attendant, joins Helen in Plymouth where he is now Visitor Services Manager at Crownhill Fort. Helen's successor is Sylvia Humphrey who is due to start at the museum in August. Other changes to staffing this year included the loss of Nicola Curry (part time clerk/typist) who resigned to move back into further education. She was succeeded by Lesley Nicholson.

### The current staffing complement is

Alec Coles (Senior Curator and Principal Keeper, Natural Sciences)  
Fiona Fenwick (Senior Curator's Assistant)\*  
Steve McLean (Curator and Senior Keeper Natural Sciences)  
Les Jessop (Keeper of Biology) based at Sunderland Museum  
Assistant Keeper Geology: currently vacant based at Sunderland Museum  
Eric Morton (Assistant Keeper, Biology)  
Kirsty Ramshaw (Biology Assistant)\*

Gillian Mason (Education Officer)  
Lesley Nicholson (Clerk/Typist)\*  
John Pratt (Chief Attendant)  
John Connell (Senior Attendant)  
Sean Dykes (Attendant)  
Anne Aspery (Attendant)\*  
Kath Fenwick (Attendant)\*  
Ingrid Solberg (Attendant)

(\*indicates part-time)

**Table 1**

**Grants and Support** The Hancock Museum has once again benefited considerably from the generous award of several grants from NEMS.

Purpose	Source	Value (£)
<b>Access grants</b>		
Visual fire alarm signalling system	Railtrack/Adapt	2,200
	NEMS	1,862
<b>Collections Management grants</b>		
Botany & Geology documentation	NEMS	7,000
	Univ. Conservation Fund	1,100
Ethnography Storage	NEMS	7,500
Environmental Control System	NEMS	300
Storage	NEMS	395
<b>Exhibition grants</b>		
Dinosaurs Alive!	NEMS	1,000
Monster Creepy Crawlies	NEMS	1,000
Zoo	The Crafts Council	In kind
	North West Arts	In kind
<b>Support in kind</b>		
BGC Wildlife Photographer of the Year	British Gas	
Dinosaurs Alive!	Atlas Copco Compressors	
	NEXUS	
Venom	NEXUS	
<b>Sponsorship</b>		
Monster Creepy Crawlies	Magic 1152AM	
	Sponsors Club	
Insects, Shells & Other Fragments	Shepherds Scrap Metal	
	Morley	
<b>Northern Arts, Artist's Payment Right</b>		
Simon Terry	Recent Work	150
Bridget Kennedy	Observations	150
Andy McDermott	Insects, Shells & Other Fragments	150



## Volunteers

The Hancock has continued to benefit from the exceptional work undertaken by a considerable number of volunteers who have given up their own time to contribute to the work of the museum, both on the collections and through educational initiatives. They have included the following:

Janet Angel	Transcription of Temperley diaries	Joan and Jim Malligan	Snake educational events/animal care
Trevor Bridges	Mineralogy curation	Mariella Marzano	Ethnography research and curation
Peter Burke	Education support	George March	Geology documentation
Katherine Calder	Art collections	Melissa Murphy	Education support
S Carr	35mm transparencies	Alan Pringle	Mineralogy curation
Amelia Campbell	Biology cataloguing	Louise Sherrington	Education/Photographic collections
Helen Cheetham	Environmental recording	Roger Stobbart	Entomology curation
Ron Cook	Botany/oology curation	Anna Theilen	Mineralogy curation
Paddy Cottam	Osteology curation	Alex Urquhart	Education support
John Durkin	Biological recording	June Waites	Education support
Michael Frankis	Northumberland bird records	Matthew Wassermann	General documentation
Jess Fermie	Palaeontology curation	L Welbourne	Education
Darren Hudson	Internet publishing	Helen Wilkinson	Mineralogy curation
E Lance	Education	Malcolm Woodward	Mineralogy curation
Nicola McNicholas	Environmental recording	P Woolner	Education
		Gordon Young	Environmental

## LIBRARY

This year ninety-seven books, two offprints and three members' dissertations (one of which was based on a Gosforth Park study) were added to the library. Forty-eight of the books were donated and we must thank Peter Davis, David Gardner-Medwin, Trevor Hardy, June Holmes, Les Jessop, Miss H M Oliver, Eddie Slack and others for their donations. A special thanks is due to James Alder for a copy of his prestigious book *The Birds and Flowers of Balmoral* which he presented to the Society at the Council meeting on 15 January. Books purchased included the latest volumes of *The Handbook of Marine Mammals*, *The Birds of Australia* and *The Birds of India*, the Geological Survey Memoir of *The District around Newcastle, Gateshead & Consett*, the latest Poyser books, the Collins New Naturalist *Ireland* and some very good new bird books. More than 380 items of serial publications (Journals, Transactions etc.) were received from more than sixty sources by exchange, subscription and donation.

The Library Evening was held on 29 January when Dr Anne Wilson gave an excellent talk about Russell Goddard, Museum Curator from 1923-1948; she supplemented the talk by an exhibition in the library covering various aspects of his life and work.

The library has been open every Wednesday during the year for use by members, researchers and students.

The direction of library affairs is controlled by the library committee which meets four times a year; the members are Hugh Chambers (chairman), Paddy Cottam (mammals), Peter Davis (marine biology), David Gardner-Medwin (history of natural history), June Holmes (archives), David Noble-Rollin (ornithology), Joyce Parvin (secretary), Alick Walker (geology) and Trevor Walker (botany). The library continued to be serviced by the office staff. Tricia Hammock generally dealt with the exchange arrangements with other organisations around the world and Helen Dalrymple arranged the binding of journals and periodicals and



recorded incoming periodicals. This year twenty-two volumes were bound to become a permanent part of our collection.

A number of volunteers gave reliable assistance during the year. Stella Chambers kept the filing system in order, Alick Walker did essential work in organising the Palaeontographical Society Monographs for binding and Trevor Hardy worked steadily on his winter task of reviewing the ten thousand geological off-prints entrusted to our care by Newcastle University. The Society thanks them all for their efforts.

## ARCHIVES

The early and recent history of the Society and of natural history in the North-East are well represented in our archives but we depend heavily on our members and other donors to add to this invaluable record. The collection is of such importance that we are giving it a section of its own in the annual report this year *pour encourager les autres*. For a decade it has been catalogued and indeed cherished, on a voluntary basis, by Mrs June Holmes and a team of archival workers digging into the past under her direction. We owe special thanks to her, to them and to the generous donors of the acquisitions mentioned below.

In 1997, Charles G Gent presented a precious collection of his nature diaries and notes of 1928-1996 including important records for Gosforth Park. Several important collections have been added to the archives this year. After failing last year in our bid at Sothebys to buy a large collection of manuscripts, photographs, drawings and papers from the estate of Abel Chapman, we were able to rescue at little cost, from the dealer who outbid us, a collection of manuscript letters and the inventory for probate of Chapman's possessions, including the full list of his shooting trophies bequeathed to the Society (many of them displayed in 'Abel's Ark'). Some other estate papers of no natural history interest we passed on to the Northumberland Archives. Another acquisition was a splendid collection of the ornithological notes and cuttings of articles in the *South Shields Gazette* by Frederick G Grey (1911-1997), kindly presented by his daughter Mrs A McClelland. Fred Grey was an active member of the Society, whose photograph many members will have seen in Grace Hickling's sesquicentennial history of the Society (1980), and for many years he edited our Ornithological Reports. From the estate of Mr Alan Blackett we acquired an interesting scrapbook of letters to him from George Temperley. A much earlier document was kindly presented by Mr A Sinton last autumn: a remarkable manuscript of about 1881 signed by the Mayor and a long list of notable citizens of Newcastle petitioning Isabella and Jane Bewick to present their collection of the works of their father, Thomas Bewick, to the 'New Museum' (now the Hancock) so that it should remain in Newcastle.

## FINANCE

The surplus for the year is £865 (1998 - £689). The main variations in income and expenditure, when compared with the previous year, are as follows:

Increase in salary expenditure	1040	
Printing and stationery	681	
General expenses	687	
Lecture and field expenses	861	
Transactions	1393	
Net increase on other headings	499	
Net reductions over income headings	<u>358</u>	5519
Less: Reduction in postage & telephones	(905)	
Library expenses	(1390)	
Appropriations	<u>(3400)</u>	(5695)
Overall increase in surplus (£865 - £689)		(£176)

The surplus for the year of £865 includes a transfer from Gosforth Park Nature Reserve Restoration Fund of £600 representing conservation expenditure incurred.

The charge for library expenses was reduced by £1250, representing earlier provisions for updating and binding no longer relevant. However, additional binding costs will be included in the 1999/2000 budget.

A provision of £3600 has been included in *Transactions* to cover the cost of producing Volume 59, part 3, which will be published in September 1999.

During the year, the investment portfolio has continued to be managed in consultation with Brewin Dolphin Securities Ltd (formerly Wise Speke). The following gains and losses were realised:

**Gains:**

T B Short Memorial Fund	1405
Grace Hickling Memorial Fund	6673
	8078

**Losses:**

General Fund	2605	
Net realised gain		£5473

The investment portfolio is shown at market value in the Balance Sheet, which, at 31 July 1999 was £640,036 compared with a cost of £376,534. The difference of £263,502 represents unrealised gains and is shown in the Balance Sheet under 'Investment Revaluation Reserve'.

Following the resignation of the Honorary Treasurer Richard Slack, Neville Furness was appointed in May 1999 to succeed him, subject to the confirmation of the appointment at the 1999 Annual Meeting.

## INDEPENDENT REVIEW

The financial statements to 31 July 1999, independently reviewed by Mr R Bunter of PricewaterhouseCoopers, were approved by Council on 15 October 1999. Council gave its approval for an independent review at its meeting on 16 July 1999.

## CONSERVATION

This year the Society embarked upon a new venture to give its members the opportunity to become actively involved in regional conservation issues, with a particular emphasis on wildlife survey work and collation of data. This initiative was launched to improve the information currently available regarding the nature conservation interest of the North East for the benefit of future nature conservation work in the region.

One initiative is the development of a computer database with a mapping facility so that all existing and future biological recording information can be collated in one place. Our aim is that it should be possible for members and professional conservationists requiring specific information about a site or locality to access this information and use it to support the conservation of the region's natural history interest.

Another initiative is the active involvement of Society members in practical survey work. This year fourteen members volunteered to undertake survey work within the Northumbria region and we would like to say a very warm thank you to them. Meanwhile, a number of local councils, wildlife trusts and other conservation agencies provided the Society's office with priority lists for survey work and outlined those sites most urgently requiring wildlife information. In spite of a delay, it was still possible for some surveys to begin this season. These ranged from woodland bird surveys in County Durham to general wildlife recording in urban areas of Tyneside.

We are keen to increase the number and scope of these wildlife surveys in the year 2000 and the Society would be very interested to hear from those members who would like to become



involved. In addition to wildlife surveys for particular groups of animals and plants, we are also hoping to undertake general habitat surveys and geological surveys where required, organised by Anne Westerberg.

Apart from the above initiatives the Society is represented on a range of committees that are attempting to deal with conservation issues in the region. Most of the groups are concerned with the creation of Biodiversity Action Plans (BAPs) and Species Action Plans (SAPs) which we hope will be used to direct our conservation energies in the future. The Committees cover Northumberland, the Coast from North Berwick to Amble, Newcastle upon Tyne and the Tyne and Wear Biodiversity Liaison Group. Added to these are sub-groups that deal with specific areas such as Tyne and Wear Biodiversity Liaison Group, Newcastle Airport sub-group and Local Agenda 21 Natural Environment Working Group Wildlife sub-group. The Society is also involved in the Gosforth to Cramlington Corridor Action Plan which has been recently published for public consultation and comment.

## ACTIVITIES

**Visit to Blagdon** The Society was invited to Blagdon by our President, Viscount Ridley, on 23 May. The invitation was enthusiastically taken up; approximately ninety people booked for the afternoon visit. Lord and Lady Ridley took members around the gardens and Matt Ridley led a more strenuous trip to some distant parts of the estate to see the breeding buzzards and the wildlife habitats that have been incorporated into the farming strategy of the estate. The meeting ended with an excellent tea in the Clock Tower. Both Council and members would like to thank the Ridley family for their hospitality and cordial welcome to their home.

**Ornithology section** The first field meeting, a pelagic cruise, was to have been a joint venture with the North Northumberland Bird Club. Unfortunately, due to bad weather, this had to be cancelled. The next field meeting suffered a similar fate on 19 September, as there were insufficient numbers to take a coach to Fairburn Ings and Blacktoft Sands. The following meeting, on 24 October, was the section's annual trip to Holy Island. The lack of numbers again meant that a bus was not possible; however, the secretary decided to run the trip based on cars. This proved to be a great error as it rained continually for most of the outing. There were very few migrants on the island and shortly after lunch it was agreed unanimously that a very wet and sorry crowd should head for home.

In January the Aberlady trip was again taken in cars as numbers were too small to hire a bus. That day the weather proved to be very good in the morning with excellent sightings of velvet scoters, long-tailed ducks and a number of species of grebe at Musselburgh. We then went to Aberlady and did the usual walk from Aberlady to Gullane. Everybody agreed that it was a reasonable venue to visit by car and we intend to do this again next year. Unfortunately, the south-west Scotland trip could not be run easily by car and had to be cancelled.

Because of the problems and apparent inability to get twenty-five plus members to go on the field meetings, the secretary decided to use car rather than bus travel for the summer programme. The first meeting was held on 8 May and was a spring migration trip to Holy Island. As the group assembled in the car park the rain started to pour and there were not very subtle murmurings mentioning the previous autumn's trip. However, after lunch the rain stopped and we made our way towards the sand dunes along the Straight Lonnen. There we found lesser and common whitethroats and other small migrants were evident on the island. We met three other bird watchers returning very wet from the sand dunes, who reported a male golden oriole which had flown towards the Crooked Lonnen. After going round the island we returned via the Crooked Lonnen and set up temporary camp outside the woodland that was most likely to hold this rare visitor. We had one sighting of the bird lasting approximately ten seconds; however, our patience was rewarded by an excellent view of a night heron which was disturbed by some carrion crows. This made a pretty exciting migration trip to the island. On 16 May the Society had an early morning walk in Gosforth Park Nature Reserve. Everybody seemed to enjoy a rather beautiful morning listening to the bird song and finding out about the Society's Constant Effort ringing in the reserve. On 26 June members went to the Harthope Valley to look for ring ouzels and other hill birds. The most exciting view was of a young



cuckoo being fed by its meadow pipit foster parents. The bird had fledged and they had to perch on its head in order to feed it. We also saw most of the other species that one would expect, except that the pied flycatchers and green woodpeckers were not in evidence. The final meeting of the year was to try to see and hear nightjars in Hamsterley Forest. Because of the numbers, two trips were organised. On the first trip we heard two nightjars churring and on the second members were delighted to see a nightjar flying over. We also had excellent views of roding woodcock and, midges apart, the trips were extremely enjoyable.

The winter programme began on 2 October with a lecture by Dr D Latham on 'The ecology and conservation of amphibians in Britain'. Although obviously not an ornithological topic the meeting was hosted by the section and was well attended by members. On 6 November Dr Nick Rossiter talked on 'Historical trends in birds of prey in Northumberland'. This proved to be a most interesting and entertaining discussion of 17th-19th century life in Northumberland and the effects this had on the local populations of birds of prey. He gave us a great insight into life, particularly in the Tyne Valley, during this period and made what could have been a rather academic subject accessible and interesting to the audience. On 4 December the Reverend D A Quine talked on 'George Clayton Atkinson', one of the Society's very active members during the last century. He spoke about his natural history activities and particularly his journey to the Outer Hebrides and St Kilda, reading from his diaries and describing his meetings with various important naturalists.

On January 8 Professor Colin Bradshaw spoke of 'Whales, waders and Wilson's petrels' (and he might have added fall warblers) in a riveting and beautifully illustrated account of a (somewhat biased) family holiday in the Bay of Fundy. Then on 5 February Dr Juliet Vickery of the British Trust for Ornithology gave a clear and very well researched lecture on 'The rise and fall of the skylark', making a strong but well balanced case for the changes in agricultural policy and practice that will be needed to reverse the recent fall in the skylark population in Britain. On 26 February David Noble-Rollin talked on his recent trip entitled 'Bird watching and ringing in Gambia'. This covered a two week trip to an island off the coast of Gambia where he ringed the palearctic migrants that pass through or winter in this area. He described the wonderful range of species that they caught and also talked about the species one could see while bird watching in Gambia. On 5 March Dr Chris Spray talked on 'Wetlands, water birds and the water industry'. This was a very thought provoking talk on work being done by Northumbrian Water to help conserve the habitats and species in the north-east of England. He discussed the European requirement to have cleaner water round the coast and the research that is being undertaken by Durham University to assess the effect this cleaner environment will have on bird populations and the coastal ecosystem.

**Mammal section** The Northumbria Mammal Group has organised two joint meetings with the Society. On 23 October Mr Bernie McConnel from the Sea Mammal Research Unit gave an interesting talk 'Seals, satellites and sand eels'. He described how satellite telemetry was being used to investigate the foraging patterns of seals and to determine the extent of waters that they are using around the Farne Islands. In January the Mammal Group invited Dr Peter Evans to talk on 'The cetaceans of the north-east of England' This proved to be a very popular talk and filled the lecture theatre. He discussed the species likely to be seen in the north-east and talked about the important work of the Sea Watch Foundation.

The field meetings of the section began with several evenings set aside for badger watching, beginning on 5 May; these were led by Bob Wilkin and Paul Drummond and altogether seventeen members attended. The spacious, newly-built platform came into its own by giving members a much more comfortable evening with plenty of room to stretch their limbs. Thanks must go to the individuals who provided the money and work-time for its construction. Most evenings allowed time for a small amount of fieldwork off site, viewing badger paths, dung pits and badger prints. Members were rewarded with good views of badgers and on occasions, foxes and roe deer were also seen.

On 5 June Bob Wilkin led an otter outing. Five sites on the River Wansbeck system were visited and all proved positive with otter spraint present. The last and most interesting site was

on the upper Wansbeck where a sandbank was covered with otter padding and several 'sandcastles' where an otter or otters had pushed up mounds of sand before topping them with spraint. We are indebted to Mr Michael Cookson and other landowners who have given us access to the waterside. Two of our members, Richard and Sue Cansdale, provided accommodation for lunch and a 'comfort stop'.

**Geology section** At the end of this financial year Mr Ken C Patterson decided to step down as Secretary of the Geological section. This work involved arranging the speakers for the winter programme and organizing the field meetings. He also gave talks and led meetings and prepared the material for the annual report. His increased commitment to the Centre for Lifelong Learning made it impossible for him to continue with his Society work. Council would like to express their thanks for the years of effort he has put into the geology section and for helping to maintain the high standard of the programme.

The section's summer meeting in September was to the coast around Dunbar and was led by Ken Patterson. It began with a close look at the volcanic features on the shore to the west of Dunbar and the group of fifteen was able to examine over a dozen volcanic necks, many dykes of Carboniferous age and realise the complex igneous activity which had existed over a long period of time. The members then moved to the east side of Dunbar to see the sedimentary sequence in the Limestones of the Barns Ness area. The quarry company has helped in the preservation and development of the geological nature trail which is well laid out. The group was impressed by the Scottish Lower Carboniferous fossil fauna.

In October there was a double event when Mr David Mills, late of the Geological Survey, gave the first lecture of the winter series on 'The new Newcastle sheet Geological Memoir', to which he was the chief contributor, followed the next day by a visit to see some of its significant features in the field, mostly south of the River Tyne. The lecture was impressive; the speaker used the overhead projector and colour slides and explained the history of previous work and new techniques used to assist in bringing the map and memoir to eventual publication. In the field David was a good leader, choosing interesting sites mostly close to or in the Derwent Valley. We were all surprised to find that this valley boasted an impressive post-glacial gorge of vast proportions but sadly mostly hidden by recent forest development. Thirty-four turned up for the lecture and fifteen in the field on the next day.

The November lecture was given by Dr Henry Emeleus of Durham University on the 'Igneous geology of south-west Greenland'. Dr Emeleus is widely known for his work in the Tertiary geology of the Inner Hebrides; however, in his earlier days he had been involved with the mapping of the south-west Greenland granites and other intrusions. His slides were good and he gave a lively and interesting lecture about this rather remote area. The forty-five members were keen to ask questions at the end.

In December Dr Mick Money was invited to lecture to us on 'Landslips and landslides'. He explained how scientists had discovered the principles that control movement of steep slopes and how this can be remedied. He also explained what happens when inappropriate action is taken. The lecture was well illustrated and attended by forty-four members.

The January 1999 lecture 'Falkland Islands geology' was given by Dr Ken Thomson. He explained the seismic evidence from the Falklands Shelf and interpreted it in a unique way. He convinced many present that this slice of plate is part of Natal in South Africa but is now attached to South America. It certainly makes one think differently about political claims for possession of the 'Malvinas'. The lecture was skilfully given with good supporting evidence for the hope for future oil and gas production. During question time some concern was expressed for the safety of the wildlife in this area close to Antarctica.

The geology section hosted the Pybus lecture in February which was given by Professor Sir Arnold Wolfendale, the former Astronomer Royal. Sir Arnold is an accomplished lecturer and his talk on 'The search for extra-terrestrial life' was both highly entertaining and informative. He gave a potted history of the early work and then spent some time on the modern techniques being undertaken. He did promise successfully not to baffle the audience with vast numbers.



However, his conclusion was somewhat sceptical about an early discovery. He also said that the spread of signals from this planet would take nearly immeasurable time to reach out to prospective listeners and by the time they reacted and replied, earth may well have become an astronomical memory. Over ninety members attended and they were very keen to ask questions.

The final winter lecture in March was given by Dr Andy Apline who gave a lecture on the snail trail clues to the finding of petroleum in rocks. He is very involved with studies of the movement of oil and gas through the crust. He was able to convince members that oil does leave faint chemical traces in rocks that can be found by careful analysis. Though he was quite technical, Andy allowed the lay person to understand the processes involved.

The first of the summer field trips, led by Dr Paul Younger in May, was to visit sites of mine water pollution and to view some of the remedial work that had taken place. The sites were well chosen and members were able, with some horror, to see the mine waters emerging at the surface and heard with dismay likely problems the future has in store for us. The remediation sites were a glimpse into what can be achieved.

In June, a member of the Society, Professor Maurice Tucker of Durham University, took the group to Howick to revisit the amphibian footprint site and they were fortunate in having a fine day and an excellent explanation of the sedimentary structures and palaeontology of the Yoredale sequence on this important heritage coastline. Twelve members attended this visit.

At the end of the season, on 24 July, Dr Mick Jones led a field trip to Blagill Burn in the Nenthead area, beginning at Carrshield and finishing at Greenfields Quarry near Allenheads. His prime concern was to investigate the Great Limestone which is the base of the Namurian in Northern England. This does suggest that the beginning of the deposition of the Great Limestone was a major environmental and sedimentary event and that the coral band near the base, containing compound and tabulate corals, though common was not invariable. The day began fine though punctuated later by some rain, and the group of eighteen survived without mishap the assault course up the overgrown and slippery Blagill Burn.

**Botany section** Members will be delighted that Professor George Swan, author of the *Flora of Northumberland*, a member of the Society since 1937 and leader of many botany field meetings, has been elected an honorary member of the Botanical Society of the British Isles. He thus joins a very select group of botanists indeed.

The four winter lectures were delivered by exceptionally distinguished experts in their fields. In October, Dr John Richards of the University of Newcastle spoke on 'The natural history of *Primula*', a large genus centred on the Sinohimalaya, on which he has written the standard monograph. Then in November Professor Jim Dickson, Professor of Archaeobotany and Plant Systematics in the University of Glasgow, lectured on the 'Life and death of the Tyrolean Iceman: clues from plants'. Professor Dickson was part of the team which studied the 5,000 year old frozen body, and he showed how, using plant remains associated with the Iceman, something of his way of life, circumstances of death, and provenance could be deduced. In February Professor Diane Edwards, Distinguished Research Professor in the Department of Earth Sciences of Cardiff University, spoke on 'The greening of planet earth'. She traced the history of plant life on land during the Palaeozoic and showed how the advent of plants on land should no longer be considered in isolation, since they had a key role in weathering processes and the control of climate, and hence in the development of the earliest terrestrial ecosystems and land animals. Finally in March, Dr Roger Smith, also of the University of Newcastle, discussed 'Plant coexistence in Pennine hay meadows' – how so many species are able to live together in the same patch of ground and the relationship of this to the biology of the individual species and traditional management systems.

The summer field meeting programme began on a very wet June Saturday when Mr Alec Coles, who is helping to resurvey the Durham flora, led us in Castle Eden Dene. Through the rain we were able to admire a wide range of dene species, including specialist limestone ones. In early July Mrs Dorothy Hardy, assisted by her husband Trevor and by Dr Angus Lunn, led us

on a glorious day in Upper Coquetdale. Apart from looking at basiphilous crag and meadow species along the main Coquet valley, we walked almost to the head of the Blind Burn valley – as far as the illicit whisky still. Particularly spectacular were the sheets of stream water-crowfoot *Ranunculus penicillatus* in the burn, and the hairy stonecrop *Sedum villosum* in several flushes. On a July Wednesday evening Dr Veronica Howard provided identification training at Druridge Bay dunes where a diverse assemblage of species was encountered under modestly damp conditions. Finally, on another glorious day in July, Dr Lunn led us on our customary more distant expedition, to the limestone pavements of Hutton Roof Crag, near Morecambe Bay in southern Cumbria. Apart from the pavement species, which included rigid buckler-fern *Dryopteris submontana*, limestone polypody *Gymnocarpium robertianum*, angular Solomon's-seal *Polygonatum odoratum*, ploughman's spikenard *Inula conyza* and dark-red helleborine *Epipactis atrorubens*, we also saw numerous limestone woodland and grassland species, and discussed the conservation management requirements of the internationally-important limestone pavement habitat.

**Lichen section** The year started with a late summer field trip on 20 September, when Janet Simkin took about eighteen members and guests up the Bizzle Valley on the north side of Cheviot. The temptation to look for rare vascular plants was firmly resisted, and instead we found sixty-two species of lichen on the scree and lower crags, including *Cornicularia normoerica* and *Umbilicaria cylindrica* which were new to most of those present. Unfortunately time did not allow us to reach the higher crags where some of the rarer lichens are to be found.

On 30 October we were delighted to welcome Dr Oliver Gilbert back to the Society to speak on 'Lichens of freshwater habitats'. In a fascinating talk he introduced us to a whole new world of lichens on the edges of lochs, in rivers and streams, and even in chalk springs. Examples from Northumberland included the nationally rare river jelly lichen *Collema dichotomum* which had already been found on submerged river boulders in the Tyne, Tweed and Coquet and is likely to be more widespread in the county. Much of the work described had only recently been published.

On the following day Dr Gilbert led a field meeting at Briarwood Banks. Fifteen members explored some of the less well known parts of the Northumberland Wildlife Trust reserve and beyond as we moved up the valley in search of mature trees. Several were found with elements of the ancient woodland lichen flora, including *Arthonia vinosa*, *Catillarea atropurpurea*, *Thelotrema lepadinum* and *Peltigera horizontalis*. Sadly we did not find any lungwort, *Lobaria pulmonaria*, and this is now assumed to have been lost from the wood since it was last seen in 1980.

On 26 March Dr Alan Fryday lectured on the lichens of the highlands of Scotland, introducing us to some of the more unusual species to be found at high altitude, and giving a fascinating insight into their ecology. His description of the difficulties of working on the snowbeds of the Cairngorms was particularly memorable.

The next day Dr Fryday led a field meeting at Shaftoe Crag near Bolam. These sandstone outcrops bear a remarkably rich lichen flora, considering their proximity to the industry of Tyneside, and we found sixty-five species on the crags and nearby walls during the day. Highlights included rock tripe *Lasallia pustulata*, at its only known site in Northumberland, as well as *Ochrolechia frigida* and some spectacular colonies of *Sphaerophorus globosus*.

**Teas before indoor meetings** At the Annual Meeting in November it was agreed that we should enliven the social activities of the Society to encourage new members to become involved and to provide time for informal discussion. As a first step, after Christmas, coffee and tea were made available before each lecture. This proved successful and the donations of members present made it self-supporting. Because of this success it will be continued into the next winter season.



## GOSFORTH PARK NATURE RESERVE

Gosforth Park Nature Reserve is a very valuable site under pressure from a number of factors with its position on the edge of a continually expanding urban environment. The year can fairly be called one of consolidation, with some exciting prospects for the future. The good relations we have developed with St Modwen Developments Limited, the owners of the racecourse and the reserve, have continued. A meeting was held in the spring between Society representatives and Mr Bill Midgley of St Modwens to discuss matters of mutual interest such as security and fencing and to put the case for a longer lease for the Society. This request was received sympathetically; we are awaiting a response.

In the autumn of 1998, the Environment Agency very kindly agreed to excavate a new strip of shallow open water on the north side of the lake. This will become colonised by *Phragmites* within the reserve. The work had hardly been completed when we were told by English Nature that a grant might be available for further work on the lake. This has now been confirmed and tenders are currently being priced by contractors with a view to creating a further 3000m<sup>2</sup> or more of open water. Whilst doing this work it is hoped to create some vertical banks to attract nesting sand martins and possibly kingfisher (this latter species has been seen very regularly during the year).

A survey of fish, carried out by the Environment Agency in the autumn, showed only roach and stickleback to be present in the lake. The roach appeared to lie within only two age bands, mainly three years old (about 13cm long) with a few nine or ten year old specimens (about 26cm long). In an attempt to provide a more natural spread within the population about 200 smaller fish were added to the water in March.

Work parties took place throughout the year at varying frequencies, involving removal of willow from the heathland area adjacent to the racecourse and rhododendron clearance amongst a variety of other tasks. Not least of these was the installation of a new 'tern table' in the lake to replace the old, partially subsided platform. This was an extremely difficult and at times dangerous task that was well rewarded when a pair of common terns successfully fledged two chicks in July. This is the second successive year that this species has bred in the reserve.

As some members will already know, we have a new badger-watching platform on the island. This is as a result of the generosity of Mr and Mrs David Davison, who not only bought the timber but designed and built the platform which was erected in the reserve with the help of warden Paul Drummond.

Trespass and vandalism have been kept under control generally throughout the year, although some of the hides were broken into one night in September. The damage – mainly to the doors – has been repaired. A new feeding station hide to replace the one burned down last year is planned for completion by the end of September 1999.

Although we have had no really rare birds in the reserve, we did have two marsh harriers this spring, and pochard, great crested and little grebe all raised young. Water rail also bred and Chris Redfern ringed a young one.

During the year the Management Committee was strengthened by the election of Mr Steve Davison, a man with unusually wide interests and expertise in natural history, as well as a great affinity with Gosforth Park. We wish him a happy association with the committee; his contribution is already greatly appreciated.

It remains to thank all those who have contributed to the success of the reserve during the year, the Management Committee (who perhaps got their reward when they saw a family of badgers in early evening during their annual site meeting!), the working party members, voluntary wardens and other helpers and, last but by no means least, warden Paul Drummond, his wife Mary and their family.

## RINGING GROUP

Council would like to congratulate Dr Chris Redfern on becoming Chairman of the British Trust for Ornithology's Ringing Committee. He was elected to this post at the BTO annual conference held in December 1998.

During the year, the Society's Ringing Group pursued four main projects: the continuation of Constant Effort ringing at Gosforth Park; a ringing study at Wideopen aimed at gathering data on the numbers and movement of birds using a potential wildlife corridor into Gosforth Park; seabird studies on Coquet Island and the Farne Islands and autumn migration ringing at Newton Pool. The ability of the Society to carry out these activities is due to the excellent support it receives from the Ringing Group members who contribute their time, effort and transport costs, and also from organisations such as Northumbrian Water who have provided the boat and Land Rover for seabird studies, and the landowners who allow access to their land. The group has nine active members and we continue to attract others to the team. Since a significant proportion of conservation data for birds is derived from ringing studies, the Society is making an important contribution to conservation through ringing and providing resources to facilitate the much-needed training of new ringers. Furthermore, many academic ornithological studies require staff trained in how to ring and handle birds and the Society can make a valuable contribution to academic ornithology in the UK by providing training to Newcastle University graduates before they start PhD studies.

The main element of the Group's ringing activities is the Constant Effort ringing site at Gosforth Park. The ringing total for this year was 538, an increase over last year's total of 467 but still less than in 1997. Reed and sedge warblers are species of particular interest for the reserve and the totals for new birds ringed during the period 1 August 1998 to 31 July 1999 were thirty-five and eighty-one, respectively. The reed warbler total, up by 50% from the previous year, indicates that this species remains at strength. Since the *Phragmites* reedbeds have continued to improve in extent, with the maintenance of high water levels in the reserve in spring and the desilting work, we hope that the reed warbler population will remain steady or even increase in the future. Sedge warblers are also up from the low of fifty-seven the previous year and it will be interesting to see whether the reduction in successional scrub as the reed beds increase in extent is accompanied by a reduction in sedge warbler numbers in the long term. Although reed beds are an important breeding habitat for reed warblers, we need to bear in mind that adjacent scrub is also important as a feeding habitat and it will be important not to neglect the management of willow carr and attempt to achieve a mosaic habitat with areas of *Phragmites* interspersed with stands of young willows. Of the other birds ringed in the reserve, the most abundant species was the willow warbler with 138 ringed. Other species of interest were nine house martins and two kingfishers. The tern platform installed in early spring proved a success. Three common tern chicks were ringed and at least two apparently fledged successfully.

One of the exciting aspects of ringing is the possibility of recapturing (controlling) a bird ringed elsewhere, or hearing the news that one of our birds has been controlled or recovered some distance away. At Gosforth Park this year, we have controlled five birds in the reserve (all of them *Acrocephalus* species!). One of these was a sedge warbler wearing a ring from the Belgian Ringing Scheme. We are awaiting details of this bird, and of a reed warbler and a sedge warbler carrying BTO rings. Another reed warbler and a sedge warbler controlled in the reserve had been ringed at Big Waters, 4.5 km away. This is further evidence for the interchange of birds between wetland sites in the North East. We have recently received details of a long-distance recovery of a Gosforth Park bird: a blackcap, ringed as a juvenile at Gosforth Park on 29 August 1998, was recovered 107 days later on 14 December, at Douar El Kocca, Morocco, a distance of 2234 km due south.

Gosforth Park is an important wildlife habitat, but its proximity to Newcastle means that it is under constant threat from developments which could, if allowed to proceed unchecked and without proper planning, effectively isolate the Park from the surrounding countryside. This could have disastrous consequences for the numbers and diversity of wildlife. A proposed



wildlife corridor from Cramlington to Gosforth Park could ameliorate the effects of industrial and residential development, but we have very little information on the extent to which this may be used by wildlife. To obtain data on the numbers and movement of birds using the corridor, the Group started ringing birds at a site within the corridor in July last year. To date, 460 birds have been ringed; the retrapping of a willow warbler and a long-tailed tit from the Gosforth Park Constant Effort Site shows that movement of birds from Gosforth Park along the corridor does occur, but one interesting result so far is the number and variety of thrushes (66 blackbirds, 41 song thrushes, 33 robins), warblers (19 blackcaps, 36 willow warblers, 10 chiffchaffs, 5 sedge warblers, 2 garden warblers, 3 lesser whitethroats, 9 whitethroats) and finches (28 greenfinches, 11 chaffinches, 11 linnets, 19 bullfinches) that have been ringed there. The numbers of song thrushes caught there reached a peak in early October and this suggests that the area is important for this species on migration.

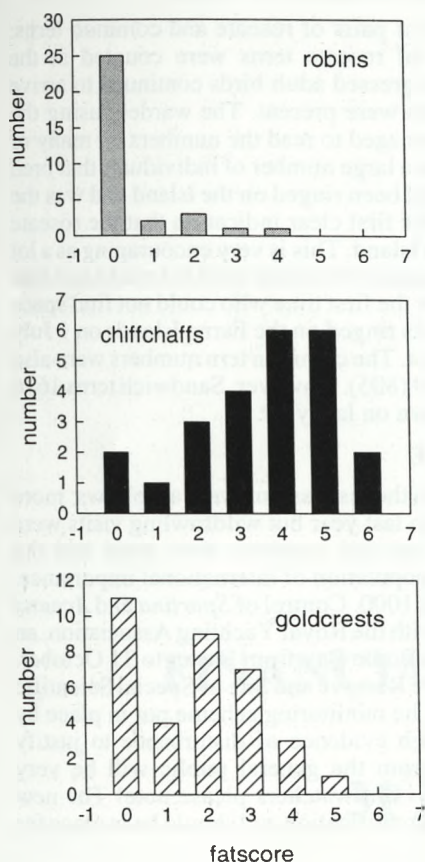
The seabird projects had mixed success this year. The theft of one of the boat engines before the season started was a blow, but Northumbrian Water came to the rescue and provided a replacement as the season got under way. The final ringing totals (with the total for last year in brackets) were eider 61 (34), shag 116 (105), kittiwake 290 (153), Sandwich tern 370 (1025), common tern 265 (80), arctic tern 444 (656), roseate tern (Inner Farne) 2 (1), fulmar 24 (14) and black-headed gull 170 (145). The totals for kittiwakes, shags and black-headed gulls remained similar to last year. We put more effort into eiders on Inner Farne and almost doubled the number of adult females ringed; in addition thirty-three eiders were retrapped and these data will be submitted to the BTO as part of a new RAS (Retrapping Adults for Survival) project which will be continued on a yearly basis with the agreement of the Farne Islands Local Management Committee. The number of Sandwich terns ringed was considerably lower than in previous years; this was due to a number of factors: the main colony on Inner Farne did not do well and no chicks were ringed. A small number of chicks were ringed at a secondary colony on Inner Farne and on Brownsman. Although the Brownsman and Coquet Island colonies did quite well, we were unable to ring many chicks due to the weather and time available. This year was particularly interesting for the marked difference in arctic tern success between Coquet Island and the Farne Islands. On Coquet, 212 arctic tern chicks were ringed in the south garden as part of our continuing study to develop indices for long term monitoring of growth variation. Thanks to the efforts of Kathy Fletcher from Durham University, practically all of these chicks were of known age and hatching status (i.e. first or second-hatched chicks), and many were retrapped at an appropriate age for measurement. Conversely, of the 143 chicks ringed on Inner Farne and Brownsman, only a few were eventually retrapped and the majority died or disappeared. The number of arctic terns ringed on the Farnes was also lower than previous years because many chicks died soon after hatching. This seemed to have been due to a problem with food supply and the wardens reported that few adults were bringing in food and were resorting to kleptoparasitism. In contrast, food supplies (mainly sand-eels) seemed to be relatively plentiful around Coquet (twenty miles to the south of the Farnes). The failure of arctic tern breeding on the Farnes meant that we could not obtain sufficient data for mortality estimates by mark-recapture (mortality was so high that there was no sample left).

The Ringing Group carried out its annual autumn migration ringing programme at Newton Pool from the beginning of September to the end of October as in previous years. The total number of birds ringed, 225, was slightly down on the total for last year of 256. Goldcrests (35), robins (32), goldfinches (24), chiffchaffs (22), wrens (18) and dunnocks (17) were the most numerous species. Leaving aside the goldfinches (attracted to the nets by using a tape-recording of goldfinch calls), goldcrests, robins and chiffchaffs were up substantially on last year's totals of fourteen, eighteen and seven, respectively, and were most likely to be migrants. Conversely, wrens were down from last year's total of thirty. Notable species were redstarts (3), reed warblers (5), lesser whitethroats (2), a great spotted woodpecker, a water rail and a juvenile scarlet rosefinch. This year, we obtained estimates of relative fat levels on all birds caught, before weighing them. A summary of data for chiffchaffs, robins and goldcrests is shown in figure 1, and is an illustration of the information on birds that can be obtained by detailed observation. Most of these three species were caught on 4 October. The robins had very little fat and weighed less than usual, implying that they were recent arrivals and had

exhausted fat reserves. In contrast, the chiffchaffs had substantial amounts of visible subcutaneous fat, and the goldcrests were intermediate between chiffchaffs and robins. Interpretation of these observations is not straightforward, as the origins and destinations of these birds are not known. It seems likely that these species had different migration strategies,

but it is clear that much further work, preferably co-ordinated at a national level, is required for us to understand more fully the migratory strategies of even the commoner migrants.

The scientific and conservation studies carried out by the Society's Ringing Group would not be possible without the help and support of many people. Northumbrian Water have generously continued to support the seabird studies, and we hope that the results of the work will justify their investment in us. We are grateful to Kathy Fletcher for her help with the tern project on Coquet Island, the Farne Islands Local Management Committee of the National Trust for granting permission for the Farnes ringing studies to continue for a further year, the Coquet Island Management Committee for allowing access to Coquet Island, Mike Freeman of the National Trust for his support of ringing at Newton Pool, and Major Carr-Ellison for the use of his beach chalet at Newton. Finally, the success of the ringing studies is dependent on the ringers themselves, and we are grateful for their hard work on the Society's behalf, often at unsocial early hours.



**Figure 1** Relative fat levels in robins (top panel), chiffchaffs (centre panel) and goldcrests (bottom panel) caught at Newton Pool, Northumberland, in autumn 1998. Fat deposits in the tracheal (furcular) pit and abdomen were scored visually using a nine-point scale (abscissa), and the numbers of birds in each fat class is represented by the height of each bar (ordinate).

## COQUET ISLAND MANAGEMENT COMMITTEE

The Management Committee met to discuss the various factors affecting the island. The outgoing warden from Durham University had finished his PhD at the end of the 1998 season. In consequence a new student would be taking over to continue the research projects run by Durham University on the island. It was agreed that the new student would need to be accompanied by a paid warden from the RSPB because of safety regulations. As mentioned in the previous annual report, the Society had agreed to help with the production of the new management plan for the island. Dr Chris Redfern and the Secretary both attended regular meetings throughout the year to prepare this important document. It is hoped that it will be ready to go to the main management committee at its autumn meeting.

The Research sub-committee met in the spring to review all the research projects that were to take place in the 1999 season. The main objective of this committee is to ensure that the various



projects taking place do not conflict with each other or use the same study plots. Various projects were put forward including the Society's work on arctic terns. The allocation of research plots was worked out and all the projects were undertaken during the season. The Society also undertook the general ringing of the main species on the island.

The 1999 season showed an increase in the number of pairs of roseate and common terns. Rather disappointingly, only about nineteen pairs of roseate terns were counted at the beginning of the season. However, as the summer progressed adult birds continued to arrive and started breeding until a final total of 34 (29) pairs were present. The warden, using the RSPB larger rings that are applied to roseate terns, managed to read the numbers on many of the adults and from this it was possible to work out that a large number of individuals that bred on the island last year had returned. One individual had been ringed on the island and was the offspring of a bird also ringed on the island. This is the first clear indication that the roseate terns are returning in successive generations to Coquet Island. This is very encouraging as a lot of the previous evidence suggested that most of the roseates were birds bred in Ireland and that it was possible that they were simply birds breeding for the first time who could not find space in the main Irish colonies. Also one of the roseate chicks ringed on the Farne Islands on 1 July was seen sitting on the jetty at Coquet Island on 3 August. The common tern numbers were also excellent with a 34% increase on last year's figure, 1049 (805). However, Sandwich terns 1676 (1897) and arctic terns 830 (843) were marginally down on last year.

#### **LINDISFARNE NATIONAL NATURE RESERVE**

**Lindisfarne Advisory Committee** The main points in the discussions were as follows: more wildfowling permits were issued in 1998/99 (179) than last year but wildfowling visits were down, as was punt gunning. Wigeon, brent geese and teal numbers were good and the pink-footed goose has now reached the criterion for a population of international importance. In contrast, greylags are declining, with a peak of about 1000. Control of *Spartina* and *Aceana* continued and progress was made. After negotiations with the Royal Yachting Association, an experimental watersports zone has been established in Budle Bay from Easter to 31 October. Your Secretary finds this incredible in a National Nature Reserve and Site of Special Scientific Interest of such importance to birds and suspects that the monitoring scheme put in place by English Nature will be inadequate to establish enough evidence of disturbance to justify discontinuing the watersports. Casual observations from the general public will be very welcome, with date, time and details of any incidents. Birdwatchers please note! The new bait-digging byelaw has gone to the Secretary of State for ratification and should be in place for next year.

**Lindisfarne Wildfowl Panel** The Wildfowl Panel meets on the same days as the Joint Advisory Committee and discussed the main subject areas as shown above. A good deal of its time, however, was spent on discussing the refuge area that had been designated in the southern half of the nature reserve. This area has had increases in the number of birds present. Dr Steve Percival took members through the interim refuge report. Wigeon numbers had shown an encouraging increase following a downward trend. The plateau effect of November 1977 had been repeated in October 1998. Brent also appeared to be responding to the refuge with both species making considerably more use of the food resource in the refuge area. Curlew and redshank also appeared to be benefiting although this was less obvious for grey plover and bar-tailed godwit which favour Holy Island sands.

# FINANCIAL STATEMENTS

31 JULY 1999



**THE NATURAL HISTORY  
STATEMENT OF FINANCIAL ACTIVITIES**

1998			
£		£	£
	SALARIES, PENSION CONTRIBUTIONS AND		
29,867	NATIONAL INSURANCE (Note 10).....		30,907
1,699	PRINTING AND STATIONERY .....		2,380
3,032	POSTAGE AND TELEPHONE .....		2,127
1,944	INSURANCE .....		1,943
721	GENERAL EXPENSES .....		1,408
5	LICENCE FEE .....		5
	TREASURER'S FEES AND		
450	INDEPENDENT REVIEW.....		725
825	SUBSCRIPTIONS TO SOCIETIES .....		997
1,708	LECTURE AND FIELD MEETING EXPENSES .....		2,569
	TRANSACTIONS		
7,397	Expenditure .....	5,590	
3,200	Less: Contributions for publication of Red Data Book.....	—	
4,197			5,590
2,612	LIBRARY.....		1,222
	GOSFORTH PARK NATURE RESERVE		
3,854	Expenditure .....	2,128	
	Less: Transfer from Gosforth Park Nature Reserve		
2,400	Restoration Fund .....	600	
1,454			1,528
1,546	COASTAL RESEARCH (Note 11)		1,340
2,113	DEPRECIATION .....		2,298
	APPROPRIATIONS		
3,400	Gosforth Park Nature Reserve Restoration Fund		—
	EXCESS OF INCOME OVER EXPENDITURE		
689	FOR THE YEAR .....		865

£56,262

£55,904

**SOCIETY OF NORTHUMBRIA**  
FOR THE YEAR ENDED 31 JULY 1999

1998

£		£	£
	<b>SUBSCRIPTIONS</b>		
15,486	Annual subscriptions .....	15,344	
240	Add: Transfer from Life Members' Fund .....	<u>240</u>	
15,726			15,584
1,018	<b>DONATIONS .....</b>		1,242
179	<b>ARCHIVE CATALOGUE RESEARCH FUNDING ..</b>		—
8,000	<b>UNIVERSITY OF NEWCASTLE UPON TYNE .....</b>		8,000
29,241	<b>INVESTMENT INCOME (GROSS) .....</b>		29,114
2,098	<b>PROCEEDS FROM SALES OF TRANSACTIONS...</b>		1,964

£56,262

£55,904



# THE NATURAL HISTORY

## BALANCE SHEET

1998			
£	£		£
	GENERAL FUND		
108,188	Balance at 1 August 1998 .....	110,100	
689	Add: Excess of income over expenditure		
1,223	for the year (Note 4).....	865	
	Less: Loss on sale of investments .....	( 2,605)	
110,100			108,360
2,119	LIFE MEMBERS' FUND (Note 5).....		1,880
	EXPENDABLE ENDOWMENTS		
	T B Short Memorial Fund (Note 6)		
	Balance at 1 August 1998.....	155,983	
155,983	Add: Surplus on sale of investments.....	1,405	157,388
	Grace Hickling Memorial Fund (Note 6)		
	Balance at 1 August 1998 .....	118,297	
118,297	Add: Surplus on sale of investments .....	<u>6,673</u>	124,970
259,075	INVESTMENT REVALUATION RESERVE (Note 7)		263,502
	DESIGNATED CAPITAL FUNDS		
3,000	Provision for deferred repairs		3,000
	Gosforth Park Nature Reserve Restoration Fund (Note 8)		
	Balance at 1 August 1998 .....	20,500	
20,500	Less: Expenditure during year .....	<u>(600)</u>	19,900

Approved by Council on 15 October 1999

D GARDNER-MEDWIN – Chairman and Trustee

N A FURNESS – Treasurer

£669,074

£679,000

# SOCIETY OF NORTHUMBRIA

31 JULY 1999

1998

£

£

£

## FIXED ASSETS

Freehold property (Note 2)

Hancock Museum .....

Not valued

Lake Lodge

Cost .....

3,899

Electrical installation .....

5,300

3,899

5,300

9,199

9,199

6,938

Less: Depreciation .....

7,016

2,261

2183

Hides, equipment, office furniture and computers (Note 3)

Cost 1 August 1998 .....

25,243

Additions .....

2,737

Cost 31 July 1999 .....

27,980

Less: Depreciation .....

24,486

25,243

22,267

2,976

3,494

Investments in trustee securities, at market value (Note 7)

Quoted

Narrow range .....

175,572

Wide range .....

260,941

Special range .....

97,714

Unquoted

Charities Official Investment Fund

9,750 shares .....

105,809

170,496

256,593

91,338

100,103

618,530

640,036

## CURRENT ASSETS

Income tax recoverable, accrued income  
and payments in advance

7,997

2,610

Cash at bank

Charities deposit fund .....

26,441

Deposit account .....

309

Current account .....

6,067

20,849

1,268

26,736

48,853

32,817

## CURRENT LIABILITIES

Creditors, accrued charges and subscriptions  
received in advance

(7,527)

(6,156)

£669,074

£679,000



**THE NATURAL HISTORY SOCIETY OF NORTHUMBRIA**  
**RECONCILIATION OF FUNDS FOR THE YEAR ENDED 31 JULY 1999**

1998		
£		£
689	Excess of income over expenditure for the year	865
99,703	Net investment gains (realised and unrealised)	9,901
1,000	Change in capital funds	(600)
<u>(240)</u>	Change in life members' fund	<u>(240)</u>
101,152	Net movement in funds	9,926
567,922	Net funds brought forward	669,074
<u>£669,074</u>	Net funds carried forward	<u>£679,000</u>

## STATEMENT OF TRUSTEES' RESPONSIBILITIES

The Trust deed, the Charities Act 1993 and the Charities (Accounts and Reports) Regulations 1995 require the trustees to prepare accounts for each financial year. In preparing these accounts, the trustees are encouraged to follow the recommendations outlined in Statement of Recommended Practice No. 2 - Accounting by Charities (issued by the Accounting Standards Board in 1995).

The trustees consider that in preparing these accounts they have used appropriate accounting policies, consistently applied and supported by reasonable and prudent judgements and estimates.

The trustees are responsible for keeping proper accounting records to enable them to ensure that the accounts comply with the Charities Act 1993. They are also responsible for safeguarding the assets of the charity and hence for taking reasonable steps for the prevention and detection of fraud and other irregularities.

## ACCOUNTING POLICIES AND NOTES

### 1. **Basis of accounting**

The accounts have been prepared under the historical cost convention as modified by the revaluation of investments.

### 2. **Freehold property including Library and Collections**

- (a) No value was attributed to the Hancock Museum at the date of its completion in 1884. The building is leased to the University of Newcastle upon Tyne which is normally responsible for all repairs and improvements.
- (b) (i) The cost of Lake Lodge, less donations and grants received, of £3,899 is depreciated at 2% per annum.  
(ii) The cost of installing mains electricity, less donations received, of £5,300 has been fully depreciated.

### 3. **Hides, equipment, office furniture and computers**

The cost of the hides, equipment and office furniture is depreciated at 10% per annum and computers at 20% per annum.

### 4. **Income and expenditure account**

All of the charity's revenue income received is unrestricted and is applied by the trustees to meet general expenditure. Any excess of income over expenditure for the year is arrived at after making any appropriations to special funds for the purpose of setting aside temporary surpluses of income to meet future expenditure.

### 5. **Life members' fund**

Amounts received in payment of life subscriptions are taken to the life members' fund and are released to income and expenditure account over a period of 20 years in equal annual instalments.

### 6. **T B Short and Grace Hickling Memorial Funds**

The funds from these legacies are invested in accordance with the Trustee Investment Acts and are subject only to expenditure for special projects.



7. Investments are shown on the Balance Sheet at their market value. The difference between market value and cost is shown as an Investment Revaluation Reserve.

8. **Gosforth Park Nature Reserve Restoration Fund**

	1999	1998
General restoration	£11,400	£12,000
Sir James and Lady Steel donation for lake rejuvenation	<u>£8,500</u>	<u>£8,500</u>
	<u>£19,900</u>	<u>£20,500</u>

9. Payments made to trustees comprised salary costs £304 (1998 £1,996), travelling expenses £NIL (1998 £238) and reimbursement for entertaining speakers after lectures £178 (1998 £72), library books £50 (1998 £100) and office sundry expenses £24 (1998 £7). The payments made related to four trustees (1998: four trustees).
10. **Employees' Remuneration**  
Total remuneration (excluding employer's National Insurance contributions) for the year was £28,691 (1998 £ 27,718). The average number of paid staff for the year was one full time and four part time employees.
11. Coastal Research comprises boat costs and ringing expenses for Farne Islands and Coquet Island research.
12. The Society is a registered charity, official number 526770.

## **Independent Examiner's Report to the Trustees of The Natural History Society of Northumbria**

I report on the accounts of the Trust for the year ended 31 July 1999, which are set out on pages 28 to 34.

### **Respective responsibilities of trustees and examiner**

As the charity's trustees you are responsible for the preparation of the accounts; you consider that the audit requirement of section 43 (2) of the Charities Act 1993 (the Act) does not apply. It is my responsibility to state, on the basis of procedures specified in the General Directions given by the Charity Commissioners under section 43 (7) (b) of the Act, whether particular matters have come to my attention.

### **Basis of independent examiner's report**

My examination was carried out in accordance with the General Directions given by the Charity Commissioners. An examination includes a review of the accounting records kept by the charity and a comparison of the accounts presented with those records. It also includes consideration of any unusual items or disclosures in the accounts, and seeking explanations from you as trustees concerning any such matters. The procedures undertaken do not provide all the evidence that would be required in an audit, and consequently I do not express an audit opinion on the view given by the accounts.

### **Independent examiner's statement**

In connection with my examination, no matter has come to my attention:

- (1) which gives me reasonable cause to believe that in any material respect the requirements
  - i. to keep accounting records in accordance with section 41 of the Act; and
  - ii. to prepare accounts which accord with the accounting records and to comply with the accounting requirements of the Acthave not been met; or
- (2) to which, in my opinion, attention should be drawn in order to enable a proper understanding of the accounts to be reached.

R BUNTER  
PRICEWATERHOUSECOOPERS  
89 Sandyford Road  
Newcastle upon Tyne  
NE99 1PL

15 October 1999



THE UNIVERSITY OF CHICAGO PRESS  
5 EAST 57TH STREET, NEW YORK, N. Y. 10022

THE UNIVERSITY OF CHICAGO PRESS  
5 EAST 57TH STREET, NEW YORK, N. Y. 10022  
THE UNIVERSITY OF CHICAGO PRESS  
5 EAST 57TH STREET, NEW YORK, N. Y. 10022  
THE UNIVERSITY OF CHICAGO PRESS  
5 EAST 57TH STREET, NEW YORK, N. Y. 10022

THE UNIVERSITY OF CHICAGO PRESS  
5 EAST 57TH STREET, NEW YORK, N. Y. 10022  
THE UNIVERSITY OF CHICAGO PRESS  
5 EAST 57TH STREET, NEW YORK, N. Y. 10022  
THE UNIVERSITY OF CHICAGO PRESS  
5 EAST 57TH STREET, NEW YORK, N. Y. 10022

THE UNIVERSITY OF CHICAGO PRESS  
5 EAST 57TH STREET, NEW YORK, N. Y. 10022  
THE UNIVERSITY OF CHICAGO PRESS  
5 EAST 57TH STREET, NEW YORK, N. Y. 10022  
THE UNIVERSITY OF CHICAGO PRESS  
5 EAST 57TH STREET, NEW YORK, N. Y. 10022

THE UNIVERSITY OF CHICAGO PRESS  
5 EAST 57TH STREET, NEW YORK, N. Y. 10022  
THE UNIVERSITY OF CHICAGO PRESS  
5 EAST 57TH STREET, NEW YORK, N. Y. 10022  
THE UNIVERSITY OF CHICAGO PRESS  
5 EAST 57TH STREET, NEW YORK, N. Y. 10022

THE UNIVERSITY OF CHICAGO PRESS  
5 EAST 57TH STREET, NEW YORK, N. Y. 10022  
THE UNIVERSITY OF CHICAGO PRESS  
5 EAST 57TH STREET, NEW YORK, N. Y. 10022  
THE UNIVERSITY OF CHICAGO PRESS  
5 EAST 57TH STREET, NEW YORK, N. Y. 10022

## BIRDS ON THE FARNE ISLANDS in 1999

compiled by

**JOHN WALTON<sup>1</sup>**

National Trust Property Manager

ringing report by

**CHRIS REDFERN<sup>2</sup>**

edited by

**MARGARET PATTERSON<sup>3</sup>**

<sup>1</sup>The National Trust, The Sheiling, 8 St Aidans, Seahouses, Northumberland NE68 7SR <sup>2</sup>Medical Molecular Biology Group, Department of Medicine, University of Newcastle NE1 7RU and <sup>3</sup>The Natural History Society of Northumbria, Hancock Museum, Newcastle upon Tyne NE2 4PT

### INTRODUCTION

Calm seas on 25 March allowed the wardening team to sail out to the islands and take up residence on Inner Farne and Brownsman; the latter island was manned until 23 November and Inner Farne finally shut down on 8 December. Twenty-two species bred with an estimated population of just under 70,000 pairs. After the disastrous weather and consequently poor breeding seasons of 1997 and 1998, it might have been expected that the more settled weather of 1999 would have produced a bumper crop of young birds – and for some species this was the case. Eiders enjoyed an excellent year, shags raised good numbers of young and puffins enjoyed the lack of rainfall and a better season. In stark contrast were the terns – four species, totalling 3,301 pairs, managed to fledge only 310 young. There was an apparent lack of fish in the top few centimetres of the sea: diving birds had no difficulty in finding sandeels but they were not available to the ‘dip-feeding’ terns. The result was that hatchlings survived for a couple of days before succumbing to starvation. We do not understand why the fish were not at the surface of the sea and, to confuse matters even further, this was a very ‘local’ event. The terns nesting on Coquet Island, some eighteen miles south, experienced no problems whatsoever with food supply. The occasional disastrous season is nothing new: Goddard, in his writings in the 1920s, tells of appalling failures amongst the terns. Whilst we hope the results of this season will not be repeated in 2000 the situation will be closely monitored.

Passage birds were represented by 160 species, the overall total of 182 species eclipsing the previous record of 180 logged in 1995 and 1998. 1998 was described as a ‘classic year’ for migrants and this year was as good. Four species were added to the island list: kingfisher, calandra lark (a ‘first’ for Northumberland), Radde’s warbler and black-headed bunting (the 1971 record was presumed to be an escaped cage-bird). Recorded for the second time were common crane and red-necked phalarope, soft-plumaged petrel in November was a third and woodchat shrike appeared for the fourth time. Other species of note included storm petrel (5), Leach’s petrel (2), Cory’s shearwater, quail, wryneck (2), short-toed lark (2), grey-headed wagtail, icterine warbler (4), barred warbler (2), Pallas’s warbler (2), yellow-browed warbler (a record thirteen – the previous best year was 1994 with seven), dusky warbler, red-breasted flycatcher, great tit, common rosefinch, ortolan bunting and little bunting.

Thanks go to the 1999 wardening team of Steven Bloomfield, Mark Cornish (who provided the illustrations used in this report), Robin Cox, Stephen Duffield, Michael Maher, Adrian Mills, Nicholas Oughtred, Robert Mortley and Stuart Thomas, as well as to various boatmen, for supplying the records which make up this report.



Details of all the birds are given in the following list: this follows the order and scientific nomenclature of Professor Dr K H Voous' list of recent holarctic species (1977), except for the shearwaters and gannet which adopt the new changes recommended by *Ibis* 133, p438. Where appropriate, the figures for 1998 breeding birds are included, for comparison, in brackets.

**Red-throated Diver** *Gavia stellata*

One to six were recorded regularly from 25 March until 24 May, with three records in early-mid June. The peak spring count was of seventeen flying north on 17 April. Birds were then noted regularly from 2 September onwards with a maximum count of fourteen flying north on 1 November.

**Black-throated Diver** *G. arctica*

One spring record of a bird flying north on 24 May. There were five records in November of 1-3 birds with a single past Inner Farne on 2 December.

**Great Northern Diver** *G. immer*

Single birds on two dates in mid-April with one, in summer plumage, on 16 May. 1-9 were recorded on twenty days from 23 September-4 December.

**Great Crested Grebe** *Podiceps cristatus*

An adult flew north through Staple Sound on 16 August and a juvenile flew north past Crumstone on 23 August.

**Red-necked Grebe** *P. grisegena*

One flying north past Inner Farne on 13 April was the sole spring record. One was seen on 18 August, with 1-4 on twenty days from 22 October-4 December.

**Slavonian Grebe** *P. auritis*

One was on the sea off Inner Farne on 6 November, an adult and a juvenile were in the Kettle on 18 November, and finally one was in Staple Sound on 2 December.

**Fulmar** *Fulmarus glacialis*

Birds were on site when the wardens arrived and, after the traditional exodus for 'honeymoon', the first egg was located on Inner Farne on 13 May. The first young appeared on 8 July on North Wamses. 264 (254) pairs nested as follows: Inner Farne 31 (34), Knoxes Reef 15 (21), West Wideopens 17 (19), East Wideopens 18 (18), Skeney Scar 2 (1), Staple Island 42 (34), Brownsman 66 (59), North Wamses 29 (29), South Wamses 29 (33), Big Harcar 11 (3), Northern Hares 2 (0), Longstone End 2 (3). The first young fledged from both the inner and outer groups on 27 August with the last fledging on 11 September. One blue-phase bird was recorded on 19 November.

**Fea's-type Petrel** *Pterodroma feae*

During a seawatch on 19 November from the south end of Brownsman one was seen flying north at a range of 300-400 metres. The lone observer was the envy, to say the least, of his wardening colleagues! Third record for the islands and last recorded in 1996 (under the name of soft-plumaged petrel).

**Cory's Shearwater** *Calonectris diomedea*

One was observed flying north through Staple Sound on 23 July. Sixth record for the islands and last recorded in 1996.

**Sooty Shearwater** *Puffinus griseus*

1-9 were noted on seventeen days between 12 August and 20 November. The only counts to exceed this were sixty plus on the sea between Inner Farne and Megstone on 18 August and thirty-three seen flying north on 8 September.

**Manx Shearwater** *P. puffinus*

Recorded regularly from 4 April-31 October. The largest spring count was 220 flying north past Crumstone in three hours, with 101 flying north on 22 August being the maximum autumn count.

**Mediterranean Shearwater** *P. yelkouan*

There were seven records, all relating to single birds, on 29 April, 21 and 26 July, 9, 10 and 22 August and 21 September.

**Storm Petrel** *Hydrobates pelagicus*

In 1998 the ringing team had alerted the wardens on Brownsman to the possible presence of shearwater/petrel: working on the islands on 28 June they had noticed the distinctive musty odour. This season a storm petrel was calling from a burrow on Brownsman – first heard on 17 June and finally on 29 June. To avoid disturbance no examination of the burrow was made so it was something of a mystery – was this a prospecting bird or one of a pair of this secretive nocturnal species? All other 'fly-past' records were from the outer group: one on 22 July, two on 26 July and one on 22 October.

**Leach's Petrel** *Oceanodroma leucorhoa*

The only records were of one flying north through Inner Sound on 5 November and one, also north, past Brownsman on 16 November.

**Gannet** *Morus bassanus*

Recorded almost daily until early September and becoming less regular thereafter. The peak spring count was of 1,039 flying north in one hour on 1 May, with an autumn count of 1,060 north in forty-five minutes on 19 August.

**Cormorant** *Phalacrocorax carbo*

Nest-building was well under way when the wardens arrived in late March. Dates of egg-laying are unknown but the first young appeared on North Wamses on 8 May. 167 (175) pairs nested as follows: East Wideopens 67 (87), North Wamses 100 (88). Fledged birds were noted from early July with the last fledging around 30 August. Birds were only recorded in small numbers after this date.



**Shag** *P. aristotelis*

Well-built nests were in evidence when the wardens arrived and the first eggs were on Staple Island on 14 April and on Inner Farne on 16 April. 940 (1,000) pairs nested as follows: Megstone 24 (16), Inner Farne 193 (212), West Wideopens 34 (40), East Wideopens 57 (43), Skeney Scar 53 (62), Staple Island 235 (258), Brownsman 119 (126), North Wamses 24 (28), South Wamses 35 (46), Roddam and Green 19 (11), Big Harcar 83 (91), Longstone End 64 (67). The first young was recorded on Staple Island on 20 May with the first fledging on North Wamses on 16 July; the last had fledged by 20 September.



**Grey Heron** *Ardea cinerea*

1-4 were observed during the season: birds were scarce in spring and summer with just eleven records but they were seen regularly from 2 August and daily from 16 September onwards.

**Mute Swan** *Cygnus olor*

Three flew south through Staple Sound on 4 April, three north through Inner Sound on 7 October and two north on 11 October.

**Whooper Swan** *C. cygnus*

There was one record from the outer group of three over Big Harcar on 1 October. All other records were from the inner group: four on 5 October, two on 8 October, two on 26 October and two on 2 December.

**Pink-footed Goose** *Anser brachyrhynchus*

There were spring records on three days in March and one in April with the largest skein of 115 noted on 28 March. Nine skeins were recorded from 4 October-1 December, varying in number from 3-95.

**Greylag Goose** *A. anser*

Four, first noticed on the sea off Crumstone, flew off south on 2 July.

**Canada Goose** *Branta canadensis*

Two flew north through Inner Sound on 23 May with three, also north, on 20 November.

**Barnacle Goose** *B. leucopsis*

Skins of fifteen and sixty were noted on 24/25 April with a single bird on 10 May. Recorded on eight days from 1-16 October with the largest count of 250+ on 4 October.

**Brent Goose** *B. bernicla*

Two spring records: one north through Staple Sound on 4 April and two on 10 April. Recorded on thirteen days from 4 October-21 November with the largest skein of 213 flying north through Inner Sound on 16 October.

**Shelduck** *Tadorna tadorna*

As usual a pair was present around the outer group throughout April and May but there was no evidence of nesting. Absent from 16 May with birds recorded on eight days from 8 July-10 November with a peak count of seventeen flying west over Inner Farne on 15 October.

**Wigeon** *Anas penelope*

One to six were recorded on six days between 29 March and 18 April, followed by regular records of 1-60 from 20 August until 20 November.

**Gadwall** *A. strepera*

One was in Staple Sound on 17 April, three flew north-east over Brownsman on 25 April, and one was in the Kettle on 1 June.

**Teal** *A. crecca*

1-10 were observed on twelve days from 25 March-24 April. Autumn birds were noted from 1 August, becoming daily from 13 August onwards. The maximum count of 160+ on Knoxes Reef was on 27 November.

**Mallard** *A. platyrhynchos*

1-6 birds were seen daily throughout April and May. The three nesting attempts on the outer group all failed. There were two records, of single birds, in late June then regular sightings from July onwards. An albino was present on 14 October. The largest count of the season occurred on 21 November when sixty were on Knoxes Reef.

**Pintail** *A. acuta*

A pair flew over Staple Island on 17 April, two flew through the Kettle on 12 September and one was 'resident' on Staple Island from 25-29 September.

**Shoveler** *A. clypeata*

Two were flushed from Brownsman on 29 March with singles recorded on three further dates in April and one on 2 May. One was seen on 22 August and five flew north over Brownsman on 3 September with two on 15 September and one on 1 November.

**Pochard** *Aythya ferina*

1-14 were observed on eight days between 24 September and 6 November.

**Tufted Duck** *A. fuligula*

1-7 were seen on five days from 4 April-26 May, with 1-8 on ten days between 3 September and 5 November.

**Scaup** *A. marila*

One flew north on 17 April, one south through Inner Sound on 4 November and two moved west past Megstone on 5 November.

**Eider** *Somateria mollissima*

Birds were prospecting sites on both island groups from 29 March with the first egg located on Brownsman on 10 April. 1,278 (1,082) females nested as follows: Inner Farne 795 (704), Knoxes Reef 8 (3), West Wideopens 37 (29), East Wideopens 9 (9), Staple Island 45 (37), Brownsman 361 (270), North Wamses 7 (10), South Wamses 7 (13), Big Harcar 7 (3), Longstone main rock 1 (0), Longstone End 1 (4). The first ducklings were noted on 8 May with the majority having left by mid-July – a late youngster was seen on 12 August. This was a good year for the eiders with the monitored nests each producing 3-4 young. Some 3,000 birds were present around the islands in late autumn.

**Long-tailed Duck** *Clangula hyemalis*

There was one spring record of two off Knocklin Ends on 13 April. As expected the majority of the records came in the autumn: 1-18 recorded on twenty-two days from 4 October-2 December.

**Common Scoter** *Melanitta nigra*

Recorded in every month of the season with the lowest numbers in May and June. The peak count was 500+ moving through Inner Sound on 12 November.

**Velvet Scoter** *M. fusca*

One was observed flying north past the south end of Brownsman on 22 June. Then 1-4 were noted on thirteen days from 17 September-18 November with counts of fourteen on 10 November and twenty on 11 November.



**Goldeneye** *Bucephala clangula*

Spring records, all from the inner group, were of 1-3 birds on four days from 26 March-14 April. 1-35 were recorded on twenty days between 15 October and 6 December with 165 flying north through Inner Sound on 10 November proving the largest ever day-count from the islands.

**Red breasted Merganser** *Mergus serrator*

Scarce in spring with one on 28 March, five on 5 April and a single on 21 April. Two flew north through Inner Sound on 9 June, and one was over Knoxes Reef on 29 July. 1-6 were noted on six dates from 5 October-10 November.

**Goosander** *M. merganser*

A male flying west through Staple Sound on 26 March was the sole spring record. Singles were seen on 28 October and 6, 8 and 10 November.

**Sparrowhawk** *Accipiter nisus*

Singles were recorded on four days between 18 and 26 April with one on 10 May, then on five days from 6 September-3 November. All records were of females.

**Kestrel** *Falco tinnunculus*

Singles were recorded on 10 and 18 May, 25 and 30 July and 13 August and then on eight occasions from 19 September-26 November. Five on Brownsman on 20 September was an unusually high day-count.

**Merlin** *F. columbarius*

Single birds were seen almost daily between 25 March and 29 April, with one on 21 September, then 1-3 were present daily from 7 October until the end of the season. On 28 October one trapped itself in the Inner Farne Information Centre and was released by the wardens. Kills included water rail, feral pigeon, rock pipit, waxwing (the only one of the season and the first since 1994), dunnoek and redwing.

**Peregrine** *F. peregrinus*

An adult female flew over Staple Island on 6 April, with immatures through the Kettle on 12 and 17 April. There were records of single juveniles over Staple Island on 15 and 21 August, with 1-2 birds seen on thirty-two days between 7 September and 7 December. Two perching on the Pinnacles on 22 November made a change from the guillemots.

**Quail** *Coturnix coturnix*

One was seen dropping into cover onto Inner Farne on the evening of 2 June. Ninth record for the islands and last recorded in 1998.

**Water Rail** *Rallus aquaticus*

The wings, beak and legs of a water rail were found on Brownsman on 10 November – taken by a merlin.

**Coot** *Fulica atra*

A first year bird spent the afternoon of 18 August in Brownsman Gut and an adult was on Staple Island on 25 August.



### **Common Crane** *Grus grus*

On 15 May one was seen flying onto Brownsman from the direction of the Harcars. It spent two and a half hours wandering the island before flying off to the mainland. Second record for the islands and last recorded in 1998.

### **Oystercatcher** *Haematopus ostralegus*

The largest count of the spring occurred in mid-April when *ca* 150 were scattered around the island group. 30 (31) pairs nested as follows: Inner Farne 5 (5), Knoxes Reef 3 (2), West Wideopens 1 (3), East Wideopens 2 (3), Staple Island 4 (4), Brownsman 9 (8), North Wamses 2 (2), South Wamses 1 (1), Northern Hares 1 (1), Longstone main rock 2 (2). The first eggs were located on 30 April with young on 24 June. The first fledging was on 27 July with the last on 10 August. Good numbers were recorded from mid-August onwards with a peak of 170+ on 20 November.

### **Ringed Plover** *Charadrius hiaticula*

The first egg was found on 2 May on Inner Farne. 7 (9) pairs nested as follows: Inner Farne 2 (4), Knoxes Reef 0 (1), Staple Island 2 (1), Brownsman 3 (3). The first young were observed on 2 June with the first fledging on 27 July. 1-10 were noted during the autumn.

### **Golden Plover** *Pluvialis apricaria*

Single birds on Brownsman on 4 and 23 April were the only spring records. In autumn birds were seen regularly between 6 August and 27 October with the largest count, of 250+, on 14 September.

### **Grey Plover** *P. squatarola*

Single birds were on the outer group on 3 and 20 May, then 1-4 on forty-one days from 16 August-7 December.

### **Lapwing** *Vanellus vanellus*

1-4 were noted on four April dates, singles on 4 June and 5 August, then 1-18 on forty days from 29 August-7 December. The only count to exceed these numbers was when 150 flew south through Inner Sound on 6 October.

### **Knot** *Calidris canutus*

One was on Brownsman on 17 April with 1-50 on three May dates, followed by regular sightings from 4 July-3 December. The largest numbers appeared in mid-August when 80+ were present around the island group.



**Sanderling** *C. alba*

An excellent season for this species: forty-four were on Staple Island on 19 May, one was on Longstone on 29 July, a juvenile was on Inner Farne on 28 August, two flew west over Brownsman on 4 September with another on 6 September, and two were on Knoxes Reef on 15 September.

**Little Stint** *C. minuta*

One was on Brownsman pond from 23-24 May, and a juvenile was also on Brownsman from 19-26 August.

**Purple Sandpiper** *C. maritima*

Recorded almost daily until the end of May with peak counts of *ca* 440 in mid-April. Twenty were on Knoxes Reef on 17 June, becoming regular from early July onwards. There were peak counts of 550+ in mid-late September.

**Dunlin** *C. alpina*

Observed regularly throughout the season with 1-20 in spring. 1-3 were seen in June-early July, followed by almost daily sightings with a peak of *ca* eighty on 15 August. Sixty-one flying north past the outer group on 10 June was a notable sighting.

**Ruff** *Philomachus pugnax*

One flew north-east over Staple Island on 28 May. Singles were seen on 6, 18 and 25 August and one on 12 September with a final sighting on West Wideopens on 8 October.

**Jack Snipe** *Lymnocyrtus minimus*

One on Big Harcar on 9 April was the only spring record. Well-represented in autumn with 1-3 on fifteen days from 21 September-24 October.

**Snipe** *Gallinago gallinago*

1-2 were on the outer group on five days between 31 March and 24 April. More widespread records in autumn involved 1-5 on twenty-seven days from 6 August-10 November.

**Woodcock** *Scolopax rusticola*

One was on Longstone on 31 March and one on Inner Farne on 4 April. 1-6 were seen on seventeen days from 16 October-5 December.

**Black-tailed Godwit** *Limosa limosa*

One flew south over Brownsman on 24 April, three were on Inner Farne on 6 May and three were around the outer group on 14 May.

**Bar-tailed Godwit** *L. lapponica*

One was observed on 4 April and twenty-eight were scattered around the outer group on 1 May with one on 23 May. Regular in autumn with 1-26 on fifty-two days between 15 August and 3 December.

**Whimbrel** *Numenius phaeopus*

1-5 were seen on fifty-four days between 30 April and 22 September. Scarce in mid-summer with just one June record.

**Curlew** *N. arquata*

Recorded in every month with marked peaks in spring and autumn. The spring maximum was *ca* 400 in mid-April with an autumn count of *ca* 600 in early October.

**Spotted Redshank** *Tringa erythropus*

One was on Inner Farne on 23 July, one flew east (calling) over Inner Farne on 21 August and one was on the same island on 4 September.

**Redshank** *T. totanus*

Recorded regularly throughout the season with a spring peak of *ca* twenty in mid-April and larger numbers in autumn: 110 in late August/early September declining to *ca* twenty by early October.

**Greenshank** *T. nebularia*

1-4 were recorded on fifteen days from 6 August-15 September.

**Green Sandpiper** *T. ochropus*

Singles were noted on eight days from 4 August-19 September.

**Common Sandpiper** *Actitis hypoleucos*

Singles were seen on seven days between 24 April and 13 May and on 14-23 July, then 1-11 were observed daily from 31 July-27 September.

**Turnstone** *Arenaria interpres*

Recorded daily throughout the season with *ca* seventy summering. The spring maximum was 150 with autumn counts of 550+ in August/September.

**Red-necked Phalarope** *Phalaropus lobatus*

A juvenile flew past the south end of Brownsman on 31 October. Third record for the islands and last recorded in 1992.

**Grey Phalarope** *P. fulicarius*

An adult in winter plumage flew along the east shore of Brownsman on 18 September.

**Pomarine Skua** *Stercorarius pomarinus*

Recorded on fourteen days from 5 June-19 November. Counts were generally of 1-3 but were into double figures on four days with a maximum of thirty flying north on 20 October.

**Arctic Skua** *S. parasiticus*

Singles were seen on 16 April, 1 and 29 May and 9-11 June (with two on 24 June), then birds were observed regularly from early July-21 October. The normal day count was 1-8 with only two days exceeding this: twenty-five on 8 September and thirty-three on 19 October.

**Long-tailed Skua** *S. longicaudus*

Singles were observed on 22 July and 8 and 18 September with two on 3 October. The final sighting was of a lone bird on 22 October.



### **Great Skua *S. skua***

1-2 were observed on five days between 11 and 16 April. Regular sightings were made from 3 June-22 October with 1-2 seen on four days from 10-19 November. The usual day count was 1-8 with double figures on only two days – ten on 23 August and thirty-nine on 19 October.

### **Mediterranean Gull *Larus melanocephalus***

A first winter bird was observed in a feeding frenzy in Staple Sound on 26 September and on Longstone on 27 September. A second winter bird on 10 October and an adult winter bird on 24 October were both engaged in feeding frenzies in Staple Sound. Ninth-eleventh records for the islands and last recorded in 1997.

### **Little Gull *L. minutus***

An exceptional year for this species with records in every month of the season apart from December. The spread of records – thirty-eight days from 13 April-25 November – makes estimating exact numbers impossible. However, from plumages and timing, a minimum of sixty-one birds were probably involved. The largest flock was of sixteen adults moving north-east past Staple Island on 10 July. Two flew over Staple Island jetty on 27 May, one showing the rare plumage variant of all-dark wings.

### **Black-headed Gull *L. ridibundus***

Birds were displaying from 25 March onwards with the first eggs on Inner Farne on 4 May and on Brownsman on 11 May. 80 (67) pairs nested as follows: Inner Farne 15 (27), Brownsman 65 (40). The first young were seen on 31 May with the first fledging on 5 July: all young were fledged by 30 July. 300+ were seen daily from 1 October.

### **Common Gull *L. canus***

Birds were recorded daily with the expected drop in numbers, to between one and four, during May-July. The spring peak was *ca* 150 in early April with autumn counts of 250+ noted regularly from early September onwards.

### **Lesser Black-backed Gull *L. fuscus* and Herring Gull *L. argentatus***

1,305 (1,192) pairs nested as follows: Inner Farne 9 (5), Knoxes Reef 17 (15), West Wideopens 188 (175), East Wideopens 105 (98), Skeney Scar 50 (52), Staple Island 81 (56), Brownsman 44 (61), North Wamses 309 (308), South Wamses 218 (192), Roddam and Green 10 (15), Big and Little Harcar 222 (142), Northern Hares 29 (31), Longstone main rock 11 (12), Longstone End 12 (30). The first eggs were located on 2 May. A rough estimate suggests that lesser black-backs remain approximately twice as common as herring gulls as a breeding species.

### **Glaucous Gull *L. hyperboreus***

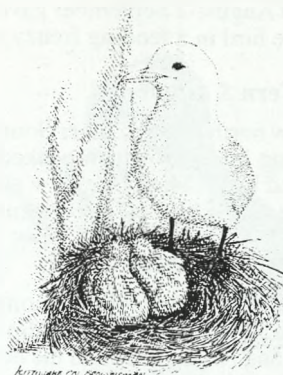
A good year for this species, probably helped by the 'residents' in Seahouses harbour. Singles were observed on four days from 29 March-13 May, then on fourteen days from 29 August-13 November.

### **Great Black-backed Gull *L. marinus***

Scarce in spring with less than twenty noted. 3 (1) pairs nested as follows: West Wideopens 2 (0), North Wamses 0 (1), South Wamses 1 (0). The usual build-up was observed from mid-August with a peak count of 500+ on 22 September.

### Kittiwake *Rissa tridactyla*

Birds were present on sites when the wardens arrived and the first eggs were recorded on 8 May with the first young on 10 June. 5,492 (5,009) pairs nested as follows: Megstone 14 (23), Inner Farne 1,381 (1,464), West Wideopens 222 (221), East Wideopens 314 (336), Skeney Scar 258 (243), Staple Island 1,645 (1,438), Brownsman 1,392 (1,069), North Wamses 67 (43), South Wamses 62 (65), Roddam and Green 23 (19), Big Harcar 114 (88). The first fledged young was noted on 15 July, with the last on 9 September. 2,000+ flew north past Inner Farne on 19 November, otherwise very small numbers were recorded during the autumn.



### Sandwich Tern *Sterna sandvicensis*

One over Brownsman on 28 March heralded the expected build-up. 1,946 (1,785) pairs nested as follows: Inner Farne 1,090 (778), Brownsman 856 (1,007). First eggs were recorded on 11 May with the first young on 2 June. The first fledged bird was noted on 6 July with the last on 9 August. An apparent lack of food in the top few centimetres of the sea, poor weather in early June and gull predation combined to make this a dismal season – from the monitored nests and general observation it is thought that only *ca* 286 young fledged. All birds had left the islands by 18 September with three 'migrants' on Inner Farne on 27 September.

### Roseate Tern *S. dougallii*

One calling over Inner Farne on 3 May was the first observation of the year. 4 (3) pairs nested as follows: Inner Farne 4 (3). Eight eggs were laid, four hatched and three young fledged. This species was able to combat the difficulties of food supply, to some extent, thanks to its expertise at kleptoparasitism. Whilst no birds were seen from the inner group after the end of July there was a good spread of records from the outer group during August and early September. One feeding off Brownsman on 7 September was the last of the season.

### Common Tern *S. hirundo*

Two birds on Inner Farne on 22 April and on Brownsman on 23 April were the first records. The first egg was found 22 May with the first young on 11 June. 128 (160) pairs nested as follows: Inner Farne 125 (158), Brownsman 3 (2). The first young fledged on 10 July with the last in late August. As with the other tern species 1999 was a disastrous season – just nine young fledged. The final record was of a bird observed in a feeding frenzy off Staple Island on 10 October.

### Arctic Tern *S. paradisaea*

One on Knoxes Reef on 10 April was the first arrival with 'hundreds' displaying over the islands by early May. Eggs were noted on 15 May with the first young on 9 June. 1,223 (1,721) pairs nested as follows: Inner Farne 665 (1,212), Staple Island 0 (7), Brownsman 558 (502). The first young fledged on 8 July with the last on 10 August. The failure of the terns in rearing young was most marked in this species, with only twelve fledging from 1,223 nests. Wardens used to the sight of fledglings begging for food and learning to fly found Inner Farne 'eerie' in its lack





of young birds. Birds were scarce from early August onwards although an influx of juveniles from 30 August-2 September gave counts of 200+ from the outer group. The final record was of a lone bird in a feeding frenzy on 27 September.

#### **Little Tern *S. albifrons***

One flew north through Inner Sound on 10 April. Ten in St Cuthbert's Cove on 1 May heralded the spring build-up which peaked at seventy-eight birds in the roost on 10 May: these had dispersed by 23 May. One flew north through Staple Sound on 26 June and the final sighting was of a single bird off Brownsman on 2 August.

#### **Black Tern *Chlidonias niger***

Inner Farne had the monopoly on the early records with singles seen on 6 and 11 June and 3 July. On 30 August one was dip-feeding off Brownsman, then eight juveniles were noted feeding and roosting around the outer group on 1 September with three on 2nd and eight again on 3 September.

#### **Guillemot *Uria aalge***

Although birds were on the cliffs when the wardens arrived they did not really settle until early April. The first egg was recorded on 17 April on Staple Island. 31,386 (33,456) individuals were present on the breeding cliffs as follows: Megstone 170 (172), Inner Farne 2,775 (3,552), West Wideopens 1,459 (1,631), East Wideopens 2,047 (2,165), Skeney Scar 1,222 (1,715), Staple Island 17,040 (16,546), Brownsman 4,980 (5,531), North Wamses 1,321 (1,507), South Wamses 193 (482), Roddam and Green 100 (111), Big Harcar 79 (44). The first young was seen on 28 May with the first 'jumping' on 15 June. The final young of the year had left the cliffs by 4 August. 1-15 birds were seen almost daily until the end of the season with 200+ moving north on 30 November.



#### **Razorbill *Alca torda***

Birds were present on nesting ledges, and rafting on the sea below the cliffs, when the wardens arrived. The first egg was located on 8 May on Inner Farne with the first young on 8 June. 146 (156) pairs nested as follows: Inner Farne 55 (68), West Wideopens 14 (19), East Wideopens 17 (16), Skeney Scar 5 (5), Staple Island 30 (28), Brownsman 6 (5), North Wamses 5 (4), South Wamses 7 (4), Big Harcar 6 (6), Longstone End 1 (1). The first young left the cliffs on 30 June and the last on 4 August. Birds were scarce thereafter, generally only 1-2, but 'hundreds' flew south on 18 September.

#### **Black Guillemot *Cephus grylle***

A summer-plumaged bird roosted on Staple Island west jetty on 16 August, and another flew west past Inner Farne on 17 August. 1-5+ were recorded regularly from 10 October onwards with at least twelve, and the possibility of twenty-four, on 18 November although gale force winds and huge seas made counting 'difficult' that day.

#### **Little Auk *Alle alle***

1-3 were noted on eight days from 30 October-20 November with nine seen flying north on 30 November.

### Puffin *Fratercula arctica*

During periods of settled weather 'thousands' were on the island tops from 25 March onwards, becoming more settled from mid-April. There was evidence of the first egg by 26 April with the first young (indicated by an adult bringing in sandeels) on 29 May. The first fledged chick was recorded on 4 July with the last assumed to have left around 20 August. No nest count was undertaken – the last census, in 1993, suggested a figure of 34,710 occupied burrows. After two seasons of heavy rain, and consequent flooding, the more settled weather of 1999 enabled this species to enjoy a good breeding season. Birds were very scarce from mid-August onwards with singletons worthy of record. There was one 'big' day when 400+ flew north through Staple Sound on 30 November.



**Feral pigeon** *Columba livia*

Present throughout the season with possibly eighty pairs nesting. Numbers built up to *ca* 400 by late autumn.

### Stock Dove *C. oenas*

Two flew over Brownsman on 4 April with one on Inner Farne on the same day. One was over Brownsman on 9 April. A good showing for what remains an island rarity.

### Woodpigeon *C. palumbus*

1-3 were recorded on twenty days from 29 March-28 May. Three were seen on 13 June, one on 15 June and one on 5 July, then three on 22-23 October. Very much an outer group bird with only two of these records relating to Inner Farne.

**Collared Dove** *Streptopelia decaocto*

All records were from Brownsman: singles on 4 and 10 April and 25 September.

### Cuckoo *Cuculus canorus*

One flew over Staple Island on 8 May and a different bird was over the island on 10 May. A juvenile spent the afternoon of 19 September on Inner Farne.

### Long-eared Owl *Asio otus*

1-2 birds were recorded on five days from 15-21 October.

### Short-eared Owl *A. flammeus*

Single birds were seen on 27 and 28 September with 1-3 on five mid-late October days, then singles again on 4, 10 and 20 November.

### Swift *Apus apus*

First recorded on 20 May with the final record on 20 September. 1-24 were observed regularly during this period with one bird on 9 September roosting inside Brownsman cottage.



**Kingfisher** *Alcedo atthis*

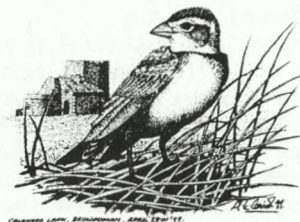
A female was on Longstone (in the same gully as the 1998 bluetail) on 4 April. First record for the islands and, as the log-writer says, 'a stunning addition to the Farnes list'.

**Wryneck** *Jynx torquilla*

Two were on Brownsman and Staple Island on 25 August with one remaining until the following morning.

**Calandra Lark** *Melanocorypha calandra*

One was on Brownsman from 07.20-11.00 (intermittently) on 28 April. Dense fog meant that only the two wardens resident on the island saw the bird – the highlight, in rare bird terms, of the year. First record for the islands and for Northumberland.



**Short-toed Lark** *Calandrella brachydactyla*

One was on Brownsman on 5 May, and one commuted between Brownsman and West Wideopens on 9-10 May. There was some discussion amongst the observers as to whether these records might relate to the same bird but a two bird option appears most likely. Eighth and ninth record for the islands and last recorded in 1998.

**Skylark** *Alauda arvensis*

1-5 were recorded regularly throughout April with singles on 10 May, 2-4 June and 10-12 July. Birds were seen on a regular basis from 13 September-2 December with a peak count of twenty-two on 17 October.

**Sand Martin** *Riparia riparia*

The first record was of one over Brownsman on 2 April with four further sightings on five April dates, four days in May, one on 12 June, singles on 12/13 July, and a final sighting on 6 September. Records were generally of 1-3 with fifteen on 3 May. All, with the exception of one bird over Inner Farne on 4 April, came from the outer group.

**Swallow** *Hirundo rustica*

Birds were recorded regularly from 31 March-29 September with a maximum count of eighteen over Brownsman on 20 May. There was no sign of any birds attempting to nest in St Cuthbert's Chapel.

**House Martin** *Delichon urbica*

1-6 were recorded on eight days between 23 April and 16 June, with singles on three days from 17-21 September.

**Tree Pipit** *Anthus trivialis*

1-7 were noted almost daily from 3-14 May. Birds were more regular in autumn with 1-16 on eighteen days from 18 August-12 October.

**Meadow Pipit** *A. pratensis*

Recorded daily from 25 March-14 May and then again, although not daily, from 15 August-12 November. The largest spring count was of 510+ flying south on 4 April whilst 80+ on 21-23 September was the largest count of the autumn.

**Rock Pipit *A. spinoletta***

Present throughout the season. 22 (21) pairs nested as follows: Inner Farne 5 (5), West Wideopens 1 (1), Knoxes Reef 0 (1), Staple Island 4 (3), Brownsman 8 (8), North Wamses 1 (1), South Wamses 2 (1), Longstone main rock 1 (1).

**Yellow Wagtail *Motacilla flava***

One to four were recorded on ten days from 3-24 May, then 1-6 on seven days from 28 August-16 October. Blue-headed wagtails *M. f. flava* were present on Staple Island on 12 May and on Inner Farne on 3 June and 21 September. A grey-headed wagtail *M. f. thunbergi* was around Brownsman pond on 2 June.

**Grey Wagtail *M. cinerea***

Single birds were seen on seven days between 12 September and 21 October.

**Pied Wagtail *M. alba***

Birds were present daily until late September. 8 (8) pairs nested as follows: Inner Farne 2 (2), West Wideopens 1 (1), Staple Island 1 (1), Brownsman 3 (3), Longstone main rock 1 (1). A white wagtail *M. a. alba* was on Staple Island on 24 April.

**Waxwing *Bombicilla garrulus***

A freshly killed bird was found on Brownsman on 12 November. This had fallen prey to a merlin – an unfortunate end to the first of this species on the islands since 1994.

**Wren *Troglodytes troglodytes***

One to eight were seen daily on both island groups from 25 March-28 April. One on Brownsman was seen carrying nesting material on 16 April. The first bird of the autumn was on Longstone on 4 September with 1-25 observed daily from 10 September to the end of the season.

**Dunnock *Prunella modularis***

One to two were observed on eight days from 30 March-8 April with singles on three September dates. 1-5 daily were noted from 6 October to the end of the season.

**Robin *Erithacus rubecula***

One to four were seen almost daily from 25 March-30 May. A lone bird was on Inner Farne from 17-19 August, then 1-24 were observed daily from 31 August onwards. Just one count exceeded this when sixty-five were scattered over both island groups on 16 October.

**Black Redstart *Phoenicurus ochruros***

One to two were seen on twenty days from 28 March-9 May with one on Brownsman on 4 July and 25 September. 1-4 were recorded daily from 16-23 October.

**Redstart *P. phoenicurus***

Singles were recorded on eleven days between 26 April and 12 June, with autumn birds observed regularly from 18 August-29 September and a late one on 20 October. Generally single birds but an influx from 19 September peaked at forty-six on 21 September.

**Whinchat *Saxicola rubetra***

One to two were seen on seven days from 3-18 May, with singles on 3 June and 25 July. As expected birds were far more common in autumn with records of 1-8 almost daily from 18 August-29 September.



**Stonechat** *S. torquata*

Single birds, all on Brownsman, were noted on 2 April, 28 September and 5 October.

**Wheatear** *Oenanthe oenanthe*

One to thirteen were seen almost daily between 25 March and 4 June. A single bird was on Staple Island from 27-29 June, and juveniles on 14 and 24 July. Returning birds were recorded almost daily from 6 August-28 October with a peak count of sixty-six on 21 September.

**Ring Ouzel** *Turdus torquatus*

All records came from the outer group: singles on 4 and 24 April and 8 May, two on 21 September and singles on 23 and 25 September.

**Blackbird** *T. merula*

One to eleven were recorded almost daily from 25 March-30 April. The first bird of the autumn was on Inner Farne on 4 September with regular records from 21 September onwards. The largest counts occurred in mid-October with *ca* 1,000 on 15 October.

**Fieldfare** *T. pilaris*

One to twenty were observed regularly from 25 March-15 May. A lone bird was on Inner Farne from 4-6 August with records becoming regular from 4 September-24 November. As with the previous species peak counts occurred in mid-October with *ca* 550 on 21 October.

**Song Thrush** *T. philomelos*

One to two were noted regularly from 29 March-14 May with records of single birds on 5, 17 and 18 July. Generally small numbers were observed almost daily from 11 September-7 December with a maximum count of forty-five on 16 October.

**Redwing** *T. iliacus*

One to nine were seen almost daily from 25 March-24 April. Winter birds started arriving on 5 September and were observed regularly until 18 November. Usually recorded in numbers of less than forty but there was one 'big day' when *ca* 4,400 flew over the islands on 15 October.

**Mistle Thrush** *T. viscivorus*

One flew south over the outer group on 25 March, and one was on Inner Farne on 2 November.

**Grasshopper Warbler** *Locustella naevia*

One to three were seen on six days from 18-25 August, with one on 20 September. With the exception of one bird on Inner Farne on 23 August all records relate to the outer group.

**Sedge Warbler** *Acrocephalus schoenobaenus*

One to four were observed on fourteen days from 3 May-8 June, then 1-4 on twelve days between 5 August and 23 September.

**Reed Warbler** *A. scirpaceus*

One on Inner Farne on 5 June was the only spring record. Eight birds were responsible for a spread of records on Brownsman/Staple Island on six days between 6 and 25 August (maximum five on 18 August) with singles on five days from 15-22 September, and four birds on the outer group on 21 September.

**Icterine Warbler** *Hippolais icterina*

Singles (different birds) were on Inner Farne and Staple Island on 4 August, and one was on Inner Farne on 4 September. The birds in August constitute the earliest ever records for the islands.

**Barred Warbler** *Sylvia nisoria*

A first year bird on 25 August was found in Brownsman cottage – twice! Another bird, of similar age, was on Brownsman on 6 September.

**Lesser Whitethroat** *S. curruca*

One to four were seen on nine days from 3-19 May, one on 4 June, and one to two from 18-20 June. Autumn birds were represented by 1-4 from 17-21 August then 1-2 on seven days from 23 September-19 October.

**Whitethroat** *S. communis*

One to four were seen almost daily from 3-18 May, with singles on eight days from 7 August-16 October and three on 25 August.

**Garden Warbler** *S. borin*

Scarce in spring with singles on just six days between 4 May and 4 June. In autumn 1-43 were observed regularly from 4 August-18 October with the peak count on 21 September.

**Blackcap** *S. atricapilla*

One to six were seen regularly from 20 April-23 May, with 1-21 almost daily from 3 September-3 November.

**Pallas's Warbler** *Phylloscopus proregulus*

One was on Inner Farne on 15 October, and one on Brownsman on 18 October. Seventh and eighth records for the islands and last recorded in 1996.

**Yellow-browed Warbler** *P. inornatus*

A minimum of thirteen birds – six on the inner group and at least seven on the outer group – on 27 September was unprecedented. This was on a day of south-westerly winds and no other migrants on the east coast – amazing! Eight and three on the following two days were remnants of this fall. Another bird was on Inner Farne on 15 October.

**Radde's Warbler** *P. schwarzi*

One was on Brownsman from 27-29 September. First record for the islands – oft-predicted and long-awaited.

**Dusky Warbler** *P. fuscatus*

One was on Brownsman on 18-19 October. Fifth record for the islands and last recorded in 1997.

**Wood Warbler** *P. sibilatrix*

One was on Staple Island on 4 May.

**Chiffchaff** *P. collybita*

One to six were seen almost daily from 31 March-17 May, with odd stragglers until 10 June. Birds were seen regularly from 18 August-12 November with a peak of sixteen on 27 September.



**Willow Warbler** *P. trochilus*

One to twenty-five were observed regularly from 3 April-3 June. Singles were noted on five days from 30 July-15 August followed by regular records of 1-36 from 18 August-16 October.

**Goldcrest** *Regulus regulus*

One to nine were seen daily from 25 March-4 April. One was on Brownsman on 6 August followed by 1-45 almost daily from 27 August-14 November with peak counts occurring in mid-October.

**Spotted Flycatcher** *Muscicapa striata*

One to four were observed on ten days from 6 May-3 June, with 1-3 on three days between 19 and 23 September.

**Red-breasted Flycatcher** *Ficedula parva*

A first winter/female was on Brownsman on 25 October.

**Pied Flycatcher** *F. hypoleuca*

The only spring record was a female on Brownsman from 6-10 May. Returning birds were noted on twenty-one days from 4 August-27 September with a peak count of thirty-one on 21 September.

**Coal Tit** *Parus ater*

One was on Brownsman on 12 October. Seventh record for the islands and last recorded in 1997.

**Great Tit** *P. major*

A male and female arrived on Inner Farne on 21 October. The female was found dead on 30 October whilst the male was still present when the wardens left the islands on 8 December.

**Woodchat Shrike** *Lanius senator*

A female was on Inner Farne during the evening of 3 June. Fourth record for the islands and last recorded in 1970.

**Jackdaw** *Corvus monedula*

One to seven were observed flying over the outer group on eight days from 2 April-10 May, with autumn records all from Inner Farne: one on the island on 8 November and four flying east on 9 November.

**Rook** *C. frugilegus*

One to five were seen daily from 30 March-29 April, with 1-3 seen infrequently from 2-20 October.

**Carrion Crow** *C. corone*

Seen regularly throughout the season although scarce from mid-May until early June. The peak count was of forty-one flying east on 9 November. A hooded crow *C. c. cornix* on Brownsman on 29-30 March was the first record since 1994. One pair attempted to nest on the Wideopens but were unsuccessful.

**Starling** *Sturnus vulgaris*

Recorded daily throughout the season with peak counts of 200+ from September onwards. 3 (3) pairs nested as follows: Inner Farne 3 (3).

**House Sparrow** *Passer domesticus*

An adult female, an adult male and two juveniles were on Brownsman on 13 October. These are the thirteenth-sixteenth records for the islands and were last recorded in 1997.

**Tree Sparrow** *P. montanus*

On 17 May one was observed 'dropping in from high altitude onto Brownsman north rocks'. It remained for just over two hours before flying off to the south-west.

**Chaffinch** *Fringilla coelebs*

One to two were seen on five days from 26 March-28 April. Seen almost daily from 20-27 September with regular records from 15 October-7 November. Numbers were generally 1-23 with a peak of thirty-four on 20 September.

**Brambling** *F. montifringilla*

One to four were observed on ten days from 31 March-27 April with 1-23 on nineteen days between 19 September and 8 November. The only count to exceed this was on 17 October when twenty-eight were present.

**Greenfinch** *Carduelis chloris*

Scarce in spring with just four records, of 1-3 birds, between 31 March and 7 April. A juvenile was in Inner Farne courtyard on 16 July. Birds were observed regularly from 6 October-10 November with a peak count of thirty-six on 16 October.

**Goldfinch** *C. carduelis*

In contrast to the other finches this is very much a 'spring' bird. There were records of 1-4 on thirteen days from 26 March-5 May. One was on Inner Farne on 31 August, then 1-2 on three days from 26-29 October.

**Siskin** *C. spinus*

One to two birds were noted on seven days from 2 April-14 May. These were followed by lone birds on 9 and 14 July, then 1-11 on seventeen days from 24 August-29 October.

**Linnet** *C. cannabina*

Observed almost daily from 25 March-31 May with a peak count of fifty on 16 April. There were daily sightings from 28 September until the end of the season with a maximum count of ca 120 on 28-29 September.

**Twite** *C. flavirostris*

One to two birds were with linnet flocks on 28 September, 11 and 23 October. Singletons and small flocks were noted flying over Inner Farne on ten days between 24 October and 23 November. The peak count was ten birds.

**Redpoll** *C. flammea*

Two were on Inner Farne on 20 September, then singles on five days from 27 September-7 November.

**Common Rosefinch** *Carpodacus erythrinus*

One was around Brownsman cottage for fifteen minutes on the evening of 6 September.



**Lapland Bunting** *Calcarius lapponicus*

Singles were on Brownsman on 19-22 September, 28 September and 22-23 October, with one on West Wideopens on 27 October.

**Snow Bunting** *Plectrophenax nivalis*

One to eight were observed regularly from 5 October-30 November.

**Yellowhammer** *Emberiza citrinella*

One was on Brownsman on 17 October, whilst two spent thirty minutes on Inner Farne on the morning of 30 October.

**Ortolan Bunting** *E. hortulana*

A first winter bird was on Inner Farne on 16 October.

**Little Bunting** *E. pusilla*

One was on Brownsman on 21-22 September, whilst a bird on Inner Farne on 26 September spent just two minutes on the island.

**Black-headed Bunting** *E. melanocephala*



One was present on Brownsman and Staple Island from 10-20 July, becoming progressively more elusive during its stay. First record for the islands – the bird in 1971, accompanied by a red-headed bunting, was 'suspect' to say the least.

**Reed Bunting** *E. schoeniclus*

One to six were observed on thirteen days from 31 March-21 May. One was on Inner Farne on 5-6 August, then 1-5 on thirteen days between 25 September and 25 October.

**FARNE ISLANDS RINGING REPORT FOR 1999**

Two years ago, a period of bad weather in late June severely affected breeding of seabirds along the north-east coast; although arctic terns and Sandwich terns on Coquet Island suffered high mortality, these species were relatively unaffected on the Farne Islands. In 1999 the tables were turned, and while Coquet terns did well, arctic terns on the Farne Islands suffered almost complete breeding failure with most chicks dying within a few days of hatching. Since this was mainly confined to arctic terns, a lack of surface fish (sandeels) may have been the main cause, and the wardens reported that arctic terns were resorting to kleptoparasitism to obtain food. The absence of arctic tern chicks meant that the growth and mortality data could not be obtained in 1999, but this event provides an interesting comparison with Coquet Island where the growth index and mortality was comparable to the previous year.

The ringing totals for all species on the Farne Islands in 1999 (with 1998 totals in brackets) were: shag 118 (105), eider 60 (34), kittiwake 291 (153), Sandwich tern 139 (609), roseate tern 2 (1), arctic tern 122 (378). The numbers of kittiwakes were double the previous year as this species did better overall and there were more surviving nests. We increased the effort on eiders and about thirty were retrapped from previous years in addition to the sixty new birds ringed. These ringing and retrap data are now being submitted to the British Trust for Ornithology (BTO) as a 'Retrapping Adults for Survival' (RAS) project. The shag data will

also be submitted to the BTO as an RAS project, and thus the ringing effort on shags and eiders will form part of a national long-term dataset for monitoring annual survival rates. Although 122 arctic terns were ringed (twelve on Brownsman, the rest on the Inner Farne study plots), most of these failed to survive. The numbers of Sandwich terns ringed was also substantially lower than the previous year. The main colony on Inner Farne did not do well, and a subsidiary colony became established on the Cemetery Bank where most of the Sandwich tern chicks were ringed. A colony on Brownsman was productive but, due to weather limiting access to Brownsman, it was too late to ring most of these chicks.

Sandwich terns on the Farne Islands and Coquet Island represent approximately 25% of the breeding population of this species for the whole of Britain and Ireland, and these colonies are therefore nationally important. Recoveries of Sandwich terns ringed on the Farne Islands account for over 40% of the total ringing recoveries and have thus made a major contribution to our knowledge of this species. Since the last Ringing Report, twenty-six recoveries of Sandwich terns have been received; these fall into four categories: resightings or controls (recaptured in the course of scientific studies) in Griend (The Netherlands), other European recoveries, recoveries in Africa, and recoveries in Britain and Ireland. Sustained observational work in the Dutch colonies at Griend have resulted in ten birds being seen or controlled there; these were nestlings ringed in 1973, 1979, 1981 (two birds), 1982, 1984, 1985 (three birds) and 1986, and provide evidence for extensive natal dispersal of Farne Island Sandwich terns to Dutch breeding colonies. Elsewhere in Europe, three birds were recovered along the south coast of Spain west to Malaga. One of these was an adult, ringed as a nestling in 1981 and recovered in February; the other two were both ringed as nestlings in 1998 and recovered in November 1998 and January 1999. Although most Sandwich terns winter along the west African coast, recoveries such as these indicate that some do winter further north. An adult Sandwich tern, ringed in 1986 and trapped on the Adriatic coast of Northern Italy in September 1998, is relatively unusual and suggests that there may be some mixing of west European Sandwich tern populations with those in the Black Sea that winter east along the Mediterranean to Spain. The remaining European recovery was of a bird ringed as a nestling in 1981 and controlled at Falsterbo, Sweden, in late August 1999. This may also be a bird that has dispersed to become a breeding adult on the other side of the North Sea.

Only five African recoveries of Sandwich terns were reported; three of these were nestlings ringed in 1998 and controlled in Ghana (July 1999), the Gambia (December 1999) and at sea off Dakar, Senegal (July 1999). The two July recoveries are further evidence that juvenile Sandwich terns do not return to natal latitudes until their second summer. The other African recoveries were in the Ivory Coast (a nestling ringed in 1997) and Namibia (a nestling from 1986) in February and March 1999, respectively. These areas, particularly the Ivory Coast and from Angola southwards, support important pelagic fisheries dependent on plankton-rich ocean upwellings.

Recoveries within Britain were birds found dead at Aberlady (ringed in 1982), the Isle of Arran (ringed in 1985), Teesmouth (ringed in 1985) and Bexhill, Sussex (ringed in 1982), and two birds controlled at Teesmouth (ringed in 1986 and 1999).

Three arctic terns ringed as nestlings on Inner Farne in 1985 (two birds) and 1986 were controlled as breeding adults on Coquet Island in 1999, and another nestling ringed on Inner Farne in 1978 was found dead on Coquet Island. These are examples of natal dispersal, a process vital for the exchange of 'new blood' between breeding colonies and have mainly come to light through the trapping of adult birds at breeding colonies.

Three recoveries of Farne-ringed kittiwakes in Greenland reflect the pelagic nature of this elegant gull outside the breeding season. These birds were ringed as nestlings on the Farnes in 1970, 1985 and 1996, and were recovered (two recorded as shot, the other unknown) from the southern tip of Greenland north into the Davis Strait between Greenland and Canada. Three other kittiwakes were found dead locally, at Dunstanburgh (ringed in 1984), Brownsman (ringed in 1982) and Low Newton (ringed in 1980).

With respect to other seabirds, two guillemots were resighted on the Farnes, and both of these were birds from the Isle of May (ringed in 1993 and 1994). Few puffins are now ringed on the



Farnes but there is continuing evidence of interchange between the Farnes and the Isle of May. Four Farne-ringed puffins have been controlled, recovered or resighted on the Isle of May: two birds ringed in 1968 (as adults) and a nestling ringed in 1975 were controlled, and a report has been received of a nestling ringed on Staple Island being resighted thirty years later on the Isle of May. In addition, an adult ringed in 1977 on the Isle of May was found dead on the Farne Islands. The leg of a puffin ringed as a nestling on Inner Farne in 1981 was found on the tide-line at Ross Back Sands in spring 1999. Recoveries of shags were widely distributed around the coast: nestlings ringed in 1998 were recovered dead in Orkney, Worthing (Sussex) and Antwerp (Belgium). Nestlings ringed in 1985 and 1997 were recovered locally on Brownsman and Holy Island respectively, and an adult ringed on the Isle of May in 1994 was resighted on Brownsman. Two eiders were recovered dead locally, both ringed as adult females, one in 1981 and one in 1986. The cause of death of these birds was recorded as 'oiled' and 'due to weather'. A fulmar ringed in 1980 on Staple Island was recovered dead on Walney Island in Cumbria in October 1998.

From the recovery patterns of Farne Island seabirds it is clear that maintaining ringing effort is important to elucidate the movements and mortality of these birds and to detect long term trends in survival, wintering areas, migration routes and dispersal between colonies. Mortality of Sandwich terns due to trapping in their winter quarters was identified through ringing many years ago, but has remained a problem in recent years and could have significant consequences for European populations of Sandwich terns, particularly if breeding colonies and wintering birds come under pressure from future reductions in food availability. Therefore, it is important to maintain the ringing of nestlings to monitor changes in wintering distribution and pre-breeding mortality from year to year.

Closer to home, the marked differences in arctic tern breeding performances between the Farnes and Coquet Island in 1997 and in 1999 suggest that birds nesting on these two island groups, only twenty miles apart, have very different feeding areas in which the quality and availability of food varies independently from year to year. Monitoring these marine resources and how they change in relation to the fishing industry, pollution and sewage discharges must become a priority for the next few years. Furthermore, detailed, quantitative studies on annual recruitment of first-time breeders into colonies and the extent of interchange between different populations is important for understanding seabird population dynamics. The trapping or resighting of adults at breeding colonies thus needs to be encouraged to estimate dispersal, emigration and adult survival rates.

The ringing studies on the Farne Islands would not be possible without the generous support of Northumbrian Water, and we are extremely grateful to them for providing the boat that enables the ringing team to access the islands. Many ringers participate in the work and these studies would not be possible without the time and effort that they put in. We are also grateful to the Farne Islands Local Management Committee of the National Trust for their support of the work, and to John Walton and his wardens for help and participation in the studies. The wardens resident on the islands provide excellent data by reading ring numbers in the field and this is greatly appreciated.

TRANSACTIONS  
OF THE  
NATURAL HISTORY SOCIETY  
OF  
NORTHUMBRIA

Editor:

B J SELMAN

Assistant Editors:

D C NOBLE-ROLLIN

M A PATTERSON

Volume 60

Part 3

THE NATURAL HISTORY SOCIETY OF NORTHUMBRIA  
THE HANCOCK MUSEUM  
NEWCASTLE UPON TYNE NE2 4PT

2001



**Front Cover:** Aerial photo of Gosforth Park Nature Reserve taken in 1996. Copyright of Geoinformation International from their CD-rom Cities Revealed.



ISSN 0144-221X

©The Natural History Society of Northumbria, 2001  
This publication is copyright. It may not be  
reproduced in whole or in part without the  
Society's permission.

Printed by Pattinson and Sons, Newcastle upon Tyne.

## CONTENTS

	Page
<b>An ecological evaluation method for regional butterfly faunas</b> by S ELLIS	59
<b>The vegetation of Gosforth Park Nature Reserve</b> by D N MITCHELL and J A BAKER	74
<b>Building stones of the district around Alnwick, Northumberland</b> by D E JACKSON	101
SHORT COMMUNICATIONS	
<b>The Heslop-Harrisons: a dynasty of Northumbrian naturalists</b> by B J SELMAN	115
BOOK REVIEW	
<b><i>A Rum Affair</i> by Karl Sabbah</b> by A J RICHARDS	116



## APPENDIX

THE APPENDIX CONTAINS THE FOLLOWING:

1. THE APPENDIX CONTAINS THE FOLLOWING:

2. THE APPENDIX CONTAINS THE FOLLOWING:

3. THE APPENDIX CONTAINS THE FOLLOWING:

4. THE APPENDIX CONTAINS THE FOLLOWING:

5. THE APPENDIX CONTAINS THE FOLLOWING:

6. THE APPENDIX CONTAINS THE FOLLOWING:

7. THE APPENDIX CONTAINS THE FOLLOWING:

8. THE APPENDIX CONTAINS THE FOLLOWING:

9. THE APPENDIX CONTAINS THE FOLLOWING:

10. THE APPENDIX CONTAINS THE FOLLOWING:

## AN ECOLOGICAL EVALUATION METHOD FOR REGIONAL BUTTERFLY FAUNAS

S Ellis

Ecology Centre, School of Environment, University of Sunderland SR1 3SD

(Present address: 7 Mayorswell Close, Durham City, County Durham DH1 1JU)

### SUMMARY

This paper describes a method of ecological evaluation for regional butterfly faunas. Distribution data for the butterflies of magnesian limestone grassland Sites of Special Scientific Interest (SSSIs) in north-east England were collated, together with data on site area and isolation, habitat and plant diversity. Twenty-two species of butterfly were recorded from twenty-six sites. The conservation value of the sites was assessed by scoring two criteria, butterfly diversity and rarity and compared with evaluations of five site criteria. Two versions of a Regional Butterfly Conservation Value Index were constructed from three terms: a species richness score, a regional rarity score and the population size category of nationally rare or declining species. The resulting site rankings compared favourably to a subjective assessment of ten criteria by English Nature and to an objective Site Evaluation Index, based on the five site criteria.

### INTRODUCTION

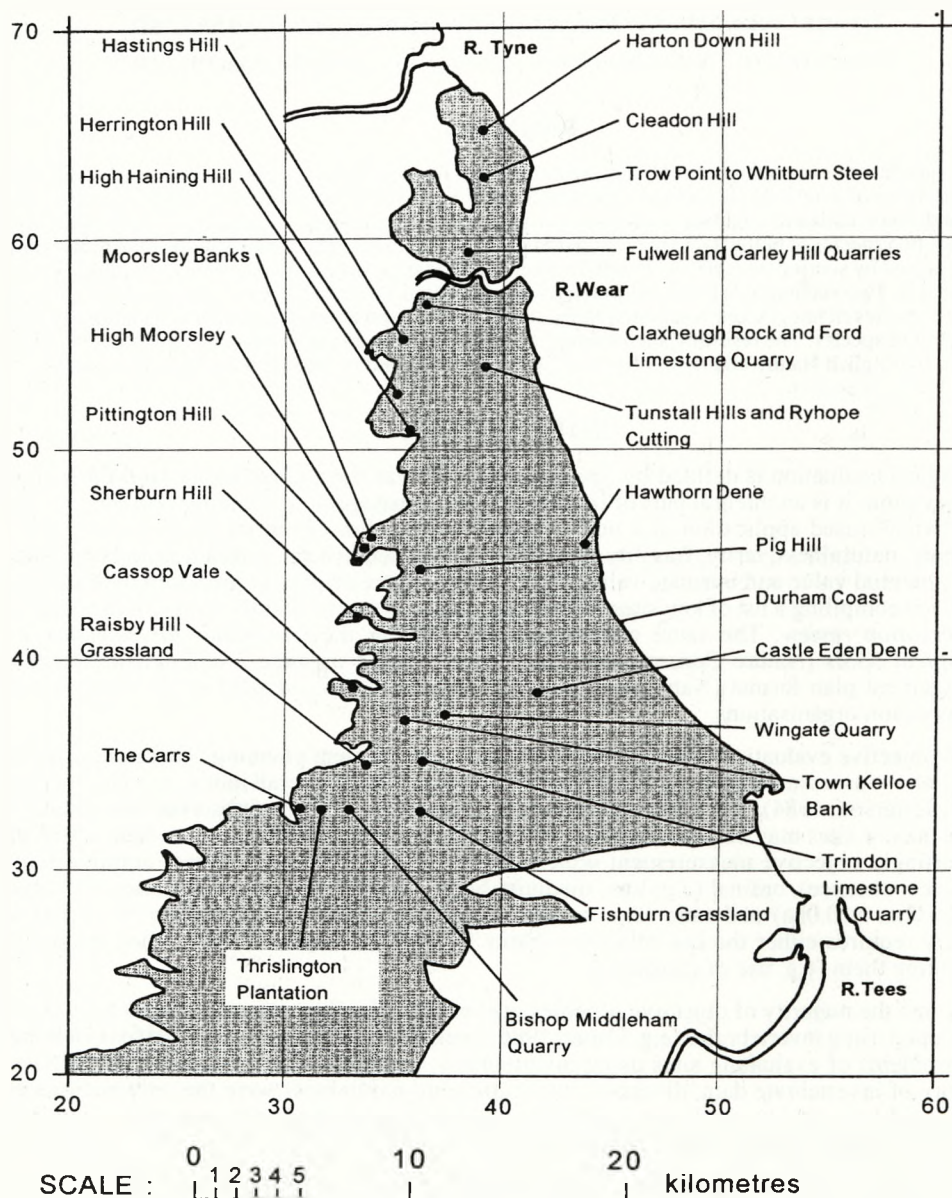
Ecological evaluation is defined by Spellerberg (1992), as the assessment of land for nature conservation. It is an integral part of the conservation management planning process and the most widely used application is a non-numerical evaluation of ten standard criteria: area, diversity, naturalness, rarity, fragility, typicalness, recorded history, position in an ecological unit, potential value and intrinsic value. These criteria were originally proposed by Ratcliffe (1977) in compiling a list of key sites of National Nature Reserve (NNR) status for the *Nature conservation review*. The same criteria are also used in the *Guidelines for selection of biological SSSIs* (Nature Conservancy Council, 1989) and in stage 2 of English Nature's management plan format (Nature Conservancy Council, 1988) adopted by the majority of conservation organisations.

More objective evaluation methods can be used in management planning. These are usually based on the assessment of several criteria combined to give an overall index (e.g. Goldsmith, 1975; Jefferson, 1984). The principal advantage is the minimisation of observer bias whereby some taxa or sites may be favoured over others. Spellerberg (1992) describes four scales of increasingly objective measurement which can be used in such evaluations: nominal (e.g. presence, absence), ordinal (e.g. low, medium, high), interval (e.g. area categories: 0-2.5ha, 2.6-10.0ha, >10.0ha) and ratio (e.g. number of species) scales. Computation of an index usually requires either the use of score classes for each criterion or some other means of weighting them (e.g. use of constants).

Although the majority of objective schemes are based on the flora, many methods have been developed using invertebrates (e.g. Usher, 1986; Spellerberg, 1992). Disney (1986) reviewing the problems of evaluating sites using invertebrates, concluded that because of the relative paucity of invertebrate data, diversity, rarity, area and naturalness were the only ecological criteria which could be easily assessed. The extent of habitat fragmentation and isolation is another important criteria, but is more difficult to quantify.

In north-east England, the national importance of magnesian limestone grassland is well recognised (e.g. Ratcliffe, 1977), with about 65% of the SSSI total resource occurring in County Durham and Tyne and Wear (Fig. 1). Although the primary conservation interest is the unique and rare vegetation type, the habitat supports an important invertebrate community. English Nature (formerly Nature Conservancy Council) began to address the problems of inadequate and uncoordinated management of the north-east England SSSIs through Pritchard's (1989) *A strategy for the magnesian limestone grasslands*. Ecological evaluation was an integral part of the planning process employed in this strategy, with each site subjectively evaluated prior to the development of management objectives and prescriptions.





**Fig. 1** Magnesian limestone grassland sites with SSSI status in north-east England (County Durham and Tyne and Wear)

(source: 1:250000 solid geology - Institute of Geological Sciences)

The evaluation and subsequent rank order of each site was based on Ratcliffe's (1977) criteria plus an assessment of the current management condition.

During the 1990s, the butterfly fauna of these sites was studied in some detail (e.g. Ellis, 1991, 1995, 1999a). This paper utilises butterfly distribution data, to propose an objective method of regional ecological evaluation of the SSSIs. The results of the evaluation are then tested against an objective assessment of five other site characteristics as well as Pritchard's (1989) subjective site rankings.

## METHODS

### Butterfly distribution data

Butterfly distribution data, based on presence/absence tetrad records (2 km<sup>2</sup>), were collated for the period 1990-98. The main source of records was the County and Butterfly Conservation Recorder (Ian Waller, pers. comm.). Where two or more sites occupied a single tetrad, the LEVANA database (the recording system used by Butterfly Conservation) was searched so that records could be allocated to the individual sites concerned. Additional records from several sites briefly surveyed by Ellis (1995) during 1990-93 were also included. In 1995, Butterfly Conservation initiated the *Butterflies for the New Millennium* project, designed to be the largest and most wide-ranging butterfly survey to date. The records collated for this assessment should therefore represent better coverage than earlier databases (e.g. Dunn *et al.*, 1986; Cook, 1990) though it is likely to be incomplete, as for most invertebrate taxa.

### Site data

Several site characteristics, frequently used in ecological evaluations (e.g. Usher, 1986; Spellerberg, 1992), were also recorded for each SSSI:

1. Total site area (ha)
2. Area of calcareous (magnesian limestone) grassland (ha)
3. Isolation (km): edge to edge distance to nearest other SSSI
4. Habitat diversity (number of habitat types)
5. Plant species richness (number of recorded species)

Area and habitat diversity measurements were calculated from Phase 1 habitat maps and plant species richness was taken from SSSI file notes (Fuller, 1990).

### Butterfly evaluation criteria

The butterfly distribution records were used to evaluate two criteria, diversity and rarity. These were selected as attributes of the butterfly fauna, which could be assessed objectively using presence/absence data.

#### 1) Diversity

Diversity has two components, species richness (the number of species) and their relative abundance (evenness or equitability). These two components are often combined in a diversity index (e.g. Simpson's index). Clearly the assumption that value increases with diversity is implicit, but note this may not be compatible with rarity when large populations of rare species will be highly valued.

A further complication with diversity relates to the concept of 'tourist' species. These were described by Moran and Southwood (1982), in a study of arthropod communities in trees, as an influx of species from adjacent habitats. A similar distinction is often made between two groups of butterflies according to broad differences in population structure (e.g. Thomas, 1984; Warren, 1992). 'Sedentary' species are those with more or less closed population structures, which regularly use a site for breeding. 'Mobile' species have open population structures and are locally mobile or semi-migratory, only occasionally using a site for



breeding. There is an obvious parallel here with the 'tourist' species concept. This distinction has been blurred by recent studies of the metapopulation structure of butterflies, which suggests that even the most 'sedentary' species are more mobile than previous research suggested (e.g. Hill *et al.*, 1996). In general, unoccupied sites become colonised providing they are in close proximity to large, occupied sites, confirming that some individuals migrate between sites even if most remain within the colony. Furthermore, there is some evidence to suggest that population structure varies with geographic region. For example, Courtney (1980) found that both the green-veined white *Pieris napi* L. and the orange tip *Anthocharis cardamines* L., mobile species in the south, tend towards a more sedentary habit in the north and at higher altitudes. Nevertheless, the broad distinction between the two groups remains true and in particular the degree to which a site is used for breeding.

Diversity indices cannot be calculated from presence/absence data and therefore only species richness was measured, but account was taken of differences in population structure, i.e.

1. The total number of species of butterfly on a site ( $T$ )
2. The total number of 'characteristic' magnesian limestone grassland species of butterfly ( $S$ ). This assessment was based on the number of sedentary species recorded and reflects the naturalness and typicalness of the butterfly community. Ratcliffe (1977) produced similar lists of characteristic butterfly fauna for magnesian limestone grassland and other biotopes.
3. The combined scores (CSR) for total species richness and characteristic species for each site. Each characteristic species is therefore scored twice:

$$CSR = T + S$$

A similar method was used by Jefferson (1984) assessing vascular plant richness in disused chalk quarries and pits.

## 2) Rarity

Rarity evaluations are based on the frequency of occurrence of species in a county, a region or a country and require detailed distribution maps. On a national scale this has been applied by Perring *et al.* (1977) who fixed a 'rarity line' for British Red Data Book higher plants at 15-16/10 km square. A similar rarity line has been used for British Red Data Book butterflies (Shirt, 1987) and applied to the selection of SSSIs by English Nature (Nature Conservancy Council, 1989). Butterfly species with 16-100/10 km square are described as nationally scarce (e.g. northern brown argus *Aricia artaxerxes* Fabricius). Butterflies which have experienced substantial local declines, are also listed as criteria for the selection of SSSIs (e.g. dingy skipper *Erynnis tages* L.). In this evaluation, rarity was assessed both regionally and nationally.

### Regional rarity

Several indices using score classes of the number of grid squares occupied by a species have been developed for both plants (e.g. Dony *et al.*, 1985) and animals (e.g. Foster, 1987). Other methods (e.g. Jefferson, 1984) have used rarity indices directly which are based on the inverse of the proportion of the number of grid squares occupied by a species. Both approaches were used to assess regional rarity and required the number of magnesian limestone grassland tetrads in which the  $i^{\text{th}}$  sedentary species occurred to be calculated:

#### (I) Regional rarity: score classes

Each sedentary species is allocated a score class based on the number of tetrad records:

Number of tetrad records	1	2-3	4-7	8-15	16-31	32 or more
Score class	6	5	4	3	2	1

Scores for each sedentary species are summed to give a site rarity index (RRSC):

- 1 Nomenclature of butterflies follows Emmet and Heath (1989)

$$RRSC = \sum_{i=1}^s ci$$

Where  $ci$  = score class for the number of tetrad records for the  $i$ th species  
 $s$  = number of sedentary species recorded for the site

(ii) Regional rarity index for sedentary species

The proportion of magnesian limestone grassland tetrads occupied by each sedentary species is calculated. Scores for each sedentary species recorded are summed to give a site rarity index (RR):

$$RR = \sum_{i=1}^s 1/mi$$

where  $mi$  = the proportion of magnesian limestone grassland tetrads in which the  $i$ th sedentary species occurs  
 $s$  = number of sedentary species recorded for the site

*National rarity*

The assessment of national rarity requires some means of categorising species. Red Data Books and Red Lists (Warren 1987) provide the most widely used system for classifying taxa by rarity. Warren (1993), for example, prioritised nationally rare butterflies as either top priority (Red Data Book classes 1-3: endangered, vulnerable or rare), medium priority (Red Data Book class 4: out of danger or nationally scarce species) or as other key species which were declining at a regional or local level. That system has been developed by Warren *et al.* (1997), adapting the methodology of the 'conservation cube' (Avery *et al.*, 1995). Butterfly species are classified as high, medium or low priority according to their national status (based on rarity and/or decline in populations or range), international importance (proportion of western European colonies in Great Britain) and European or global status (based on rarity and/or decline). Using this system, only *A. artaxerxes* of magnesian limestone grassland butterflies would qualify as a top priority species. Warren (1993) includes *E. tages* as a key species and although Warren *et al.* (1997) classify it as low priority, it is recognised as a butterfly which has undergone regional declines and whose status may have to be reviewed (Bourn *et al.*, 1996). Its regional priority was raised to medium in Butterfly Conservation's North East Regional Action Plan (Ellis, 1999b).

Warren (1993) utilised the priority ratings of key species to grade sites in central southern England. The peak flight period population sizes for the priority species were estimated and classified into large (>500), medium (50-500) and small (<50). Sites were graded according to the presence of important populations of nationally rare species. For example, a site supporting one large/medium colony of a top priority species or five medium priority species would qualify as nationally important. A site with one small colony of a top priority species or 3-4 small or two large colonies of medium priority species would qualify as regionally important. This system was adapted for the present study, to arrive at an evaluation of national rarity.

Sites were scored according to the peak flight colony size (Ellis, 1995) of *A. artaxerxes* (*Aa*), the only nationally high or medium priority species on the magnesian limestone grasslands. Estimated population size was calculated from transect count data using the method of Thomas (1983). Large colonies (>500) scored 3, medium colonies (50-500) scored 2 and small colonies (<50) scored 1; extinct colonies were recorded as 0.

**Site evaluation criteria**

In order to provide an objective comparison of the butterfly evaluations, a simple Site Evaluation Index (SEI) using the site data was constructed. The area and isolation data included several very large and small values respectively, and these criteria were therefore assessed using score classes:



Table 2 Site characteristics for twenty-six magnesian limestone grassland SSSIs in north-east England.

SITE NAME	TOTAL AREA (ha)	CALCAREOUS GRASSLAND (ha)	ISOLATION (Distance to nearest SSSI - km)	HABITAT DIVERSITY (No. of biotope types)	PLANT SPECIES RICHNESS
Bishop Middleham Quarry	8.60	5.02	1.10	5	124
Cassop Vale	40.90	5.79	1.74	9	136
Castle Eden Dene	192.97	0.13	3.70	3	*
Claxheugh Rock and Ford Limestone Quarry	7.25	1.84	2.60	5	53
Cleadon Hill	9.96	2.70	1.86	3	39
Durham Coast	284.40	79.60	0.02	11	121
Fishburn Grassland	1.12	1.12	2.40	2	*
Fulwell and Carley Hill Quarries	6.00	1.73	2.60	6	71
Harton Down Hill	1.05	0.59	0.46	3	37
Hastings Hill	1.04	0.55	1.46	3	67
Hawthorn Dene	64.10	3.46	0.02	4	*
Herrington Hill	6.90	4.14	1.46	4	84
High Haining Hill	2.90	0.97	2.04	3	70
High Moorsley	6.80	4.42	0.02	5	56
Moorsley Banks	5.54	0.98	0.02	4	*
Pig Hill	12.60	3.80	2.50	5	61
Pittington Hill	6.22	2.95	0.25	3	96
Raisby Hill Grassland	15.13	2.49	2.00	6	81
Sherburn Hill	18.37	2.91	2.44	6	91
The Carrs	12.90	1.80	0.90	7	51
Thrislington Plantation	17.25	10.40	0.90	6	121
Town Kelloe Bank	5.59	1.50	0.60	4	84
Trimdon Limestone Quarry	0.80	0.80	1.65	2	*
Trow Point to Whitburn Steel	107.50	13.80	0.46	5	63
Tunstall Hills and Ryhope Cutting	15.80	4.30	3.74	6	67
Wingate Quarry	19.70	7.48	0.60	7	101

No data available for sites denoted \*.

65

Table 1 1990-98 butterfly records for twenty-six magnesian limestone grassland Sites of Special Scientific Interest (SSSIs) in north-east England

	a) Sedentary species (S)												b) Mobile species (M)												
	<i>Thymelicus sylvestris</i> Poda	<i>Ochlodes venata</i> Bremer & Grey	<i>Erynnis tages</i> L.	<i>Lycia phlaeas</i> L.	<i>Aricia artaxerxes</i> Fabricius	<i>Argynnis icarus</i> Rot.	<i>Lasioommata megera</i> L.	<i>Pyronia tithonus</i> L.	<i>Maniola jurtina</i> L.	<i>Aphantopus hyperantus</i> L.	<i>Coenonympha pamphilus</i> L.	<i>Colias croceus</i> Geoffrey	<i>Pieris brassicae</i> L.	<i>Pieris rapae</i> L.	<i>Pieris napi</i> L.	<i>Anthocharis cardamines</i> L.	<i>Vanessa atalanta</i> L.	<i>Cynthia cardui</i> L.	<i>Aglais urticae</i> L.	<i>Inachis io</i> L.	<i>Polyommata c-album</i> L.	TOTAL M	TOTAL SPP		
Bishop Middleham Quarry	+	+	+	+	+	+		+	+	+	10	+	+	+	+	+	+	+	+	+	10		20		
Cassop Vale	+	+	+	+	+	+	+	+	+	+	11		+	+	+		+	+			6		17		
Castle Eden Dene	+	+			+	+			+	+	6		+	+	+	+			+	+	7		13		
Claxheugh Rock											0										0		0		
Cleadon Hill								+			2										0		2		
Durham Coast	+	+	+	+	+	+	+	+	+	+	10	+	+	+	+	+	+	+	+	+	10		20		
Fishburn Grassland											0										0		0		
Fulwell and Carley Hill Quarries											0										0		0		
Harton Down Hill											0										0		0		
Hastings Hill					+			+			2										0		2		
Hawthorn Dene	+	+	+	+	+	+	+	+	+	+	10	+	+	+	+	+	+	+	+		8		18		
Herrington Hill											0		+								1		1		
High Haining Hill			+			+		+	+	+	4			+		+		+	+		4		8		
High Moorsley	+	+			+			+	+	+	6								+		1		7		
Moorsley Banks			+		+			+	+	+	4										0		4		
Pig Hill			+	+	+	+		+	+	+	6		+		+			+			3		9		
Pittington Hill	+	+	+	+	+	+	+	+	+	+	10	+	+	+	+	+	+	+	+	+	9		19		
Raisby Hill Grassland	+	+	+	+	+	+	+	+	+	+	10	+	+	+			+	+	+	+	7		17		
Sherburn Hill	+	+	+	+	+	+	+	+	+	+	9	+	+	+	+		+	+	+		7		16		
The Carrs											0										0		0		
Thrislington Plantation	+	+	+	+	+	+	+	+	+	+	11	+	+	+	+	+	+	+	+	+	9		20		
Town Kelloe Bank			+		+			+	+	+	5	+		+							2		7		
Trimdon Limestone Quarry	+	+	+	+	+	+	+	+	+	+	10	+	+	+	+	+	+	+	+	+	9		19		
Trow Point to Whitburn Steel				+	+			+			3		+						+		2		5		
Tunstall Hills and Ryhope Cutting											0										0		0		
Wingate Quarry	+	+	+	+		+		+	+	+	8	+	+	+					+	+	5		13		
TOTAL RECORDS PER SPECIES	12	15	12	11	11	19	1	10	2	19	10	15	2	14	13	12	10	8	9	15	11	6			

64



**Table 4** Evaluation of magnesian limestone grassland SSSIs in north-east England using area, isolation, habitat and plant diversity criteria.

SITE NAME	WEIGHTED SITE AREA: SCORE CLASSES (SASC)	WEIGHTED CALCAREOUS GRASSLAND AREA: SCORE CLASSES (CGSC)	WEIGHTED ISOLATION: SCORE CLASSES (I)	WEIGHTED HABITAT DIVERSITY (HD)	WEIGHTED PLANT SPECIES RICHNESS (PSR)	SITE EVALUATION INDEX 1	SITE EVALUATION INDEX 2
Bishop Middleham Quarry	0.75	1.54	0.95	1.02	1.55	5.81	7
Cassop Vale	1.51	1.54	0.95	1.84	1.70	7.54	2
Castle Eden Dene	1.89	0.38	0.32	0.61	0.80	4.00	19
Claxheugh Rock and Ford Limestone Quarry	0.75	0.77	0.64	1.02	0.66	3.84	21
Cleadon Hill	0.75	1.15	0.95	0.61	0.49	3.95	20
Durham Coast	1.89	1.92	1.59	2.25	1.51	9.16	1
Fishburn Grassland	0.38	0.77	0.64	0.41	0.55	2.75	25
Fulwell and Carley Hill Quarries	0.75	0.77	0.64	1.23	0.89	4.28	18
Harton Down Hill	0.75	0.38	1.27	0.61	0.46	3.47	23
Hastings Hill	0.75	0.38	0.95	0.61	0.84	3.53	22
Hawthorn Dene	1.51	1.15	1.59	0.82	1.27	6.34	6
Herrington Hill	0.75	1.15	0.95	0.82	1.05	4.72	13
High Haining Hill	0.38	0.38	0.64	0.61	0.88	2.89	24
High Moorsley	0.75	1.15	1.59	1.02	0.70	5.21	10
Moorsley Banks	0.75	0.38	1.59	0.82	0.89	4.43	17
Pig Hill	1.13	1.15	0.64	1.02	0.76	4.70	14
Pittington Hill	0.75	1.15	1.27	0.61	1.20	4.98	11
Raisby Hill Grassland	1.13	0.77	0.64	1.23	1.01	4.78	12
Sherburn Hill	1.13	1.15	0.64	1.23	1.14	5.29	8
The Carrs	1.13	0.77	1.27	1.43	0.64	5.24	9
Thrislington Plantation	1.13	1.92	1.27	1.23	1.51	7.06	3
Town Kelloe Bank	0.75	0.77	1.27	0.82	1.05	4.66	16
Trimdon Limestone Quarry	0.38	0.38	0.95	0.41	0.53	2.65	26
Trow Point to Whitburn Steel	1.89	1.92	1.27	1.02	0.79	6.89	4
Tunstall Hills and Ryhope Cutting	1.13	1.15	0.32	1.23	0.84	4.67	15
Wingate Quarry	1.13	1.54	1.27	1.43	1.26	6.63	5
Weighting constant	0.3774	0.3846	0.3175	0.2049	0.0125		

The Site Evaluation Index is the sum of the weighted area, isolation, habitat and plant diversity criteria. See text for explanation of criteria weightings.  
Site rankings in italics. Index 1 includes plant species richness estimates for four sites (italicised), calculated as the mean value of the other four criteria.  
Index 2 is the sum of the first four criteria and excludes plant species richness data.

**Table 3** Evaluation of magnesian limestone grassland SSSIs in north-east England using different assessments of butterfly diversity and rarity criteria.

SITE NAME	COMBINED SPECIES RICHNESS (CSR)	REGIONAL RARIETY: SCORE CLASSES (RRSC)	REGIONAL RARIETY INDEX (RR)	NATIONAL RARIETY INDEX (NR): POPULATION SIZES OF HIGH PRIORITY SPECIES - NORTHERN BROWN ARGUS (Aa)
Bishop Middleham Quarry	30	17	70.51	2
Cassop Vale	28	22	156.51	2
Castle Eden Dene	19	9	36.84	1
Claxheugh Rock and Ford Limestone Quarry	0	0	0	
Cleadon Hill	4	2	7.66	
Durham Coast	30	17	70.51	3
Fishburn Grassland	0	0	0	
Fulwell and Carley Hill Quarries	0	0	0	
Harton Down Hill	0	0	0	
Hastings Hill	4	2	7.66	0
Hawthorn Dene	28	17	70.51	1
Herrington Hill	1	0	0	
High Haining Hill	12	6	25.32	
High Moorsley	13	8	33.16	
Moorsley Banks	8	5	21.63	
Pig Hill	15	10	42.97	1
Pittington Hill	29	17	70.51	2
Raisby Hill Grassland	27	17	70.51	1
Sherburn Hill	25	15	63.89	2
The Carrs	0	0	0	
Thrislington Plantation	31	23	242.51	3
Town Kelloe Bank	12	7	30.68	2
Trimdon Limestone Quarry	29	20	147.45	
Trow Point to Whitburn Steel	8	4	15.85	
Tunstall Hills and Ryhope Cutting	0	0	0	
Wingate Quarry	21	13	54.84	

Regional rarity assessments were based on the following sedentary species (number of magnesian limestone tetrad records in brackets, maximum 172):  
*T. sylvestris* (35), *O. venata* (20), *E. tages* (14), *L. phlaeas* (21), *A. artaxerxes* (19), *P. icarus* (39), *A. aglaja* (1), *L. megera* (22), *P. tithonius* (2),  
*M. jurtina* (40), *A. hyperantus* (2), *C. pamphilus* (35). National rarity assessments were based on the following population size score classes:  
3, large colonies (>500); 2, medium colonies (50-500); 1, small colonies (<50); 0, extinct colonies.



**Table 5** Calculation of a Regional Butterfly Conservation Index(RVBCI) and rankings for magnesian limestone grassland SSSIs in north-east England

SITE NAME	WEIGHTED	WEIGHTED	WEIGHTED	WEIGHTED	REGIONAL BUTTERFLY		SITE EVALUATION		PRITCHARDS (1989) RANKING		
	COMBINED	REGIONAL	REGIONAL	NATIONAL	CONSERVATION VALUE		INDEX 1	INDEX 2			
	SPECIES	RARITY: SCORE	RARITY	RARITY	INDEX (RBCV)						
	RICHNESS (CSR)	CLASSES (FRSC)	INDEX (RR)	INDEX (NR)	VERSION 1	VERSION 2					
Bishop Middleham Quarry	2.09	1.40	1.08	1.10	4.59	4	4.27	5	7	8	9
Cassop Vale	1.95	1.81	2.39	1.10	4.86	3	5.44	2	2	3	3
Castle Eden Dene	1.32	0.74	0.56	0.55	2.61	10	2.43	10	16	17	16
Claxteugh Rock and Ford Limestone Quarry											
Cleodon Hill	0.28	0.16	0.12		0.44	18=	0.40	18=	17	16	18
Durham Coast	2.09	1.40	1.08	1.65	5.14	2	4.82	3	1	1	2
Fishburn Grassland											
Fulwell and Carley Hill Quarries											
Harton Down Hill											
Hastings Hill	0.28	0.16	0.12		0.44	18=	0.40	18=	18	18	13
Hawthorn Dene	1.95	1.40	1.08	0.55	3.90	7	3.58	8	6	6	12
Herrington Hill	0.07	0	0		0.07	20	0.07	20	12	13	10
High Haining Hill	0.83	0.49	0.39		1.32	15	1.22	15	19	20	17
High Moorsley	0.90	0.66	0.51		1.56	14	1.41	14	9	7	15
Moorsley Banks	0.56	0.41	0.33		0.97	16	0.89	16	15	15	19
Pig Hill	1.04	0.82	0.66	0.55	2.41	13	2.25	13	13	10	4
Pittington Hill	2.02	1.40	1.08	1.10	4.52	5	4.20	6	10	11	11
Raisby Hill Grassland	1.88	1.40	1.08	0.55	3.83	8	3.51	9	11	12	14
Sherburn Hill	1.74	1.23	0.98	1.10	4.07	6	3.82	7	8	9	5
The Carrs											
Thrsington Plantation	2.15	1.89	3.71	1.65	5.69	1	7.51	1	3	4	1
Town Kelloe Bank	0.83	0.58	0.47	1.10	2.51	12	2.40	11	14	14	6
Trimdon Limestone Quarry	2.02	1.64	2.26		3.66	9	4.28	4	20	19	
Trow Point to Whitburn Steel	0.56	0.33	0.24		0.89	17	0.80	17	4	2	7
Tunstall Hills and Ryhope Cutting											
Wingate Quarry	1.46	1.07	0.84		2.53	11	2.30	12	5	5	8
Weighting constant	0.0695	0.0820	0.0153	0.5495							

The RBCV is the sum of the weighted combined species richness, regional rarity score class and the national rarity index. See text for explanation of criteria weightings. Sites are ranked in italics according to the RBCV evaluation and compared with objective (see Table 4) and subjective rankings (Pritchard 1989), adjusted for sites without butterfly data.

### Site area (SASC)

Total site area (ha)	<5.0	5.1-10	10.1-20	20-100	>100
Score class	1	2	3	4	5

### Calcareous grassland area (CGSC)

Calcareous grassland area (ha)	<1.0	1.1-2.5	2.5-5	5.1-10	>100
Score class	1	2	3	4	5

### Isolation (I)

Isolation (km)	>3.0	2.1-3.0	1.1-2.0	0.1-1.0	<0.1
Score class	1	2	3	4	5

The values for each of the five criteria were weighted equally and summed:

$$SEI = wc1(SASC) + wc2(CGSC) + wc3(I) + wc4(HD) + wc5(PSR)$$

where  $wc$  = weighting constant for each term such that the mean value of the sites was 1, HO = habitat diversity, PSR = plant species richness.

No plant species richness data were available for six sites, so estimates of the mean of the other four criteria were used (Site Evaluation Index 1). A second index was calculated without the plant species richness data (Site Evaluation Index 2).

### A Regional Butterfly Conservation Value Index

Two versions of a Regional Butterfly Conservation Value Index (RBCVI) were tested. Version 1 was the sum of the combined scores for total species richness and characteristic species (CSR), regional rarity score classes (RRSC) and national rarity (NR):

$$RBCVI(\text{Version 1}) = wc1(T+S) + wc2 \sum_{i=1}^n ci + wc3(Aa)$$

where  $wc$  = weighting constant for each term such that the mean value of the sites was 1. All three terms were weighted equally.

In version 2, regional rarity score classes were replaced by the regional rarity index (RR):

$$RBCVI(\text{Version 2}) = wc1(T+S) + wc2 \sum_{i=1}^n 1/mi + wc3(Aa)$$

### Data analysis

Evaluations of both butterfly and site criteria were compared with each other using correlation coefficients. Sites were ranked in order from the evaluations of the two butterfly indices, the two site indices and the subjective assessment of Pritchard (1989). Site rankings were compared using the Spearman rank correlation coefficient. Since no butterfly data were available for six sites, these were excluded from the analyses, with sites re-ranked accordingly.

## RESULTS

### Butterfly distribution data

Twenty-two butterfly species were recorded during the survey period. A total of 217 records were unevenly distributed between the twenty-six SSSIs, with six sites having no records at all and three with records for twenty species (Table 1).

Twelve of the twenty species recorded are regarded as sedentary (Warren, 1992), regularly using the calcareous grassland as breeding habitat: small skipper *Thymelicus sylvestris* Poda, large skipper *Ochlodes venata* Bremer & Grey, dingy skipper *E. tages*, small copper *Lycaena*



*phlaeas* L., northern brown argus *A. artaxerxes*, common blue *Polyommatus icarus* Rott., dark green fritillary *Argynnis aglaja* L., wall *Lasiommata megera* L., gatekeeper *Pyronia tithonus* L., meadow brown *Maniola jurtina* L., ringlet *Aphantopus hyperantus* L. and small heath *Coenonympha pamphilus* L. Most of these were described as characteristic of magnesian limestone grassland (Ratcliffe, 1977). The most frequently recorded species were *P. icarus* (19 sites) *M. jurtina* (19), *O. venata* (15) and *C. pamphilus* (15).

The other ten species are locally mobile or semi-migratory (Warren, 1992) only occasionally using the calcareous grassland for breeding: clouded yellow *Colius croceus* Geoffrey, large white *Pieris brassicae* L., small white *Pieris rapae* L., green-veined white *P. napi*, orange-tip *A. cardamines*, red admiral *Vanessa atalanta* L., painted lady *Cynthia cardui* L., small tortoiseshell *Aglais urticae* L., peacock *Inachis io* L. and comma *Polyommata c-album* L.

### Site characteristics

Table 2 summarises the data for the five site characteristics. Total area ranged from 0.8 to 284.4 ha, but most sites were small. Similarly the area of calcareous grassland was small, exceeding over 5 ha on only five sites. The degree of isolation was also variable with five sites very close together (<0.5 km), while two were nearly 4 km from the nearest adjacent SSSI. In addition to the calcareous grassland, most sites supported a range of other habitats, especially neutral grassland, dense scrub and woodland (Ellis, 1995). Over 100 plant species have been recorded from five of the sites.

### Evaluation criteria and indices

Table 3 summarises the results for the evaluation of butterfly diversity and rarity and Table 4 the results of the site evaluation using area, isolation, habitat and plant diversity criteria. Table 5 summarises the two versions of the RBCVI and subsequent site rankings.

Analysis of the relationship between the weighted evaluations showed very strong correlations between butterfly diversity and rarity measures (combined species richness vs. regional rarity score classes:  $r = 0.972$ ,  $df = 18$ ,  $P < 0.001$ ; combined species richness vs. regional rarity indices:  $r = 0.749$ ,  $df = 18$ ,  $P < 0.001$ ). However, all butterfly evaluations were independent of the site criteria, except for plant species richness (combined species richness:  $r = 0.617$ ,  $df = 18$ ,  $P < 0.02$ ; regional rarity score classes:  $r = 0.625$ ,  $df = 18$ ,  $P < 0.01$ ; regional rarity index:  $r = 0.511$ ,  $df = 18$ ,  $P < 0.05$ ). Although the two methods of assessing regional rarity were very similar ( $r = 0.861$ ,  $df = 18$ ,  $P < 0.001$ ), correlations with the site criteria were stronger for regional rarity score classes than regional rarity indices.

Site area was significantly correlated with the area of calcareous grassland ( $r = 0.500$ ,  $df = 18$ ,  $P < 0.05$ ) and habitat diversity ( $r = 0.570$ ,  $df = 18$ ,  $P < 0.05$ ) and calcareous grassland area with habitat diversity ( $r = 0.686$ ,  $df = 18$ ,  $P < 0.01$ ) and plant species richness ( $r = 0.591$ ,  $df = 18$ ,  $P < 0.05$ ). Habitat diversity and plant species richness were also significantly correlated ( $r = 0.686$ ,  $df = 18$ ,  $P < 0.01$ ). Isolation was not correlated with any other site feature and there was no correlation between site area and plant species richness.

Comparisons of site rankings using the different methods showed no difference between the two versions of the butterfly index ( $r_s = 0.974$ ,  $df = 18$ ,  $P < 0.001$ ), nor between the two objective site indices ( $r_s = 0.979$ ,  $df = 18$ ,  $P < 0.001$ ). Correlations between version 1 of the RBCVI and the site indices were generally stronger (SEI 1:  $r_s = 0.599$ ,  $df = 18$ ,  $P < 0.01$ ; SEI 2:  $r_s = 0.514$ ,  $df = 18$ ,  $P < 0.05$ ; Pritchard:  $r_s = 0.575$ ,  $df = 17$ ,  $P < 0.02$ ) than between version 2 and the same indices (SEI 1:  $r_s = 0.495$ ,  $df = 18$ ,  $P < 0.05$ ; SEI 2:  $r_s = 0.422$ ,  $df = 18$ , NS; Pritchard:  $r_s = 0.598$ ,  $df = 17$ ,  $P < 0.01$ ). There were also significant correlations between the two objective site indices and Pritchard's subjective ranking (SEI 1:  $r_s = 0.725$ ,  $df = 17$ ,  $P < 0.001$ ; SEI 2:  $r_s = 0.716$ ,  $df = 17$ ,  $P < 0.001$ ).

## DISCUSSION

The butterfly data presented here confirm magnesian limestone grassland as a relatively species poor region compared to other grassland biotopes in southern Britain (Ellis, 1999a).

The absence of records from six sites suggests a pattern of under recording as well as genuine gaps in distribution, since any casual visit to these sites in the spring or summer is likely to turn up at least one or two butterfly records. A similar recording pattern was reported by Ellis (1991) for pre-1990 butterfly records for these SSSIs. Ellis (1991) noted that larger sites appeared to be more species rich, but these tended to be the best known and most frequently visited by amateur naturalists and professional ecologists.

Despite the data limitations, evaluations of butterfly diversity and rarity suggest all assessments were potentially useful in developing an index. However, the combined species richness score was used in the RBCVI because *T* gives an equal weighting to both the 'tourist' (mobile) and the 'characteristic' (sedentary) species and because *S* assesses only the latter. Although there were significant correlations between combined species richness and both regional rarity measures, the relationship was stronger for score classes than indices. Similar results were obtained for correlations between plant species richness and the two rarity measures. Indices were based on the inverse of the number of tetrad records and produced disproportionately high scores for some species. For example, the records of a single *A. aglaja* individual at Thrislington Plantation increased the site score by 172 using this system. Use of a logarithmic scale was considered as an alternative, but rejected due to the difficulty of weighting negative logarithms.

The national rarity criterion increases the regional value of those sites where important colonies of priority species occur, but requires data on abundance as well as distribution. Such data were readily available for *A. artaxerxes*, including probable extinctions. The presence of other priority species would no doubt have increased the required survey time considerably. An earlier version of the index (e.g. Ellis, 1996) included *E. tages* as a key species, but there were insufficient data to make reliable population estimates for more than a few sites.

The rankings produced by the various butterfly, site and subjective evaluations were all correlated with each other. However, version 1 of the RBCVI, which utilised regional rarity score classes, is preferred to version 2 because of the limitations of using a regional rarity index and because the relationships with the butterfly diversity criterion and with the overall site rankings were stronger.

Although there was a positive relationship between the site rankings, the butterfly and site criteria from which the indices were calculated were largely independent of each other. This suggests the RBCVI could provide an independent alternative to site or subjective evaluations. In practice, methods such as the RBCVI are only ever likely to provide a complementary assessment, because an evaluator is unlikely to adopt a technique based upon a single invertebrate group. Furthermore, the method was not designed to, for example, compare the butterfly faunas of calcareous grasslands in southern and northern Britain, or of different biotope types in the same region. It is therefore proposed its use be restricted to evaluating sites for nature conservation purposes within the same region and within broadly the same biotope type.

Finally, butterflies are amongst the most conspicuous and easy to survey of insects in Britain, but even these are still recorded only sporadically. Using a similar approach to other invertebrate taxa may therefore not be practical, because the length of a species list depends even more on the enthusiasm and expertise of the recorders (Foster, 1991). The length of the species list is an important determinant of the rarity assessment, because a long list of common species may produce a similar score to a short list of rare species. Developing aquatic and ground beetle rarity indices for site assessments in north-east England, Eyre *et al.* (1989) attempted to overcome this problem by summing all species rarity scores and dividing the total by the number of species in the sample to produce a site quality score. This type of data manipulation may be necessary for many taxa, but is inappropriate for butterflies, since even relatively simple surveys have the potential to generate comparable data sets.

#### ACKNOWLEDGEMENTS

I thank Andrew Cherrill for comments on an earlier version of this manuscript.



## REFERENCES

- AVERY, M, GIBBONS, D W, PORTER, R, TEW, T, TUCKER, G and WILLIAMS, G, (1995).  
 Revising the UK Red Data List: the biological basis of UK conservation priorities. *Ibis*, **137**,  
 232-239.
- BOURN, N A D, WARREN, M S and KIRKLAND, P, (1996). *Butterfly Conservation's Guidelines for  
 producing Regional Action Plans*. Butterfly Conservation.
- COOK, N J, (1990). *An atlas of the butterflies of Northumberland and Durham*. Northumberland  
 Biological Records Centre.
- COURTNEY, S P, (1980). *Studies on the biology of the butterflies Anthocharis cardamines L. and Pieris  
 napi L. in relation to speciation in Pierinae*. PhD thesis. University of Durham.
- DISNEY, R H L, (1986). Assessments using invertebrates: posing the problem. In *Wildlife conservation  
 evaluation*, ed by M B Usher. Chapman and Hall, London, pp 271-293.
- DONY, J G and DENHOLM, I, (1985). Some quantitative methods of assessing the conservation value  
 of ecologically similar sites. *J. appl. Ecol.* **22**: 229-238.
- DUNN, T C and PARRACK, J D, (1986). The moths and butterflies of Northumberland and Durham 1.  
 Macrolepidoptera. *Vasculum* Suppl. 2.
- ELLIS, S, (1991). The distribution and abundance of butterflies on the magnesian limestone grasslands  
 of County Durham. *Vasculum*, **76**: 20-32.
- (1995). *Ecological studies of the butterflies of magnesian limestone grassland*. PhD thesis. University  
 of Sunderland.
- (1996). *Ecological evaluation and conservation management of butterflies on magnesian limestone  
 grassland. Environmental Monitoring Services workshop on environmental monitoring and  
 conservation using invertebrates*. University of Durham.
- (1999a). The distribution, abundance and conservation management of butterflies on magnesian  
 limestone grassland sites in north-east England. *Trans. nat. Hist. Soc. Northumbria*, **59**:  
 149-168.
- (1999b). *Butterfly Conservation North East Regional Action Plan*. Butterfly Conservation.
- EMMET, A M and HEATH, J, (1989). *The moths and butterflies of Great Britain and Ireland  
 (Hesperiidae to Nymphalidae)*. 7 part 1. Harley Books, Colchester.
- EYRE, M D and RUSHTON, S P, (1989). Quantification of conservation criteria using invertebrates. *J  
 appl Ecol*, **26**: 159-171.
- FOSTER, G N, (1987). The use of Coleoptera records in assessing the conservation value of wetlands. In  
*The use of invertebrates in site assessment for conservation*, ed by M L Luff. Agricultural  
 Environment Research Group, University of Newcastle upon Tyne, pp 8-18.
- (1991). Conserving insects of aquatic and wetland habitats with special reference to beetles. In *The  
 conservation of insects and their habitats*, ed by N M Collins & J A Thomas. Symposium of the  
 Royal Entomological Society, Academic Press, London, pp 237-262.
- FULLER, H, (1990). *Biological records: a practical resource for nature conservation*. BSc thesis.  
 Sunderland Polytechnic.
- GOLDSMITH, F B, (1975). The evaluation of ecological resources in the countryside for conservation  
 purposes. *Biol. Conserv.*, **8**: 89-96.
- HILL, J K, THOMAS, C and LEWIS, T, (1996). Effects of habitat patch size and isolation on dispersal by  
*Hesperia comma* butterflies: implications for metapopulation structure. *J. appl Ecol*, **65**: 725-735.
- JEFFERSON, R G, (1984). Quarries and wildlife conservation in the Yorkshire Wolds, England.  
*Biological Conservation*, **29**: 363-380.
- KENT, M and SMART, N, (1981). A method for habitat assessment in agricultural landscapes. *Applied  
 Geography*, **1**: 9-30.
- MORAN, V C and SOUTHWOOD T R, E, (1982). The guild composition of arthropod communities in  
 trees. *J. anim. Ecol*, **51**: 289-306.
- NATURE CONSERVANCY COUNCIL (1988). *Site management plans for nature conservation*.  
 (1989). *Guidelines for selection of biological SSSIs*.

- PERRING, F H and FARRELL, L, (1977). *British red data books: 1. Vascular plants*. Royal Society for the Promotion of Nature Reserves, Nettleham.
- PRITCHARD, A, (1989). *A strategy for the magnesian limestone grasslands*. Confidential report to the Nature Conservancy Council.
- RATCLIFFE, D A, (1977) (ed). *A nature conservation review Vols 1 and 2*. Cambridge University Press.
- SHIRT, D B, (1987). *British red data books: 2 Insects* Nature Conservancy Council.
- SPELLERBERG, I F, (1992). *Evaluation and assessment for conservation*. Chapman and Hall, London.
- THOMAS, J A, (1983). A quick method of estimating butterfly numbers during surveys. *Biol. Conserv.*, **27**: 195-211.
- (1984). The conservation of butterflies in temperate countries: past efforts and lessons for the future. In *The biology of butterflies*, ed by R I Vane-Wright and P R Ackery, Symposium of the Royal Entomological Society of London, No.11. Academic Press, London, pp 333-353.
- USHER, M B, (1986). Wildlife conservation: attributes, criteria and values In *Wildlife Conservation Evaluation*, ed by M. B. Usher. Chapman and Hall, London, pp 3-44.
- WARREN, M S, (1992). Butterfly populations. In *The ecology of butterflies in Britain*, ed by R. L. H. Dennis. Oxford University Press, Oxford, pp 73-92.
- (1993). A review of butterfly conservation in central southern Britain: 1. protection, evaluation and extinction on prime sites. *Biol. Conserv.*, **64**: 25-35.
- WARREN, M S, BARNETT, L. K, GIBBONS, D W and AVERY, M I, (1997). Assessing national conservation priorities: an improved red list of British butterflies. *Biol. Conserv.*, **82**: 317-328.





**Plate 1** Gosforth Park Nature Reserve aerial photograph taken in 1996





## THE VEGETATION OF GOSFORTH PARK NATURE RESERVE

D N Mitchell<sup>1</sup> and J A Baker<sup>2</sup>

<sup>1</sup>English Nature, Northumbria Team, Stocksfield Hall, Stocksfield, Northumberland NE43 7TN

<sup>2</sup>Planning and Transportation Division, Newcastle City Council, Civic Centre, Newcastle upon Tyne  
NE1 8PH

### SUMMARY

A vegetation survey of Gosforth Park Nature Reserve, a Site of Special Scientific Interest in north-east England, was undertaken to describe the plant communities present according to the new British National Vegetation Classification (NVC). Fifteen NVC types were defined and phytosociological tables for each community are presented. These include wet and dry woodlands, mesotrophic and calcifugous grasslands, swamp, reed-bed and fen vegetation and various aquatic communities. Of particular interest were extensive stands of *Phragmites australis* swamp and reedbeds (S4) and *Salix cinerea* - *Betula pubescens* - *Phragmites australis* woodland (W2), which are of restricted occurrence in north-east England.

### INTRODUCTION

Although Gosforth Park Nature Reserve is one of the oldest designated wildlife sanctuaries in north-east England it remains vulnerable to changes that may be detrimental to its nature conservation interest. Over the years the management of the adjacent race course has had knock-on effects to the nature reserve, particularly the lake, which has been subject to drainage fluctuations, eutrophication, silting and associated invasion by vegetation, leading to degeneration of important reedswamp habitat (Heward, 1989; Noble-Rollin, 1995; Northumberland Ecological Services, 1992; Tynan, 1993). It has also been suggested that earth movements and mining subsidence have resulted in the water receding from the east end of the lake so that the former east island became a circular mound on dry ground (Briggs, 1963). In addition to these factors, vandalism, misuse and poaching continue to present a threat to the nature reserve (Gardner-Medwin *et al.*, 1997). In a wider context, parts of the surrounding Gosforth Park Estate have been considered for housing developments (Northumberland Ecological Services, 1989), new industrial developments have recently commenced on open land to the east of the reserve and more are proposed to the north and west of Gosforth Park Estate (Newcastle City Council, 1993; North Tyneside Council, 1996). Taken together, these developments potentially inhibit the dispersal of species between Gosforth Park Nature Reserve and other areas (Gardner-Medwin *et al.*, 1997).

The maintenance of accurate, detailed and up to date records of fauna and flora within the reserve are required to assess the likely effects of the previously mentioned processes on its nature conservation interest and to provide a scientific basis for its future management. A number of animal groups occurring within the reserve have been recorded and studied in some detail in recent years, including mammals (Bowman *et al.*, 1997; Hammock *et al.*, 1991, 1993), birds (Hammock *et al.*, 1991, 1993; Moorhouse, 1983; Noble Rollin *et al.*, 1993) and invertebrates (Fenwick, undated; Jessop, 1990). However, there have been no recent studies of the vegetation of the reserve, the only accounts being unpublished manuscripts of the vascular plants and bryophytes which were written some time ago (Lindsay *et al.*, 1964; Pittendrigh, 1935; Richards, 1978; Swan, 1979). This is perhaps surprising as the nature reserve is easily accessible from the Tyneside conurbation and supports the largest *Phragmites* reedswamp in the east Northumberland area (Nature Conservancy Council, 1970), a scarce plant community in north-east England and a priority habitat for national nature conservation and biodiversity initiatives (UK Biodiversity Steering Group, 1995). The site also supports populations of rare plant species, including *Epipactis youngiana* (Young's helleborine), a UK endemic which occurs only in a small number of sites in northern England and southern Scotland (UK Biodiversity Steering Group, 1995), *Oenanthe fistulosa* (tubular water-dropwort) and *Corallorhiza trifida* (coralroot orchid), which are rare in Northumberland (Swan, 1993). Other species of localised occurrence in the county recorded in previous studies of the Gosforth Park



Nature Reserve (Lindsay *et al.*, 1964; Pittendrigh, 1935) include *Carex acuta* (slender tufted-sedge), *Carex vesicaria* (bladder sedge), *Epipactis helleborine* (broad-leaved helleborine), *Equisetum hyemale* (rough horsetail), *Gnaphalium sylvaticum* (heath cudweed), *Hippuris vulgaris* (mare's-tail), *Ranunculus lingua* (greater spearwort) and *Veronica anagallis-aquatica* (blue water-speedwell), although some of these records have never been confirmed.

It was because of this botanical interest, the potential threats to the reserve and the lack of recent vegetation data that the survey reported here was undertaken in 1997. The only previous survey of the vegetation types of the reserve is the unpublished work of Lindsay and Rudd (1964). This had attempted to map and describe the vegetation compartments within the reserve, but their maps were disjointed and difficult to interpret, some of the species identification was almost certainly erroneous and their description of vegetation types was clearly subjective and unrelated to any systematic classification of the time. The aim of the study reported here was, therefore, to provide an accurate, systematic, intelligible and contemporary description of the vegetation of Gosforth Park Nature Reserve that would assist future monitoring and conservation management initiatives. The publication of the new British National Vegetation Classification (Rodwell, 1991 *et seq.*) provides a modern ecological basis for the description of vegetation at sites throughout the British Isles. It enables any particular example of vegetation to be described in terms of its affinities with the standardised classes recognised in the NVC scheme and was used as the systematic framework for the study reported here.

## THE SITE

Gosforth Park Nature Reserve lies within the Gosforth Park Estate (Plate 1), approximately 4 km to the north of Newcastle upon Tyne city centre in north-east England (grid reference NZ 250710) and occupies an area of approximately sixty hectares on the northern fringe of the Tyneside conurbation. Situated within the south-east Northumberland Coalfield, the underlying strata are composed of Carboniferous Middle Coal Measures overlaid with glacial till (Johnson, 1995). On this glacial drift typical stagnogley soils of the Dunkeswick Association have developed over most of the reserve, with pelo-stagno-gley soils of the Foggathorpe Association represented on its eastern fringe (Jarvis *et al.*, 1984). Much of the drainage on these clay-rich, waterlogged soils within the reserve is artificial; Gosforth Lake is largely fed by the Whitcroft Burn and several other drainage channels to the north, although there is some natural drainage from Gosforth Park southwards to the Ouseburn, a tributary of the river Tyne. The site lies in one of the warmest and driest locations in Northumberland, with a median accumulated temperature above zero degrees Centigrade of 1350 day-degrees (a measure of the heat energy available for plant growth) and an average annual precipitation of approximately 700mm (Jarvis *et al.*, 1984; Lunn, 1993).

The reserve is part of a landscaped estate laid out by the Brandling family in the mid-18th century which consisted of extensive woodland planting with rides to the north of the present-day lake, on what had once been old ridge and furrow grassland and heath vegetation at West Moor, Killingworth (Tynan *et al.*, 1993). Archival maps of the early 19th century (Fryer, 1820; Greenwood, 1827-28) suggested that the original estate was then extended to include the present-day nature reserve. Around 1815 a shallow lake was created by constructing an earth bank on original ridge and furrow grassland to hold back inflowing waters from a burn to the north-east and several gutters to the north and north-west (Tynan *et al.*, 1993). Other works at this time included the planting of marginal willows, the creation of islands and the installation of stone sluices and culverts (Tynan *et al.*, 1993), so that by the mid-19th century a mosaic of mature woodland, wetland and grassland vegetation types covered that part of the estate now represented by the nature reserve.

The wetland habitats in the southern part of the nature reserve (37.3 ha) are designated as a Site of Special Scientific Interest (SSSI), and include the largest *Phragmites* reedbed in the east Northumberland area, whilst the mixed plantation woodland in the northern section of the reserve is recognised as a Site of Nature Conservation Importance (SNCI). The site also lies

within a recognised strategic wildlife corridor between urbanised Tyneside and the open countryside of Northumberland (Blyth Valley Borough Council *et al.*, 1999; Nature Conservancy Council, 1988). The reserve has been managed by the Natural History Society of Northumbria since 1929 and in recent years a number of management plans have been written (Heward, 1989; Noble-Rollin, 1995; Northumberland Ecological Services, 1992).

## METHODS

The survey reported here was conducted during the months of June to September 1997. With reference to the most recently published habitat map for Gosforth Park Nature Reserve (Hammock *et al.*, 1991) areas representative of visually different vegetation physiognomy were sampled according to standard NVC procedure (Rodwell, 1991 *et seq.*). Sample size varied according to vegetation type; 50 x 50 m and 10 x 10 m plots for woodland canopy and ground flora vegetation respectively; 10 x 10 m or 4 x 4 m plots for tall swamp and fen vegetation; 4 x 4 m or 2 x 2 m plots for grassland and aquatic vegetation. Aquatic communities and some swamp communities were sampled by boat, with floating and submerged aquatic assemblages being recorded separately. Sample plots, referred to as 'relevés' in the National Vegetation Classification, were positioned to incorporate as wide a variety of vegetation types as possible, with particular care being taken to avoid obvious boundaries between different communities and transitional vegetation types. In addition, replicate samples of visually homogenous stands of vegetation were conducted wherever possible so that the description of vegetation types was not based on single samples only.

All species of vascular plants, bryophytes and lichens occurring in each releve were recorded on standard NVC sample sheets (Rodwell, 1991 *et seq.*) together with an assessment of their cover abundance according to the Domin scale. Habitat notes and details regarding the exact location of each releve were also recorded. Most species were readily identified in the field, although some difficult water plants, bryophytes and lichens were collected and identified by microscopic examination shortly afterwards. Nomenclature of vascular plants, bryophytes and lichens followed that of Stace (1997), Smith (1978; 1989) and Purvis *et al.*, (1992) respectively. It was not the intention of this survey to record every single plant species occurring in the nature reserve, but it was expected that most species would be listed if an adequate number of sample plots were conducted.

Sample and species data was compiled onto computer using the RECORD programme within the VESPAN II package (Malloch, 1990a). A preliminary comparison between each releve and standard NVC communities was conducted using the programme MATCH (Malloch, 1990b). This allowed the identification of groups of samples with similar floristic composition. Replicate samples of these similar vegetation types were then transformed into phytosociological tables using the TABLE programme of the VESPAN II package (Malloch, 1990a). These tables were then related to plant communities defined in the National Vegetation Classification using the MATCH programme (Malloch, 1990b).

## RESULTS

During the four month fieldwork period forty-eight sample plots were conducted, within which 143 species of vascular plants, twenty-eight bryophyte species and eight lichen species were recorded. The greater variety of vegetation types were located in the vicinity of Gosforth Lake and, consequently, most samples were recorded from that part of the nature reserve. In contrast, fewer samples were recorded from the rather homogenous plantation woodland stands which dominate the northern and eastern areas of the reserve.

A number of broad vegetation types were present in the nature reserve: wet and dry woodlands; mesotrophic and calcifugous grasslands; swamps, reedbeds and fens; floating and submerged aquatic vegetation. These could be described according to fifteen NVC types as follows:

*Salix cinerea* - *Betula pubescens* - *Phragmites australis* woodland (W2)  
Grey Willow - Downy Birch - Common Reed (Table 1)



*Quercus robur* - *Pteridium aquilinum* - *Rubus fruticosus* woodland (W10)  
 Pedunculate Oak - Bracken - Bramble (Table 2)

*Arrhenatherum elatius* grassland (MG1)  
 False Oat Grass (Table 3)

*Cynosurus cristatus* - *Centaurea nigra* grassland (MG5)  
 Crested Dog's-tail - Black Knapweed (Table 4)

*Lolium perenne* leys and related grassland (MG7)  
 Perennial Ryegrass (Table 5)

*Holcus lanatus* - *Deschampsia cespitosa* grassland (MG9)  
 Yorkshire Fog - Tussock Grass 9 (Table 6)

*Festuca ovina* - *Agrostis capillaris* - *Galium saxatile* grassland (U4)  
 Sheep's-fescue - Common Bent - Heath Bedstraw (Table 7)

*Phragmites australis* swamp and reed-beds (S4)  
 Common Reed (Table 8)

*Typha latifolia* swamp (S12)  
 Bulrush (Table 9)

*Phragmites australis* - *Urtica dioica* fen (S26)  
 Common Reed - Common Nettle (Table 10)

*Phalaris arundinacea* fen (S28)  
 Reed Canary-grass (Table 11)

*Lemna minor* community (A2)  
 Common Duckweed (Table 12)

*Potamogeton natans* community (A9)  
 Broad-leaved Pondweed (Table 13)

*Potamogeton pectinatus* community (A12)  
 Fennel Pondweed (Table 14)

*Elodea canadensis* community (A15)  
 Canadian Waterweed (Table 15)

#### Wet and dry woodlands

Relevés 2, 3, 40 and 42 were most closely related (similarity coefficient 35.2) to *Salix cinerea* - *Betula pubescens* - *Phragmites australis* woodland (W2) in the NVC scheme (Table 1). These samples were scattered around the margins of Gosforth Lake (Figure 1) and consisted of mixed canopies of *Betula pubescens*, *Alnus glutinosa* and *Salix cinerea*. There was generally a sparse understorey of the same species and the ground flora was characterised by *Phragmites australis*, *Deschampsia cespitosa*, *Agrostis canina*, *Dryopteris dilatata* and several prominent bryophytes, including *Mnium hornum*, *Brachythecium rutabulum* and *Sphagnum recurvum*. Species of lower constancy within the samples included *Valeriana officinalis*, *Juncus bulbosus* and *Filipendula ulmaria*, with most other species being recorded from only one of the four sample plots. This community gave way to stands of *Phragmites australis* swamp and reedbed (S4) and *Phragmites australis* - *Urtica dioica* fen (S26) towards the lake, and to *Quercus robur* - *Pteridium aquilinum* - *Rubus fruticosus* woodland plots (W10) on higher ground to the north and east of the lake.

A number of samples were taken from the extensive plantation woodland which dominated the northern and eastern areas of the nature reserve. Relevés 1, 4, 5, 41, 46, 47 and 48 were most closely related (similarity coefficient 55.9) to *Quercus robur* - *Pteridium aquilinum* - *Rubus fruticosus* woodland plots (W10) in the NVC scheme (Table 2). This vegetation was characterised by a mixed assemblage of mature canopy-forming trees, such as *Acer pseudoplatanus*, *Betula pendula* and *Fraxinus excelsior*, with a sparse understorey and ground flora. The ground surface was deeply shaded in many places and covered by a thick layer of leaf litter. Species of high constancy within the samples were *Rubus fruticosus* agg., *Deschampsia cespitosa* and *Dryopteris dilatata*. Species of lower constancy included

*Athyrium filix-femina*, *Dryopteris filix-mas*, *Digitalis purpurea*, *Holcus mollis*, *H. lanatus*, *Agrostis capillaris* and *Lonicera periclymenum*. Of particular interest, sample plot 41 (to the west of the feeding station; see Fig. 2) was characterised by small populations of *Epipactis helleborine* and *E. youngiana*. Bryophytes were generally very sparse, with only *Eurhynchium praelongum* of high constancy within the sample plots. Species of lower constancy included *Lophocolea bidentata* and *L. heterophylla* on decaying logs and humus, and *Brachythecium rutabulum* and *Dicranella heteromalla* on a variety of substrates.

### Mesotrophic and calcifugous grasslands

Relevés 26, 28 and 29 were most closely related (similarity coefficient 43.6) to *Arrhenatherum elatius* grassland (MG1) in the NVC scheme (Table 3). The samples were located in scattered patches along woodland paths and clearings and on drier fen margins (Fig. 2). These mesotrophic grassland swards were dominated by the tall tussock grasses *Arrhenatherum elatius* and *Dactylis glomerata*, the swards of which were punctuated by competitive forbs such as *Heracleum sphondylium*, *Cirsium arvense*, *Galium aperine* and *Rubus fruticosus* agg. Bryophytes were generally sparse or absent, with occasional patches of *Brachythecium rutabulum* and *Eurhynchium praelongum* occurring in the litter layer. These small stands gave way to more extensive stands of *Holcus lanatus* - *Deschampsia cespitosa* grassland (MG9) and *Phragmites australis* - *Urtica dioica* fen (S26) with increased waterlogging in the vicinity of the lake, and to the extensive plantation woodland in other areas of the reserve.

Within the nature reserve dicotyledon-rich grassland was restricted to a small area adjacent to Gosforth race course. Releve 6 was most closely related (similarity coefficient 37.4) to *Cynosurus cristatus* - *Centaurea nigra* grassland (MG5) in the NVC scheme (Table 4). Fine-leaved grasses included *Cynosurus cristatus*, *Anthoxanthum odoratum* and *Festuca rubra*, whilst prominent mesophytic forbs included *Centaurea nigra*, *Lathyrus pratensis*, *Trifolium pratense*, *Prunella vulgaris* and *Dactylorhiza fuchsii*. Of interest, the calcifugous species *Calluna vulgaris* and *Potentilla erecta* were also well represented in this area. Bryophytes were scattered within the sward and included the pleurocarpous mosses *Calliergon cuspidatum*, *Pseudoscleropodium purum* and *Rhytidiadelphus squarrosus*. Seedlings and juvenile individuals of woody species such as *Betula pendula*, *Quercus robur* and *Salix cinerea* were also represented in this plot and suggested that the grassland was experiencing seral succession to scrub.

Small areas of trampled and disturbed grassland vegetation were recorded at the entrance to the nature reserve and adjacent to the race course. Relevés 27 and 30 (Table 5) were characterised by open swards of *Lolium perenne* and various ruderal forbs, including *Plantago major*, *Rumex obtusifolius* and *Cirsium arvense*. These plots were most closely related to *Lolium perenne* leys (MG7) in the NVC scheme (similarity coefficient 51.8).

Relevés taken from wetland areas on the northern fringe of Gosforth Lake (relevés 33 and 34) and wet areas elsewhere in the nature reserve (releve 7) were most closely related to *Holcus lanatus* - *Deschampsia cespitosa* grassland (MG9) in the NVC scheme (similarity coefficient 39.0). These coarse, tussocky swards were dominated by *Deschampsia cespitosa* and *Holcus lanatus*, with other prominent species including *Cirsium palustre*, *Galium palustre*, *Iris pseudacorus*, *Juncus conglomeratus* and *J. effusus* (Table 6). Occasional species included *Achillea ptarmica*, *Galeopsis bifida*, *Cardamine pratensis*, *Lychnis flos-cuculi*, *Ranunculus sceleratus* and *R. flammula*. Bryophytes were generally of low cover abundance within these dense swards, although *Brachythecium rutabulum* occurred as a constant species in gaps between the grass tussocks. This community was part of the zonation of marginal vegetation around the lake, grading into *Phragmites australis* swamp and reed-bed (S4) or *Phragmites australis* - *Urtica dioica* fen (S26) towards the lake and into *Arrhenatherum elatius* grassland (MG1) in drier areas away from the lake.

Although a number of species indicative of calcifugous grassland were recorded within the nature reserve, only one sample was most closely related to any of the NVC calcifugous grassland types (Table 7). Releve 32, taken from a grassy woodland glade on the South Ride (see Figure 1), was related to *Festuca ovina* - *Agrostis capillaris* - *Galium saxatile* grassland (U4) in the NVC scheme (similarity coefficient 37.6). This short sward was characterised by



the fine-leaved grasses *Agrostis capillaris* and *Anthoxanthum odoratum*, with characteristic calcifuges including *Galium saxatile* and *Potentilla erecta*. Bryophytes were prominent within the sward and included *Rhytidiadelphus squarrosus*, *Brachythecium rutabulum* and *Pseudoscleropodium purum*. Observations at the time of the survey suggested that examples of this community occurred elsewhere in other woodland rides within the nature reserve.

#### Swamp, reed-bed and fen vegetation

Large areas in and around Gosforth Lake were characterised by monocultures or species-poor stands of *Phragmites australis* vegetation. Relevés 14, 18, 35 and 38 were taken from these areas (Table 8) and were most closely related to *Phragmites australis* swamp and reed-bed vegetation (S4) in the NVC scheme (similarity coefficient 45.7). Common associates in these tall stands were *Juncus effusus* and *Solanum dulcamara*, with occasional species including *Alisma plantago-aquatica*, *Galium palustre*, *Iris pseudacorus*, *Ranunculus lingua*, *R. sceleratus*, *Phalaris arundinacea* and *Sparganium erectum*. Bryophytes were generally absent, although *Calliergon cordifolium*, *C. cuspidatum* and *Brachythecium rutabulum* were recorded in sample plot 35. In the deeper waters of the lake this community gave way to *Typha latifolia* swamp (S12) or various types of aquatic vegetation. Around the margins of the lake the community occurred in shallow water and on waterlogged soils and graded into various types of vegetation, including *Phragmites australis* - *Urtica dioica* fen (S26), *Holcus lanatus* - *Deschampsia cespitosa* grassland (MG9) and *Salix cinerea* - *Betula pubescens* - *Phragmites australis* woodland (W2).

Areas of deep water (> 0.5m depth) towards the centre of the lake were dominated by extensive monocultures or species-poor stands of *Typha latifolia* vegetation. Relevés 15, 16, 17 and 19 were taken from these areas (Table 9) and were most closely related to *Typha latifolia* swamp (S12) in the NVC scheme (similarity coefficient 42.6). Other species recorded in these relevés included *Alisma plantago-aquatica*, *Juncus effusus* and *Schoenoplectus tabernaemontani*. In these deeper waters the community gave way to various aquatic communities, whilst it graded into *Phragmites australis* swamp and reed-bed vegetation (S4) in shallower waters.

Marginal areas of Gosforth Lake which experienced waterlogged soils during the summer months rather than complete inundation were characterised by mixed stands of reeds and various tall-herb species. Relevés 31, 36, 37, 39, 44 and 45 (Table 10) were most closely related to *Phragmites australis* - *Urtica dioica* fen (S26) in the NVC scheme (similarity coefficient 51.4). Species of high constancy included *Phragmites australis*, *Urtica dioica*, *Juncus effusus*, *Angelica sylvestris*, *Solanum dulcamara*, *Galium aparine* and the bryophytes *Brachythecium rutabulum* and *Eurhynchium praelongum*. Species of lower constancy within the samples included *Stachys palustris*, *Cirsium palustre*, *Senecio aquaticus*, *Valeriana officinalis*, *Galeopsis bifida* and the pleurocarpous moss *Calliergon cordifolium*. This community formed complex mosaics with other marginal vegetation types, including *Phragmites australis* swamp and reed beds (S4), *Phalaris arundinacea* fen (S28) and *Salix cinerea* - *Betula pubescens* - *Phragmites australis* woodland (W2).

Several isolated stands dominated by *Phalaris arundinacea* were observed as part of the mosaic of communities around the margins of the lake. A single sample plot (relevé 43), taken from the western fringe of the lake (Table 11) was most closely related to *Phalaris arundinacea* fen (S28) in the NVC scheme (similarity coefficient 41.1). Associated species were those recorded in the *Phragmites australis* - *Urtica dioica* fen samples (S26), such as *Solanum dulcamara*, *Juncus effusus* and *Urtica dioica*.

#### Floating-leaved and submerged aquatic vegetation

Relevés 22 and 25 consisted of single-species mats of the free-floating duckweed *Lemna minor* and were recorded on the water surface of the lake between the Jubilee and Roy Pearce hides (Fig.2). These relevés (Table 12) were most closely related to the *Lemna minor* community (A2) in the NVC scheme (similarity coefficient 60.2). This species also occurred with *Potamogeton natans* in other areas of the lake (Table 13). Representative relevés of these mixed assemblages (relevés 8, 10, 12) were most closely related to the *Potamogeton natans* community (A9) in the NVC (similarity coefficient 73.6). Both of these floating-leaved

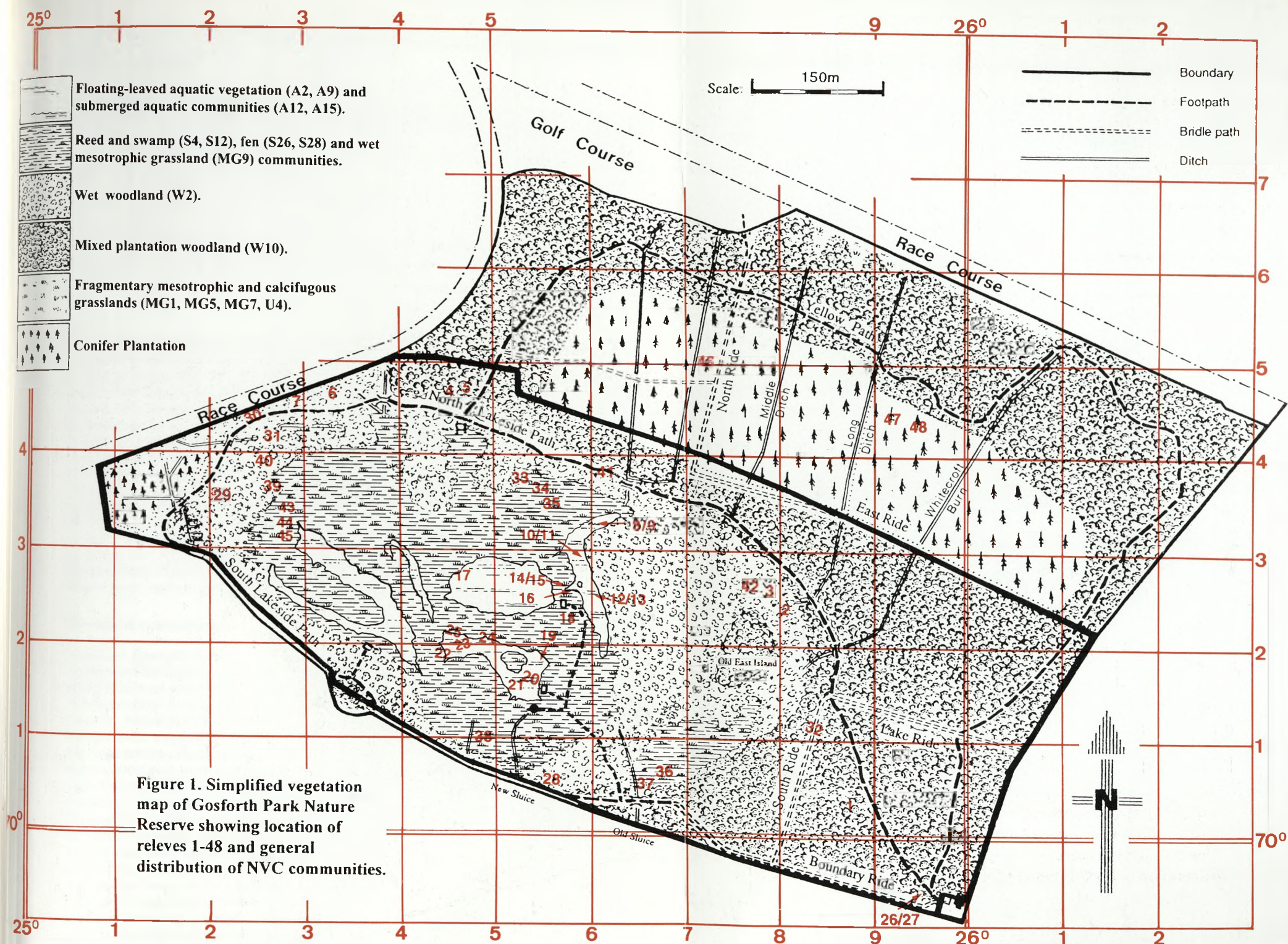


Figure 1. Simplified vegetation map of Gosforth Park Nature Reserve showing location of relevés 1-48 and general distribution of NVC communities.

Fig. 1 Simplified vegetation map of Gosforth Park Nature Reserve showing location of relevés 1-48 and general distribution of NVC communities



t  
c  
v  
/

c

s

I

s

a

v

t

/

s

a

i

n

i

t

i

t

i

t

i

t

i

t

i

t

i

t

i

t

i

t

i

t

i

t

i

t

i

t



aquatic communities occurred mainly in shallow waters of the lake beyond colonising emergent swamp vegetation, particularly *Phragmites australis* swamp (S4) and *Typha latifolia* swamp (S12).

Several samples of submerged aquatic vegetation taken from the lake (relevés 21 and 24) were characterised by mixtures of fine-leaved pondweeds and other species (Table 14). *Potamogeton pectinatus* and *Elodea canadensis* were recorded in both relevés, whilst *Potamogeton pusillus* and *Lemna trisulca* occurred in one releve each. These mixed assemblages were most closely related to the *Potamogeton pectinatus* community (A12) of the NVC scheme (similarity coefficient 46.7). In contrast, relevés 9, 11, 13, 20 and 23 were characterised by dense, relatively monodominant submerged stands of *Elodea canadensis* (Table 15). Rare associates included *Lemna trisulca* and *Potamogeton pusillus*. These relevés were most closely related to the *Elodea canadensis* community (A15) of the NVC (similarity coefficient 50.4). Both of these submerged aquatic communities occurred beneath the floating-leaved aquatic communities described previously.

## DISCUSSION

The results show that the plant communities of Gosforth Park Nature Reserve can be successfully described according to the new British National Vegetation Classification. Based on the most recent habitat map of the site (Hammock *et al.*, 1991), it is possible to interpret the results of this survey and show the general distribution of NVC communities within the reserve (Fig. 1). The northern and eastern areas of the reserve (approximately 70% of the site) were characterised by mixed plantation woodland (W10) with a variable ground flora consisting of mosaics of grasses and ferns. Within these areas small, well-lit woodland clearings, rides, paths and edges were characterised by fragmentary mesotrophic and calcifugous grasslands (MG1, MG5, MG7, U4). In contrast, carr woodland (W2) on waterlogged ground in the south and west of the reserve adjacent to the lake was characterised by an understorey of tall swamp and fen vegetation. This opened out into extensive fen and wet grassland vegetation (S26, S28, MG9) around the margins of the lake where the water table was at or near the soil surface in summer. With increasing inundation these communities graded into species-poor swamps and reed-beds (S4, S12) in the lake where the water level remained permanently above ground. In the lake itself, floating-leaved aquatic communities (A2, A9) occurred in the shallow waters, whilst dense, submerged aquatic communities (A12, A15) tended to occur in deeper waters.

### Woodland communities

Stands of *Quercus robur* - *Pteridium aquilinum* - *Rubus fruticosus* woodland (W10) are widespread throughout the British lowlands and many are represented by recent plantations with a relatively impoverished and untidy field layer, compared to the bluebell-rich oakwoods of semi-natural stands (Rodwell, 1991). This was certainly the case at Gosforth Park Nature Reserve, where the plantation woodland was characterised by single-aged stands of mature, canopy trees, a sparse understorey and a variable grass-fern field layer, a feature observed in previous surveys (Lindsay *et al.*, 1964; Richards, 1978). In general, the plantation was of low botanical interest, presumably because of this lack of habitat diversity and other factors such as air pollution, which inhibits groups such as the bryophytes (Richards, 1978). Nevertheless, the plantation woodland is notable in supporting the globally threatened *Epipactis youngiana* (Young's helleborine). This is likely to require particular management operations, as listed in its national species action plan (UK Biodiversity Steering Group, 1995), such as the control of invasive species, canopy thinning and the reinforcement of populations by introducing new individuals raised from collected seed. During this survey, several plants of *Epipactis helleborine* were found adjacent to a woodland path immediately to the north of the lake (releve 41) and it is likely that some realignment of this access path may be necessary to avoid trampling of these plants by unwary visitors. In an early study of the reserve, Pittendrigh (1935) recorded helleborines (as *Epipactis latifolium*) in the vicinity of the Old East Island and it is suggested that future survey and monitoring work should be conducted to establish whether *Epipactis* spp., particularly *E. youngiana*, occur elsewhere in the reserve.

Around the margins of Gosforth Lake, narrow stands of *Salix cinerea* - *Betula pubescens* - *Phragmites australis* woodland (W2) have developed on waterlogged soils. This type of carr woodland community occurs mainly in the south of England, with fragmentary stands elsewhere and develops as a result of the direct invasion of fens by trees and shrubs (Rodwell, 1991). It often develops when the accumulation of litter raises the peat surface above the limit of flooding, with floristic composition being determined by subtle variations in ground water movement, trophic levels, calcium content of peat, and human activities (Rodwell, 1991). The main factor, however, appears to be increasing shade, so that fen and reedbed dominants such as *Phragmites australis* show a marked reduction in shoot density, height and flowering (Haslam 1971b, 1972). Where this happens at Gosforth Park (e.g. quadrats 2 and 3 adjacent to the Old East Island) a more open vegetation characterised by bryophytes has developed. Such areas are of significance as they support populations of *Corallorhiza trifida* (coralroot orchid). This small, saprophytic species was not seen in the 1997 survey but eight spikes were observed in 1998 by D N Mitchell and D Noble-Rollin. It relies on decaying vegetation for nutrients (Stace, 1997) and future management must ensure the retention of appropriate materials such as leaf litter and the maintenance of open, competition-free microhabitats within the wet woodland.

### Grassland communities

Woodland clearings, rides, paths and edges were characterised by fragmentary stands of mesotrophic and calcifugous grassland vegetation. Most prominent of these were examples of *Arrhenatherum elatius* grassland (MG1), a community characteristic of unmanaged grasslands on circumneutral, well-drained soils (Rodwell 1992). Although this rank grassland type was floristically poor, it can be an important habitat for invertebrates, particularly species dependent on aerial structures of plants and leaf litter (Ausden *et al.*, 1995; Fry and Lonsdale, 1991) and should be retained within the reserve for these purposes. The community is intolerant of excessive disturbance and in the nature reserve it gives way to narrow strips of *Lolium perenne* grassland (MG7), a community characterised by the presence of weedy species tolerant of heavy trampling (Rodwell, 1992). Although of little conservation interest, examples of this community occurring along woodland tracks were characterised by patches of bare ground, an important microhabitat for certain groups of basking or predatory invertebrates (Fry *et al.*, 1991).

Also represented along these woodland rides were remnant patches of *Festuca ovina* - *Agrostis capillaris* - *Galium saxatile* grassland (U4), a community on soils subject to surface leaching above and gleying below (Rodwell, 1992). These may represent surviving fragments of the original grass-heath vegetation that occurred in the area prior to the planting of the woodland by the Brandling family in the 18th and 19th centuries (Tynan *et al.*, 1993). It is likely that they may be retained by appropriate woodland ride management (e.g. canopy thinning, creation of glades) to prevent excessive shading and to encourage grazing by mammals.

Floristically-rich *Cynosurus cristatus* - *Centaurea nigra* grassland (MG5) was restricted to a small open glade at the western fringe of the woodland, adjacent to the race course. Such forb-rich communities generally occur on circumneutral, undisturbed soils of lower trophic status than other mesotrophic grasslands (Rodwell, 1992) and are of conservation importance for invertebrate populations (Fry *et al.*, 1991). The survey suggested that this community was experiencing serial succession to scrub and that remedial management works would be necessary to arrest this process and conserve its interest.

### Reedbed communities and associated vegetation

The results of this survey suggest that the *Phragmites* dominated vegetation in and around Gosforth Lake can be described as *Phragmites australis* swamp and reedbeds (S4) and *Phragmites australis* - *Urtica dioica* fen (S26) according to the NVC (Rodwell, 1995). The former occurred mainly in permanently inundated areas of the lake, with the latter occurring in areas subject to seasonal drying, particularly on the eastern fringes of the lake. Both communities are characteristic of eutrophic, open water transitions around the margins of lakes and ponds, the former being maintained by stable water levels, with the latter often



developing as a secondary community subject to eutrophication, disturbance, seasonal drying out and invasion by tall herbs (Rodwell, 1995). Almost certainly, extensive stands of this fen vegetation on the eastern fringes of the lake have developed from reedbeds which have been degraded, probably as a result of mining subsidence, earth movements and artificial lowering of the water levels by the adjacent race course (Briggs, 1963; Tynan *et al.*, 1993). In addition, lack of active management of the reedbeds for many years will have led them to gradually dry out, become invaded by tall herbs and eventually develop into scrub and carr woodland, a successional process observed in other reedbeds and leading to a loss of characteristic reedbed fauna and flora (Burgess *et al.*, 1989; Hawke *et al.*, 1996). Indeed, an early study of the reserve suggests that the *Phragmites* reedbeds were more open and species-rich than they are today: '... the reed bed is broken every ten or twenty yards by low growing *Salix*, marsh cinquefoil, marsh pennywort, *Salix repens* and many others form a tight rich carpet to the forest of silvery *Phragmites*.' (Pittendrigh, 1935).

*Phragmites australis* will grow well in anaerobic conditions in deep and shallow waters, provided rhizome aeration is maintained (Haslam, 1970). The best performance in Britain seems to occur where the water level relative to the ground surface ranges from +50 cm to -20 cm, although approximately one-third of the shoot must remain above water to supply oxygen to submerged parts (Haslam, 1970). Monodominant stands are known to persist for long periods, effectively resisting invasion, their density being influenced by litter, water regime, nutrient status, substrate aeration and climate (Haslam, 1971a). However, *Phragmites* is intolerant of erratic and sudden fluctuations of water level (Haslam, 1970) and if the substrate becomes sufficiently dry, this may favour nutrient-demanding perennial dicotyledons such as *Urtica dioica* at the expense of *Phragmites* (Haslam, 1965, 1971a, 1971b, 1972). Such mixed stands occur where water level fluctuations, substrate aeration, nutrient inputs and shading favour competitors at the expense of *Phragmites* (Haslam, 1971b). This process of *Phragmites* reedbed deterioration to drier fen has been a factor in the decline of breeding bird populations such as the reed warbler, *Acrocephalus scirpaceus*, the Gosforth park population being largest breeding population this far north in the UK (Day *et al.*, 1995). In some parts of the reserve open water was created by excavation of areas of degraded *Phragmites* reedbed during the late 1980s (Tynan *et al.*, 1993) and the present survey indicates that these areas are now in the process of being recolonised by new *Phragmites* growth.

Associated with *Phragmites australis* in Gosforth Lake are extensive and species poor stands of *Typha latifolia* swamp (S12), as recognised in the NVC scheme (Rodwell, 1995). Unlike *Phragmites*, this species appears to be spreading in Northumberland and is very common in and around waterbodies in the south-east of the county (Swan, 1993). This is of interest as only one small patch of *Typha* was recorded in the reserve some sixty years ago (Pittendrigh, 1935), although photographs taken in the 1960s show that the plant had clearly colonised extensive areas of the lake (Lindsay *et al.*, 1964). Indeed, *Typha* seems to be one of the few wetland species that is increasing nationally, possibly due to its wind-dispersed seeds and its tolerance of pollution and hydrological fluctuations (Grime *et al.*, 1990). In Gosforth Lake it now occurs extensively in the deeper waters, presumably because of competitive exclusion by *Phragmites* in the shallower waters and marginal habitats. Although *Typha* is invasive and may become a management problem in open water bodies, it does provide a valuable habitat for a variety of invertebrates (Andrews, 1995; Fry and Lonsdale, 1991).

Around the outer margins of the lake small communities of *Phalaris arundinacea* fen (S28) (Rodwell 1995) and *Holcus lanatus* - *Deschampsia cespitosa* grassland (MG9) (Rodwell, 1992) were recorded. Both of these communities are characteristic of periodically, but not permanently, inundated soils around water bodies (Rodwell, 1992, 1995) and in the nature reserve they occurred in areas where the summer water table was below the soil surface.

### Aquatic plant communities

In Gosforth Lake four distinct plant communities as defined in the NVC (Rodwell, 1995) were recorded. These were a *Lemna minor* community (A2), a *Potamogeton natans* community (A9), a *Potamogeton pectinatus* community (A12) and an *Elodea canadensis* community (A15). These aquatic communities are generally indicative of nutrient-rich waters (Rodwell,

1995), a situation which has probably arisen in Gosforth Lake following years of fertiliser run-off from the adjacent race course. Such communities are of great importance as the primary food resource and the physical habitat of much of the fauna associated with open water bodies (Andrews, 1995). For example, the thalli of *Lemna minor* and the seeds of *Potamogeton* species provide a food source for wildfowl, whilst the foliage of *Elodea canadensis* is an excellent feeding habitat for aquatic invertebrates (Andrews, 1995; Grime, 1990). As well as providing food, these plants also provide shade and help to oxygenate the water, thereby improving the habitat for aquatic invertebrates (Fry *et al.*, 1991). Photographs from an earlier study (Lindsay *et al.*, 1964) also showed the occurrence of *Persicaria amphibia* communities (now included as A10 in the NVC scheme) in shallow waters around the margins of the lake, but these stands appear to have been reduced to scattered individuals within invasive *Phragmites australis* - *Urtica dioica* fen (S26) due to hydroserial succession in the lake.

#### ACKNOWLEDGEMENTS

The authors wish to thank David Noble-Rollin, Secretary of the Natural History Society of Northumbria, for his helpful comments and advice during this survey.

#### REFERENCES

- ANDREWS, J, (1995). Waterbodies. *Managing habitats for conservation*, ed. by W J Sutherland and D A Hill, pp 121-148. Cambridge University Press, Cambridge.
- AUSDEN, M and TREWEEK, J, (1995). Grasslands. *Managing habitats for conservation*, ed. by W J Sutherland and D A Hill, pp 197-229. Cambridge University Press, Cambridge.
- BLYTH VALLEY BOROUGH COUNCIL, NEWCASTLE CITY COUNCIL, NORTH TYNESIDE COUNCIL *et al.*, (1999). Gosforth Park - Cramlington Wildlife Corridor Biodiversity Action Plan.
- BOWMAN, R and BAKER, J, (1997). Gosforth Park Nature Reserve small mammal trapping survey. Ms., Nat. Hist. Soc. Northumb.
- BRIGGS, H D, (1963). Gosforth Park and its bird sanctuary. *Trans. nat. Hist. Soc. Northumb.*, **14**: 77-89.
- BURGESS, N D and EVANS, C E, (1989). *The management of reedbeds for birds*. RSPB Management Case Study. RSPB, Sandy.
- DAY, J C, HODGSON, M S and ROSSITER, N, (eds.) (1995). *The atlas of breeding birds in Northumbria*. Northumberland and Tyneside Bird Club.
- FENWICK, G A, (undated). Spiders. Gosforth Park Nature Reserve 1929-93, ed. by D C Noble-Rollin *et al.* Ms., Nat. Hist. Soc. Northumb.
- FRY, R and LONSDALE, D, eds, (1991). *Habitat conservation for insects - a neglected green issue*. The Amateur Entomologists' Society, Middlesex.
- FRYER, J and SONS, (1820). One Inch Map. Archive Map. Nat. Hist. Soc. Northumb.
- GARDNER-MEDWIN, D and PATTERSON, M A, eds, (1997). Annual report of the Council for the year ended 31 July 1997. *Trans. nat. Hist. Soc. Northumb.*, **58**: 1-35.
- GREENWOOD, (1827-28). One Inch Map. Archive Map. Nat. Hist. Soc. Northumb.
- GRIME, J P, HODGSON, J G and HUNT, R, (1990). *The Abridged Comparative Plant Ecology*. Chapman & Hall, London.
- HAMMOCK, P and NOBLE-ROLLIN, D C, (1991). Gosforth Park Nature Reserve Annual Report for 1990. *Trans. nat. Hist. Soc. Northumb.*, **5**: 213-243.
- (1993). Gosforth Park Nature Reserve Annual Report. *Trans. nat. Hist. Soc. Northumb.*, **56**: 13-34.
- HASLAM, S M, (1965). Ecological studies in Breck Fens. I. Vegetation in relation to habitat. *Journal of Ecology*, **53**: 599-619.
- (1970). The performance of *Phragmites communis* Trin. in relation to water supply. *Annals of botany N.S.*, **34**: 867-877.



- (1971a). Community regulation in *Phragmites communis* Trin. I. Monodominant stands. *Journal of Ecology*, **59**: 65-73.
- (1971b). Community regulation in *Phragmites communis* Trin. II. Mixed stands. *Journal of Ecology*, **59**: 75-88.
- (1972). Biological Flora of the British Isles: *Phragmites communis* Trin. *Journal of Ecology*, **60**: 585-610.
- HAWKE, C J and JOSE, P V, (1996). *Reedbed management for commercial and wildlife interests*. RSPB, Sandy.
- HEWARD, D, (1989). Gosforth Park Reedswamp - A Guide Line for a Management Plan. BSc Environmental Studies Thesis, Newcastle Polytechnic. Ms., Nat. Hist. Soc. Northumb.
- JARVIS, R A, BENDELOW, V C, BRADLEY, R I, CARROLL, D M, FURNESS, R. R., KILGOUR, I N L and KING, S J, (1984). *Soils and their use in Northern England*. Soil Survey of England and Wales, Bulletin No. 10. Harpenden, Herts.
- JESSOP, L, (1990). Arthropods of Gosforth Park. Gosforth Park Nature Reserve 1929-93 (edited by NOBLE-ROLLIN, D. C *et al*). Ms., Nat. Hist. Soc. Northumb.
- JOHNSON, G A L, ed., (1995). Robson's Geology of north east England (second edition). *Trans. nat. Hist. Soc. Northumb.*, **56**: 226-391.
- LINDSAY and RUDD (1964). Gosforth Park Survey 1964. Ms., Nat. Hist. Soc. Northumb.
- LUNN, A G, (1993). The Environment. *Flora of Northumberland* (by G A SWAN), pp 23-77. The Natural History Society of Northumbria, Newcastle upon Tyne.
- MALLOCH, A J C, (1990a). *VESPAN II*. Unit of Vegetation Science, University of Lancaster.
- (1990b). *MATCH*. A computer program to aid the assignment of vegetation data to the communities and sub-communities of the National Vegetation Classification, ver. 1.2. Unit of Vegetation Science, University of Lancaster.
- MOORHOUSE, I D, (1983). Gosforth Park Nature Reserve annual report 1983. Ms., Nat. Hist. Soc. Northumb.
- NATURE CONSERVANCY COUNCIL, (1970). Gosforth Park SSSI site description. Ms., NCC, Newcastle upon Tyne.
- (1988). *Tyne and Wear Nature Conservation Strategy*. NCC, Peterborough.
- NEWCASTLE CITY COUNCIL, (1993). *Newcastle City Unitary Development Plan*. Deposit Version. Newcastle City Council.
- NOBLE-ROLLIN, D C, (1995). Gosforth Park Nature Reserve Management Plan 1995-2000 (Draft). Ms., Nat. Hist. Soc. Northumb.
- NOBLE-ROLLIN, D C., TYNAN, A M., JESSOP, L., FENWICK, G., ANGEL, G., HAMMOCK, P and RICHARDS, A J, (1993). Gosforth Park Nature Reserve 1929-93. Ms., Nat. Hist. Soc. Northumb.
- NORTH TYNESIDE COUNCIL, (1996). *Unitary Development Plan*. Deposit Draft. North Tyneside Council.
- NORTHUMBERLAND ECOLOGICAL SERVICES, (1989). Ecological appraisal of proposed developments at Gosforth Park. Ms., Nat. Hist. Soc. Northumb.
- (1992). Management plan for Gosforth Park Nature Reserve and other areas of wildlife interest within Gosforth Park Estate. Ms., Nat. Hist. Soc. Northumb.
- PITTENDRIGH, C S, (1935). Gosforth Park. Ms., Nat. Hist. Soc. Northumb.
- PURVIS, O W, COPPINS, B J, HAWKSWORTH, D L, JAMES, P J and MOORE, D M, (1992). *The Lichen Flora of Great Britain and Ireland*. The British Museum (Natural History), London.
- RICHARDS, A J, (1978). A bryophyte list from Gosforth Park. Gosforth Park Nature Reserve 1929-93, eds D C Noble-Rollin *et al*. Ms., Nat. Hist. Soc. Northumb.
- RODWELL, J S, ed., (1991). *British Plant Communities*. Volume 1. *Woodland and Scrub*. Cambridge University Press, Cambridge.
- (1992). *British Plant Communities*. Volume 3. *Grasslands and montane communities*. Cambridge University Press, Cambridge.
- (1995). *British Plant Communities*. Volume 4. *Aquatic communities, swamps and tall-herb fens*. Cambridge University Press, Cambridge.

- SMITH, A J E, (1978). *The moss flora of Britain and Ireland*. Cambridge University Press, Cambridge.
- (1989). *The liverworts of Britain and Ireland*. Cambridge University Press, Cambridge.
- STACE, C A, (1997). *New Flora of the British Isles*. Second edition. Cambridge University Press, Cambridge.
- SWAN, G A, (1979). The vascular plants of Gosforth Park Nature Reserve. Ms., Nat. Hist. Soc. Northumb.
- (1993). *Flora of Northumberland*. The Natural History Society of Northumbria, Newcastle upon Tyne.
- TYNAN, A M and NOBLE-ROLLIN, D C, (1993). Introduction and management. Gosforth Park Nature Reserve 1929-93 (eds D C Noble-Rollin *et al.*). Ms., Nat. Hist. Soc. Northumb.
- UK BIODIVERSITY STEERING GROUP (1995). *Biodiversity: The UK Steering Group Report*. Volume 2: Action Plans. HMSO, London.

### Tables 1-15

The vegetation types are shown in Tables 1-15 respectively. Each phytosociological table contains the following information:

- (i) Standardised NVC nomenclature and code (in brackets).
- (ii) Czechanowski coefficient of similarity relating table of combined, floristically-similar samples to NVC community type.
- (iii) List of species observed in combined samples (first column), in order of constancy within samples (final column), and the domin cover abundance scores for each species (intermediate columns). Codes in brackets following names of woody species denote canopy species (c), shrub species (s) and ground layer species (g) respectively. Constancy classes for each species within the combined samples ( V = 80-100%, IV = 60-79%, III = 40-59%, II = 20-39%, I = 1-19%).
- (iv) Relevé (sample plot) number at the top of each intermediate column.
- (v) Number of species per relevé at the bottom of each intermediate column.
- (vi) Summary notes for each relevé at the bottom of the table, including 8 figure Ordnance Survey grid reference (see Fig. 2<sup>1</sup> for location of individual relevés), sample date, relevé size and general habitat description.

<sup>1</sup> Since this survey was conducted in 1997, additional areas of open water habitat have been created within the nature reserve. The work was funded by English Nature and the Environment Agency and was completed in 1999.



Table 1

*Salix cinerea* - *Betula pubescens* - *Phragmites australis* woodland (W2)

Similarity coefficient = 35.2

Species	Releve	2	3	40	42	Constancy
	Domin					
<i>Dryopteris dilatata</i>	2	1		1	2	V
<i>Agrostis canina</i>	3	7			4	IV
<i>Alnus glutinosa(c)</i>	2	2			7	IV
<i>Betula pubescens(c)</i>	8	8			8	IV
<i>Deschampsia cespitosa</i>		1		3	2	IV
<i>Epilobium montanum</i>		1		1	1	IV
<i>Juncus effusus</i>	3	1			1	IV
<i>Phragmites australis</i>		1		9	9	IV
<i>Brachythecium rutabulum</i>		2		2	2	IV
<i>Mnium hornum</i>	4	5			2	IV
<i>Sphagnum recurvum</i>	9	3			7	IV
<i>Cladonia coniocraea</i>	1			1	1	IV
<i>Acer pseudoplatanus(s)</i>		1		1	1	IV
<i>Lepraria incana</i>	1			2	2	IV
<i>Anthoxanthum odoratum</i>	2	2				III
<i>Cirsium palustre</i>		2		1		III
<i>Crataegus monogyna(s)</i>		1		1		III
<i>Filipendula ulmaria</i>		2		5		III
<i>Holcus lanatus</i>		3		5		III
<i>Juncus bulbosus</i>	3				3	III
<i>Valeriana officinalis</i>		3		2		III
<i>Dicranella heteromalla</i>	1				1	III
<i>Eurhynchium praelongum</i>		4		3		III
<i>Rhizomnium punctatum</i>		5			2	III
<i>Polytrichum commune</i>	3				7	III
<i>Lophocolea bidentata</i>		1		2		III
<i>Hypogymnia physodes</i>				2	2	III
<i>Acer pseudoplatanus(g)</i>	1	1				III
<i>Betula pendula(g)</i>	2	2				III
<i>Crataegus monogyna(g)</i>	1	1				III
<i>Salix cinerea(g)</i>	1	1				III
<i>Salix cinerea(c)</i>				9	6	III
<i>Ajuga reptans</i>		2				II
<i>Angelica sylvestris</i>				4		II
<i>Arrhenatherum elatius</i>				4		II
<i>Carex echinata</i>	3					II
<i>Equisetum arvense</i>				1		II
<i>Galium saxatile</i>		2				II
<i>Hypericum maculatum</i>				1		II
<i>Luzula multiflora</i>		1				II
<i>Poa trivialis</i>				3		II
<i>Potentilla erecta</i>		2				II
<i>Prunella vulgaris</i>				1		II
<i>Ranunculus flammula</i>		1				II
<i>Salix fragilis</i>					1	II
<i>Senecio jacobaea</i>		1				II
<i>Urtica dioica</i>				6		II
<i>Veronica serpyllifolia</i>		1				II
<i>Vicia sativa</i>		1				II
<i>Vicia cracca</i>				2		II
<i>Viola riviniana</i>		1				II
<i>Hypnum cupressiforme</i>				2		II

<i>Sphagnum squarrosum</i>				5	II
<i>Lophocolea heterophylla</i>			1		II
<i>Parmelia glabratula</i>			1		II
<i>Parmelia sulcata</i>			3		II
<i>Usnea subfloridana</i>			1		II
<i>Quercus robur(s)</i>	2				II
<i>Evernia prunastri</i>			1		II
<i>Lecanora conizaeoides</i>			1		II
<b>Number of species</b>	19	34	32	22	

2. (NZ 25807024) 15.7. 97. Releve 50x50m (canopy), 10x10m (field and ground layer). Open, damp birch-willow woodland with poorly developed field layer and abundant bryophyte cover in localised patches, near Old East Island.
3. (NZ 25807025) 15.7. 97. Releve 50x50m (canopy), 10x10m (field and ground layer). Open, damp birch-willow woodland with poorly developed field layer, near Old East Island.
40. (NZ 25257039) 10.8.97. Releve 50x50m (canopy), 10x10m (field and ground layer). Dense willow carr with understorey of reeds on western fringe of reserve.
42. (NZ 25767027) 10.8.97. Releve 50x50m (canopy), 10x10m (field and ground layer). Alder-willow-birch woodland in damp depression with understorey of reeds and abundant bryophytes, near Old East Island.

**Table 2**

*Quercus robur* - *Pteridium aquilinum* - *Rubus fruticosus* woodland (W10)

Similarity coefficient = 55.9

	Releve	1	4	5	41	46	47	48	
Species		Domin							Constancy
<i>Rubus fruticosus</i> agg.		1	5	7	2	1	1	3	V
<i>Acer pseudoplatanus(c)</i>		5	6	6	5	3			IV
<i>Deschampsia cespitosa</i>				2	4	3	2	8	IV
<i>Dryopteris dilatata</i>		8			6	4	3	3	IV
<i>Eurhynchium praelongum</i>		1		1	5	3		2	IV
<i>Agrostis capillaris</i>					4		3	2	III
<i>Betula pendula(c)</i>		4			5	5			III
<i>Dryopteris filix-mas</i>		3			1	1			III
<i>Fraxinus excelsior(c)</i>			4	4	5				III
<i>Holcus mollis</i>		6	9				8		III
<i>Juncus effusus</i>						2	1	4	III
<i>Lophocolea bidentata</i>					2	2		2	III
<i>Lophocolea heterophylla</i>					2	2			III
<i>Acer pseudoplatanus(g)</i>		2	2	2					III
<i>Crataegus monogyna(g)</i>			3	3		2			III
<i>Athyrium filix-femina</i>		3			2				II
<i>Crataegus monogyna(s)</i>				1	4				II
<i>Digitalis purpurea</i>							1	1	II
<i>Fagus sylvatica(c)</i>			5	5					II
<i>Galium aparine</i>			1	4					II
<i>Galium saxatile</i>						1	2		II
<i>Holcus lanatus</i>					2	3			II



<i>Juncus conglomeratus</i>					1	4	II
<i>Lonicera periclymenum</i> (g)		4				1	II
<i>Quercus robur</i> (c)	6		8				II
<i>Rosa canina</i> agg.		1	1				II
<i>Viola riviniana</i>		2	3				II
<i>Brachythecium rutabulum</i>	1	2					II
<i>Dicranella heteromalla</i>	1		2				II
<i>Mnium hornum</i>			5	3			II
<i>Pellia epiphylla</i>			3			1	II
<i>Acer pseudoplatanus</i> (s)	2			1			II
<i>Betula pendula</i> (s)					1	3	II
<i>Ilex aquifolium</i> (g)		4	4				II
<i>Sambucus nigra</i> (g)		1	1				II
<i>Ulmus glabra</i> (g)		2	2				II
<i>Sorbus intermedia</i> (c)		3	3				II
<i>Arrhenatherum elatius</i>			8				I
<i>Brachypodium sylvaticum</i>				6			I
<i>Bromopsis ramosa</i>				2			I
<i>Cardamine hirsuta</i>				1			I
<i>Cirsium palustre</i>				1			I
<i>Dactylis glomerata</i>		1					I
<i>Epipactis helleborine</i>				2			I
<i>Fragaria vesca</i>				3			I
<i>Geranium robertianum</i>					1		I
<i>Geum urbanum</i>				2			I
<i>Ilex aquifolium</i> (s)	1						I
<i>Poa trivialis</i>				1			I
<i>Prunella vulgaris</i>				2			I
<i>Ranunculus repens</i>				2			I
<i>Rhododendron ponticum</i>				7			I
<i>Rumex sanguineus</i>				3			I
<i>Sorbus aucuparia</i> (c)	1						I
<i>Atrichum undulatum</i>				5			I
<i>Aulacomnium androgynum</i>						1	I
<i>Hypnum cupressiforme</i>	1						I
<i>Plagiomnium undulatum</i>				3			I
<i>Plagiothecium denticulatum</i>						1	I
<i>Polytrichum formosum</i>					2		I
<i>Sorbus aucuparia</i> (s)				4			I
<i>Corylus avellana</i> (g)	5						I
<i>Fagus sylvatica</i> (s)		1					I
<i>Fraxinus excelsior</i> (s)			3				I
<i>Fraxinus excelsior</i> (g)		3					I
<i>Quercus robur</i> (s)	1						I
<i>Lonicera periclymenum</i> (s)				2			I
<i>Rosa canina</i> (g)		1					I
<i>Rosa canina</i> (s)					1		I
<i>Taraxacum seedling</i> /sp					1		I
<i>Lepraria incana</i>				1			I
<i>Picea sitchensis</i> (c)					8		I
<i>Epipactis youngiana</i>				2			I
<b>Number of species</b>	<b>19</b>	<b>16</b>	<b>20</b>	<b>38</b>	<b>19</b>	<b>11</b>	<b>14</b>

- (NZ 25887004) 15.7.97. Releve 50x50m (canopy), 10x10m (field and ground layer). Secondary plantation woodland with sparse field layer characterised by ferns and abundant dry leaf litter.
- (NZ 25457047) 15.7.97. Releve 50x50m (canopy), 10x10m (field and ground layer). Open stand of mature beech trees with mixed understorey of shrubs and tall grassland.
- (NZ 25467048) 15.7.97. Releve 50x50m (canopy), 10x10m (field and ground layer). Open stand of mature beech trees with mixed understorey of shrubs and tall grassland.
- (NZ 25617039) 10.8.97. Releve 50x50m (canopy), 10x10m (field and ground layer). Secondary plantation woodland immediately west of feeding station.

46. (NZ 25717050) 11.9.97. Releve 50x50m (canopy), 10x10m (field layer). Spruce plantation with naturally regenerating birch and sycamore, with sparse field layer.
47. (NZ 25907045) 11.9.97. Releve 2x2m. Grassy vegetation in woodland clearing at northern edge of conifer plantation.
48. (NZ 25927044) 11.9.97. Releve 4x4m. Grassy vegetation in woodland clearing at northern edge of conifer plantation.

**Table 3**

*Arrhenatherum elatius* grassland (MG1)

Similarity coefficient = 43.6

Species	Releve	26	28	29	Constancy
		Domin			
<i>Arrhenatherum elatius</i>		8	7	9	V
<i>Dactylis glomerata</i>		5	5	4	V
<i>Galium aparine</i>		4	5	5	V
<i>Rubus fruticosus</i> agg.		2	4	3	V
<i>Alopecurus pratensis</i>		3	3		IV
<i>Cirsium arvense</i>		5	5		IV
<i>Crataegus monogyna</i> (s)		1		1	IV
<i>Deschampsia cespitosa</i>			1	2	IV
<i>Elytrigia repens</i>		4	3		IV
<i>Heracleum sphondylium</i>		4	3		IV
<i>Holcus mollis</i>			4	5	IV
<i>Urtica dioica</i>		4		2	IV
<i>Agrostis stolonifera</i>				2	II
<i>Angelica sylvestris</i>				3	II
<i>Anthriscus sylvestris</i>		4			II
<i>Dryopteris filix-mas</i>				1	II
<i>Equisetum arvense</i>			3		II
<i>Festuca rubra</i>		3			II
<i>Filipendula ulmaria</i>			1		II
<i>Galeopsis tetrahit</i>			2		II
<i>Geranium robertianum</i>		2			II
<i>Geum urbanum</i>		2			II
<i>Holcus lanatus</i>				4	II
<i>Myosotis sylvatica</i>		4			II
<i>Phragmites australis</i>			3		II
<i>Plantago major</i>			1		II
<i>Ranunculus repens</i>		2			II
<i>Rosa canina</i> agg.		1			II
<i>Vicia cracca</i>			2		II
<i>Brachythecium rutabulum</i>		7			II
<i>Eurhynchium praelongum</i>		6			II
<i>Taraxacum seedling</i> /sp		3			II
<b>Number of species</b>		<b>20</b>	<b>16</b>	<b>12</b>	

26. (NZ 25966996). 3.8.97. Releve 4x4m. Rank mesotrophic grassland and tall herb vegetation adjacent to entrance gate of reserve.
28. (NZ 25567005) 3.8.97. Releve 4x4m. Rank mesotrophic grassland and tall herb vegetation adjacent to southern access path, near new sluice.
29. (NZ 25217034) 3.8.97. Releve 4x4m. Rank mesotrophic grassland and tall herb vegetation at western boundary of reserve, adjacent to main path.



Table 4

*Cynosurus cristatus* - *Centaurea nigra* grassland (MG5))

Similarity coefficient = 37.4

Species	Releve	6	
		Domin	Constancy
<i>Angelica sylvestris</i>		2	V
<i>Anthoxanthum odoratum</i>		2	V
<i>Calluna vulgaris</i>		7	V
<i>Campanula rotundifolia</i>		1	V
<i>Carex flacca</i>		4	V
<i>Centaurea nigra</i>		4	V
<i>Cirsium palustre</i>		2	V
<i>Cynosurus cristatus</i>		1	V
<i>Dactylorhiza fuchsii</i>		2	V
<i>Deschampsia cespitosa</i>		3	V
<i>Equisetum arvense</i>		1	V
<i>Festuca rubra</i>		3	V
<i>Filipendula ulmaria</i>		1	V
<i>Fragaria vesca</i>		1	V
<i>Hieracium sabaudum</i>		1	V
<i>Holcus lanatus</i>		3	V
<i>Hypochoeris radicata</i>		2	V
<i>Juncus conglomeratus</i>		2	V
<i>Lathyrus pratensis</i>		1	V
<i>Lotus corniculatus</i>		3	V
<i>Luzula multiflora</i>		1	V
<i>Lychnis flos-cuculi</i>		1	V
<i>Plantago lanceolata</i>		2	V
<i>Potentilla erecta</i>		4	V
<i>Prunella vulgaris</i>		3	V
<i>Ranunculus bulbosus</i>		1	V
<i>Stellaria graminea</i>		3	V
<i>Trifolium pratense</i>		4	V
<i>Trifolium repens</i>		3	V
<i>Vicia cracca</i>		1	V
<i>Calliergon cuspidatum</i>		3	V
<i>Pleurozium schreberi</i>		2	V
<i>Pseudoscleropodium purum</i>		3	V
<i>Rhytidiadelphus squarrosus</i>		2	V
<i>Lophocolea bidentata</i>		1	V
<i>Betula pendula(g)</i>		5	V
<i>Quercus robur(s)</i>		1	V
<i>Salix cinerea(g)</i>		2	V
<i>Taraxacum seedling/sp</i>		2	V
Number of species		39	

6. (NZ 25347046) 15.7.97. Releve 4x4m. Open area of relict grass-heath adjacent to nature reserve boundary with race course.

Table 5

*Lolium perenne* leys and related grassland (MG7)

Similarity coefficient = 51.8

Species	Releve	27	30	Constancy
		Domin		
<i>Cirsium arvense</i>		1	5	V
<i>Lolium perenne</i>		8	5	V
<i>Plantago major</i>		5	1	V
<i>Rumex obtusifolius</i>		1	2	V
<i>Trifolium repens</i>		5	1	V
<i>Agrostis stolonifera</i>			3	III
<i>Agrostis capillaris</i>			3	III
<i>Alopecurus pratensis</i>			4	III
<i>Anthriscus sylvestris</i>	2			III
<i>Arrhenatherum elatius</i>			5	III
<i>Cirsium vulgare</i>			5	III
<i>Dactylis glomerata</i>	4			III
<i>Epilobium ciliatum</i>			1	III
<i>Elytrigia repens</i>			5	III
<i>Heracleum sphondylium</i>	1			III
<i>Holcus lanatus</i>			4	III
<i>Matricaria discoidea</i>	1			III
<i>Phleum pratense</i>			4	III
<i>Poa annua</i>	5			III
<i>Poa pratensis</i>	3			III
<i>Poa trivialis</i>			3	III
<i>Ranunculus repens</i>			3	III
<i>Rumex crispus</i>			1	III
<i>Sonchus asper</i>			1	III
<i>Stachys sylvatica</i>			1	III
<i>Urtica dioica</i>			1	III
<i>Barbula unguiculata</i>	2			III
<i>Bryum argenteum</i>	2			III
<i>Bryum caespitium</i>	3			III
<i>Bryum capillare</i>	1			III
<i>Eurhynchium praelongum</i>	2			III
<i>Taraxacum seedling/sp</i>			1	III
<b>Number of species</b>		16	21	

27. (NZ 25966996). 3.8.97. Releve 2x2m. Open, low growing vegetation on disturbed trackside adjacent to entrance gate of reserve.

30. (NZ 25257043) 3.8.97. Releve 4x4m. Tall mesotrophic grassland and thistles on disturbed bankside adjacent to race course.

Table 6

*Holcus lanatus* - *Deschampsia cespitosa* grassland (MG9)

Similarity coefficient = 39.0

Species	Releve	7	33	34	Constancy
		Domin			
<i>Cirsium palustre</i>		3	1	1	V
<i>Deschampsia cespitosa</i>		2	10	10	V



<i>Galium palustre</i>	1	4	5	V
<i>Holcus lanatus</i>	4	5	4	V
<i>Brachythecium rutabulum</i>	2	3	4	V
<i>Arrhenatherum elatius</i>		3	3	IV
<i>Cirsium arvense</i>		4	2	IV
<i>Iris pseudacorus</i>		3	4	IV
<i>Juncus conglomeratus</i>	1	3		IV
<i>Juncus effusus</i>		4	4	IV
<i>Phragmites australis</i>	1	3		IV
<i>Ranunculus repens</i>		3	3	IV
<i>Rosa canina</i> agg.		1	1	IV
<i>Salix cinerea</i> (s)		2	2	IV
<i>Sonchus arvensis</i>		2	2	IV
<i>Urtica dioica</i>		4	4	IV
<i>Betula pubescens</i> (s)		1	1	IV
<i>Galeopsis bifida</i>		4	3	IV
<i>Achillea ptarmica</i>	1			II
<i>Agrostis capillaris</i>		2		II
<i>Aiuga reptans</i>	1			II
<i>Angelica sylvestris</i>	2			II
<i>Anihoxanthum odoratum</i>	2			II
<i>Bromopsis ramosa</i>		1		II
<i>Cardamine pratensis</i>			1	II
<i>Carex flacca</i>	5			II
<i>Centaurea nigra</i>	3			II
<i>Cerastium fontanum</i>		2		II
<i>Dryopteris filix-mas</i>		1		II
<i>Epilobium montanum</i>		1		II
<i>Epilobium palustre</i>			1	II
<i>Filipendula ulmaria</i>	2			II
<i>Juncus acutiflorus</i>	4			II
<i>Luzula multiflora</i>	1			II
<i>Lychnis flos-cuculi</i>	1			II
<i>Phalaris arundinacea</i>			2	II
<i>Plantago lanceolata</i>	2			II
<i>Poa pratensis</i>			4	II
<i>Prunella vulgaris</i>	3			II
<i>Ranunculus flammula</i>	1			II
<i>Ranunculus sceleratus</i>			2	II
<i>Rubus fruticosus</i> agg.		1		II
<i>Rumex conglomeratus</i>			3	II
<i>Rumex crispus</i>		1		II
<i>Senecio aquaticus</i>	2			II
<i>Solanum dulcamara</i>			1	II
<i>Trifolium pratense</i>	3			II
<i>Vicia hirsuta</i>	1			II
<i>Calliargon cuspidatum</i>	7			II
<i>Plagiomnium rostratum</i>	1			II
<i>Aneura pinguis</i>	1			II
<i>Salix cinerea</i> (g)	2			II
<i>Carex viridula</i>	4			II
<b>Number of species</b>	<b>28</b>	<b>25</b>	<b>23</b>	

7. (NZ 25297045) 15.7.97. Releve 2x2m. Small area of damp, forb-rich grassland adjacent to nature reserve boundary with race course.

33. (NZ 25537038) 6.8.97. Releve 10x10m. Tall tussock grassland on northern fringe of lake near feeding station.

34. (NZ 25557037) 6.8.97. Releve 10x10m. Tall tussock grassland on northern fringe of lake near feeding station.

Table 7

*Festuca ovina* - *Agrostis capillaris* - *Galium saxatile* grassland (U4)

Similarity coefficient = 37.6

Species	Releve	32	Constancy
		Domin	
<i>Agrostis capillaris</i>		6	V
<i>Anthoxanthum odoratum</i>		5	V
<i>Galium saxatile</i>		3	V
<i>Holcus lanatus</i>		1	V
<i>Juncus effusus</i>		1	V
<i>Lolium perenne</i>		1	V
<i>Poa pratensis</i>		1	V
<i>Poa trivialis</i>		1	V
<i>Potentilla erecta</i>		8	V
<i>Brachythecium rutabulum</i>		3	V
<i>Pseudoscleropodium purum</i>		1	V
<i>Rhytidiadelphus squarrosus</i>		7	V
<b>Number of species</b>		12	

32. (NZ 25837021) 3.8.97. Releve 2x2m. Low growing acidic grassland in woodland glade on South Ride access path.

Table 8

*Phragmites australis* swamp and reed-beds (S4)

Similarity coefficient = 45.7

Species	Releve	14	18	35	38	Constancy
		Domin				
<i>Phragmites australis</i>		9	9	9	10	V
<i>Juncus effusus</i>			2	8	2	IV
<i>Solanum dulcamara</i>			2	3	3	IV
<i>Lemna minor</i>				2	5	III
<i>Myosotis laxa</i>				1	1	III
<i>Alisma plantago-aquatica</i>				1		II
<i>Arrhenatherum elatius</i>				1		II
<i>Callitriche stagnalis</i>				3		II
<i>Cardamine pratensis</i>				3		II
<i>Deschampsia cespitosa</i>				1		II
<i>Galium palustre</i>				4		II
<i>Iris pseudacorus</i>				2		II
<i>Lemna trisulca</i>					4	II
<i>Mentha aquatica</i>			1			II
<i>Phalaris arundinacea</i>					3	II
<i>Potamogeton natans</i>					2	II
<i>Ranunculus lingua</i>			4			II
<i>Ranunculus sceleratus</i>				3		II
<i>Rorippa nasturtium-aquaticum</i>				1		II



<i>Rumex conglomeratus</i>	2		II
<i>Salix cinerea(s)</i>		4	II
<i>Sparganium erectum</i>	2		II
<i>Typha latifolia</i>		3	II
<i>Calliergon cordifolium</i>	2		II
<i>Calliergon cuspidatum</i>	1		II
<i>Brachythecium rutabulum</i>	2		II
<b>Number of species</b>	<b>1</b>	<b>5</b>	<b>10</b>

14. (NZ 25577025) 22.7.97. Releve 10x10m. Species-poor reedswamp in 0.8m deep water in central area of lake, adjacent to Pyle hide.
18. (NZ 25577023) 22.7.97. Releve 10x10m. Species-poor reedswamp in 0.4m deep water in central area of lake, adjacent to Pyle hide.
35. (NZ 25567035) 6.8.97. Releve 10x10m. Tall reedswamp in waterlogged mud on northern fringe of lake near feeding station.
38. (NZ 25497010) 10.8.97. Releve 10x10m. Tall reedbed in 0.2m deep water near new sluice.

**Table 9**

*Typha latifolia* swamp (S12)

Similarity coefficient = 42.6

	<b>Releve</b>	<b>15</b>	<b>16</b>	<b>17</b>
<b>Species</b>	<b>Domin</b>			
<i>Typha latifolia</i>		8	9	9
<i>Alisma plantago-aquatica</i>		2		
<i>Juncus effusus</i>		4	2	
<i>Salix cinerea(s)</i>		1	2	
<i>Eleocharis palustris</i>				
<i>Schoenoplectus tabernaemontani</i>				
<b>Number of species</b>		<b>4</b>	<b>3</b>	<b>1</b>

15. (NZ 25577025) 22.7.97. Releve 10x10m. Species-poor reedmace swamp in 0.8m deep water in central area of lake, adjacent to Pyle hide.
16. (NZ 25587025) 22.7.97. Releve 10x10m. Species-poor reedmace swamp in 0.65m deep water in central area of lake, adjacent to Pyle hide.
17. (NZ 25477027) 22.7.97. Releve 4x4m. Species-poor reedmace swamp in 0.65m deep water in central area of lake.
19. (NZ 25587019) 22.7.97. Releve 10x10m. Open reedmace swamp in 0.3m deep water in lake, adjacent to Jubilee hide.
15. (NZ 25687027) 22.7.97. Releve 10x10m. Species-poor reedmace swamp in 0.8m deep water in central area of lake, adjacent to Pyle hide.

Table 10

*Phragmites australis* - *Urtica dioica* fen (S26)

Similarity coefficient = 51.4

Releve	31	36	37	39	44	45	
Species	Domin						Constancy
<i>Urtica dioica</i>	2	3	5	7	2	1	V
<i>Juncus effusus</i>	1		1	2	9	9	V
<i>Brachythecium rutabulum</i>	3		3	5	2	3	V
<i>Angelica sylvestris</i>	4	1	1	3			IV
<i>Galium aparine</i>	3	1	2	3			IV
<i>Phragmites australis</i>	2	10	3	9			IV
<i>Solanum dulcamara</i>		2	2		3	2	IV
<i>Eurhynchium praelongum</i>			2	3	1	2	IV
<i>Persicaria amphibia</i>	1		4	2			III
<i>Cirsium arvense</i>			4	4			II
<i>Deschampsia cespitosa</i>	9			2			II
<i>Epilobium palustre</i>	1		1				II
<i>Equisetum arvense</i>		1	2				II
<i>Filipendula ulmaria</i>	3			3			II
<i>Iris pseudacorus</i>	3			3			II
<i>Juncus conglomeratus</i>	2			1			II
<i>Lathyrus pratensis</i>	1			4			II
<i>Phalaris arundinacea</i>		3	9				II
<i>Stachys palustris</i>				2		1	II
<i>Arrhenatherum elatius</i>				4			I
<i>Athyrium filix-femina</i>			1				I
<i>Cirsium palustre</i>	4						I
<i>Dactylorhiza purpurella</i>	1						I
<i>Heracleum sphondylium</i>	1						I
<i>Poa trivialis</i>				2			I
<i>Rubus idaeus</i>			2				I
<i>Senecio aquaticus</i>	1						I
<i>Valeriana officinalis</i>	1						I
<i>Calliergon cordifolium</i>	3						I
<i>Galeopsis bifida</i>	2						I
Number of species	20	7	15	17	5	6	

31. (NZ 25267040) 3.8.97. Releve 4x4m. Tall tussock grass area in damp depression on western fringe of reserve.
36. (NZ 25687007) 10.8.97. Releve 10x10m. Tall reedbed in damp hollow at east end of lake near old sluice.
37. (NZ 25677005) 10.8.97. Releve 10x10m. Tall reedbed in damp hollow at east end of lake near old sluice.
39. (NZ 25257036) 10.8.97. Releve 10x10m. Tall reedbed on dry ground at western fringe of reserve.
44. (NZ 25257034) 11.9.97. Releve 4x4m. Damp depression at western fringe of lake, dominated by rush vegetation.
45. (NZ 25257034) 11.9.97. Releve 4x4m. Damp depression at western fringe of lake, dominated by rush vegetation.



Table 11

*Phalaris arundinacea* fen (S28)

Similarity coefficient = 41.1

Species	Releve	43	Constancy
	Domin		
<i>Juncus effusus</i>		3	V
<i>Myosotis laxa</i>		1	V
<i>Phalaris arundinacea</i>		9	V
<i>Solanum dulcamara</i>		4	V
<i>Urtica dioica</i>		2	V
Number of species		5	

43. (NZ 25257035) 11.9.97. Relève 4x4m. Isolated stand of reed canary grass on western fringe of lake

Table 12

*Lemna minor* community (A2)

Similarity coefficient = 60.6

Species	Releve	22	25	Constancy
	Domin			
<i>Lemna minor</i>		5	7	V
Number of species		1	1	

22. (NZ 25467020) 22.7.97. Relève 4x4m. Floating leaved duckweed vegetation in lake, between Jubileehide and Roy Pearce hide.

25. (NZ 25477021) 22.7.97. Relève 4x4m. Floating duckweed vegetation in lake, between Jubilee hide and Roy Pearce hide.

Table 13

*Potamogeton natans* community (A9)

Similarity coefficient = 73.6

Species	Releve	8	10	12	Constancy
	Domin				
<i>Lemna minor</i>		2	1	2	V
<i>Potamogeton natans</i>		7	7	8	V
Number of species		2	2	2	

8. (NZ 25617033) 22.7.97. Relève 4x4m. Floating leaved aquatic vegetation in shallow water in recently excavated area on eastern side of lake

10. (NZ 25597029) 22.7.97. Relève 4x4m. Floating leaved aquatic vegetation in shallow water in recently excavated area on eastern side of lake.

12. (NZ 25617025) 22.7.97. Relève 4x4m. Floating leaved aquatic vegetation in shallow water in recently excavated area on eastern side of lake.

**Table 14**

*Potamogeton pectinatus* community (A12)

Similarity coefficient = 46.7

Species	Releve	21	24	Constancy
	Domin			
<i>Elodea canadensis</i>		7	8	V
<i>Potamogeton pectinatus</i>		6	8	V
<i>Lemna trisulca</i>			4	III
<i>Potamogeton pusillus</i>		4		III
Number of species		3	3	

21. (NZ 25557015) 22.7.97. Relève 4x4m. Open, submerged aquatic vegetation in lake, adjacent to Jubilee hide.

24. (NZ 25497020) 22.7.97. Relève 4x4m. Submerged aquatic vegetation in lake, between Jubilee hide and Roy Pearce hide.

**Table 15**

*Elodea canadensis* community (A15)

Similarity coefficient = 50.4

Species	Releve	9	11	13	20	23	Constancy
	Domin						
<i>Elodea canadensis</i>		8	9	8	8	8	V
<i>Lemna trisulca</i>						5	I
<i>Potamogeton pusillus</i>					6		I
Number of species		1	1	1	2	2	

9. (NZ 25617033) 22.7.97. Relève 4x4m. Submerged aquatic vegetation in shallow water in recently excavated area on eastern side of lake.

11. (NZ 25597029) 22.7.97. Relève 4x4m. Submerged aquatic vegetation in shallow water in recently excavated area on eastern side of lake.

13. (NZ 25617025) 22.7.97. Relève 4x4m. Submerged aquatic vegetation in shallow water in recently excavated area on eastern side of lake.

20. (NZ 25577016) 22.7.97. Relève 4x4m. Open, submerged aquatic vegetation in lake, adjacent to Jubilee hide.

3. (NZ 25477020) 22.7.97. Relève 4x4m. Submerged aquatic vegetation in lake, between Jubilee hide and Roy Pearce hide.



## BUILDING STONES OF THE DISTRICT AROUND ALNWICK, NORTHUMBERLAND

D E Jackson

10 Whittlestone Hollow, Lower Swell, Gloucestershire GL54 1LL

### SUMMARY

A survey of villages between Cheviot and the coast demonstrates that older buildings used local stone in the Devonian and Carboniferous, for example Wooler is of pink Doddington Stone, Denwick is entirely of Denwick Stone, Alnwick is a mixture of sandstone from Alnwick Moor and Denwick and Craster and Embleton used intractable black whinstone. Imported stones include red Penrith Sandstone from Lazonby for Bamburgh Castle, Springwell Stone from Gateshead for the Duchess School in Alnwick and, in very recent times, Ladycross Stone from near Hexham for houses in Lesbury. This study represents the 'tip of the iceberg' and sadly most of the data are probably lost for ever.

### INTRODUCTION

Alnwick has a long history of building in stone that can be traced back to Norman times. The initial demand for stone was largely for military defence and bridges, then for churches and last century saw a resurgence in its use for commercial buildings, houses, monuments and roads. It is a widely held view that the oldest buildings were sourced from nearby quarries and indeed some can still be found adjacent to farms, grand houses and castles. For example, Dunstanburgh Castle was built of sandstone from Gull Crag nearby. There is, however, plenty of evidence that some of our most ancient structures in England were built of stone transported huge distances as, for example, Stonehenge. After the Norman Conquest, limestone from Caen was imported to this country from Normandy to build Canterbury Cathedral and Westminster Abbey. Likewise, Portland Stone from Portland Bill in Dorset was extensively used in London from the mid-1600s onwards e.g. St. Paul's Cathedral, Westminster Bridge and Blackfriars Bridge. It was also shipped to Dublin to build the Bank of Ireland (1729), the General Post Office and parts of Trinity College. Of course with the advent of canals in the 1700s and the railways in the mid-1800s, building materials were moved from one end of Britain to the other, and this brought about a steep decline of vernacular traditions.

Old Alnwick is predominantly a sandstone town with a unity of scale and colour such that a cursory glance at Bondgate Within might suggest it is monolithic. On careful study however, one can see subtle variations in colour, from light grey in Barclays Bank, through light brown in Lloyds Bank, to ochre in Hansel House. Furthermore, the internal structures of the stones varies from fine to coarse grained and from a complete lack of bedding planes, as for example Lloyds Bank, to strongly cross-bedded as in Northumberland Hall. Clearly, this suggests different sources and tracking these down, though difficult, is one of the objects of this study. Data on the provenance comes from:

1. archival data in Alnwick Castle covering the period 1806 to 1855;
2. publications by the British Geological Survey;
3. suppliers of stone who have kept records of where their products were used;
4. matching a specific building stone to a quarry on the basis of colour, grain size, internal structure and post-depositional structure;
5. anecdotal evidence.

Ordnance Survey maps were also used to locate and date quarries.

My brief is to take up a challenge laid down by Eric Robinson's *Presidential Address* to the Geological Association in 1964 in which he said 'Many have drawn attention to the relationship which can be established between the building stone fabric of English villages and towns and a simple map of the geology of England. The book *The Pattern of English Building*

by Alec Clifton-Taylor (1962) can be credited with probably the clearest statement of this idea. It remains, however, to be treated in a more detailed approach, recording the geological subtleties which geologists would recognise in a local investigation....' The scope of the study embraces the area between Cheviot and the coast from Bamburgh to Amble and looks at building stones used in the area as well as roadstone – an industry that lives on today.

Although the passing of a generation of stonemasons and quarrymen whose works were seldom recorded amounts to corporate memory loss, there are still a few stonemasons or ex-employees of old family concerns to whom I have been able to talk and who have given me useful information. An insight into the magnitude of this loss is indicated by the discovery in the archives of Alnwick Castle of Warrants for 1723, 1753 and 1783 and a Ledger entitled *Quarry Leaves* covering the period 1806-1855, all dealing with limestone, coal and sandstone extraction in and around Alnwick. These show that at one time a thriving extractive industry existed in the area; indeed, in 1904 there were 1347 quarrymen employed in the county. Another source of data is that given by George Tate (1886), who was well versed in geology. However, many of the quarries mentioned by Tate were not adequately located and we do not know where they were e.g. Brislaw (= Brizlee?), Paul's Rest, Quarrel Hills and Race Ground; others have been partially filled either by farmers or by the Council, e.g. Denwick Quarry. It seems that a hole in the ground is a valuable thing today and such holes have found a variety of uses e.g. Birling Quarry in Warkworth is used as a caravan site, a quarry north-east of Link House, Amble is a recreational area, Spy Law Quarry near Shillbottle is a rifle range, Cave Quarry in Seahouses now underlies the fourteenth green of the golf course, Reigham Quarry is occupied by a sawmill and Craster Quarry is a car park. Such widespread destruction of old quarries means that it is impossible to determine the full variation of stone that has been taken from these old quarries.

## PREVIOUS WORK

The amount of published information on building stone of the Alnwick district is very small. The two regional memoirs by the British Geological Survey (Carruthers *et al.*, 1927; Carruthers *et al.*, 1930) identify some buildings in Newcastle and Edinburgh *etc.* where stone from the Alnwick area was used. Pevsner (1957) was the first to draw attention to the fact that red sandstone was imported from north-west England to rebuild Bamburgh Castle and Grundy (1992) noted the types of stone used in various villages in the area. The nearest anyone has come to a systematic study of Alnwick building stones consists of two short articles for the Alnwick Civic Society by Jackson (1997; 1998).

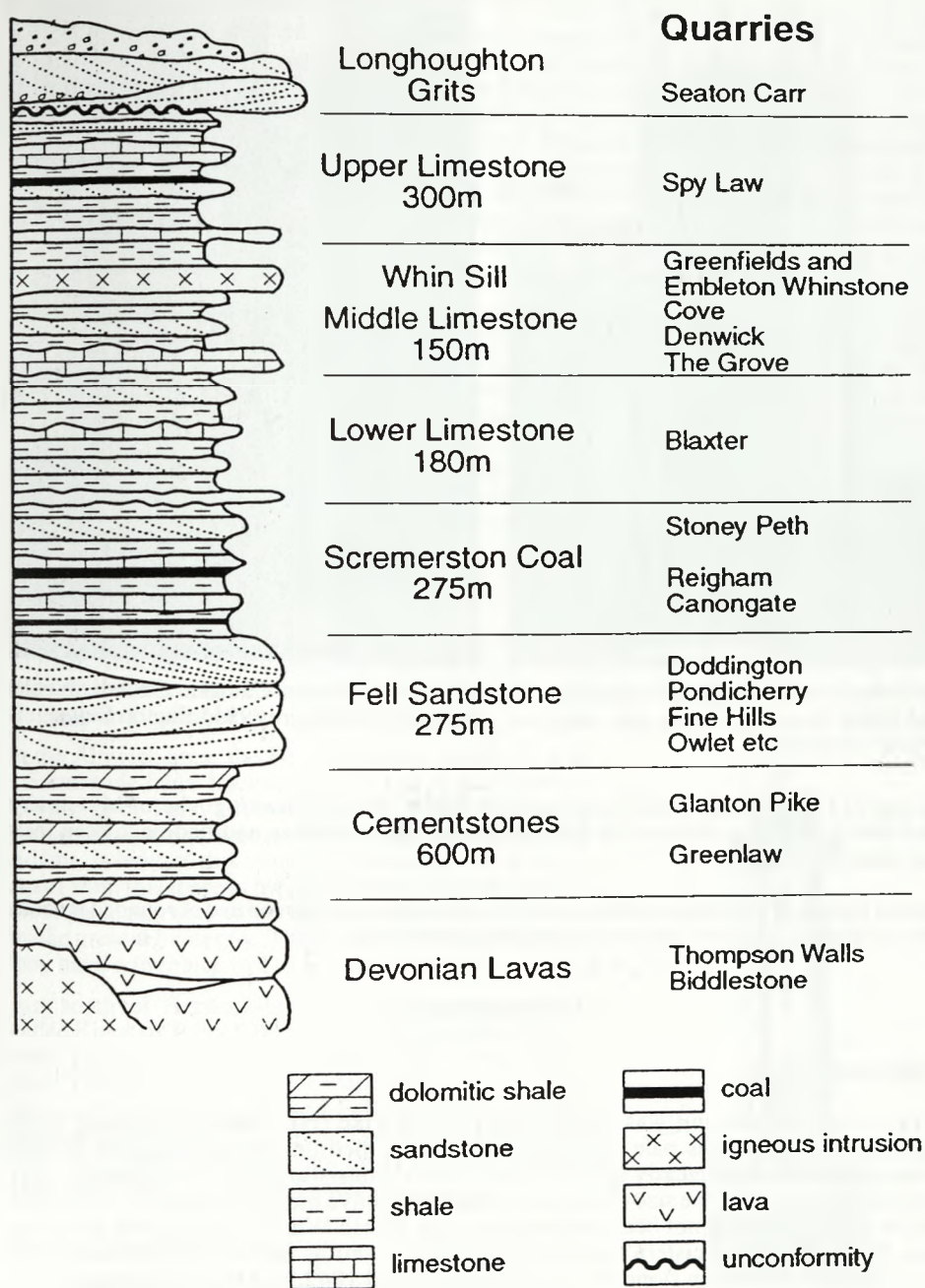
## GEOLOGY

This part of Northumberland lies on the south-eastern flank of a deeply eroded dome in which a core of granite and Devonian lavas is flanked by the Carboniferous (Westoll *et al.*, 1955, Plate 6; Robson, 1966 Plate 2). Broadly speaking, if one were to walk from Cheviot to Boulmer, all six units of the Lower Carboniferous (Fig. 1). would be traversed in the following order: Cementstones Group; Fell Sandstone Group; Scremerston Coal Group; Lower Limestone Group, Middle Limestone Group and Upper Limestone Group; and Longhoughton Grits (= Millstone Grits). Each of these units will now be considered in terms of what they have contributed to the built environment.

### Pre-Carboniferous

The oldest outcrops are the andesites and basalts of Devonian age which make up the Cheviot. They are extremely hard and difficult to dress but were used for Yetholm Church (1836) (Fig. 2) and several houses in Kirk Yetholm. According to Tomkeieff (1965) the source of the stone was a quarry 90 m south-east of Thompson Walls, north-east of the village. During one of my rambles up College Valley, north of Cheviot, I came across an RAF memorial at Cuddystone Hall dedicated to eleven British pilots who died on Cheviot. This was built in 1995 using local boulders, largely from the stream, under the direction of J J Nugent of Longhorsley who had been a stonemason prior to joining the RAF. In the centre of the circle stands an erect slab of





**Fig. 1** Schematic geological succession and the stratigraphical distribution of quarries referred to in the text.



**Fig. 2** Yetholm Church (1836) with walls of dressed black basalt and doors and windows of dressed sandstone.



**Fig. 3** St. Ninian Catholic Church, Wooler built of pinkish-grey Doddington Stone.

purple slate of Cambrian age found only in North Wales. But how had it got here? My enquiry revealed that it had been donated by RAF Boulmer Officers Mess and had once been their snooker table!

A common feature of buildings in this part of Cheviot is the widespread use of rounded igneous boulders of glacial origin in uncoursed random rubble walls.

### Carboniferous

#### Cementstones Group

Building stone from this unit was quarried on Glanton Pike (NU 065145) and used in the village nearby. The stone is pale buff coloured, fine to medium grained, massive bedded sandstone with distinctive, nearly spherical 'red horses' consisting of soft weathering, rusty coloured concretions up to the size of cannon-balls. In the above mentioned quarry, a 10 m face can still be seen which has not been worked since pre-World War II. Many of the houses in Glanton, the village water cistern and sundial (1848) as well as the walls of Shawdon Hall Lodge (1779) are of Glanton stone, as is a headstone dated 1842 in Bolton Churchyard.

A very different stone of excellent quality was once taken out of Greenlaw Quarry (NU 014 090) 1.3 km south-west of Yetlington. This is a greyish-brown, fine-grained sandstone devoid of bedding planes. According to Carruthers *et al.* (1930), it was used for the War Memorial (1920-22) in Alnwick and Lloyds Bank in Carlisle. Lloyds Chambers in Alnwick (1906) is of a very similar stone and although it is recorded that it was altered by T Muckle of Rothbury in 1909-10 for a cost of £2749, the source of the stone is unknown.



### Fell Sandstone Group

The overlying Fell Sandstone Group consists of around 250 m of yellowish, grey-brown to pink, well sorted, cross-bedded sandstone that crops out between Rothbury and Berwick-upon-Tweed and is one of the major feature-making units. At Rothbury, the three quarries called Cove, Pondicherry and Pennistane to the west of the town produced the stone of which much of the town was built. Crag-side, Lord Armstrong's house, used a supply of stone adjacent to it. The aforementioned *Quarry Leaves* shows that wallstone was taken from Pondicherry in October, 1806 for repairs on the Duke's estate and flagstones were being extracted from Pennistane in 1814. But I am suspicious of Tate's (1886, p. 378) attribution of the grand staircase in Alnwick Castle to Rothbury stone which is a greyish-white colour, the likes of which I have failed to find in the area.

The largest producer of stone from this group was undoubtedly Doddington Quarry (NT 008 327). Much of Wooler was built of this stone last century as for example St Ninian Catholic Church (Fig. 3), St Mary's Church and the United Reformed Church. It was extensively used in Edinburgh e.g. for the Redford Cavalry and Infantry Barracks (1914) between Colinton Road and Coulton Mains Drive, St. Giles Industrial Museum, the Observatory (1897) and the Reid Memorial Church near Blackford Avenue. There are also records of its use in Glasgow, Dunfermline, Portobello, Greenock and Dingwall (Appendix 1). According to Ashurst and Dimes (1990), it was used in Newcastle for St Andrews Church (1874) and the Arts Building, Newcastle University. They also tracked the stone as far south as London where it was used in 25-26 Lovat Lane, off Cheapside in the City. John Forder of Tynecastle Stone informed me that a pink Fell Sandstone from Cop Crag (NY 822 995) near Otterburn was used for the John Radcliffe Hospital, Oxford in 1988-89 and for the restoration of Ferniehurst Castle, Jedburgh.

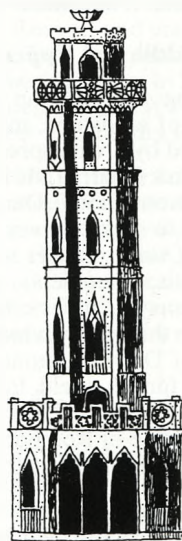
East of Cheviot, the group reappears along the eastern flank of the north-south trending Holburn Anticline and crops out on Old Bewick, Chattonpark Hill, Lyham Moor and the Kylee Hills. In the latter, sandstone was quarried at Collar Heugh (NU 040 394) for the building of Haggerston Castle (1898).

In the Alnwick area, the Fell Sandstone crops out in a 1.5 km wide band between Corby Crag and Brizlee Hill in Hulne Park. Brizlee Tower (1778-9, Fig. 4), a gothic folly which was probably designed by Robert Adams, is built of this stone from an adjacent quarry. Apart from this there is no documentation of the use of the stone in Alnwick town, but I was recently informed by the present owners of The Grange in Alnmouth that they have a fireplace of Doddington Stone.

Just south of Berwick-upon-Tweed, a large quarry called Kings (NT 999 508) at Sunnyside supplied much stone to the town. Berwick Bridge (1634), the Town Hall (1754-60) and Ravensdowne Barracks (1717-21) are also thought to have used Fell Sandstone but the source is uncertain. One of the last jobs done by J G Green of Warkworth was an extension to Berwick Hospital (1993) using Fell Sandstone.

### Scremerston Coal Group

The Scremerston Coal Group is well developed on the sea shore at Scremerston where it consists of about 300 m of sandstones, mudstones, fireclays, limestones and several coal seams. The group crops out on the Alnwick Moors and underlies Alnwick. Alnwick Castle archives contain mention of an eighteen-year lease from the Duke of Northumberland to quarry limestone and mine coal in the Scremerston Coal Group on Alnwick Moor,



**Fig. 4** Sketch of Brizlee Tower (1778-79) in Hulne Park, Alnwick built of Fell Sandstone.

Hobberlaw and Rugley dated 1793. Sandstone quarries can still be seen on roads out of the town e.g. Canongate (NU 181 139), Stoney Peth (NU 176 134), an unnamed quarry on the Rothbury road (NU181 127) and Reigham (NU 173 125). Tate made mention of the fact that Quarrel Hills Quarry was the source of stone for the castle in the 14th century and was last worked in 1678. Unfortunately, its whereabouts is unknown though I suspect it was a misspelling of 'Quarry Hills Quarry, Canongate Common'<sup>1</sup>. Apart from this, little is known about how stone from these quarries was used. The only evidence I have been able to glean comes from *Quarry Leaves* in the archives of Alnwick Castle. The relevant entries are shown below:

Date	Quarry	Uses
31 May, 1806	Reigham	walling stone for John Foster
17 June, 1808		Hope House in Canongate for Thomas Grey
28 June, 1806		walling stone
3 May, 1809	Stoney Peth	flagstones
17 June, 1808		dykes on Hawkshill Estate
3 Feb., 1809		flagstones
25 Feb., 1817		headstone

A warrant for six dozen flagstones out of Hulne Park for John Doubleday dated 1723 probably came out of Stoney Peth. Carruthers *et al.* (1930) state that this quarry worked a freestone 6 m thick but was abandoned due to thick overburden. Reigham Quarry was described by Tate (1886 p. 452) as Reham Quarry yielding two types of stone, namely hard flagstones from the upper part and soft sandstones from the lower. On the OS map of 1861 it was already a large quarry and in Tate's (1886) volume II we learn that Reigham was named after Riham House (1655) meaning 'house on the ridge'. The quarry belonged to the Freemen of Alnwick and when it closed it became a Victorian rubbish dump.

### Lower, Middle and Upper Limestone Groups

Between the Scremerston Coal Group and the Longhoughton Grits is a 1000 m-thick succession of sandstone, mudstone, limestone and coal that is subdivided into three groups, each defined by a widespread marine limestone. The best known stone in this interval came from Denwick Quarry (NU 210 145) which, according to Tate (1886), was operational in 1611 and closed around 1930. Denwick freestone was 6 m thick with a variable lithology, commonly pale straw to light brown in colour, micaceous, usually cross-bedded, medium-grained sandstone. *Quarry Leaves* reveal that the sandstone was used for walling, houses, flagstones, fire surrounds, monuments, millstones, tombs and headstones. Two photographs owned by Mr Ian Robertson of Alnwick, dated 1893, showed that a dozen men, two horses and two cranes were used in this quarry which had a working face 10 m high (Fig. 5). Much of Denwick village was built of Denwick stone, including a pant (1859), the school (1907), the village bridge (1924) and, further afield, Lesbury school (1817), Shortridge Hall (1898) near Warkworth and the War Memorial (1920) in Rothbury. The latter was designed by G Reavell and crafted by Thomas Muckle of Rothbury for a cost of £67. The reason why this mason did not use local stone was that he claimed it was too difficult to work<sup>2</sup>.

Denwick Stone was much used in Alnwick and examples are Denwick Bridge (1766), designed by J Adams, the Duke's School for Boys (1810) in Green Batt, The White Swan (rebuilt in 1873), The Plough in Bondgate Without (refaced in 1904) and the Infirmary (1906). Jack Cook, who worked as a stone mason for Alnwick Castle between 1930 and 1970, recalls that most of Canongate Street was built of Denwick Stone. A newspaper article dated 21

1 The source of this information comes from a collection of stone samples in Alnwick Castle which includes one labelled 'Quarry Hills. Cannongate Common.'

2 This information was provided by Mrs Elsie Brown of Thropton in 1996.





**Fig. 5** Denwick Quarry (1910) in the Middle Limestone Group with millstones and headstones in foreground. Photo by kind permission of Mr Ian Robertson.

October 1891 described the Robertson Fountain in the town centre as a 25-foot high monument in Italian Renaissance style which was designed by G Reavell and crafted by six masons from Green and Douglas of Amble for a cost of £234. 6s. Two contrasting types of stone were used, namely Denwick stone and monumental red Peterhead granite. In Newcastle, Denwick stone was able to compete with Springwell stone from Gateshead, for it was used for part of the Hancock Museum, Dial House in Northumberland Street and Trinity House.

In recent times, the most widely used stone was Blaxter stone from a quarry south-east of Otterburn (NY932 900). The quarry is now operated by Tarmac, though it is nearly worked out. The rock is a pale buff, medium grained, cross bedded sandstone commonly disfigured by bands of iron staining, at least in recently worked stone. In Alnwick, Blaxter stone was used to build the front of The Playhouse (1996), and according to G Reavell (1926) some of the repairs to Howick Hall following the fire of 1925 used Blaxter stone. Further afield, Tynecastle stone brochures claim that Blaxter was used for buildings in Edinburgh, Glasgow, Perth and Londonderry (Appendix 1).

Bamburgh Castle (Fig. 6) poses an interesting question concerning the source of the pinkish stone used in its walls. Beside the War Memorial (in Jurassic Portland Stone) below the castle is an outcrop of reddened sandstone which could be a clue and Carruthers *et al.* (1927) described a vault opening from the entrance hall of the castle which had an old well dating to before 1129 AD which was rediscovered in 1770. This was 44 m deep, the upper 22 m was in Whin Sill and the lower 22 m was in white and reddened sandstone. Carruthers *et al.* also state that 'the village itself is on sandstone, which is met with in the churchyard at a depth of 4 ft. to 9 ft., and is close to the surface south of the road; The Grove, in the centre of the village, [now covered in grass and trees] is the site of an old quarry from which rock was obtained for rebuilding the Castle ...'. A house that faces The Grove has a door lintel dated 1692 which could have come from that quarry but by 1801, builders were using a greyish sandstone and presumably The Grove was by that time closed. Thus by the time Lord Armstrong was building the west entrance of the Castle in the early 1900s, reddish-brown Penrith sandstone of

Permian age had to be imported from Cumberland (Leary 1986). This is contrary to Pevsner (1957, pp 12-13) who believed this stone was Triassic St Bees Sandstone.

A distinctive stone from the Middle Limestone Group was once extracted from Cave Quarry (NU 224316) which now lies under the fourteenth green of Seahouses Golf Course (*vide* Jim Donaldson, 1996). The stone is a light grey, fine grained sandstone with concretions that have blackened with time and are still visible in the cliff. It can be viewed in St Aidans Hotel, Seahouses, the entrance to Beadnell House, Beadnell and the Victoria Hotel, Bamburgh (used in conjunction with dressed whinstone!) (Fig. 7). The fact that this hotel was built by Fordys of Seahouses might explain why stone was brought such a distance when there was ample supplies of local material.

A quarry in the Upper Limestone Group on Spy Law Hill (NU 215 103) south-west of Alnmouth was, according to Jim Murdy of Alnwick Castle Estate, the source of stone used to construct the massive eighteen-arched railway viaduct of 1850 across the River Aln at Lesbury. I have examined the lithology of the stone in this quarry and find it matches exactly that used for the bridge. The stone is a massive, cross-bedded, coarse grained, pebbly sandstone ideally suited for dimension stone. It is my opinion that the Duchess Bridge (1864), Alnmouth and the old Cawledge Viaduct that carried the line between Alnmouth and Alnwick were built of the same material.

### Longhoughton Grits

The youngest clastics seen in the area under discussion are the Longhoughton Grits (= Millstone Grits) that are well exposed between Seaton Point and Marmouth Scars north of Alnmouth. These are yellowish to reddish-brown, massive, cross bedded, medium to coarse grained, pebbly sandstones of Namurian age. Because of easy access, it is hardly surprising that there is a long history of usage of sea shore stone. Tate (1886) made reference to the fact that 'Eighteen persons from Lesbury were amerced in sums for 1s 8d to 3s 4d each ... in not leading slates [flagstones] from Seaton Point into Alnwick in 1655'. In *Quarry Leaves*, these beds are referred to as 'Alnmouth rocks', e.g.

1809 Alnmouth shore produced stone for Messrs Waites and Taylor

1809 Alnmouth rocks were used to raise a granary in Alnmouth

1822 Alnmouth rocks were used for Dr Herdman's house in Lesbury

1825 John Appleby used Alnmouth rocks to build a school room.

This distinctive reddened<sup>3</sup> stone can be seen in field walls at Boulmer, in the walls of the Alnmouth School (1875), Hindmarsh Hall (early 18th century) (Fig. 8), Driftwood Lodge (*ca* 1790), Marine Country House Hotel and Nether Grange in Alnmouth, the east end of Lesbury Church and, I suspect, the pediment of the Percy Tenantry Monument (1816). In the last named structure, this stone was described erroneously by Davison (1822) as 'rose coloured granite'.

To the south of Alnmouth 'Birling Scars on Sea' (= Birling Carr) was, according to *Quarry Leaves*, a source of flagstones and it is still possible to see the pick marks on an outcrop on the beach.

### Whinstone

Whin or whinstone is a quarrymans term for any dark coloured igneous rock, usually basalt or dolerite, that can be used as a roadstone or building stone. In this area, the principal source was and still is the Whin Sill which is a quartz-dolerite intrusion of early Permian age that extends from the Farne Islands southwards to Middleton-in- Teesdale. The earliest record of its use for roadstone is an entry in *Quarry Leaves* for 1807 which states that Canongate Street was paved with whinstone from Greensfield Quarry (NU 180 118), Alnwick. These records also tell us

3 The existence of a zone of reddening at the top of the Carboniferous, along the plane of unconformity with the Permian in Durham and south-east Northumberland, is well documented by Anderson *et al.* (1952). These authors suggested that the reddening was due to the oxidation of pyrite and chalybite as well as the introduction of red iron oxide and that this occurred before the Permian was deposited.





**Fig. 6** West end of Bamburgh Castle rebuilt in the early 1900s using Penrith Sandstone from Lazonby.



**Fig. 7** Victoria Hotel, Bamburgh (ca 1893) built by Fordys of Seahouses using coursed dressed black whinstone possibly from Brada Quarry and door and window dressings of concretionary sandstone from Cave Quarry, Seahouses.

**Fig. 8** Hindmarsh Hall, Alnmouth built before 1779 as a granary with at least three floors. In 1859, it was altered to a church by the Duke of Northumberland giving it lancet windows and bell turret. In 1937, it was converted to the village hall by the Hindmarsh family.







**Fig. 9** Embleton School (1898) built of dressed whinstone.

that in the 1820s Ratcheugh (NU 230 153) and Snableazes Quarries (224 140) were also being worked. Other whinstone quarries were also worked between Longhoughton and Peppermoor, High Hobberlaw (NT 180 118), Hampeth Burn (NT 152 074) and Brada (NU161 340) near Bamburgh.

In 1864, Thomas Appleby and his two sons started up the Embleton Whinstone Quarry (NU 232 227) and subsequently they developed additional operations at Sunnybrae, Craster, Belford and Kirkwhelpington. During its early history, Embleton produced mostly kerbstones and whinstone setts which were used for paving the streets of Bondgate Within in Alnwick, Newcastle, Leeds and the Mersey Tunnel. According to Mr D Malthouse's (1991) compiled history of this quarry, there were twelve knockers-up and twelve sett makers employed in 1930 to produce dressed whinstone which can be examined in the Old Vicarage (1828) by J Dobson (in a castellated Tudor style), the United Reformed Church (1833), Creighton Hall (*ca* 1908) and the School (1898) in Embleton (Fig. 9), Craster Tower in Craster, the Masons Arms (in part) in Rennington, the Victoria Hotel (1893) in Bamburgh and farm buildings too numerous to mention. Other examples are St Cuthbert's Chapel (Fig. 10) on Staple Island and the base of Longstone Lighthouse (1896). However, by 1900 the most important product was chippings which were used for tarmacadam and large tonnages were shipped from Craster Harbour, built in 1908-10. During its heyday, Embleton employed eighty men but by 1950 the quarry was almost exhausted and it closed in 1961.

The Tarmac quarry at Little Houghton near Howick is the only operational whinstone quarry in the area today. It has fourteen employees and the stone is crushed and used for concrete pipes, armourstone and tarmacadam. Thus we see that historical records of whinstone quarrying span



**Fig. 10** St Cuthbert's Chapel (1370 and restored in 1844-48), Inner Farnes. Quoins, bellcote, window and door dressings of sandstone (stippled) and walls partly of uncoursed random rubble whinstone (black) probably from the beach.





**Fig. 11** The Playhouse, Alnwick refaced in Blaxter Stone in 1996. The Seven Ages Of Man frieze was sculptured by D. Edwick of Hexham using a sandstone from Stanton Moor, Derbyshire.

**Fig. 12** Roxburgh House (ca 1970) in Green Batt, Alnwick built of Coal Measures sandstone probably from near Bradford.



**Fig. 13** Shap Granite basin on the Denton Memorial Fountain, Alnmouth designed by G. Reavell and built in 1924-25 by J. G. Green of Warkworth for a cost of £299. Note the large crystals of orthoclase feldspar.

a longer period of time than any other stone and we can expect this Cinderella industry will continue to thrive far into the future because, since 1930, although the use of sandstone and limestone in Britain has increased by a factor of twelve, igneous stone has risen by a factor of fifty.

In the Cheviot area, a red quartz porphyry called Harden Red is presently quarried at Biddlestone (NT 959 087) and crushed to aggregate. It is suitable for roadstone, driveways, paths, coated macadam and for structural concrete. It is used for the distinctive bus lanes in London and is exported to Holland, Germany, and Japan.

### Imported Stone

Because of the closure of all the local building stone quarries except those near Otterburn, any newbuilds or restoration work necessitate the 'importation' of stone from working quarries as far away as Yorkshire. An example is Springwell stone from the Middle Coal Measures south-east of Gateshead. This stone is pale buff-to-ginger, fine to medium grained, massive sandstone with fossil plants. It has a uniform texture and is devoid of bedding so masons consider it a *safe* stone which can be viewed in the Duchess School (1960) and the top ten courses of the repaired shaft of the Percy Tenantry Monument (Jackson, 1997) in Alnwick. Other imports into the town are a sandstone from Stanton Moor, Derbyshire which was used by David Edwick (stone mason) for the relief sculptures (1997) on the frieze of Alnwick Playhouse (Fig. 11), Dunhouse sandstone from west of Darlington which was used for windows and doors of the 'Court Buildings' on Prudhoe Street (*vide* Leary, 1986), and Bolton Woods sandstone from the Coal Measures near Bradford which was chosen to build an apartment block at 19 Narrowgate Street around 1976; the same stone was probably used for Roxburgh House (Fig. 12) in Green Batt. This stone is characterised by abundant wisps of carbonaceous plant fragments. The town square has recently been given a facelift using York stone, granite setts and Caithness Flagstone (dark grey).

Lord Armstrong imported red Penrith sandstone from Lazonby in Cumberland to build parts of Bamburgh Castle about one hundred years ago. Another sandstone was brought from Blackpasture Quarry near Hexham to complete an unfinished wing of the castle. This work was done by a team of masons on loan from that quarry under the direction of George Johnston who were billeted in the green bungalows (Armstrong cottages) which still exist south of the Castle. Lastly, in the 1990s, a number of houses in Meadowlands, Lesbury were built with a strongly banded brown sandstone of Namurian age from the Ladycross Quarry near Slaley. This stone darkens quickly due to the oxidation of pyrite.

Mention should also be made of polished monumental stone which Victorians considered the height of fashion and which can be seen in the Pottergate Pant (1876) and Robertson Fountain (1890) in Alnwick and the Shilbottle Pant (1868). All three are adorned with red Peterhead Granite. The Denton Memorial Fountain (NU 249 108) alongside the road that crosses the Alnmouth golf course displays a basin in Shap granite. This is a very distinctive stone that possesses 3 cm-long pink feldspar crystals (Fig. 13).

### ACKNOWLEDGEMENTS

The author wishes to acknowledge helpful discussions and assistance from Jack Cook (stonemason) and Colin Shrimpton (archivist) both of Alnwick Castle Estate; Jim Donaldson (stonemason); Miss Peggy Sennet and Fred Bettess of Alnmouth; Mrs Elsie Brown of Thropton; Joe Cummins of Rothbury; David Edwick (sculptor) of Hexham; Eddie Forder of Tynecastle Stone; John Howliston (ex-employee of J G Green) of Warkworth; George Smart of Amble; Ray Connell and Peter Clark (architects) of Reavell and Cahill, Alnwick; Chris Alcock, an engineer with ARC.; and Neville Longstaff who accompanied me on many quarry visits. Dr Eric Robinson kindly read an early version of the manuscript and offered many good suggestions.



## REFERENCES

- ANDERSON W and DUNHAM K C, (1953). Reddened beds in the Coal Measures beneath the Permian of Durham and south Northumberland. *Proc. Yorks. Geol. Soc.* **19**: (1): 21-32.
- ASHURST, J and DIMES F G, (1990). Conservation of Building and Decorative Stone. vols. 1-5. Butterworth-Heinemann.
- CARRUTHERS R G, BURNETT G A and ANDERSON W, (1930). The geology of the Alnwick District. *Mem. Geol. Surv. England and Wales*, xiii + 138 pp. HMSO, London.
- CARRUTHERS R G, DINHAM C H, BURNETT G A and MADEN J, (1927). The geology of Belford, Holy Island and the Farne Islands. *Mem. Geol. Surv. England and Wales*, xi + 195 pp. HMSO, London.
- CLIFTON-TAYLOR A, (1962). The Pattern of English Building. Batsford, London.
- DAVISON W, (1822). Descriptive and historical view of Alnwick. Davison, Newcastle upon Tyne.
- FOWLER A, (1926). The geology of Berwick-on-Tweed, Norham and Scremerston. *Mem. Geol. Surv. Great Britain*. ix + 58 pp.
- (1936). The geology of the country around Rothbury, Amble and Ashington. *Mem. Geol. Surv. Great Britain*. xii + 159 pp.
- JACKSON D E, (1997). Alnwick Stone. *Alnwick Civic Society Newsletter*. September: 6-9.
- (1998). Alnwick Stone. *ibid.* January: 6-9.
- LEARY E, (1986). The building sandstones of the British Isles. *Building Research Establishment Report*, Watford.
- MALTHOUSE D, (1991). A short history of Embleton Whinstone Quarry: 5 pp. *A private publication*.
- PEVSNER N, (1957). The Buildings of England: Northumberland. *Penguin Books*: 1-362
- QUARRY LEAVES, (1806-1855). Archives of Alnwick Castle Estate, Class K, D1 N.
- REAVELL G, (1926). Estimate for the erection and completion of proposed rebuilding of Howick, Northumberland. Reavell and Cahill, Lloyds Chambers, Alnwick.
- ROBINSON E, (1965). A Pattern of English building: a challenge. *Proc. Geol. Assoc.* **106**: 161-170.
- ROBSON D A, (1966). A guide to the geology of Northumberland and the Borders. *Trans. Nat. Hist. Soc. Northumbria* **XVI**: 77 pp.
- TATE G, (1886). The history of the Borough, Castle and Barony of Alnwick, Northumberland. Vols I and II. Blair.
- WARNES A R, (1926). Building Stones, their properties, decay and preservation. Benn.
- WESTOLL T S, ROBSON D A and GREEN R, (1955). A guide to the geology of the district around Alnwick. *Proc. Yorks. Geol. Soc.* **30**: 61-100.

## Appendix 1

Tabulation of buildings which have used stone from the Carboniferous in the area of study. Sources of data: Ashurst and Dimes (1990); Carruthers *et al.* (1927, 1930); Leary (1986); Natural Stone Products, Gateshead; Reavell (1926); Tynecastle Stone, Gateshead; and Warnes (1926).

### Doddington Stone (Fell Sandstone Group)

Location	Reference Buildings
Wooler	United Reformed Church, St Ninians Catholic Church and St Mary's Church.
Newcastle upon Tyne	St Andrew's Church (1894), School of Architecture and the extension to the Arts Building, Newcastle University.

Berwick-upon-Tweed	Ravensdowne Barracks and the 1993 extension to the Hospital.
Oxford	John Radcliffe Hospital (1988-89).
London	Finials in 25-26 Lovat Lane EC3.
Edinburgh	St Giles Industrial Museum, Observatory (1897), Redford Cavalry and Infantry Barracks (1914), Reid Memorial Church (1929), Wesleyan Memorial Hall, Scottish Equitable in St Andrews Square; National War Memorial, Edinburgh Castle; Jenners, Princes Street (1964 and 1979); and Royal Veterinary College.
Dingwall	Sheriff Court (1991-93).
Greenock	Sheriff Court (1992-93).
Glasgow	Wellington House.
East Kilbride	Scottish Nuclear HQ.

#### **Blaxter Stone (Lower Limestone Group)**

<b>Locality</b>	<b>Reference Buildings</b>
Newcastle upon Tyne	Central Station, City Hall, Armstrong College Library (1926), Leazes Terrace and Sallyport Tower restoration.
Alnwick	Playhouse (1996).
Durham	St Mary's College (early 1960s).
Howick	Howick Hall (1926-27).
London	Killock Street Offices near Kings Cross.
Edinburgh	Royal Hotel, George IV Bridge, National Library of Scotland (1950-55), Marks and Spencers, Standard Life Assurance Office in Thistle Street (1972), North British Hotel (1902), Sherrif Court, Royal Infirmary Simpson Memorial Maternity Pavilion (1935), Scottish and Newcastle Breweries head office (late 1950s).
Glasgow	St Augustines Church, Scottish Legal Life Assurance in Bothwell Street (1927).
Perth	House of Fraser.
Iona	Abbey restoration.
Londonderry	Head Post Office.

#### **Denwick Stone (Middle Limestone Group)**

<b>Locality</b>	<b>Reference Building</b>
Newcastle upon Tyne	Hancock Museum, Dial House, Trinity House and County Council Offices.
Sunderland	Post Office.



## SHORT COMMUNICATIONS

### The Heslop-Harrisons: a dynasty of Northumbrian naturalists

Some of our readers may not know the Heslop-Harrison family, five members of which played an important part in the development of the study of natural history in the north-east of England and beyond for much of the 20th century. The founder of this dynasty was Professor John William Heslop-Harrison FRS, born in Birtley, County Durham, in 1881. It is his controversial life and work that is the subject of the book *A Rum Affair* by Karl Sabbagh, reviewed by Dr John Richards in this volume of the *Transactions*.

John Heslop-Harrison was the bright son of an iron worker and the family made great sacrifices to provide him with an education, first at Rutherford College Newcastle and later at Armstrong College Newcastle, then part of the University of Durham. After graduating with a first class degree with distinctions in education and chemistry, John spent twelve years as a schoolmaster in Gateshead and Middlesbrough. During this time he obtained the degrees of MSc and DSc for his entomological researches, especially his studies of geometrid moths. Much of this research was carried out on Billingham Flats, subsequently buried beneath the ICI chemical plant. In 1920 he became a lecturer in the Zoology Department, eventually becoming Professor of Genetics before moving to the Botany Department to become Professor and Head of Department. All who knew him speak in awe of his breadth and depth of knowledge of all forms of natural history. He was undoubtedly a superb field naturalist, one who could find rare plants and insects where others could find little of note.

John Heslop-Harrison was socially a rather difficult man who worked on his own or with a small group of very close associates, somewhat isolated from mainstream science. This can often lead into new and interesting fields and indeed much of his work was highly original but it was also prone to error. The errors led some other workers to ignore or doubt the main body of sound science. John was a great exponent of Lamarckism, that is, the inheritance of acquired characters. His work on this included industrial melanism in moths and sawflies and resulted in a extensive exchange of letters with Professor J S Huxley, a strong opponent of such views. John Heslop-Harrison is particularly remembered for his work on the botany of nunataks, areas of land which remained ice-free between the glaciers during the last ice age, thus preserving the flora of earlier times. It was this work which led him to work on the flora of the western isles of Scotland and the Isle of Rum in particular, the subject of the book *A Rum Affair*. This is a scientific 'whodunnit?' but we shall probably never know the truth of the matter.

John had three well-known children: Gordon, Reader in Entomology in the Faculty of Agriculture, was very like his father both in character and scientifically; Helena, better known as Dolly, became a leading plant scientist; and Jack was another botanist. Dolly was an expert on the origins of crop plants and one of the first archaeological botanists. She, like her brother Gordon, was a lecturer in the Faculty of Agriculture at Newcastle and she married George Clark, Reader in Botany at Newcastle, who also features in the book. Jack was destined to become a Royal Society Professor, Director of Kew Gardens and chairman of the Agricultural Research Council. His son followed in his father's footsteps as a professor. To complete the family tree, Gordon's wife was the librarian of the Gilchrist Library of the Faculty of Agriculture.

The family played a surprisingly small part in the affairs of the Natural History Society but were leading members of the Northern Naturalists Union and the Chester-le-Street Natural History Society, and founded the publication *Vasculum* which was originally very much an outlet for their field records. John Heslop-Harrison published more than 500 scientific papers and innumerable field records before he died in 1967, aged 86. His obituary in the *Biographical Memoirs of the Fellows of the Royal Society* (Vol. 14; Nov 1967) states:

'Certainly Harrison was a fine teacher: he had verve and great pedagogic skill; and it would be a rare listener who did not recognize him as a man with a touch of genius, first, last and all the time dedicated to his calling and master of it. It was but natural that his department flourished as a green bay tree. He was a 'character', he had many idiosyncrasies and inconsistencies, yet

there has been abundant testimony to the ready sympathy and generous help that he gave to students, to colleagues in various faculties, to school teachers, and, always to be remembered, to the naturalists of Northumbria.'

B J Selman  
Department of Agriculture and Environmental Sciences  
University of Newcastle  
NE1 7RU

#### BOOK REVIEW

***A Rum Affair* by Karl Sabbah. 22x14 cm. Pp ix + 224 with 11 text figures.  
Allen Lane: The Penguin Press: London. 1999. Price £16.99.**

In a formulaic 'whodunnit' we are presented with a body, a trail of cryptic evidence, the character profiles of a cast of suspects, and a detective who by establishing opportunity, means and motive identifies the murderer. British botany's most celebrated hoax gives us a whole series of 'bodies' (none of the 'planted' rarities seems to have persisted very long), a trail of circumstantial and somewhat cryptic evidence, a single suspect whose character is thoroughly assassinated, and a detective, who like the suspect, is long since dead. This is Sabbah's central difficulty; the alleged misdemeanours were perpetrated half a century ago, and no key witnesses have survived to the present day. In this sense *A Rum Affair* can be likened to a modern account of 'Jack the Ripper'. No new evidence is likely to come to light today, so the narrator has had to depend on contemporary accounts of the evidence and suspects, and needs critically to assess possible bias amongst those who undertook investigations at the time.

Sabbah is a journalist with a track record of investigative television scrips and, self-confessedly, is not a botanist. I imagine he aimed to undertake a balanced account of the contemporary evidence (most of which was not previously in the public domain) through the objective of writing an entertaining, accessible book. In this, he has been largely successful. *A Rum Affair* is undoubtedly a good read. Sabbah cunningly uses his naiveté as a tool by which non-botanical readers can access botanical complexities.

As the tale unfolds, two main protagonists emerge (I suspect that peripheral but powerful characters such as A J Wilmott and Maybud Campbell played much more important roles than suggested here, but the evidence is equivocal). These central figures are dramatically counterpoised, a sort of botanical 'yin' and 'yang'. One is a professional biologist of international renown, Professor, Head of Department, D.Sc, FRS, extrovert, outspoken, domineering, northern, of working-class origins and paranoid tendencies. The other is an amateur botanist, junior academic, scholarly, principled, southern, the middle-class son of an ecclesiastical Cambridge don, gregarious and with an overdeveloped sense of humour. Where do our sympathies lie? The reader, conditioned by the Peter Wimseys and Roderick Alleyns of his youth, is automatically expected to back the self-appointed detective, the young classicist John Raven.

I am acutely aware that I am writing here in a particular forum, with a particular historical interest in Sabbah's treatise. The northern Professor was of course J J H Harrison, sometime Reader and Professor in Genetics and then Professor of Botany at Kings College, Durham (despite Sabbah, the foundation of the University of Newcastle only dates from 1963, four years before Harrison's death). He added his given name Heslop to his family name, so that the botanical dynasty he founded became double-barrelled. Both this, Sabbah argues, and his adoption of a geographically inaccurate but more fashionable home address, are symptomatic of a snobbishness seemingly at odds with his loyalty to his relatively humble, northern origins.

Harrison dominated natural history in the north-east of England for nearly half a century. Many local natural historians are direct or indirect descendants of his inspirational teaching. Even his most vociferous opponents (and Sabbah has found many) describe a hugely charismatic, massively influential character with an unrivalled ability in the field (and it seems a total inability to accept that he could ever make a false identification). Nearly forty years after his death, Harrison still has local supporters, perhaps many, who cannot conceive the possibility



that Harrison could have ever falsified a record. Sabbagh apparently sought them out, but some at least would not grant an interview, perhaps fearing that they would be misrepresented.

Raven wrote a report on his visit to Rum, where Harrison was alleged to have planted material of several rare plants, two of which were new to the flora of the British Isles. To Raven's disappointment, a decision seems to have been made to suppress the report, which was lodged in the vaults of Kings College, Cambridge, where Sabbagh later unearthed it. Sabbagh failed to discover the source of this suppression although Wilmott, who may have instigated Raven's odyssey, was probably influential. Sabbagh seems bewildered by this decision, invoking a scientific cabal of silence. In fact the real reason was probably less sinister. Harrison seems not to have been actively litigious, but he threatened legal action on several occasions in response to private accusations. Raven (and half a century later, Sabbagh) present a compelling case against Harrison, but one consisting entirely of circumstantial evidence and the balance of probabilities. This lack of proof, combined with Harrison's scientific standing, strength of personality, self-belief and vigorous, persistent denial, could have resulted in only one legal outcome.

Some vital questions remain. Harrison is supposed to have faked plant records by planting living material of a number of non-native (or otherwise distantly distributed) species into various Scottish islands. These plants were invariably non-charismatic (sedges, rushes etc.) and so not available from horticultural sources. Where did he get them from, especially during war-time? He had travelled to the Pyrenees (his house was called 'Gavarnie', but most of his 'discoveries' were not Pyrenaean. How did he transport them to the islands unknown to the rest of his party? Where did he store them on the island before he was able to 'stage' his discoveries? Sabbagh provides the motive and the opportunity, but he is very weak on the means of Harrison's alleged misdeeds.

This necessary book makes several points. Irrational personal behaviour may be accompanied by irrational scientific behaviour. Mud sticks, so that although the miscreant and his collaborators may publish volumes of perfectly valid work, it will be ignored once a hoax has been proven. Proper documentation is central to all good science; Harrison was notoriously slack in his curation of voucher specimens. For this alone he deserved the tacit censure which isolated him from the scientific community in his later life.

A J Richards

Dept of Agriculture and Environmental Science

Ridley Building

University of Newcastle

NE1 7RU





TRANSACTIONS  
OF THE  
NATURAL HISTORY SOCIETY  
OF  
NORTHUMBRIA

Editor:

B J SELMAN

Assistant Editors:

D C NOBLE-ROLLIN

M A PATTERSON

Volume 61

THE NATURAL HISTORY SOCIETY OF NORTHUMBRIA  
THE HANCOCK MUSEUM  
NEWCASTLE UPON TYNE NE2 4PT  
2000-2001

ISSN 0144-221X

©The Natural History Society of Northumbria, 2001.  
This publication is copyright. It may not be  
reproduced in whole or in part without the  
Society's permission.

Printed by Pattinson and Sons, Newcastle upon Tyne.



## CONTENTS

	Page
PART 1	
<b>Annual Report 2000</b>	1
PART 2	
<b>Birds on the Farne Islands in 2000</b>	37
compiled by R Harvey and J Walton, edited by M A Patterson	
PART 3	
<b>A Supplement to Flora of Northumberland</b>	71
by G A Swan	
<b>The Durham Flora - Corrigenda et Addenda</b>	161
by G G Graham	





TRANSACTIONS  
OF THE  
NATURAL HISTORY SOCIETY  
OF  
NORTHUMBRIA

Editor:

B. J. SELMAN

Assistant Editors:

D. C. NOBLE-ROLLIN

M. A. PATTERSON

Volume 61

Part 1

THE NATURAL HISTORY SOCIETY OF NORTHUMBRIA

THE HANCOCK MUSEUM

NEWCASTLE UPON TYNE NE2 4PT

2000

**ISSN 0144-221X**

© The Natural History Society of Northumbria, 2000

This publication is copyright. It may not be reproduced in whole or in part without the Society's permission.

Printed by Pattinson and Sons, Newcastle upon Tyne.



**ANNUAL REPORT  
OF THE  
COUNCIL AND TRUSTEES  
FOR THE  
YEAR ENDED 31 JULY 2000**

## THE NATURAL HISTORY SOCIETY OF NORTHUMBRIA

**PRESIDENT** The Viscount Ridley

### VICE PRESIDENTS

A H Dickinson	Dr G A L Johnson	I D Moorhouse	E Slack
R W T Thorp	<u>D F McGuire</u>	Mrs M A Patterson	Professor R Bailey
M J Hudson (resigned)	D R Shannon	Dr A G Lunn	Dr J M Jones
J Alder	D P Walton	A M Tynan	R Wilkin

### COUNCIL

#### (1) Elected by members:

1997 - Ms L Kerslake (resigned), Dr D N Mitchell (resigned)

1998 - S Lowe

1999 - J S North Lewis, Dr D Gardner-Medwin (Chairman of Council), J Walton

#### (2) Nominated by sections:

H H Chambers (library), Dr A G Lunn (botany), Dr G A L Johnson (geology), I D Moorhouse (Gosforth Park), Dr C P F Redfern (ornithology), Dr B J Selman (publications), Ms J Simkin (lichenology)

#### (3) University representatives:

P S Davis, Dr A J Richards, Dr B J Selman

### TRUSTEES

H H Chambers, Dr D Gardner-Medwin, Dr A G Lunn, I D Moorhouse, J S North Lewis, Mrs M A Patterson, Dr B J Selman, D R Shannon, E Slack

**TREASURER** N A Furness FCA

**SECRETARY** D C Noble-Rollin

**SOLICITORS** Dickinson Dees, St Ann's Wharf, 112 Quayside, Newcastle upon Tyne

**BANK** Lloyds TSB Bank plc, 102 Grey Street, Newcastle upon Tyne

### FINANCIAL ADVISERS

Brewin Dolphin Securities Ltd, 39 Pilgrim Street, Newcastle upon Tyne

### INDEPENDENT EXAMINERS

PricewaterhouseCoopers, 89 Sandyford Road, Newcastle upon Tyne

### GENERAL PURPOSES COMMITTEE

P S Davis (resigned April 2000), Dr D Gardner-Medwin, Dr A G Lunn, I D Moorhouse (from April), J S North Lewis and Dr B J Selman (from April); N A Furness and D Noble-Rollin in attendance

### SOCIETY REPRESENTATIVES

**Coquet Island Advisory Management Committee:** I D Moorhouse, D C Noble-Rollin

**Coquet Island Research Sub-Committee:** Dr C P F Redfern, D C Noble-Rollin

### Lindisfarne National Nature Reserve:

**Advisory Committee:** D G Bell

**Wildfowl Panel:** D C Noble-Rollin

**Museum Management Committee:** Dr D Gardner-Medwin, D C Noble-Rollin, E Slack, Dr R H Stobbart

**STAFF** Ms S Carter, Mrs H Dalrymple, Ms P Hammock, Mrs J Jones, Dr A Westerberg

**GOSFORTH PARK NATURE RESERVE** Warden: P Drummond

### THE HANCOCK MUSEUM

Senior Curator and Principal Keeper: A Coles

Curator and Senior Keeper, Natural Sciences: S McLean



## ANNUAL REPORT OF THE COUNCIL AND TRUSTEES FOR THE YEAR ENDING 31 JULY 2000

The Natural History Society of Northumbria is a registered charity and is governed by the rules of the Charity Commission. The Trust Deed dated 30 December 1965 was last updated after the annual meeting on 28 November 1997. A list of the present trustees is given opposite with the other officers of the Society. Our rules state that 'The objects of the Society shall be the encouragement by every means of the study of natural history in all its branches; the protection of the local flora and fauna; the maintenance and extension of the Society's library and collections; the publication of *Transactions* and other scientific papers, the organisation of lectures, discussions and field meetings and co-operation with other scientific societies or associations with similar objects'. The following annual report outlines the main achievements of the year in relation to the charity's objects.

### INTRODUCTION

This Annual Report has been written by many people. As Chairman, I sign it on behalf of the Council after the whole Council has scrutinised it with care. But this introduction I should like to use first to thank the real authors and compilers of the report, principally Mr David Noble-Rollin, our Secretary, Mr Neville Furness, our Treasurer, and Mr Steve McLean, the acting Principal Keeper of the museum, but with important contributions from Mr Hugh Chambers, Mrs June Holmes, Dr Angus Lunn, Mr Ian Moorhouse, Dr Chris Redfern, Mr Denis Scadeng, Ms Janet Simkin and Mr Bob Wilkin.

Next, I should like to thank all the innumerable members of staff and volunteers who did the hard work set out here which added up to a year of fine achievements. I feel sure that everyone who reads this report will feel proud to belong to our Society; I certainly do.

In March we lost one of our most respected and gracious senior members, Mr Don McGuire. I am grateful to Mr Derek Shannon for writing the obituary that follows this report and would like to add my personal gratitude and that of Council for Don's warm friendship, constant support and wise advice. Derek also kindly wrote the obituary of Mr Fred Colley (a former warden at Gosforth Park), and Dr Alec Panchen that of Dr Alick Walker, for many years secretary of our Geology Section, both of whom died this year.

There were three other events of special importance which should be highlighted. The first was the very unfortunate illness of our usually ubiquitous Secretary, David Noble-Rollin. David fell ill in October, while on holiday in Spain prospecting for good sites for an ornithology section field trip, and it was several weeks before he was well enough to return to Newcastle and many months before he could return to work. We rejoice that he is now sufficiently recovered to have taken up nearly all of his old activities and we wish him the best of health in the future. His absence emphasised not only how crucial he is to the many activities of the Society, but also how generous with their time and how talented our office staff and volunteers are; they rallied splendidly and Council is very grateful to everyone involved. David has mentioned them individually in his section on office management below.

The second event was our formal decision at the Annual Meeting to change the rules to permit the employment of a Treasurer. Since 1829 the Society had relied upon Honorary Treasurers and Council would like to pay tribute to this long succession of gifted and expert people. Mr Neville Furness, promptly elected as our first staff Treasurer, has brought great expertise and some new ideas to the job as readers will see in this year's Financial Statement. We welcome him and hope he will greatly enjoy his work for the Society.

Finally I should like to pay tribute to Mr Alec Coles who resigned as Principal Keeper to take up a post as Director of our younger but heavier sister organisation, the Northumberland Wildlife Trust. Alec's contributions to the care of the collections, to the development plans for the museum, to regional wildlife recording and to the Society as a whole have been immense. We thank him for all he has done and are delighted that he remains a power in local wildlife conservation and that he has agreed to co-opt as a member of Council.

## MEMBERSHIP

The total membership on 31 July 2000 (with 1999 figures in brackets) was 876 (859). This was made up of 8 (7) honorary members, 39 (40) life members, 526 (519) members who receive *Transactions*, 269 (262) members who do not receive *Transactions*, 23 (21) associate members, 0 (0) school and 11 (10) complimentary members. Several people make payments under long-standing banker's orders ranging from £1 to £12, made when these amounts were the current subscription rates, and they are regarded as donors and not members.

The Council reports with much regret the death during the year of nine members. Mr R F Walker (elected in 1938) was one of our longest-standing members, and was also a trustee of the Society for many years. Obituaries of Dr Alick Walker (1958), Mr Don McGuire (1965) and Mr Fred Colley (1976) appear later in this report. Other members whose deaths were reported to the Society were Mr D Barnes (1994), Mr G Feggetter (1958), Mr L Harle (1979), Mr A W Jones (1952) and Mr G H Newby (1991).

## ANNUAL MEETING

Viscount Ridley presided at the Annual Meeting of the Society on 26 November 1999 which was attended by thirty-six members and guests. The 1998-9 Annual Report and the Financial Statements were formally adopted and the President and other officers of the Society and members of Council listed at the beginning of this report were elected. Mr Mervyn Anthony retired by rotation. Mrs Margaret Patterson proposed that Mr Don McGuire be elected an honorary member in recognition of his many services to the Society in the previous thirty-four years, and this was agreed unanimously. A change in the rules was agreed to permit the election of either a salaried or an honorary treasurer.

Mr Steve McLean reported on the progress of the plans to extend the museum. The final report of the architectural audit had not yet been received. However, a preliminary version had emphasised the historic and cultural importance of the collections as well as of the building, a welcome statement which should facilitate developments designed to protect the collections. The meeting was followed by a tour of the museum, with special emphasis on the recently conserved and catalogued ethnography collection.

## COUNCIL

The Society's officers and members of Council are listed on page 4. Council, the governing body of the Society, meets four times a year, usually in October, January, April and July. It is made up, first, of the President and Vice-Presidents who are elected at the annual meeting and are chosen for their wide range of knowledge and experience in many fields. The major contributions they have all made to the well-being and success of the Society make their advice of great value. This year Mr M J Hudson, who had been closely involved in our work as the former Director of the Countryside Commission in Newcastle but had lived in the South for some years, resigned his vice-presidency.

Next are the elected members who are proposed by either individual members or by Council: they are elected for three years after which they automatically retire by rotation. Each year up to three can be elected. Each section in the Society nominates a member to represent the interests of the group and in this role they can be on Council for many years. Because of the special relationship with the University concerning the management of the Hancock Museum the University is entitled to four representatives on Council.

The Trustees have a special responsibility to see that the charity is run correctly and that the collections and buildings owned by the Society are maintained and preserved for the future. These responsibilities are summarised in the preamble to the Financial Report.

In addition to the above elected members, Council has members in attendance: these include the Principal Keeper of the Museum, the Treasurer, and the Secretary.



## PUBLICATIONS

After the publication of the last part of Volume 59 Dr David Gardner-Medwin handed over the role of editor of the *Transactions* to Dr Brian Selman, who has recently retired as a Senior Lecturer at the University of Newcastle and has for many years been a University representative on the Society's Council. The current year's publication of the *Transactions* is Volume 60. Part 1 is the Annual Report for the year ending 31 July 1999, which was sent out with the winter bulletin. This was followed by the Farne Island Bird Report (volume 60 part 2), which was sent to members in April. The main issue of the year (Volume 60 part 3) has three papers and a short communication. This should shortly be ready for distribution.

## OFFICE MANAGEMENT

The Society office was not helped this year by the sudden illness of the Secretary, which effectively made him absent for over four months and able to work only part-time for the next few months. The only good point was that the winter programme had been arranged, the annual report was close to publication and the autumn bulletin had been sent to the members. However this put a great strain on the staff and Council would like to thank everyone who worked so hard to maintain the office during this time. Particular thanks should go to Gary Stephenson who not only proceeded with the publication of the winter bulletin, but also maintained a level of cohesion in the office that enabled the service to members to continue and the programme of events to take place. Dr Anne Westerberg should also be thanked for her extra work during this difficult time.

During the year there have been a number of staff and volunteer changes which are mentioned under the individual headings.

### Staff

**Mrs Helen Dalrymple** Helen has worked in the Society office for a number of years. She came first as a volunteer and then joined the staff with a special responsibility for the binding and exchanges of periodicals. Unfortunately she cannot undertake her office work any longer because she has moved to Morpeth, now has a full time job and during the year suffered from ill health. Council would like to thank her for all her work and wishes her well in the future.

**Mr Neville Furness** Neville was elected as Treasurer at the annual meeting in November but had been dealing with the accounts since his appointment after the April Council meeting in the previous financial year.

**Ms Tricia Hammock** Tricia began the final year of her degree course at Durham University and consequently her energies were directed toward her studies. However, she continued to deal with the Society's covenants and to oversee the periodical exchanges as well as taking minutes at the Annual Meeting and at the Council and General Purposes Committee meetings if she was available. Council would like to take this opportunity to congratulate her on her first class honours degree in Environmental Management and to wish her every success in the work for her doctorate which she begins in September.

**Mrs Joyce Jones** Joyce Jones continued her office duties of typing and membership during much of the year. However, in assessing future needs it was decided that different skills were required to oversee the work of the office, and Joyce left in April. We wish her well in the future.

**Dr Anne Westerberg** Anne has worked hard this year to maintain the office and to keep the service to members going throughout the time that the Secretary was ill. Her contribution cannot be overstated: she got bulletins and annual reports to members on time and checked the arrangements for speakers as well as doing the jobs normally undertaken by the Secretary to ensure the smooth running of the programme. Not only did she do this but she also asked her husband, Mr Steve Westerberg, to organise the field meetings for the ornithological section. This has proved so successful that Steve has agreed to continue with this in the coming year. Anne's organisational skills were also apparent in the Society's trip to the Cairngorms which

she ran jointly with Steve. Members who enjoyed this will be pleased to know that a long weekend in Norfolk is planned for next year.

**Ms Siu Carter** The Society would like to welcome Siu back to the office. She worked for the Society for many years until she decided to go to Newcastle University to take a degree in Fine Art. Her main duties are to take over the day-to-day finances from Mrs Rita Wolland and to maintain the membership database.

### **Volunteers**

**Mrs Janet Angel** Janet has continued her analyses of the members' log sheets from Gosforth Park, and although she only makes infrequent visits to the office her work in keeping this task up-to-date is greatly appreciated.

**Mr and Mrs Chambers** Hugh and Stella have continued to run the Society's library and to look after the many students and members who visit and use the resources. They are always available to help in any way necessary to improve the working of the Society. Council would like to thank them for their excellent work during the year.

**Miss Barbara Harbottle** Barbara has for some time been working on the database and checking the records of arctic tern recoveries and sightings. This task was completed during the year and she has now started to work on archival material in the library and is compiling a data base of Society officers from 1829 onwards.

**Mrs Joan Holding** Joan has once again devoted some of her spare time to illustrating the bulletin and redrawing maps and diagrams for the *Transactions*. This work is essential to maintain the standard of our publications and we are grateful for the expertise that she so freely offers to the Society.

**Mrs June Holmes** June continues to produce the catalogue of manuscripts and other archival papers held in the Hancock Museum. Apart from her work on the collections she is now the museum's expert on matters concerning Thomas Bewick, and deals with the enquiries and visiting scholars on this subject. As her knowledge of the archives increases, she is increasingly relied upon as an expert on other areas of the Society's collections.

**Ian Johnston** Ian already works extremely hard for the Society as a member of the ringing group. He puts in many hours of his time in the maintenance work required for ringing in many varied types of habitat. His help in making it possible for the Secretary to carry out the routine maintenance to Northumbrian Water's boat *Seaspray* was particularly useful in the early stages of his recovery. Apart from this Ian has agreed to come into the office and to take on the typesetting of the *Transactions* as well as helping with other computer jobs that will allow the Secretary to concentrate on other aspects of the Society.

**Mrs Margaret Patterson** Margaret is assistant editor of the *Transactions* and editor of 'Birds on the Farne Islands'. She also helps with the bulletin and programme editing and continues to be secretary to the Gosforth Park Management Committee. This year the Management Plan for Gosforth Park has needed updating for the next five years (2001-2005) and Margaret has worked closely with the Secretary preparing this complex document.

**Ms Ann Stephenson** Ann is currently cataloguing and transcribing the large collection of John Hancock's letters. This is a very slow and painstaking task but will be invaluable to scholars in the future.

**Mr Gary Stephenson** In last year's report it was mentioned that Gary had volunteered to come into the office and begin to prepare historical data to be accessed into 'Recorder', the County record database. He continued this work until he took up a work placement in the Society office. When the Secretary failed to return from his Spanish holiday Gary took on the task of maintaining the standard of publications during this difficult time. He mastered the desk top publication system and produced the winter bulletin and the parts of the *Transactions* that went out with this to members. He also created continuity on all the office functions with the result that jobs got done on time and efficiently. Council would particularly like to thank him for all his work and help during this period.



**Dr Anne Wilson** Anne continues to hunt for early records of the numbers of birds on the Farne Islands and details of their behaviour. This information is being collected onto a database and spreadsheet and Anne is now working closely with the Secretary on producing a paper on the historic numbers of birds on the Farnes. This paper is in its initial stages but it looks as though it will be extremely useful as a complete summary of the changes in population density on the islands. Anne has also volunteered to help look after the office on Monday mornings and her help is greatly appreciated.

**Mrs Rita Wolland** Rita has again been invaluable this year. She has put in a great deal of time in overseeing the day to day financial records of the Society; her work in checking these accounts and maintaining their accuracy is greatly appreciated. She has also continued to put records of the Farne Island's ringing recoveries into the database and to update the recoveries and sight records of the wardens.

## **GOSFORTH PARK**

This has been a year of steady progress in a variety of ways.

Perhaps the most important event was the award of a grant for £20,000 from English Nature for work on the lake. This enabled a significant amount of open water to be created thanks to the endeavours of R Thornton & Company who were awarded the contract. This was the fourth time that they had done work on the lake over the years, and although the founder, Mr Bob Thornton, has now handed over to his sons, the Society has always been impressed by the company's ability to track large machines over the bed of the lake as well as with the sympathetic way in which they carry out their work.

The work was planned jointly by Mr David Noble-Rollin and Mr Ian Moorhouse and supervised by the latter, who welcomed this return to his old profession of civil engineering. The site, on which excavation was completed in October, has now had some time to settle down, and is beginning to look more natural, improving and considerably extending the view from the Jubilee Hide. English Nature pronounced itself well pleased with the activities and there is the possibility of a further grant in a year or two.

Following the excavation a new feeding station, a new and this time, we hope, fireproof hide was created with a certain amount of landscaping to the lake. This has increased the range of birds at the station although mute swans do tend to Hoover up everything that has been put out for the other water birds! During the winter a large flock of siskins was seen at the station, as were long-tailed tits, not normally, until recently, feeding station visitors, and red squirrels.

Mention of the red squirrels, which are dependent on the cones of Scots pine, brings to mind the heavy loss of top foliage that many of these trees are suffering during gales. Some fifty saplings have already been planted outside the SSSI to compensate for this. Within the SSSI, however, it was thought proper to plant trees grown from what may be the only pines descended directly from the original Northumbrian pine forests. These are a small group of trees at Williams Cleugh in Kielder Forest. Cones were collected in the autumn and given to Dr Anne Pickering at the University who has very kindly offered to plant the seeds and grow them for us. Unfortunately the old trees do not seem to be very fertile and some difficulties have been experienced to date.

As far as the wildlife in the Park is concerned, the most exciting event was the report of an otter being sighted on the lake. Mr Bob Wilkin subsequently confirmed this, seeing footprints and spraint. Otters have been increasing in the area for some years now, probably as the result of Northumbrian Water's work to remove sewage from the River Tyne and associated waters, but to record them in our reserve is a great thrill and would have seemed impossible not many years ago.

Although there have been no real bird rarities this year, there was great excitement when a lesser spotted woodpecker appeared in spring, drumming and calling frequently and even excavating nest holes. It is not thought, however, that breeding took place. The new tern platform proved attractive to the common terns which have been a feature of recent summers,

with two pairs on eggs until torrential rain in early June washed them out along, it is feared, with the clutches of any wildfowl being incubated at the time.

On the management front, things have been moving slowly but generally satisfactorily. Our landowners, St Modwen's, have a new racecourse manager. He has visited the reserve and appears to have a real understanding and feel for what we are achieving. We have again put our case for a longer lease and better fencing and are awaiting a response. This must all sound very familiar but we will keep trying!

On the debit side, the scout camp at the racecourse end of the reserve is now closed. This has resulted in a large amount of vandalism which, it is hoped, will not spread into the reserve.

Work on the Management Plan for the years 2001-2005 has progressed fitfully throughout the year, but is now complete in draft form except for some reorganisation. Most of the prescriptions in it are continuations of our present management activities but, providing agreement is reached with St Modwen's, we intend to improve the conifer plantations outside the SSSI by some limited felling. Other new activities include the provision of nest sites for sand martins and kingfishers.

Lake Lodge, as members will have noticed, is looking rather neglected. It requires a range of work which will cost several thousand pounds. This includes new barge boards, rebuilding part of the chimney and painting. In view of the amount of expenditure required, we are applying for grants from charitable trusts. This will delay the execution of the work but should if successful save the Society a considerable sum of money.

Finally, I would like to pay tribute to all who have helped with the running of the reserve during the year. To the Management Committee, warden Paul Drummond and his wife, and all the voluntary wardens and working party members, very sincere thanks are due. Very special thanks must go to David Noble-Rollin. He works away quietly and almost ceaselessly, and it is so easy to underestimate just what he does. We found that out last autumn when he had his heart attack. We wish him all the best in the world for his continued recovery.

#### **MUSEUM MANAGEMENT COMMITTEE**

Professor R Dye has taken on the chairmanship of the committee in succession to Professor A R Archibald. We are grateful to them both for their very active interest in the affairs of the museum and for their support of our case in university committees. Most of the very important discussions and decisions of this committee are reflected in the report on the museum below, but this is the place to record our sincere gratitude to the museum staff, the officers of Tyne and Wear Museums and the members of the university who regularly come together to make sure that our collections, the museum building and the staff are all properly cared for, and that the people of the North-East can learn from the displays and enjoy them.

#### **HANCOCK MUSEUM**

Total visitors for the academic year 1999-2000 were 127,611, over 23,000 higher than last year. This was in part due to the popularity of the *Movie Magic* exhibition which ran over the summer period, with the August visitor figures being just over 25,000, our best August ever! However, the museum has continued to provide a wide range of exciting exhibitions and events throughout the year.

#### **Major Exhibitions**

Whilst some might question the relevance of exhibitions like *Movie Magic* to the Hancock, the inclusion of a populist programme of exhibitions over the summer periods has continued to demonstrate the value of such a venture. This is traditionally a difficult period of time to persuade visitors to give up the summer sun and venture into the museum. *Movie Magic* brought popular culture to the Hancock in the form of props, costumes and models from blockbuster movies such as *Star Wars*, *Titanic*, *Braveheart* and the *Alien* trilogy and created a media interest which came close to rivalling exhibitions like *Dinosaurs Alive* and *Star Trek*. *Movie Magic* was followed by the second showing of *Claws!* which ran from October 1999 to January 2000 and then *Myths and Monsters*, on tour from the Natural History Museum in



London. This exhibition investigated the myths and origins of some of the world's most famous mythical creatures, some of which were brought dramatically to 'life' using the latest robotic technology. The exhibition was opened by Alison Hastings, editor of the *Newcastle Evening Chronicle*, accompanied by a Chinese dragon dance by children from Dance City in association with Chillingham Road School, Byker City Farm and local Chinese artist Lip Lee. The exhibition attracted just under 55,000 visitors to the museum during its run and was accompanied by numerous supporting activities and events including a 'Monster Snore-In' which allowed forty children to spend the night with the monsters, and live dance performances by students from Newcastle College. The exhibition was generously sponsored by the *Newcastle Evening Chronicle*, and all air equipment was supplied, free of charge, by Atlas Copco Compressors Ltd.

The Tyne and Wear Museums' (TWM) exhibition to mark the Millennium, *Objects of Desire*, ran over part of the summer 2000 season. The exhibition, which is touring to numerous TWM venues, consists of a huge selection of objects and specimens from many of the TWM sites as well as the Hancock. The objects were selected by ordinary people invited to visit the stores of the museums. The exhibition was funded by the HLF under the Millennium Festival Fund Programme and sponsored by Northumbrian Water and the TWM Business Partners.

This year's summer exhibition is *Top Secret*, a selection of props, costumes and models from cult TV and films. Once again the exhibition attracted a great deal of media interest and visitors are thoroughly enjoying the show. However, this is the first exhibition to be tested against the latest major charging visitor attraction within Newcastle, namely *Life: Interactive World* and it remains to be seen whether or not this will have an effect on the museum's visitor figures.

### **Art Programme**

The Hancock's art programme included a wonderful selection of exhibitions to augment the museum's popular blockbuster shows.

**Exhibitions** included prints and watercolours by local artist and printmaker Caroline Coode entitled *Impressions: Ammonites to Himalayas*. This was followed by *Wildside Sculpture* by Nick Rowsell, a series of stone carvings based on natural history themes. A small exhibition of images of fictitious creatures by James Johnson Perkins entitled *Myths of the Mind* coincided with the *Myths and Monsters* exhibition and London-based artist Rowan Huntley exhibited a series of superb Norwegian landscape oil paintings entitled *Spirit of Norway* as part of the Visions of Norway Festival. This exhibition was opened by Nigel Westwood, Consul, Royal Norwegian Consulate and sponsored by OBC Shipping. *Endangered*, an exhibition of two and three-dimensional works by advanced GNVQ art and design students from New College Durham, followed. The students used a variety of media to express their concerns about the world in the 21st century, including human cloning, sea pollution and endangered species. The museum also exhibited one of the *AIDS Memorial Quilts* in conjunction with several other venues throughout the City of Newcastle in order to help raise AIDS awareness.

This years, the *Visual Arts North East 1999 (VANE) festival* was marked by two pieces of work by Lindsay Duncanson and Steve Hines and Northern Arts-funded residency work was undertaken by Henna Asikainen and Silvana Macedo. The latter two artists have been particularly keen to document many aspects of the work that staff undertake behind the scenes at the museum and it is envisaged that an installation will be produced later this year.

Finally, the Newcastle-based artists' agency, Locus+, was commissioned, through a further Northern Arts grant, to undertake research work into future art residencies at the museum.

### **Temporary Exhibitions: Major Exhibitions**

#### **Movie Magic: 4 July-12 September 1999**

Supported by Warner Village Cinemas, TWM Business Partners, NEMS, Nexus, Film Nova Production

#### **Claws!: 2 October 1999-9 January 2000**

Supported by Nexus, Glasgow Culture and Leisure Services, National Museums of Scotland

**Wild Christmas:** 13 November 1999-9 January 2000

**Myths and Monsters:** 5 February-11 June 2000

Sponsored by the Newcastle Evening Chronicle. Supported by Nexus, Atlas Copco Compressors Ltd.

**Objects of Desire:** 24 June-13 August 2000

Sponsored by TWM Business Partners, Northumbrian Water. Supported by the HLF under the Millennium Festival Fund Programme

**Top Secret:** 15 July-17 September 2000

Supported by NEMS, Nexus, Warner Village Cinemas

#### **Temporary Art Exhibitions:**

**Impressions: Ammonites to Himalayas** by **Caroline Coode:** 31 July-17 October 1999

**VANE 1999 :** 7 October-31 October 1999

Supported by Northern Arts

**Wildside Sculpture** by **Nick Rowsell:** 23 October 1999-16 January 2000

**Spirit of Norway** by **Rowan Huntley:** 22 January-26 March 2000

Sponsored by OBC Shipping. Supported by Northern Arts, ONE North East

**Myths of the Mind** by **James Johnson Perkins:** 5 February-11 June 2000

**Names Project (AIDS Memorial Quilt):** 16 March-24 March 2000

**Endangered!** by **New College Durham:** 1 April-7 May 2000

**Under the Skin** by **Frank Briffa:** 20 May-6 August 2000

#### **Temporary Exhibitions: Others**

**The Campaign Against Illegal Poisoning** by **MAFF and DETR:** 31 July-29 October 2000

#### **Education Activities – Schools**

**Living History** - The series of Ancient Greeks and Ancient Egyptians living history sessions for schools ran for sixteen weeks and attracted a total of 7,428 school children to the museum.

**Literacy Links** - A programme of literacy based activities in association with the Myths and Monsters exhibition ran over the March-May period and included the following events: Dragon Days – celebrating the Chinese Year of the Dragon, 28, 29 and 30 March 2000; Making Myths Story Drama, 3-7 April; Storysacks, 11, 12 and 13 April and 11 May; A Tale Well Told, 2, 3 and 4 May; Big Book of A-Z Monsters, 16, 17, 23 and 24 May. The enormous interest in this programme followed a targeted mail-out to the literacy/history co-ordinators in schools within the five local LEAs and demonstrated the great interest and enthusiasm in activities that supports the teaching of the literacy hour. The Literacy Links programme was partly funded through a NEMS grant.

**Project Partners** - An on-going partnership with two Newcastle nurseries has been established with groups visiting free of charge. Staff and parents from Ashfield Nursery, Rye Hill and Newburn Manor Nursery were initially consulted with a view to developing a specific area for under 4s within the museum. Although the bid to the DfEE for this project was unsuccessful the relationship with the partners has continued.

**Creating New Audiences** - An application made to NEMS for funds from the DCMS Challenge Fund for the development of new audiences has been successful. A grant of £2650 has been promised which will allow the museum to undertake a special exhibition project with teenagers from the Northern Counties School for the Deaf. The project will involve pupils taking photographs of specimens from the collections and exhibiting them in the White Room Gallery next year.

#### **Education Activities – Informal Activities**

An extensive programme of 'drop-in' activities for families to support the programme of exhibitions and permanent displays at the museum included: Flower Power, 4 August 1999; Alien Day, 11 August; Picture Perfect, 18 August; Movie Magic, 25 August; Animal ID, 5



September; Folk Art Fun, 3 October; Snake Handling, 27 October; Paw Prints, 28 October; The Owl and the Pussycat, 29 October; The Sparkling Sky, 7 November; Cats at Christmas, 5 December; Dragon Day, 29 February 2000; Ziggy Pop!, 18 April; Weaving Words and Travellers' Tales 25, 26 and 27 April; Minotaurs and Masks, 30 May; Minotaur Myths, 31 May; Myths and Masks, 1 June; Minotaurs and Mazes, 2 June.

In addition there were several reptile handling days throughout the year courtesy of Joan and Jim Malligan, and the very popular 'Monster Snore-In' mentioned earlier.

### **Adult Education and Training**

Once again a number of staff were involved in teaching both undergraduate and postgraduate courses in the university. These included the now regular module entitled '**Museology**' for third year zoology students, four sessions on '**Bird Conservation**' for first year biologists and a range of core subjects for the postgraduate Museums Studies course.

In addition the museum played host to Nicola McNicholas who attended for a two month Museum Studies placement.

Steve McLean organised another study visit, on behalf of the UK Geological Curators Group, to the National Museum of Natural History in Paris.

### **Collections Management and Research**

**Digitisation Project** - A NEMS-funded contract to make digital images of parts of the biology, geology and ethnography collections was undertaken throughout the year by Tina Wiffen. The project achieved the following :

<i>Type, figured &amp; cited fossil vertebrates:</i>	338 specimens/578 images
<i>Type, figured &amp; cited fossil plants:</i>	156 specimens/226 images
<i>Bird specimens:</i>	102 specimens/89 images
<i>Ethnography collections:</i>	206 objects/548 images

In total, 802 specimens, utilising 1441 separate images, have been digitised and added to the collections database. It is now intended to place some of these images 'on-line' through the museum's web site thus providing unprecedented access to these selected parts of the collections.

**General Curation and Backlogs** - Staff and volunteers have continued to make inroads into the cataloguing backlogs at the museum as well as undertaking numerous re-storage projects. Notable projects include the cataloguing of the museum's numismatics collection (over 500 coins) and the cataloguing of part of the historically important bird collections. Considerable progress has been made on the cataloguing of the ethnography collections. Our key volunteer team (Paddy Cottam, Ron Cook and Roger Stobart) have continued to work on the museum's holdings of bones, eggs and sedges and numerous volunteers have worked on the re-organisation of parts of the palaeontology and mineralogy collections.

**NEMS Peripatetic Ethnographer** - A twenty-two month project funded by NEMS to employ a peripatetic ethnographer to curate ethnography collections in the north-east of England commenced in October 1999. Much of the work has taken place at the Hancock which has been designated by NEMS as the regional centre for ethnography. Les Jessop, our Keeper of Biology, who has recently diversified his interests to include ethnography, worked as a consultant to NEMS for a four month period over the project duration in 2000.

Work has included the re-storage of the textile collections and the standardisation of terminology on the ethnography database involving over 100,000 edits. Over 90% of the North American artefacts have been digitised and each image has been added to the collection database. Re-organisation of the first floor ethnography store has now been completed and the integration and cataloguing of the recently acquired ex-Darlington museum ethnographic collections is also complete.

**Research** - A PhD researcher (part funded by the RSPB) from the Natural History Museum, Tring, undertook studies on the thickness of egg shells within the collections as part of a pollution analysis. This type of important work demonstrates the vital importance of maintaining such collections at the Hancock. Two researchers from Cardiff University and Montpellier University conducted four days of research on the museum's important palaeobotanical slide collections, and a researcher from the Smithsonian Institute conducted research on the Indian bird collections. Historical research into the origins and content of the pre-20th century mineral collections was conducted by Anna Theilen from Koblenz University, and two researchers from Aberdeen University, on a recent visit, identified a very rare fossil fish within the collections which will soon be described as a new fossil species. In addition staff at the museum have administered a considerable number of loans to scientific institutions throughout the world.

**New Collection** - Staff at the museum have undertaken a brief survey of the remaining fossil collections housed at the University of Newcastle. This material is in urgent need of conservation and re-storage and it is essential that it be relocated to a more suitable location. Consideration is being given to relocating these collections to the Hancock Museum provided that suitable space can be secured to accommodate them.

**Environmental Records** - Jo Rockingham took up her temporary post as Environmental Records Assistant in order to work on the environmental database held at the Hancock and in particular to collate and distribute information relating to the conservation of red squirrels in the north-east of England. This post has been funded by English Nature and Northumbrian Water's Environmental Trust (NWET) through the Durham and Northumberland Wildlife Trusts. The other main project was the completion of work on the botanical database for vice county 66 (County Durham and south Tyne and Wear) in time for submission to the BSBI for the Atlas 2000 project.

**Travelling Mummy** - The Hancock's most famous Egyptian Mummy, Irt-Irw, returned from her travels to the Louvre in Paris where she was on display to celebrate the work of Baron Dominique-Vivant Denon. She survived her journey intact and has now been reinstated in the Land of the Pharaohs gallery much to the delight of the Hancock's visitors. Not surprisingly her return created a great deal of media interest. This prestigious loan has generated good co-operative contacts between the Hancock and the Louvre.

### **Acquisitions**

During the year the Society received a bequest from Dr A Walker of a section of the coal strata of Northumberland, and gifts of the following specimens: albino common shrew (R Clarke); red squirrel (Mr Pickard); blackbird (MR Smith); woodcock (Mrs Burke); sparrowhawk (Dr F Clark); barn owl (J Makepiece); great spotted woodpecker and bullfinch (J Darcy); heron (A Pickering); swallow (Mrs Porter); otter (K Ohara); hare (A Pickering); two red squirrels and three hedgehogs (J Makepiece); skeleton of a mara (Glasgow Zoo); collection of skulls and other skeletal material (Mr Bretherton); specimen of bioclastic limestone from Cincinnati (Proctor and Gamble); Northumberland rock samples (D Gardner-Medwin).

### **Hancock developments**

Following the architectural and historic building audit late in 1999, the Newcastle-based architects, the Howe Partnership, were commissioned to produce architectural drawings for the proposed Phase I extension to the rear of the Hancock Museum, and also to consider access improvements to the front of the building. Currently, the proposed extension would consist of a new lecture theatre and education suite as well as some additional archival storage, toilets and display space. The completion of the first drawings is expected in early November 2000. Derek Shannon has been appointed NHS liaison to the development design team.

Council has agreed to provide £50,000 towards the cost of capital re-developments and sources of matching funding are being explored. At this stage, however, the University of Newcastle has not committed itself to providing the potential increased revenue costs for an additional building and future developments may have to be limited to improving the existing building.



## Grants and Support

The Hancock has once again received a considerable number of grants and other support. The grants are listed below.

Purpose	Source	Value (£)
<b>Access/Education Grants</b>		
Natural History Discovery Boxes	NEMS	498
Literacy Links	NEMS	800
<b>Development Grants</b>		
Architectural Survey	TWM Business Partners	1,000
	University of Newcastle	1,000
<b>Exhibition Grants</b>		
Movie Magic	NEMS	3,560
	TWM Business Partners	453
Top Secret	NEMS	2,268
Ethnography Gallery	NEMS	3,343
Art Research	Northern Arts	3,200
Residency Work	Northern Arts	3,250
Artist's Payment Right	Northern Arts	150
Objects of Desire	HLF under the Millennium Festival Fund Programme	Grants to TWM
<b>Collections Management Grants</b>		
Digitisation of collections	NEMS	4,000
Ethnography Catalogue	MGC	1,000
Conservation Mounts	University of Newcastle	1,000

**Sponsorship** We are grateful to the *Newcastle Evening Chronicle* for sponsorship of *Myths and Monsters*, to OBC Shipping for *Spirit of Norway* and to Northumbrian Water and TWM Business Partners for *Objects of Desire*.

**Support** was provided for *Movie Magic* by NEXUS, Warner Village Cinemas and Film Nova Production; for *Claws!* by NEXUS and Glasgow Culture and Leisure Services and National Museums of Scotland; for *Myths and Monsters* by NEXUS and Atlas Copco Compressors; for *Top Secret* by NEXUS and Warner Village Cinemas; and for *Spirit of Norway* by Northern Arts and ONE North East.

For all of this financial help and support, we are very grateful.

## Staffing

Sean Dykes, attendant, left us in January this year to take up an attendant post at the Shipley Art Gallery in Gateshead. He was succeeded by Gary Ewles who came to us from St Mary's

Lighthouse. However, Gary left shortly after to take up a new post at Segedunum Roman Fort and Museum. He was replaced by Michael Cranston who came from Segedunum. Ingrid Solberg, attendant, took maternity leave this year to have her second child and was temporarily replaced by Ian Yeats. Kath Fenwick, attendant, replaced Gavin Lockey who left us last year.

Juliet Young, our Marketing and Press Officer, left us in February to go to Australia with her husband. Whilst Juliet's stay with us was brief (she was with us for only one year) her work on raising the profile of the museum was superb. All our best wishes go with her and her husband in their new lives 'down under'! Juliet was replaced by Sheryl Muxworthy who took up her post in April.

Last, but by no means least, Alec Coles (Senior Curator and Principal Keeper, Natural Sciences) left us in April this year to take up his new post of Chief Executive of the Northumberland Wildlife Trust. Alec's contribution to the success of the Hancock Museum since 1992 cannot be overstated and he will be sorely missed by us all. We wish him the best of success in his new post and look forward to much fruitful co-operation between the Hancock and the Trust.

### Current staffing complement

Senior Curator: currently vacant	Gillian Mason (Education Officer)
Fiona Fenwick (Senior Curator's Assistant)*	Lesley Nicholson (Clerk/Typist)*
Steve McLean (Curator and Senior Keeper Natural Sciences)	John Pratt (Chief Attendant)
Les Jessop (Keeper of Biology) based at Sunderland Museum	John Connell (Senior Attendant)
Sylvia Humphrey (Assistant Keeper, Geology) based at Sunderland Museum	Anne Aspery (Attendant)*
Eric Morton (Assistant Keeper, Biology)	Michael Cranston (Attendant)
Kirsty Ramshaw (Biology Assistant)*	Kath Fenwick (Attendant)*
	Ian Yeats (Attendant – temporary maternity cover)*

(\*indicates part-time)

### Volunteers

The Hancock Museum has once again benefited from the tremendous work undertaken by a considerable number of volunteers who have given up their own time to contribute to the work of the museum, both on the collections and through educational initiatives. They have included the following:

Janet Angel	Transcription of Temperley diaries	Joan and Jim Malligan	Reptile educational events/animal care
Trevor Bridges	Mineralogy curation	Melissa Murphy	Education support
Peter Burke	Education support	Alan Pringle	Mineralogy curation
Sarah Carr	35mm transparencies	Adele Smith	Environmental recording
Ron Cook	Botany/oology curation	Barry Smith	Mineralogy curation
John Coleman	Mineralogy curation	Kathryn Smith	Mineralogy curation/exhibitions
Paddy Cottam	Osteology curation		
Michael Frankis	Northumberland bird records	Roger Stobbart	Entomology/bird curation
Jess Fermie	Palaeontology curation	Anna Theilen	Mineralogy curation
Julie Gowland	Education support	June Waites	Education support
June Holmes	Archive collections	Helen Wilkinson	Mineralogy curation
Nicola McNicholas	Zoology/palae-ontology curation	Malcolm Woodward	Mineralogy curation



## LIBRARY

This year 113 books were added to the library. Fifty of the books were donated and we must thank Peter Davis, Bill Fawcett, Judy Foster-Smith, David Gardner-Medwin, June Holmes, Les Jessop and others for them. Of the many excellent donations special mention must be made of *A history of Fungusses growing about Halifax* by J Bolton which was published in 1788, the NE Railway Association publication *The High Level Bridge & Newcastle Central Station, 150 years across the Tyne*, where the painting of the interior of the Central Station hanging in our Council Room was used on the front cover, the two-volume Dove Laboratory publication on *The Marine fauna and flora of the Cullercoats District* which was edited by Judy Foster-Smith, and two volumes on *The Great Herbal of Leonhart Fuchs* edited by F Meyer (1999).

The books purchased included – for ornithology *The Handbook of the Birds of the World* volume 5, *The Great Auk*, *The state of the nation's birds* and *Population limitation in birds*; – for botany *British plant communities* volume 5, *A Rum Affair*, the *Liverwort Flora* and the *New Naturalist Plant Diseases and Lichens*; – for geology *The Tracks of Triassic Vertebrates* and *The Encyclopaedia of Dinosaurs*; – for mammals and general zoology *The order of Wolves*, *Proposals for monitoring of British Mammals*, the *Poyser History of British Mammals*, and *The Atlas of Molluscs of Britain & Ireland*; – for our Archivist *The Carrs and The Ellisons*, *Archives at the Millennium*, *The Percys* and *The Correspondence of Charles Darwin* volume 11. In addition to these there were another forty-three books.

More than 300 items of serial publications (*Journals*, *Transactions* etc.) were received from more than sixty sources by exchange, subscription and donation.

The problem of shelf space for books in the library was eased by the Society's acquisition of another bookcase in the Council Room which has been filled with books of suitable appearance.

The Library Evening was held on 28 January when Grace McCombie discussed the design and building of the Hancock Museum and displayed many of the historical documents from the archives.

The Library has been open every Wednesday during the year for use by members, researchers and students.

The direction of library affairs is controlled by the Library Committee which meets four times a year: the members are Hugh Chambers (chairman), Paddy Cottam (mammals), Peter Davis (marine biology), David Gardner-Medwin (history of natural history), June Holmes (archives), David Noble-Rollin (ornithology), Joyce Parvin (secretary), Trevor Walker (botany) and, following the death of Alick Walker, Trevor Hardy who was co-opted as geology representative. The library continued to be serviced by the office staff; the binding of journals and periodicals was arranged and this year twenty-one volumes were bound to become a permanent part of our collection. Incoming periodicals and exchange arrangements were dealt with.

Volunteers gave reliable assistance during the year: Stella Chambers kept the filing system in order, and Trevor Hardy worked steadily on his winter task of reviewing the ten thousand geological off-prints from the University that have been entrusted to our care. The Society thanks them for their efforts.

## ARCHIVES

The cataloguing, research and general rearranging of the archives continues apace with a greater emphasis being placed on the conservation and storage of the more delicate items. There are currently five volunteers working on archival material.

There have been more enquiries than ever this year. Various scholars and students requested information on, or asked to see, manuscripts relating to George Bolam, T R Goddard, John Hancock, Thomas Sopwith, Thomas Bewick, R I Murchison, Frank Rich, John Wardle, Bentley Beetham, William Pennington Cocks and Horace W Wheelwright to name but a few, as well as early museum history and the Darlington Field Club.

As always we are greatly indebted to our members and other donors who see the Society as a worthwhile sanctuary for their precious records and this year has been no exception.

A rather splendid late eighteenth century hand coloured manuscript geological section of the Newcastle coalfield near Wallsend and the lead mining districts of Healy Field, Blanchland, Weardale, Alston Moor and Dufton Fell was presented by Mr W Bretherton (presently on display at the Laing Art Gallery).

Miss D Hutchinson donated papers, *ca* 1872, relating to her great uncle F Hutchinson, a local ornithologist living in the Derwent Valley who donated bird specimens to the museum at that time.

A programme printed for the centenary celebrations of the Society in 1929 has recently been presented by Tony Tynan from the estate of Gladys M Scott, along with her original printed invitations to afternoon tea and a social evening at the Hancock Museum (academic, evening or morning dress *de rigueur*). Miss Scott joined the museum staff as lady assistant and secretary in 1914 when E Leonard Gill was curator and progressed to assistant/deputy curator under T Russell Goddard and C E Fisher, eventually retiring in 1954 after forty years of service.

We were delighted to be entrusted with the manuscript botanical field notebooks (1960-95), vegetation surveys and other papers by Reverend Gordon G Graham, the author of *The Flora and Vegetation of County Durham* (1988). Reverend Graham has been BSBI recorder for County Durham for many years, recently relinquishing the task to Alec Coles, and his notebooks will be an invaluable source of information for botanical researchers for many years to come.

*Thomas Bewick at the Hatton Gallery* 4 December 1999-22 January 2000

Over one hundred and sixty pencil drawings and watercolours from the Society's Bewick Collection were loaned to the Hatton Gallery for six weeks, along with the rather impressive oil painting of Bewick in his later years by James Ramsay. The exhibition, which concentrated on the tailpiece vignettes, received a lot of publicity and was well attended with a reported fourteen hundred people visiting the show in the last week.

One of the most positive aspects of the exhibition, apart from introducing Bewick's artistry to a wider audience, was the school workshop programme. The Bewick workshops organised by the Hatton Gallery's Education Officer, Jean Taylor, attracted almost six hundred schoolchildren, from primary level to sixth formers, who participated in designing Bewick posters, calendars and vignettes on scraper board.

The exhibition was deemed a great success and we hope it will not be too long before the work of our illustrious local wood engraver is on display again in his native town.

## CONSERVATION

We were sorry to lose two members of Council with special expertise in conservation matters during the year. Ms Lisa Kerslake moved to Yorkshire to become Director of the Environmental Recording Unit there and Dr David Mitchell resigned because of a conflict of interest between his employment at North Tyneside Council and the Society's opposition to that borough's Unitary Development Plan. We thank them both for their valuable help and wish them well.

Our most direct conservation activities are in our own reserve and are mentioned in the section on Gosforth Park. During the year we commented on a number of planning proposals which were likely to have detrimental effects upon local wildlife, most notably the North Tyneside UDP which included plans which would impair the wildlife corridors in the borough, especially those linking Gosforth Park with other wildlife populations. The Chairman appeared at four hearings of the Public Inquiry on the UDP to present the Society's case, in June and July.



## FINANCE

The Financial Statements this year have been changed to comply with the Statement of Recommended Practice No.2 – Accounting by Charities (SORP 2), which requires investments to be valued at market value rather than cost.

The final result for the year was a surplus of £10386 (1999 – £865), which was £11,216 better than our original budget. The surplus includes a general donation of £5000 from the Storrow-Scott Charitable Trust, and a donation from the Sir James Knott Trust of £5,000 specifically towards the purchase of a Land Rover for coastal research. The main variations in income and expenditure, when compared with the previous year, are as follows:

### Income

Increases in:	Subscriptions	256	
	Donations	9,889	
	University grant	200	
	Investment income	<u>225</u>	
			10,570
Reduction in:	Proceeds from sale of <i>Transactions</i>	<u>( 966 )</u>	
	Net increase in income		9,604

### Expenditure

Increases in:	Postage & telephone	393	
	Treasurer's fees and independent review	1,270	
	<i>Transactions</i>	394	
	Library	1,446	
	Office equipment maintenance	318	
	Net increase in other headings	99	
			(3,920)
Reductions in:	General expenses	1,034	
	Subscriptions to societies	204	
	Lecture expenses	1,103	
	Gosforth Park Nature Reserve	329	
	Coastal research	232	
	Depreciation	<u>935</u>	
			3,837
Net increase in expenses			<u>(83)</u>
Net increase in surplus	(£10,386 - £865)		<u>£9,521</u>

The surplus for the year of £10,386 includes a transfer from Gosforth Park Nature Reserve Restoration Fund of £600 representing conservation expenditure incurred. Expenditure totalling £25,148, also in respect of lake conservation work, was carried out in the course of the year, and was fully funded by grants from English Nature.

The substantial increase in library expenditure arose as a result of the accounting adjustment referred to in last year's report, and represented a true increase of only £196.

A provision of £3000 has been included in *Transactions* to cover the cost of producing Volume 60, part 3, which will be published towards the end of 2000.

The investment portfolio continues to be managed in consultation with Brewin Dolphin Securities Ltd. The following gains and losses were realised during the year:

## Gains

General Fund	3,253
TB Short Memorial Fund	21,123
Grace Hickling Memorial Fund	475
Net realised gains	<u>£24,851</u>

The investment portfolio was valued at 31 July 2000 at £632,498 (1999 £640,036).

## ACTIVITIES

**Ornithological section** Mr John Strowger opened the programme of evening meetings with an account (based on his paper in *Bird Study* (1998) **45**, 85-91) of his experience of the dotterel in Northern England in 1972-99, during which time he had probably seen every nesting pair (forty-one pairs, never more than about five each year) and had recorded nearly 5000 passage migrants. Breeding sites varied from year to year but depended heavily on the proper habitat; not every fell top would do. The numbers seen on passage far exceeded breeding numbers in Scotland, and seemed to include many Scandinavian birds. He showed some informative and evocative slides of habitat and behaviour.

Mr Terry Pickford gave the annual Pybus Lecture on 'The illegal persecution of moorland raptors'. Many members had seen his television broadcasts on behalf of the North West Raptor Protection Group and were impressed and not a little disturbed by his more detailed, lucid, beautifully illustrated and sometimes harrowing account of his campaigns both in his local patch and more widely, for instance in the Czech Republic. The prospects for the hen harrier, despite his efforts, are poor.

On 3 December Mr Keith Bowey gave a remarkable account of his careful studies of the value of oil seed rape fields – 'The Yellow Fields of Spring' – as a breeding habitat for birds, contrasting them with the barren fields of wheat and other cereals. He had recorded surprisingly large numbers of sedge warblers in the rape fields of Gateshead, more than compensating for the loss of their more traditional habitats there, although the fields they used did seem to be those nearest their older habitats. Display flights were more conspicuous than at other breeding sites, perhaps because birds found it difficult to find each other in the uniform yellow fields. The audience emerged with a changed attitude to these unattractive new features of our landscape.

Dr David Baines lectured on 7 January on 'The ecology and conservation of black grouse'. His research had illustrated the complexity of the probable causes of the decline of this spectacular local species which has a variety of rather special habitat requirements, not helped by recent changes in farming practices at the moorland edge. It was clear that both continuing research and public education were needed if the long-term decline was to be reversed.

Mr Mark Eaton gave an account of his research on 'Purple sandpipers and turnstones in Northumberland' on 4 February. Local populations of the species are large enough to be internationally important and he had analysed their numbers and movements by several ingenious methods. A dilemma is posed by the government's plans to clean up our coastlines: the loss of sewage in the sea may indirectly impoverish the feeding grounds of these birds.

Mr Douglas Simpson's subject on 3 March was 'Red kites in the north of England'. He had been closely involved in the recent introduction of European birds to the Harewood Estate in Yorkshire. His lecture left no doubt of the good will, the meticulous planning and care of the birds prior to their release, and the follow-up studies that were essential to success in this work. Some of the birds had already died, but another, from outside the area, had been seen nearby and overall the prospects were good. The speaker emphasised the difficulties that would be involved in any plan to reintroduce this magnificent bird to Northumbria.

The field meetings for the section began with a joint 'Pelagic Cruise' with the North Northumberland Bird Club. It was a wild but attractive evening as the boat set out from Seahouses, but despite 'chum' and David Noble-Rollin playing tape recordings of shearwaters and storm petrels our best sighting was of immature pomarine skua.



On 16 October the autumn trip to Holy Island was led by Dr Mike Smith, who kindly agreed to take the meeting at short notice due to the illness of the Secretary. There was a light fall of thrushes from Scandinavia including fieldfares, redwings, blackbirds and a few song thrushes. Blackcaps and bramblings were present in small numbers although every second bird seemed to be a robin. News of a few rarities raised members' spirits and some of the party were lucky enough to catch sight of a great grey shrike and yellow-browed and barred warblers. One of the highlights of the day was experienced by all as a female merlin dashed by in hot pursuit of a luckless passerine which may well have just arrived from Norway. The members also saw a second merlin, perched on a pole near the causeway, making a fitting end to a most pleasant day at Lindisfarne.

On 15 January the section went to Musselburgh and Aberlady Bay. This trip was led by Steve Westerberg and was the Society's first trip using a self-drive minibus. Members were treated to a fine, sunny day and good sightings of sea duck and divers and distant views of grebes at Musselburgh and at Aberlady. Although there were no geese or short-eared owls, a good variety of waders was present. This was followed on 4 March by a trip to the Galloway coast and Loch Ken, again led by Steve. The trip began with a visit to Carsethorne where there was a scaup on the sea and a peregrine flew alongside the minibus! At the RSPB's Mersehead reserve, thousands of barnacle geese repeatedly dropped from clear blue skies making our search for a lesser white-fronted goose even more difficult than expected. However, we located white-fronts at Loch Ken, with good views. By the time we reached Laurieston forest, to search for golden eagles, it had begun to snow, making further bird-watching rather difficult.

The summer programme began on 29 April with Steve leading a group to Leighton Moss. Good weather once again, with brief views of several bearded tits and superb views of a bittern being mobbed and put to flight by black-headed gulls. Bitterns were heard booming frequently throughout the day. An adult Mediterranean gull and marsh harriers were also seen. The party's luck and the diesel ran out on the return home, but fortunately the group was already in Newcastle. The trip leader will be more sceptical of fuel gauge readings in future! This trip was followed by David Noble-Rollin leading a migration trip to Holy Island on 7 May. The weather was good for people but without the right winds for migrants. However, the party had a few potentially exciting moments with some warblers on the Straight Lonnen and excellent views of black-necked grebe and wood sandpipers.

The programme continued with a five-day visit to the Cairngorms organised by Anne and Steve Westerberg from 11-14 May. The Society's members were treated both to amazing weather and to memorable views of displaying capercaillie from the RSPB's Loch Garten osprey hide. They were excellently fed and accommodated at the family-run Skye of Curr Hotel, Dulnain Bridge, where their every request was gladly granted. On the journey up they stopped at Loch of Lowes to see osprey there and to pick up the final party member. After a dawn start to view capercaillie the group elected to go up Cairngorm, only partly possible by chairlift. The members' efforts were rewarded with views of snow bunting, of ptarmigan for the more energetic members of the party, and of magnificent mountain scenery. The following day we had a gentle amble along the Findhorn River (Strath Dearn) seeing golden eagle, peregrine, buzzard and kestrel, but no ravens. Other visits during the trip included Loch Insh to see ospreys, an evening walk in the Caledonian pine forest at the RSPB's Abernethy reserve in search of crested tits (which proved uncharacteristically elusive, with only one seen) and displaying black grouse (for which we were there too early in the evening, not wishing to miss our evening meal!). Two evening lectures and a bird quiz completed the full programme. We returned on Sunday evening, still buzzing with the capercaillie 'experience' and never once having run out of diesel!

On 11 June David Noble-Rollin led an early morning walk in Gosforth Park. This was again a beautiful morning and about twenty members enjoyed listening to the bird song and looking for roe deer. The ringing group put on a demonstration and showed the group the techniques of weighing, measuring, ageing and ringing. Dr Chris Redfern explained the value of the 'constant effort' work and how it helps the Society in managing the reserve by monitoring important bird species.

The last field meeting of the year was led by Ian Moorhouse and was to County Durham to look for nightjars. After a day of steady rain, conditions had improved by mid evening when a party of twelve members gathered at the Grove car park in Hamsterley Forest. A new site had been chosen for the visit where the distinctive churring song of a nightjar had been heard only a few nights previously. It is a typical location for the birds, comprising a large open stretch of land at the edge of the forest, but with a line of well-grown trees right at the boundary, ideal for nightjars to hunt moths and other flying insects. On their way, the group halted for a few minutes at a junction in the tracks. A roe deer fawn, fascinated by such a knowledgeable party, approached slowly and uncertainly, stopping each time its sense of self-preservation overcame its curiosity. A sparrowhawk flew over, appearing more intent on going to roost than on hunting. At the site a woodcock passed almost overhead, making its 'squeak-grunt' roding call. The midges came out, no doubt refreshed by the day's rain, to antagonise the watchers, and darkness began to fall. Shortly after ten o'clock a two syllable 'goo-ek' call was heard and the shape of a nightjar was seen flying past in the dusk. One member of the party was close enough to observe white spots on the bird, indicating a male.

**Mammal section** The evening meetings of the mammal section are a joint venture with the Northumbria Mammal group. In only its second year of existence, the latter has developed a solid base of lectures, surveys and training activities throughout the year. Following a number of requests, the group has expanded to cover Teesside. The first lecture was on 22 October when Mr Nick Redman spoke about his hobby of photographing and recording whalebones used for a great variety of more or less decorative purposes. A register of artefacts had been set up but the species involved were not identified. The evening illuminated an arcane aspect of human behaviour. This was followed on 21 January by Dr Johnny Birks of the Vincent Wildlife Trust, who discussed the recent return of polecats to the region, following their localised extinction. On 25 February Mr Kevin O'Hara and Mr Terry Coult of the Northumbrian Otters and Rivers Project, provided an update on the continued success of otter conservation measures in the region and the subsequent rise in otter distribution.

The mammal section field meetings began in May with badger watches on several evenings. These were led by Mr Bob Wilkin and Mr Paul Drummond and some sixteen people attended. Two separate setts were used this year; as with all wildlife experiences conditions varied but on some evenings good views were obtained of boar, sow and cubs in various behaviour patterns, including feeding, musking and play. Prior to the watch, a pre-visit was made to another area to view badger paths, footprints, feeding habitat and dung pits. On some evenings a vixen with seven cubs was present near the main viewing area. These threatened to up-stage the badgers with their tameness and play. On several occasions both species were on view at the same time. On some evenings deer, owl and lesser spotted woodpecker made an appearance.

In between visits by our members, the badgers were also being filmed for the 'Wild North' programme which was shown on ITV later in the summer and will be repeated over the next few months.

During May and June members, through the bulletin, were invited to join the Northumbria Mammal Group field meetings at Ebchester Woods, Rainton Meadows and Seal Sands.

**Geology section** Mr Ken Patterson has now retired as Secretary of the Geology Section. Over many years he has organised geological programmes which have informed, entertained and delighted members. Council would like to thank Ken for all his hard work and to wish him every success in his teaching at the Centre for Lifelong Learning where he continues to encourage the study of geology.

The section's last summer field meeting in September was planned as a visit to Lewis and Akenshaw Burns in Kielder but a hitch meant that Dr Mick Jones had to take over at the last minute. He took the group over the Scottish border to Deadwater for an informative and entertaining field trip.

The programme of winter talks covered a wide range of geological topics. Professor Maurice Tucker's talk in October not only dealt with the limestones of Southern China but also gave a fascinating insight into the culture and customs of that country. In November, Dr Julian Pearce



gave an update on the latest work on plate tectonics. The theme of tectonic influences was continued in Dr Brian Turner's excellent account of the complexities of the Karoo Basin in South Africa. In January, Professor Steve Larter described how bacteria survive in what must be one of the most extreme environments for any living organism – hot oil deposits several kilometres below the surface of the earth. A very good example of the way different scientific disciplines interact. Professor Duncan Murchison's talk on the global distribution of coal fields illustrated the continuing importance of this fossil fuel in the world economy and the way in which extraction and utilisation involves issues of politics and money as much as geology. The winter season finished with a stimulating talk by Dr Mick Jones on the effects of geothermal heat on local geology. All the talks were well attended and followed by lively question and answer sessions.

In May, the first of the summer field trips was led by Dr Mick Jones to examine the fossil plants in Hartley Bay which are exposed only at extreme low tide. An examination of the nearby cliffs and the evidence of past mining showed the extent of erosion in this area in the recent past. In June, Mr Trevor Hardy led a visit to Upper Coquetdale which was enjoyed by all in spite of local insect activity. July saw the visit to the Lewis and Akenshaw Burns postponed from the previous year. This was led by Dr Brian Turner who gave a very clear description of the Coal Group cyclothems exposed by the Lewis Burn.

**Botany section** The winter lecture programme began with Mr Alec Coles on 'Sun, sea, sand and snow: plants that survive the extremes of Crete and how they do it', when he described the exceptionally rich flora, with many endemic species, found in the often harsh environments of the island. Then Dr Rod Corner made a welcome return visit, speaking on the 'Plants of east and north Greenland', and surprising us by describing the diversity of species in that unpromising land with the most northerly botanical localities on earth. He compared the flora of the high arctic tundras with the British montane flora. In the new year, and new millennium, we firstly welcomed Dr Brian Selman who gave us a fascinating account of the range of weird and wonderful paropsid beetles feeding on *Eucalyptus* species in Australia. His lecture was 'Up a gum tree with the beetles', and concerned the interaction of the host trees and their pests, involving the constant recycling of scarce nutrients. Finally Professor Elaine Perry, in 'Medicinal plants: back to the future', described her research on the proven and potential medicinal uses of plants, and on the active metabolites involved. She was particularly interested in brain function, including the use of St John's-wort for depression and *Ginkgo biloba* for memory loss.

The summer field season began when Dr Veronica Howard led a Wednesday evening meeting to the Woodland Trust's reserve at Whittle Dene, to examine the May woodland flora. In June Dr Roger Smith followed his lecture on hay meadow ecology and conservation in the 1998-99 lecture programme by leading a visit to surviving species-rich meadows and associated habitats in the Muker area of Swaledale, on a blisteringly hot day. In contrast, the early July visit to Mickle Fell, which had been aborted two years ago because of the weather, did go ahead this time but in thick cloud and occasional drizzle. Led by Dr John Richards we accomplished the long climb to the top of the Fell but, in the conditions, failed to locate the alpine forget-me-not *Myosotis alpestris*. We did, however, find pale forget-me-not *M. stolonifera*, northern buckler-fern *Dryopteris expansa*, chickweed willowherb *Epilobium alsinifolium*, alpine willowherb *E. anagallidifolium*, hairy stonecrop *Sedum villosum* and rare spring sedge *Carex ericetorum*. The final summer meeting, in mid-July, was at the Northumberland Wildlife Trust's new hill farm/nature reserve of Whitelee Moor. In glorious weather, led by Dr Angus Lunn, we walked from Carter Bar via the lime kilns to one of the limestone quarries. We found *Myosotis stolonifera*. Under rank heather was lesser twayblade *Listera cordata* and on calcareous spoil lesser clubmoss *Selaginella selaginoides* and a variety of sedges.

The members who have formed an informal botanical group which meets between 'official' meetings made an inspirational early summer visit to The Burren, in western Ireland.

**Lichen section** The lichen section has again put on several talks and field meetings this year. Although the number of members with an active interest in the subject remains small, it is

encouraging to see others with a more general interest in botany and other subjects joining us on occasion.

On 12 September Ms Janet Simkin led a field meeting at Nenthead Mines, in the North Pennines. Sadly very few members of the society attended, but we were joined by a number of enthusiastic guests to make up a party of twelve. This area is heavily contaminated by lead and zinc from mining activity over the centuries, and so has a highly diverse lichen flora with many metallophyte species that are not commonly seen. Those visiting the site for the first time were particularly impressed by the thick carpets of *Cladonia* and *Stereocaulon* to be found on some of the spoil heaps.

On 29 October Mr Don Smith, one of the Churchyard Survey Co-ordinators for the British Lichen Society, spoke to us about 'Churchyard Lichens'. His talk was abundantly illustrated and gave us a thorough introduction to the species we can expect to find in this part of the country. This was followed up by a field meeting the next day, when Don led a small group round the churchyard of St John's, Whitfield, in Allendale. This churchyard has a remarkable lichen flora for the area, perhaps a consequence of its exposed position, and we found fifty-nine species of lichen there. These included some dramatic displays of *Bryoria* and *Ramalina* on the gravestones, and some interesting *Parmelia* species on the mature trees. The meeting ended with the discovery of the only limestone monument in the churchyard and on it a number of species rarely seen in this area and new to most of those present.



The display of historic lichen specimens and books in the Council Room.

On 23 March we held a herbarium evening, based on the lichen collections at the Hancock Museum. Ms Janet Simkin gave a brief talk on the history of the collections, and the twenty people present were then treated to a display of material in the Council room. This included a fascinating assortment of historical specimens, including herbarium sheets of local material compiled by Sir Walter Trevelyan, the exsiccatae of William Mudd, William Johnson and William Leighton, and various books and letters, including books annotated by Nathaniel Winch and William Robertson. There was also more modern material deposited by Oliver Gilbert on completion of his *A Lichen Flora of Northumberland* and a

collection of reference specimens formerly used in teaching at Newcastle University, which members were able to examine under the microscope.

In response to comments made by members it was decided not to hold any summer field meetings this year, as there are already so many weekend events to pack into a short season.

### RINGING GROUP

Ornithological work carried out by the Society's ringing group was focused on its three core activities: coastal research with the emphasis on the Farne Islands and Coquet Island, constant-effort ringing at Gosforth Park Nature Reserve and migration ringing at Newton Pool. The ringing group continues to attract new members to the Society and we hope that the group's efforts will aid the conservation of birds, particularly seabirds, in the North-East.

The coastal research in spring and early summer 2000 has gone relatively well. Over 1000 arctic tern chicks were ringed on study sites on Coquet Island and the Farnes, and over 1000 Sandwich tern chicks were ringed on the islands. Biometric data on samples of the arctic tern chicks were obtained to produce a growth index for this year. Mortality estimates in relation to chick hatching status (whether first or second hatched) were also obtained for arctic terns from both island groups using mark-recapture and the recovery of ringed chicks that had died before



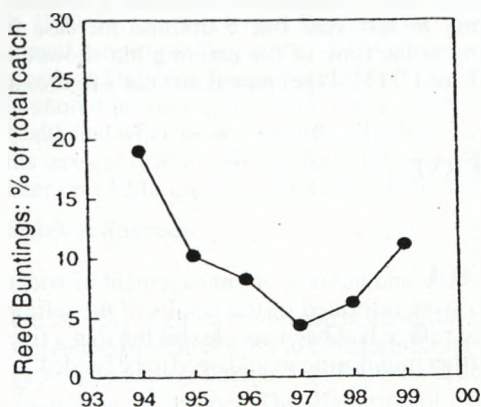
fledging. To complement the ringing studies, the National Trust wardens on the Farnes collected data on fish sizes being brought back by adult arctic terns to feed their chicks; we hope that this will also be carried out on a yearly basis, together with observations on feeding locations around the Farnes, to monitor food availability. Unlike last year, when few arctic tern chicks survived to fledging on the Farnes, chick survival was high on both Coquet Island and the Farnes. The tern studies on Coquet Island took off in a new direction this year when we left one of the team, Ian Johnston, on the island to ring or retrap adult arctic terns. In a successful ten days, he caught 188 adult arctic terns; if we can put a similar amount of effort into ringing and recapturing adult terns in this way each year we will be able to produce accurate estimates of the annual mortality rates of these birds – this is information that is hard to obtain from ringing recoveries since the main wintering areas of arctic terns are amidst the antarctic pack ice and the recovery rate is relatively low.

While the tern studies are developing in exciting directions, useful work has continued on the eiders of Inner Farne and approximately 160 new birds were ringed and thirty adults retrapped. The number of eiders retrapped from previous years was lower than expected and it may be that females do not return to breed every year. Ringing shags on Staple Island also produced unexpected results; contrary to a study carried out many years ago, few adults had apparently retained the same mate as last year.

The constant-effort ringing in Gosforth Park has gone well during this past year, with the total birds ringed up from 538 the previous year to 665 for this period (1 August 1999–31 July 2000). The numbers of reed warblers and sedge warblers ringed has also continued to increase; the totals for this year (last year in brackets) were 50 (35) reed warblers and 133 (81) sedge warblers. It is encouraging to see healthy populations of these *Acrocephalus* species and this may reflect the increasing vigour and extent of the *Phragmites* reed-beds now that water levels in the reserve can be more accurately controlled. One reed warbler was controlled and we await ringing details. We now have details of the sedge warbler wearing Belgian ring 6792412 that we controlled last year. This bird was ringed 524 km away at Veurne, West-Vlaanderen, Belgium as a first-year bird on 16 August 1998. Interestingly, one of our sedge warblers N827934 ringed at Gosforth Park on 18 July 1999 as a juvenile (and therefore likely to have fledged in the reserve or nearby) was controlled at Veurne on 2 August 1999. The pattern of sedge warbler recoveries overall suggests that, after moving to the south coast of the UK, birds may move both east and west in search of good feeding sites before going on to the continent and migrating to Africa down the Atlantic coast of Europe. Perhaps sedge warbler 6792412 was originally fledged from Gosforth Park or the vicinity and when controlled here in 1999 was merely returning to its approximate natal area. Interesting species caught this year include

a kingfisher and a young water rail; the latter inadvisedly came out of the reeds to view the ringing hut and was rewarded with a brand new BTO ring.

Continuing the trend from last year, the total number of birds ringed at Newton Pool during September to October was down from 225 to 198. However, given that many east-coast bird observatories reported a poor autumn for coastal migration in Britain, this total is quite respectable. Weather was the main problem, producing few falls of birds and preventing us from ringing due to high winds. Compared to the previous year, more reed buntings, sedge warblers, blue tits, thrushes and wrens were ringed, and fewer chiffchaffs, goldcrests, robins, goldfinches and meadow pipits. The reduction in numbers of these last two species is largely because we did not use tape-lures to



**Figure 1.** The relative catch size for reed buntings at Newton Pool from 1994 to 1999.

attract them to the nets, as we did last year. The reduction in chiffchaffs, goldcrests and robins reflects the poor conditions for producing falls of migrating birds. The number of reed buntings ringed shows a welcome increase. The relative catch of this species (as a percentage of total catch) had declined from 19% in 1994 to 4% in 1997 (Figure 1); the increase to 11% this year may indicate a recovery in numbers and it will be useful to see if this trend continues in subsequent years. The number of birds that the group rings at Low Newton is relatively low and so generates few recoveries. However, a chiffchaff that we ringed on 17 October 1999 was controlled at Hauxley (21 km south) on 30 October 1999. In the intervening thirteen days it had increased in weight from 6.6 g to 8.2 g and was clearly depositing fat in preparation for migration further south.

The Society's ornithological research benefits tremendously from the support of many people and organisations in the North-East. As in previous years, Northumbrian Water has generously continued to support the seabird studies, and Northern Electric & Gas helped with our efforts to launch the boat by the loan of a Land Rover. The Sir James Knott Trust has awarded a grant to help with the purchase of the team's own Land Rover for next season and we are extremely grateful to them for their support. The work on Coquet Island would have been considerably more difficult without Kathy Fletcher's help with the tern project, and to her we extend our thanks. We are also grateful to the Farne Islands Local Management Committee and the Regional Committee of the National Trust for granting permission for the Farnes ringing studies to continue for a further year, the Coquet Island Management Committee for allowing access to Coquet Island, Mike Freeman of the National Trust for his support of ringing at Newton Pool, and Major Carr-Ellison for the use of his beach chalet at Newton. Work on the Farne Islands would not be possible without the help and support of John Walton and his staff, and the team was particularly grateful for the hot tea on Brownsman! Finally, we thank the ringing team for their pleasant company and hard work on the Society's behalf.

#### **COQUET ISLAND MANAGEMENT COMMITTEE**

The Management Committee met during the winter and again at Amble on 10 July. The first meeting concerned the forthcoming season and the work to be undertaken by the wardens. Once again the island had two wardens, Kathy Fletcher who is undertaking research on common and arctic terns through Durham University, and Liz Giddings, who undertook the wardening work for the season. There was also a meeting of the Research Committee which oversees all research projects being carried out on the island and makes sure that there is no overlap or interference between projects. The Society's contribution to this work is mentioned under the ringing report. At the July meeting there was a summary of the year's breeding success, which showed similar numbers of pairs to last year but a definite increase in productivity. The roseate terns were still breeding at the time of the meeting but showed a healthy population of 31(34) pairs and productivity of 1.7 (1.34) per pair (last year's figures in brackets). This was a very encouraging result.

#### **LINDISFARNE NATIONAL NATURE RESERVE**

##### **Lindisfarne Advisory Committee**

The committee oversees the National Nature Reserve and advises on management of wider issues than the Wildfowl Panel. Both committees were informed of the results of the refuge programme and the general consensus was that the refuge had been successful but that a five year period of assessment was too short and that further monitoring would need to be funded.

Other research being looked at was the control of the spread of *Spartina*. English Nature has commissioned Hull University to undertake a baseline survey of the areas of *Spartina* and other survey work was also in progress. The issue of bait digging was discussed and the effect of the change in the bye-laws in Budle Bay on other areas of the Holy Island slake and the rest of the Northumberland Coast will need to be monitored.



### **Lindisfarne Wildfowl Panel**

The main concern of the Wildfowl Panel this year was that the initial five-year trial period of the non-shooting refuge area within the nature reserve came to an end in the spring of 2000. The plan for the refuge had been set out at the beginning: the first two years were used to collect baseline material, *i.e.* shooting took place over the whole area and the effect on both quarry and non-quarry species was closely monitored; for the last three years a large area at the south of Fenham Flats has been a non-shooting refuge, and monitoring was continued. This year the Committee was presented with a draft report of the results of the creation of the refuge area. The Panel agreed that the findings were encouraging, with increases in wigeon and also numbers of many of the important wintering waders showing greater use of the area. Because of this it was agreed that the refuge should remain for further monitoring to see if the initial improvement continues and whether having this non-shooting area benefits the over-wintering populations of both waterfowl and waders.

DAVID GARDNER-MEDWIN  
Chairman of Council

## **OBITUARIES**

### **Don McGuire MBE**

To most members of the Society Don McGuire was the quiet silver-haired man who for twenty years operated the projector at our Friday evening winter lectures. I do not believe that he ever appeared 'out front' at a members' meeting but for twenty-five years he was the reliable supportive member of Council to whom successive officers turned for advice and opinion. Grace Hickling placed immense trust and reliance on Don's advice and I know that Sir James Steel, during his fourteen years as chairman, respected and valued his support. For myself, during my ten years as chairman, I could not have asked for more from him. The Society owes so much to Don's unwavering support and advice.

He was the much respected elder statesman of the Society, always deep in thought during Council and General Purposes Committee meetings, then making a measured and valuable contribution to the matter under discussion. He shunned innumerable suggestions that he should become chairman of Council and having ruled himself out it almost always fell to Don to conduct the January election of chairman. It also frequently fell to him to propose a vote of thanks to speakers at our meetings or to the outgoing chairman at the Annual Meeting, for his words were always well chosen and appropriate and much appreciated by everyone.

In 1979 the society elected Don as a vice president and he was re-elected each year until the annual meeting in November 1999 when, to mark out gratitude, he was elected an honorary member. Only Sir James Steel, Mr Tony Tynan and Professor George Swan have been so honoured in recent times and it was richly deserved. Unfortunately Don was by then in poor health and when he was awarded the MBE in the New Year's Honours list of January 2000 for his services to Jesmond and Jesmond Dene it was clear that he was very ill; he died two months later on 13 March, only days after he had received his medal.

Derek R Shannon

### **Fred Colley**

Fred Colley died at the Freeman Hospital on 16 November 1999, aged 64. He was resident warden at our Gosforth Park Nature Reserve from October 1975 to July 1979. Fred was an extremely enthusiastic and dedicated warden who was very passionate in his concern for the animals in the reserve. The shattering of a roe deer's leg by the rifle bullet of a poacher's gun would bring him near to tears.

He greeted everyone entitled to be in the reserve with a smiling face and could talk for ages about every aspect of wildlife, but poachers, vandals and anyone misbehaving would see another side of Fred.

Fortunately, he had the full support of his family while living at Lake Lodge and his two sons, Ian and David, were constantly on patrol giving the badgers in particular their special protection. When in early 1979 a couple of us were carting rubble to form the path to what was to be our first hide, Fred and the whole family set about building a railway sleeper bridge over the Whitecroft Burn and they completed it in one day. It was then named Colley's Bridge and I hope it will always remain so.

Fred was primarily a bird man and his ultimate dream bird when his imagination was running riot was Cretzschmar's bunting. He had done a lot of bird-ringing and not without suffering damage from the birds that he would never harm. I remember helping to extract a barn owl's talons from the back of his hand at Eshott while Fred went through excruciating pain.

His working day was long with very early starts as a postman, but on returning home at midday he then put in innumerable hours of work in the reserve. He rejuvenated a whole new interest in it, encouraging many volunteers to help maintain and patrol it, particularly when he was not present. To walk around the reserve with him was always a pleasure and the discussion was never dull.

The family moved from The Lodge to Forest Hall from where Fred and his wife Carol worked for the welfare of donkeys. In his later years, he lost his power of speech which must have hurt him enormously.

He was a good man. I hope he has found his Cretzschmar's bunting.

Derek R Shannon

### **Dr Alick Walker**

Alick Walker (1925-1999) was a distinguished vertebrate palaeontologist who shunned the limelight, but contributed importantly to his subject. He was schooled in Yorkshire and went on to read engineering at Cambridge, a subject he was to abandon in favour of geology. A first class degree in that discipline from Bristol led to a PhD in vertebrate palaeontology. He was appointed to a lectureship in geology at Newcastle University in 1954 and promoted to senior lecturer in 1970.

His PhD project was to lead to the lifelong research which established his reputation and led to his particular interest in the origin of birds. Alick developed a uniquely meticulous technique for producing casts from natural moulds preserved in the hard rock from the Triassic of the Elgin area. The theoretical results were controversial and important. The Elgin reptiles included a number of archosaurs, the great reptile group that includes crocodiles, dinosaurs, and birds. Many argued over his conclusion that crocodiles and birds were the more closely related, but few could match the exquisite detail of the skull anatomy on which it was based. Members may recall a lecture on *Archaeopteryx* that he gave to the Society a few years ago.

He joined the Society in 1958 and served for many years as secretary of the Geological Section, and more recently, as a member of the library committee, when, characteristically he brought superb order to the palaeontological works. He will similarly be remembered by fellow members of St Aidan's Church, Brunton Park, for his work on their behalf. Alick died on 4 December 1999.

Alec Panchen



## FINANCIAL STATEMENTS

31 JULY 2000

# **THE NATURAL HISTORY SOCIETY OF NORTHUMBRIA TRUSTEES' REPORT FOR THE YEAR ENDED 31 JULY 2000**

**CHARITY NUMBER 526770**

## **Review of Developments and Activities**

The detailed report of the Society's activities during the year appears on pages 5-27 of the Annual Report.

## **Accounts Presentation**

The format of the accounts complies with the requirements of Statement of Recommended Practice No. 2 – Accounting by Charities (SORP 2). SORP 2 requires investments to be valued at market value rather than cost.

All investments held have been acquired in accordance with the powers available to the trustees.

## **Statement of Trustees' Responsibilities**

Law applicable to charities in England and Wales requires the trustees to prepare financial statements for each financial period which give a true and fair view of the charity's financial activities during the period and of its financial position at the end of the period, and adequately distinguish any material trust or other restricted fund of the charity. In preparing financial statements giving a true and fair view, the trustees should follow best practice and:

- select suitable accounting policies and then apply them consistently;
- make judgements and estimates that are reasonable and prudent;
- state whether the policies are in accordance with applicable accounting standards and statements of recommended practice on accounting by charities subject to any departures disclosed and explained in the financial statements;
- prepare the financial statements on the going concern basis unless it is inappropriate to presume that the charity will continue in operation.

The trustees are responsible for keeping accounting records which disclose, with reasonable accuracy at any time, the financial position of the charity, and which enable them to ensure that the financial statements comply with the Accounting Standards and Statements of Recommended Practice and the regulations made under s44 of the Charities Act 1993. They are also responsible for safeguarding the assets of the charity and hence for taking reasonable steps for the prevention and detection of fraud and other irregularities.

## **Investments**

All investment transactions during the year under review have been carried out in accordance with the trustees' powers.

<b>Financial Review</b>	<b>2000</b>	<b>1999</b>
Net Incoming Resources	£10386	£865

## **Independent Examiners**

PricewaterhouseCoopers have expressed their willingness to continue in office, and a resolution to re-appoint them will be proposed at the Annual Meeting

## **Signed on behalf of the Trustees**

D Gardner-Medwin  
Chairman and Trustee

13 October 2000



**THE NATURAL HISTORY SOCIETY OF NORTHUMBRIA**  
STATEMENT OF FINANCIAL ACTIVITIES FOR THE YEAR ENDED 31 JULY 2000

	2000			1999
	Restricted	Unrestricted	Total	Total
	£	£	£	£
<b>Income and expenditure</b>				
<b>Incoming resources</b>				
Members' subscriptions		15840	15840	15584
Donations	5000	6131	11131	1242
Investment income		23757	23757	24169
Interest receivable		5582	5582	4945
University of Newcastle upon Tyne		8200	8200	8000
Proceeds from the sale of <i>Transactions</i>		998	998	1964
<b>Total incoming resources</b>	<u>5000</u>	<u>60508</u>	<u>65508</u>	<u>55904</u>
<b>Resources expended</b>				
Direct charitable expenditure (note 2)	-	46156	46156	46301
Management and administration (note 3)	-	8966	8966	8738
<b>Total resources expended</b>	<u>-</u>	<u>55122</u>	<u>55122</u>	<u>55039</u>
<b>Net incoming resources for the year</b>	5000	5386	10386	865
<b>Other recognised gains and losses</b>				
Realised		24851	24851	5473
Unrealised		(7051)	(7051)	3588
<b>Total investment gains/ (losses)</b>	<u>-</u>	<u>17800</u>	<u>17800</u>	<u>9061</u>
<b>Net movement in funds</b>	5000	23186	28186	9926
Balance brought forward	-	679000	679000	669074
<b>Total funds carried forward 31 July 2000</b>	<u>5000</u>	<u>702186</u>	<u>707186</u>	<u>679000</u>

**THE NATURAL HISTORY SOCIETY OF NORTHUMBRIA**  
BALANCE SHEET AS AT 31 JULY 2000

	2000	1999
	£	£
<b>Fixed assets</b>		
Tangible assets for use by the charity (note 6)	13467	5677
Investments (note 7)	632499	640036
	<u>645966</u>	<u>645713</u>
<b>Current assets</b>		
Debtors	10060	7997
Cash at bank and in hand	59492	32817
	<u>69552</u>	<u>40814</u>
<b>Creditors:</b> Amounts falling due within one year	8332	7527
<b>Net Current Assets</b>	<u>61220</u>	<u>33287</u>
<b>Total Assets Less Current Liabilities</b>	<u><u>707186</u></u>	<u><u>679000</u></u>
<b>Funds</b>		
General Fund	220335	203629
Expendable Endowments:		
TB Short Memorial Fund	228781	240972
Grace Hickling Memorial Fund	229051	209619
	<u>678167</u>	<u>654220</u>
Life Members Fund	1719	1880
Designated Capital Funds (note 8)		
Gosforth Park Nature Reserve Restoration Fund	19300	19900
Deferred Repairs Fund	3000	3000
Restricted Funds		
Coquet/ Farnes Research Fund (note 9)	5000	0
	<u><u>707186</u></u>	<u><u>679000</u></u>

Approved by Council on 13 October 2000

D GARDNER-MEDWIN - Chairman and Trustee

N A FURNESS - Treasurer



## THE NATURAL HISTORY SOCIETY OF NORTHUMBRIA

### NOTES TO THE ACCOUNTS FOR THE YEAR ENDED 31 JULY 2000

#### 1 Accounting Policies

##### 1.1 Basis of Accounting

The accounts are prepared under the Historical Cost Convention as modified for the revaluation of Fixed Asset Investments and comply with the Statement of Recommended Practices "Accounting by Charities"

##### 1.2 Realised and Unrealised Gains and Losses on Investments are recognised in the Statement of Financial Activities in the period in which they arose.

##### 1.3 Quoted Investments are stated at market value at 31 July 2000.

##### 1.4 Tangible Fixed Assets

Tangible fixed assets are stated at cost less depreciation which is provided in equal annual instalments over the estimated useful lives of the assets.

No value was attributed to the Hancock Museum at the date of its completion in 1884. The building is leased to the University of Newcastle upon Tyne which is normally responsible for all repairs and improvements.

The cost of Lake Lodge, less donations and grants received, of £3899 is depreciated at 2% per annum. The cost of installing mains electricity at Lake Lodge, less donations received, of £5300 has been fully depreciated

The cost of the hides, equipment and office furniture is depreciated at 10% per annum and computers and office equipment at 20% per annum.

##### 1.5 Statement of Financial Activities

Donations are recognised when received unless the receipt is certain, when they are recognised as accrued income. Expenditure is accounted for on an accrued basis. Any excess of income over expenditure for the year is arrived at after making appropriations to special funds for the purpose of setting aside temporary surpluses of income to meet future expenditure.

##### 1.6 Fund Accounting

The General Fund is unrestricted, and is expendable at the discretion of the trustees in the furtherance of the objects of the charity. The T B Short and Grace Hickling Memorial Funds were created from legacies and are invested in accordance with the Trustee Investment Acts and are subject only to expenditure for special projects. The Life Members Fund consists of amounts received in payment of life subscriptions and they are released to income over a period of 20 years in equal annual instalments.

<b>Gosforth Park Nature Reserve Restoration Fund</b>	<b>2000</b>	<b>1999</b>
General Restoration	10800	11400
Sir James and Lady Steel donation for lake rejuvenation	8500	8500
	<u>£19300</u>	<u>£19900</u>

## 2 Direct Charitable Expenditure

	2000	1999
Salaries, pension contributions and national insurance	24620	24726
Printing and Stationery	2385	2261
Postage and Telephone	2394	2021
Insurance	1858	1749
Office Equipment maintenance	318	-
Subscriptions to societies	793	997
Lecture and Field Meeting expenses	1466	2569
Transactions	5984	5590
Library	2668	1222
Gosforth Park Nature Reserve	1799	
Less: Transfer from Restoration Fund	600	1199
Coastal Research (note 5)		1108
Depreciation	<u>1363</u>	<u>2298</u>
	<u>£46156</u>	<u>£46301</u>

## 3 Administration Expenses

	2000	1999
Salaries, pension contributions and national insurance	6135	6181
Printing and stationery	125	119
Postage and telephones	126	106
Insurance	206	194
General Expenses	379	1413
Treasurer's Fees	1500	250
Independent Review	<u>495</u>	<u>475</u>
	<u>£8966</u>	<u>£8738</u>

## 4 Information regarding Employees and Trustees

	2000	1999
Average number of employees during the year	5	6
Total emoluments	£30755	£30907

No trustee, or person related or connected by business to them, has received any remuneration from the charity during the year

During the year, payments were made to three (1999 – four) trustees as follows:

Salary costs	£nil	£304
Reimbursement of speakers entertainment expenses	£346	£178
Library books	£60	£50
Office sundry expenses	£14	£24
Gosforth Park Nature Reserve restoration expenses	£190	£nil

A payment was received during the year from one trustee (1999 nil) of £100 in respect of photocopying carried out at a commercial rate.



## 5 Coastal Research

Coastal Research comprises boat costs and ringing expenses for Farne Islands and Coquet Island research.

## 6 Tangible Fixed Assets for use by the Society

	2000	1999
Hancock Museum	Not valued	
Lake Lodge: Cost	3899	3899
Electrical installation	<u>5300</u>	<u>5300</u>
	9199	9199
Less: Depreciation to date	<u>7095</u>	<u>7016</u>
Net book value	2104	2183
Hides, equipment, office furniture and computers		
Cost	37134	27980
Depreciation to date	25771	24486
Net Book Value	<u>11363</u>	<u>3494</u>
Total Net Book Value	<u>£13467</u>	<u>£5677</u>

There were no capital commitments at 31 July 2000

## 7 Investments held as Fixed Assets

Investments in trustee securities, at market value, were held as follows:

	2000	1999
<b>Quoted</b>		
Narrow range	143723	175572
Wide range	282681	260941
Special range	94198	97714
<b>Unquoted</b>		
Charities Official Investment Fund		
9750 shares	<u>111897</u>	<u>105809</u>
	<u>£632499</u>	<u>£640036</u>
<b>Historical cost</b>	<u>£372,284</u>	<u>£376,533</u>

## 8 Designated funds

	1999	New designations	Utilised	2000
Gosforth Park Nature Reserve	19,900	-	(600)	19,300
Deferred repairs	<u>3,000</u>	<u>-</u>	<u>-</u>	<u>3,000</u>
	<u>£22,900</u>	<u>-</u>	<u>£(600)</u>	<u>£22,300</u>

## 9 Restricted funds

	1999	Incoming Resources	2000
Coquet/Farnes research	-	£5,000	£5,000
This fund has been set up to accumulate funds for the purchase of a Land Rover.			

**Report of the Independent Examiner to the Trustees of The Natural History Society of Northumbria in respect of an examination carried out under Section 43 of the Charities Act 1993 and in accordance with directions given by the Charity Commissioners under subsection 7(b) of that Section**

I have examined the financial statements for the year ended 31 July 2000

**Respective responsibilities of Trustees and Independent Examiner**

As described in page 30 as the charity's trustees you are responsible for the preparation of financial statements. It is my responsibility to carry out an examination of those financial statements and to issue a report based on that examination.

**Scope of examination**

I conducted my examination in accordance with directions given by the Charity Commissioners under section 43 (7) (b) of the Charities Act 1993 and my letter of engagement dated 22 September 2000. An examination is limited primarily to enquiries of the charity's personnel and analytical and review procedures applied to financial data and this provides less assurance than an audit. I have not performed an audit, and accordingly, I do not express an audit opinion.

**Report**

I report that nothing has come to my attention in connection with my examination:

- (1) that gives me reasonable cause to believe that in any material respect
  - i. accounting records have not been kept in respect of the charity in accordance with section 41 of the Charities Act 1993; or
  - ii. the financial statements do not accord with those records; or
  - iii. the financial statements do not comply with any of the requirements of regulation 3[4] of The Charities (Accounts and Reports) Regulations 1995 with the exception of paragraph 1 of Part III of these Regulations (requirement to give a true and fair view).
- (2) to which, in my opinion, attention should be drawn in this report in order to enable a proper understanding of the financial statements to be reached.

Mr R BUNTER  
Independent Examiner  
Chartered Accountant  
PricewaterhouseCoopers  
89 Sandyford Road  
Newcastle upon Tyne  
NE99 1PL

13 October 2000



## BIRDS ON THE FARNE ISLANDS in 2000

compiled by

**ROBIN HARVEY<sup>1</sup>**

National Trust Warden

and

**JOHN WALTON<sup>2</sup>**

National Trust Property Manager

ringing report by

**CHRIS REDFERN<sup>3</sup>**

edited by

**MARGARET PATTERSON<sup>4</sup>**

<sup>1</sup> Foresters Cottage, Doxford, Chathill, Northumberland NE67 5DS <sup>2</sup> The National Trust, The Sheiling, 8 St Aidans, Seahouses, Northumberland NE68 7SR <sup>3</sup> Medical Molecular Biology Group, Department of Medicine, University of Newcastle NE1 7RU and <sup>4</sup> The Natural History Society of Northumbria, Hancock Museum, Newcastle upon Tyne NE2 4PT

### INTRODUCTION

Gale force winds and rough seas delayed the wardens sailing to the islands on the planned date of 23 March and it was not until 25 March that *Glad Tidings* was able to leave harbour – even then sea conditions made landing on Brownsman ‘interesting’. Both island groups were occupied from this date until 7 December. Twenty-three species bred with an estimated population of 70,000 pairs. Breeding for the first time on the islands was a yellow-legged gull; this was paired with a herring gull and at least one young fledged from a clutch of three eggs. After three seasons of ‘bad news’ this was the year when it all went well – reasonably clement weather (the rain fell and gales blew at non-critical times) and an abundant food supply, in the shape of sand-eels, produced a bumper crop of young birds. Some results of the wardens’ monitoring work is given in the species accounts and this provides details of how species fared. After the appalling productivity experienced by the tern species in 1999 this year provided the antidote – ‘massive’ numbers of young terns in evidence throughout late summer. The one cloud on the horizon was the reduction of our roseate tern population to just one breeding pair – the lowest number since records began. Despite faring well on the neighbouring Coquet Island, this is still a species in dire straits.

Passage birds were represented by 161 species, the overall total of 184 species creating a new record – beating the 183 of 1999. Four species were added to the island list: honey buzzard (2), yellow-legged gull (2), crag martin and melodious warbler – the latter two records are still under consideration by the Rarities Committee. Recorded for the second time were bean goose, hobby, little ringed plover, woodlark and citrine wagtail. Subalpine warbler made its third appearance, arctic warbler its fifth, marsh warbler its sixth and Richard's pipit its sixth and seventh. An unprecedented five buzzards were the sixth to tenth records. Other species of note included Balearic shearwater (2), storm petrel (5), Leach's petrel (2), marsh harrier, quail (2), grey phalarope, turtle dove, nightingale, bluethroat (8), barred warbler (2), yellow-browed warbler, red-breasted flycatcher (2), long-tailed tit (10), red-backed shrike, common rosefinch (8), ortolan bunting (2) and little bunting (5).

Thanks go to the 2000 wardening team of Mark Brown, Richard Cooper, Owain Gabb, Graeme Garner, Robin Harvey, Adrian Mills, Niall Mugan, Peter Nuttall, Nicholas Oughtred and

Stuart Thomas as well as to various boatmen (and a seemingly endless stream of visiting ex-wardens!) for supplying the records which make up this report.

Details of all the birds are given in the following list: this follows the order and scientific nomenclature of Professor Dr K H Voous' list of recent holarctic species (1977), except for the shearwaters and gannet which adopt the new changes recommended by *Ibis* 133, p438. Where appropriate, the figures for 1999 breeding birds are included, for comparison, in brackets.

#### **Red-throated Diver** *Gavia stellata*

Scarce in spring with singles off Inner Farne on 5 April and flying north through Staple Sound on 19 April. One (in summer plumage) flying south through Inner Sound on 23 July was the only summer record. Birds were seen regularly from 1 September onwards with peak counts of eighteen south through Inner Sound on 25 September and seven through Staple Sound on 7 November.

#### **Black-throated Diver** *G. arctica*

There was an early record of one flying south through Staple Sound on 31 August. Thereafter singles were noted on nine days from 26 October-29 November with three in or through Staple Sound on 8 November.

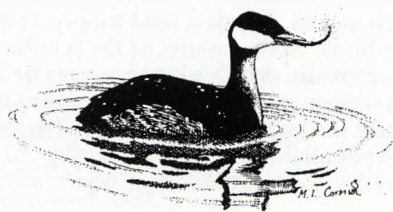
#### **Great Northern Diver** *G. immer*

One flying north through Inner Sound on 16 April was the only spring record. Return passage began on 4 September when one flew south through Inner Sound. 1-9 were recorded on twenty-two days from 19 September-2 December with the peak count (birds moving through Staple Sound) on 8 November. One noted from both the inner and outer groups on 12 October showed some of the characteristics of white-billed diver *G. adamsii* and was thought by several of the wardens to be a hybrid between this species and *G. immer*.

#### **Great Crested Grebe** *Podiceps cristatus*

Singles flew north through Staple Sound on 14 August and north past the south end of Brownsman on 7 November.

#### **Red-necked Grebe** *P. grisegena*



There were two spring records: one on the sea towards Megstone on 26 March and one off the north end of Brownsman on 24 April. Return passage began on 28 August when two flew north through Inner Sound. Thereafter 1-3 were noted on fifteen days from 3 September-5 December.

#### **Slavonian Grebe** *P. auritis*

One flew south through Staple Sound, landing briefly, on 26 September and one was watched flying south through Inner Sound before landing on the sea off Lighthouse Cliff (Inner Farne) on 3 October. Still a Farnes scarcity despite good numbers wintering off the Northumberland coast.

#### **Fulmar** *Fulmarus glacialis*

Birds were present when the wardens arrived and following the traditional brief 'honeymoon' period were back holding territory by the second week of May. The first eggs were found on 15 May on Brownsman and 16 May on East Wideopens, with the first young on 9 July on Brownsman and 13 July on the Wideopens. 253 (264) pairs nested as follows: Inner Farne 24



(31), Knoxes Reef 26 (15), West Wideopens 8 (17), East Wideopens 18 (18), Skeney Scar 2 (2), Staple Island 43 (42), Brownsman 55 (66), North Wamses 33 (29), South Wamses 38 (29), Big Harcar 4 (11), Northern Hares 0 (2), Longstone End 2 (2). The first young fledged on 2 August with the last fledging on 10 September. 153 monitored nests produced an average of 0.58 young, a reasonable breeding season. The usual exodus followed, with birds very scarce around the islands during the first half of October. A return to territories brought the first bird back to the Inner Farne cliffs by 3 November and birds were at nest sites on the outer group by 16 November. Thirty-six had returned to Inner Farne by 27 November with twenty on Knoxes Reef on 4 December and 185 around Staple Island and Brownsman on 24 November. There was one significant count of passage birds on 7 November, when during strong north-easterlies 2,000+ moved north past the outer group. A single blue-phase bird was seen off the north end of Brownsman on 17 November – the only record of the year. The numbers of breeding pairs have remained stable during the last seven years following a steady increase since 1970 (see Fig. 1).

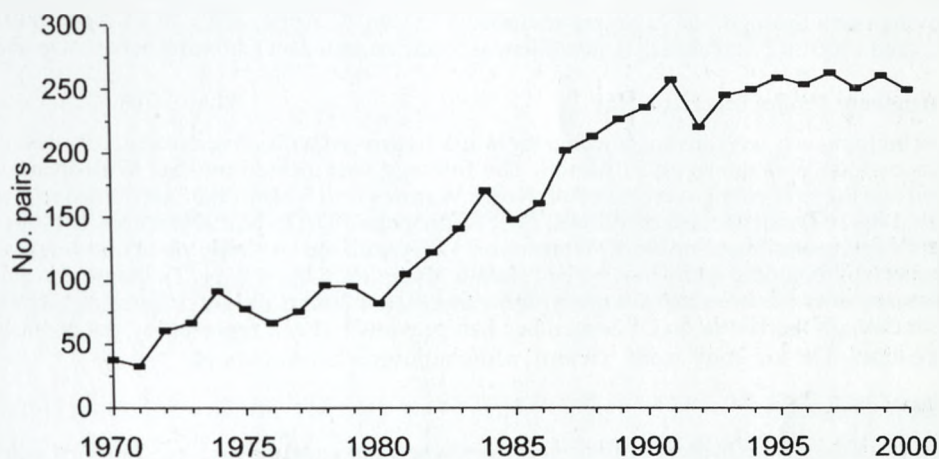


Fig. 1 Numbers of breeding pairs of Fulmars.

#### Sooty Shearwater *Puffinus griseus*

1-3 were noted on seventeen days between 15 July and 7 November. More significant counts were of thirty-three north in ninety minutes off the south end of Inner Farne on 3 September, thirty-three north in one hour off the same island the next day and seven north (plus one south) off Brownsman on 11 October.

#### Manx Shearwater *P. puffinus*

Recorded on five days in April and May with by far the largest count being sixty-three north through Staple Sound on 19 May. The first bird of the autumn was seen off Longstone on 13 June with regular sightings until the last four were noted flying through Staple Sound on 7 November. The peak count was a disappointing fifty-three north on 25 July, reflecting a poor year for seabird passage in general.

#### Balearic Shearwater *P. mauretanicus*

Just two records this year, obviously reflecting the poor passage of *P. puffinus*: one flew north past the south end of Inner Farne on 11 July and one flew north-east off the south end of Brownsman on 11 October.

**Storm Petrel** *Hydrobates pelagicus*

The outer group had the monopoly on this and the next species, much to the frustration of the inner group wardens! During strong north-easterly winds on 7 November three flew north through Staple Sound with another off the south end of Brownsman. A fifth flew north through Staple Sound on 8 November.

**Leach's Petrel** *Oceanodroma leucorhoa*

Two flying north through Staple Sound on 7 November provided the Brownsman wardens with excellent views. The inner group wardens, however, were thwarted by breaking waves, spray and strong winds.

**Gannet** *Morus bassanus*

Recorded almost daily until early November when numbers tailed off. Hourly counts of birds moving north through Staple Sound included 1152 on 12 April, 1052 on 14 April, 540 on 2 May and 1400 on 2 September. A juvenile was found stranded on Knoxes Reef on 9 October.

**Cormorant** *Phalacrocorax carbo*

Nest building was well advanced when the wardens arrived with, for example, fifty developed nests on East Wideopens on 27 March. The first egg was located on East Wideopens on 15 April and the first young were noted on North Wamses on 15 May and East Wideopens on 16 May. 146 (167) pairs nested as follows: East Wideopens 68 (67), North Wamses 78 (100). The first fledgling was found on North Wamses on 1 July with the last fledging in mid August. The numbers of breeding pairs have been stable since 1970 (see Fig. 2). Numbers quickly decreased after the breeding season with no significant counts made. A leucistic bird flying north through the Kettle on 21 September had previously been reported by the boatmen on three dates. The log entry reads 'creamy white all over – a bizarre sight'.

**Shag** *P. aristotelis*

Large numbers were present at their nest sites when the wardens arrived. The first egg was located at Inner Farne quarry on 5 April and the first young on Brownsman on 15 May. 1310

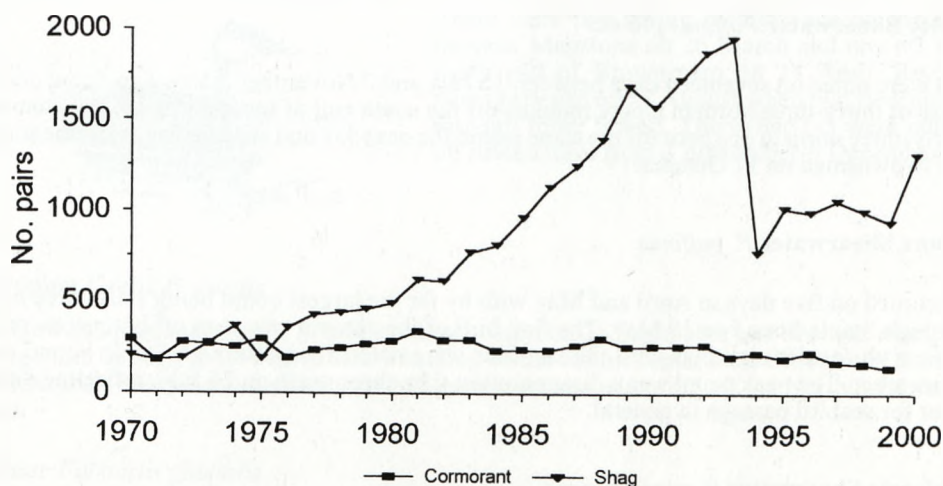


Fig. 2 Numbers of Cormorant and Shag pairs.



(940) pairs nested (a thirty-nine per cent increase) as follows: Megstone 28 (24), Inner Farne 274 (193), West Wideopens 78 (34), East Wideopens 74 (57), Skeney Scar 43 (53), Staple Island 319 (235), Brownsman 149 (119), North Wamses 30 (24), South Wamses 64 (35), Roddam and Green 29 (19), Big Harcar 132 (83), Longstone End 90 (64). The first fledglings were on both Brownsman and Inner Farne on 6 July with the last on Inner Farne in early October. It was a productive season, especially on the inner group where 140 monitored nests produced an average of 1.11 fledged young (161 monitored nests on the outer group averaged 0.51 fledglings). Compared with the cormorant, shag numbers have fluctuated since 1970 with a peak in 1993. This season suggests that their numbers are once again moving towards a higher breeding population (see Fig. 2). Typically birds remained around the islands after the breeding season with, for example, 450 counted around the outer group on 3 November.

#### **Grey Heron** *Ardea cinerea*

1-2 were seen on six day in spring from 25 March-4 May. They were noted more frequently in the autumn with 1-3 on twenty-four days between 3 July and 23 November.

#### **Mute Swan** *Cygnus olor*

Just one record, of two flying north through Inner Sound on 28 August.

#### **Whooper Swan** *C. cygnus*

Three records: three flew south over Brownsman on 28 September, eleven rested in Inner Sound for forty-five minutes before flying north on 14 October and five (two adults and three juveniles) flew north through Staple Sound on 1 November.

#### **\*Bean Goose** *Anser fabalis*

One of the race *A. rossicus* (often known as tundra bean goose) was flushed from Northern Hares as the wardens arrived to undertake a seal count on 15 November. This (and the Richard's pipit found on the same day) was more than enough to justify the decision of one of the wardens to take his binoculars along! Second record for the islands and last recorded in 1989.

#### **Pink-footed Goose** *A. brachyrhynchus*

One spring record, of two east over Brownsman, then noted on Big Harcar on 27 March. As expected they were more common in autumn with skeins of 2-160 recorded on ten days between 22 September and 15 November. The peak day count was 254 (flying south in two skeins) on 23 October.

#### **Greylag Goose** *A. anser*

Thirty-three flew south over Inner Sound on 10 October and six were in Staple Sound before flying off west on 8 November.

#### **Canada Goose** *Branta canadensis*

Very much an inner group bird this year: skeins of fifteen and twenty flew through Inner Sound on 30 and 31 May followed by sixty-seven over Inner Farne on 8 June and twenty-one through Inner Sound on 27 June. All were moving north.

#### **Barnacle Goose** *B. leucopsis*

Eighteen landed on East Wideopens before flying north on 10 May and three flew east towards Longstone on 11 May. The autumn produced more records with 2-30 on fifteen days from 30 September-31 October including five 'resident' on East Wideopens from 22-31 October.

**Brent Goose** *B. bernicla*

Rather scarce this year with no spring records and no big counts in the final quarter. Eight flying north through Inner Sound on 2 September and three north off Longstone were the first of the autumn. Thereafter 1-20 were noted on six days from 16 September-7 November with the last, a single, briefly resting on Inner Farne.

**Shelduck** *Tadorna tadorna*

One to two were seen on one day in March, three days in April and two days in June. The last record was of six flying east over Brownsman on 2 July. A pair displaying on the central meadow of Inner Farne on 26 March was the only sign of breeding activity, but predictably they had gone by the next day.

**Wigeon** *Anas penelope*

There were four spring records: two flew south through Inner Sound on 5 April with four south, also through Inner Sound, on 16 April, three moved north through Brownsman Haven on 18 April and one was off South Wamses on 7 May. Numbers were much higher in the autumn with 1-82 noted regularly from 27 August until 29 November.

**Gadwall** *A. strepera*

Just one record: a single flew south through Inner Sound on 4 September.

**Teal** *A. crecca*

One to eight were seen on nine days from 25 March-25 April. The first bird of the autumn was one on Staple Island on 19 August. Birds were noted almost daily from 26 August until the end of the season with significant passage counts including 125 north between 12-14 September, twenty north and sixty-eight south on 12 October, and 123 south on 29 October. Numbers on Knoxes Reef rose from ten on 17 September to a peak of 434 on 23 November.

**Mallard** *A. platyrhynchos*

Observed almost daily throughout the period. Birds were present around both the inner and outer groups during the breeding season but the only nesting attempts were made on the latter. Three early nests on Brownsman and Staple Island were all unsuccessful due to abandonment/predation. A female found incubating on North Wamses on 27 June was seen with five young on Big Hancar on 23 July, but a single duckling on South Wamses on 26 July suggests that the majority were predated. Numbers on Knoxes Reef built up from four on 18 September to a peak of fifty-five on 14 November.

**Pintail** *A. acuta*

A good year for this species. Singles were seen on six days from 13 September to 13 November, including females flushed from Longstone on 19 September and in the Kettle on 12 November. Five flew south through Inner Sound on 22 September.

**Shoveler** *A. clypeata*

One flew north through Staple Sound on 21 August, one was on Knoxes Reef on 17 September and a pair was also on Knoxes Reef on 25 October. A male lingered around Knoxes Reef and the Kettle from 1-5 December with presumably the same bird flying east over Brownsman on the last date.

**Pochard** *Aythya ferina*

There were four records: two flew north through Staple Sound on 16 September, with one north there on 19 September. Two flew south then north through Inner Sound on 24 September and on 12 October three flew north through the Kettle.



### Tufted Duck *A. fuligula*

One to two were seen on seven days from 6 April-12 May, with two north through Staple Sound on 9 October and three north through the Kettle on 22 October. The low number of autumn records reflects a lack of any major wildfowl movement in the last few months of the year.

### Scaup *A. marila*

All records came from the inner group: two north through Staple Sound on 19 September, four south through Inner Sound on 21 September, two north through Inner Sound on 6 November and two in Inner Sound on 7 November.

### Eider *Somateria mollissima*

Many birds were present around the islands as the wardens arrived and they were soon prospecting on the island tops. The first scrapes were located on Brownsman on 29 March and the first egg was found on 4 April. The inner group had to wait until 21 April for their first nest by which time nine females were on eggs on Brownsman. 1050 (1,278) females nested as follows: Inner Farne 721 (795), Knoxes Reef 5 (8), West Wideopens 35 (37), East Wideopens 8 (9), Staple Island 40 (45), Brownsman 217 (361), North Wamses 5 (7), South Wamses 11 (7), Big Harcar 5 (7), Longstone main rock 1 (1), Longstone End 2 (1). Large numbers of desertions were noted, possibly due to a higher proportion than usual of younger females. There was also higher mortality of adults than is usual during the season, including some incubating females, and this may have had an adverse affect on productivity. The first ducklings were found on Brownsman on 3 May with the first on Inner Farne on 22 May and the last were seen on the Churn pool (Inner Farne) on 31 July. Despite the above concerns it was a reasonably successful season for the species with the monitored nests producing an average of 2-3 ducklings each. The population, which appears to be prone to marked cyclic variations, is at present around the average for the islands (see Fig. 3). Wetland Bird Survey counts in the autumn produced totals of 1,054 on 22 October and 2,434 on 23 November.

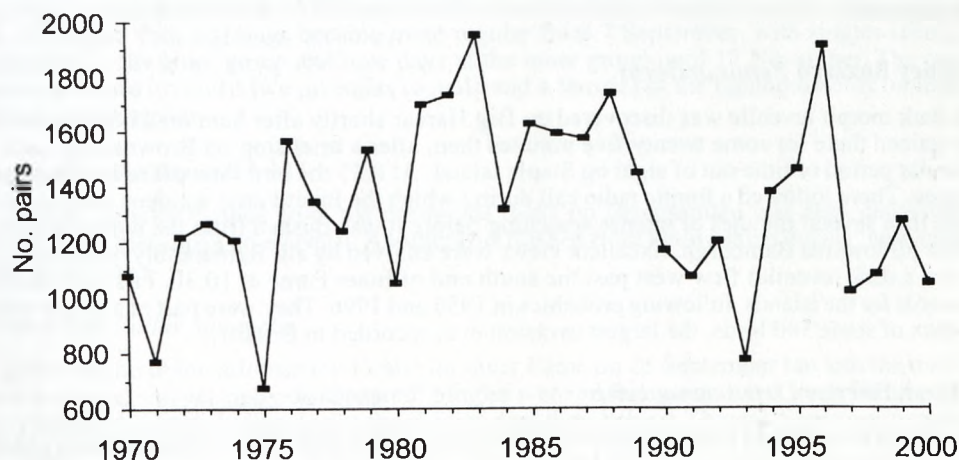


Fig. 3 Numbers of Eider Duck pairs.

**Long-tailed Duck** *Clangula hyemalis*

There were two spring records: a male flew north through Inner Sound on 27 March and a female was off West Wideopens on 13 April. The majority of records were in autumn with one to four noted on nine days from 20 October-2 December. The only counts to exceed this were twenty in Inner Sound on 29 October and thirteen flying through Staple Sound on 8 November. A pair in the Kettle on 7 November was also worthy of note.

**Common Scoter** *Melanitta nigra*

Recorded in every month during the season with lowest numbers in May and August. The only counts to exceed 100 were 150 through Staple Sound on 22 July, 300+ there on 28 October and 108 on 29 October. All were flying north.

**Velvet Scoter** *M. fusca*

Well recorded in autumn with one to six on eight days from 13 September-2 December. Higher counts of fourteen north through Staple and Inner Sounds on 29 October and thirteen north through Staple Sound on 8 November.

**Goldeneye** *Bucephala clangula*

A very quiet year for this species. One to six were noted on seven days from 18 October-1 December. The only count to exceed this was thirteen (mainly north through Staple and Inner Sounds) on 29 October. The majority of birds were flying through, but two females were by the Bridges on 11 November and two males lingered in the Kettle on 1 December.

**Red-breasted Merganser** *Mergus serrator*

Just two spring records: singles in the Kettle on 28 March and in Staple Sound on 30 April. One to three were observed on eight days from 12 September-8 November.

**Goosander** *M. merganser*

One to three were noted on five days between 6 October and 23 November. All but one were flying north.

**Honey Buzzard** *Pernis apivorus*

A dark morph juvenile was discovered on Big Harcar shortly after 8am on 25 September. It remained there for some twenty-five minutes then, after a brief stop on Brownsman, spent a similar period of time out of sight on Staple Island. At 8.55 the bird flew off to land on Inner Farne. There followed a frantic radio call during which the Inner Farne wardens were alerted, and then several minutes of intense searching before it was flushed from the north rocks and flew off towards Bamburgh. Excellent views were enjoyed by all! Remarkably, a second bird (also a dark juvenile) flew west past the south end of Inner Farne at 10.30. First and second records for the islands, following probables in 1956 and 1996. They were part of a nation-wide influx of some 500 birds, the largest invasion ever recorded in Britain.

**Marsh Harrier** *Circus aeruginosus*

A female or immature landed briefly on Brownsman on 22 September. After a similarly short rest on Staple Island it was watched flying off over Staple Sound. Last recorded in 1998.

**Sparrowhawk** *Accipiter nisus*

One to two were noted on six days from 5 September-8 November. All were females or immatures.



#### **Buzzard *Buteo buteo***

An adult flying west over St Cuthbert's Chapel on Inner Farne at 14.45 on 22 September heralded an unprecedented influx. Four more followed: one found over the sea beyond the outer group at 15.20 eventually came past Inner Farne at 15.50, one flew west past the south end of Inner Farne at 17.30, and it was joined by two more over Inner Sound before all three flew inland. Sixth to tenth records for the islands and last recorded in 1983.

#### **Kestrel *Falco tinnunculus*.**

No spring records this year. One to three were noted (on both inner and outer groups) on eight days from 11 to 28 September with three roosting on Brownsman tower on 26 September. A female 'resident' on Inner Farne from 2-8 October was watched feeding on caterpillars. The last sighting was of one flying west past the south end of Brownsman on 21 October.

#### **Merlin *F. columbarius***

Early in the year singles were noted on 28 March and 1 and 19 April (with birds found dead on Brownsman on 26 March and on Longstone on 20 April). The first of the autumn was on Brownsman on 3 September. There were three records from 17-24 September, then almost daily sightings from 27 September until the end of the season. Most were singles (and all were females/immatures) although two were seen on 2-4 October and on 28-29 November. Kills included knot, feral pigeon, robin, redstart, blackbird, song thrush, redwing and goldcrest.

#### **Hobby *F. subbuteo***

On 22 September at 14.00 a juvenile flew north past St Cuthbert's Chapel on Inner Farne, then up over the top meadow before disappearing over the lighthouse cliff. As the log records 'the two observers were left shell-shocked'. Second record for the islands and last recorded in 1998. Five buzzards, a marsh harrier and a hobby – surely the best day for raptors that the Farnes has ever experienced!

#### **Peregrine *F. peregrinus***

There were two spring records of females over Inner Farne on 20 April and 13 May. In addition, dead arctic terns on Brownsman on 15 May and on Inner Farne on 22 May were believed to have been killed by this species. One was seen over Staple Island and Brownsman on 15 August, then sightings became more regular from 7 September, with singles seen on eight days at the outer group and nine days at the inner group until 17 November. The only multiple record involved two juveniles (a male and a female) at the lighthouse cliff on Inner Farne on 10 October.

#### **Quail *Coturnix coturnix***

A female, initially flushed from the north-east rocks on Brownsman, was seen daily from 26-28 April, then again on 30 April. Another was flushed from Brownsman during 'nest count day' on 6 June.

#### **Water Rail *Rallus aquaticus***

An adult found in the Information Centre on Inner Farne on 25 September ran into the toilets when released and promptly disappeared! Singles were on Brownsman and Inner Farne on 22 November, the latter hiding under the Zodiac and then behind Thomas Sparrowe's coffin during its short stay.

#### **Moorhen *Gallinula chloropus***

One was flushed from beside Brownsman pond on 6 November and two juveniles were found in St Cuthbert's Chapel on Inner Farne on 22 November. This was the best year for the species since 1994.

### Oystercatcher *Haematopus ostralegus*

Numbers on the inner group rose from forty-five on 25 March to a peak of 154 on 4 April before declining again as birds departed for their breeding grounds. The first eggs were located on Inner Farne on 7 May and on Brownsman on 12 May, with the first young on Brownsman on 22 June and on Inner Farne on 24 June. 24 (30) pairs nested as follows: Inner Farne 4 (5), Knoxes Reef 2 (3), West Wideopens 2 (1), East Wideopens 1 (2), Staple Island 4 (4), Brownsman 6 (9), North Wamses 1 (2), South Wamses 1 (1), Big Harcar 1 (0), Northern Hares 1 (1), Longstone main rock 1 (2). The species again fared badly due to gull predation. Thirty eggs from fourteen monitored breeding attempts on the outer group produced only four fledglings, while only four fledglings (from *ca* twenty-seven eggs) were seen on the inner group. The number of pairs has remained stable since 1970 which is surprising considering the high predation level of chicks (see Fig. 4). Numbers increased from the start of August with peak counts of 257 on West Wideopens on 2 September and a total of 257 on the islands on 23 November.

### Little Ringed Plover *Charadrius dubius*

One flushed from the south end of Brownsman on 22 August flew off to Staple Island. Second record for the islands and last recorded in 1989.

### Ringed Plover *C. hiaticula*

Display was well under way when the wardens arrived with the first scrape found on Brownsman on 19 April and the first eggs on Inner Farne on 26 April. 4 (7) pairs nested as follows: Inner Farne 2 (2), Staple Island 1 (2), Brownsman 1 (3). Yet again it was a disastrous year for the species. The six eggs laid on the outer group were all predated. On Inner Farne, four nesting attempts produced sixteen eggs, seven of which survived to hatching but all of the young had disappeared within a few days: the future of this attractive wader as a breeding species on the islands looks far from secure. Fig. 4 shows a steady decline in numbers since the mid-1980s with this season's breeding population now below the 1970 total. Post breeding roosts on Inner Farne and West Wideopens produced counts of 16-30 between 23-27 August,

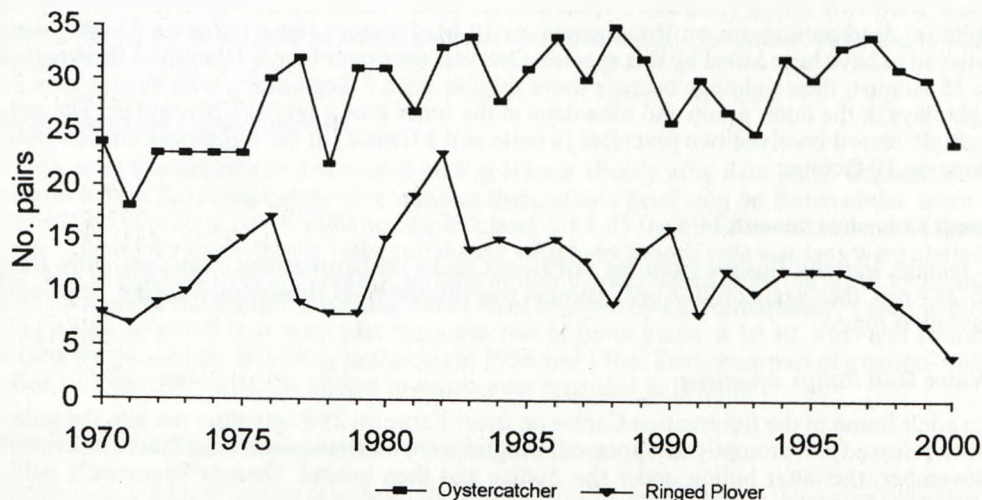


Fig. 4 Numbers of Oystercatcher and Ringed Plover pairs.



then sixty on 30 August and sixty-two on 1 September before a decline to twenty-four by 16 September. Few were seen during the last three months with three on Longstone on 23 November being worthy of note.

#### **Golden Plover** *Pluvialis apricaria*

A single was flushed from the top meadow pool on Inner Farne on 20 April. Post-breeding arrival began on 13 August when twenty flew over Inner Farne. The species was recorded regularly from mid-August with numbers roosting on West Wideopens rising from seventy on 22 August to a peak of 1000+ on 8 October. This appears to be the largest ever count for the islands (in recent times at least), the previous best being 270 in October 1995. The largest count on the outer group came on 25 September when 420 were on Brownsman/Staple Island. Numbers declined rapidly during the second half of October with very few seen in the final two months.

#### **Grey Plover** *P. squatarola*

There were three records in spring: one on West Wideopens on 5-6 April, one flying west over Brownsman on 28 April and two on Longstone on 18 May. Sightings increased in the autumn with 1-2 noted on thirty-one days on the outer group and eleven days on the inner group from 20 September-22 November. The only count to exceed these was five roosting on West Wideopens on 23 November.

#### **Lapwing** *Vanellus vanellus*

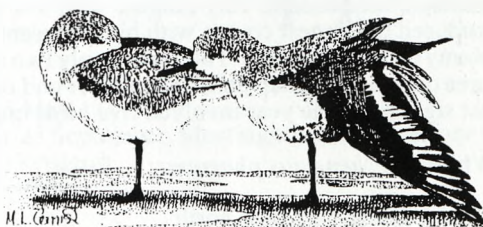
Singles flew west over Brownsman on 2 April and Staple Island on 29 July. One was on Inner Farne on 1-2 September and one on Brownsman on 12 September. Records increased from 25 September with 1-5 on eight days until 5 October, then 1-58 on thirty-three days from 23 October-6 December. Peak numbers occurred during major thrush movements with twelve on 23 October and fifty-eight on 22 November flying west in small flocks. One was 'resident' on Inner Farne from 10 November-6 December and forty arrived to roost on Knoxes Reef at dusk on 5 December.

#### **Knot** *Calidris canutus*

One was on Inner Farne on 28 March with one found dead there on 2 April, then four (summer plumaged adults) on West Wideopens on 5 April, five on Knoxes Reef on 22 May and thirty on the Blue Caps on 26 June. There were regular sightings from 11 July-3 November, the peak counts being a hundred on Longstone on 23 July and 10 September and seventy-seven on the inner group on 31 July.

#### **Sanderling** *C. alba*

A summer-plumaged bird was on West Wideopens from 18-20 May and one was on Staple Island from 17-19 August.



#### **Little Stint** *C. minuta*

Just one record, on 5 September: a bird seen on Longstone End by two of the wardens from a visitor boat.

#### **Purple Sandpiper** *C. maritima*

Noted almost daily until the end of May with peaks of 150 on Knocklin Ends on 4 April and sixty on Longstone/Northern Hares on 18 May. The first returning bird was on Brownsman on 10 July and thereafter they were present daily until the end of the season. Numbers were

generally lower than usual with a peak of 152 around the inner group (including seventy-one on Megstone) on 23 November.

**Dunlin** *C. alpina*

One to four were seen on eleven days from 22 April-28 May. Autumn passage brought regular sightings of 1-6 from 13 July-22 October, with higher counts of 10-11 on Knoxes Reef on 17, 28 and 29 September. The last sightings of the year were of two on Knoxes Reef on 6 November and three there and on the outer group on 23 November.

**Ruff** *Philomachus pugnax*

One to four were recorded on nineteen days from 23 July-22 September.

**Jack Snipe** *Lymnocyptes minimus*

Three were seen in spring: on Brownsman on 28 April and 10 May and on Inner Farne on 8 May. In autumn singles were seen on nine days from 22 September-7 November with all but one (Inner Farne on 11 October) on Brownsman.

**Snipe** *Gallinago gallinago*

Spring produced singles on fifteen days from 25 March-12 May. Higher numbers were recorded in autumn with 1-4 from 22 August-28 November on twenty-three days on the outer group and seventeen days on the inner group (thirty-seven days in total). The only count to exceed these was seven over Brownsman on 11 September.

**Woodcock** *Scolopax rusticola*

An early bird was on Inner Farne on 27 September. The main period of arrival fell between 12 October and 1 December with 1-3 noted on twenty-five days. Higher counts of seven to twelve (often associated with heavy thrush passage) were made on 27 October and 6, 7, 11 and 22 November with the peak of 10+ on Inner Farne and 1-2 on Brownsman on 6 November.

**Black-tailed Godwit** *Limosa limosa*

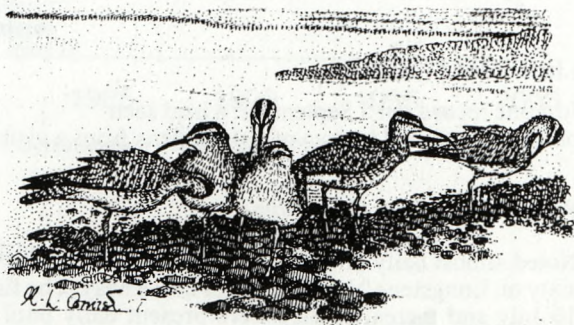
A good year with three records: three flew east over Knoxes Reef on 6 July, nine flew south through Inner Sound on 20 July and one flew west over Brownsman on 6 November.

**Bar-tailed Godwit** *L. lapponica*

Four on Knoxes Reef on 25 March and one there on 29 June were the only early records. Numbers increased in July-August with 1-4 noted on seven days. September and October produced the largest counts with birds present on Knoxes Reef on fourteen days, peaking at twenty on 20 September. There were only two records from the outer group during this period: three over Brownsman on 30 September and one through Brownsman Gut on 7 October. The last sighting of the year involved five birds on Knoxes Reef on 23 November.

**Whimbrel** *Numenius phaeopus*

A quiet spring: one flew north through the Kettle on 21 April, one was on Brownsman from 3-9 May, one flew east over Brownsman on 14 May and two were on Knoxes Reef on 28 May. As is to be expected, autumn produced the majority of records: 1-5 were seen on twenty-seven days between 21 July and 1 September with higher counts of seven over Brownsman on 15





July, twenty-nine moving west over Inner Farne on 17 August and sixteen south over Brownsman on 31 August. Late singles flew over Inner Farne on 17 September and over Brownsman on 22 September.

**Curlew** *N. arquata*

Recorded almost daily in every month with highest numbers in spring and autumn. As usual Knoxes Reef produced the largest counts with a spring peak of 250+ on 28 March and an autumn maximum of 423 on 23 November.

**Spotted Redshank** *Tringa erythropus*

An excellent year for this species. The first was one over Inner Farne on 13 August. A juvenile was regularly on Brownsman from 1-14 September with possibly the same bird flying past Inner Farne on 4, 8 and 12 September. Another juvenile was on Brownsman on 26-27 September.

**Redshank** *T. totanus*

Regularly recorded throughout the season. The highest spring count was twenty flying west over Inner Farne on 1 May. Return passage produced up to thirty around the inner group and twenty on Brownsman during August. Twenty-eight were still at the inner group on 22 October with fifteen on Brownsman on 8 October.

**Greenshank** *T. nebularia*

There was one spring record: a bird heard calling on Knoxes Reef on 16 April. One on Brownsman Pond on 30 July was the first of the autumn followed by 1-2 on ten days from 5 August-27 September with four over Inner Farne and three over Brownsman on 1 September. The last bird of the year flew west over Inner Farne on 10 October.

**Green Sandpiper** *T. ochropus*

Singles were on West Wideopens on 12 August and in Brownsman Gut on 1 September.



**Common Sandpiper** *Actitis hypoleucos*

Singles were noted on six days from 25 April-15 May, then birds were noted regularly from 16 August-28 September. Most sightings involved one to four birds but twelve were on Inner Farne on 19 August.

**Turnstone** *Arenaria interpres*

Recorded daily throughout the season with small numbers summering. The peak in spring was 200+ on the inner group on 11 April. Autumn produced maxima of 300+ on several days during September and November.

**Grey Phalarope** *Phalaropus fulicarius*

A first winter bird was on Brownsman Pond from 6-10 November. As is typical of the species it proved exceptionally confiding during its stay, allowing close approach and excellent photographic opportunities.

### **Pomarine Skua *Stercorarius pomarinus***

Adults were seen on 22 and 25 July and on 20 and 30 August, the last a dark phase bird over Inner Farne. One to two juveniles were seen on eleven days from 1 September-29 October. The only count to exceed these was five moving north off Brownsman on 7 November.

### **Arctic Skua *S. parasiticus***

Two flying south through Inner Sound on 2 April were the first of the year. On 21 April an exhausted first summer bird was watched dropping in to feed on a dead great black-backed gull on Inner Farne, and a dark phase adult flew north through Staple Sound. The last bird of the spring was observed from a visitor boat in Inner Sound on 15 May. The first bird of the autumn was one north through Staple Sound on 29 June. Birds were noted regularly from 4 July-7 November, mostly involving 1-5, but eighteen were seen on 25 July, thirteen on 2 September and twenty on 20 September. One chasing two skylarks off Inner Farne on 6 November was worthy of note.

### **Long-tailed Skua *S. longicaudus***

There were four records, all from Inner Farne: a juvenile flew north through Inner Sound on 12 September, another flew north through the Kettle on 20 September, an adult flew south over Knoxes Reef and the Wideopens on 22 September and finally a juvenile flew north through Staple Sound on 11 October.

### **Great Skua *S. skua***

Two spring records: one flew north off Brownsman on 27 April and one was off Inner Farne on 5 May. Returning passage birds began to arrive from 20 June and were noted regularly until 8 November. Numbers were generally low with the only double figure counts being ten-twelve north past the inner group on 22 and 25 July and eleven past the outer group on 11 October. Three late birds flew through Staple Sound on 22 November.

### **Mediterranean Gull *Larus melanocephalus***

An adult in winter plumage flew north through Staple Sound on 12 September, an adult was on Brownsman flats for five minutes on 24 September, and a first winter was in the Kettle briefly before flying off north on 2 October.

### **Little Gull *L. minutus***

Following last year's major influx, numbers returned to more normal levels. Four flew north through Staple Sound on 24 July with nine there the next day, when five were also seen off Inner Farne. 1-2 were noted on seven days between 22 September and 22 November with six north off the south end off Inner Farne on 3 November. First winter birds with all-dark wings were observed off Inner Farne on 11 and 30 October.

### **Black-headed Gull *L. ridibundus***

Display was noted from 26 March onwards with the first eggs found on Inner Farne on 6 May and on Brownsman on 12 May. 84 (80) pairs nested as follows: Inner Farne 70 (27), Brownsman 14 (65). The first young were seen on 6 June and the first fledgling on 5 July. All had fledged by the end of July. Numbers were generally low after the breeding season until an increase in autumn, with a peak of 1500+ north past Brownsman on 6 October.

### **Common Gull *L. canus***

Present daily from 25 March-23 April with peaks of fifty on Longstone on 30 March and 100 on Knoxes Reef on 14 April. Small numbers were around the islands until the end of May. Birds began to return at the start of September and 1-10 were recorded almost daily until the end of the season.



**Lesser Black-backed Gull** *L. fuscus* and **Herring Gull** *L. argentatus*

1,233 (1,305) pairs nested as follows: Inner Farne 12 (9), Knoxes Reef 35 (17), West Wideopens 208 (188), East Wideopens 131 (105), Skeney Scar 36 (50), Staple Island 60 (81), Brownsman 44 (44), North Wamses 303 (309), South Wamses 169 (218), Roddam and Green 21 (10), Big and Little Harcar 143 (222), Northern Hares 14 (29), Longstone main rock 8 (11), Longstone End 49 (12). The first eggs were located on 29 April. A rough estimate suggests that lesser black-back gulls are twice as common as herring gulls on the islands. Large post-breeding roosts built up on the Wideopens with, for example, 2000+ counted on 29 October. Small numbers of lesser black-backs were still present at the end of November.

**\*Yellow-legged Gull** *L. cachinnans*

An adult was present on East Wideopens from 20 May-4 August. It was obviously paired with a herring gull and holding territory. A nest containing three eggs was found on 28 May, the first egg hatched on 16 June and at least one chick went on to fledge. An additional adult was seen on 30 July. These are the first definite records of this recently split species for the islands.

**Glaucous Gull** *L. hyperboreus*

All records came from the inner group. A first summer bird roosted on the Wideopens on 8-9 April, one flew east over Inner Farne lighthouse on 17 April and a first summer bird was on the sea east of the Bridges on 4 May. Two records in the autumn involved an adult roosting on the Wideopens on 20 September and 11 October.

**Great Black-backed Gull** *L. marinus*

Small numbers were present in spring with a peak of forty on the outer group on 30 March. 2 (3) pairs nested as follows: West Wideopens 1 (2), East Wideopens 1 (0), South Wamses 0 (1). The first eggs were located on 6 May on West Wideopens. Numbers increased in autumn with seventy-nine on Knoxes Reef on 30 August and 120 on the outer group on 15 October being the peak counts.

**Kittiwake** *Rissa tridactyla*

Birds were present on their nesting ledges when the wardens arrived and nest building was under way by early April. The first eggs were found on Brownsman on 6 May and on Inner Farne on 8 May with the first young on Brownsman and West Wideopens on 31 May. 5,125

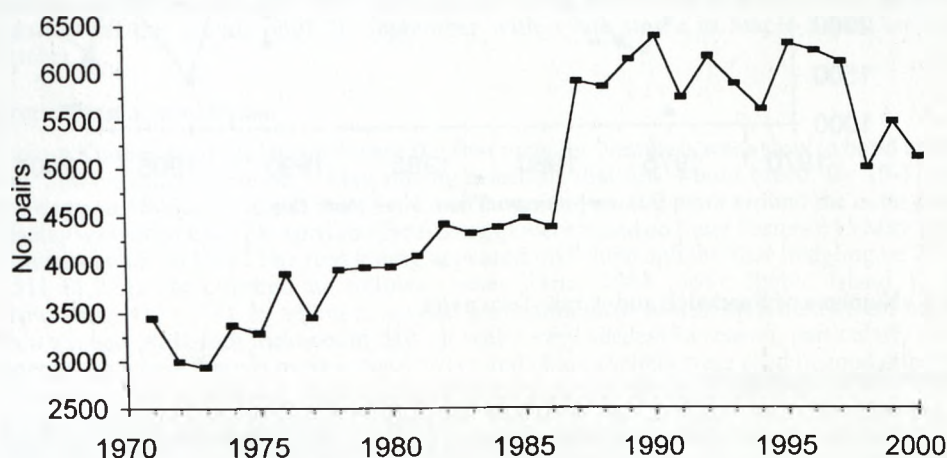
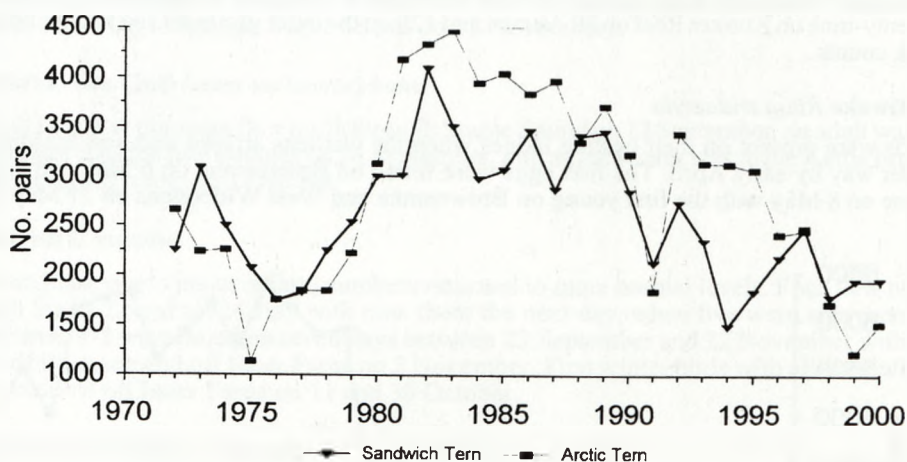


Fig. 5 Numbers of Kittiwake pairs.

(5,492) pairs nested as follows: Megstone 23 (14), Inner Farne 1,600 (1,381), West Wideopens 315 (222), East Wideopens 368 (314), Skeney Scar 158 (258), Staple Island 1,236 (1,645), Brownsman 1,133 (1,392), North Wamses 85 (67), South Wamses 72 (62), Roddam and Green 22 (23), Big Harcar 113 (114). The first fledged young was found on 1 July with the last on 24 August. Small numbers were washed off the cliffs throughout the season but in general it was a productive year. On the outer group 393 monitored nests produced 477 fledglings, an average of 1.2 per nest, while on the inner group 250 nests produced 219 fledglings, an average per nest of 0.83. The overall population continues to fall towards its 1986 numbers (see Fig. 5). Small numbers were noted daily in autumn with one large count of 4,000+ north off Brownsman on 7 November.

#### **Sandwich Tern *Sterna sandvicensis***

The first bird of the year flew over Brownsman before roosting on Knoxes Reef on 31 March. Numbers then rapidly increased to a peak of 2,750 by 3 May (2,000 on Inner Farne and 750 on Longstone End). 1,950 (1,946) pairs nested as follows: Inner Farne 1,923 (1090), Brownsman 27 (856). The first eggs were found on 10 May on Inner Farne and 23 May on Brownsman and the first young on Inner Farne on 6 June and on Brownsman on 20 June. The first fledgling was on Inner Farne on 3 July with late stragglers until mid-August. In stark contrast to last year it was an excellent breeding season. Sand-eels appeared to be abundant and 'massive' numbers of chicks fledged. As well as being an excellent year for chicks the total number of breeding pairs improved on last year's total and is hopefully the beginning of a revival in numbers (see Fig. 6). The breeding colonies were deserted by mid-August and thereafter only small numbers were noted at sea, with the last off Inner Farne on 10 October.



**Fig. 6** Numbers of Sandwich and Arctic Tern pairs.

#### **Roseate Tern *S. dougallii***

The first record was one calling over Inner Farne on 6 May. 1 (4) pairs nested as follows: Inner Farne 1 (4). Two eggs were laid, both hatched and one young fledged. Two additional pairs were noted regularly around the island throughout the breeding season but failed to settle. In addition two (presumably one of these pairs) were displaying in the Sandwich tern colony on Brownsman on 10-11 June. Fig. 7 shows that the species has remained at this low level since



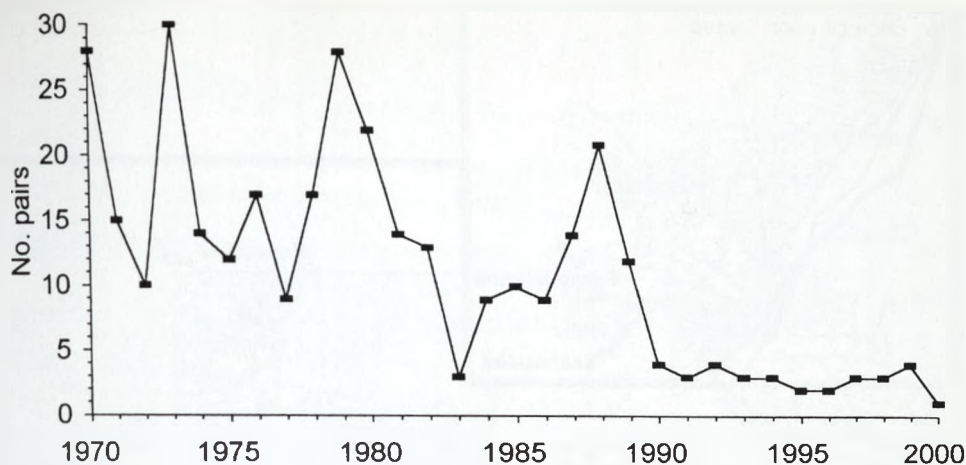


Fig. 7 Numbers of Roseate Tern pairs.

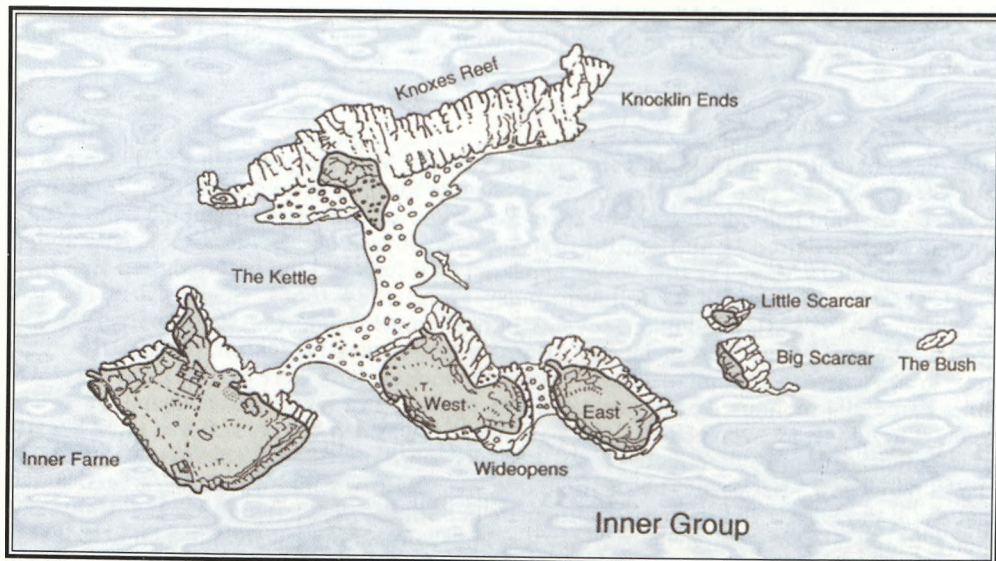
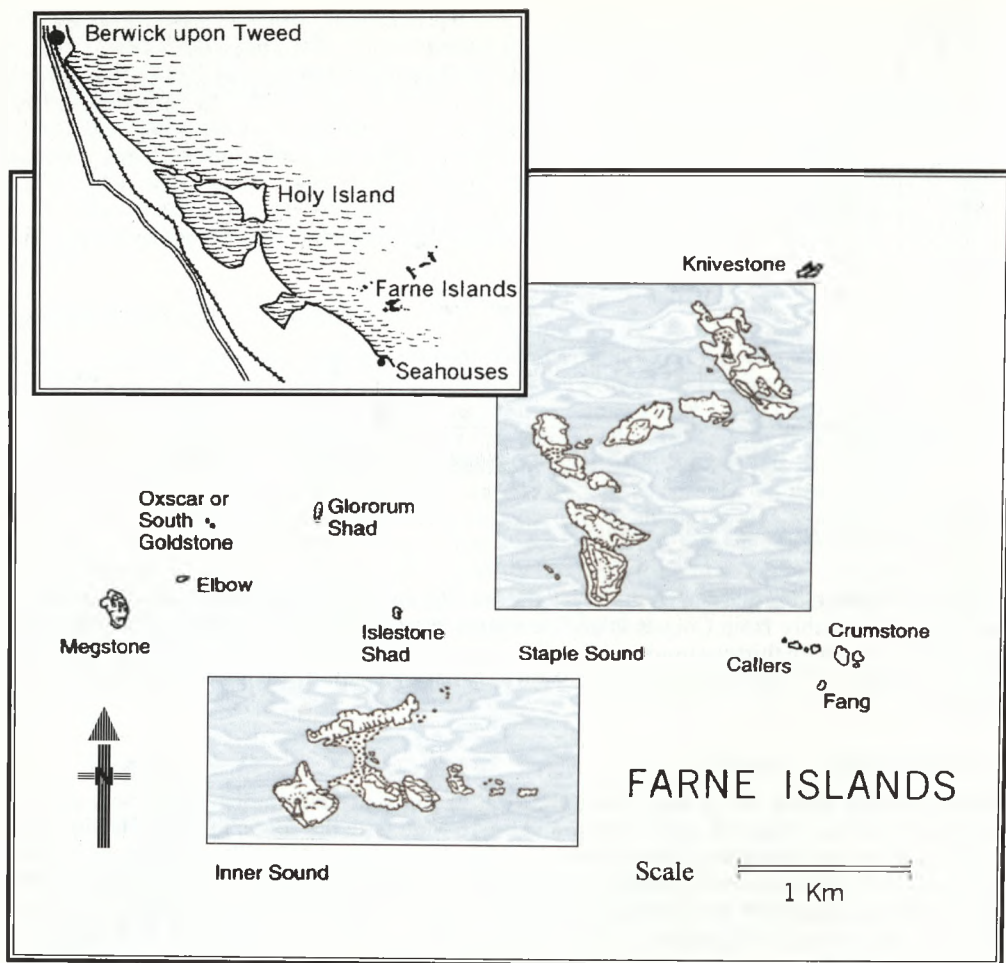
1990 with marked fluctuations in numbers before this date. An adult was seen with a ringed juvenile (presumably from Coquet Island) on Inner Farne on 26 June. Some unusually large counts followed with thirteen (eight adults, five juveniles) on 5 July, seventeen (thirteen adults, four juveniles) on 7 July and thirteen on 9 July. A very late adult was on Knoxes Reef on 15 October.

#### Common Tern *S. hirundo*

Three on Inner Farne on 21 April were the first of the year and numbers had built up to a hundred by 3 May. The first eggs were found on 16 May with the first chicks on 16 June. 150 (128) pairs nested as follows: Inner Farne 147 (125), Brownsman 3 (3). The first young fledged on 5 July with the last in early August. Despite some early losses due to heavy rain it was a productive season. Seventy-five eggs were laid in thirty monitored nests on Inner Farne and thirty chicks survived to fledging. The plentiful supply of sand-eels meant no problems with the food supply this year. In contrast the three pairs on Brownsman all failed (probably due to the lateness of breeding – the first chick did not hatch there until 31 July). Birds were seen regularly off the islands until 28 September with a late single in Staple Sound on 16-17 October.

#### Arctic Tern *S. paradisaea*

Four on Knoxes Reef on 16 April were the first arrivals. Numbers were slow to build up with only 200 on Inner Farne on 3 May raising concerns that few would breed. By 10-11 May however, *ca* 1000 individuals were on Inner Farne and *ca* 400 pairs around the outer group. Display was noted from 28 April and the first eggs were found on Inner Farne on 15 May and on Brownsman on 16 May. The first young appeared on 9 June and the first fledgling on 2 July. 1,511 (1,223) pairs nested as follows: Inner Farne 1084 (665), Staple Island 12 (0), Brownsman 415 (558). In addition, several pairs attempted to nest on Knoxes Reef but had been washed off before 'nest count day'. It was a very successful season, particularly on the inner group where there is more natural cover and chick shelters were used to good effect. On Inner Farne 204 monitored nests produced 428 eggs, 282 of which hatched and 238 chicks went on to fledge, an average of 1.2 per pair. The Brownsman colony suffered more heavily from gull predation: 230 monitored nests produced 439 eggs, 225 of which hatched and 121 chicks fledged (0.5 per pair). The last fledgling was on Brownsman on 12 July. Fig. 6 shows that arctic and Sandwich tern numbers fluctuate in a similar manner: both are in decline since the very high numbers seen in the early 1980s. First summer birds were noted on Inner Farne from 26 May into July with a peak of thirty-four on 30 June. Following the breeding season







numbers quickly declined, with only 1-10 daily during September and the last two juveniles off Inner Farne on 3 October.

#### **Little Tern *S. albifrons***

Two flying east over Brownsman on 30 April were the first of the year, followed by four in the Kettle on 1 May. The now traditional roost in St Cuthbert's Cove, Inner Farne, built up from three on 2 May to a peak of eighty-two on 12 May (the highest count since 1996) before declining to fifteen by 24 May. Unusually 4-5 roosted on 29 June with one on 1 July, perhaps failed breeders from the mainland colonies. The only other record was of two juveniles flying north through Staple Sound on 24 July.

#### **Black Tern *Chlidonias niger***

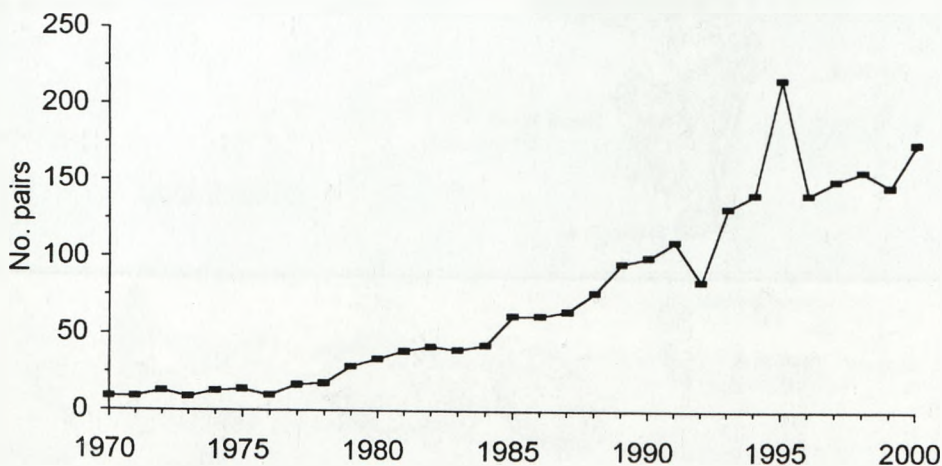
There were four records: singles south through Staple Sound on 20 and 21 September, then singles north through Inner and Staple Sounds on 22 September.

#### **Guillemot *Uria aalge***

Birds were present on breeding ledges when the wardens arrived on 25 March but did not really settle until mid-April. The first egg was recorded on 15 April on East Wideopens. 33,038 (31,386) individuals were present on the breeding cliffs as follows: Megstone 200 (170), Inner Farne 3,980 (2,775), West Wideopens 1,904 (1,459), East Wideopens 2,414 (2,047), Skeney Scar 1,369 (1,222), Staple Island 15,718 (17,040), Brownsman 5,743 (4,980), North Wamses 1,063 (1,321), South Wamses 420 (193), Roddam and Green 110 (100), Big Harcar 117 (79). The first young was observed on 2 June with the first 'jumping' on 16 June and the last chick was noted on Inner Farne on 10 August. Small numbers were recorded regularly until the end of the season with a heavy passage of *ca* 7000 north through Staple Sound on 7 November.

#### **Razorbill *Alca torda***

Birds were present on the sea and on breeding ledges when the wardens arrived. The first egg was found on East Wideopens on 10 May with the first young on Staple Island on 10 June. 174 (146) nested as follows: Megstone 2 (0), Inner Farne 58 (55), West Wideopens 28 (14), East



**Fig. 8** Numbers of Razorbill pairs.



Wideopens 16 (17), Skeney Scar 10 (5), Staple Island 29 (30), Brownsman 6 (6), North Wamses 5 (5), South Wamses 10 (7), Big Harcar 8 (6), Longstone End 2 (1). The first young left the cliffs on 1 July and the last on 3 August. Some eggs and young were lost in easterly storms but breeding success was fair with thirteen young fledging from twenty-four monitored nests. The population has continued to increase steadily from the 1970s (see Fig. 8) which is encouraging. The high peak in 1995 was mirrored by a similar increase in numbers at the nearest major colony at St Abbs. At present the reason for this sudden influx is unknown. Birds were scarce for the rest of the season with no double-figure counts.

#### **Black Guillemot *Cepphus grylle***

The first sighting was of an adult in Inner Sound on 30 September. One to three were recorded on fifteen days between 6 October and 23 November from both the inner and outer groups with *ca* ten in or through Staple Sound on 7 November.

#### **Little Auk *Alle alle***

A small influx began on 27 October when three flew south through Staple Sound. Larger numbers were recorded on 29 October when sixty-seven flew south and forty-four north. Thereafter, 1-14 were noted on twenty days from 30 October-6 December. The only other count to exceed these was when fifty moved past the south end of Brownsman and through Staple Sound on 7 November.

#### **Puffin *Fratercula arctica***

Only one was seen on the sea off Inner Farne on 25 March when the wardens arrived. Numbers built up steadily the next day, however, and by the evening there were thousands wheeling over both Brownsman and Inner Farne. Birds were soon displaying and prospecting and the first eggs were found on Brownsman on 24 April and on Inner Farne on 27 April. The first evidence of young was on Inner Farne on 19 May with the first fledged bird on 30 June. Single adults were still returning to burrows on Inner Farne and Brownsman on 19 August and a dead chick was found in Brownsman Pond on 30 August. Although a few early nests were lost to flooding it was a good year for the species. Fifty monitored burrows on the outer group produced thirty-three fledglings, and forty-four young fledged from fifty burrows on Inner Farne. Due to the fragility of the soil cap no nest count was undertaken – the last population estimate, in 1993, was 34,710 pairs. Birds were generally scarce from mid-August onwards although they were recorded in small numbers until 30 November. There was one big count on 29 October when 600+ flew through Staple Sound. A partially albino bird was on Inner Farne on 26 April.

#### **Feral pigeon *Columba livia***

Present throughout the season with probably at least a hundred nesting pairs and regular counts of over 200.

#### **Woodpigeon *C. palumbus***

One to two were seen on five days in April, then one on 4 June, one on 25 September and one on 6 November. With the exception of two birds on West Wideopens, all were on Brownsman.

#### **Collared Dove *Streptopelia decaocto***

One was on Inner Farne on 11 April and one flew over Brownsman on 22 May.

#### **Turtle Dove *S. turtur***

An adult was discovered on the 'dock bank' on Inner Farne on 31 August and eventually gave great views on the north-east rocks. Amazingly this was the only record of the species in Northumberland this year, reflecting its continuing decline as a British breeding species.

**Cuckoo** *Cuculus canorus*

One, mobbed by a pied wagtail, flew east over Staple Island on 15 May and one flew over Inner Farne on 20 June.

**Long-eared Owl** *Asio otus*

Singles were on Brownsman on 20 September, Staple Island then South Wamses on 23 October, and again on Brownsman on 31 October.

**Short-eared Owl** *A. flammeus*

Singles were seen on nine days from 23 September-26 November with three on Brownsman and two flying west past Inner Farne on 22 November.

**Swift** *Apus apus*

Three to six were around Inner Farne lighthouse almost daily from 5-18 June and four flew west over Staple Island on 3 July. Then there was a break in records until one flew south past Inner Farne on 6 September. One was seen on 20, five on 22, one on 23 and three on 27 September, all on, or from, Inner Farne.

**Woodlark** *Lullula arborea*

One was flushed (twice) on Inner Farne on 10 October before disappearing off towards the mainland. For the two observers views were all too brief – a shame it did not stay as long as the last one! Second record for the islands and last recorded in 1980, this bird being 'resident' for three days.

**Skylark** *Alauda arvensis*

One to two were recorded on fourteen days from 27 March-28 April with four on 1 April, then one on 4 June. Larger numbers were seen in the autumn with 1-10 recorded regularly from 20 September until the end of the season. There were higher counts of twenty on 12 October, thirteen on 13 October, thirty-seven on 16 October and nineteen on 22 November, all flying west.

**Shore Lark** *Eremophila alpestris*

One flew west with two skylarks over the Pele tower on Inner Farne on 22 October. It was seen again later, in flight, over Knoxes Reef and the Wideopens.

**Sand Martin** *Riparia riparia*

One to six were seen on eight days from 19-30 April, then one on 7 May, one on 24 May and two on 21 July.

**\*Crag Martin** *Ptyonoprogne rupestris*

One was watched hawking around Inner Farne lighthouse for approximately ten seconds on 25 April. It then promptly disappeared leaving the sole observer (and later the rest of the wardens) dismayed to say the least. First record for the islands and for Northumberland, and only the eighth for Britain.

**Swallow** *Hirundo rustica*

Birds were recorded regularly from 18 April-27 September with a peak of seventy-five (forty-five north, thirty south) past Inner Farne on 9 September. A late single was on Inner Farne on 16 October.



**House Martin** *Delichon urbica*

Recorded on nine days from 30 April-24 September. The highest count was four over Brownsman on 1 September.

**Richard's Pipit** *Anthus novaeseelandiae*

One was on Staple Island for four minutes on 10 October before flying off west. Another found on North Wamses on 15 November during seal work promptly flew off to Big Harcar and could not be relocated. Sixth and seventh records for the islands and last recorded in 1998.

**Tree Pipit** *A. trivialis*

One to six were recorded daily from 26-29 April, then singles on 6-7 and 21 May. Autumn produced the largest counts with a total of twenty-five on Brownsman and Inner Farne on 26 August, then 1-20 were seen regularly from 27 August-12 October.

**Meadow Pipit** *A. pratensis*

Spring birds were present regularly from 25 March-10 April, with a maximum of thirty-five flying east over Brownsman on 31 March. Autumn brought regular sightings of 1-35 from 19 August-19 November with fifty on Inner Farne on 9 September and 100+ over Brownsman and on Inner Farne on 24 September. A leucistic bird was on Inner Farne on 11 September.

**Rock Pipit** *A. spinoletta*

Present throughout the season. 24 (22) pairs nested as follows: Inner Farne 5 (5), West Wideopens 1 (1), Staple Island 6 (4), Brownsman 9 (8), North Wamses 1 (1), South Wamses 1 (2), Longstone main rock 1 (1). The first eggs were found on 28 April on Inner Farne, the first young on 12 May and the first fledgling on 31 May. It was an excellent breeding season with nine monitored nests producing twenty-seven fledged young, an average of three per nest. Second broods were also suspected.

**Yellow Wagtail** *Motacilla flava*

One to four were seen on eight days from 17 April-14 May, then singles on five days from 11-24 September with two on 12 September. Single blue-headed wagtails *M. f. flava* were on Brownsman on 27 April and on Inner Farne on 30 April.

**Citrine Wagtail** *M. citreola*

A first winter bird found on Inner Farne (by a visiting ex-warden) on 26 September initially proved flighty, quickly disappearing to the Wideopens hotly pursued by three men in a rubber boat. After a chase around both islands the bird flew back to Inner Farne where it gave superb views for half an hour on the north rocks. As the log records 'one of the undoubted highlights of the year'. Second record for the islands (fifth for Northumberland) and last recorded in 1989.

**Grey Wagtail** *M. cinerea*

One was seen in spring, on Brownsman on 19 April. A good run of autumn records began with one flying north over Inner Farne on 4 September, then two flew north over Brownsman and three were on Inner Farne on 15 September. Singles were seen on Inner Farne on five more days during September (and once on Staple Island), with the last on Inner Farne on 1 October.

**Pied Wagtail** *M. alba*

Birds were seen almost daily until the end of October. 9 (8) pairs nested as follows: Inner Farne 3 (2), West Wideopens 1 (1), Staple Island 2 (1), Brownsman 2 (3), Longstone main rock 1 (1). The first eggs were found on 28 April and the first young on 23 May with the first fledgling on 17 June. Mixed pairs of pied and white wagtails *M. a. alba* were recorded on both Brownsman and Inner Farne with the former seen copulating and carrying nesting material and the latter

successfully rearing three young. Other records of white wagtails involved 1-2 on nine days from 12 April-21 May.

**Wren** *Troglodytes troglodytes*

One to six were present daily from 25 March-30 April, then one was on Brownsman on 11-12 May. Autumn arrival began on 10 September and birds were present daily until the end of the season. The peak count was 15-20 on Inner Farne on 22 November.

**Dunnock** *Prunella modularis*

One to fourteen were noted daily from 12-30 April. Autumn brought regular sightings of 1-23 from 14 September until the end of the season, with a peak of forty-three on Brownsman and Inner Farne on 26 September.

**Robin** *Erithacus rubecula*

Spring birds were recorded daily from 25 March-7 May with a peak of sixty plus on Inner Farne on 12 April. A single was on Inner Farne on 1 June. Autumn arrival began with one on Brownsman on 3 August, records becoming more regular from 21 August and daily from 6 September. The peak count was a total of 140 on Inner Farne and Brownsman on 22 November.

**Nightingale** *Luscinia megarhynchos*

One was on Brownsman from 26-28 April.

**Bluethroat** *L. svecica*

After a blank year in 1999 there was a welcome return to form for this attractive migrant. Three (two males and a female) were on Brownsman/Staple Island on 5 May with two remaining until 7 May. Further single males were on Brownsman on 10 and 12-13 May. A late spring influx on 4 June brought two males to Inner Farne and a single male to Brownsman, with one still present on Inner Farne the following day. More unusual was a first winter male on Inner Farne on 23 October and 27 October-4 November. All the spring birds were of the red-spotted form *L. s. svecica*. The autumn bird was identified as being of the white-spotted race *L. s. cyanecula*, the first record of this sub-species for the islands.

**Black Redstart** *Phoenicurus ochruros*

One to five were recorded on thirteen days from 10 April-7 May. Three arrived on 20 September, two were present on 16 October, one on 6 November and two on 22 November, with one remaining until 28 November.

**Redstart** *P. phoenicurus*

One to three were present regularly from 17 April-1 May, then one on 7-8 May and one on 19 August. The main autumn passage began on 1 September and birds were observed regularly until 2 October with a maximum of twenty-five on Brownsman and Inner Farne on 26 September.

**Whinchat** *Saxicola rubetra*

Scarce in spring with 2-4 daily from 25-29 April. Autumn arrival commenced on 19 August and birds were recorded almost daily until 6 October with a peak of seventeen (fifteen of which were on Brownsman) on 1 September.

**Stonechat** *S. torquata*

Single males were on Brownsman on 30-31 March and 13-14 October and on Inner Farne on 26 April and 1 October.



#### **Wheatear *Oenanthe oenanthe***

Spring passage produced 1-28 almost daily from 25 March-22 May. Singles were seen on 4 and 6 August followed by regular sightings from 15 August-11 October with a peak of thirty-five on Inner Farne and Brownsman on 26 September. A very late first winter male was on Inner Farne on 8 November. Three birds of the Greenland race *O. o. leucorrhoa* were on Inner Farne on 12 September with one still present the next day.

#### **Ring Ouzel *Turdus torquatus***

Single males were an Inner Farne on 12-13, 17 and 26 April with 2-3 on Brownsman on 25-26 April and one on 14 May. There were just two autumn records: four on Brownsman/Staple Island on 10 October and one west over Inner Farne on 23 October.

#### **Blackbird *T. merula***

One to eight were recorded daily from 25 March-1 May with one on 7 May. A juvenile on Inner Farne on 30 July was unusual. More typical autumn arrival began on 20 September with 1-2 daily until 26 September. Birds were recorded more regularly from 7 October, with 1-45 on most days until the end of the season. There were three 'big days': 300+ on 23 October, 710 on 27 October and 2,300+ on 22 November, all flying west. Hundreds stopped to rest on the islands on the last date and some were taken by gulls over the Wideopens.

#### **Fieldfare *T. pilaris***

One to four on 25-26 March, seven on 3 April and one on 3-5 April were the first records, becoming more regular from 15 April with 1-36 noted daily until 3 May. One on 19 and three on 24 September were the first of the autumn. Four more singles were noted until the first major arrival on 27 October when 651 flew west over Inner Farne and 350+ over Brownsman. 1-20 were noted regularly for the rest of the season with *ca* a hundred west on 11 November and 222 west on 22 November.

#### **Song Thrush *T. philomelos***

Spring birds were seen regularly between 25 March-9 May with a maximum of ten on 13 April. The first autumn arrival was one on Brownsman on 1 September. Further singles followed on 11 and 16 September, then sightings became regular from 19 September until the last on 2 December. Daily counts of 1-55 were typical but 100+ flew west on 23 October, 155 west on 27 October and 100+ west on 22 November.

#### **Redwing *T. iliacus***

Birds were seen almost daily from 25-31 March and 10 April-1 May with a peak of sixteen on the last date. 1-5 on four days from 26 September-3 October were followed by the main arrival from 10 October. Thereafter birds were recorded almost daily until the end of the season. Most counts involved less than a hundred but there were three 'big days': 7,500 on 23 October, an impressive 11,000+ on 27 October and 1,060 on 22 November flying west over the islands.

#### **Mistle Thrush *T. viscivorus***

Just one record: a single bird flying west over Brownsman on 22 November during heavy passage of other thrushes.

#### **[Pallas's Grasshopper Warbler *Locustella certhiola***

A very skulking bird was present on Brownsman on 19 August. It gave only the briefest of views – both in flight and on the ground – and the record has not been accepted by the Northumberland Rarities Committee.]

**Grasshopper Warbler** *L. naevia*

In spring 1-2 were on Inner Farne on 17-18 April and on Brownsman on 25-27 April with a single on Brownsman on 3 May. An influx on 19 August brought one to Inner Farne and five to Brownsman (one of which was found in the cottage) with two still on Brownsman the following day. Further singles were on Inner Farne on 27 August and 11 and 20 September and on Brownsman on 1-2 and 5 September. A late bird on South Wamses on 13 October initially masqueraded as a 'Lancey' before showing its true colours.

**Sedge Warbler** *Acrocephalus schoenobaenus*

One to two were present on eight days from 26 April-16 May, one on 1-2 June, 1-3 on six days from 3-29 August and 1-4 from 11-13 September.

**Reed Warbler** *A. scirpaceus*

There was one spring record: a bird on Staple Island on 18 May. Autumn records were spread evenly between the inner and outer groups. 1-5 were present on fourteen days from 25 August-28 September, the peak count being on 20 September when at least three were on Inner Farne and two on Brownsman.

**Marsh Warbler** *A. palustris*

One was on Brownsman on 4-5 June. Sixth record for the islands and last recorded in 1998.

**\*Melodious Warbler** *Hippolais polyglotta*

One was seen by a single (lucky) observer in 'awful' conditions on Brownsman on 11 September. First record for the islands (and for Northumberland) following several probables/possibles in the past.

**Subalpine Warbler** *Sylvia cantillans*

A first summer male showed well on Brownsman on 10 May. Calm seas allowed the inner group wardens to join the celebrations! Third record for the islands and last recorded in 1991.

**Barred Warbler** *S. nisoria*

Single first winters were on Inner Farne on 13 August and on Brownsman on 19 August (possibly two birds) and 1 September.

**Lesser Whitethroat** *S. curruca*

One to fourteen were present daily between 25-30 April with 1-4 from 5-7 May, one on Staple Island on 9 May, and singles on Brownsman on 13-14 May and 5-6 June. The first bird of the autumn was one on Inner Farne on 3 September. 1-5 were recorded on twelve days from 12 September-1 October.

**Whitethroat** *S. communis*

On the outer group 1-5 were noted daily from 18 April-10 May, while 1-3 were on the inner group from 25-30 April. Autumn sightings involved 1-3 on eight days from 14 August-12 September, then daily sightings of 2-10 from 19-28 September. The last was one on Brownsman on 30 September.

**Garden Warbler** *S. borin*

Spring passage brought 1-4 to the islands almost daily from 23 April-1 May, then singles on six days from 7-19 May. Autumn arrival began on 3 August with two on Brownsman/Inner Farne. One was seen on 15 and three on 19 August before regular sightings of 1-8 from 22 August-2 October. A very late bird was found in Brownsman cottage on 21 November.



**Blackcap** *S. atricapilla*

One to seven were present almost daily from 17-30 April with a single on 6-7 May, the last of the spring. Autumn brought regular sightings from 11 September-24 October with a peak of 18-19 from 25-27 September. Arrival continued into November with records on five days and a maximum of over ten on 22 November.

**Arctic Warbler** *Phylloscopus borealis*

One found in fading light on Brownsman on 2 September was initially identified as a greenish warbler *P. trochiloides*. Fortunately it was still present the next day, allowing correct identification and excellent photographic opportunities. As the log records 'a superb bird for the 2000 list'. Fifth record for the islands and last recorded in 1994.

**Yellow-browed Warbler** *P. inornatus*

One was found on the 'dock bank' on Inner Farne on 25 September, before flying off rapidly over the lighthouse.

**Wood Warbler** *P. sibilatrix*

Singles were on Brownsman on 26 April and 3 August, and on Inner Farne on 19 August.

**Chiffchaff** *P. collybita*

One was on Brownsman on 25 March, then birds were noted daily from 2-30 April, 5-18 May and 1-5 June with a maximum of fourteen on 19 April. Autumn arrival began on 1 September with two on Inner Farne, followed by singles on Brownsman on 4 and 7 September, then regular sightings of 1-15 from 10 September-4 October. 1-4 were present on nineteen days from 10 October-22 November with one lingering on Brownsman until 3 December.

**Willow Warbler** *P. trochilus*

Birds were noted regularly from 2 April-28 May and from 30 July-21 October. Peak counts were thirty-five plus on 26 April and forty plus on 25 September. Grey birds, probably of the northern race *P. t. acredula*, were on Inner Farne on 11 September (two), 12 September and 18-21 October.

**Goldcrest** *Regulus regulus*

One to nine were seen regularly from 25 March-1 May, then 1-30 regularly from 18 August-28 October (peaking in late September), 3-10 from 7-13 November and 1-3 from 22-25 November.

**Spotted Flycatcher** *Muscicapa striata*

One to two were seen on four days from 10-21 May, then one on 5 June. Larger numbers were recorded in autumn with singles on 19 and 29 August followed by 1-4 on twelve days from 6-28 September.

**Red-breasted Flycatcher** *Ficedula parva*

Single females/first winter birds were on Brownsman on 11 and 24 September.

**Pied Flycatcher** *F. hypoleuca*

There were three spring records, all from the outer group: singles on 26, 27 and 29 April. Return passage began on 19 August when three were on Brownsman/Inner Farne. Thereafter 1-9 were recorded on seventeen days from 26 August-27 September with the peak count on 1 September.

**Long-tailed Tit** *Aegithalos caudatus*

Eight flew west over Brownsman on 18 October and two were present on the island later in the day. First records since 1997.

**Red-backed Shrike** *Lanius collurio*

A 'stunning' male was on Inner Farne on 4-5 June.

**Jackdaw** *Corvus monedula*

Birds were recorded on six days from 1-20 April with the maximum an impressive count of thirty-four flying east over Inner Farne on 6 April (thirty-one of which flew back towards the mainland ten minutes later!). Two flew east over Brownsman on 28 May, four flew north there on 13 October and one was on the island the next day.

**Rook** *C. frugilegus*

One to two flew over Inner Farne on 7 and 8 April, two were at the lighthouse on 1 May and two flew over Brownsman on 14 May. In autumn 1-3 flew over Inner Farne on seven days from 17 September-19 October and one was on Brownsman and the Harecarrs on 29 September.

**Carrion Crow** *C. corone*

Recorded regularly throughout the season with a peak of thirteen on Knoxes Reef on 19 September. Breeding was suspected but not confirmed on the inner group. Single hooded crows *C. c. cornix* flew over Inner Farne on 10 April and 7 November.

**Starling** *Sturnus vulgaris*

Recorded daily throughout the season. The peak count was 312 west over Inner Farne on 23 November, involving continental birds arriving to winter in Britain. 1 (3) pairs nested at the lighthouse on Inner Farne – the traditional nest site in St Cuthbert's Chapel was filled in during re-pointing work last year.

**Tree Sparrow** *Passer montanus*

Three found on Brownsman on 30 April remained around the outer group until 6 May.



**Chaffinch** *Fringilla coelebs*

One to two were seen on ten days from 2-29 April. Autumn produced sightings on twenty-nine days from 12 September-11 November with the largest numbers between 24-30 September. Flocks of a hundred on Brownsman on 25 and Inner Farne on 26 September provided the maximum counts, with a combined total of ca 160 on 25 September.

**Brambling** *F. montifringilla*

Spring passage brought 1-15 to the islands from 2 April-1 May. Autumn arrival began on 20 September with birds recorded daily until 2 October and then on thirteen days from 10 October-22 November. Numbers involved were generally between 1-20 but sixty-five (twenty-five on Brownsman and forty on Inner Farne) were seen on 21 September.

**Greenfinch** *Carduelis chloris*

There were two spring records: one flying west over Brownsman on 31 March and two on Inner Farne on 2 April. Inner Farne had the monopoly in autumn with three on 22 October, two on 27



October and then birds present almost daily from 22 November-4 December. The peak count was six on 26 November.

**Goldfinch** *C. carduelis*

Recorded on eleven days from 18 April-12 May, then seven days from 4 October-30 November. Spring and autumn maxima were 4-6 on Brownsman/Inner Farne on 26-27 April and seven west over Inner Farne on 4 October.

**Siskin** *C. spinus*

A female was 'resident' on Inner Farne from 17-21 April, two flew north there the next day and 1-5 were on Brownsman from 25-26 April. One on Inner Farne on 16 September preceded the main autumn arrival with birds present daily from 20 September-4 October. Numbers increased steadily during this period to a peak of 130 plus on 26 September (a hundred of which were on Inner Farne) before declining to thirty-five by 30 September and two by 4 October. Sporadic records followed with one on Inner Farne on 8-9 October, two over Brownsman on 19 October and the last on Inner Farne on 17 November.

**Linnet** *C. cannabina*

Recorded almost daily from 25 March-1 May and 25 September until the end of the season with sporadic sightings during the intervening period. Spring and autumn maxima were twenty-five on Inner Farne on 31 March and fifty on Inner Farne/West Wideopens on 11 November.

**Twite** *C. flavirostris*

One flew west over Inner Farne on 21 April and two were on Brownsman on 26 April. The first bird of the autumn was one flying west over Brownsman on 15 October, followed by ten on Inner Farne on 16, nine west over Brownsman on 22 and seventeen on Inner Farne on 27 October.

**Redpoll** *C. flammea*

The only spring record was one on Brownsman on 26-29 April. Autumn brought singles to Inner Farne on five days and Brownsman on two days from 12 September-2 October, with the last south over Inner Farne on 12 November.

**Common Rosefinch** *Carpodacus erythrinus*

It was an exceptional year for the species with a minimum of eight birds in the autumn (four in a year was the previous best - see Fig. 7). The first arrived on Inner Farne during ideal fall

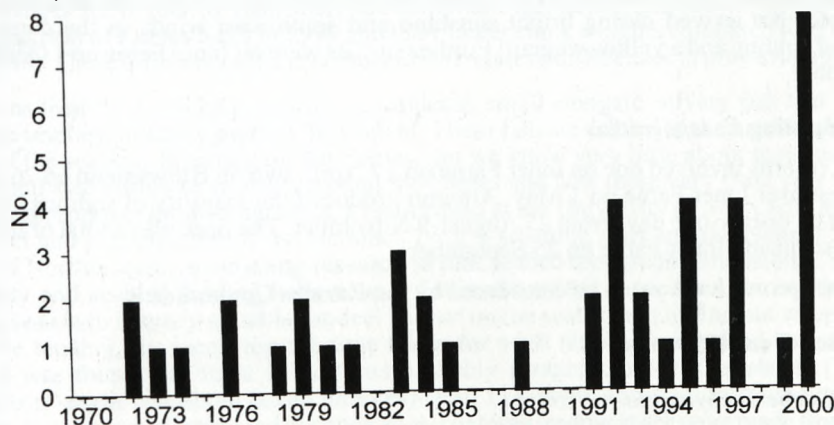


Fig. 9 Numbers of individual Rosefinches seen on the islands.

conditions on 26 August. 1 September produced singles on Brownsman and Staple Island with possibly the same two together on Inner Farne later in the day. Another was on Brownsman and Staple Island from 2-3 September. A second wave began on 11 September when two were on Inner Farne. One was still present the next day and was joined by two new arrivals from 17.30. A single remained on Inner Farne until 16 September. All were females or immatures (a male is long overdue – the last was in 1983).

**Lapland Bunting** *Calcarius lapponicus*

The first sightings of the year were two on Brownsman/Staple Island on 2 September. Singles were seen on five more days in September (two on 23 September), with one over Inner Farne on 15 October and one on Brownsman on 6-7 November. One on Inner Farne on 28 September was chased by both merlin and kestrel.

**Snow Bunting** *Plectrophenax nivalis*

Singles were on Brownsman and Inner Farne on 27 March with two on Inner Farne on 29 March, one on Brownsman on 26-27 April and one on Knoxes Reef on 30 April. 1-3 were recorded on twelve days from 2 October-17 November and five plus were on Brownsman and Inner Farne on 22 November.

**Yellowhammer** *Emberiza citrinella*

One was on Brownsman on 7-8 November and one flew west over Inner Farne on 22 November.

**Ortolan Bunting** *E. hortulana*

A male was found on the north rocks of Inner Farne on 4 June. It remained around the east rocks and vegetable garden all day, sometimes associating with the red-backed shrike and even clinging to the side of the Pele tower at one point. It appeared to have departed the next day but then was seen dropping into long vegetation by the Sandwich tern colony at 15.30. A first-winter bird on the north rocks of Inner Farne on 20 September proved less cooperative: it was watched for about four minutes by a single warden but had disappeared by the time the others on the island had been summoned.

**Little Bunting** *E. pusilla*

An excellent year for the species with a minimum of five birds, the best year since 1989 when five or six were on the islands. One was on Brownsman on 2 September departing at 07.30 the next day. One on Inner Farne for two minutes from 08.35 may have been the same bird. Another arrived on Brownsman at 08.30 and was present until 12.00. One on Brownsman on 16 September arrived during bright sunshine and south-west winds in the company of a Lapland bunting and a yellow wagtail! Further singles were on Inner Farne on 1 October and 6 November.

**Reed Bunting** *E. schoeniclus*

Spring records involved one on Inner Farne on 17 April, two on Brownsman on 26 April and one west over Inner Farne on 1 May. Autumn produced the majority of sightings with birds present on twenty-one days from 25 August-9 November. The peak was a total of fourteen on Brownsman and Inner Farne on 25 September.

\* These records have yet to be considered by the Rarities Committee

**Omission from 1999 report**

**Little Grebe** *Tachybaptus ruficollis*

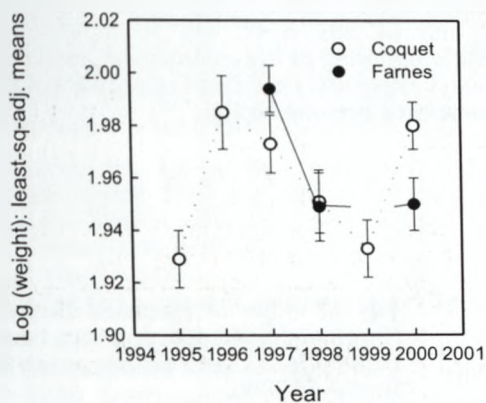
One was on Inner Farne from 22-24 October, being found dead on the last date. Fifth record for the islands and last seen in 1985. This brings the total number of species seen in 1999 to 183.



## FARNE ISLANDS RINGING REPORT FOR 2000

### Monitoring studies

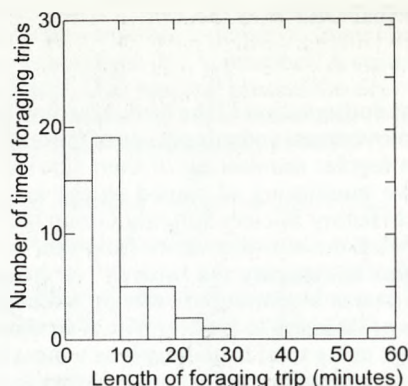
The ringing of Farnes seabirds is focused towards the conservation of the birds breeding on the islands. In addition to providing information on the movements and migrations of these species outside the breeding season, ringing chicks allows regular monitoring of their survival and growth before fledging. So far, this more intensive monitoring of ringed chicks has been confined to arctic terns: for this species, the Natural History Society Ringing Group has been using mark-recapture to estimate chick survival and find out how this varies from year to year, and measurements of age-standardised chick weights to compare the 'quality' of growth in each year. As data accumulates, the value of these data is beginning to emerge, although we still have to learn how to interpret the results in terms of variation in food supply. A summary of age-standardised chick weights (standardised for age using total head length as a measure of chick age, and plotted on a logarithmic scale) is shown for arctic terns on the Farnes and, for comparison, Coquet Island, in Fig. 10.



**Fig. 10** Weights of arctic tern chicks, standardised for age and plotted on a log scale (Y-axis), for birds on the Farnes Islands and Coquet Island for each year from 1995 to 2000 (X-axis). No data were available for the Farnes in 1995 (no ringing was carried out) and 1999 (breeding failure).

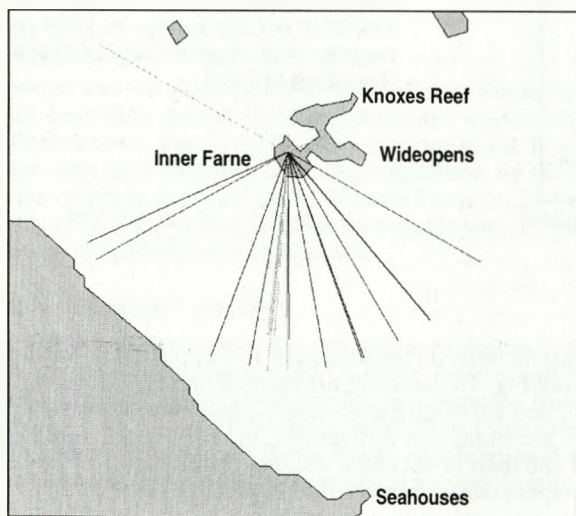
The extremely low breeding success of arctic terns on the Farnes in 1999 meant that we lack data for that year. However, it is clear from Fig. 10 that there are marked annual variations in the chick weights (standardised for age), and although Farnes and Coquet Island birds show similar changes from year to year, there are important differences, as shown by the lack of breeding success of Farnes birds in 1999 and their lower chick weights compared with Coquet birds in 2000. These differences may (we speculate) relate to differences in prey availability.

Arctic terns feed their chicks primarily on sandeels, small elongate, silvery fish that live, as their name implies, in sandy parts of the seabed. These fish are critical to the breeding success of most of the seabirds breeding on the Farnes, yet we know very little about their locations, numbers and availability to seabirds around the Farnes and how these vary from year to year. To design appropriate monitoring tools, a team based at the University of Newcastle and with the support and participation of the National Trust wardening staff and the Natural History Society of Northumbria, is initiating research to link seabed topography and habitat, sandeel availability and seabird feeding behaviour. Pilot studies were carried out during the 2000 breeding season to identify suitable sandeel habitat on the seabed and to find out where arctic terns were feeding. By recording the time taken for adult terns to bring food back to their chicks, it was found that most arctic terns probably foraged close to the islands (median foraging trip length was about seven minutes) (Fig. 11). Some observations of the locations (compass directions and estimated distance away) of terns feeding at sea were made from Inner Farne, and tend to suggest that there were preferred foraging areas within the Inner Sound between Inner Farne and Seahouses (Fig. 12).



**Fig. 11** Duration of foraging trips by adult arctic terns. The time for each foraging trip (minutes) is given on the X-axis, and the number of foraging trips represented by each bar on the Y-axis.

These studies will be extended and continued in greater detail in the 2001 breeding season; in particular, we would like to obtain accurate estimates of food size, foraging trip length, and foraging locations of arctic terns, puffins and shags, species representing surface mid-water and bottom-feeding seabirds. An important aim of this work will be to establish scientifically-validated methods for the long term monitoring of the environment, resources and habitat of the Farne Islands. This approach will be essential for future management of the islands as the implications and extent of global warming become clearer.



**Fig. 12** Plots of estimated distance (line length) and direction from Inner Farne of terns seen feeding at sea in June-July 2000.

### Ringling totals for 2000

The conventional ringing programme on the Farne Islands achieved good success in the 2000 breeding season. The ringing totals for all species on the Farnes in 2000 (1999 totals in brackets) were: shag (adults and chicks) 213 (118), guillemot 8 (0), eider (adult females) 158 (60), kittiwake (chicks) 224 (291), Sandwich tern chicks 440 (139), roseate tern 0 (2), arctic tern (chicks plus 2 adults) 645 (122). In addition, thirty-one eiders (adult females) and sixty-one shags were retrapped. The guillemots were ringed and fitted with temporary radio-tags as part of a study by Dr Richard Bevan of the University of Newcastle to define their feeding areas and diving behaviour. An important component of the ringing effort on the shags and eiders is the retrapping of adult birds. This provides data that can be analysed to estimate survival rates more efficiently than recovery data alone. The shag and eider retrap data are submitted to the British Trust for Ornithology (BTO) as part of a nation-wide project



(Retrapping Adults for Survival or RAS) to estimate survival rates for a range of species, and the RAS study for Farnes eiders is currently the biggest for this species in the UK. As the Farnes eiders are at the southernmost limit of their breeding range on the east coast of the UK, detecting reductions in the survival rates of our adult females could give warning of environmental problems.

### **Ringling recoveries**

Over the years, recoveries of Sandwich terns ringed on the Farne Islands have accumulated and form perhaps the largest single source of data on the migration and survival rates of this species from Britain and Ireland. Although these data have been analysed and published in various formats in the past, they have now been summarised as a chapter on Sandwich terns in the forthcoming *Migration Atlas*. This book, due to be published by the British Trust for Ornithology at the end of 2001, represents the culmination of a project to analyse and present the results of ringing in a migration context since the Ringing Scheme began in 1909.

During the past year, twenty-eight recoveries of Sandwich terns were reported, seven of which were recoveries of chicks (pulli) ringed in 2000 and recovered from September to November. A keen-sighted ornithologist read the rings from three of these young birds in the field in Edinburgh in early September; the remaining four birds were all caught or trapped 5,000 km further south in Africa (one each in Guinea Bissau, Gambia, Sierra Leone and Ghana) from early October to November. The location of the Edinburgh birds is typical of post-fledging dispersal, and the African recoveries are consistent with the rapid movement south that Sandwich terns undertake during September to October.

Sandwich terns start to breed from about three years; six recoveries of immature birds (pulli ringed between 1997 and 1999, inclusive), were reported and five of these were in Africa: Senegal, Gambia, Ghana, Sierra Leone and one from much further south (over 9,000 km from the Farnes) in the Republic of South Africa. The other recovery of an immature bird was of a bird ringed as a pullus in 1997 and recovered dead in Norfolk in July 2000; this was possibly a bird that had returned to breed in its third year.

Twelve recoveries of adult Sandwich terns were reported: all except an injured bird in Antrim, Northern Ireland, were controls (birds retrapped and released) or sight records (rings read in the field). Seven sight records were from a well-observed Sandwich tern colony in the breeding season at Griend in the Netherlands, as in previous years, and two autumn sight records from Edinburgh. These two Edinburgh birds were seen at the same time as the three ringed juveniles, and it is likely that adults and juveniles move both up and down the coast after breeding and before embarking on the long journey south. An adult ringed as a chick in 1983 and controlled in north-east Italy in August 1999 is of particular interest. This bird joins a cluster of Sandwich tern recoveries in the lowlands adjacent to Venice. Sandwich terns breeding in the Black Sea winter south and west to the Mediterranean, and it is possible that some birds of British origin reaching the Mediterranean shores of the Iberian peninsula subsequently move east to breed with birds from Black Sea populations.

Three Sandwich terns from elsewhere were seen on the Farnes: two birds came from Fife (both ringed in 1992), and the bird from Donegal, Eire, nicely complements the injured Farnes bird found in Antrim, Northern Ireland. This interchange of birds between Ireland and the north-east coast may occur via the trans-Pennine migratory route suggested by Robin Ward (Ward, 2000). Three arctic tern recoveries were reported last year, all on Coquet Island: one was a chick ringed in 1978 and recovered dead on Coquet Island (almost exactly twenty-one years old) in June 1999, and the two others were both retrapped in the 2000 season as breeding adults aged twenty-four and twenty-two years – further examples of the dispersal of young birds to adjacent breeding colonies.

Outside the breeding season, kittiwakes are pelagic and this results in few recoveries, except when man actively intervenes. The three Greenland recoveries of kittiwakes reported last year are now complemented by a fourth, also shot within the Davis Strait between Greenland and Canada. This bird was ringed as a chick on Inner Farne in 1999 and recovered in August 2000. Three other kittiwakes, all ringed in 1982, were reported from closer to home: one was seen and

identified from colour marks at Heligoland, Germany, in September 1999, and the others were both local breeding season recoveries of birds found dead at Embleton and North Shields.

Unlike kittiwakes, eiders do not travel far: of the seven recoveries reported for this year, six were local. The longer distance recovery was of a bird ringed as an adult in June 1999 and recovered dead on the beach at Lower Largo, Fife. Our understanding of eider movements is rather biased towards adult females. Practically all birds ringed on the Farnes have been adult females caught on the nest. Males do not incubate and so we know very little about their movements and survival. The chicks cannot be ringed as the female takes them to sea soon after hatching and at this stage their legs have not grown sufficiently to hold a ring. Adult females are delightful birds to ring; when approached slowly and quietly, most can be gently lifted off the nest, ringed and replaced nearby to return to their eggs.

In the last fifteen years, no puffins have been ringed on the Farnes, but we are still getting recoveries from birds ringed up to 1986. Five recoveries were reported last year, and these were birds ringed as chicks on the Farnes between 1976 and 1983. Two of these were found dead locally, one was found dead (oiled) near Hartlepool, and the other two were birds found dead in Scandinavia (Norway and Denmark).

There were eleven recoveries of shags, five of which were local recoveries of birds ringed in 1986 (1) and 1996 (3), and included the ring only, found by a diver, of a bird ringed in 1982. Apart from a sight record on the Farnes of a shag ringed on the Isle of May in July 1994, the other non-local recoveries were mainly all of first year birds further south than Cleveland (ringed 1998, found dead in July 2000), Norfolk (in care, November 2000), Suffolk (sight records of two birds in November 2000) and Colchester (found dead, December 2000). These recoveries are consistent with the pattern of juvenile dispersal along the east coast shown by previous results.

The ringing studies on the Farne Islands would not be possible without the support and encouragement of many people. The wardens on the islands have made a major contribution to the work by retrapping tern chicks on our behalf (under licence), and recording fish sizes, foraging times and foraging locations of arctic terns. The Farne Islands Local Advisory Committee of the National Trust have allowed this work to be carried out and developed since 1996 and we are grateful to them and to John Walton for his support. It would not be possible for the ringing team to gain access to the islands without the boat generously provided by Northumbrian Water, and last year Northern Electric & Gas helped with launching the boat by the loan of a Land Rover. The costs of rings and other essential equipment has been met by the Natural History Society of Northumbria. Lastly, none of this would be possible without the many hours of hard work and dedication put in by members of the Ringing Team. Long may it continue!

#### Reference

- Ward, R M, (2000). Migration patterns and moult of Common Terns *Sterna hirundo* and Sandwich Terns *Sterna sandvicensis* using Teesmouth in late summer. *Ringing and Migration* 20: 19-28.



TRANSACTIONS  
OF THE  
NATURAL HISTORY SOCIETY  
OF  
NORTHUMBRIA

Editor:

B J SELMAN

Assistant Editors:

D C NOBLE-ROLLIN

M A PATTERSON

Volume 61

Part 3

THE NATURAL HISTORY SOCIETY OF NORTHUMBRIA  
THE HANCOCK MUSEUM  
NEWCASTLE UPON TYNE NE2 4PT  
2001

**Front Cover:** *Geum rivale* (Water Avens), teratological form, Plessey Woods (1997)  
photographed by Gordon Young.

ISSN 0144-221X

©The Natural History Society of Northumbria, 2001.  
This publication is copyright. It may not be  
reproduced in whole or in part without the  
Society's permission.

Printed by Pattinson and Sons, Newcastle upon Tyne.



## CONTENTS

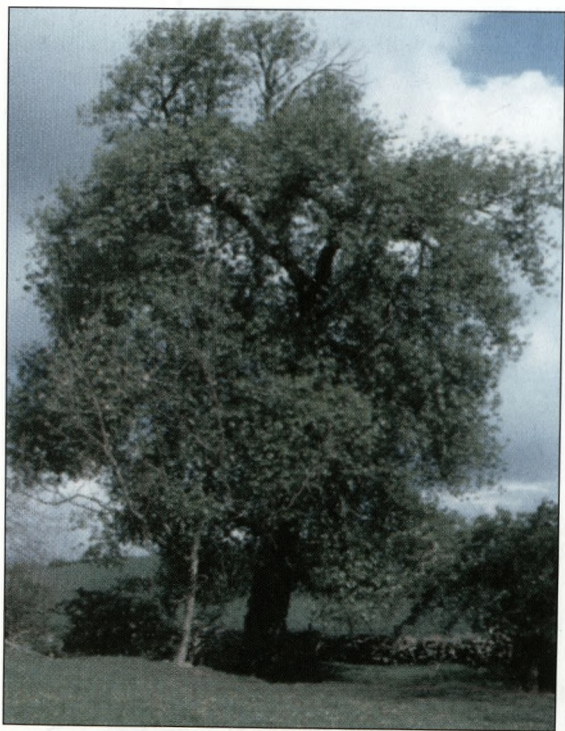
	Page
<b>A Supplement to Flora of Northumberland</b>	71
by G A SWAN	
 <b>The Durham Flora - Corrigenda et Addenda</b>	161
by Rev. G G GRAHAM	



**Fig. 1** *Asplenium x clermontiae*, Howick (2000)  
photographed by G A Swan



**Fig. 2** Close up of *Asplenium x clermontiae* photographed by F J Rumsey(2000)



**Fig. 3** *Populus nigra* subsp. *betulifolia* (Black Poplar), Humshaugh Burn (1995), photographed by G A Swan.



**Fig. 4** *Populus nigra* subsp. *betulifolia* (trunk).



## A SUPPLEMENT TO FLORA OF NORTHUMBERLAND

G A Swan

81 Wansdyke, Morpeth, Northumberland NE61 3QY

### INTRODUCTION

The purpose of this supplement is to collect together new records made since the manuscript of Swan's *Flora of Northumberland* (1993) was completed, as well as earlier records which came to light only after that date, so as to make the account of the flora as complete as possible up to and including the year 2000. A number of native species and hybrids and a considerable number of introduced species have been recorded in Northumberland for the first time since the *Flora* was published. Many of the latter are aliens (including bird-seed aliens) or species deliberately planted (including 'wild-flower seed mixture'), some of which may not survive here very long.

The nomenclature in *Flora of Northumberland*, (Swan, 1993) is that used in *New Flora of the British Isles*, (Stace, 1991) and that of Kent (1992). In this *Supplement*, this same nomenclature is used, but with changes in the names of a small number of taxa, as detailed in Kent (1996), so that the names now correspond to those in the second edition of *New Flora of the British Isles*, (Stace, 1997), with very few exceptions which are detailed in Kent and Stace (2000). However, where the changes involve only a change in the authority or a minor spelling error, they are usually omitted. The sequence remains as in *Flora Europaea*. The abbreviations are also as in *Flora of Northumberland*. In cases where the locality given for a record is not in the Gazetteer of *Flora of Northumberland*, an approximate grid reference is given in square brackets. As seen from *Watsonia* vol. 22, part 4, August 1999, the name accepted for v.c. 68 is now North Northumberland.

In the case of species for which there is a distribution map in *Flora of Northumberland*, the 5 x 5km squares for which there is a new record are usually listed (Part B). Part A contains more detailed information about species without a map, as well as a small number of species included in Part B, but which merit more detailed information. A species may be included here because it provides a new record in an area where it was previously unknown, or because there are few records for the species, or because a herbarium specimen has recently been found, which shows that the species once occurred in an area where it is unknown today, or because it has recently appeared in a new type of habitat. A species is not included in Part B if there are only 1-3 new records for it, all of which are given in Part A.

**As a summary (pages 153-157), the following lists are provided:**

- 1 Taxa new to the flora of Northumberland.
- 2 Taxa new to one vice-county in Northumberland (67 or 68).
- 3 Taxa which had become extinct in at least one vice-county in Northumberland, but which have been recorded again recently. Some of these have returned naturally (or were, perhaps, never really extinct); others have been planted (usually by sowing seed).
- 4 Taxa lost since the preparation of *Flora of Northumberland*.
- 5 Corrections.

In Part A, the number between the scientific name and the English name of each species is the number of the page in Swan *Flora of Northumberland* (1993) on which that species appears; in Part B, this page number also appears after the scientific name. In the case of species not included in the *Flora*, the approximate page number where the species should occur is given. In the Summary, in the section 'New to Northumberland', the number which appears after the family name is the page in *Flora of Northumberland* on which the family begins; in the other sections, it is the page for the species.

### Some changes in the flora

During the past ten years or so, *Azolla filiculoides* (water fern), *Crassula helmsii* (New Zealand pigmyweed) and *Lemna minuta* (least duckweed), alien aquatics, have been recorded for the first time in Northumberland. Of these, *Crassula helmsii* is known to be capable of rapid spread (it does not die back in winter) and of choking out aquatic plants already there; and *Azolla filiculoides* has already been seen to be highly invasive in Northumberland. The choking of the R Tweed by *Elodea canadensis* around 1850 has already been described in the *Flora* (p257).

Quite a number of new ponds have been constructed in the county, mainly as nature reserves. On the other hand, some old ponds have been drained, resulting in the loss of flora. In and around the new ponds, planting has been carried out, including species which although occurring elsewhere in Northumberland, did not occur in the area of the new pond, and also including species hitherto unknown in the county, e.g. *Alisma lanceolatum* (narrow-leaved water-plantain) and *A. gramineum* (ribbon-leaved water-plantain). In nature reserves and elsewhere, seeds of wild flowers have often been sown, including taxa differing from those native in the area, e.g. *Lotus corniculatus* var. *sativus*, which is a much less attractive plant than native *L. corniculatus* (common bird's-foot-trefoil). Species which have become extinct in Northumberland, e.g. *Agrostemma githago* (corncockle) are now sometimes sown.

The feeding of seed to wild birds in gardens, etc. has led to the occurrence of many alien species casually (bird-seed aliens). In the 19th century, most of the ballast plants did not survive long, once the unloading of ballast had ceased, and it is possible that many of these bird-seed aliens will only be here so long as their seed continues to be fed to birds.

*Ophrys apifera* (bee orchid) has been known in Co Durham (66) since the 18th century, occurring as far north as Marsden, according to Graham (1988), in which it is stated to occur '... in disturbed Magnesian Limestone soils, particularly in old quarries'. However, this was its northern limit in Britain, and the plant was first recorded in 67 in 1988, at Willington Dene, since when it has been discovered at four additional sites in this SE corner of Northumberland. In *Flora of Northumberland* (1993), Plate 2 (page 28) shows three tiny areas of Magnesian Limestone in this region, so that none of the five *Ophrys* sites is far from Magnesian Limestone. The plant could be spreading northwards. However, some of the *Ophrys* sites are on recently disturbed ground, which raises the question as to whether seed could have survived long dormancy in the soil.

*Blackstonia perfoliata* (yellow-wort) has a similar distribution to *Ophrys apifera* in the NE corner of 66 today (Graham, 1988), although it seems not to have been recorded in that area in earlier times. According to Graham (1988) it occurs '... in quarries and on spoil-heaps and dry waste places on the Magnesian Limestone'. In recent years it has appeared on disturbed land in the SE corner of 67, although its occurrence is complicated by the fact that it sometimes seems to have been deliberately sown as seed, sometimes along with *Centaureum erythraea* (common centaury). Nevertheless, there appears to be some parallel between the northern spread of *Ophrys* and *Blackstonia*, both of which are more southern species.

After the recent conversion of parts of a disused railway near Walker into a cycle-track, a number of species have appeared, of which it seems possible that the seeds had been dormant in the ballast, until disturbed by the conversion work. For example, *Chrysanthemum segetum*, *Erigeron acer*, *Lepidium campestre*, *Phalaris canariensis*, *Setaria pumila* and *Vulpia myuros*.



## PART A

### EQUISETACEAE

**Equisetum arvense x fluviatile** 81 Shore Horsetail  
= *E. x litorale* Kühlew. ex Rupr.

67 Crag Lough, C N PAGE (1964), E. Bardon Mill, S side of river, near footbridge, R. MASKEW (1994).

### HYMENOPHYLLACEAE

**Hymenophyllum tunbrigense** (L.) Sm. 82 Tunbridge Filmy-fern

67 The Bull Crag site has been destroyed, S (1994). Still extant in 67.

68 The Cateran Hill site is still intact, S (1997).

**H. wilsonii** Hooker 83 Wilson's Filmy-fern  
A new native site.

67 Chirdon Burn, Seven Linns (at 275m), under a rock at the falls. Found by A VAN DER POORTEN at a meeting of the British Bryological Society on 29 June 1995 (comm. O L Gilbert and S Hedley).

**Trichomanes speciosum** Willd. 83 Killarney Fern  
Native. New to the flora of Northumberland.

67 Roughside, Cragshield Hope, under sandstone crags facing NW (at 245m), the gametophyte, near *Hymenophyllum tunbrigense*, A C JERMY and S, 26 July 1994 (*Wats*, 1998, 22, 12). The sporophyte (not found in Northumberland) is considered to be one of the rarest and most beautiful ferns in the British flora, although the gametophyte has recently been shown to be not uncommon in suitable localities in upland Britain.

### ASPLENIACEAE

**Asplenium trichomanes** L. subsp. **pachyrachis** (H. Christ)  
Lovis and Reichst. 85 Lobed Maidenhair Spleenwort

Native. New to the flora of Northumberland. There is a photograph of the plant on Plate 3 of the *Flora*, with a note that the record was too late for inclusion in the text.

67 Hareshaw Linn, on a shaded, calcareous rock wall, under overhang, discovered by J M IDE on 7 August 1992, conf. A C Jermy; !1992 (*Wats*, 1993, 19, 279). A few records in SW Britain.

**A. trichomanes** subsp. **quadrivalens x ruta-muraria**

= **A. x clermontiae** Syme Fig. 1& 2 85 Lady Clermont's Spleenwort

Native. New to the flora of Northumberland. Only known extant record in Britain.

68 One tuft, along with many tufts of the parents, on a mortared wall near Howick, S (2000). Although the parents often grow together, this hybrid is extremely rare. Hitherto, the only certain record in the British Isles was in Co Down, Ireland, in 1863. Identification confirmed by Dr F J Rumsey.

**A. trichomanes-ramosum** L. 85 Green Spleenwort  
is now known as

**Asplenium viride** Hudson

**Ceterach officinarum** Willd.

86

Rustyback

68 Rothbury, on a wall, J STEELE (1996), ! 2000. Not previously known in that area, except for an unconfirmed record at Brinkburn Priory (1893).

#### DRYOPTERIDACEAE

**Polystichum setiferum** (Forsskål) Moore exWoynar

87

Soft Shield-fern

67 Dovecrag Burn (at 180m), S (1997). Second confirmed record in v.c.

68 Swinhoe Farm, near stream by bridge, S (1996).

**Dryopteris dilatata** x **expansa**

= **D. x ambroseae** Fraser-Jenkins and Jermy 88

Native. New to the flora of Northumberland.

67 Deadwater Fell, K TREWREN (1997).

**D. expansa** (C. Presl) Fraser-Jenkins and Jermy 88

Northern Buckler-fern

68 Near Lemmington, by dismantled railway, D and T HARDY (1999), **Hb GAS**.

#### AZOLLACEAE

**Azolla filiculoides** Lam.

88

Water Fern

Alien, new to the flora of Northumberland.

Introduced from tropical America, although present in Britain during some interglacials, (A G LUNN). Hitherto known mainly in S England, but evidently now spreading into SE Northumberland, although I knew it in 1960 in Bradley Hall pond, near Crawcrook (66). First records for Northumberland.

67 Gosforth Park, bomb ponds, J L DURKIN (1983). Ashington, Dougie's Pond (a school nature reserve), I DOUGLAS (1994), ! 1995. North Shields, Middle Engine Lane, D N MITCHELL (1996), in newly created ponds along disused waggonway; also A and G YOUNG (1998) [45(NZ)32.69]. Wallsend, Rising Sun Country Park, D N MITCHELL (1996), in newly created ponds on southern fringe of plantation. Wallsend, Richardson Dees Park pond, A and G YOUNG (1997, 1998). S of New York Road, West Allotment Country Park [45(NZ)31.70], A and G YOUNG (1998). On E side of Killingworth Lake [45(NZ)27.70], D N MITCHELL (2000), A and G YOUNG (2000), ! 2000.

In just three weeks, the fern has completely covered the surface of a two-acre pond at Ellington, spreading at the rate of about 6m per day (report in newspaper, September 2000); this is a matter of very serious concern for birds and other forms of plant life here and at nearby nature reserves.

#### CUPRESSACEAE

**Juniperus communis** L. subsp. **alpina** Čelak. 89

is now known as

**Juniperus communis** L. subsp. **nana** (Hooker) Syme

#### SALICACEAE

**Salix aurita** x **cinerea**

92

= **S. x multinervis** Doell



68 Brandon Ford, R C L HOWITT (1970).

*S. aurita* x *viminalis* 93 Shrubby Osier  
= *S. x fruticosa* Doell

68 Brandon ford, R C L HOWITT (1970). First record for v.c.

*S. repens* L. var. *fusca* Wimmer and Grab. 94

67 Caw Lough, S (1988). An erect plant, occurring in the fenland of East Anglia, not previously recognised in Northumberland.

*Populus candicans* Aiton 94 Balm-of-Gilead  
is now known as

*Populus balsamifera* L. x *deltoides* Marshall  
= *Populus x jackii* Sarg.

*P. nigra* L. subsp. *betulifolia* (Pursh) Torrey Fig. 3 & 4 94 Black Poplar

67 By a small stream, Humshaugh Burn (at 85m), one old, female tree, reported by F FEWSTER, S (1995). Det. E Milne-Redhead, who thought it was probably native. Accepting the latter, this is presumably the most northerly, native site in Britain (Wats, 1997, 21, 385).

#### BETULACEAE

*Alnus glutinosa* x *incana* 95  
is now known as

*Alnus x hybrida* A. Braun ex Reichenb.

#### CORYLACEAE

*Carpinus betulus* L. 96 Hornbeam  
Recently seen at a number of sites in 67 and 68, evidently planted at border of state forests, S (1999).

67 Plessey Woods, by side of Pegwhistle Burn, A and G YOUNG (1998).

68 Norham Castle, R FITZ GERALD (1995).

#### FAGACEAE

*Quercus cerris* L. 96 Turkey Oak  
68 Norham Castle, R FITZ GERALD (1995).

#### ULMACEAE

*Ulmus procera* Salisb. 97 English Elm  
67 Hexham Abbey, AJR (1996). Belsay Castle, two dated 1835, MITCHELL (1996, p 356).  
68 Howick grounds, MITCHELL (1996, p 356). First record for v.c.

#### MORACEAE

*Ficus carica* L. 98 Fig  
67 Alien. New to the flora of Northumberland.

Ouseburn, J L DURKIN (2001).

## ARISTOLOCHIACEAE

**Asarum europaeum** L. 99 Asarabacca  
67 Ridley Hall, F EVANS (1959).

## POLYGONACEAE

**Polygonum rurivagum** Jordan Ex Boreau 99 Cornfield Knotgrass  
New to the flora of Northumberland.

In recent years, this species (of cornfields and other arable land in S and S E England) has been found on roadside verges in Northumberland. Although Dr J R Akeroyd suggested that it may have been introduced with soil, it seems to me that it often occurs with other species which are associated with roadside verges salted in winter, so its origin and status require clarification. The following have been determined by JRA.

67 Morpeth, gravel path in garden, S (1998). A1 near High Highlaws [45(NZ)17.89], S (1998). Roadside near Minsteracres, S (1999). A68 near Colt Crag Reservoir, S (1997); near Woodhorn Colliery, S (2000), not determined by JRA.

68 Near roundabout on A1, N of Berwick, MEB (1992) (*Wats*, 1995, 20, 28). A 697 near Coupland cross-roads, S (1998). A1 near Adderstone junction [46(NU)13.30], S (1998). B1339 at Brunton Bridge, S (1999).

**Persicaria laxiflora** (Weihe) Opiz 99 Tasteless Water-pepper  
is now known as

**Persicaria mitis** (Schränk) Opiz ex Assenov

**Fallopia baldschuanica** (Regel) J. Holub 100 Russian-vine  
67 Brier Dene, S (1997).

68 Near Chatton, S (1999).

**F. japonica** x **sachalinensis** 101

= **F. x bohémica** (Chrtěk and Chrtěková) J. P. Bailey

New to the flora of Northumberland.

68 On S bank of R Tweed between Horncliffe and the island to W, two clumps, growing by the footpath, R J GORNALL, P M HOLLINGSWORTH and C D PRESTON (1995), conf. J P Bailey (*Wats*, 1997, 21, 384), ! 1995.

**F. sachalinensis** (F. Schmidt ex Maxim.) Ronse Decraene 101 Giant Knotweed

67 Elsdon, S (1999).

**Fagopyrum esculentum** Moench 101 Buckwheat

67 In a cultivated field near Littleharle Tower [45(NZ)01.83], S (1999).

**Rheum** x **hybridum** Murray 101 Rhubarb

68 By the sea, near Craster, A and G YOUNG (1999).

**Rumex obtusifolius** x **sanguineus** 102

= **R. x dufftii** Hausskn.

Native. New to the flora of Northumberland.



68 Brunton, roadside near level-crossing, G D KITCHENER (2000).

**R. maritimus** L. 102 Golden Dock

An additional record for a species, rare in Northumbeland.

68 Etal, on E bank of R Till, S (1995).

#### CHENOPODIACEAE

**Atriplex littoralis** L. 104 Grass-leaved Orache

67 By salted roadsides, 45(NZ)18.87, 22.77, 23.75, N E SCOTT (1982).

**A. longipes** x **prostrata** 104 Kattegat Orache

= **A. x gustafssoniana** Taschereau

68 Additional record, Warkworth, A COLES (1994).

**A. glabriuscula** x **longipes** 104 Taschereau's Orache

= **A. x taschereaui** Stace

New to the flora of Northumberland.

68 Warkworth, edge of salt-marsh, A COLES (1994), SUN, det. J R Akeroyd.

#### AMARANTHACEAE

**Amaranthus lividus** L. 106

is now known as

**Amaranthus blitum** L.

#### PORTULACACEAE

**Montia fontana** subsp. **minor** Hayward 107

is now known as

**Montia fontana** subsp. **chondrosperma** (Fenzl) Walters

**Claytonia perfoliata** Donn ex Willd. 107 Springbeauty

67 Gosforth, Three Mile Bridge allotments, for one year in the 1950s, B H THOMPSON.

68 Seahouses, by roadside, S (1996). Roadsides near Milfield and near Barelees, B H THOMPSON (1998).

#### CARYOPHYLLACEAE

**Arenaria balearica** L. 107 Mossy Sandwort

67 Catcleugh, on a wall, S (1996).

**Cerastium arvense** x **tomentosum** 110

= **C. x maureri** M. Schulze nom. nud.

68 Additional record. Seahouses, on sand dunes, S (1996).

**C. diffusum** Pers. 110 Sea Mouse-ear

New inland records.

67 Recorded at Walltown Crags by HSJL and SP (1980). Now recorded on the Roman Wall within 0.5 mile of Cawfields quarry by D and T HARDY (1999).

68 Hepburn Wood, forest car park [46(NU)07.24], on gravel, S (1995).

**Sagina filicaulis** Jordan 111

*S. ciliata* var. *minor* Rouy and Fouc.

First records for Northumberland of a species known (presumably as native) in S and W England.

67 Wark forest road, on Black Rigg, S (1967), det. F N Hepper.

68 Roadside verge near Mindrum, S (1999), det. N Jardine.

**Spergularia marina** (L.) Griseb. 112 Lesser Sea-spurrey

Map 1

Now very common by the side of roads, salted in winter, over a large area of 67 and 68, including high-level roads, e.g. Carter Bar (at 418m). Records by MEB (1994, 1996), G M KAY (1995), A and G YOUNG and S (1995-99). See distribution map.

**Agrostemma githago** L. 113 Corncockle

Has recently reappeared in Northumberland, presumably as a result of intentionally planted seed.

67 Benwell Nature Reserve, A and G YOUNG (1996). Hexham, Cockshaw Burn [35(NY)91.63], J E ANGEL and C M IRVINE (1996). Marden quarry [45(NZ)35.71], planted with wild-flower seed mixture, A and G YOUNG (1998).

68 Littlemill Nature Reserve, M PEARCE (1998).

**Dianthus barbatus** L. 114 Sweet-William

Casual hort.

68 Holy Island on dunes [46(NU)10.40], A and G YOUNG (1990).

**D. deltoides** L. 114 Maiden Pink

67 Planted in Hauxley Nature Reserve, S (1997).

68 Titlington Burn, probably introduced with road material, D and T HARDY (1999).

#### NYMPHAEACEAE

**Nymphaea marliacea** Lat.-Marl. 115

68 Seahouses, Snook pond, S (1996). Introduced. New to Northumberland.

#### CERATOPHYLLACEAE

**Ceratophyllum demersum** L. 115 Rigid Hornwort

68 Planted in a newly constructed pond near Branton, J HOPE (1999).

#### RANUNCULACEAE

**Helleborus foetidus** L. 115 Stinking Hellebore

67 Netherwitton, H JEFFREYS (post 1900).



- H. viridis** L. 115 Green Hellebore  
 67 R Wansbeck, near Rivergreen Mill [45(NZ)13.84], I DOUGLAS (1994). R Font, J DARGUE (1994). The Ravenshill Wood record, CLARK (1958) has been confirmed by G SIMPSON (1992).
- Aconitum napellus x variegatum** L. 116 Hybrid Monk's-hood  
 = **A. x cammarum** L.  
 68 Biddlestone [36(NT)96.08], J M HUMPHRIS (1998). Hortal.
- Ranunculus sceleratus** L. 117 Celery-leaved Buttercup  
 68 Planted in newly constructed pond near Branton, J HOPE (1999), area where unknown. One plant by edge of R Coquet near footbridge at Thropton, J M HUMPHRIS (2000), **Hb GAS**; much higher up river than ever previously recorded.
- R. aconitifolius** L. 118 Aconite-leaved Buttercup  
 68 Hortal (*flore pleno*), but naturalised on the flood-plain of Shawdon Burn, S (1997). First record for v.c.
- Aquilegia vulgaris** L. 120 Columbine  
 67 Possibly native, on S side of Warks Burn, B H THOMPSON (early 1950s).
- Thalictrum minus** L. 120 Lesser Meadow-rue  
 An interesting, inland site.  
 67 B6306, near Wooley sanatorium [35(NY)96.59], on verge of road, very well established and occurring in a closed species-rich grassland community, AJR (1998).

#### PAPAVERACEAE

- Papaver orientale** L. 122 Oriental Poppy  
 is now known as  
**Papaver pseudoorientale** (Fedde) Medw.
- Pseudofumaria alba** (Mill.) Lidén 123 Pale Corydalis  
 67 Kirkwhelpington, on a wall, coming from a garden, S (1998).  
 An escape, not previously recorded in Northumberland.
- Fumaria capreolata** L. 123 White Ramping-fumitory  
 A new record for a species rare in the county.  
 68 Spindlestone, roadside, R M BURTON (1994).
- F. bastardii** Boreau 123 Tall Ramping-fumitory  
 Two additional records from 67, where it is rare.  
 67 Near Cresswell, S (1998). Near Viewlaw [Lake], S (1999).

#### CRUCIFERAE (BRASSICACEAE)

- Sisymbrium orientale** L. 124 Eastern Rocket  
 67 Near Meldon, E MILNE-REDHEAD (1958), K. North Shields, A and G YOUNG (1996).

- Rorippa sylvestris** x **amphibia** (L.) Besser 126 Lesser Hybrid Yellow-cress  
= **R. x anceps** (Wahlenb.) Reichenb.  
68 Berwick, pond, **GLAM**, det. T C G Rich.
- Cardamine corymbosa** Hooker fil. 128 New Zealand Bitter-cress  
First records for Northumberland. Introduced with purchased garden plants. This species resembles *C. hirsuta*, but is stoloniferous, often propagating by rooting at leaf-tips, so may be effectively perennial. First recorded in Britain in 1985.  
67 Garden in south Hexham; serious garden weed since about 1990, AJR, **Hb GAS**.  
68 Near Craster, garden weed, E M CRASTER (1998), **Hb GAS**.
- Arabis glabra** (L.) Bernh. 128 Tower Mustard  
67 Jesmond, DBB (1934). Last known record for Northumberland.
- Cochlearia danica** L. 129 Danish Scurvygrass  
Abundant along salt-treated roads but, according to AJR, mainly in the central reservations of dual-carriageways.  
67 A69, to W of Hexham junction, AJR (1996), and to E of same junction, G M KAY (1997). A193 near South Beach, A and G YOUNG (1998). Many patches by A69 between Newcastle and Corbridge; and by A1 between Newcastle and Morpeth, A and G YOUNG (2000).
- Cochlearia scotica** Druce 130 Scottish Scurvygrass  
is now known as  
**Cochlearia officinalis** L. subsp. **scotica** (Druce) Wyse Jackson
- Iberis umbellata** L. 131 Garden Candytuft  
67 Low Prudhoe, on Spetchell heaps, S (1996). Casual. First record for v.c.
- Lepidium campestre** (L.) R. Br. 132 Field Pepperwort  
A new site for a species thought probably extinct in Northumberland.  
67 S of Shiremoor, by a dismantled railway, near the Stephenson Railway Museum, A and G YOUNG (2000), **Hb GAS**. Also seen by D N MITCHELL (2000), who wrote 'The plants I observed appeared to have germinated in colliery ash on the disused railwayline which had recently been disturbed by the construction of a new cycleway. It is possible that this construction work has brought dormant seeds to the surface and allowed them to germinate next to the new cycleway'.
- L. ruderale** L. 132 Narrow-leaved Pepperwort  
First record for 68. Only extant record for Northumberland. Casual.  
68 On saline roadside of B6341, N of Craggside, J M HUMPHRIS (1998, 2000), **Hb GAS**, ! 2000.
- Diplotaxis muralis** (L.) DC. 133 Annual Wall-rocket  
67 High Heaton, coast-road, A and G YOUNG (1999). Tynemouth, A and G YOUNG (2000).
- Brassica juncea** (L.) Czern. 134 Chinese Mustard  
67 Morpeth garden, bird-seed alien, S (1996). First record for Northumberland.
- Sinapis alba** L. subsp. **alba** 134 White Mustard  
68 Norham, S (1995). Boathouse Plantation, S (1996).



**Raphanus sativus** L. 134 Garden Radish  
67 Near Mitford, S (1997). Casual hort. First record for v.c.

#### DROSERACEAE

**Drosera longifolia** L. 135 Great Sundew  
is now known as

**Drosera anglica** Hudson

#### CRASSULACEAE

**Crassula helmsii** (Kirk) Cockayne 136 New Zealand Pigmyweed  
Alien, new to the flora of Northumberland. Native of Australia and New Zealand. Discarded by aquarists and naturalised. Said to have been sold for aeration of garden ponds since 1927; first found as established alien in Britain in 1956.

67 Backworth [45(NZ)30.72], S LOWE (1990). East Cramlington Nature Reserve; Seaton Burn, Holiday Inn garden, M TEFFNER (1992). Benwell Nature Reserve, edge of pond, A and G YOUNG (1996, 2000). Arcot Hall pond (at 70m), S (1999). Wallsend, Hadrian Park pond, D N MITCHELL (1999), extremely abundant and invasive along S margin of pond; appears to have eliminated most other aquatic plants. Rising Sun Country Park, Wallsend, D N MITCHELL (1999); dominant in water-filled ditch to W of Swallow Pond; also in a small pond, just outside the Country Park, A and G YOUNG (2000). Seaton Burn High School nature reserve, D N MITCHELL (1999); one patch in small pond. In Slaley Forest, G SIMPSON (2001).

**Sedum rupestre** L. 136 Reflexed Stonecrop  
67 Near Bellingham, S (1996). N bank of R Wansbeck, E of Morpeth, on a rock, S (1998). Throckley Dene, A and G YOUNG (1998).

**S. forsterianum** Sm. 136 Rock Stonecrop  
67 Whitton [46(NU)05.01], on a wall, J M HUMPHRIS (1996), ! 2000. Longbyre [35(NY)65.66], waste tip, S (1997). Elsdon, S (1999).

**S. spathulifolium** Hooker 136 Colorado Stonecrop  
68 Rothbury, on a wall, J M HUMPHRIS (1996). From a garden; N American. First record for Northumberland.

#### SAXIFRAGACEAE

**Tolmiea menziesii** (Pursh) Torrey and A. Gray 137 Pick-a-back-plant  
Naturalised hort. New to the flora of Northumberland. Native of WN America.

67 Oakerland cross-roads, near Hexham, R M BURTON (1994), **Hb GAS**. Morpeth garden weed, S (1997). Letah Burn, J E ANGEL and C M IRVINE (1999), comm. G. Young.

68 Ingram, by a small, shady stream, S (1995).

**Tellima grandiflora** (Pursh) Douglas ex Lindley 137 Fringe cups  
Naturalised hort. New to the flora of Northumberland. Native of WN America.

67 Noted in Bothal Woods on 16 May 1987 by H A ELLIS, but not reported by him until May 1997, when he refound the plant. On N bank of R Wansbeck, in some shade, just E of the railway viaduct, S (1997). However, the plant is now known to be well naturalised at several

points along the river, H A ELLIS (*V*, 1998, 83, 11-12). Also reported by R BOYCE (*V*, 1998, 83, 72-73). Also seen in Morpeth by a small stream, S (1998) and as a garden weed, S (1997). Kirkwhelpington, S (1998).

<b>Saxifraga umbrosa</b> L.	137	Pyrenean Saxifrage
67 Near Bakethin Reservoir, S (1996).		

#### HYDRANGEACEAE

<b>Deutzia scabra</b> Thunb.	139	Deutzia
Hortal; from China and Japan. New to the flora of Northumberland.		
68 Guyzance, near mill, S (1995), det. P S Green.		

#### ROSACEAE

<b>Spiraea x arguta</b> Zabel	140	Bridal-spray
Hortal, of garden origin. New to the flora of Northumberland.		

67 Morpeth, in a hawthorn hedge, by the edge of a wood, bordering on a housing estate, S (2000), det. C A Stace, **HB. GAS**.

<b>Rubus spectabilis</b> Pursh	141	Salmonberry
68 Thrum Mill, S (1996).		

<b>Rubus fruticosus</b> L. <i>sensu lato</i>	141	Bramble, Blackberry, Bummel-kite
--	-----	-------------------------------------

(by G H Ballantyne)

It was noted in the *Flora* (p 141) that the distribution of bramble species in Northumberland had not been fully worked out. While this is still the case, visits to most lowland squares during July and August 2000 have helped to establish a better picture of the distributional patterns of those species present. Alan Newton (AN) has also both found and determined some new and older records since 1993 and has assisted in determining specimens and giving advice for which grateful thanks are due. Additionally a few older literature and herbarium sources have been checked, notably George Johnston's *Botany of the Eastern Borders* (1853) (GJ) from which some records have been extracted (mostly backed by specimens in **E**), and F A Rogers *Cheviotland Rubi and Rosae* (J. Bot., 35, 1897: 490-1) (FAR), most of the entries in which are assignable to current names. However, the records in C C Babington *The British Rubi* (1869) have been omitted until they can be matched to any extant specimens. Therefore a fresh account has been prepared, incorporating most, although not all, of the information given in the *Flora* (for which the earlier records of Eric Edees (ESE) are valuable). Maps on a 10km square basis have been compiled for those species with more than a handful of sites, including a few squares in Edees and Newton's *Brambles of the British Isles* (1988) (E and N) where a species was not seen in 2000. It should be pointed out that visits were not made south of the Tyne Corridor nor to the Newcastle conurbation so that most records from these areas are from herbarium sheets. It is emphasised that a deal of field-work is still required before a comprehensive account for such a large area can be written, and that there will be more brambles to be found, e.g. perhaps *R. robiae*. Further searches of herbaria may also yield earlier new vice-county records for some species. A note on the national distribution is included in each entry, for comparative purposes. GHB is responsible for all unattributed records (dated 1991/2000); specimens of most taxa so dated (but by no means for every record listed) are in **Hb GHB**. See also 2001 Addendum on p121.



## Section **RUBUS**

### Subsection **RUBUS**

A group believed to have originated by hybridisation with *R. idaeus*.

**R. fissus** Lindley 141

During the 19th century probably scattered throughout Northumberland on moors and in heathy woods, but not seen for many years. Rare in England, still reasonably frequent in some Scottish districts.

68 46(NU)12: Twizell House Dean, W JARDINE, **E** (1826), det. AN; GJ (1853) as '*R. plicatus*'. 46(NU)03: Copses on Kyloe Crags, GJ (1853).

**R. nessensis** W. Hall 141

During the 19th century probably occurring here and there in damper wood and heathy margins, but only one recent record. Occasional throughout Britain.

67 35(NY)87: ESE, **NMW** (1970), det. ESE (but not in **NMW** printed list of 2000).

68 36(NT)93: Kirknewton, DO, **K** (1898), det. AN.

**R. scissus** W. C. R. Watson 141

New to the flora of Northumberland. Previously, probably locally common on remnants of heathlands and moorland fringes, now rare. Widely scattered in upland and northern Britain.

67 35(NY)88: Hareshaw Linn, R V JONES, **NMW** (1956), det. AN. 35(NY) 69 and 78: various sites in Kielder Forest, G SIMPSON (1997-2000), det. D R Grant, the following confirmed by GHB: 35(NY)69: near roadside N of Kielder village, 35(NY)78: N side of Kielder dam in Hawkhope Farm area (2001).

### Subsection **HIEMALES** E. H. L. Krause

#### Series **SYLVATICI** (Mueller) Focke

**R. errabundus** W. C. R. Watson 141

Common in NW England and central Scotland, with occasional sites in the Borders and Northumberland. Rare.

67 45(NZ)37: Hartley Links, C C BABINGTON, **CGE** (1863), det. B A Miles. 45(NZ)18: Mitford, GAS (1962), det. ESE. 45(NZ)27: E and N.

68 46(NU)00: ESE, **NMW** (1970) (but not in **NMW** printed list of 2000). 46(NU)10: Framlington Gate (2000).

**R. laciniatus** Willd. 141

Map 2

An occasional escape (?bird sown) or cast-out from gardens.

67 35(NY)98: Knowesgate, GAS (1958).

68 46(NU)11: N bank of R Aln between Lion and Denwick Bridges, RSGT (1970).

**R. leptothyrsos** G. Braun 141

Map 3

Very common in central Scotland, this species thins out southwards in the eastern Borders and Northumberland. Somewhat localised.

67 45(NZ)28: Plessey Woods Country Park (1991).

68 46(NU)11: near Alnwick, FAR (1897 as '*R. danicus*'); Eglington (2000).

**R. lindleianus** Lees 142

Essentially western in distribution in north England and Scotland. Very rare.

67 45(NZ)28: Morpeth, Y HESLOP-HARRISON, K (1946), det. AN.

**R. newtonii** Ballantyne (inedit.) 142

Map 4

This bramble has been known for some 150 years in Northumberland and the eastern Borders, latterly termed '*R. trifolius*' by AN owing to its having three-leaved barren stems. It has proved to be widespread north of the Tyne, and edges into Berwickshire and East Lothian. It is locally common by old moorland margins and by woods and hedges, often associated with honeysuckle.

67 45(NZ)27: Stannington area, CGE (1858), det. AN, (2000).

68 46(NU)12: Twizell House Dean, GJ (1853) – the description of '*R. leucostachys*' fits well and there is a lot of the bramble in the vicinity. 46(NU)11: Eglington area, BM (1897), det. AN, (2000).

**R. sciocharis** (Sudre) W. C. R. Watson 142

New to the flora of Northumberland. Very thinly scattered throughout England, with one outlier in Edinburgh.

68 36(NT)95: Berwick-upon-Tweed, T S WHARTON, SUN (1991), det. AN.

#### Series RHAMNIFOLII (Bab.) Focke

**R. amplificatus** Lees 142

In north England, almost confined to scattered stations in Yorkshire and the eastern Borders coast; otherwise widespread in the Midlands, South England and Ireland.

67 45(NZ)29: Stobswood N of Ulgham (2000). First record for v.c.

68 46(NU)04: Ancroft [GJ], E [ca 1850], (2000). 46(NU)13: Belford Craggs, GJ (1853), both as '*R. macrophyllus* var. *schlechtendalii*', nearby at Harper's Heugh picnic site (2000).

**R. elegantispinosus** (A. Schum.) H. E. Weber 142

Of horticultural origin, now widely naturalised in east central Scotland and parts of eastern England, spreading into other areas. It will almost certainly be increasingly found throughout lowland Northumberland in future, especially near railway lines.

67 35(NY)86: Haydon Bridge, waste ground near rail station (2000). First record for v.c.

68 46(NU)00: Craggside, Rothbury (1991), det. AN.

**R. lindebergii** P. J. Mueller 142

Map 5

Common from the English to the Scottish Midlands; common and widespread, especially in the north, usually on the fringes of former moorland, on mineral soils.

67 35(NY)86: Haydon Bridge, JGB, CGE (1865), det. B. A. Miles. 45(NZ)08: S of Netherwitton (2000).

68 36(NT)93: near Ford, GJ (1853), (2000). 46(NU)11: Eglington, FAR (1897), (2000) – both as '*R. rhamnifolius*'.



**R. nemoralis** P. J. Mueller

142

Map 6

One of Britain's most widespread and frequent brambles, although less so in north-east England and the eastern Borders. Localised.

67 35(NY)86: N of Haydon Bridge (2000). 35(NY)96: Bridge End –Oakwood, C BAILEY, MANCH (1894), det. AN. 45(NZ)19: Beacon Hill, GAS (1964), det. ESE.

68 46(NU)11: Eglington area, FAR (1897) (as '*R. selmeri*'), (2000).

**R. pistoris** W. C. Barton and Riddelsd.

A dwarf version of *R. nemoralis*, although not intergrading with it. Very rare.

67 35(NY)76: Bardon Mill, JGB, CGE (1869), det. B. A. Miles.

**R. polyanthemus** Lindeb.

142

Map 7

Very common throughout Britain, less so in Northumberland other than in the south, but seldom in quantity. Localised.

67 35(NY)96: Oakwood, N of Hexham, C BAILEY, (ref. in E) (1894), (2000).

68 46(NU)21: Alnmouth area, FAR (1897), (1991); (both as '*R. pulcherrimus*').

Series **DISCOLORES** (Mueller) Focke

**R. armeniacus** Focke

142

Himalayan Giant

Map 8

*R. procerus* auct.

An increasingly frequent garden escape or cast-out, characterised by the robustness and size of all its parts (hence its horticultural name).

67 46(NU)20: Amble (1991). 45(NZ)16: Heddon-on-the-Wall (2000).

68 46(NU)12: Chathill area, AN (1981); Doxford Hall (2000).

**R. ulmifolius** Schott

142

Although one of the commonest species in south and central England, this bramble thins out northwards and becomes more or less confined to the coast, especially in the east. Very rare.

67 45(NZ)36: Wallsend Dene, D N MITCHELL and A COLES (*Wats*, 1991, 18, 424), !1990.

Series **VESTITI** (Focke) Focke

**R. vestitus** Weihe

142

Map 9

Very common in south and central England, but decreasing northwards. Rare.

67 Centered on 45(NZ)06/16 on either side of the R Tyne including Corbridge-Ovingham-Wylam areas, ESE (1964), (2000). 45(NZ)37: Hartley Links, C C BABINGTON, CGE (1863), det. B A Miles.

68 46(NU)11: Eglington (2000). First record for v.c.

Series **MUCRONATI** (Focke) H. E. Weber

**R. mucronulatus** Boreau

142

Predominantly a species of central and NE Scotland; in England, sporadic from Staffordshire northwards. Uncommon, probably only in the north.

[67 46(NU)20: the Amble (1991) record requires to be re-checked, as it is possibly the next species.]

68 46(NU)12: Twizell-dean, [GJ], E (1851) as '*R. macrophyllus*', det. GHB. 36(NT)93: Ford, AN (1971), and to S and SE, frequent (2000). 46(NU)02: Chillingham Castle grounds (1991). 46(NU)00/01: Thrunton Wood, frequent (2000). 46(NU)03 and 46(NU)11: (E and N).

**R. wirralensis** Newton

142

Map 10

Although mainly western in its distribution in Britain, this bramble has proved to be quite common in Northumberland, especially N of the R Wansbeck.

67 35(NY)65: [The Slaggyford, JGB, E (1869) entry in the *Flora* is an error for] between Slaggyford and Halton-Lea-Gate, C W MUIRHEAD, E (1969), det. AN. 46(NU)20: Acklington (2000).

68 46(NU)03: Kylloe Wood area, AN (1971), (2000).

Series **MICANTES** Sudre ex Bouvet

**R. raduloides** (Rogers) Sudre

142

Scattered throughout Britain up to west central Scotland, this species is very scarce in the east and this is reflected locally. Rare.

67 45(NZ)28: Morpeth, by A197 (old road layby) (2000). First record for v.c.

68 46(NU)22: Embleton area, AN (1981). 46(NU)01: Roadside SW of Eglington (2000). 46(NU)11: Alnwick, below Lion Monument (2000).

Series **ANISACANTHI** H. E. Weber

**R. anisacanthos** G. Braun

142

Map 11

Concentrated in north England, this species is widespread and frequent.

67 45(NZ)38: Newbiggin-by-the-Sea, E S MARSHALL, BM (1896), det. AN. 45(NZ)28: Longhirst area (2000).

68 46(NU)11: near Alnwick, FAR, BM (1897), det. AN (2000). 46(NU)13: near Budle (2000).

**R. drejeri** G. Jensen ex Lange

142

Map 12

The main populations are in central and SE Scotland, and NE England; seldom occurs in quantity. Localised.

67 45(NZ)18: Gubeon Plantation (Tranwell Woods), SW of Morpeth (2000). First record for v.c.

68 46(NU)11: N of Alnwick, FAR (1897); Eglington (2000). 46(NU)03: Kylloe Wood area, AN (1971), (2000).



**R. infestus** Weihe ex Boenn.

142

Map 13

Scattered from the Midlands to central Scotland, less frequent in the east. Localised.

67 35(NY)96: Leazes, Hexham, C BAILEY, **LIV** (1894), det. AN; east of Low Brunton (2000).

68 46(NU)21: Alnmouth area, FAR (1897). 46(NU)11: near Alnwick, AN (1981); Eglington (2000).

Series **RADULAE** (Focke) Focke

**R. adenantoides** Newton

142

Map 14

Widespread in central and northern England, and in Ireland. Common.

67 45(NZ)05: Healey, ESE, **NMW** (1964). 35(NY)96: Oakwood area, near Corbridge (2000).

68 46(NU)00: Craggsdale (1991), det. AN. 46(NU)04: S of Scremerston (2000).

**R. echinatoides** (Rogers) Dallman

142

Map 15

Widespread throughout Britain, most frequent north of Derbyshire. Common.

67 35(NY)96: [N of] Hexham, C BAILEY, **MANCH** (1894): Acomb/Oakwood/Sandhoe areas (2000) (a lot).

68 46(NU)22: Dunstanburgh Head, FAR (1897). 46(NU)21: Craster, AN (1996).

**R. flexuosus** P. J. Mueller and Lefèvre.

142

More or less confined to south of The Wash, so that the following site is well north of its known range. Very rare, should be looked for again.

67 35(NY)86: Haydon Bridge, I M HAYWARD, **OXF** (1913), det. AN.

**R. radula** Weihe ex Boenn.

142

Map 16

Widely distributed over Britain, particularly in central and east Scotland, and in the Borders and NE England, on morainic soils. Common.

67 45(NZ)37: Seaton Delaval, C C BABINGTON, **CGE** (1863), det. B A Miles. 45(NZ)29: Stobswood, near Widdrington Station (2000).

68 36(NT)93: Ford, GJ, **E**, (ca 1850) (2000).

Series **HYSTRIX** Focke

**R. dasyphyllus** (Rogers) E. S. Marshall

143

Map 17

One of the commonest British brambles, although petering out quickly north of the Clyde/Forth valley in Scotland. The commonest Northumberland species.

67 45(NZ)26: Scotswood Dene, JGB, **CGE** (1849), det. B A Miles. 35(NY)76: Haltwhistle (2000).

68 46(NU)00: ESE (1970) (but not on **NMW** printed list of 2000); Rothbury (2000).

Series **GLANDULOSI** (Wimmer and Grab.) Focke

**R. pedemontanus** Pinkwart

143

Widely distributed in England but not at all common. Very rare; the undernoted are the most northerly stations in the British Isles.

68 46(NU)11: Eglington, FAR, **BM** (1897) (as '*R. bellardi*'), det. AN, (2000); Hulne Priory, NW of Alnwick, AN (1981).

Section **CORYLIFOLII** Lindley

Members of this section are frequently difficult to identify, owing to their probable, and comparatively recent, hybrid origin between *R. caesius* and various members of Subsection Hiemales. Thus, as well as the following five species, there are other taxa scattered throughout the two vice-counties that, to date, are unidentifiable; notably, there is a smaller, 'neater' version of *R. tuberculatus* occasionally found, e.g. at the old railway station at Alnwick, and elsewhere.

**R. eboracensis** W. C. R. Watson

143

Map 18

Common from the Midlands to central Scotland, mainly in the east. Common, especially in hedgerows, but seldom as robust as *R. latifolius* and with pink or pinkish flowers.

67 45(NZ)05: Healey, ESE, **NMW** (1964). 35(NY)97: Humshaugh (2000).

68 46(NU)21: Alnmouth, FAR (1897) (as '*R. dumetorum* var. *cyclophyllus*'). 46(NU)04: South Low, GAS, **NMW** (1963), det. ESE; (in that area) (2000).

**R. hindii** A. L. Bull sensu Watson pro max pte

143

*R. scabrosus* Mueller

New to the flora of Northumberland. First described in 1998, this species is widespread in eastern England S of the Humber and occurs sporadically further north. It is probably scattered here and there in Northumberland and needs to be looked for. Like *R. tuberculatus*, but with pink flowers and longer prickles.

67 45(NZ)18: by minor road S of Mitford Castle (2000), det. AN.

68 46(NU)12: near Newham level crossing (1991), det. GHB (coll. as *R. tuberculatus*).

**R. latifolius** Bab.

143

Map 19

The commonest bramble in central, east and SE Scotland and NE England, often festooning hedgerows especially within sight of the sea; its large white flowers are conspicuous from the end of May until into August. However, it is variable and weak forms do occur. A very common and widespread Northumberland species.

67 45(NZ)08: Wallington, Y HESLOP-HARRISON, **K**, (1946); Hartburn area (2000).

68 46(NU)04: near Ancroft, [GJ], **E** [ca 1850] (as '*R. corylifolius*'), (2000).

**R. pruinosis** Arrh.

143

Common in some areas of England, but not in the NE. Rare.

67 45(NZ)06: Whittle Dene, GAS (1964), det. ESE as near this species.

68 46(NU)11: Alnwick, DO, **K** (1888) det. AN. 46(NU)21: Craster, GAS (1962), det. ESE. 46(NU)13: Ross, GAS (1968), det. ESE.



**R. tuberculatus** Bab.

143

Uncommon away from Lancashire south to the Isle of Wight, also in central Scotland, probably increasing as it is a vigorous coloniser of waste ground by roads, railways and canals. Apparently uncommon as yet, but confusion with related species has obscured its frequency; needs to be looked for.

67 46(NU)20: Amble (1991). 45(NZ)18: roadside at Mitford Hall (2000).

68 36(NT)92: Humbleton, Wooler (2000).

Section **CAESII** Lej. and Courtois**R. caesius** L.

143

Dewberry

Map 20

In the *Flora* (p143), because no records had been confirmed by ESE or AN, this usually distinctive species was placed in square brackets. Since then, it has been found to be widespread, as it is in most of England, but just extending into Scotland.

67 45(NZ)16: near Wylam, GAS (1994), det. AN, (*Wats*, 1995, 20, 426). 45(NZ)28: Morpeth, by A197 (old road layby) (2000), det. AN.

68 46(NU)21: Howick, FAR (1897); above Howick Burn, GAS (1994), det. AN, (*Wats*, 1995, 20, 426). 46(NU)13: Burton, GAS (1999).

**ROSA**

In roses, A L Primavesi is abbreviated to ALP.

**Rosa luciae** Franchet and Rochebr.

143

Memorial Rose

Hortul. New to the flora of Northumberland. Native in E Asia.

67 Nether Warden, by roadside, S (1969), det. ALP.

**R. arvensis** Hudson

143

Field-rose

68 An additional record, roadside near Falldon, S (1998); so now in three contiguous 5 x 5km squares.

**R. arvensis x canina**

143

= **R. x verticillacantha** Mèrat

Native. First record for Northumberland.

68 Hulne Park, WR (1869), BM, det. ALP.

**R. pimpinellifolia x sherardii**

143

= **R. x involuta** Sm.

Native. First records for Northumberland.

67 Heaton Dene (1834), CGE; Newcastle, Ouse Burn, RBB, E. Near mouth of R Wansbeck, E S MARSHALL (1896), CGE.

68 Kyloe, HEF (1885), LIV. Near Flotterton [36(NT)99.02] (1855), CGE. All det. ALP.

**R. mollis x pimpinellifolia**

143

= **R. x sabinii** J. Woods

67 Cresswell (1874), CGE, det. ALP.

- R. pimpinellifolia x rubiginosa** 143  
 = **R. x biturigensis** Boreau  
 Native. First record for Northumberland.  
 67 Newcastle, W A STABLES, CGE, det. ALP.
- R. stylosa** Desv. x **canina** 144  
 = **R. x andegavensis** Bast.  
 68 Haggerston, in a hedge, S (1999), det. ALP. *R. stylosa* occurs in S England; it is unknown in the north; and it is obscure as to how and why this hybrid should have been introduced into Northumberland.
- R. canina** L. 144 Dog-rose  
 Map 21
- R. caesia x canina** 144  
 = **R. x dumalis** Bechst.  
 Map 22
- R. caesia** subsp. **caesia** x **canina** 144  
 67 Heaton Dene, NJW, CGE. Hexham, C BAILEY (1894), NMW. Bardon Mill and Newbiggin (Dipton Burn), E B BISHOP (1928), BM.  
 68 East Learmouth (1895), E. Brunton Burn, S (1963).  
 All det. ALP.
- R. canina x sherardii** 144  
 = **R. x rothschildii** Druce  
 Native. New to Northumberland.  
 67 Newbiggin (Dipton Burn), E B BISHOP (1928), BM. Saltwick Plantation, S (1998), det. ALP.  
 68 Kyoie 1885, BM.
- R. canina x mollis** 144  
 = **R. x molletorum** Heslop Harrison  
 Native.  
 68 Branton, K G AINLEY (1998), det. ALP.
- R. canina x rubiginosa** 144  
 = **R. x nitidula** Besser  
 Native. New to Northumberland.  
 67 In an old hedge near Morpeth, S (2001), det. ALP, Hb GAS.
- R. caesia** Sm. subsp. **caesia** 144 Hairy Dog-rose  
 67 Seaton Delaval, JGB (1864), BM, det. ALP. Wall, by R N Tyne, I L WILDE (1928), BM. Near Henshaw, E B BISHOP (1928), BM, det. ALP. Near Hexham, C L WILDE (1928), BM, det. ALP. Kirkley (1998), Catton, (1999), S, det. ALP..  
 68 Westnewton, AB (1878), CGE. East Learmouth, W. BARCLAY (1895), E. Berwick-upon-Tweed, S (1962). Near Seahouses (post 1950). Near Denwick, T W WANLESS (post 1950). Lanton, S (1998). All det. ALP.





- Acaena novae-zelandiae** Kirk 146 Piri-piri-burr  
Now appearing at more inland sites. The first 67 record (Holystone Burn) was missing from distribution map on p146 of *Flora of Northumberland*.
- 67 Simonside forest car-park, trackside, D and T HARDY (1995), second record for v.c. (*Wats*, 1997, 21, 389). Forest roadside near Smales Burn, S (1996). Blakehopeburnhaugh, S (1996). Bolam Lake Country Park, S (1997).
- 68 Howick, S (1978). Near Holburn, D O'CONNOR (1979). Hepburn Wood [46(NU)07.24], S (1995). Thrunton, forest roadside, S (1997). Bathingwell Plantation, S (1998).
- Geum rivale** L. Photograph on front cover 146 Water Avens  
67 A teratological form, found by A and G YOUNG in Plessey Woods (1989 and 1997), growing in a small patch of normal *G. rivale*. This plant has an upward-pointing flower-head, with multiple petals (twelve or more), surrounded by a rosette of leaf-like bracts, the colour of the petals extending into the midribs of some of the bracts. This resembles plants described and illustrated in G. Hegi, *Illustrierte Flora von Mitteleuropa*, 1st edition, IV (2), p 917. HALLIDAY (1997, p 270) also mentions what may be a similar variant.
- G. urbanum** L. 146 Wood Avens  
67 Seaton Sluice, A and G YOUNG (1998), a plant similar to above, with multiple petals, but with a rosette of entirely green leaf-like bracts.
- Potentilla neumanniana** Reichenb. 147 Spring Cinquefoil  
is now known as
- Potentilla tabernaemontani** Ascherson
- Fragaria muricata** Miller 148 Hautbois Strawberry  
is now known as
- Fragaria moschata** (Duchesne) Duchesne
- Fragaria x ananassa** (Weston) Loisel., Vilm., Nois and J. J. Deville 148 Garden Strawberry  
is now known as
- Fragaria ananassa** (Duchesne) Duchesne
- Alchemilla gracilis** Opiz 148  
is now known as
- Alchemilla micans** Buser  
*Alchemilla gracilis* Opiz is, in fact, *A. monticola* Opiz
- 67 A new site, on roadside verge near Ned's Whin [45(NZ)22.96], S (1998). The Scroggs site (although an SSSI) was destroyed by quarrying in 1999. An attempt was made to re-establish these plants on bare, quarried whinstone at nearby Keeper Shield quarry by moving turf with mechanical diggers. The success of this experiment is not yet known. Over 3000 plants were seen by AJR at The Scroggs during the wet summer of 1998.
- A. filicaulis** Buser subsp. **filicaulis** 149  
68 Additional site: Bizzle corrie, B H THOMPSON (1953), **Hb BHT**.  
[**A. glomerulans** Buser 149  
67 Reported on Haltwhistle Burn by F J ROBERTS (post 1970), but confirmation lacking. This would be first v.c. record.]
- Aphanes inexpectata** Lippert 149 Slender Parsley-piert  
is now known as



*Aphanes australis* Rydb.

*Cotoneaster rotundifolius* Wallich ex Lindley 150 Round-leaved Cotoneaster

68 One very large plant, evidently many years old, on W bank of Usway Burn, between Batailshiel Haugh and Shillmoor at 225m, S (2000), det. F Fryer, **Hb GAS**. Few records in Britain for this Himalayan species, presumably bird-sown from a garden. First record for Northumberland.

*Crataegus laevigata* x *monogyna* 151

is now known as

*Crataegus* x *media* Bechst.

*Prunus cerasifera* Ehrh. 151 Cherry Plum

67 Haughton Castle, MEB (1996). First record for v.c. Hortal.

### LEGUMINOSAE (FABACEAE)

*Genista tinctoria* L. 152 Dyer's Greenweed

67 Planted in Rising Sun Country Park, A and G YOUNG (2000).

68 Planted near a newly constructed pond near Branton, J HOPE (2000). The only currently known site in the v.c.

*Ulex minor* Roth 153 Dwarf Gorse

67 Planted on N bank of R Wansbeck, near North Seaton Colliery, S (1998). First record for Northumberland.

*Lupinus arboreus* Sims 153 Tree Lupin

67 North Seaton, S (1998), probably planted. First record for v.c.

*Colutea arborescens* L. 153 Bladder-senna

67 Planted near Meadowell Metro station [45(NZ)34.67], A and G YOUNG (1997). First record for Northumberland. River bank, Scotswood, J L DURKIN(2001).

*Vicia tetrasperma* (L.) Schreber 154 Smooth Tare

67 Stocksfield station, disused siding, A and G YOUNG (1996). Planted in Benwell Nature Reserve, A and G YOUNG (1996, 2000). Ponteland, in a herb garden, L S DICKSON (1998), det. A Coles.

*Lathyrus japonicus* Willd. subsp. *maritimus* (L.) P. W. Ball 155 Sea Pea

Extinct in Northumberland.

68 Probably extinct at Birling Links, through erosion of dunes by sea, S (1994).

*L. grandiflorus* Sm. 155 Two-flowered Everlasting-pea  
Hortal.

67 Fourstones, on derelict ground, S (1995, 1996).

68 Longhoughton Quarry, G D KITCHENER (2000). New to v.c.

*L. latifolius* L. 155 Broad-leaved Everlasting-pea

67 Established by roadside, not far from Dipton Mill, S (2000). First record for v.c.

- L. nissolia** L. 155 Grass Vetchling  
 67 Stewart Shiels [35(NY)86.98], J YOUNG (1994).  
 68 Planted near a newly constructed pond near Branton, J HOPE (2000). First record for v.c.
- Melilotus altissimus** Thuill. 156 Tall Melilot  
 67 Hadston Links, S (1992). Newbiggin-by-the-Sea, S (1996). Waste ground near former Northumberland Dock, A and G YOUNG (2000), Q J GROOM (2000).
- M. officinalis** (L.) Lam. 157 Ribbed Melilot  
 A recent record for this uncommon species, which probably arrived on the banks of R Tyne with ballast, before 1850.  
 67 Rising Sun Country Park, A and G YOUNG (2000), **Hb GAS**.
- Medicago arabica** (L.) Hudson 157 Spotted Medick  
 First record for Northumberland for more than 50 years.  
 68 Alnmouth, near golf course, A and G YOUNG (1998), **Hb GAS**, det. R M Burton, ! 2000.
- Trifolium micranthum** Viv. 158 Slender Trefoil  
 68 Spindlestone S Hill, S (1995). Formerly grew on dip slope of whin, just N of Craster village. However, a visit, S (1999), showed that soil had evidently been spread over this beautiful habitat, with the loss of this and other interesting plants.
- T. incarnatum** L. 159 Crimson Clover  
 68 Casual, near South Charlton, E M TULLY (1957). First record for Northumberland.
- Lotus corniculatus** var. **sativus** Chrtková 159  
 In recent years it appears that seed of this has often been intentionally sown in Northumberland, although the plant is much less attractive than native *L. corniculatus*.
- Onobrychis viciifolia** Scop. 160 Sainfoin  
 67 Planted in Benwell Nature Resrve, A and G YOUNG (1996, 2000).

#### OXALIDACEAE

- Oxalis corniculata** L. 160 Procumbent Yellow-sorrel  
 67 Billy Mill [45(NZ)33.69], garden weed, A and G YOUNG (1985-99).
- O. exilis** A. Cunn. 160 Least Yellow-sorrel  
 68 Doddington North Moor, in a plantation, S (1998).
- O. rosea** Jacq. 160 Annual Pink-sorrel  
 Casual hort.; from Chile. First record for Northumberland.  
 68 Seahouses, roadside, S (1997).

#### GERANIACEAE

- Geranium sanguineum** L. 161 Bloody Crane's-bill  
 67 Planted in Benwell Nature Reserve, A and G YOUNG (1996, 2000).  
 68 var. **striatum** Weston (var. *lancastricense* (Miller) Gray)



Scremerston, sand dunes, S (1996).

**G. endressii x versicolor** L.

161

Druce's Crane's-bill

= **G. x oxonianum** Yeo

68 Thrum Mill, S (1999).

## LINACEAE

**Linum usitatissimum** L.

163

Flax

With increasing cultivation of flax in recent years, this is now more frequently being found as casual.

67 Wylam, old railway, S (1996). Lynemouth, S (1997). Sandy Bay, S (1997). Roadside verge from A68 to Quarry House [45(NZ)06.51]; near Killingworth Lake [45(NZ)27.70], A and G YOUNG (2000), ! 2000.

68 Near Wooler, Common Road, S (1995). Near Lilburn Pond, S (1999).

## EUPHORBIACEAE

**Mercurialis annua** L.

163

Annual Mercury

67 Has persisted for 20 years as garden weed in Morpeth, S (2000).

**Euphorbia cyparissias** L.

164

Cypress Spurge

67 Wardrew, S (1992). Hortal.

**E. amygdaloides** L.

164

Wood Spurge

67 Blanchland, S (1993), garden escape.

68 Thrum Mill, S (1999), garden escape. First record for v.c.

## BALSAMINACEAE

**Impatiens noli-tangere** L.

165

Touch-me-not Balsam

67 By Cockshaw Burn, near Hexham [35(NY)91.63], J E ANGEL and C M IRVINE (1996). Origin unknown.

## TILIACEAE

**Tilia platyphyllos** Scop.

167

Large-leaved Lime

67 Hexham, Tyne Green, at far western end, row of trees planted between footpath next to railway and river, over 80 years old, even aged, AJR (1998).

**Tilia cordata x platyphyllos**

167

Lime

is now known as

**Tilia x europaea** L.

## MALVACEAE

**Lavatera arborea** L.

168

Tree-mallow

68 Holy Island, S HEDLEY (1992). Casual hortal.

## ELAEAGNACEAE

- Hippophae rhamnoides** L. 168 Sea-buckthorn  
 67 A single plant, growing on a slope near Freestone Point, Tynemouth, A and G YOUNG (1999). Very unlikely to have been planted, although possibly bird-sown, otherwise native.

## HYPERICACEAE (CLUSIACEAE)

- Hypericum androsaemum** L. 169 Tutsan  
 67 Black Pasture Nature Reserve [35(NY)93.69], D and T HARDY (1995). Tranwell, S (1998).

- H. pulchrum** L. 169 Slender St John's-wort  
 67 This species, which usually grows on non-calcareous soils, occurs on some of the Spetchell heaps at Low Prudhoe, S (1995). Perhaps it is conceivable that a few of the heaps may consist not of calcium carbonate, but of unused anhydrite.

- H. maculatum** subsp. **obtusiusculum** x **perforatum** 169  
 = **H. x desetangsii** Lamotte

F E Crackles (*Wats*, 1990, 18, 63-67) has given an interesting account of the occurrence in Yorkshire of this hybrid along railways, almost invariably in the absence of one or both parents. In Northumberland the hybrid occurs in places along the track of the former N Tyne railway line, in the fragments still recognisable as such, and also near some still existing railways, e.g. near Longhirst station.

## VIOLACEAE

- Viola reichenbachiana** Jordan ex Boreau 170 Early Dog-violet  
 67 West Dipton Burn, beside stream, 150m upstream from Queen's Cave, AJR (1996). Third extant site in Northumberland.

- V. canina** L. subsp. **canina** x **riviniana** 170  
 = **V. x intersita** G. Beck  
 68 Alnmouth, P A SIMS (1954), det. J P M Brenan. New to v.c.

## LYTHRACEAE

- Lythrum portula** (L.) D.A. Webb 172 Water-purslane  
 67 Derwent Reservoir, near Millshield, S (1997). The pond near Shaftoe, where the plant grew, is no longer in existence, S (1999).  
 68 Probably now extinct in pond near Hazeltonrigg, owing to drying-out of pond, S (1999).

- L. junceum** Banks and Solander 172 False Grass-poly  
 67 Morpeth, bird-seed alien, S (1998), det J L Mason. Mediterranean. Casual, new to the flora of Northumberland.

## ONAGRACEAE

- Epilobium palustre** x **parviflorum** 174  
 = **E. x rivulare** Wahlenb.  
 Native. New to the flora of Northumberland.



68 Alnmouth, near golf course, G D KITCHENER (2000).

**E. ciliatum** Rafin. x **montanum** 174

= **Epilobium** x **interjectum** Smejkal

Native. New to the flora of Northumberland.

67 Newcastle upon Tyne, Castle Leazes, roadside hedge, bordering on allotments, G D KITCHENER (1999).

68 Cragside; Preston; Alnmouth, G D KITCHENER (2000).

**E. ciliatum** Rafin. x **obscurum** Schreber 174

= **Epilobium** x **vicinum** Smejkal

Native. New to the flora of Northumberland.

68 Cragside; Doxford Hall, G D KITCHENER (2000).

**E. roseum** Schreber 174 Pale Willowherb

Second confirmed record for 67.

67 Near Littlecharle Tower [45(NZ)01.83] (at 160m), damp, shady ground between wall and roadside, S (1999), det. T D Pennington. Hexham, garden weed, G M KAY (2000).

**E. ciliatum** Rafin. x **palustre** 174

= **Epilobium** x **fossicola** Smejkal

Native. New to the flora of Northumberland.

68 Alnmouth, marshy, sandy ground, G D KITCHENER (2000).

#### HALORAGACEAE

**Myriophyllum verticillatum** L. 175 Whorled Water-milfoil

67 Planted in Benwell Nature Reserve, A and G YOUNG, (1996).

#### CORNACEAE

**Cornus suecica** L. 176 Dwarf Cornel

Not previously recorded on S-facing slope of The Cheviot.

68 Standrop Burn (at 530m), J HOPE (1982), J HOPE, D and T HARDY (1998). On watershed between Harthope Burn and R Breamish at 630m, I and K DAVIDSON and J HOPE (2000).

#### ARALIACEAE

**Hedera colchica** (C.Koch) C. Koch 177 Persian Ivy

67 Near Wylam, S (1999).

#### UMBELLIFERAE (APIACEAE)

**Eryngium maritimum** L. 177 Sea-holly

Still just managing to survive.

68 Alnmouth, one very small plant, S (1997).

**Anthriscus caucalis** Bieb. 178 Bur Chervil

67 Near Ponteland, B H THOMPSON (1953).

- Smyrniolus olusatrum** L. 178 Alexanders  
67 Warkworth, S bank of R Coquet, S (1997). Recorded in 35(NY)85 in 1910, H JEFFREYS.
- Berula erecta** (Hudson) Coville 179 Lesser Water-parsnip  
68 Priestdean Burn, near Fleetham, S (1999).
- Oenanthe pimpinelloides** L. 180 Corky-fruited Water-dropwort  
68 Native in S England, but planted in a newly constructed pond near Branton, J HOPE (1999).
- Bupleurum subovatum** Link ex Sprengel 181 False Thorow-wax  
68 Spittal (1880), E.
- Apium graveolens** L. 181 Wild Celery  
67 Near mouth of Chevington Burn, one plant, J LORING (1988).  
68 Berwick, behind pier, R DUNLOP (1832), ex **Hb Johnston, E**, conf. D McKean (given as 81), ex MEB.
- Peucedanum ostruthium** (L.) Koch 183 Masterwort  
First record for 67 for many years.  
67 A strong colony at W end of enclosure around Grindon Green, G SIMPSON (1992), ! 1997, **Hb GAS**.

#### PYROLACEAE

- Pyrola media** Swartz 185 Intermediate Wintergreen  
67 The colony by the Darden Burn (as *P. minor* in *Flora of Northumberland*, 1993, p 185) flowered in 1993 and proved to be *P. media*. This is on N bank of stream, near Key Heugh, near the most westerly of three pine trees; six flowering spikes seen by GAS on 23 June 1993.
- Monotropa hypopitys** L. 186 Yellow Bird's-nest  
First definitely confirmed record for Northumberland.  
67 Honeycrook Burn (at 150m), on heaps of old lead mine, lightly shaded by pine and birch, L C COOMBES (1996), ! 1996, 17 spikes. Seen again by LCC each succeeding year (including 2000), with an additional site 100m to the east in 1999.

#### ERICACEAE

- Gaultheria mucronata** (L. fil.) Hooker and Arnott 187 Prickly Heath  
67 Planted at North Shields Metro station, A and G YOUNG (2000). First record for v.c. Near Kielder Water, G SIMPSON (2001).

#### PRIMULACEAE

- Primula florindae** Kingdon-Ward 190 Tibetan Cowslip  
New to the flora of Northumberland. From Tibet.  
68 Planted in Longhoughton Quarry, G D KITCHENER (2000).
- Lysimachia nummularia** L. 190 Creeping-Jenny  
67 Elsdon, S (1997).  
68 On damp limestone outcrop, near Swinhoe, S (1999).



- Anagallis arvensis* L. subsp. *caerulea* Hartman 191 Blue Pimpernel  
is now known as  
*Anagallis arvensis* L. subsp. *foemina* (Miller) Schinz and Thell.

### OLEACEAE

- Ligustrum vulgare* L. 193 Wild Privet  
67 Tynemouth, not far from the *Salvia verbenaca*, A and G YOUNG (1999). On Magnesian Limestone; could it be native, as in 66?  
*L. lucidum* W. T. Aiton 193 Glossy or Chinese Privet  
Hortal. From E Asia. Very attractive. First record for Northumberland..  
67 Tynemouth, eastern end of old quarry, A and G YOUNG (1999). **Hb. GAS.**

### GENTIANACEAE

- Blackstonia perfoliata* (L.) Hudson 193 Yellow-wort  
In recent years, has often appeared (especially in SE Northumberland) on derelict land and elsewhere, sometimes accompanied by *Centaureum erythraea*. Possibly seed has been intentionally sown; possibly brought with soil; possibly dormant seeds had been brought to the surface.  
67 Sown at Hauxley Nature Reserve, S (1997); has been there since at least 1990, AJR. Northumberland Dock, Howdon and Port of Tyne, Howdon, in abundance on poorly vegetated spoil and derelict ground, D N MITCHELL (1998). Bull Ring Dock, North Shields, abundant on derelict land and tracksides; derelict Esso terminal, North Shields, abundant on bare ground and derelict land, D N MITCHELL (1999).  
68 Planted near newly constructed pond near Branton, J HOPE (1999).  
*Gentiana asclepiadea* L. 194 Willow Gentian  
68 On moorland above Rothbury, J M HUMPHRIS and M COOPER (1996), **Hb GAS.** Hortal, new to v.c. 68.

### MENYANTHACEAE

- Nymphoides peltata* O. Kuntze 195 Fringed Water-lily  
67 Planted in new ponds near Billy Mill [45(NZ)32.69], A and G YOUNG (1998).  
68 R Tweed, NE of Union Bridge, J M CROFT and C D PRESTON (1991, 1994) (*Wats*, 1995, 20, 295). First record for 68.

### RUBIACEAE

- Galium mollugo* x *verum* 196  
= *G. x pomeranicum* Retz.  
67 By road to farm past Burnfoot [35(NY)90.65], verge, AJR (1998). Second record for 67. Bardon Mill, T G EVANS, and by Military Road opposite Hotbank, R A BLADES (2000).  
*G. sternerii* Ehrend. 197 Limestone Bedstraw  
68 Belford, E B TERRAS (1883), **BM**, det. K M Goodway. Linshiels (1954), **CGE**, det. K M Goodway.

- G. tricornutum** Dandy 197 Corn Cleavers  
67 Newcastle upon Tyne, W GOURLIE, BM. First record for v.c.

#### HYDROPHYLLACEAE

- Phacelia tanacetifolia** Bentham 198 Phacelia  
Hortal. From WN America. Cultivated as a nectar plant for bees; but also encourages hoverflies, which are successful aphid predators and so beneficial to crops, see M Briggs (*BSBI News*, 1993, no. 63, p31). New to the flora of Northumberland.  
67 Littleharle Tower [45(NZ)01.83], in a cultivated field, (probably sown), S (1999). Near Walker, old railway, recently converted into a cycle-track, S HEDLEY (2000), det. B S Wurzell.  
68 Alnmouth, on dunes, A and G YOUNG (1998).

#### BORAGINACEAE

- Pulmonaria officinalis** L. 199 Lungwort  
67 Haltwhistle Burn, A and G YOUNG (1999). In forest near Haughtengreen, G SIMPSON (1990).  
**Symphytum asperum** x **officinale** 199 Russian Comfrey  
= **S. x uplandicum** Nyman  
Maps 27 and 28  
Occurs in two forms, one with red-purple flowers, the other with flowers which are pink in bud, but change to blue. See distribution maps.  
**S. 'Hidcote Blue'** 200 Hidcote Comfrey  
67 Hartburn, roadside; garden escape, S (1997) New to the flora of Northumberland..  
**S. grandiflorum** DC. 200 Creeping Comfrey  
67 Brier Dene, A and G YOUNG (1995).  
**Borago officinalis** L. 200 Borage  
67 Ladycross Bank Quarry, S (1992). Near Shiremoor, disused railway [45(NZ)31.70], A and G YOUNG (1996). Tynemouth, H A ELLIS (*V*, 1997, 82, 23).  
68 Near Harehope, S (1999). Berwick, N bank of R Tweed, A and G YOUNG (1999).  
**Trachystemon orientalis** (L.) G. Don. fil. 200 Abraham-Isaac-Jacob  
67 Acomb, by side of old railway track, shaded by trees (at 45m), S (1996). First record for v.c. Planted in Jesmond Dene, A and G YOUNG (2000). Wallington, Q J GROOM (2000).  
**Amsinckia micrantha** Suksdorf 201 Common Fiddleneck  
67 Near Woodhorn Colliery Museum, J M HUMPHRIS (2000), ! 2000. First record for the v.c.

#### LABIATAE (LAMIACEAE)

- Galeopsis bifida** Boenn. 204 Bifid Hemp-nettle  
67 River bank, N of Mickley [45(NZ)07.62], AJR (1996).  
68 Cannomill Bog, S (1996). Fallodon, S (1998).



**Lamium maculatum** (L.) L. 205 Spotted Dead-nettle  
 68 Roadside verge, opposite Shawdon Cottage [46(NU)08.14], S (1995), the immaculate form, det. R M Harley, first record for Northumberland.

**L. hybridum** Vill. 205 Cut-leaved Dead-nettle  
 67 Haughton Castle, walled vegetable garden, MEB (1995) (*Wats*, 1997, **21**, 394). First record for 67 for many years.  
 68 Cornhill, roadside verge, S (1999).

**Ballota nigra** L. subsp. **foetida** (Vis.) Hayek 205 Black Horehound  
 is now known as

**Ballota nigra** L. subsp. **meridionalis** (Bég.) Bég.

**Lamium galeobdolon** (L.) Ehrend. and Polatschek  
 subsp. **argentatum** (Smejkal) Stace 205  
 68 Fenham, A G KNAPP (1996). First record for v.c.

**Stachys palustris** x **sylvatica** 206 Hybrid Woundwort  
 = *S. x ambigua* Sm.  
 67 Bardon Mill and Beltingham, BSBI meeting (2000).

**Lycopus europaeus** L. 207 Gipsywort  
 67 Wallsend Swallow Pond, plentiful along northern edge, in *Typha latifolia* swamp, D N MITCHELL, D CROZIER and L A KERGON (1996). Planted in Benwell Nature Reserve, A and G YOUNG (1996).  
 68 Reported by S WATSON, near Yeavering (1995) and by J A GREEN, between Monks House and Bamburgh (1998).

**Salvia verbenaca** L. 209 Wild Clary  
 67 Field on S(E) bank of R Coquet near Catheugh [45(NZ)15.99], S (1994). Evidently seed had been intentionally sown.

#### SOLANACEAE

**Hyoscyamus niger** L. 210 Henbane  
 67 Ovingham, J F BIGGE (1846), HAMU.

**Solanum linnaeum** Hepper and P. M. L. Jaeger 210 Apple-of-Sodom  
 The name *S. sodomaeum* L. said to be error for this, CLEMENT and FOSTER (1994).

#### SCROPHULARIACEAE

**Mimulus cupreus** Dombrain x **guttatus** 211 Coppery Monkeyflower  
 = *M. x burnetii* S. Arnott  
 67 R S Tyne near Kirkhaugh, BSBI meeting (2000).  
 68 Alnham, in pond, S (1999).

**M. guttatus** x **luteus** 211  
 67 R S Tyne near Kirkhaugh, BSBI meeting (2000).

- Verbascum nigrum** L. 212 Dark Mullein  
67 Planted in Hauxley Nature Reserve, S (1997).
- Linaria repens** (L.) Miller 213 Pale Toadflax  
67 North Shields, Stephenson Leisure Railway, several plants on railway ballast, D N MITCHELL and A COLES (1999).
- Cymbalaria pallida** (Ten.) Wettst. 213 Italian Toadflax  
67 Newcastle upon Tyne, Jesmond, garden walls, Q J GROOM (2000).
- Veronica agrestis** L. 215 Green Field-speedwell  
67 Warkworth Castle, R FITZ GERALD (1995).  
68 Near Alnham, S (1999).  
Following *Euphrasia* specimens, identified by P F Yeo. The grid references in square brackets, in the case of *Euphrasia*, represent the 5 x 5 km square in which the plant was recorded.
- Euphrasia arctica** Lange ex Rostrup subsp. **borealis** (Townsend) Yeo 217  
67 Near Simonburn [35(NY)85.70], E B BANGERTER and J F HALL (1958), CGE. Near Whitley Bay [45(NZ)35.70], F H PERRING (1958). Near Stakeford [45(NZ)25.80], S (1962).  
68 Holy Island [46(NU)10.40], E GIBBONS (1969).
- E. arctica x confusa** 217  
68 Old railway cutting near Edlingham (at 110m) [46(NU)10.05], S (1965).  
New to Northumberland.
- E. arctica x micrantha** 217  
67 Loop in Akenshaw Burn (gravelly patch by stream) (at 210m) [35(NY)60.85]; track by Willowbog (at 300m) [35(NY)55.85], S (1961).  
New to Northumberland.
- E. tetraquetra** (Bréb.) Arrondeau 217  
68 Near Alnmouth [46(NU)20.10], W S CRASTER (1955), not det. PFY.
- E. nemorosa** (Pers.) Wallr. 217  
68 Kyloe Hills [46(NU)00.35], F H PERRING (1958). Near Blindburn [36(NT)80.10], S (1968).
- E. confusa** Pugsley 218  
68 Near Pawston [36(NT)85.30], S (1965).
- E. confusa x micrantha** 218  
68 Near Quarry House [46(NU)10.25], S (1971). First record for v.c.
- E. confusa x scottica** 218  
67 Hawkhope Burn [35(NY)70.90], S (1967).
- E. micrantha** Reichenb. 218  
68 Harthope Burn [36(NT)95.20], P F YEO (1964).



**Odontites vernus** (Bellardi) Dumort. subsp. **serotinus** (Syme) Corb. 218

67 Great Swinburne, F H PERRING and S (1963). First record for v.c.

68 Longhoughton; Bilton, old railway, S (1994). Woodend, S (1999).

**Parentucellia viscosa** (L.) Caruel

218

Yellow Bartsia

Casual hort. First records for 67.

67 Roadside adjacent to Rothbury reservoir, A and G YOUNG (1998), S (1998). West Allotment, Silverlink Biodiversity Park [45(NZ)30.70], D N MITCHELL (1998), three plants in newly seeded area adjacent to car park and access road on westerly fringe of new country park.

### ACANTHACEAE

**Acanthus mollis** L.

219

Bear's-breech

The record for *A. spinosus* L. in *Flora of Northumberland*, p 219 is erroneous. Comparison with authentic herbarium specimens (BM) showed the plant from Newton Links House to be *A. mollis*, S (1997).

### OROBANCHACEAE

**Orobanche minor** Sm.

219

Common Broomrape

First record for 67, casual.

67 Warden, one plant, on clover, by roadside, S (1997).

### PLANTAGINACEAE

**Plantago maritima** L.

221

Sea Plantain

67 A teratological form, found by J M HUMPHRIS and C M IRVINE (1998). A single plant with about twenty congested heads on Seaton Sluice salt-marsh.

**P. lanceolata** L.

221

Ribwort Plantain

67 A teratological form at Havanah Nature Reserve, C M IRVINE (2000).

### CAPRIFOLIACEAE

**Viburnum lantana** L.

222

Wayfaring-tree

67 [45(NZ)00.60], S (1999).

**Linnaea borealis** L.

222

Twinflower

67 The small colony around a tree stump by the Norham Burn is now almost extinct, whereas the Kellas Plantation colony seems to be increasing, S (1994).

**Leycesteria formosa** Wall.

223

Himalayan Honeysuckle

67 Ponteland, in crack in pavement, A HALL (1991), flowered 1992. First record for v.c.

**Lonicera caprifolium** L.

223

Perfoliate Honeysuckle

67 Ridley Hall, F EVANS (1959). Hort. First record for v.c.

## CAMPANULACEAE

- Campanula persicifolia** L. 225 Peach-leaved Bellflower  
 67 Shiremoor [45(NZ)31.71], old railway, A and G YOUNG (1996). Minsteracres, S (1999).  
 Hortal, first records for v.c.
- C. glomerata** L. 225 Clustered Bellflower  
 67 Marden quarry, A and G YOUNG (1994).

## COMPOSITAE (ASTERACEAE)

- Solidago gigantea** Aiton 226 Early Goldenrod  
 67 Longhorsley Moor, roadside, S (1994).
- Bellis perennis** L. 227 Daisy  
 68 A teratological form at Craster, A and G YOUNG (1999). This plant had several stem leaves and irregular, globular head, with ray-florets protruding randomly, giving it a straggly appearance.
- Aster novi-belgii** L. 227 Confused Michaelmas-daisy  
 Naturalised hortal. First confirmed records for Northumberland.  
 67 Bardon Mill, bank of R S Tyne, P F YEO (1994). Near Williamston, E bank of R S Tyne (at 215m), S (1994), det. P F Yeo (*Wats*, 1997, 21, 393). Elsdon, S (1997).
- Erigeron acer** L. 227 Blue Fleabane  
 Appears to be increasing in 67, probably as a result of ground disturbance.  
 67 Low Prudhoe, Spetchell heaps, A and G YOUNG (1995). North Shields, Bull Ring Dock, abundant on derelict land and tracksides, D N MITCHELL (1999). Near Walker, old railway converted into cycle-track, S HEDLEY (1999). Waste ground near former Northumberland Dock, A and G YOUNG (2000).
- E. karvinskianus** DC. 227 Mexican Fleabane  
 67 Corbridge, on old stonework, G M KAY (1991). Introduced, native of Mexico. New to Northumberland.
- Conyza canadensis** (L.) Cronq. 227 Canadian Fleabane  
 A N American plant, commonly naturalised in SE England, but on its northern limit in Northumberland. First definite records for Northumberland.  
 67 Near Ridley Hall, F EVANS (1959). Hexham, railway station, AJR (1996). Newcastle upon Tyne, Chillingham Road Metro station, A and G YOUNG (1998), **Hb GAS**. Newcastle upon Tyne, Jesmond, many plants growing in the spaces between paving slabs of house gardens, A and G YOUNG (2000).
- Anaphalis margaritacea** (L.) Bentham 228 Pearly Everlasting  
 67 Hortal. New to the flora of Northumberland. Native in E Asia and N America. In forest, Shepherdshield [35(NY)76.73], G SIMPSON (1993).
- Inula magnifica** Lipsley 228  
 Hortal, from Caucasus. New to the flora of Northumberland.  
 67 The plant given as *Ligularia dentata* (A Gray) Hara in *Flora of Northumberland* is, according to C Jeffrey, this. Still at the same site, S (2000), **LTR**.



- Pulicaria dysenterica* (L.) Bernh.** 229 Common Fleabane  
 67 Planted in Hauxley Nature Reserve, S (1997). East Sleekburn, S (1998). Near Shiremoor [45(NZ)31.71], dismantled railway, H A ELLIS (1999). Havanah Nature Reserve, A and G YOUNG (2000).  
 68 Twizel Boathouse, junction of R Tweed and R Till; Horncliffe, R Tweed, R J GORNALL (1995). Planted near a newly constructed pond, near Branton, J HOPE (1999).
- Telekia speciosa* (Schreber) Baumg.** 229 Yellow Oxeye  
 67 Bank of R Tyne at Hagg Bank [45(NZ)10.64], A and G YOUNG (1989, 1996). Wylam, disused railway, S (1996).
- Guizotia abyssinica* (L.fil.) Cass.** 229 Niger  
 67 Morpeth, bird-seed alien, S (1998), det. J L Mason. From E Africa. New to Northumberland.
- Helianthus tuberosus* L.** 229 Jerusalem Artichoke  
 Hortal. Native of N America. New to Northumberland.  
 67 Wylam, disused railway, S (1996).  
 68 Lanton, S (1998).
- Ambrosia artemisifolia* L.** 229 Ragweed  
 Bird-seed alien. Native in N America. First records in Northumberland.  
 67 Ingoe Mill, Matfen (at 170m), G M KAY (1997). Morpeth, S (1998), det. J L Mason.
- Galinsoga quadriradiata* Ruiz and Pavón** 229 Shaggy Soldier  
 67 Billy Mill [45(NZ)33.69], garden weed, A and G YOUNG (1992, 1994). Newcastle upon Tyne, Claremont Street, AJR (1996 to 2000); colony has increased to several hundred plants annually.
- Chrysanthemum segetum* L.** 231 Corn Marigold  
 Presumably planted with wild-flower seed mixture.  
 67 Marden quarry [45(NZ)35.71], A and G YOUNG (1989). Cockshaw Burn [35(NY)91.63], J E ANGEL and C M IRVINE (1996). Near Walker, old railway converted into cycle-track, S HEDLEY (1999). Possibly dormant seed, ground disturbed.
- Artemisia verlotiorum* Lamotte** 231 Chinese Mugwort  
 67 On N bank of R Tyne, E of Bywell Bridge, S (1995). Tynemouth, near Collingwood Monument, very large patch, A and G YOUNG (1999).
- Seriphidium maritimum* (L.) P. P. Poljakov** 232 Sea Wormwood  
 68 Bamburgh, S (1996). Second extant site in Northumberland.
- Petasites albus* (L.) Gaertner** 232 White Butterbur  
 67 Aydon Castle, R FITZ GERALD (1995). Naturalised hortal. Second record in v.c.
- P. japonicus* (Siebold and Zucc.) Maxim.** 233 Giant Butterbur  
 67 Honeycrook Burn, S (1996). Third record for Northumberland.
- Doronicum plantagineum* L.** 233 Plantain-leaved Leopard's-bane  
 68 Bamburgh, sand dunes, S (1995). Ratcheugh, S (1999).

- D. x excelsum** (N. E. Br.) Stace 233 Harpur-Crewe's Leopard's-bane  
Hortal. First record for Northumberland.  
67 Roadside on Acomb Fell, S (1996), det. P S Green.
- Echinops bannaticus** Rochel ex Schrader 235 Blue Globe-thistle  
Hortal. Native of SE Europe. First records for Northumberland.  
67 Darras Hall Recreation Area, S (1998). On roadside verge, A68 near Fotherley Buildings [45(NZ)03.57], A and G YOUNG (2000).
- Arctium minus** (Hill) Bernh. subsp. **minus** 235  
67 R Coquet near Thistleyhaugh [45(NZ)12.98], S (1994).  
68 Coldgate Mill; Shawdon, S (1997).
- Arctium minus** (Hill) Bernh. subsp. **pubens** (Bab.) J. Arènes 235  
68 Howick Burn, S (1994).
- Carduus crispus x nutans** 236  
is now known as  
**Carduus x stangii** Buek
- Silybum marianum** (L.) Gaertner 237 Milk Thistle  
68 Planted in seed mixture by roadside near Spindlestone, S (1997).
- Centaurea cyanus** L. 238 Cornflower  
Presumably planted with wild-flower seed mixture.  
67 Cockshaw Burn [35(NY)91.63], J E ANGEL and C M IRVINE (1996).
- Leontodon autumnalis** L. 238 Autumn Hawkbit  
67 A teratological form, on old railway near Shiremoor [45(NZ)31.71], A and G YOUNG (1996) – 'These plants have very finely-cut leaves, with the stem completely covered with regular-sized bracts. The flower-heads consisted of numerous fine florets similar to those of a thistle.'
- Lactuca virosa** L. 239 Giant Lettuce  
68 Railway, near Shortridge Hall [46(NU)24.07], S (1995). Baker and Tate (1868) and Luckley (1893) give a record on bank of R Coquet at Warkworth, which has never been confirmed; but this new site is not far away. It is distant from the other Northumberland localities, by the Tweed and Till.
- Taraxacum parnassicum** Dahlst. 241  
The plant referred to in *Flora of Northumberland* (1993) under the synonym *T. silesiacum*.
- T. scoticum** A. J. Richards 242  
68 46(NU)20.05 (Alnmouth Dunes). First record for v.c.
- T. nordstedtii** Dahlst. 244  
68 In Hen Hole corrie at 610m, S (1975), det. AJR.
- T. hamatulum** Hagend., Soest and Zevenb. 245  
Native? New to the flora of Northumberland.



67 19 squares.

68 7 squares.

**T. marklundii** Palmgr. 245

Native. New to the flora of Northumberland.

67 8 squares.

68 2 squares.

**T. cyanolepis** Dahlst. 246

Native, at least in Scotland. New to the flora of Northumberland.

67 10 squares.

68 1 square.

**T. subcyanolepis** M. P. Christ. in Raunk. 247

Probably native. New to the flora of Northumberland.

67 14 squares.

68 4 squares.

**T. latisectum** H. Lindb. 248

Native.

68 3 squares. First records for v.c.

**T. vastisectum** Markl. ex Puol. 249

Introduced. New to the flora of Northumberland.

67 45(NZ)20.65.

**T. adiantifrons** Ekman ex Dahlst. 249

The plant referred to in *Flora of Northumberland* (1993) as *T. hemicyclum*.

67 4 squares.

68 1 square. First record for v.c.

**T. planum** Raunk. emend. H. Øllg. 250

Introduced. New to the flora of Northumberland.

67 1 square.

**T. aberrans** Hagend., Soest and Zevenb. 250

Probably introduced. New to the flora of Northumberland.

67 4 squares.

68 1 square.

#### ALISMATACEAE

**Alisma lanceolatum** With. 256 Narrow-leaved Water Plantain

68 Planted in a newly-constructed pond near Branton, S (1999). Native only further S in Britain. New to the flora of Northumberland.

- A. gramineum** Lej. subsp. **gramineum** 256 Ribbon-leaved Water Plantain  
 67 Planted in Hauxley Nature Reserve, S (1997). Doubtfully native in Britain. New to Northumberland.

#### BUTOMACEAE

- Butomus umbellatus** L. 257 Flowering-rush  
 67 Planted in Killingworth Lake (one plant), A and G YOUNG (2000).  
 68 Planted (1995) near a newly-constructed pond near Branton, and now seen in R Breamish, 600m below Brandon, J HOPE (2000).

#### HYDROCHARITACEAE

- Stratiotes aloides** L. 257 Water-soldier  
 67 Planted in Benwell Nature Reserve, A and G YOUNG (1996, 2000).

#### JUNCAGINACEAE

- Triglochin palustre** L. 258 Marsh Arrowgrass  
 67 Seen with salt-marsh plants, by roadside, A696 near Ottercops, S (1996). A68 near Colt Crag Reservoir, S (1997); and B6342, with *Spergularia marina*, *Plantago maritima* and *Puccinellia distans*, G M KAY (1995).  
 For the occurrence of this species as a roadside 'halophyte', see R Corner, BSBI News 2001, No. 86, p37 and I P Green, BSBI News 2001, No. 87, p37.

#### POTAMOGETONACEAE

- Potamogeton coloratus** Hornem. 258 Fen Pondweed  
 68 Near Belford, E B TERRAS (1879, 1880), E, det. N T H Holmes.
- P. gramineus x lucens** 258 Long-leaved Pondweed  
 is now known as
- Potamogeton x angustifolius** J. S. Presl
- P. alpinus x crispus** 259 Graceful Pondweed  
 = **P. x olivaceus** Baagøe ex G. Fischer  
 68 R Tweed, near Norham, N T H HOLMES (1978, 1981).
- P. pectinatus x vaginatus** Turcz. 260  
 = **P. x bottnicus** Hagström  
 68 In R Till, at Twizel Bridge and R Tweed, at Norham Main. The plant in R Tweed, identified by Dandy and Taylor as *P. x suecicus* K. Richter (*Flora of Northumberland*, p 260) is now considered to be *P. x bottnicus*, although *P. vaginatus* Turcz., is not at present known in Britain. See C D Preston, P M Hollingsworth and R J Gornall (*Wats*, 1998, 22, 69-82), R A King, R J Gornall, C D Preston and J M Croft (*Botanical Journal of the Linnean Society* 2001, 135, 67-70).
- Groenlandia densa** (L.) Fourr. 261 Opposite-leaved Pondweed  
 68 Planted in a newly constructed pond near Branton, J HOPE (1999).



## RUPPIACEAE

- Ruppia maritima** L. 261 Beaked Tasselweed  
 68 Lowmoor Point, in a pool near high-water mark, with *Zostera noltei*, S (1996). Second extant site in 68.

## ZOSTERACEAE

- Zostera angustifolia** (Horem.) Reichenb. 262 Narrow-leaved Eelgrass  
 is now regarded as  
**Zostera marina** L. var. **stenophylla** Ascherson and Graebner  
 Note change in spelling of *Z. noltii* to *Z. noltei*.

## ZANNICHELLIACEAE

- Zannichellia palustris** L. 262 Horned Pondweed  
 is now divided into  
 subsp. **palustris**  
 Probably the majority of records.  
 subsp. **pedicellata** (Wahlenb. and Rosén) Syme  
 67 The records (as var. *pedicellata*) of BAKER and TATE (1868) probably represent this.

## LILIACEAE

- Gagea lutea** (L.) Ker-Gawler 263 Yellow Star-of-Bethlehem  
 67 On N bank of R Blyth, in Plessey Woods and also near Hartford Hall (1999), H A ELLIS and C E ELLIS (*V*, 1997, 82, 10-11).  
 68 Howick Hall, B H THOMPSON (early 1980s).
- Fritillaria meleagris** L. 263 Fritillary  
 67 Brier Dene, A and G YOUNG (1998). Hortal. First record for v.c.
- Lilium pyrenaicum** Gouan 263 Pyrenean Lily  
 67 Near Chipchase, J F HALL (1958). Hortal.
- L. x hollandicum** Woodcock and Stearn 263 Orange Lily  
 67 Minsteracres, S (1999), of garden origin. First record for Northumberland.
- Ornithogalum angustifolium** Boreau 263 Star-of-Bethlehem  
 68 Wood near Newtown Bridge (Chillingham) [46(NU)04.25], S (1995). East Learmouth, S (1996). Bamburgh dunes, A and G YOUNG (1999).
- Hyacinthoides hispanica** (Miller) Rothm. 264 Spanish Bluebell  
 67 Ridley Hall, F EVANS (1959). Cresswell, S (1999). First records for v.c.  
 68 Seahouses, S (1997).
- H. hispanica x non-scripta** 264  
 is now known as  
**H. x massartiana** Geer

- Allium paradoxum** (Bieb.) G. Don 265 Few-flowered Garlic  
First records for 67.  
67 In a ditch, near Military Road, near Portgate [35(NY)98.68], D and T HARDY (1994), ! 1995 (Wats, 1997, 21, 401). Humshaugh, road verge, B N RICHARDSON (1996), det. AJR. Planted in Jesmond Dene, A and G YOUNG (2000).
- A. scorodoprasum** L. 265 Sand Leek  
68 Howick Hall, garden, GHB (1991).
- A. vineale** var. **vineale** 265 Wild Onion  
First records for Northumberland.  
67 Roadside near Throphill [45(NZ)13.85], S (1976). Newburn, A and G YOUNG (1996).  
68 Annstead Links, A and G YOUNG (2000).
- Convallaria majalis** L. 266 Lily-of-the-valley  
67 Ridley Hall, F EVANS (1959), of garden origin.
- Polygonatum multiflorum** (L.) All. 266 Solomon's-seal  
67 Greenhaugh, S (1995). Whittle Dene, C M IRVINE (1997).
- P. multiflorum** x **odoratum** 266 Garden Solomon's-seal  
= **P. x hybridum** Brügger  
67 Hagg Wood [45(NZ)10.64], S (1996).  
68 Lemmington; Guyzance, S (1995). First records for v.c.
- Ruscus aculeatus** L. 267 Butcher's-broom  
68 Etal, S (1998).
- Kniphofia uvaria** (L.) Oken 267 Red-hot-poker  
68 Bamburgh, sand dunes, S (1995).

#### IRIDACEAE

- Sisyrinchium montanum** E. L. Greene 268 American Blue-eyed-grass  
Hortal. Native of N America. First records for Northumberland.  
67 Billy Mill, A and G YOUNG (1995). Havanah Nature Reserve, B ASTLEY (1999).
- Crocus nudiflorus** Sm. 268 Autumn Crocus  
68 Harehope, on a roadside verge, S (1999).

#### JUNCACEAE

- Juncus tenuis** Willd. 270 Slender Rush  
67 Kielder, on disused railway track, S (1996), ! 2001.
- J. ambiguus** Guss. 270 Frog Rush  
68 On the shore, just N of Craster village, and on rocks near Black Hole, S of village, S (1997).



**J. subnodulosus** Schrank 270 Blunt-flowered Rush  
Native. Second and third records for 68.

68 Newton Pool, marshy edge, M JEFFRIES (1993), ! 1994, **Hb GAS**. Bamburgh, edge of pool, A and G YOUNG (1998), det. R Cook.

**Luzula luzuloides** (Lam.) Dandy and Wilmott 270 White Wood-rush  
is now divided into  
subsp. **luzuloides**

subsp. **rubella** (Hoppe ex Mert. and W. Koch) Holub

68 The records given in the *Flora*. Howick and Ford, **Hb GAS**.

#### GRAMINEAE (POACEAE)

**Festuca heterophylla** Lam. 271 Various-leaved Fescue  
68 Planted in the car park at Barrowburn, S (1998).

**F. rubra** L. subsp. **junceae** (Hackel) K. Richter 271  
Native. New to the flora of Northumberland. On rocky sea shore (whin).  
68 Newton Point and N of Cullernose Point, S (2000), det. C. A. Stace, **Hb GAS**.

**F. rubra** L. subsp. **megastachys** Gaudin 271  
Probably introduced. New to the flora of Northumberland.  
67 Near mouth of Chevington Burn, S (1996); in a garden in Morpeth, S (1998), det. C A Stace.

**F. arenaria** Osbeck 271 Rush-leaved Fescue  
is now divided into  
subsp. **arenaria**  
67 Newbiggin-by-the-Sea, S (1996), det. C A Stace. First record for v.c.  
68 The records given in the *Flora* for Bamburgh and probably also Scremerston and Ross Links.  
subsp. **oraria** (Dumont.) Dengler  
68 The record given in the *Flora* for Newton Links.

**Vulpia myuros** (L.) C. C. Gmelin 273 Rat's-tail Fescue  
Additional record. Possibly seed from old ballast has been dormant in ground, until recently disturbed.  
67 Near Walker, old railway converted into cycle-track, S HEDLEY (1999).

**Poa compressa** L. 274 Flattened Meadow-grass  
67 Near Walker, old railway constructed into cycle-track, S HEDLEY (1999).

**Puccinellia distans** (Jacq.) Parl. 274 Reflexed Saltmarsh-grass  
Map 29  
Now very common in the county by side of roads, salted in winter, MEB (1996), S (1996-99).  
See distribution map.

- Catabrosa aquatica** (L.) Beauv. 275 Whorl-grass  
67 Newcastle upon Tyne, Town Moor (1868). Jock's Well, near Belsay [45(NZ)08.77], S (1998).
- Briza maxima** L. 275 Greater Quaking-grass  
Casual, garden escape. First record for Northumberland.  
68 Craster, A and G YOUNG (2000), **Hb GAS**.
- Glyceria fluitans** x **notata** 276 Hybrid Sweet-grass  
= **G. x pedicellata** Townsend  
67 West Charlton [35(NT)88], C E HUBBARD (1937), **K**. First record for v.c.  
68 West Larmouth [36(NT)84.37], C E HUBBARD (1937), **K**.
- Bromus secalinus** L. 277 Rye Brome  
Was known as a casual colonist in the 19th century; now recorded as casual.  
67 Haydon bridge, under wall next to a metal scrap yard, N S DE SAUSMAREZ (2000), **Hb GAS**.
- B. hordeaceus** L. subsp. **ferronii** (Mabille) P. M. Sm. 277  
Native. New to the flora of Northumberland.  
68 Holy Island, The Heugh, base of sea-cliff (whin), S (2000), det. C A Stace and T A Cope, **Hb GAS**.
- B. lepidus** Holmberg 277 Slender Soft-brome  
68 Roadside, S of Bamburgh Castle, B A TREGALE (1993); Goswick, S (1996), det. R M Payne.
- Ceratochloa carinata** (Hooker and Arnott) Tutin 277 California Brome  
67 Hexham, South Park, colony by side of lane, ca 30 plants. Presumed bird-seed alien from bird-feeding station in garden about 120m away, AJR (1996), still in quantity (2000), **Hb, GAS**. From N America. New to the flora of Northumberland.
- Brachypodium pinnatum** (L.) Beauv. 278 Tor-grass  
68 Hethpool, M J CRAWLEY (1977). Second locality in v.c.
- Hordeum secalinum** Schreber 279 Meadow Barley  
67 Morpeth, casual in garden, Q J GROOM (2000).  
68 Planted by roadside near Spindleston, S (1993).
- Hordelymus europaeus** (L.) Jessen 279 Wood Barley  
67 This scarce species is still on N bank of R Wansbeck, E of Morpeth (northern limit in Britain), S (2001).
- Avena sativa** L. 279 Oat  
67 Morpeth, bird-seed alien, S (1996). W Mediterranean. First record for Northumberland.
- Polypogon monspeliensis** (L.) Desf. 281 Annual Beard-grass  
68 Beal Point, J M HUMPHRIS (1998) **Hb GAS**, det. R M Payne. Casual, hort. New to the flora of Northumberland.



**Calamagrostis canescens** (Wiggers) Roth 282 Purple Small-reed  
Native. New to v.c. 67.

67 Near Wind Hill on northern side of Kielder Water [36(NY)68.88], G SIMPSON (2001), **Hb GAS**, det. H J M Bowen.

68 Still at Cannomill Bog, I DOUGLAS (2001).

**Phleum pratense** L. 282 Timothy

67 Killingworth Lake (E side) [45(NZ)27.70], a form in which the lower spikelets in the inflorescence were proliferous, A and G YOUNG (2000).

**Alopecurus borealis** Trin. 283 Alpine Foxtail

68 One fruiting spike, seen at the Hen Hole site, 31 August 1993, S.

**Parapholis strigosa** (Dumort.) C. E. Hubbard 283 Hard-grass

67 Seaton Sluice, A and G YOUNG (1999).

**Setaria pumila** (Poiret) Schultes 286 Yellow Bristle-grass

Alien. New to the flora of Northumberland. From warm-temperate Old World.

67 Near Walker, old railway, recently converted into a cycle-track, S HEDLEY (2000), det. T B Ryves.

#### LEMNACEAE

**Lemna minuta** Kunth 286 Least Duckweed

Alien, from N and S America, first recorded in 1977 in Cambridgeshire. Following are first records for Northumberland.

67 Smelting Sike [35(NY)93.59], S (1988). Hallington, in a small stream, S (1999).

68 Burton [46(NU)17.33], by a pond in a disused limestone quarry, S (1999). By a small pond near Swinhoe, S (1999).

**Spirodela polyrhiza** (L.) Schleiden 286 Greater Duckweed

Now extinct in Northumberland.

67 The water reservoir in Saltwick Plantation, in which this grew, is no longer in existence, S (1998).

#### TYPHACEAE

**Typha angustifolia** L. 287 Lesser Bulrush

68 Planted in a newly-constructed pond near Branton, S (1999).

#### CYPERACEAE

**Schoenoplectus lacustris** (L.) Palla 288 Common Club-rush

is now known as

**S. lacustris** (L.) Palla subsp. **lacustris**

**S. tabernaemontani** (C. C. Gmelin) Palla 288 Grey Club-rush

is now known as

**S. lacustris** (L.) Palla subsp. **tabernaemontani** (C. C. Gmelin) A. D. Löve

**Trichophorum cespitosum** (L.) Hartman subsp. **cespitosum** x subsp. **germanicum** (Palla) Hegi

= **T. cespitosum** nothosubsp. **foersteri** G. A. Swan 289

This newly described taxon (a sterile hybrid) now refers to the plant given as *T. cespitosum* (L.) Hartman subsp. *cespitosum* in *Flora of Northumberland* (1993, p289). The account and the distribution map given for the latter can now be regarded as representing this newly described taxon, and not subsp. *cespitosum*. This hybrid is widespread in raised and intermediate mires, valley mires, and other *Sphagnum* bogs in Northumberland (67 and 68) although it also occurs elsewhere in Britain and N W Europe. It is a constant component of the Border Mires, and just as characteristic of them as is *Andromeda polifolia*. In raised mires, proliferous forms of this taxon also occur. See G A SWAN (*Wats*, 1999, 22, 209-233) and P M HOLLINGSWORTH and G A SWAN (*Wats*, 1999, 22, 235-242).

**T. cespitosum** (L.) Hartman subsp. **cespitosum** 289

This arctic-alpine (circumpolar) species is rare in Britain, but has been found at four sites in 67. Blackheugh End [35(NY)82.91] (at 330m), S (1996). At the margin of Gowany Knowe Moss (at 280m), S (1996). At the head of Bucklake Sike (at 420m), S (1996). In the 'lagg' of Muckle Moss (at 230m), S (1996). Presumably in earlier times it covered the area occupied by the hybrid today (distribution map in *Flora of Northumberland*), but has been lost through hybridisation with subsp. *germanicum* in all except for a few small relatively base-rich areas.

**T. cespitosum** (L.) Hartman subsp. **germanicum** (Palla) Hegi 289

The common deergrass in Northumberland, absent from base-rich soils; see account in *Flora of Northumberland* (1993), p 289.

68 Two small tufts of this were found on the summit plateau of the Cheviot at 800m, S (1995).

**Carex paniculata** x **remota** 291

= **C. x boenninghausiana** Weihe

67 Ramsey's Burn [36(NT)87.02], S (1996).

**C. spicata** Hudson 292 Spiked Sedge

67 Havanah Nature Reserve, A and G YOUNG, C M IRVINE and J M HUMPHRIS (2000), among long grass where *Acer campestre* had recently been planted, det. D A Pearman, ! 2000, **Hb GAS**. Third confirmed record in v.c. Also reported from Aydon Castle by Lady R FITZ GERALD (1995).

**C. distans** L. 295 Distant Sedge

67 Seaton Sluice, A and G YOUNG (1998), det. R Cook. Second record for 67 in the 20th century.

**C. viridula** Michx. subsp. **viridula** 295 Small-fruited Yellow-sedge

67 Hallington Reservoir, west, N Shore, J YOUNG (1999), **Hb, GAS**. Second record for v.c. in the 20th century.

**C. limosa** L. 296 Bog-sedge

67 Head waters of Black Burn, near Blaxter Lough, B H TOMPSON (1954) (now afforested).

**C. bigelowii** Torrey ex Schweinitz subsp. **bigelowii** 297 Stiff Sedge

67 Limestone Knowe (at 540m) [36(NT)67.01], R W M CORNER and S (1993).

**C. pauciflora** Lightf. 297 Few-flowered Sedge

67 Grain Heads Moss, S (1993). Haining Head Moss; Pundershaw Moss [35(NY)77.79], S (1994). Near Paddaburn, G SIMPSON (1996).



## ORCHIDACEAE

- Epipactis leptochila** (Godfery) Godfery                      298              Narrow-leaved Helleborine  
is now known as
- Epipactis muelleri** Godfery
- E. phyllanthos** G. E. Sm.    298              Green-flowered Helleborine  
67 Four stems of this rare plant, found under beech at the Rothley Lakes site, J M HUMPHRIS (2000).
- E. youngiana** A. J. Richards and A. F. Porter                      299              Young's Helleborine  
Two additional sites.  
67 Gosforth Park (1993) and Killingworth graveyard [45(NZ)27.71] (1995), S P DAVISON and L A KERSON (*Wats*, 1997, 21, 401).
- Pseudorchis albida** (L.) A. and D. Löve                      301              Small-white Orchid  
67 The Heatheryburn site, severely over-grazed in the late 1980s, seems to have recovered; five flowering spikes seen, J LORING and S HEDLEY (1995).
- Coeloglossum viride** x **Dactylorhiza maculata**                      301  
is now known as  
x **Dactyloglossum conigerum** (J. Norman) Rauschert
- Ophrys apifera** Hudson    303              Bee Orchid  
Four new sites.  
67 Rising Sun Farm, reclaimed pit-heap, under birch, S P DAVISON and L A KERSON (1996); five plants seen by D N MITCHELL (2000). Near Shiremoor [45(NZ)31.71], old railway, H A ELLIS (1999) (*V*, 1999, 84, 20-21), probably the most northerly site in Britain. North Shields, North Sea ferry port terminal, on rough ground near car park. Found on 2 June 2000 by Dr Q J Groom who, at a later date, saw 64 flowering spikes and noticed that these were running to seed more rapidly than he was used to in S England. This colony was also visited on 13 July 2000 by A and G YOUNG, who found seven flowering spikes close together. North Shields, Howden Community Centre, two perfect, self-sown plants in newly seeded lawn of Community Centre, D N MITCHELL (2000).
- Hammarbya paludosa** (L.) O. Kuntze                                      303              Bog Orchid  
67 Flowering specimens (17) seen at the King's Law site in 2000, Dr M. McKay, reported by J MILLIGAN; 54 in 2001, D and T Hardy. Crane Moss (167 plants), D and T Hardy and J Steele (2001).

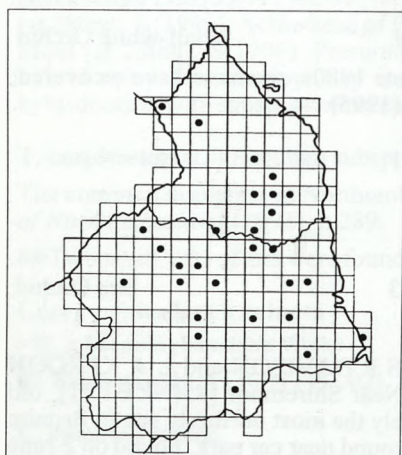
## DISTRIBUTION MAPS

### Species maps not in the *Flora of Northumberland*

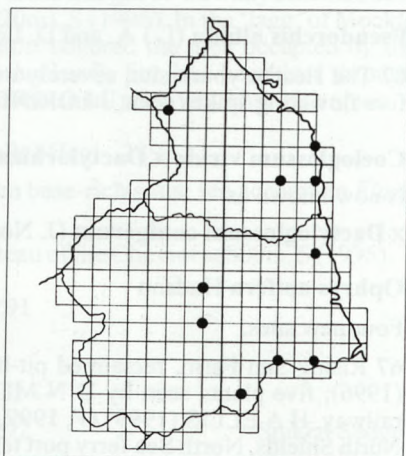
Further work, since the *Flora of Northumberland* has enabled distribution maps of some bramble and rose species to be prepared, and these are shown here. However, those for *Rubus* are on the basis of 10 x 10km squares, represented by very large, solid circles (●), whereas those for all other taxa are on the basis of 5 x 5km squares, as in *Flora of Northumberland*. Exceptionally, in the case of those for *Rosa*, a somewhat smaller solid circle (●) represents a record more recent than 1995, whereas an open circle (o) represents a pre-1995 record.

Other maps show the distribution of *Spergularia marina* and *Puccinellia distans* by inland roadsides, and of the two forms of *Symphytum x uplandicum*.

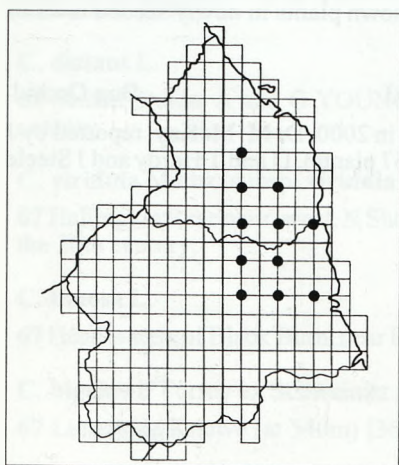
In Part B, square brackets represent pre-1995 records.



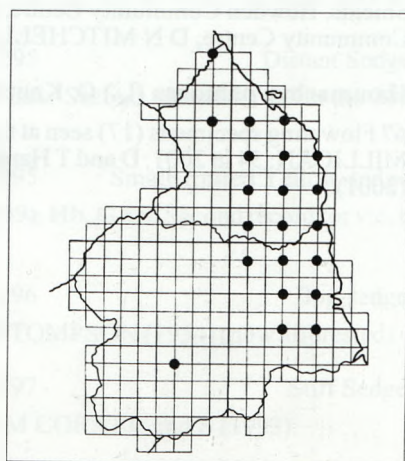
**Map 1** *Spergularia marina*, by inland roadsides



**Map 2** *Rubus laciniatus*

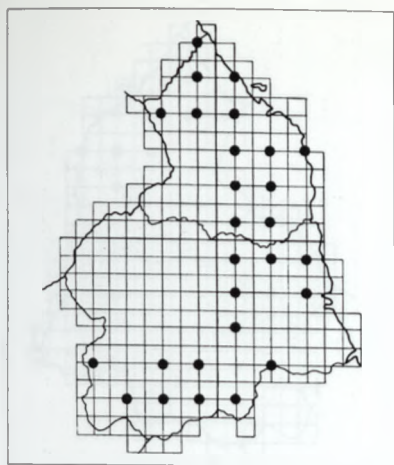


**Map 3** *R. leptothyrsos*

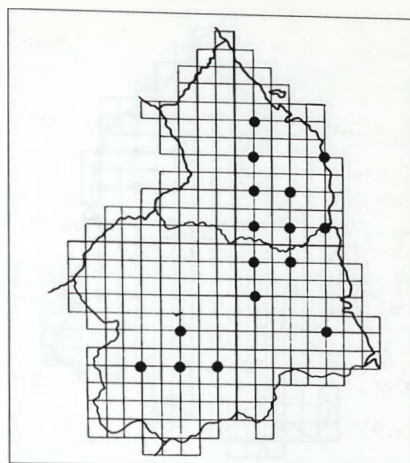


**Map 4** *R. newtonii*

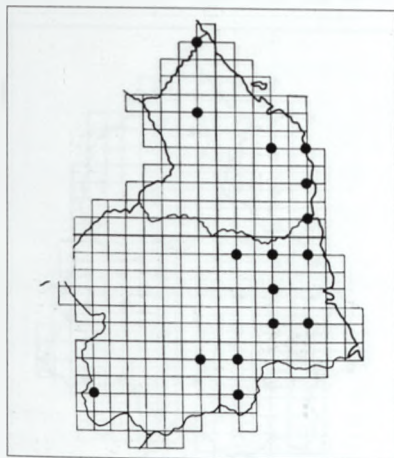




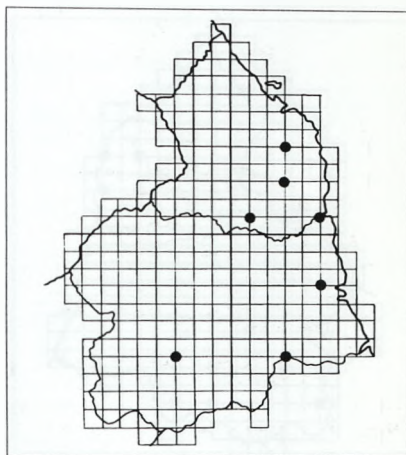
**Map 5** *R. lindebergii*



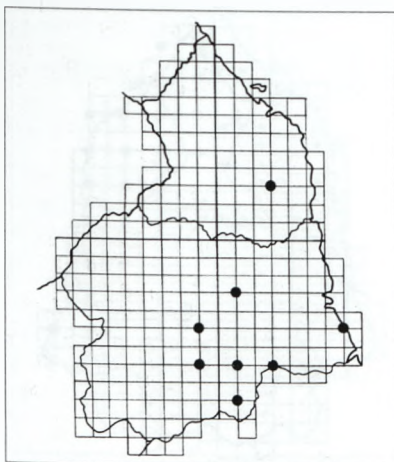
**Map 6** *R. nemoralis*



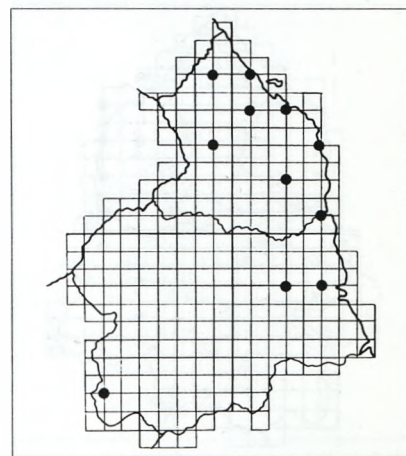
**Map 7** *R. polyanthemus*



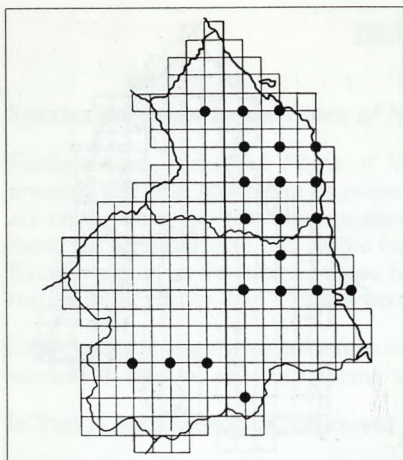
**Map 8** *R. armeniacus*



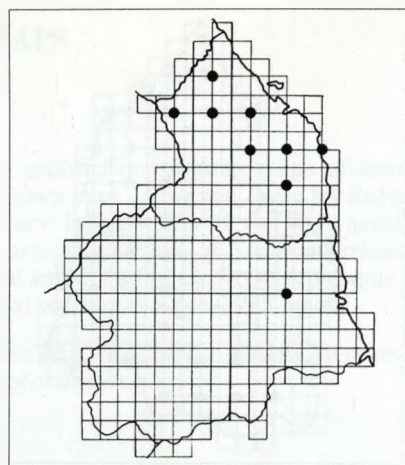
**Map 9** *R. vestitus*



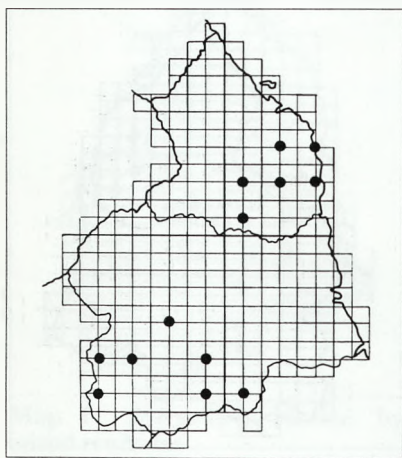
**Map 10** *R. wirralensis*



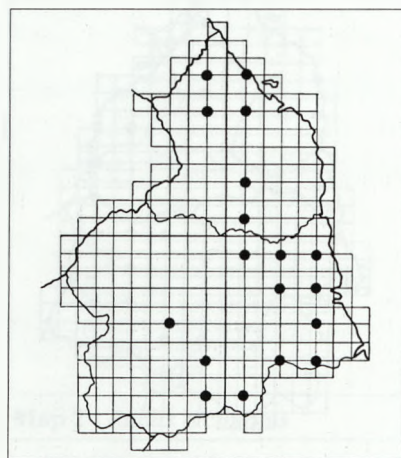
Map 11 *R. anisacanthos*



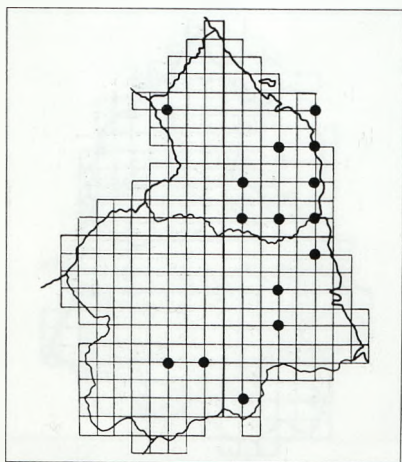
Map 12 *R. drejeri*



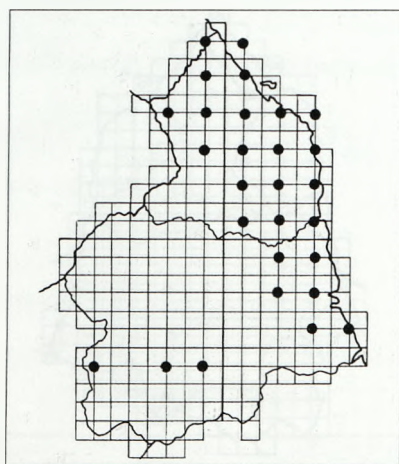
Map 13 *R. infestus*



Map 14 *R. adenanthoides*

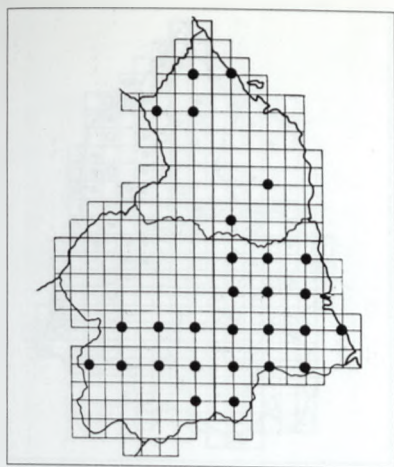


Map 15 *R. echinatoides*

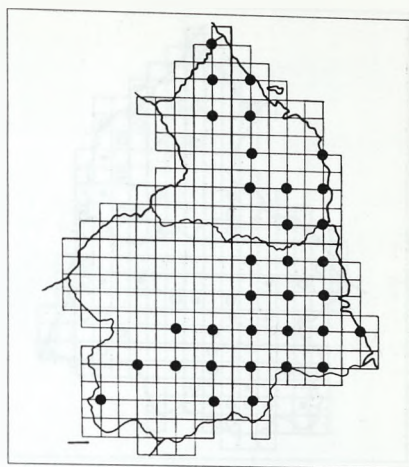


Map 16 *R. radula*

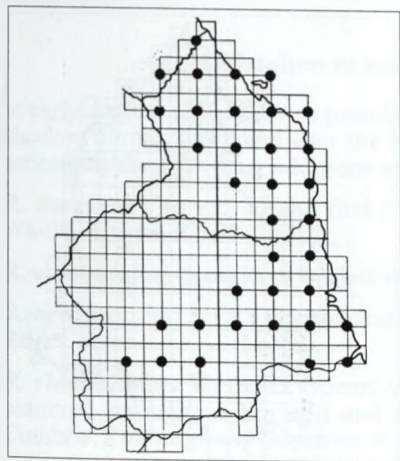




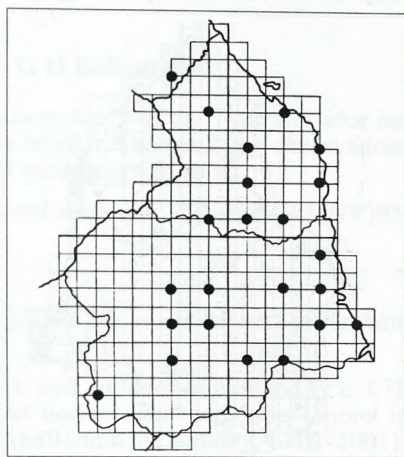
Map 17 *R. dasyphyllus*



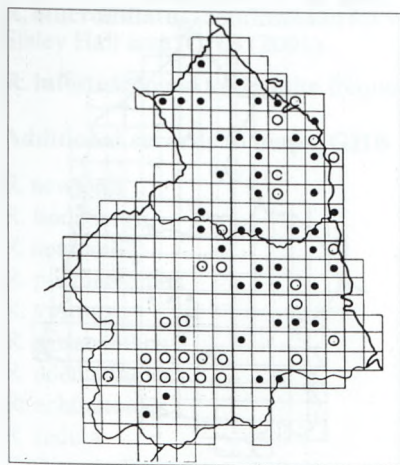
Map 18 *R. eboracensis*



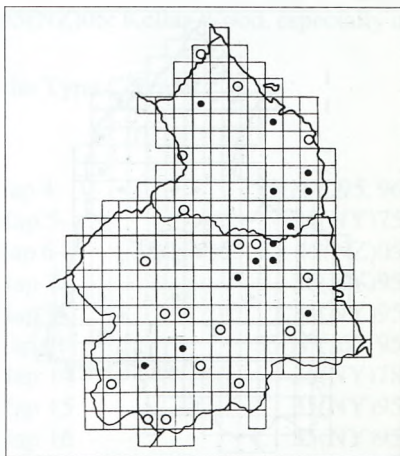
Map 19 *R. latifolius*



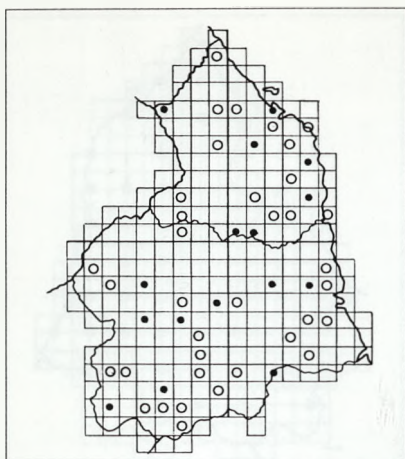
Map 20 *R. caesius*



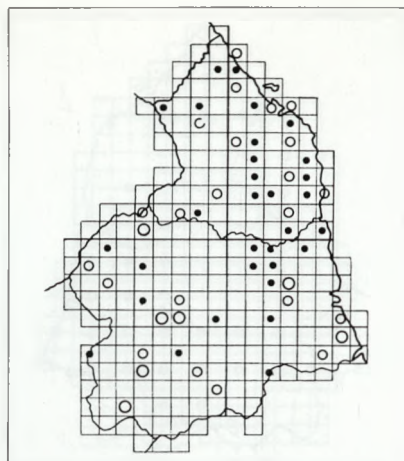
Map 21 *Rosa canina*



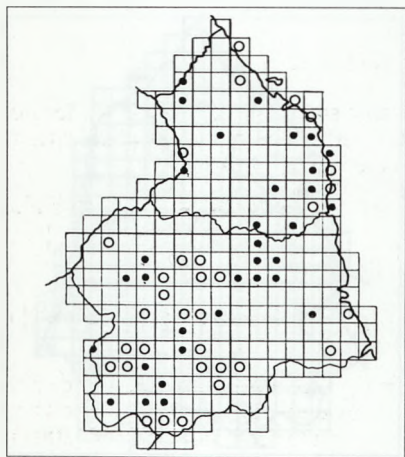
Map 22 *R. x dumalis*



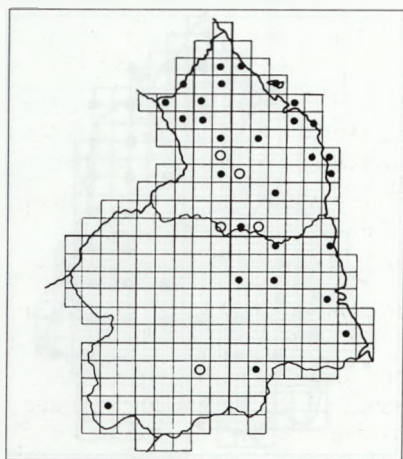
**Map 23** *R. caesia* subsp. *vosagiaca*



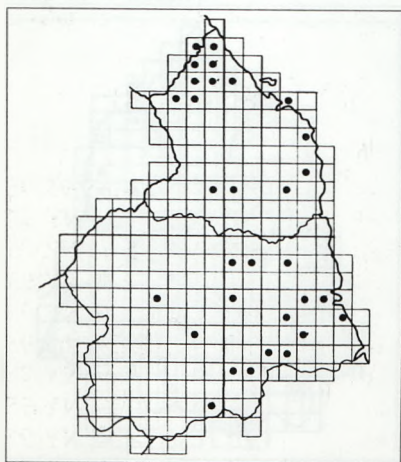
**Map 24** *R. sherardii*



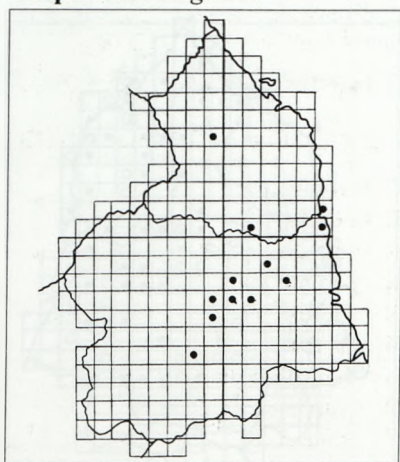
**Map 25** *R. mollis*



**Map 26** *R. rubiginosa*

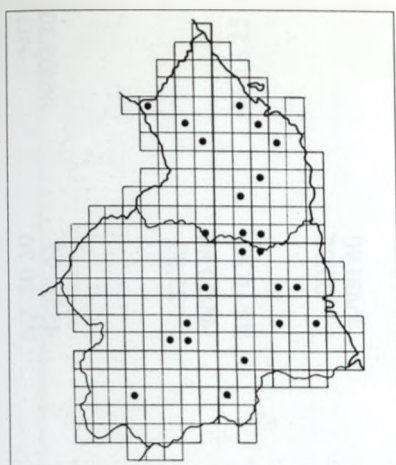


**Map 27** *Symphytum x uplandicum*,  
with red-purple flowers



**Map 28** *Symphytum x uplandicum*,  
with clear blue-pink flowers





**Map 29** *Puccinellia distans*, by inland roadsides

#### Addendum to account of *Rubus* by G H Ballantyne.

In early August (2001) it was possible to visit those squares south of the Tyne Corridor not checked during 2000, and also the Kielder Forest area briefly. The resulting observations necessitate the following additions and amendments; all records are from v.c. 67.

**R. fissus**: new to v.c. 67 and first Northumberland record for some 150 years. 35(NY)95: Whitley Chapel, GHB (2001).

**R. errabundus**: occasional bushes in 35(NY)86, 95.

**R. newtonii**: add 35(NY)95: roadside near Slaley Hall. 35(NY)96: roadside west of Hexham Race Course.

**R. rhombifolius** Weihe ex Boenn. (Series Rhamnifolii): new to Northumberland (v.c. 67); scattered throughout England and Wales, thinning out northwards, with populations in Cumbria, Roxburgh and Dumfries. Rare. 35(NY)65: by A689 south of Lambley, GHB (2001).

**R. vestitus**: also common in 35(NY)95, 96, 45(NZ)05.

**R. mucronulatus**: confirmation for v.c. 67: 35(NY)95, 45(NZ)05: Kellas Wood, especially in Slaley Hall area, GHB (2001).

**R. infestus**: found to be quite frequent in and south of the Tyne Corridor.

#### Additional records to maps, GHB (2001).

R. newtonii	Map 4	35(NY)95, 96
R. lindebergii	Map 5	35(NY)75
R. nemoralis	Map 6	35(NY)65, 95, 45(NZ)05
R. polyanthemus	Map 7	35(NY)95
R. vestitus	Map 9	35(NY)95
R. anisacanthos	Map 11	35(NY)65, 95
R. adenantoides	Map 14	35(NY)78
R. echinatoides	Map 15	35(NY)95
R. radula	Map 16	35(NY)95
R. dasyphyllus	Map 17	35(NY)65, 69, 75, 78, 85, 88
R. eboracensis	Map 18	35(NY)78, 85, 88
R. latifolius	Map 19	45(NZ)05

# PART B

Species for which there is a distribution map in *Flora of Northumberland*. In Part B, square brackets represent pre-1995 records.

		NY	NT	NZ	NU
<b>LYCOPODIACEAE</b>					
122	<b>Lycopodium clavatum</b>	79	35/60.90		46/05.20
			60.95		05.25
			65.70		10.00
			75.85		10.20
			80.70		
			80.75		
	<b>Huperzia selago</b>	79	35/65.75		
			75.95		
			80.40		
	<b>Diphasiastrum alpinum</b>	79	35/65.75		
			75.75		
			80.40		
<b>EQUISETACEAE</b>					
	<b>E. hyemale</b>	80		45/00.90	
				00.95	
	<b>E. variegatum</b>	80	35/60.95		
	<b>Equisetum sylvaticum</b>	81	35/90.75		
	<b>E. telmateia</b>	81	35/85.95	45/20.80	
				25.80	
<b>OPHIOGLOSSACEAE</b>					
	<b>Botrychium lunaria</b>	81	35/95.95		
	<b>Ophioglossum vulgatum</b>	82		45/00.95	46/05.30
				20.70	

		NY	NT	NZ	NU
<b>ADIANTACEAE</b>					
	<b>Cryptogramma crispa</b>	82	36/90.10		
<b>POLYPODIACEAE</b>					
	<b>Polypodium vulgare</b>	83	35/70.70	45/10.90	46/15.25
<b>THELYPTERIDACEAE</b>					
123	<b>Phegopteris connectilis</b>	84	35/60.95		
			65.90		
			75.80		
	<b>Oreopteris limbosperma</b>	84		45/05.85	
				10.90	
<b>ASPLENIACEAE</b>					
	<b>Phyllitis scolopendrium</b>	84	35/60.85	45/00.65	46/20.30
			95.90	45/20.60	
	<b>Asplenium</b>				
	<b>adiantum-nigrum</b>	84		45/00.65	
				05.75	
	<b>A. trichomanes</b>	85	36/85.		
		45/00.55	90.10	20.65	
				20.75	
				20.95	
				45/00.55	46/00.35
	<b>A. ruta-muraria</b>	85			00.40



		NY	NT	NZ	NU
<b>WOODSIACEAE</b>					
<i>Gymnocarpium dryopteris</i>	86	35/65.85 70.85 80.45 85.95	36/75.00		
<i>Cystopteris fragilis</i>	86	35/60.85			
<b>DRYOPTERIDACEAE</b>					
<i>Polystichum aculeatum</i>	87		36/95.35		46/05.15
<b>CUPRESSACEAE</b>					
<i>Juniperus communis</i> subsp. <i>commuis</i>	89		36/95.15	45/20.60(P)	
<b>SALICACEAE</b>					
<i>Salix pentandra</i>	90				46/10.40
<i>S. phylicifolia</i>	91			45/10.60	
<i>S. myrsinifolia</i>	92	35/75.45	36/75.00 95.20		
<i>S. repens</i>	93	35/80.90			46/10.15
<b>CANNABACEAE</b>					
<i>Humulus lupulus</i>	98	35/65.60		45/00.55 05.55	
<b>URTICACEAE</b>					
<i>Parietaria judaica</i>	98	35/90.55 95.50		45/00.65 05.60	46/10.15

		NY	NT	NZ	NU
<b>POLYGONACEAE</b>					
<i>Persicaria bistorta</i>	100			45/05.75 20.60(P)	46/25.15
<i>Rumex longifolius</i>	101	35/75.55 85.95			
<i>R. hydrolapathum</i>	101			45/10.85	46/00.15(P)
<b>CHENOPODIACEAE</b>					
<i>Chenopodium rubrum</i>	103	35/75.85			
<i>Atriplex portulacoides</i>	105			45/25.80	46/05.35 20.25
<i>Salsola kali</i>	106			45/30.85	46/00.50 20.10 20.30 25.05
<b>PORTULACACEAE</b>					
<i>Montia fontana</i> subsp. <i>fontana</i>	106	35/70.70 75.95	36/95.00		
<i>Claytonia sibirica</i>	107	35/95.85		45/15.70	46/00.00
<b>CARYOPHYLLACEAE</b>					
<i>Arenaria serpyllifolia</i> subsp. <i>leptoclados</i>	107		36/80.35 85.30		46/20.05

		NY	NT	NZ	NU
<i>Moehringia trinervia</i>	108	35/60.65 65.60			
<i>Stellaria pallida</i>	109			45/30.85	46/00.15 00.20
<i>Cerastium arvense</i>	110			45/25.95	
<i>C. semidecandrum</i>	110		36/85.05 95.20 95.25 95.35	45/00.65 00.75 10.60 10.85 25.65	46/00.15 00.25
<i>Sagina nodosa</i>	111	35/70.85 75.90 80.65	36/90.00		
<i>S. apetala</i> subsp. <i>erecta</i>	111		36/95.25	45/25.85 25.95	46/05.20
<i>S. apetala</i> subsp. <i>apetala</i>	111			45/20.80	
<i>S. maritima</i>	111			45/30.80	46/25.00
<i>Spergularia media</i>	112			45/30.85	46/05.45
<i>S. rubra</i>	112	35/75.70 95.80	36/85.05	45/20.65	
<i>Silene vulgaris</i> subsp. <i>vulgaris</i>	113	35/80.80 90.55			46/20.25
<i>Saponaria officinalis</i>	114			45/30.75 35.70	

		NY	NT	NZ	NU
<b>NYMPHAEACEA</b>					
<i>Nuphar lutea</i>	115			45/00.55	46/00.15(P)
<b>RANUNCULACEAE</b>					
<i>Trollius europaeus</i>	116	35/60.85			
<i>Aconitum napellus</i>	116	35/65.60 75.90 80.45	36/85.35 95.50	45/20.75 25.70	46/05.10 05.20
<i>Ranunculus auricomus</i>	117	35/80.45	36/80.35		46/00.45 15.25
<i>R. lingua</i>	118			45/15.80 20.60(P) 25.65(P)	46/00.15(P)
<i>R. hederaceus</i>	118	35/70.80 80.60 95.50			46/10.15 20.30
<i>R. omiophyllus</i>	118	35/80.65			
<i>R. peltatus</i>	119				46/00.00 20.00
<i>R. penicillatus</i> subsp. <i>pseudofluitans</i>	119	35/90.70		45/20.75	
<i>R. trichophyllus</i>	119	35/65.55		45/25.70	46/10.20
<i>Aquilegia vulgaris</i>	120	35/60.90 75.70 75.95 80.75		45/00.85 00.90	46/00.40 20.30
<i>Thalictrum minus</i>	120	35/90.90 95.55		45/35.70	



		NY	NT	NZ	NU
<b>PAPAVERACEAE</b>					
<b>Papaver somniferum</b>	121	35/65.65 85.65 90.65	36/95.25 95.40	45/15.85 25.90 30.85	46/00.30 00.50 20.05 20.30
<b>Meconopsis cambrica</b>	122	35/65.60 75.50 75.60 75.90 80.85	36/75.00 80.35 95.10	45/05.85 15.70	46/00.40 05.35 15.10 20.05
<b>Chelidonium majus</b>	122	35/65.60 70.60 75.50 75.60 80.60	36/85.30	45/05.85 15.75	46/00.15 10.30 15.00 15.20
<b>Ceratocapnos claviculata</b>	123	35/75.75		45/00.95	46/00.10
<b>Fumaria muralis</b> subsp. <i>boraei</i>	124	35/90.70	36/85.35 90.50	45/10.95 25.90 30.65 30.80	46/00.00 10.15
<b>F. densiflora</b>	124				46/15.20 20.25
<b>CRUCIFERAE (BRASSICACEAE)</b>					
<b>Sisymbrium altissimum</b>	124			45/25.95	
<b>Arabidopsis thaliana</b>	125	35/75.60 75.75 80.80 80.90	36/95.50	45/05.75 10.70 35.65	46/00.15 00.40 10.40

		NY	NT	NZ	NU
<b>Rorippa sylvestris</b>	126	35/60.90	36/70.00	45/05.80 10.95	46/15.00
<b>R. palustris</b>	126	35/80.60		45/00.50	46/00.15(P)
<b>R. nasturtium-aquaticum</b>	127		36/95.05	45/00.75 05.70 30.85	46/00.00 00.35
<b>R. x sterilis</b>	127		36/75.00	45/25.95	46/00.25 05.00 10.15 10.20
<b>R. microphylla</b>	127			45/15.85	46/10.30
<b>Armoracia rusticana</b>	127		36/80.35	45/30.85 35.65	46/00.50
<b>Cardamine amara</b>	127	35/80.45	36/80.10		
<b>Erophila verna group</b>	129	35/95.50		45/20.70 30.85	
<b>E. verna (L.) DC.</b>	129	35/95.85		45/00.70	46/05.30
<b>E. glabrescens</b>	129	35/80.90 85.95 95.50			
<b>Cochlearia danica</b>	129			45/30.75	46/20.30 25.05
<b>Teesdalia nudicaulis</b>	131		36/95.15		
<b>Thlaspi arvense</b>	131	35/75.85 95.55	36/80.35 95.10	45/30.65 30.70	46/00.50
<b>Lepidium draba</b> subsp. <i>draba</i>	132			45/10.75 25.60 25.65	46/10.30

		NY	NT	NZ	NU
				45/25.70 25.85 30.85	
<b>Coronopus squamatus</b>	133		36/95.35		46/00.35 10.15 20.15
<b>RESEDACEAE</b>					
<b>Reseda luteola</b>	135	35/75.70 85.60 85.65	36/85.35	45/10.95	46/15.00 15.20
<b>R. lutea</b>	135	35/65.90 90.55	36/95.00	45/20.70	46/00.45
<b>DROSERACEAE</b>					
<b>Drosera rotundifolia</b>	135		36/70.05 75.10		
<b>SAXIFRAGACEAE</b>					
<b>Saxifraga granulata</b>	138		36/95.50		
<b>Chrysosplenium alternifolium</b>	138	35/75.45 75.50	36/95.15		46/05.10
<b>GROSSULARIACEAE</b>					
<b>Ribes spicatum</b>	139	35/85.65		45/00.80	
<b>R. alpinum</b>	140	35/60.65 75.85 90.90	36/95.00		

		NY	NT	NZ	NU
		95.80			
<b>ROSACEAE</b>					
<b>Rubus chamaemorus</b>	141	35/75.40		45/15.85	
<b>R. saxatilis</b>	141			45/05.60	46/00.50
<b>Rosa rugosa</b>	144		36/80.35	10.95 20.75 30.70 30.80	25.00
<b>R. pimpinellifolia</b>	143	35/80.55		45/30.70	46/15.25
<b>Agrimonia eupatoria</b>	145	35/90.65			46/10.10
<b>A. procera</b>	145			45/00.95	46/05.05
<b>Acaena novae-zelandii</b>	146	35/70.85	36/75.00 85.35	05.80	05.20 05.35 25.15
<b>Potentilla palustris</b>	146	35/70.50 75.85 95.85		45/20.65(P) 25.95	46/20.25
<b>Aphanes arvensis</b>	149			45/00.70 05.60 15.95	46/05.20 10.30
<b>A. australis</b>	149	35/70.70 75.95 85.90	36/95.20 95.25		46/05.20



		NY	NT	NZ	NU
<i>Crataegus laevigata</i>	150			45/15.90 20.70	
<b>LEGUMINOSAE (FABACEAE)</b>					
<i>Genista anglica</i>	152	35/75.65			
<i>Vicia sylvatica</i>	154				46/00.50
<i>V. lathyroides</i>	154			45/25.95	46/05.05
<i>Ononis repens</i>	156		36/95.15	45/20.60(P)	46/05.00 05.35
<i>Melilotus albus</i>	156			45/10.60 25.65 25.70	
<i>Medicago sativa</i>	157			45/30.75	
<i>Trifolium striatum</i>	158		36/95.15		
<i>T. arvense</i>	159	35/85.90 95.95		45/00.65	46/05.20 25.00
<i>Anthyllis vulneraria</i>	160			45/05.85 20.60(P) 25.95 35.70	
<b>GERANIACEAE</b>					
<i>Geranium pyrenaicum</i>	161	35/80.80 90.60		45/05.60	46/10.05
<i>G. pusillum</i>	162		36/90.40	45/05.60 10.60 10.95	46/00.00 00.20 10.30

		NY	NT	NZ	NU
<i>G. columbinum</i>	162	35/70.80 70.85			
<i>G. lucidum</i>	162	35/65.65 75.60 80.55 80.60 85.65 90.90	36/90.10		
<i>Erodium cicutarium</i>	162				46/05.30 15.10
<b>POLYGALACEAE</b>					
<i>Polygala vulgaris</i>	164		36/90.20	45/00.70 30.70 30.75 30.80	46/15.30
<b>BALSAMINACEAE</b>					
<i>Impatiens glandulifera</i>	166	35/75.50 90.90	36/90.30 95.00 95.25(P)	45/00.80 15.70 25.90	46/20.25
<b>CELASTRACEAE</b>					
<i>Euonymus europaeus</i>	166		36/85.30		
<b>MALVACEAE</b>					
<i>Malva moschata</i>	167	35/75.75 75.85 75.90 85.70	36/65.05 80.35 85.10 90.45	45/20.60(P)	46/10.10

		NY	NT	NZ	NU
		85.90			
		95.80			
<b>M. sylvestris</b>	167	35/85.65	36/80.35	45/25.65	46/20.05
		85.75	90.35		20.15
		95.50			
<b>M. neglecta</b>	167				46/00.30
					15.30
<b>THYMELAEACEAE</b>					
<b>Daphne laureola</b>	168			45/10.75	
<b>HYPERICACEAE (CLUSIACEAE)</b>					
<b>Hypericum hirsutum</b>	169		36/85.35		46/05.15
<b>H. humifusum</b>	169	35/65.75		45/20.95	46/05.10
		65.80			25.15
<b>H. x desetangsii</b>	169	35/60.90	36/75.00	45/10.95	
		70.45		15.70	
		85.65		20.95	
		85.80		25.90	
				30.70	
<b>VIOLACEAE</b>					
<b>Viola odorata</b>	170	35/90.70	36/90.30	45/00.75	46/00.40
			95.20	15.85	
				20.75	
				25.80	
				30.70	

		NY	NT	NZ	NU
<b>CISTACEAE</b>					
<b>Helianthemum nummularium</b>	172	35/70.75		45/20.60(P)	46/05.05
<b>LYTHRACEAE</b>					
<b>Lythrum salicaria</b>	172		36/80.35	45/20.60(P) 30.65(P) 30.70	46/00.15(P)
<b>ONAGRACEAE</b>					
<b>Epilobium ciliatum</b>	174	35/65.65 70.80 75.55 75.75 75.90 80.80 85.60 85.65 85.95 90.75 95.80	36/85.05 95.10	45/00.55 00.80 00.85 05.65 10.60 10.85 10.90 20.95 25.90 30.85	46/00.40 05.20 10.40 20.20 25.15
<b>E. brunnescens</b>	175	35/85.95	36/60.00		46/05.00 05.20
<b>HALORAGACEAE</b>					
<b>Myriophyllum spicatum</b>	175				46/15.25
<b>M. alterniflorum</b>	175	35/95.50			



		NY	NT	NZ	NU
<b>ARALIACEAE</b>					
<b>Hedera 'Hibernica'</b>	177	35/75.50 75.85 90.90	36/80.35 90.35	45/00.80 05.90 20.75	46/00.40 05.00 05.15 05.25 10.15
<b>UMBELLIFERAE (APIACEAE)</b>					
<b>Hydrocotyle vulgaris</b>	177	35/85.90			46/20.25
<b>Anthriscus caucalis</b>	178		36/95.30		46/20.25 46/25.05
<b>Myrrhis odorata</b>	178		36/95.10	45/05.75 10.70 25.65	
<b>Pimpinella major</b>	179	35/85.65		45/10.60 20.65	
<b>P. saxifraga</b>	179	35/90.65	36/85.30 90.30	45/35.70	46/00.35 00.45
<b>Aethusa cynapium</b>	180	35/65.65 75.50		45/10.60 25.75 30.65 30.70 30.80	46/00.30 10.40
<b>Pastinaca sativa</b>	183			45/20.85	[46/20.30]
<b>Heracleum mantegazzianum</b>	183			45/10.60 15.70	
<b>Torilis nodosa</b>	184		36/95.50		
<b>Daucus carota</b>	184		36/65.05(P)	45/10.95(P)	46/00.15(P)

		NY	NT	NZ	NU
				20.60(P) 35.70	
<b>PYROLACEAE</b>					
<b>Pyrola minor</b>	185	35/60.90		45/05.55	
<b>ERICACEAE</b>					
<b>Erica cinerea</b>	186	35/80.45 80.90 85.85 85.90	36/60.00		
<b>Andromeda polifolia</b>	188	35/70.90			
<b>Vaccinium vitis-idaea</b>	188	35/70.50 75.40			
<b>EMPETRACEAE</b>					
<b>Empetrum nigrum</b>	189				46/05.30
<b>PRIMULACEAE</b>					
<b>Primula x polyantha</b>	189			45/15.70 25.90 30.75	
<b>P. veris</b>	190	35/85.45		45/20.60(P) 20.70	46/00.35
<b>Lysimachia vulgaris</b>	190	35/80.65 85.45 90.90		45/05.85 20.60(P)	46/00.15(P)
<b>Trientalis europaea</b>	191	35/60.85	36/70.00		46/00.25

		NY	NT	NZ	NU
		60.90			
		65.80			
		65.85			
		65.95			
		70.75			
		70.90			
		75.85			
		75.95			
	<i>Anagallis tenella</i>	191	[35/90.50]		
	<b>PLUMBAGINACEAE</b>				
	<i>Armeria maritima</i>	192		45/25.80	
	<b>GENTIANACEAE</b>				
	<i>Centaurium erythraea</i>	193	35/80.75	45/00.90 15.65 20.70 35.65	46/00.15(P)
	<i>Gentianella amarella</i>	194	35/70.70 70.90		46/25.05
	<b>MENYANTHACEAE</b>				
	<i>Menyanthes trifoliata</i>	195	36/90.35	45/15.70 20.60(P) 20.75	

		NY	NT	NZ	NU
	<b>APOCYNACEAE</b>				
	<i>Vinca minor</i>	195	35/75.60		
	<b>RUBIACEAE</b>				
	<i>Sherardia arvensis</i>	195	35/95.50	36/95.30 45/25.90 30.65 30.75	
	<i>Galium odoratum</i>	196	35/80.45 85.45 85.60		
	<i>G. mollugo</i>	196	35/70.70 85.80 95.50	45/20.60(P)	46/25.00
	<i>G. sternerii</i>	197	36/85.05 90.10		[46/10.30]
	<b>CONVOLVULACEAE</b>				
	<i>Calystegia sepium</i>	198	35/80.55 85.90 90.75	36/95.10 95.15	45/05.75
	<i>C. silvatica</i>	198	35/95.50	36/80.35 45/15.80 20.85 25.90	46/00.40 05.20 20.20
	<i>C. pulchra</i>	198		45/10.60 30.85	
	<b>BORAGINACEAE</b>				
	<i>Echium vulgare</i>	199		45/10.95(P) 20.60(P)	46/00.15 (P)



		NY	NT	NZ	NU
				25.80	
				25.95	
<b>Symphytum officinale</b>	199	35/65.50	36/95.25	45/00.80	46/20.25
		65.60		25.90	
		75.55			
		90.70			
		95.85			
<b>S. x uplandicum</b>	199	35/75.85	36/95.25	45/00.90	46/05.20
		80.80			10.15
		85.75			15.00
					15.30
<b>S. tuberosum</b>	200	35/85.75		45/10.70	46/15.00
					15.25
<b>Pentaglottis sempervirens</b>	200			45/05.55	46/15.20
				25.65(P)	
				25.95	
				30.70	
<b>Amsinckia micrantha</b>	201		36/95.25	45/25.85	46/00.15
					00.30
					10.35
					10.40
<b>Myosotis ramosissima</b>	201	35/95.50	36/85.05	45/00.85	46/00.50
			85.40	00.90	15.20
			95.20	10.85	
				10.95	
				30.75	
<b>CALLITRICHACEAE</b>					
<b>Callitriche hermaphrodita</b>	203				46/05.15

		NY	NT	NZ	NU
<b>LABIATAE (LAMIACEAE)</b>					
<b>Scutellaria galericulata</b>	204	35/60.90			
<b>Lamium confertum</b>	205				46/00.50
<b>L. amplexicaule</b>	205			45/20.65	
				25.90	
				30.65	
				35.70	
<b>Ballota nigra</b>	205		36/95.25		46/05.00
<b>Clinopodium vulgare</b>	207		36/95.20	45/10.60	46/00.40
<b>Mentha x verticillata</b>	208	35/80.65			
<b>M. x gracilis</b>	208	35/70.85		45/05.95	
		90.90			
<b>M. x piperita</b>	208	35/75.55			
<b>SOLANACEAE</b>					
<b>Solanum dulcamara</b>	210	35/90.90		45/05.80	46/00.25
				05.95	05.00
				30.80	10.00
<b>SCROPHULARIACEAE</b>					
<b>Mimulus guttatus</b>	211	35/85.45		45/20.60(P)	46/05.15
<b>M. luteus</b>	211	35/80.45			46/00.25
<b>Verbascum thapsus</b>	212	35/65.75		45/15.70	46/00.40
		65.90		35.70	05.20
		75.55			15.00
		75.60			
<b>Scrophularia auriculata</b>	212			45/00.65	46/00.15(P)
				25.85	

		NY	NT	NZ	NU
<b>Erinus alpinus</b>	214	35/75.50 75.55 75.85 80.55 85.90 90.90	36/90.40 95.15 95.25	45/05.75 45/15.65 20.95	46/05.10 15.25
<b>Veronica montana</b>	215	35/75.45	36/95.35	45/15.70	
<b>V. scutellata</b>	215	35/60.80 80.80 95.50	36/65.00	45/00.85	46/05.00
<b>V. anagallis-aquatica</b>				45/35.70	
<b>V. filiformis</b>	216	35/75.60 75.85 80.45		45/00.55 00.70 20.95 25.65 30.70 30.85	46/15.10
<b>V. hederifolia</b>	216	35/75.50 75.85 85.70		45/15.70 20.60(P) 20.70 30.65	
<b>Melampyrum pratense</b>	216			45/20.85	
<b>Odontites vernus</b>	218	35/65.50 80.55 85.90	36/95.35	45/00.75 15.70 20.60(P) 20.70 25.65	46/00.30 05.20 10.10 10.25 20.30
<b>Pedicularis palustris</b>	218		36/60.00 85.30		46/05.25

		NY	NT	NZ	NU
<b>OROBANCHACEAE</b>					
<b>Orobanche rapum-genistae</b>	220	35/85.65			
<b>PLANTAGINACEAE</b>					
<b>Plantago maritima</b>	221				46/05.00
<b>P. media</b>	221			45/20.60(P)	
<b>Littorella uniflora</b>	221	35/75.70			
<b>CAPRIFOLIACEAE</b>					
<b>Sambucus racemosa</b>	222	35/60.90 60.95 65.90 85.90 95.85	36/95.15		46/05.15 15.00  15.00
<b>Viburnum opulus</b>	222			45/20.60(P)	
<b>ADOXACEAE</b>					
<b>Adoxa moschatellina</b>	223	35/75.90 75.95 80.45	36/85.10		46/00.35 05.10
<b>VALERIANACEAE</b>					
<b>Valerianella locusta</b>	224	35/85.75			
<b>DIPSACACEAE</b>					
<b>Dipsacus fullonum</b>	224	35/90.60	36/85.35	45/25.65(P) 25.80	46/05.20 25.15



		NY	NT	NZ	NU
				25.95	
				35.65	
				35.70	
<b>Knautia arvensis</b>	225	35/60.90	36/65.05	45/20.60(P)	
		90.90	90.05	30.65	
		95.80	95.00		
<b>Scabiosa columbaria</b>	225	35/95.55		45/20.60(P)	
<b>CAMPANULACEAE</b>					
<b>Campanula latifolia</b>	225	35/85.85		45/05.85	46/00.35
					05.10
					05.35
					20.25
<b>COMPOSITAE (ASTERACEAE)</b>					
<b>Eupatorium cannabinum</b>	226			45/15.65	
				20.60(P)	
<b>Filago vulgaris</b>	227				46/05.20
<b>Gnaphalium sylvaticum</b>	228	35/75.95			
<b>G. uliginosum</b>	228	35/80.55	36/95.10	45/10.95	
		85.90			
<b>Pulicaria dysenterica</b>	229		36/85.40	45/20.70	46//00.15(P)
			90.45	25.80	
				30.70	
<b>Matricaria recutita</b>	230		36/92.50	45/05.50	46/00.40
					20.15

		NY	NT	NZ	NU
<b>Tanacetum vulgare</b>	231			45/05.90	46/15.25
<b>Artemisia absinthium</b>	232			45/20.75	
				20.60(P)	
<b>Doronicum pardalianches</b>	233		36/95.35	45/25.90	
<b>Senecio aquaticus</b>	233	35/60.90			46/00.00
		75.50			
		85.70			
<b>S. squalidus</b>	234	35/95.60			46/05.00
					15.20
					15.25
					[20.30]
<b>S. sylvaticus</b>	234	35/90.90	36/90.40	45/30.70	46/00.10
		90.95			15.20
		95.90			
<b>Carduus nutans</b>	236			45/00.70	
				30.85	
				35.70	
<b>Cirsium heterophyllum</b>	236		[36/95.10]	45/20.75	
<b>Centaurea scabiosa</b>	237			45/20.60(P)	
				35.70	
<b>Cichorium intybus</b>	238	35/95.60		45/20.60(P)	46/20.15
<b>Leontodon saxatilis</b>	239			45/10.75	46/00.40
				20.70	
				25.80	

		NY	NT	NZ	NU
<i>Mycelis muralis</i>	240	35/85.60		45/10.75	
<i>Crepis mollis</i>	251		36/90.25		
<i>C. biennis</i>	252			45/35.70	
<b>ALISMATACEAE</b>					
<i>Alisma plantago-aquatica</i>	256	35/60.90 75.85 85.65		45/05.55	46/00.15(P) 00.25 00.35
<b>HYDROCHARITACEAE</b>					
<i>Elodea canadensis</i>	257	35/85.65		45/05.60 25.75 30.65	46/05.15
<b>JUNCAGINACEAE</b>					
<i>Triglochin palustre</i>	258		36/60.00 85.15	45/25.65 30.65	46/20.30
<b>POTAMOGETONACEAE</b>					
<i>Potamogeton natans</i>	258	35/80.85		45/00.70	46/00.15(P) 00.25
<i>P. polygonifolius</i>	258	35/70.80		45/15.70	
<i>P. gramineus</i>	259	35/75.70			
<i>P. pusillus</i>	260			45/10.90	
<i>P. berchtoldii</i>	260		36/95.40	45/25.75	46/00.20 15.25
<i>P. crispus</i>	260	35/75.75	36/90.35	45/05.60 15.70	46/15.25

		NY	NT	NZ	NU
<i>P. pectinatus</i>	260		36/95.30	45/10.90	
<b>ZANNICHELLIACEAE</b>					
<i>Zannichellia palustris</i>	262				46/00.15 [10.40]
<b>LILIACEAE</b>					
<i>Gagea lutea</i>	263			45/25.80	
<i>Lilium martagon</i>	263		36/85.35		46/05.10 46/05.25
<i>Ornithogalum angustifolium</i>	263			45/15.65	
<i>Allium vineale</i>	265				
<i>Convallaria majalis</i>	266	35/75.60(P)		45/05.60	
<i>Polygonatum multiflorum</i>	266	35/75.85		05.90	
<i>Galanthus nivalis</i>	267	35/75.60		45/30.65 30.70 30.75 30.85	46/00.20
<b>AMARYLLIDACEAE</b>					
<i>Paris quadrifolia</i>	267			45/05.75	
<b>GRAMINEAE (POACEAE)</b>					
<i>Festuca altissima</i>	271	35/65.45		45/05.60	
<i>Vulpia bromoides</i>	273		36/95.15		46/05.20 15.05
<i>Poa compressa</i>	274			45/20.60	46/15.20 20.15



		NY	NT	NZ	NU
<b>Melica uniflora</b>	276	35/80.45 80.85 90.95		45/00.65 05.85	
<b>Glyceria maxima</b>	276			45/25.85	
<b>Hordeum murinum</b>	279				46/00.30
<b>H. jubatum</b>	279	35/80.75 90.95		45/25.90	
<b>Helictotrichon pubescens</b>	280	35/65.95		45/00.65	
<b>H. pratense</b>	280	35/85.75	36/95.25		
<b>Phleum bertolonii</b>	282	35/95.75	36/85.05 95.10		46/00.50 05.15 20.05
<b>Parapholis strigosa</b>	283			45/30.75 35.65	46/10.30 20.25
<b>Phalaris canariensis</b>	284			45/15.85 45/25.65	
<b>Milium effusum</b>	284	35/85.65 90.65			
<b>Phragmites australis</b>	284	35/95.70		45/20.60(P) 20.65	46/00.15(P) 10.40 15.15
<b>ARACEAE</b>					
<b>Arum maculatum</b>	286		36/80.35	45/15.70 30.65 30.85	46/05.00

		NY	NT	NZ	NU
<b>LEMNACEAE</b>					
<b>Lemna trisulca</b>	286			45/05.60 25.75	46/00.45
<b>SPARGANIACEAE</b>					
<b>Sparganium erectum</b> subsp. microcarpum	287	35/70.65	36/95.40	45/05.95	
<b>S. erectum</b> subsp. neglectum	287	35/75.75			
<b>S. emersum</b>	287	35/75.75		45/20.75 25.75	
<b>TYPHACEAE</b>					
<b>Typha latifolia</b>	288	35/85.65	36/95.10	45/20.60(P)	46/15.25
<b>CYPERACEAE</b>					
<b>Scirpus sylvaticus</b>	288	35/70.80 75.75 80.75			
<b>Schoenoplectus lacustris</b> subsp. <b>lacustris</b>	288	35/75.65			
<b>Isolepis setacea</b>	288	35/80.65 85.70 95.50		45/00.55 15.85 35.70	46/00.15 25.00
<b>Eleocharis quinqueflora</b>	290			45/00.85	
<b>Carex paniculata</b>	291	35/85.95		45/20.75	46/05.10
<b>C. otrubae</b>	292		36/85.35	45/25.65 30.65	46/10.10

		NY	NT	NZ	NU
<i>C. remota</i>	293	35/60.90		45/05.85 15.65	46/05.00 05.35 15.30
<i>C. dioica</i>	293	35/65.90			
<i>C. curta</i>	293	35/75.75	36/65.00		
<i>C. acutiformis</i>	293	35/65.80			46/10.25
<i>C. riparia</i>	293	35/65.95	36/95.35	45/10.95 25.85	46/00.15(P) 20.00
<i>C. vesicaria</i>	294	35/95.75		45/05.80	
<i>C. pendula</i>	294	35/60.95		45/05.60 10.60 20.60(P)	46/05.00
<i>C. sylvatica</i>	294	35/60.90 75.45 80.60		45/10.75 20.75 30.70	46/10.05 15.30
<i>C. laevigata</i>	294	35/65.90 75.75 75.80 75.95 80.85	36/75.00		
<i>C. distans</i>	295			45/30.75	
<i>C. hostiana</i>	295	35/80.50 80.95	36/95.10	45/10.90	
<i>C. viridula</i> subsp. <i>brachyrrhyncha</i>	295			45/00.70	
<i>C. pallescens</i>	296	35/75.90		45/05.85	46/05.20
<i>C. pilulifera</i>	296	35/75.45 80.80	36/85.15 90.10		46/00.15 05.15

		NY	NT	NZ	NU
	95.35		05.20		10.00 10.25
<i>C. limosa</i>	296	35/60.65 60.80 70.75			
<i>C. magellanica</i> subsp. <i>irrigua</i>	296	35/65.80 75.75			
<i>C. pulicaris</i>	297	35/70.70	36/95.35		46/10.15
<b>ORCHIDACEAE</b>					
<i>Epipactis helleborine</i>	298	35/95.60		45/20.95 25.80 25.90 30.75	
<i>E. muelleri</i>	298			45/05.60	
<i>Listera ovata</i>	299	35/75.70	[36/95.10]		46/15.00
<i>L. cordata</i>	299	35/55.85 60.85 65.80	36/85.20		
<i>Platanthera bifolia</i>	300			45/25.75 25.95	
<i>Gymnadenia conopsea</i>	300				46/05.00 10.00 10.15
<i>Dactylorhiza incarnata</i>	301	35/70.75			
<i>D. purpurella</i>	302	35/70.70	36/75.00	45/20.60(P)	46/10.00



		NY	NT	NZ	NU
30.80					
<b>D. maculata</b> subsp. <b>ericetorum</b>	302	35/60.90			
<b>D. fuchsii</b> subsp. <b>fuchsii</b>	302		36/70.00	45/20.60(P) 30.75	
<b>Orchis mascula</b>	303	35/80.45 80.60	36/80.05	45/05.85 20.75 25.75 25.80	
<b>Anacamptis pyramidalis</b>	303			45/30.85	46/25.15

# SUMMARY

## New to Northumberland since the preparation of *Flora of Northumberland*

<i>Trichomanes speciosum</i>	Hymenophyllaceae	83	67		Native
<i>Asplenium trichomanes</i> subsp. <i>pachyrachis</i>	Aspleniaceae	85	67		Native
<i>Asplenium</i> x <i>clermontiae</i>	Aspleniaceae	85	68		Native
<i>Dryopteris</i> x <i>ambroseae</i>	Dryopteridaceae	88	67		Native
<i>Azolla filiculoides</i>	Azollaceae	88	67		Alien
<i>Salix repens</i> var. <i>fusca</i>	Salicaceae	94	67		Native
<i>Populus nigra</i> subsp. <i>betulifolia</i>	Salicaceae	94	67		Native
<i>Ficus carica</i>	Moraceae	98	67		Alien
<i>Polygonum rurivagum</i>	Polygonaceae	99	67	68	Introduced
<i>Fallopia</i> x <i>bohémica</i>	Polygonaceae	101	68		Naturalised hort
<i>Rheum</i> x <i>hybridum</i>	Polygonaceae	101	68		Hortal
<i>Rumex</i> x <i>dufftiii</i>	Polygonaceae	102	68		Native
<i>Atriplex</i> x <i>taschereaui</i>	Chenopodiaceae	104	68		Native
<i>Sagina filicaulis</i>	Caryophyllaceae	111	67	68	Native
<i>Nymphaea marliacea</i>	Nymphaeaceae	115	68		Planted
<i>Pseudofumaria alba</i>	Papaveraceae	123	67		Garden escape
<i>Rorippa</i> x <i>anceps</i>	Brassicaceae	126	68		
<i>Cardamine corymbosa</i>	Brassicaceae	128	67	68	Casual
<i>Brassica juncea</i>	Brassicaceae	134	67		Casual
<i>Crassula helmsii</i>	Crassulaceae	136	67		Alien
<i>Sedum spathulifolium</i>	Crassulaceae	136	68		Garden escape
<i>Tolmiea menziesii</i>	Saxifragaceae	137	67	68	Naturalised hort
<i>Tellima grandiflora</i>	Saxifragaceae	137	67		Naturalised hort
<i>Deutzia scabra</i>	Hydrangeaceae	139	68		Hortal
<i>Spiraea</i> x <i>arguta</i>	Rosaceae	140	67		Hortal
<i>Rubus scissus</i>	Rosaceae	141	67		Native
<i>R. newtonii</i>	Rosaceae	142	67	68	Native
<i>R. sciocharis</i>	Rosaceae	142	68		Native
<i>R. rhombifolius</i>	Rosaceae	142	67		Native
<i>R. hindii</i>	Rosaceae	143	67	68	Native
<i>R. caesius</i>	Rosaceae	143	67	68	Native
<i>Rosa luciae</i>	Rosaceae	143	67		Hortal
<i>R. x verticillacantha</i>	Rosaceae	143	68		Native
<i>R. x involuta</i>	Rosaceae	143	67	68	Native
<i>R. x biturigensis</i>	Rosaceae	143	67		Native
<i>R. x andegavensis</i>	Rosaceae	144	68		Hortal
<i>R. x rothschildii</i>	Rosaceae	144	67	68	Native
<i>R. x nitidula</i>	Rosaceae	144	67		Native



<i>R. caesia</i> x <i>sherardii</i>	Rosaceae	144	67	Native
<i>R. tomentosa</i>	Rosaceae	144	68	Native
<i>R. x shoobredii</i>	Rosaceae	145	67	Native
<i>R. micrantha</i>	Rosaceae	145	68	Native
<i>Cotoneaster rotundifolius</i>	Rosaceae	150	68	Hortal
<i>Ulex minor</i>	Fabaceae	153	67	Planted
<i>Colutea arborescens</i>	Fabaceae	153	67	Planted
<i>Trifolium incarnatum</i>	Fabaceae	159	68	Casual
<i>Oxalis rosea</i>	Oxalidaceae	160	68	Casual hortal
<i>Lythrum junceum</i>	Lythraceae	172	67	Casual
<i>Epilobium x rivulare</i>	Onagraceae	174	68	Native
<i>Epilobium x interjectum</i>	Onagraceae	174	67 68	Native
<i>Epilobium x vicinum</i>	Onagraceae	174	68	Native
<i>Epilobium x fossicola</i>	Onagraceae	174	68	Native
<i>Oenanthe pimpinelloides</i>	Apiaceae	180	68	Planted
<i>Primula florindae</i>	Primulaceae	190	68	Planted
<i>Ligustrum lucidum</i>	Oleaceae	193	67	Hortal
<i>Phacelia tanacetifolium</i>	Hydrophyllaceae	198	67 68	Casual hortal
<i>Symphytum 'Hidcote Blue'</i>	Boraginaceae	200	67	Garden escape
<i>Lamium maculatum (immaculate)</i>	Lamiaceae	205	68	Naturalised hortal
<i>Euphrasia arctica</i> x <i>confusa</i>	Scrophulariaceae	217	68	Native
<i>E. arctica</i> x <i>micrantha</i>	Scrophulariaceae	217	67	Native
<i>Acanthus mollis</i>	Acanthaceae	219	68	Naturalised hortal
<i>Aster novi-belgii</i>	Asteraceae	227	67	Naturalised hortal
<i>Erigeron karvinskianus</i>	Asteraceae	227	67	Introduced
<i>Conyza canadensis</i>	Asteraceae	227	67	Casual
<i>Anaphalis margaritaceae</i>	Asteraceae	228	67	Hortal
<i>Inula magnifica</i>	Asteraceae	228	67	Hortal
<i>Guizotia abyssinica</i>	Asteraceae	229	67	Casual
<i>Helianthus tuberosus</i>	Asteraceae	229	67 68	Hortal
<i>Ambrosia artemisifolia</i>	Asteraceae	229	67	Casual
<i>Doronicum x excelsum</i>	Asteraceae	233	67	Hortal
<i>Echinops bannaticus</i>	Asteraceae	235	67	Hortal
<i>Taraxacum hamatulum</i>	Asteraceae	245	67 68	Native?
<i>T. marklundii</i>	Asteraceae	245	67 68	Native
<i>T. cyanolepis</i>	Asteraceae	246	67 68	Native?
<i>T. subcyanolepis</i>	Asteraceae	247	67 68	Native
<i>T. vastisectum</i>	Asteraceae	249	67	Introduced
<i>T. planum</i>	Asteraceae	250	67	Introduced
<i>T. aberrans</i>	Asteraceae	250	67 68	Introduced
<i>Alisma lanceolatum</i>	Alismataceae	256	68	Planted

<i>A. gramineum</i>	Alismataceae	256	67	Planted
<i>Potamogeton x bottnicus</i>	Potamogetonaceae	260	68	Native
<i>Lilium x hollandicum</i>	Liliaceae	263	67	Garden escape
<i>Allium vineale</i> var. <i>vineale</i>	Liliaceae	265	67 68	Native
<i>Sisyrinchium montanum</i>	Iridaceae	268	67	Hortal
<i>Festuca rubra</i> subsp. <i>junceae</i>	Poaceae	271	68	Native
<i>Festuca rubra</i> subsp. <i>megastachys</i>	Poaceae	271	67	Introduced
<i>Briza maxima</i>	Poaceae	275	68	Casual
<i>Bromus hordeaceus</i> subsp. <i>ferronii</i>	Poaceae	277	68	Native
<i>Ceratochloa carinata</i>	Poaceae	277	67	Casual
<i>Avena sativa</i>	Poaceae	279	67	Casual
<i>Polypogon monspeliensis</i>	Poaceae	281	68	Casual
<i>Setaria pumila</i>	Poaceae	286	67	Alien
<i>Lemna minuta</i>	Lemnaceae	286	67 68	Alien
<i>Trichophorum cespitosum</i> notho subsp. <i>foersteri</i>	Cyperaceae	289	67 68	Native
<i>T. cespitosum</i> subsp. <i>cespitosum</i>	Cyperaceae	289	67	Native

**New to a vice-county (67 or 68) in Northumberland since the preparation of *Flora of Northumberland***

<i>Salix x fruticosa</i>	Salicaceae	93	68	Native
<i>Ulmus procera</i>	Ulmaceae	97	68	Hortal
<i>Ranunculus aconitifolius</i>	Ranunculaceae	118	68	Naturalised hortal
<i>Iberis umbellata</i>	Brassicaceae	131	67	Casual
<i>Lepidium ruderae</i>	Brassicaceae	132	68	Casual
<i>Raphanus sativus</i>	Brassicaceae	134	67	Casual
<i>Rubus fissus</i>	Rosaceae	141	67	Native
<i>R. amplificatus</i>	Rosaceae	142	67	Native
<i>R. elegantispinosus</i>	Rosaceae	142	67	Naturalised hortal
<i>R. vestitus</i>	Rosaceae	142	68	Native
<i>R. raduloides</i>	Rosaceae	142	67	Native
<i>R. drejeri</i>	Rosaceae	142	67	Native
<i>Rosa caesia</i> subsp. <i>vosagiaca</i> x <i>rubiginosa</i>	Rosaceae	144	67	Native
[ <i>Alchemilla glomerulans</i> ]	Rosaceae	149	67	Unconfirmed
<i>Prunus cerasifera</i>	Rosaceae	151	67	Hortal
<i>Lupinus arboreus</i>	Fabaceae	153	67	Hortal
<i>Lathyrus grandiflorus</i>	Fabaceae	155	68	Hortal
<i>Lathyrus latifolius</i>	Fabaceae	155	67	Hortal
<i>Lathyrus nissolia</i>	Fabaceae	155	68	Planted
<i>Euphorbia amygdaloides</i>	Euphorbiaceae	164	68	Garden escape



<i>Viola</i> x <i>intersita</i>	Violaceae	170	68	Native
<i>Gaultheria mucronata</i>	Ericaceae	187	67	Planted
<i>Gentiana asclepiadea</i>	Gentianaceae	194	68	Hortal
<i>Nymphoides peltata</i>	Menyanthaceae	195	68	Naturalised hortal
<i>Galium tricornutum</i>	Rubiaceae	197	67	Casual
<i>Trachystemon orientalis</i>	Boraginaceae	200	67	Naturalised hortal
<i>Amsinckia micrantha</i>	Boraginaceae	201	67	Introduced
<i>Lamiastrum galeobdolon</i> subsp. <i>argentatum</i>	Lamiaceae	205	68	Hortal
<i>Euphrasia confusa</i> x <i>micrantha</i>	Scrophulariaceae	218	68	Native
<i>Odontites vernus</i> subsp. <i>serotinus</i>	Scrophulariaceae	218	67	Native
<i>Parentucellia viscosa</i>	Scrophulariaceae	218	67	Casual
<i>Orobanche minor</i>	Orobanchaceae	219	67	Casual
<i>Leycesteria formosa</i>	Caprifoliaceae	223	67	Casual
<i>Lonicera caprifolium</i>	Caprifoliaceae	223	67	Hortal
<i>Campanula persicifolia</i>	Campanulaceae	225	67	Hortal
<i>Taraxacum scoticum</i>	Asteraceae	242	68	Native
<i>T. latisectum</i>	Asteraceae	248	68	Native
<i>T. adiantifrons</i>	Asteraceae	249	68	Colonist
<i>Fritillaria meleagris</i>	Liliaceae	263	67	Hortal
<i>Hyacinthoides hispanica</i>	Liliaceae	264	67	Hortal
<i>Allium paradoxum</i>	Liliaceae	265	67	Hortal
<i>Polygonatum</i> x <i>hybridum</i>	Liliaceae	266	68	Hortal
<i>Festuca arenaria</i>	Poaceae	271	67	Native
<i>Glyceria</i> x <i>pedicellata</i>	Poaceae	276	67	Native
<i>Calamagrostis canescens</i>	Poaceae	282	67	Native

**Taxa thought extinct in at least one vice-county at the time of preparation of *Flora of Northumberland*, but now recorded recently**

<i>Agrostemma githago</i>	Caryophyllaceae	113	67	68	Planted
<i>Lepidium campestre</i>	Brassicaceae	132	67		Native
<i>Genista tinctoria</i>	Fabaceae	152	68		Planted
<i>Medicago arabica</i>	Fabaceae	157	68		Native?
<i>Onobrychis viciifolia</i>	Fabaceae	160	67		Planted
<i>Geranium sanguineum</i> var. <i>striatum</i>	Geraniaceae	161	68		Native
<i>Peucedanum ostruthium</i>	Apiaceae	183	67		Naturalised hortal
<i>Monotropa hypopitys</i>	Pyrolaceae	186	67		Native
<i>Lamium hybridum</i>	Lamiaceae	205	67		Native
<i>Verbascum nigrum</i>	Scrophulariaceae	212	67		Planted
<i>Stratiotes aloides</i>	Hydrocharitaceae	257	67		Planted

<i>Groenlandia densa</i>	Potamogetonaceae	261	68	Planted
<i>Gagea lutea</i>	Liliaceae	263	68	Planted?
<i>Bromus secalinus</i>	Poaceae	277	67	Casual
<i>Hordeum secalinum</i>	Poaceae	279	68	Planted
<i>Typha angustifolia</i>	Typhaceae	287	68	Planted

The v.c. quoted is the one in which the taxon has been refound.

#### Species lost since the preparation of *Flora of Northumberland*

<i>Lathyrus japonicus</i>	Fabaceae	155	68	Native
<i>Spirodela polyrhiza</i>	Lemnaceae	286	67	Hortal

#### Corrections of *Flora of Northumberland*

<i>Acanthus spinosus</i>	Acanthaceae	219	<i>Acanthus mollis</i>
<i>Ligularia dentata</i>	Asteraceae	234	<i>Inula magnifica</i>
<i>Potamogeton x suecicus</i>	Potamogetonaceae	260	<i>Potamogeton x bottnicus</i>
<i>Trichophorum cespitosum</i> subsp. <i>cespitosum</i>		289	<i>Trichophorum cespitosum</i> nothosubsp. <i>foersteri</i>

#### Errata and Addenda to *Flora of Northumberland*

p16	To herbaria add <b>YRK</b> York.	
p19 and 190	Change 'FITZGERALD' to 'FITZ GERALD'.	
p20	Leach, SJ (1991)	Change to (1990).
p77	Middle of page	Change 'record by Winch' to 'recorded by Winch'.
p152	<i>P. lusitanica</i>	'Canaries 67'. 67 should be bold type and on next line.
p152	<i>Ulex europaeus</i>	'Very widespread and abundant'. Add' in <b>67</b> and <b>68</b> .'
p163	<i>Euphorbia spinosa</i>	'Spring Spurge' should be 'Spiny Spurge'.
p215	<i>V. beccabunga</i>	'see p66' should be 'see p67'.
p233	<i>Senecio cineraria</i>	Add ' <b>67</b> ' before 'Established'.
p258	<i>P. xizizii</i>	Add ' <b>67</b> ' before 'Crag Lough'.
p284	' <i>M. caerulea</i> ' should be ' <i>M. caerulea</i> ' – twice.	
p292	' <i>C. muricata</i> subsp. <i>lamprocarpa</i> ' Celak. should be Čelak.	
p305	BENNETT, K D	
	BIRKS paleoecological	palaeo
Plate 5	<i>Ranunculus omiophyllus</i>	'Britian' should read 'Britain'.
Plate 14	'Plates 14' should read 'Plate 14' – twice.	



## ACKNOWLEDGEMENTS

It is good to be able to acknowledge the receipt of plant records from a considerable number of individuals since 1993. Admittedly, some of the latter submitted only one or a very few records, but several people each have many records in the *Supplement*, and their names are prominent in Part A. However, all deserve thanks for their efforts.

I would like to thank Mr G H Ballantyne (BSBI *Rubus* referee for Scotland) for visiting Northumberland and for writing the section on brambles. The Rev Dr A L Primavesi (BSBI *Rosa* referee) has assiduously worked through the British roses in many herbaria, as a result of which we now have many new records for rose hybrids; I would like to thank him for this time-consuming work. Thanks are also due to other referees.

Thanks are also due to Dr A G Lunn and Dr A J Richards for constructive criticism of the manuscript, and to Mrs Margaret Patterson for her efficient typing of it. My wife, Margaret, must also be thanked for her continued collaboration.

### Recorders

	Ainley, K G		Craster, W S
	Angel, J E		Crawley, Prof M J
	Astley, B		Croft, J M
	Babington, Prof C C		Crozier, D
	Bailey, C		Dargue, J
JGB	Baker, J G		Davidson, I and K
GHB	Ballantyne, G H		Davison, S P
	Bangerter, E B		De Sausmarez, N S
	Barclay, W		Dickson, L S
	Bigge, Rev J F		Douglas, I
	Bishop, E B		Dunlop, R
DBB	Blackburn, D B		Durkin, J L
KBB	Blackburn, Dr K B	ESE	Edees, E S
	Blades, R A		Ellis, C E
RBB	Bowman, R B		Ellis, Dr H A
	Boyce, R		Evans, F
MEB	Braithwaite, M E		Evans, T G
AB	Brotherston, A		Fewster, F
	Burton, R M		Fitz Gerald, Lady R
	Coles, A	HEF	Fox, Rev H E
	Coombes, L C		Gibbons, E
	Cooper, M		Gornall, Dr R J
	Corner, Dr R W M		Gourlie, W
	Craster, E M	GGG	Graham, Rev G G

Green, J A		O'Connor, D
Groom, Dr Q J	DO	Oliver, Prof D
Hall, A		Page, Dr C N
Hall, J F		Pearce, M
Hardy, D and T		Perring, Dr F H
Hayward, I M		Pigott, Prof D
Hedley, S		Preston, Dr C D
Heslop-Harrison, Dr Y	AJR	Richards, Dr A J
Hollingsworth, Dr P M		Richardson, B N
Holmes, Dr N T H	WR	Richardson, W
Hope, J		Roberts, F J
Howitt, R C L	FAR	Rogers, Rev F A
Hubbard, Dr C E		Scott, Dr N E
Humphris, J M		Simpson, G
Ide, J M		Sims, P A
Irvine, C M		Stables, W A
Jeffreys, Sir H		Steele, J
Jeffries, M	S	Swan, Prof G A
Jermy, A C	S	Swan, Dr M
Johnston, G		Teffner, M
Jones, R V		Terras, E B
Kay, G M		Thompson, B H
Kergon, L A	RSGT	Thompson, R S G
Kitchener, G D		Tregale, B A
Knapp, Dr A G		Trewren, K
Loring, J		Tully, E M
Lowe, S		Van der Poorten, A
Marshall, Rev E S		Wanless, T W
Maskew, R		Watson, S
McKay, Dr M		Wharton, T S
Milligan, J		Wilde, C L
Milne-Redhead, E		Wilde, I L
Mitchell, A	NJW	Winch, N J
Mitchell, Dr D N		Yeo, Dr P F
Muirhead, C W		Young, A and G
Newton, A		Young, Dr J



## REFERENCES

- CLEMENT, E J and FOSTER, M C (1994). *Alien Plants of the British Isles*. London: BSBI.
- GRAHAM, G G (1988). *The flora and vegetation of county Durham*. Published by the Durham Flora Committee and the Durham County Conservation Trust.
- HALLIDAY, G (1997). *A Flora of Cumbria*. Published by the Centre for North-West Regional Studies, University of Lancaster.
- HOLLINGSWORTH, P M and SWAN, G A (1999). Genetic differentiation and hybridisation among subspecies of Deergrass (*Trichophorum cespitosum* (L.) Hartman) in Northumberland. *Watsonia*, **22**, 235-42.
- KENT, D H (1992). List of vascular plants of the British Isles. Botanical Society of the British Isles, London.
- (1996). List of vascular plants of the British Isles by D H Kent, Supplement 1, Botanical Society of the British Isles, London.
- KENT, D H and STACE, C A (2000). List of vascular plants of the British Isles by D H Kent, Supplement 2, Botanical Society of the British Isles, London.
- MITCHELL, A (1996). *Alan Mitchell's Trees of Britain*. London: Harper Collins Publishers.
- STACE, C A (1991). *New Flora of the British Isles*. Cambridge University Press.
- (1997). *New Flora of the British Isles*, second edition. Cambridge University Press.
- SWAN, G A (1993). *Flora of Northumberland*: Natural History Society of Northumbria.
- (1999). Identification, distribution and a new nothosubspecies of *Trichophorum cespitosum* (L.) Hartman (Cyperaceae) in the British Isles and N. W. Europe. *Watsonia*, **22**, 209-233.

## THE DURHAM FLORA — CORRIGENDA ET ADDENDA

Rev. G. G. Graham

Since publication of the *Flora and Vegetation of Co Durham* (vc 66) in 1988, several corrections and additions have been either discovered by, or notified to, the author.

The following pages include corrections to the original volume and additions, the latter being new information about ballast aliens and of first records of certain taxa. This is **not** a supplement to the *Flora* and contains none of the 'post-*Flora*' records added to Tyne & Wear Museums' RECORDER database (and subsequently to the Botanical Society of the British Isles' *Atlas 2000*).

The corrections are listed as they occur in the *Flora*, as are the comments relating to ballast aliens. The information relating to first records follows the original source, namely the notebook of George Temperley, the botanical notebook of Dr Christopher Hunter (fl. 1675-1757), botanical notes of the Revd. R. Johnson (1629-1695) and the catalogue of plants of William Nicolson, recently re-published by the Surtees Society (Whittaker ed., 1981).

**Map inside boards:** move Elwick 10km east, from tetrad 33L to 43L.

### Introductory chapters

- p1 change Ipse to Ipso and Ipsi to Ipse.
- p35 Fig 12. Northern 2030 isohyet should be 1200.
- p50 % figures should all be in one column.
- p61 for 'HHH Harrison, Mrs H.H.' read 'HHH Harrison, Miss H.H.'
- p61 for 'JH Holloway, Mrs J.' read 'JHo Holloway, Mrs J.'
- p62 put 'JH Hogg, J.' in alphabetical sequence.
- p62 RTMcA should be in the first column.
- p62 for 'IJW Wallace, I.J.' read 'IDW Wallace, I.D.'

### Species accounts

- p67 **Equisetum pratense** Ehrh. for '1933 JW HH' read '1932 JW HH'.
- p68 **Cryptogramma crispa** (L.) R. Br. ex Hook. for 'GA&MSw' read 'MB & MPT'.
- p68 **Osmunda regalis** L. For '1961, JW HH' read '1961, GA&MSw'.
- p68 **Polypodium interjectum** Shivas for '1962, GA&MSw' read '1962, JW HH'.
- p71 **Dryopteris affinis** (Lowe) Fraser-Jenkins subsp. **borreri** (Newm.) Fraser-Jenkins verified by H.V. Corley not M.F.V. Corley.
- p72 **Azolla filiculoides** Lam. for 'IJW' read 'IDW'.
- p81 In **Quercus cerris** L.: '**Quercus coccinea** Muenchh.' not '**Quercus coccinea** Moench.'
- p88 **Chenopodium urbicum** L. for '1951' read '1961'.
- p88 **Chenopodium suecicum** J. Murr for 'J. Murr.' read 'J. Murr'.
- p91 **Montia perfoliata** (Donn ex. Willd.) Howell delete '**Chlora perfoliata**'.
- p94 **Sagina nodosa** (L.) Fenzl A map was prepared with 77 tetrad records but unfortunately omitted.



- p95 **Silene vulgaris** (Moench) Garcke subsp. **vulgaris** for 'Garke' read 'Garcke'.
- p129 Interchange English names of **Genista anglica** L. & **G. tinctoria** L.
- p143 **Daphne laureola** L. 'Thornton [Hall near Darlington], 1688, in a letter of Thos. Lawson'... i.e. not "Thornton in Yorkshire" and not '1588'.
- p144 **Viola rupestris** F.W. Schmidt Backhouse '(1884)' not '(1880)'. Add 'see also Horsman, F. (1990).'
- p145 **Viola reichenbachiana** Jord. ex. Boreau for 'Borrer' read 'Boreau'.
- p146 **Bryonia cretica** L. subsp. **dioica** (Jacq.) Tutin The first record was also made by Thos. Lawson in his letter to John Ray, 1688. (see **Daphne laureola** L. above).
- p147 'Codlins-and-Cream' should be justified right.
- p150 **Anthriscus caucalis** Bieb. 1588 should be changed to 1688.
- p154 **Torilis japonica** (Houtt.) DC. A map was prepared with 450 tetrad records but unfortunately omitted.
- p 180 **Littorella uniflora** (L.) Aschers. for '1967' read '1960'.
- p 186 **Galinsoga parviflora** Cav. delete the record by Wanless.
- p191 **Galactites tomentosa** Moench for 'Moench.' read 'Moench'.
- p196 **Taraxacum explanatum** H. Ollgaard ined. for 'C.C. Preston, read C.C. Haworth.
- p207 **Zostera marina** L. habitat better described as 'sea coasts below low water mark'.
- p209 **Polygonatum multiflorum** (L.) All. for '*P. x multiflorum*' read '*P. x hybridum*'.
- p211 **Tritonia x crocosmiiflora** (Lem.) Nicholson for '**crocosmiiflora**' read '**crocosmiiflora**' for both *Tritonia* and *Crocasmia*.
- p220 **Elymus farctus** (Viv.) Runemark ex Melderis subsp. **boreali-atlanticus** (Simonet & Guin.) Melderis 'subsp. **boreali-atlanticus** instead of **boreali-atlanticu**'.
- p227 **Lemna polyrrhiza** L. for '**Lemna polyrrhiza**' read '**Lemna polyrrhiza**'.
- p237 **Dactylorhiza x braunii** (Hal.) Borsos & Soó. If **Dactylorhiza purpurella** is considered to be a full species then **D. fuchsii** x **D. purpurella** must have the binomial **D. x venusta** (Stephenson & T.A. Stephenson) Soó .
- p324 **Verrucaria aethiobola** Wahlenb. The records from Castle Eden Dene, Bolam Quarry and Killerby Kilns probably refer to a shade form of **Verrucaria coerulea** DC, B.J.Coppins pers.comm.

#### Vegetation accounts

- p341 AQ14: *Potamogeton obtusifolius* should be *P. berchtoldii*.
- p368 HE2: localities should be in Roman type.
- p420 WOC8: (15 Toy Top plantation) for 'fox convert' read 'fox covert'.
- p458 BR2: add 'Saxifraga hirculus... 2' to releves 302 and 303. For reasons of safety it was thought advisable in 1988 to omit localised records of this very rare species.

#### Bibliography

- p490 for 'MORGAN, W.' read 'MORGAN, D.'
- p495 WALTERS, S.M. (1952). '*Buser in Britain [Teesdale.]*' should be in Roman type.

p495 WALLACE, I.D. for 'Vasculum,56,6' read 'Vasculum,58,5'.

#### Gazetteer

p502 North Cemetary should be North Cemetery.

#### Index

p510 **Corylus avellana** for '79' read '81'.

p510 **Crocsmia x crocosmiiflora** (spelling back to two i's).

p519 **Potamogeton berchtoldii** add AQ14.

p519 **Potamogeton obtusifolius** delete AQ14.

p522 **Saxifraga hirculus** add 'BR2' to index.

p524 Add '**Tritonia x crocosmiiflora** 211' to Index.

I am grateful to Professor G. A. Swan for noting extra corrections, for pertinent remarks on ballast aliens, where I had followed Winch & B&T too closely, and for filling out some plant records for the period between 1910 and 1960. These follow below:

p72 **Dryopteris carthusiana** (Vill.) H.P. Fuchs could add records by JWHH for Walldridge Fell in 1957 & 1960. Vasc.1966,51,23.

p84 **Polygonum hydropiper** L. add 'Tunstall Reservoir, JKM & JWHH, 1955'.

p103 **Sisymbrium orientale** L. Delete 'Ballast Hills of Tyne and Wear, Winch (1832):'.

p106 **Arabis glabra** (L.) Bernh. add 'see also MORGAN, D. (1955)'.

p108 **Thlaspi alpestre** L. add to records 'summit of Highfield, upper Ireshope Burn, 1938, GASw, Hb GASw'.

p109 **Conringia orientalis** (L.) Dum. add the following records:

'On the ballast-hills of Bishopwearmouth, JSy, Winch (1832): Durham city, 1915, (first noted 1908) JRob : near Birtley, 1921, JWHH : casual near Norton, 1937, JWHH.'

p132 Swan in Flora of Northumberland (1993) p.74 notes the confusion between **Melilotus officinalis** & **M. altissimus** in the older literature. The historical accounts and synonymy of the two species therefore need changing as follows:

#### **Melilotus altissimus** Thuill.

*M. officinalis* Willd. *Trifolium officinale*. Colonist : W.

Swan (1993) p.74 contends that *M. altissimus* Thuill. had 'probably been a colonist in our area long before *M. officinalis* (L.) Lam. came in with ballast.': In cornfields near Lumley Castle and Hetton, Winch (1805) : In cornfields near Hetton, Houghton-le-Spring, Painshier and Lumley, Winch (1832): common on the Hartlepool ballast hills, AMN (1862a): railway banks between Sunderland and Seaham, 1874, JBr\* : Sunderland July 1884, [as *M. officinalis* Willd.] WSH\* : modern records as listed in the Durham Flora are correct.

#### **Melilotus officinalis** (L.) Lam.

*M. arvensis* Wallr. *M. officinalis* Desv. Colonist : W.

Swan (1993) p.74 thinks that most, if not all, records of *M. officinalis* in both Winch and Baker & Tate refer to *M. altissimus*. The first certain Durham record would therefore seem to be by G.S. Gibson (1851) : '*M. arvensis* does not seem to be confined to the south of England as I gathered it on a ballast hill near S. Shields, with *M. officinalis*, *M. vulgaris*, *Silene noctiflora* &



*Senecio viscosus* : 'north bank of the Tees, near Port Clarence ... on ballast', 1860, JH : refuse tip at the north end of the town [Darlington], 1939; refuse tip, Hundens, Darlington, 1942, JBN : near Birtley, 1945, JWHH.

- p134     **Trifolium fragiferum** L. near Birtley, JWHH, Vasc. 1961,46,14.
- p134     **Trifolium scabrum** L. Sandy open field near Tees Bay, near Seaton, Nat. Hist.Trans. 1865-67,1,135 : between Sunderland and Seaham, 1864,JBr\*.
- p135     **Trifolium ochroleucum** Huds. Port Clarence, JWHH, B.E.C.Rep.1918,5,374. Also Nat.Hist. Trans. 1865-67,1,135.
- p148     **Epilobium brunnescens** (Cockayne) Raven & Engelhorn In great quantity along the Nookton Burn GASw, 1974. Vasculum 1975, 60, 5&6.
- p155     **Arctostaphylos uva-ursi** (L.) Sprengel Feldon Burn, GWT, Vasc. 1973,43,144&156. On East side of stream in gorge near waterfall. Two plants still there in 1946, GWT.
- p162     **Cuscuta epithymum** (L.) L. Some of the Flora records evidently refer to **C. epilinum** Weihe, formerly a parasite on Flax. e.g. 'Flaxfield Bishop Auckland' JPS, B.E.C.Rep. 1881,1,53. JWHH, Vasc.1934,20,149 says that the alien Dodder **C. epilinum** had been seen at Stockton as a result of planting ordinary linseed from a grocer's shop.
- p164     **Trachystemon orientalis** (L.) G. Don f. South Shields Park, JMM, Vasc. 1967,52,14.
- p166     **Scutellaria minor** Hudson near Edmundbyers, 23.8.1938, GASwan.
- p166     **Scutellaria galericulata** L. The Greater Skullcap was seen by E. Caswell on the right bank of the Derwent opposite the ruins of Allendale's Paper Mill, on July 14th-Consett Naturalists' Field Club. Vasc.1945,30,53.
- p168     **Leonurus cardiaca** L. Edmondbyers, 1889, Rev. A.J.Campbell (HAMU).
- p169     **Clinopodium vulgare** L. near High Force Hotel, 22.7.37, GASwan.
- p173     **Chaenorhinum minus** (L.) Lange Railway, Westgate-in-Weardale, 27.7.37 and at Stanhope 6.7.1938. GASwan, Hb. GASw.
- p 180     **Veronica filiformis** Sm. Swan (pers. comm.) notes that Winch's record refers to *V. persica*.
- p177     **Euphrasia rostkoviana** Hayne susp. **montana** (Jord.) Wettst. A specimen collected in Teesdale in 1870 by J.G. Baker was confirmed as this by Pugsley.
- p179     **Orobanche rapum-genistae** Thuill. Mr J.T.Raine of Castleside notes fine specimens of the Broomrape growing in the vicarage garden. Five spikes, one to one and a half feet high were noted growing on Broom bushes on June 26th. Vasc. 1945,30,53.
- p180     **Sambucus racemosa** L. Baybridge & Hunstanworth, common and fully naturalized, 1954, JWHH.
- p181     **Linnaea borealis** L. for '1946' read '1964'. Add to the account: 'Swan (1965) thinks it could possibly be native rather than accidentally introduced when, say, conifers were planted.'
- p181     **Symphoricarpos albus** (L.) S.F. Blake Wear at Eastgate, JWHH, Vasc.1937,23,34.
- p181     **Lonicera xylosteum** L. Durham, Linton, 28.07.1884; Durham, H.E.Fox, June 1887; both Hb. LIV. ; some records at Gibside, Vasc.1918,4,46.

- p182 **Campanula patula** L. banks of R.Tees, Co. Durham, NY9-2-, Aug. 1853, W.Foggitt. Hb. LIV.
- p183 **Campanula rapunculoides** L. Now quite extinct in the old station on the Wreckenton Long Bank, Lamesley- (? JWHH) Vasc. 1946,31,8. Very plentiful in two localities on the railway banksides near Coxhoe Bridge station, where it carries its characteristic rust, JWHH & JAR Vasc. 1951,36,23. Two large patches on the railway bank at the mouth of Hawthorn Dene, JWHH, Vasc. 1960,45,15.
- p185 **Omalotheca sylvatica** (L.) Schultz Bip. & F.W. Schultz Old Ravensworth, 1938, GASw, Hb GASw.
- p185 **Inula helenium** L. detected in flower near Dene Howl on July 19th by Mr W.H.Dixon, Vasc. 1945,30,53.
- p187 **Chamomilla suaveolens** (Pursh) Rydb. Forest-in-Teesdale, B.E.C.Rep.1924, 7.577.
- p214 **Festuca vivipara** (L.) Sm. According to JWHH (Vasc.1956,41,24;) the first record for v.-c.66 'I discovered it on August 22nd growing on rock ledges on Falcon Clints'.

#### New taxa

**Doronicum plantagineum** L. Naturalized and competing with other plants quite successfully on a bankside below Heathery Cleugh, JWHH, Vasc.1956,41,7.

**Carex montana** L. S.Shields Marine Park, J.M.Mullin, Vasc.1967,52,14. Some first records from G.W.Temperley's notes per G.A.Swan, Jan. 1994.

**Cerastium arvense x vulgatum**

= **C. x pseudoalpinum** Murr Lambton Park, JBN(1942).

**Potentilla norvegica** L. Blaydon, railway sidings, GWT(1907).

**Symphoricarpos albus** (L.) S.F. Blake 'Well established by Tees-side, Middleton-one-Row' JBN(1934).

**Carduus setosus** Croxdale, B.M.Griffiths(1934).

#### More first records of Durham plants

(a) A botanical notebook of Dr Christopher Hunter (fl. 1675-1757) and (b) botanical notes of the Revd. Ralph Johnson (1629-1695) were discovered in the Dean and Chapter Library, Durham by Dr F. Horsman whilst he was researching the history of botanical recording in Teesdale. According to Horsman (1995) Ralph Johnson, 'friend and contemporary of John Ray', was 'the pioneer botanist of upper Teesdale'. 'He is known to have discovered 20 plants there'. His 'botanical notes' were 'made in 1671-1672'. Horsman also states that Johnson's Teesdale discoveries were later transcribed by Hunter in 1698 who added his own records from the Stockton area.

Most of Johnson's records were made on the south side of the River Tees and do not concern us here.

In the following list we have extracted those records from Hunter's notebook which can clearly be referred to V.-C.66, noting those which, according to Horsman, can be attributed to Johnson. The cumbersome Latin phrase names used by Hunter and Johnson are mostly replaced by their modern binomial equivalents. The records can all be dated c. 1700.

**Festuca vivipara** (L.) Sm. '*Gramen montanum spica foliacea graminea*. In a lane between Middleton and Newbigen upon a stone wall covered with earth, on the north side of the lane about the halfway between the two places'.



**Galium boreale** L. 'In the same lane, on ye same side of it [Middleton to Newbiggin] a little nearer Newbigen'.

**Persicaria vivipara** (L.) Ronse Decraene = **Polygonum viviparum** L. '*Bistorta minor*. In a meadow field on the south side of the way between Newbigen and Watgarth below a house called Moor rig...' ... '... and all over these meadows thereabouts in great abundance'.

**Geranium lucidum** L. 'In a lane between Newbigen and Watgarth growing upon old stone walls'.

**Marchantia polymorpha** L. '*Lichen petra[e]us umbellatus*. Upon the same rocks '(below Mickle [High]-force)' on both sides of the river plentifully' (copied from Johnson's *ms*).

**Cryptogramma crista** (L.) R. Br. ex Hook. 'Upon a stone wall at Birdall that comes west from the houses, also on a stone wall full west from Watgarth ye next to the [last] but one on ye north side of ye River Tees in great plenty'. (Copied from Johnson's *ms*).

**Bartsia alpina** L. 'By ye side of a small rivulet that runs by ye south end of ye wall where on grows ye *Adiantum album floridum* [*Cryptogramma crista*] but something nearer ye house on ye Fell, full west from Watgarth'. (Copied from Johnson's *ms*).

**Minuartia verna** (L.) Hiern. 'Upon Widdybank about a mile from Watgarth to ye west'.

**Pellia epiphylla** (L.) Corda 'All three grow in Yewy-Crag.

**Equisetum hyemale** L. in Chopwell Wood, *Ep Dunelm.*'.

**Asplenium scolopendrium** L.

**Vicia lathyroides** L. 'Grows plentifully on the ballast shoar called Blount's Key near Newcastle, on the south side of the River Tyne directly over against the Glass houses'.

**Ulex gallii** Planch. '*Genista spinosa minor* on the top of Brusleton bank as you go from Aukland towards Piersbridg...' '...I saw it there in flower on ye 2d of Octob. 1699'.

**Geranium sanguineum** L. 'By ye Sea Side above ye rocks everywhere in Easington parish'.

**Juniperus communis** L. subsp. **communis** '*Juniperus baccis longioribus*. I found some bushes whose beryes were all longer and smaller than ye beryes of ye Common Juniper in Chopwell Wood'.

**Stellaria nemorum** L. subsp. **nemorum** '*Alsine nemorosa maxima montana*. I found this plentifully in a shady wood called West-field dean near Medomsley in *Ep. Dunelm.*'

**Listera cordata** (L.) R. Br. 'On moist ground on the West-field near Medomsley near ye foot way as they go to Ebchester'.

**Lactuca virosa** L. 'Grows plentifully in the hedges about Stockton, Norton etc.'

**Fagopyrum esculentum** Moench

**Anagallis arvensis** L.

**Galeopsis angustifolia** Ehrh. ex Hoffm. 'Among gravell on the Roads about Norton'.

**Bartsia odontites** (L.) Hudson = and between it and Blakston plentifully'.

**Odontites vernus** (Bellardi) Dumort  
subsp. **serotinus** (Syme) Corbière.

**Verbena officinalis** L. 'At Thorp in an old Gravell Pitt'.

**Lycopus europaeus** L. 'Nesom [Neasham] about a Well at ye east end of ye Town'.

**Salvia verbenaca** L. 'In ye lane between Blackston and Thorp'.

**Hippuris vulgaris** L. 'In ye rivulet at Thorp and on the roadsides between it and Blackston'.

**Atropa belladonna** L. 'It grows plentifully about Durham on ye broken walls'.

In 1690 Abp. William Nicolson produced a catalogue of plants which contains a few Durham records. Nicolson botanized with Thos. Lawson and his list was used in the production of Camden's *Britannica* (1695). Consequently there are only a few records in this list which have not already been given in the Durham flora. They are as follows:

**Anthemis tinctoria** L. 'Near Sogburn in *Comitatu Dunelmense* J.R.' This is John Ray's record copied in Camden (1695) [NZ 347073].

**Bryonia cretica** L. subsp. **dioica** (Jacq.) Tutin 'Ulnaby in *Comitatu Dunelmense*' [Ulnaby Hall. NZ227172].

**Onopordum acanthium** L. 'Twixt Newcastle and the Glass-houses [Glasshouse Bridge over Ouse Burn NZ 264642]. South-Shields in *Comitatu Dunelmense*'.

**Ranunculus sceleratus** L. 'Hell Kettles nigh Blackwell'. [NZ 281109].

#### ACKNOWLEDGEMENTS

I am grateful to Dr F. Horsman for the relevant information on C. Hunter and R. Johnson, for useful discussion and for sending me offprints of his papers on Teesdale; to Roger Norris, Dean and Chapter Librarian for allowing access to Hunter's notebook and to Alec Coles for a copy of Whittaker (1981). Arthur Chater and Jack Laundon helped with the elucidation of Hunter's Latin phrase names.

#### REFERENCES

- HORSMAN, F. (1990). Some Backhouse discoveries in Upper Teesdale. *Naturalist*, **115**: 89-96.  
(1995). Ralph Johnson's notebook. *Archives of Natural History* **22** (2):147-167.  
(1999). Plant distribution patterns: the first British map. *Archives of Natural History* **26** (2): 279-286.  
HUNTER, C. (fl.1675-1757). Notebook: in the Dean and Chapter library, Durham. MS Hunter 122.  
LAWRENCE, I. G. (1994). *Flora of Cleveland*. Middlesbrough: Cleveland County Council.  
NICOLSON, W. Abp., (fl. 1655-1727). Botanical Notebook (which includes *Catalogus Plantarum Britanniae*). MS: Rose Castle, Carlisle. [See also E. J. Whittaker ed. *The Surtees Society*, 193, 1981].  
SWAN, G. A. (1993). *Flora of Northumberland*. Newcastle upon Tyne: Natural History Society of Northumbria.  
WHITTAKER, E. J. ed (1981). *A Seventeenth Century Flora of Cumbria. William Nicolson's Catalogue of plants 1690*. Gateshead. Northumberland Press Limited.





TRANSACTIONS  
OF THE  
NATURAL HISTORY SOCIETY  
OF  
NORTHUMBRIA

Editor:

B J SELMAN

Assistant Editors:

D C NOBLE-ROLLIN

M A PATTERSON

Volume 62

THE NATURAL HISTORY SOCIETY OF NORTHUMBRIA  
THE HANCOCK MUSEUM  
NEWCASTLE UPON TYNE NE2 4PT

2001-2002



ISSN 0144-221X

©The Natural History Society of Northumbria, 2002.  
This publication is copyright. It may not be  
reproduced in whole or in part without the  
Society's permission.

Printed by Pattinson and Sons, Newcastle upon Tyne.

## CONTENTS

	Page
<b>PART 1</b>	
<b>Annual Report 2001</b>	3
 <b>PART 2</b>	
<b>Birds on the Farne Islands in 2001</b>	37
compiled by R Harvey, edited by M A Patterson	
 <b>PART 3</b>	
<b>The distribution, size and structure of Northern Brown Argus butterfly <i>Aricia artaxerxes</i> populations in North East England</b>	89
by S ELLIS	
<b>The importance of exposed riverine sediments for beetles (Coleoptera) in Northumberland</b>	103
by M D EYRE AND M L LUFF	
<b>The future of farm grassland as a diverse, productive environment</b>	115
by R S SHIEL	
<b>Specimens of bird species now threatened, or made extinct in recent times, in the collections of the Hancock Museum, Newcastle upon Tyne</b>	123
by L JESSOP AND R H STOBART	
<b>The parasites of pastureland Leatherjackets (<i>Tipula</i> spp., Tipulidae: Diptera) in the North East of England and their potential for biological control</b>	153
by M K ER, B J SELMAN, G R PORT AND A GÖKÇE	
<b>Dental anomalies in the Chillingham Wild White Cattle</b>	169
by B INGHAM	
 <b>Corrections to 'The Durham Flora - Corrigenda et Addenda'</b>	 177
by G G GRAHAM	
 <b>Corrections to 'A Supplement to the Flora of Northumberland'</b>	 177
by G A SWAN	



# CONTENTS

1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
10	10	10
11	11	11
12	12	12
13	13	13
14	14	14
15	15	15
16	16	16
17	17	17
18	18	18
19	19	19
20	20	20
21	21	21
22	22	22
23	23	23
24	24	24
25	25	25
26	26	26
27	27	27
28	28	28
29	29	29
30	30	30
31	31	31
32	32	32
33	33	33
34	34	34
35	35	35
36	36	36
37	37	37
38	38	38
39	39	39
40	40	40
41	41	41
42	42	42
43	43	43
44	44	44
45	45	45
46	46	46
47	47	47
48	48	48
49	49	49
50	50	50
51	51	51
52	52	52
53	53	53
54	54	54
55	55	55
56	56	56
57	57	57
58	58	58
59	59	59
60	60	60
61	61	61
62	62	62
63	63	63
64	64	64
65	65	65
66	66	66
67	67	67
68	68	68
69	69	69
70	70	70
71	71	71
72	72	72
73	73	73
74	74	74
75	75	75
76	76	76
77	77	77
78	78	78
79	79	79
80	80	80
81	81	81
82	82	82
83	83	83
84	84	84
85	85	85
86	86	86
87	87	87
88	88	88
89	89	89
90	90	90
91	91	91
92	92	92
93	93	93
94	94	94
95	95	95
96	96	96
97	97	97
98	98	98
99	99	99
100	100	100

TRANSACTIONS  
OF THE  
NATURAL HISTORY SOCIETY  
OF  
NORTHUMBRIA

Editor:

B J SELMAN

Assistant Editors:

D C NOBLE-ROLLIN

M A PATTERSON

Volume 62

Part 1

THE NATURAL HISTORY SOCIETY OF NORTHUMBRIA  
THE HANCOCK MUSEUM  
NEWCASTLE UPON TYNE NE2 4PT

2001



**ISSN 0144-221X**

© The Natural History Society of Northumbria, 2001

This publication is copyright. It may not be reproduced in whole or in part without the Society's permission.

Printed by Pattinson and Sons, Newcastle upon Tyne.

**ANNUAL REPORT  
OF THE  
COUNCIL AND TRUSTEES  
FOR THE  
YEAR ENDED 31 JULY 2001**



## THE NATURAL HISTORY SOCIETY OF NORTHUMBRIA

**PRESIDENT** The Viscount Ridley

### VICE PRESIDENTS

A H Dickinson	D R Shannon	Dr A G Lunn	Dr J M Jones
R W T Thorp	D P Walton (resigned)	A M Tynan	R Wilkin
J Alder	I D Moorhouse	E Slack	
Dr G A L Johnson	Mrs M A Patterson	Professor R Bailey	

### COUNCIL

#### (1) Elected by members:

1998 - S Lowe

1999 - J S North Lewis, Dr D Gardner-Medwin (Chairman of Council), J Walton

2000 - A Coles, D I Johnston, Dr R Stobbart

#### (2) Nominated by sections:

H H Chambers (library), Mrs J Holmes (archives – co-opted), Dr A G Lunn (botany), Dr G A L Johnson (geology), I D Moorhouse (Gosforth Park resigned as chairman April), Dr C P F Redfern (ornithology and Gosforth Park), Dr B J Selman (publications), Ms J Simkin (lichenology)

#### (3) University of Newcastle representatives:

Professor P S Davis, Dr A J Richards, Dr B J Selman

### TRUSTEES

H H Chambers, Dr D Gardner-Medwin, Dr A G Lunn, I D Moorhouse, J S North Lewis, Mrs M A Patterson, Dr B J Selman, D R Shannon, E Slack

**TREASURER** N A Furness FCA (designated Financial Manager from April)

**SECRETARY** D C Noble-Rollin

**SOLICITORS** Dickinson Dees, St Ann's Wharf, 112 Quayside, Newcastle upon Tyne

**BANK** Lloyds TSB Bank plc, 102 Grey Street, Newcastle upon Tyne

### FINANCIAL ADVISERS

Brewin Dolphin Securities Ltd, 39 Pilgrim Street, Newcastle upon Tyne

### INDEPENDENT EXAMINERS

PricewaterhouseCoopers, 89 Sandyford Road, Newcastle upon Tyne

### GENERAL PURPOSES COMMITTEE

Dr D Gardner-Medwin, Dr A G Lunn, I D Moorhouse, J S North Lewis and Dr B J Selman; N A Furness and D C Noble-Rollin in attendance

### SOCIETY REPRESENTATIVES

**Coquet Island Advisory Management Committee:** I D Moorhouse, D C Noble-Rollin

**Coquet Island Research Sub-Committee:** Dr C P F Redfern, D C Noble-Rollin

#### Lindisfarne National Nature Reserve:

**Advisory Committee:** D G Bell

**Wildfowl Panel:** D C Noble-Rollin

**Museum Management Committee:** Dr D Gardner-Medwin, D C Noble-Rollin, E Slack, Dr R H Stobbart

**STAFF** Ms S Carter, M Hughes (office manager – from June), Dr A Westerberg

**GOSFORTH PARK NATURE RESERVE** Warden: P Drummond

**THE HANCOCK MUSEUM** Senior Curator: Iain Watson  
Curator and Principal Keeper, Natural Sciences: S McLean

## ANNUAL REPORT OF THE COUNCIL AND TRUSTEES FOR THE YEAR ENDED 31 JULY 2001

The Natural History Society of Northumbria is a registered charity and is governed by the rules of the Charity Commission. The Trust Deed dated 30 December 1965 was last updated after the annual meeting on 28 November 1997. A list of the present trustees is given opposite with the other officers of the Society. Our rules state that 'The objects of the Society shall be the encouragement by every means of the study of natural history in all its branches; the protection of the local flora and fauna; the maintenance and extension of the Society's library and collections; the publication of *Transactions* and other scientific papers, the organisation of lectures, discussions and field meetings and co-operation with other scientific societies or associations with similar objects'. The following annual report outlines the main achievements of the year in relation to the charity's objects.

### INTRODUCTION

The opening of the third millennium will long be remembered in Britain as the year of the great epidemic of foot-and-mouth disease. Although the infected animals were first discovered in Essex, the origin of the outbreak was rapidly traced to Northumberland. Local people will all have shared a sense of horror, fear and guilt by association. Some of the Society's members will have suffered personally from the disaster; to them we offer our sympathy. Nearly all of us will have found it impossible to get out to make our usual observations and records of wildlife in the area. Many national and local surveys also had to be abandoned; several of our field trips had to be changed or cancelled; Gosforth Park was closed for nearly five months. As we write, in August, the epidemic continues in other counties and has flared up again in Northumberland, after nearly three months without a case in the county. It is too early to judge the effects it will have had on wildlife – perhaps some short-term benefits from lack of disturbance, and some harm and some good from the loss of grazing of important habitats. But the large-scale changes which may be needed in the management of the hard-hit rural economy and which are now being constantly but somewhat vaguely discussed, carry both hope and menace. While there is much ecologically sterile agricultural land where wildlife might benefit from change, few of our most valued biosystems will benefit from fundamental changes in management. Nor is economic need, generally, an eco-friendly determinant of change. Members of the Society should try to contribute their experience to the debate and help to optimise and monitor the effects on wildlife over the next few years.

One effect of the disruption of the field trips was that we introduced a method of updating members at the last minute about the arrangements, using electronic mail. This worked well for those who were on line, and it raises the question of whether other spontaneous and informal Society activities might be arranged in this way in the future. In the same vein, towards the end of the report year, Mr Ian Moorhouse undertook to look into how the Society might develop its activities in new and appealing ways over the next few years. By next winter we hope to be able to report back to the membership on their own ideas about this, elicited by questionnaire.

David Noble-Rollin and Anne Westerberg have been full of innovative ideas for the Society and we are delighted that David has so fully recovered his energy and enterprise after his recent illness. Anne and Steve Westerberg have taken on part of the job of devising and leading field trips with great success. In the office, too, there has been a major and welcome change with the appointment of Martin Hughes as office manager.

One failure this year has been the manner in which we arranged to substitute a remunerated treasurer for our former sequence of honorary treasurers. Mr Neville Furness has made a great success of taking on the role we devised at the Annual Meeting in November 1999, but the Charity Commission has not been happy about the rule changes we made then and, following further negotiation with them, we shall need to change the rules yet again at the next Annual Meeting. We should like to single out Neville for special thanks for his impeccable management of the Society's affairs under conditions which, entirely through our fault, were clearly as much of an embarrassment to him as they were to us, and for ensuring in a most professional way that the letter and spirit of the Charity Commission's rules were scrupulously followed.



As always, much of the exciting (and other!) work of the Society is done by volunteers. Without them we should achieve very little and they deserve our warmest thanks. The work they do will be evident, for example, in the reports below of the library, of Gosforth Park, of conservation work in the museum, of the publications with all the work of editing and all the production of illustrations that they involve, and of the efficient and cheerful help in the office. Ian Moorhouse's work as chairman of the Gosforth Park committee deserves special commendation; Ian retired during the year, and we welcome Chris Redfern as his successor. Two areas of volunteering are perhaps too little known to most members and deserve special mention. They are the work on the archives and the research programmes.

Mrs June Holmes has been cataloguing and caring for our rich and varied archive collection for more than a decade now, with the help of a few dedicated assistants. We are very grateful to them. Council has decided to give more attention to the task of conserving these precious artefacts; they represent one of the richest sources of historical information about local wildlife and local naturalists available in any region of Britain.

The research supported by the Society in recent years has been largely carried out by the bird ringing group; their report below will indicate the amount and quality of the work involved. Dr Chris Redfern and his colleagues deserve our praise and our thanks. We hope that their achievements may stimulate others to embark on research in other fields of natural history and to use the Society as a forum and a resource for their work. We are uniquely fortunate in the region in being able to bring together gifted naturalists, a major reference museum, a well stocked library and a respected journal of our own for publishing the results! As members, you are warmly encouraged to use them.

Finally, council would like to thank all our volunteers whether mentioned here or not, the staff, particularly David Noble Rollin who, to adapt a phrase, holds the Society together while driving it forward in all directions, the museum staff for their care of our collections and for collaborating with the Society in many generous and stimulating ways, and all who have contributed to this Annual Report.

## MEMBERSHIP

The total membership on 31 July 2001 (with 2000 figures in brackets) was 795 (876). This was made up of 7 (8) honorary members, 41 (39) life members, 462 (526) members who receive *Transactions*, 245 (269) members who do not receive *Transactions*, 25 (23) associate members, 0 (0) schools and 15 (11) complimentary members. There were also thirty-four members who had only paid part of their subscription by the end of the year. This was due to the old banker's orders still being used and it is hoped that these members will be reinstated by the end of the next financial year. However, this still shows a drop in the overall membership although it is not as large as in previous years when the subscriptions have been increased. Thirty-three people also make payments under long-standing banker's orders ranging from £2 to £16, made when these amounts were the current subscription rates, and they are regarded as donors and not members.

The Council reports with much regret the death during the year of seven members: Mr J S Davidson (elected in 1967), Mr E Green (1989), Dr N A Hughes (1988), Miss R E Latham (1977), Mr G E Mason (1998), Dr R Spinks (*ca* 1990) and Mr P Winter (1993). We also note with regret the death in April 2001 of Sir Kingsley Dunham FRS, at the age of 91. Though not a member, Sir Kingley was a friend and strong supporter of the Society who added distinction to our lecture programmes on several occasions. He did classic research in the region, based on deep geological cores, became Director of the British Geological Survey and, from 1950-66, was Professor of Geological Sciences at the University of Durham.

## ANNUAL MEETING

Lord Ridley presided at the Annual Meeting on 1 December; twenty-nine members attended. The Annual Report and Financial Statement were adopted and the president and vice-presidents (as listed at the beginning of this report) were re-elected. Mr Neville Furness was re-elected treasurer, and Mr A Coles, Mr I Johnston and Dr R Stobart were elected

members of Council. Some discussion followed on the lack of progress of the proposed museum developments. After the formal business, Mr Eric Morton, surrounded by a veritable parliament of specimens, gave a lively talk on taxidermy and a vivid practical demonstration of the revivification of the initially very unprepossessing skin of a tawny owl.

## COUNCIL

The Society's officers and members of Council are listed on page 4. Council met, as usual, four times during the year, in October, January, April and July. Because of the special relationship with Newcastle University concerning the management of the Hancock Museum, the University is entitled to four representatives on Council, but for some years now, has appointed only three. We have approached the University about this. During the year, Mrs June Holmes was co-opted to Council, to represent the interests of the Archives. Mr Steve McLean, representing the Principal Keeper of the Museum, Mr Neville Furness, as finance manager, and the Secretary were in attendance at Council meetings during the year. Neville was re-elected as treasurer at the annual meeting in November. At the April meeting of Council, on the advice of the Charity Commission, he was instead designated finance manager. He has continued to deal with the Society's financial activities throughout the year.

## PUBLICATIONS

In February the delayed Volume 60, part 3 of the *Transactions* was published, containing three main papers, a short communication and a book review. This was preceded by the Society's annual report for the year ending 31 July 2000, published as Volume 61, part 1. Finally, 'Birds on the Farne Islands 2000' was published as Volume 61, part 2. The final part of Volume 61 is to be the supplement to Professor George Swan's 'Flora of Northumberland' which will include corrections and additions to 'The Flora and Vegetation of County Durham' by the Reverend G Gordon Graham. This is in an advanced stage of publication. Papers for inclusion in Volume 62 are in the pipeline but the editor wishes to encourage field workers and naturalists to send in short papers outlining the preliminary results of their ongoing studies and also interesting observations, so that members can appreciate and enjoy recent developments in the world of natural history in the north-east of England.

## OFFICE MANAGEMENT

It became apparent during August 2000 that the staffing of the office had reached a point where we were unlikely both to meet our commitments to the members and to keep to the very tight deadlines that occur between August and November. In order to work out a solution to the problem, members of the staff and office volunteers had a number of meetings chaired by Derek Shannon. It became apparent that the continuity was beginning to disappear because Anne Westerberg and Siu Carter did not overlap in their work and the Secretary was becoming too busy to look after the day-to-day office organisation. The solution was to create a new post of office manager. This was advertised in the bulletin and *Roebuck* and in June Martin Hughes was appointed to the position. We welcome him. Martin's remit is to increase the efficiency of the office and to ensure the smooth running of the Society's administration.

## Staff

**Ms Siu Carter** Siu's main duties are the day-to-day finances and maintaining the membership database. Throughout the year she has worked long hours to maintain the accuracy of members' details and has dealt with much of the correspondence generated by the Secretary.

**Mr Martin Hughes** Martin joined the staff in June and is already making a big difference to the Society's efficiency. He is creating a calm and friendly atmosphere within the office and rapidly developing a background knowledge of the procedures and deadlines that are part of the Society's year. The regular updates that we needed to send to members interested in the field activities would not have been possible without his commitment to getting the job done. Moreover, Martin not only has previous experience of managing offices, he is also a naturalist, has worked for the BTO, is an A-ringer and one of his degrees is in biology.



**Dr Anne Westerberg** Anne has worked very hard during the year under increasing pressure to maintain the services to members. Her biological knowledge means that she is able to answer many of the numerous telephone queries from members and the public. Her University contacts and connections with naturalists in Durham greatly increase the number of experts that we can call on for help. She is also responsible for the organisation of the ornithological field trips and the holidays run for members.

### **Volunteers**

**Mrs Janet Angel** Janet has continued her analyses of the members' log sheets from Gosforth Park, and although she only makes infrequent visits to the office her work in keeping this task up-to-date is greatly appreciated. Janet also now runs the informal botany group and is the first contact for members wishing to join in these extra activities.

**Mr and Mrs Hugh Chambers** Hugh and Stella have continued to run the Society's library and to look after the many students and members who visit and use its resources. The library report illustrates the amount of work undertaken by them and how the library is becoming an increasingly valuable asset for members. They are always available to help in any way necessary to improve the working of the Society. Council would like to thank them for their invaluable work during the year.

**Miss Barbara Harbottle** Barbara has started to work on archival material in the library and is compiling a database of Society officers from 1829 onwards. The initial entries into the database were completed by the end of the year and this new resource will be reviewed and any suitable additions incorporated.

**Mrs Joan Holding** Joan has once again devoted some of her spare time to illustrating the Bulletin, redrawing maps for the *Transactions*, updating posters and helping to design leaflets. This work is essential to maintain the standard of our publications and we are grateful for the expertise that she so freely offers to the Society. She also enabled the Society to offer its help in preparing drawings of wildlife sites in Newcastle for the Newcastle City Biodiversity Action Plan, which should be published in Autumn 2001.

**Mrs June Holmes** June continues to produce the catalogue of manuscripts and other archival papers held in the Hancock Museum. Because of her knowledge June has been co-opted on to Council so that the archives of the Society can be properly represented at Council meetings. Apart from her work on the collections she is now the museum's expert on matters concerning Thomas Bewick, and deals with the enquiries and visiting scholars on this subject. This expertise enabled the Society to obtain a grant through 'Tomorrow's History', which will make it possible to photograph all the Bewick collection of original watercolours and drawings and put them on CD. Copies will be available at local libraries in 2002 and some will be on the 'Tomorrow's History' website as the Society's contribution.

**Mr Ian Johnston** Ian has continued to help with the ringing group administration; he organizes the meetings of the group at the beginning of the season and continues to help with boat maintenance. During the year he has taken on the periodical 'exchanges', which involves recording parts of journals as they arrive, checking for missing copies and getting volumes bound.

**Mrs Margaret Patterson** Margaret continues to be assistant editor of the *Transactions* and comes into the office one day a week. This year she has been particularly concerned with the production of the update to the *Flora of Northumberland*, due in the autumn. This has required a great deal of typing and checking to make sure all the records are accurately documented. She also helps to edit the Bulletin and other documents before they go out of the office and of course does most of the work on the annual report from the Farne Islands.

**Ms Tricia Sones** Tricia's work for her PhD began earlier than she expected with expeditions to the Arctic in August last year to collect information for her thesis. Because of this she had to give up her part-time work for the Society. However she agreed to continue to take minutes at

meetings of Council and at the Annual Meeting in a voluntary capacity. She is also a member of the Gosforth Park Management Committee.

**Ms Ann Stephenson** Ann assists June Holmes in the cataloguing of the archive letters in the museum. The Society lent one of its old computers to her so she could transcribe the Hancock letters at home and at present she has typed in approximately a thousand letters, mostly from the Hancock collection. Eventually this will form the basis of a searchable reference collection attached to the main archive catalogue.

**Dr Anne Wilson** Anne continues her work on the Farne Islands birds, researching into the past records of their numbers. She also devotes a morning each week to helping in the office and has been of great assistance to the secretary in preparing graphs and data sets for reports that he has had to write when he represents the Society on committees.

**Mrs Rita Wolland** Rita has continued to put the thousands of sightings and recovery data for ringed birds from the Farne Islands onto a database. These data, stored only on green cards, cover the period of over forty years that the Society has been ringing on the islands. We hope that this information will be useful in understanding changes in the population structure of species on the Farnes. She also helps with office duties when we are busy or short staffed.

#### **MUSEUM MANAGEMENT COMMITTEE**

The principal matters for discussion this year have been a survey of the museum building arranged by the University Estates Department, and the University's recent dissatisfaction with the plans to extend and improve the building. The survey revealed that repairs to the fabric of the building, particularly the roof, were now becoming urgent and would be likely to cost about £500,000 plus VAT. The University recognises its responsibility to carry out these repairs and at the end of the report year was discussing the possible design of the re-roofing with representatives of English Heritage (because the building is Grade II\* listed). The issue of the proposed developments is more complex and no less serious. The University proposed an extension to house the overcrowded collection several years ago and some designs were drawn up in their Department of Architecture. Since then several designs and proposals have been made, and partly funded by the University, but all have foundered after more or less progress. Most importantly, the proposal for major work on many aspects of the museum and for a large extension was challenged by English Heritage and as a result missed the chance to obtain a major Lottery Heritage Fund grant. The subsequent audit of the cultural importance of the building and its collections, suggested by English Heritage, seemed to provide an opportunity to move forward. It emphasised the dual importance of the collections and of their original architectural setting, especially the former, and the need for adequate storage and environmental control to conserve them and maintain the museum as an effective scientific and cultural asset in the region.

So much for the background. The problem that has arisen this year is that the University, which in 1958 leased the building and collections from the society for a hundred years, now finds that the academic benefit of the agreement that was sealed between us has diminished, while University funding has suffered unprecedented and unforeseen cuts. The University, by the agreement, is responsible for the staffing, servicing and upkeep of the building until 2058, and fears that any development might increase those costs. As a result the University authorities, within a decade, have reversed their stance from proposing the development to refusing to consider it. As matters stand at present, Professor Roger Dye, Pro Vice Chancellor and chairman of the Museum Management Committee, has proposed a small working committee to consider all aspects of the future of the museum. The Society will be ably represented on this group by Alec Coles whose brief is to report to Council on the discussions. The Society, which owns the collections, widely recognised and officially designated as of international importance, is determined that nothing shall be done to put their conservation, scientific value, or availability to scholars at risk.

Meanwhile the committee has continued its more routine work of overseeing the management of the museum and the conservation of the collections. Council would like to congratulate and



thank Steve McLean for shouldering the extra responsibilities, which fell to him during the interregnum which followed the departure of Alec Coles as Senior Curator. He has proved a superb curator and a valuable friend to the society. We also warmly welcome Iain Watson who was appointed Senior Curator this summer.

## HANCOCK MUSEUM

Total visitor numbers for the year were 81,327, considerably lower than in the previous year. This has been a difficult period for the museum given the competing pressures faced by the opening of other major charging visitor attractions in the region. Nevertheless, the museum has hosted a large number of exhibitions and an unprecedented number of supporting events and activities throughout the year.

### Major Exhibitions

Our first 'blockbuster' of the year was *Top Secret* which provided a 'blast from the past' for many visitors during the summer 2000 period who were able to see props and models from cult TV and films such as Dr Who, Thunderbirds, UFO, Prisoner and James Bond. *Bats: Masters of the Night* used sets and reconstructions to examine the natural history of these fascinating creatures and even delved into their mythical associations. This particular exhibition was supported by a considerable number of 'family fun' events including live bat days with Eddie Bell. The final major exhibition of the year was *Star Trek – Federation Science*. The Hancock was the first venue in the UK outside London to host this exhibition, which was produced by the Oregon Museum of Science and Industry. The exhibition used the popularity of *Star Trek* to investigate the science of space by using over thirty interactive displays examining concepts such as space travel, gravity, navigation and energy. The exhibition was supported by a 'gallery interpreter' employed on short term contract to act as a facilitator for school groups and augmented by thirteen volunteer 'Trekkers' who gave up their valuable spare time to supervise the exhibition and help visitors with the interactives. Despite increased competition from other venues, the media profile of the museum has been high, even reaching national TV for a BBC children's programme.

### Art Programme

Two notable projects this year included *Namaste*, a prestigious exchange exhibition with the Kathmandu School of Art in Nepal, and *Flash Bang Wallop - What's the Picture?* The latter was funded by the DCMS Education Challenge Fund and allowed students from the Northern Counties School for the Deaf to work with the museum's collections to produce their own photographic exhibition. Other exhibitions included a 150th anniversary display of works of art and architectural drawings of the Newcastle Central Station (including a work by John Dobson belonging to the Society), *Wildlife Photographer of the Year 2000* and *Plants and Places* by local artist and ex-university botanist, Ann Pickering, who brought a magnificent selection of floral watercolours to the museum. The programme also included an installation by Henna Asikainen and Silvano Macedo which marked the culmination of their residency work at the museum, and seven installations by seven artists as part of the annual Visual Arts North East (VANE) Festival.

Perhaps our most unusual exhibition was *Scribble a Squirrel*. This marked the launch of National Red Squirrel Week. Members of the public were invited to bid for celebrities' sketches of squirrels in the region's largest on-line charity auction. All proceeds went to the work of the charities involved in protecting wildlife and providing outdoor experiences for people with disabilities. The exhibition was organised by the Northumberland and Durham Wildlife Trusts and the Calvert Trust.

In addition to temporary exhibitions, a new permanent ethnographic display has been completed in one of the balcony galleries within the museum. The museum's touring exhibition *Claws!* appeared at Plymouth City Museum and Art Gallery and at the Discovery Museum, Newcastle upon Tyne.

The museum was runner up in the Northumbria Tourist Board 'Pride of Northumbria 2000 Awards' in the 'Visitor Attraction of the Year: over 100,000 visitors' category. The award was presented by Pam Royle of Tyne Tees TV.

### **Temporary Major Exhibitions**

#### ***Top Secret* 5 July - 10 September 2000**

A brand new exhibition of film props and memorabilia from blockbuster films based on the 'top secret' theme. This included material from well known films and TV series including Men in Black, Sherlock Holmes, X-Files, James Bond, Randell and Hopkirk, Thunderbirds, Dr Who and Mission Impossible.

#### ***Bats - Masters of the Night* - 14 October - 22 April 2001**

This highly acclaimed exhibition investigated the natural history and folklore of the bat world and included a wide selection of interactive exhibits.

#### ***Star Trek - Federation Science* - 12 May - 9 September 2001**

An exhibition exploring the science behind the science fiction of Star Trek. This exhibition included over thirty interactive exhibits exploring concepts such as space travel, gravity and energy as well as props and costumes from the TV series.

### **Temporary Exhibitions: Art and Other Exhibitions**

#### ***The Campaign Against Illegal Poisoning* - 31 July - 29 October 2000**

A small display by MAFF outlining the occurrence of illegal wildlife poisoning in the UK and what members of the public can do to help.

#### ***Namaste* - 19 August - 15 October 2000**

As part of an exchange exhibition with artists from Newcastle upon Tyne, the Museum was the first venue to host a series of watercolours by artists from the Kathmandu School of Art in Nepal. Opened by Mr Hari Kumar Shrestha, Councillor and Deputy Chief of Mission at the Royal Nepalese Embassy.

#### ***Scribble a Squirrel* - 14 September - 24 September 2000**

The museum hosted the *Scribble a Squirrel* exhibition to launch National Red Squirrel Week. Organised by the North East Wildlife Trusts and the Calvert Trust.

#### ***The Robert Stephenson Trust: 150th Anniversary of the Central Station* - 21 October - 3 December 2000**

The Robert Stephenson Trust in conjunction with the Hancock and the Laing Art Gallery showed a series of artworks to celebrate the 150th anniversary of Newcastle Central Station.

#### ***VANE: 2000 : Stuffed* - 28 October - 26 November 2000**

Seven artists from the Visual Arts North East 2000 festival produced a series of gallery interventions based around each artist's interpretation of the museum's collections and the natural world. The interventions attempted to create new and unexpected associations between art and the natural sciences.

#### ***Plants and Places* - 9 December - 18 February 2001**

An exhibition of watercolour paintings by Dr Anne Pickering.

#### ***Flash Bang Wallop - What's the Picture?* - 3 March - 29 April 2001**

An exhibition of photographs by students from the Northern Counties School for the Deaf. Opened by Bob Duncan, Senior Producer for Tyne Tees TV Deaf Unit.



**Residency work: *The First Mild Day of March* - 30 March 2001 - 22 April 2001**

An installation within the bird gallery produced on the completion of the residencies of Henna Asikainen and Silvano Macedo.

**Wildlife Photographer of the Year 2000 - 21 April - 27 May 2001**

This Natural History Museum annual exhibition was once more on display at the museum. As is always the case, the wildlife photographs were of exceptional quality.

**Education Activities - Schools**

The schools programme has been particularly successful; all the Egyptian and Greek Living History events were fully booked. The autumn Living History ran for seven weeks. Approximately 2,500 children attended the event for Egypt and just over 1200 for the Greek programme. A number of support events for the *Bats* exhibition were organised but the response in the autumn term was very disappointing. A further targeted mail-out for the spring programme resulted in some additional bookings and an activity pack was produced to support educational visits to the exhibition. The spring term Living History was also extremely popular and in total, over the two terms, just over 7000 school children attended these sessions.

Artist Didier Cauchy worked in the museum with two groups from Hotspur Primary, Newcastle. They used the galleries as stimulus for an environmental art project and made papier-mâché models of snakes, lizards and bugs.

**The *Bats* activities programme** included two storytelling sessions with Pat Renton and two days of mask-making workshops.

**Education Activities - Informal Activities**

An extensive series of 'Family Fun' events have run throughout the year. Highlights have included live reptile, insect, bats and marsupial days and a weekend 'Fossil Roadshow' organised by Rockwatch. The activities were as follows: Fossil Fun (1 August 2000), Men in Black (2 August), Crafty Creatures (3 August), Every Object tells a Story (8 August), Create a Dr Who Collage (9 August), Wacky Animal Portraits (10 August), It's Elementary my Dear Watson (16 August), Thunderbirds are Go (23 August), Find out about Bats (14 October), Wear-a-Bat (making hats) (24 October), Batty Prints (25 October), Meet a Marsupial (10 February 2001), Snakes Alive! (10 and 11 February), Mr Windbags the Magician (19 February), Batty Books - The Adventures of Basil Bat (21 & 22 February 2001), Look at Live Bats (23 February), Snakes Alive! (24 February), Behind the Scenes Tours (3 March), Flying High (17 March), Rockwatch Roadshow (24 and 25 March), Decorate an Eggcup (7 April), Bat Crafts (18 and 19 April), To Boldly Sew (31 July).

In addition, the museum played host to fifty people who were *Evening Chronicle* competition winners during the *Bats* exhibition. They spent an evening at the museum, met some live fruit bats courtesy of Eddie Bell (Durham Police Wildlife Officer) and had to solve a murder mystery of 'Bats in the Belfry' performed by the Red Herrings. After a buffet supper they had a tour behind the scenes and left the museum just after midnight!

**Adult Education and Training**

Staff at the museum have conducted a series of teaching courses for third year Zoology students at the University of Newcastle entitled 'An Introduction to Museology' and a series of four one-day courses for first Year Zoology students on the theme of 'Bird Conservation'. The geology staff conducted teaching sessions for botany students on the subject of palaeobotany, and most staff were involved with the teaching of various aspects of the University Museums Studies course.

The Education Officer ran three teaching sessions for PGCE (teacher training) students from the University of Newcastle. They were based around investigating the use of the museum for teaching science at Key Stages 1-3. Museum Studies students were given an overview of the Hancock's education programme and then carried out a number of follow-up visits to observe school groups in the Land of the Pharaohs gallery and to watch the Living History event.

Mature students on an Environmental Science course at South Tyneside College attended a teaching session on the history of the museum and its collections. Staff have also delivered numerous lectures to outside bodies during the year.

### **Collections Management and Research**

**General curation and backlogs** Staff and volunteers have continued to work on the extensive natural history and ethnographic collections at the museum. Several collections (particularly numismatics, mineralogy, osteology, oology, palaeontology and botany) have seen significant inroads made into documentation backlogs. Much of this work has been undertaken by the museum's five main curatorial volunteers, Paddy Cottam, Roger Stobbart, Ron Cook, Trevor Bridges and Jess Fermie, with support from other key volunteers (see complete volunteer list). In addition, some of this work has been the result of research visits by academics from numerous higher education establishments around the world. A Museum Studies placement student from the University of Newcastle has undertaken re-storage of selected parts of the palaeontology collections and computer catalogued some of the invertebrate fossils. Other notable projects have included the continued identification of the rare mounted bird specimens and the cataloguing of the Charlton egg collection. Ellin Bournemann, another Museum Studies student, has been working on the documentation of the type and figured fossil vertebrates and has been updating our collections database.

**NEMLAC Ethnography Project** Considerable progress has been made on the management of the Hancock's important ethnography collections through the ethnography project funded by the North East Museums, Libraries and Archives Council (formerly NEMS). Over 90% of the North American artefacts have been digitised and each image has been added to the collection database. Re-organisation of one of the ethnography stores has been completed and almost all of the textiles have been re-stored. In addition, over 100,000 standardisation edits have been made to the collection database. The museum also hosted a joint Group for 'Education in Museums' and the Museums North Education Panel meeting which examined 'Ethnography and the National Curriculum' and social inclusion. Final work taking place on the project includes cataloguing of the American and Asian material. Many thanks are due to Lisa Harris who has worked on this project (together with Les Jessop) for over two years. Lisa has now left to take up a new post and the project will finish at the end of this year.

**Research** Some of the more notable projects were the work on the Albert Long palaeobotanical slide collection by researchers from Cardiff University and Montpellier University, work on the Hutton palaeobotanical collection by researchers from Wales and Germany, palaeoecological studies of the Marl Slate fish fauna by a researcher from University College, London, and investigations into the effects of egg collecting on bird populations over the last 200 years by a researcher from Spain. In addition, staff have administered a considerable number of loans to academic institutions around the world.

**Conservation** Notable conservation projects included the installation of two permanent dehumidifiers in the fossil and mineral stores (funded by NEMLAC and the University of Newcastle Conservation Fund), the installation of a further one hundred custom-built drawers for the geology collections, and the conservation of the museum's 18th century moose-hide coat from Hudson Bay. The latter project was undertaken by Barbara Wills of the British Museum who was seconded to the Hancock through the DCMS Sharing Skills programme.

**New collection** Staff at the museum have undertaken a brief survey of the remaining fossil collections housed at the University of Newcastle. This material is in urgent need of conservation and re-storage and it is essential that it be relocated to a more suitable location. Consideration is being given to relocating these collections to the Hancock Museum.

**Zoo licensing** As the museum houses live animals it has recently been the subject of an inspection in order to obtain a Zoo Licence. The inspection was very positive and the museum is now fully licensed. As a result of the statutory notices appearing in local and national press recently, a considerable amount of media interest was generated and several articles appeared in the local newspapers as well as radio and television. It is hoped that such coverage has



increased awareness of the range of live animals that the museum houses, and will therefore appeal to visitors throughout the region.

### **Acquisitions**

Saw-fish rostrum - gift (N Hunter, Gosforth)  
Swan bones - gift (Mr Mackenzie, Ponteland)  
Commemorative Earl Grey medal - gift (R Cook, Morpeth)  
Otter - gift (D Adams)  
Egg collection - transfer (Durham City Police)  
Gannet - gift (M Freeman)  
Minerals (stilbite and apophyllite) - gift (K Smith, Newcastle)  
Mineral (zincite) - gift (K Smith, Newcastle)  
Cabinet of geological microscope slides - gift (D L Schofield, Durham)  
Large collection of 35mm botanical slides - bequest (Miss K M Firby).

### **Building and developments**

The University Estates Department has undertaken extensive work to replace a section of the roof and internal ceiling in one of the galleries to the rear of the museum. In addition, further roofing repairs have taken place on a section of the roof above the Land of the Pharaohs gallery. The University recently commissioned a condition survey of the museum building which, not surprisingly, highlighted the urgent need to replace the existing roof as well as highlighting other ongoing maintenance problems.

Discussions are currently under way with the University of Newcastle regarding potential future capital projects at the Hancock Museum. Projects under discussion are the replacement of the roof, general access improvements and future developments. The museum's Senior Curator will be participating in a new vision group for the museum, established by the University.

### **Staffing**

Most staff changes over the year have been front-of-house. After over fourteen years of work at the museum, our Attendant, Anne Asprey (formerly our Senior Attendant) retired in July. Anne has contributed to the museum in so many ways over those years and her presence will be sorely missed. Everyone at the museum wishes her a wonderful retirement. In addition, Lesley Nicholson (clerk/typist) left to take up a full time post at the University. Michael Cranston (attendant) left earlier in the year to take up a new appointment. He was replaced by Debbie Hunter, and Kath Fenwick (part time attendant) who was re-deployed to the Hancock during the closure of Sunderland Museum, has returned to Sunderland. She was replaced by Anthony Goodfellow. Finally, the vacant Senior Curator post has been filled by Iain Watson, formerly of the Arts, Libraries and Museums Department, Durham County Council.

The current staffing complement is:

Iain Watson (Senior Curator)	Gillian Mason (Education Officer)
Fiona Fenwick (Senior Curator's Assistant)*	(Clerk Typist)* Vacant
Steve McLean (Curator and Principal Keeper, Natural Sciences)	John Pratt (Chief Attendant)
Les Jessop (Keeper of Biology – based at Sunderland Museum)	John Connell (Senior Attendant)
Sylvia Humphrey (Assistant Keeper, Geology - based at Sunderland Museum)	Debbie Hunter (Attendant)
Eric Morton (Assistant Keeper, Biology)	Anthony Goodfellow (Attendant)*
Kirsty Ramshaw (Biology Assistant)	Ingrid Solberg (Attendant)*
	(Attendant)* Vacant

(\*indicates part-time)

## Volunteers

The Hancock Museum has once again benefited from the tremendous work undertaken by a considerable number of volunteers who have given up their own time to contribute to the work of the museum, both on the collections and through educational initiatives and exhibitions. They are:

Paul Bewley	Star Trek
Trevor Bridges	Mineralogy curation
Peter Burke	Education support
Ron Cook	Botany/oology curation
John Coleman	Mineralogy curation
Paddy Cottam	Osteology curation
Byron Cresswell	Star Trek
Jess Fermie	Palaeontology curation
Alan Fowler	Star Trek
Michael Frankis	Northumberland bird records
John Harrison	Star Trek
Connie Hawkins	Star Trek
Ann Hobson	Star Trek
June Holmes	Archive collections
Mathew Littleddyke	Star Trek
Tim McVey	Star Trek
Joan and Jim Malligan	Reptile educational events/animal care
Janice Peacock	Education support
Kimberley Penn	Star Trek
Alan Pringle	Mineralogy curation
Anthony Rose	Star Trek
Barry Smith	Mineralogy curation
Kathryn Smith	Mineralogy curation/exhibitions
Kristian Spencer	Star Trek
Roger Stobbart	Entomology curation/bird curation
Arron Waddle	Star Trek
June Waites	Education support
Helen Wilkinson	Mineralogy curation
Malcolm Woodward	Mineralogy curation
Mathew Young	Star Trek



Table 1

**Grants and Support** The museum has once again received a considerable number of grants and other support for which we are extremely grateful.

Project	Source	Amount
<b>Conservation and Collections</b>		
Dehumidifiers	NEMLAC	£1250
	University of Newcastle	£900
Standardised drawers - Geology	NEMLAC	£750
Conservation of Hudson Bay Coat	DCMS	Secondment
<b>Education:</b>		
Gallery Interpreter (Star Trek)	NEMLAC	£1000
<i>Flash, Bang, Wallop - What's the Picture?</i>	DCMS	
	Education Challenge Fund	£2728
<b>Exhibitions:</b>		
<i>Bats - Masters of the Night</i>	NEMLAC	£3200
<i>Star Trek - Federation Science</i>	NEMLAC	£4000
<i>First Mild Day of March</i>	Northern Arts	£500
<i>150 Years of Newcastle Central Station</i>	Northern Arts	£200
<i>Plants &amp; Places</i>	Northern Arts	£200
<i>Stuffed</i>	Northern Arts	£900
Art Residency	Northern Arts	£2200
<b>Sponsorship:</b>		
Art Residency	Bonsers	In kind
<i>Namaste</i>	Tyne and Wear Museums	
	Business Partners	£700
<i>Wildlife Photographer of the Year 2000</i>	British Gas	Sponsorship to NHM
<b>Support:</b>		
<i>Top Secret</i>	The Who Shop International, Sherlock Homes Memorabilia Co., Philip Rae, Steven Lane, Warner Village Cinemas	
<i>Star Trek</i>	Nexus, Warner Village Cinemas	
<i>Bats</i>	Nexus, Thorntons	
<i>Namaste</i>	Northumbrian Water, Water Aid	
<i>150 Anniversary</i>	Railtrack, 150 Committee	
<i>Scribble a Squirrel</i>	The North East Wildlife Trusts, The Calvert Trust	
<i>Flash Bang Wallop - What's the Picture?</i>	Re:source, NEMLAC	

## LIBRARY

During the year the library has been used by members, researchers and students, and for this purpose it has been open and staffed by volunteers every Wednesday. This year, 109 books were added. Fifty-one were donated and we must thank Peter Davis, David Gardner-Medwin, Trevor Hardy, Steve Lowe, June Holmes, Les Jessop, Steve Westerberg and others for them. Of the many excellent donations, special mention must be made of Marmaduke Tunstall's notes on Pennant's *Natural History* of 1780-1790. Our Chairman discovered these in McGill University library; photocopies of the notes were generously sent to the Hancock, which Les

Jessop bound in four volumes and kindly donated to the library. Other items included *Threatened Birds of the World*, *A Summer Atlas of the Breeding Birds of County Durham* and a copy of the Ostervald Bible of 1795, which has numerous illustrations by Beilby and Bewick.

The books purchased included: for ornithology, *Handbook of the birds of the world* Vol.6, *Birds of Africa* Vol.6, updates of four of the *Where to watch birds* series for our region, *Sylvia warblers*, and *Cuckoos, cowbirds and other cheats*; for botany, *Lichens* the 4th edition of Dobson's work, a reprint of Evelyn's *Sylva* and *The Plant Book*; for geology, The Countryside Commission landscape assessments *The Northumberland coast* and *North Pennines*, *Fossil fishes of Great Britain*, and *The dating game*; for general zoology, the New Naturalist *Amphibians and reptiles* and *Loch Lomondside*, Brady's report on *Ostracoda* from the Voyage of HMS Challenger; for our archivist, *The artists of Northumbria*, *The man who made Beamish*, *The Aurelian legacy*, *Buffon*, and *John Lindley pioneer orchidologist*. In addition to these there were thirty-five other books.

More than 370 items of serial publications (Journals, Transactions etc.) were received from more than fifty sources by exchange, subscription and donation. During the year, the library committee carried out a detailed review of all serial publications purchased by the Society and, after notification in the bulletin, the purchase of eight publications was discontinued.

The subject for the library evening held on 26 January was Prestwick Carr and was attended by more than seventy-five members. Barbara Harbottle talked on the draining and enclosure of the carr, followed by Judith Baker who briefly discussed the management of Newcastle City Council's Nature Reserve. There was a display in the library of maps and drawings together with numerous items from the museum collections and archives relating to the Carr. It was a most successful evening and the Society must thank all concerned.

The direction of library affairs is controlled by the Library Committee, which meets four times a year. The members are Hugh Chambers (chairman), Paddy Cottam (mammals), Peter Davis (marine biology), David Gardner-Medwin (history of natural history), Trevor Hardy (geology), June Holmes (archives), David Noble-Rollin (ornithology), Joyce Parvin (secretary) and Trevor Walker (botany). The library continued to be serviced by the office staff; the binding of journals and periodicals was arranged by Ian Johnston and this year twenty-one volumes were bound to become a permanent part of our collection. Ian also dealt with the incoming periodicals and exchange arrangements.

Volunteers gave reliable assistance during the year: Stella Chambers kept the filing system in order and Trevor Hardy worked steadily on his winter task of reviewing the ten thousand geological off-prints from the University that have been entrusted to our care. The Society thanks them for their efforts.

## ARCHIVES

The cataloguing of the archives continues; all information is being entered into a readily accessible computer database, the prospect being that in the future researchers and members will be able to access archival records for themselves in the library. There are currently two volunteers, Ann Stephenson and Barbara Harbottle, working on archival material with June Holmes. The preservation of some of the more delicate items in the archive collections, mainly watercolours and drawings, is becoming increasingly more urgent and it is hoped that suitable grants can be obtained to start a programme of conservation next year.

Interest in the archival collections of the Society has increased from last year with many more enquires. Numerous students, researchers and members of the public have asked to consult archives pertaining to the Hancock Family, Abel Chapman, George Gibsone, George Temperley, George S Brady, Henry Seebohm, and others with the greater number of enquires relating to the Thomas Bewick Collection. One delighted researcher, studying the formation of early natural history societies, commented on how uniquely complete and well preserved our Society's early records are in relation to those preserved in all the other contemporary Society resources he had consulted.



There have been further interesting additions to the archives. A manuscript notebook on the genealogy of the Chapman family by William Chapman (1713-1793), the great grandfather of Abel Chapman (1851-1929) has been generously presented by the Marques of Tamarón, Spanish Ambassador to the UK. The notebook came into the possession of the family of the Marques from his great great grandfather Walter Buck, who was a close friend of Chapman and co-author of *Wild Spain* and *Undiscovered Spain*.

A colour reproduction of a watercolour sketch of Mitford Church, dated 1870, by Mary Jane Hancock (1810-1896), held in a private collection, has been given by Mrs S Meyer; three invoices and a letter relating to Thomas Bewick have also been presented.

The historian and television presenter Simon Sharma requested information on Thomas Bewick, and a production team was allowed access to the collections in order to obtain footage for a short section on the work of Bewick to be included in the forthcoming *History of Britain* documentary scheduled to be broadcast in the autumn.

A grant has been received from the Heritage Lottery funded project 'Tomorrow's History' (a major web-based regional local heritage resource for North East England) in order to photograph and digitally record on computer the complete collection of over 700 original watercolours and drawings held in the Bewick collection. This information will be available through local libraries and the Society for research purposes and via the 'Tomorrow's History' web site, citing the Natural History Society of Northumbria as the source and hopefully creating greater awareness of our unique Bewick collection as well as publicity for the Society.

## FINANCE

The final result for the year was a surplus of £9,736 (2000 £10,386). This was £9,736 better than budget, and includes a donation of £5,000 from the Sir James Knott Trust for research into sand-eels, and grants totalling £1,000 from the Joicey Trust and the Percy Hedley Trust towards the essential repairs to the fabric of Lake Lodge. Lord Ridley made a general donation of £1,000, and a legacy of £4,000 was also received from the Storrow-Scott Charitable Trust. £4,351 has been expended from the grant received last year of £5,000 for the purchase of a vehicle for coastal research.

There has been a significant increase in income from subscriptions this year. This is in part due to the increase in subscription rates. However, about £2,000 relates to the increased refund of tax as a result of the excellent number of gift aid forms returned. The main variations in income and expenditure when compared with the previous year are as follows:

### Income

Increases in:	Subscriptions	5,230	
	Donations	646	
	University Grant	150	
	Investment income	1,829	
	Proceeds from the sale of <i>Transactions</i>	<u>331</u>	
	Net increase in income		8,186

### Expenditure

Increases in:	Salaries	1,576
	Postage and telephone	306
	<i>Transactions</i>	335
	Gosforth Park Nature Reserve	510
	Coastal Research	1,212
	Depreciation	923
	Purchase of coastal research vehicle	4,351
	Net increase in other headings	<u>61</u>
		(9,274)

Reductions in: Subscriptions to societies	210	
Library	<u>228</u>	
	438	
Net increase in expenses		(8,836)
Net reduction in surplus (£9,736 - £10,386)		<u>(£650)</u>

The surplus of £9,736 includes a transfer from Gosforth Park Nature Reserve Restoration Fund of £374, being the cost of new boardwalks.

A provision of £3,650 has been included in *Transactions* to cover the cost of producing Volume 61, part 3, which will be published later in 2001.

The Council carried out a review of the investment portfolio management arrangements earlier in the year, and considered proposals from two other brokers, in addition to one from the existing advisers, Brewin Dolphin Securities Ltd. Following a consideration of all three proposals, it was agreed to re-appoint Brewin Dolphin Securities Ltd for a further period. The following gains and losses were realised during the year:

#### Gains

TB Short Memorial Fund	1,142
Grace Hickling Memorial Fund	<u>7,518</u>
Total realised gains	8,660

#### Losses

TB Short Memorial Fund	(2,035)
Grace Hickling Memorial Fund	<u>( 30)</u>
Total realised losses	(2,065)
Net realised gains	<u>£6,595</u>

This has been a difficult year for stock market investments. The Society's investments have held up better than average, but still show an unrealised loss of £36,871. The investment portfolio was valued at 31 July 2001 at £607,452 (2000 - £632,498)

### CONSERVATION

The society presented evidence at two hearings of the Local Public Inquiry on the North Tyneside Urban Development Plan, and we appear to have had some success in persuading the Inspector to recommend restricting the proposed developments to the north of Gosforth Park and strengthening the protection to be given to wildlife corridors elsewhere in the borough. The outcome of the Otterburn Inquiry at which we gave evidence in 1997 and 1999 is still unknown. We have continued to make written submissions opposing various other, more minor developments that seemed likely to pose a threat to local flora and fauna or their habitats.

### ACTIVITIES

#### Ornithology section

On 29 September Graham Bell started the lecture season with 'Images of Antarctica', a beautifully illustrated talk on his recent visits to birds and animals of the southern oceans. His enthusiasm and love of this wild place was obvious and the beauty of the ice formations left a lasting impression.

On 27 October Dr Algirdas Knystautas gave the Pybus Memorial Lecture on 'Baltics: the unknown Europe'. After a heroic train and taxi journey from London via Carlisle in the wake of the Selby train crash, he gave a comprehensive lecture covering the political history, architecture and landscape of all three Baltic states and, towards the end of the evening, their natural history. His photographs were superb.



On 24 November Paul Henery talked on 'Wildlife and the Law'. Paul is the Wildlife Liaison Officer for Northumberland and a noted local artist. His talk was both informative and interesting and covered the topics of both birds and mammals and their protection. He also brought some of his most recent artistic work, which proved to be of great interest to the members.

On 5 January members filled the lecture hall to hear James Alder talking on the 'new' dipper. He gave the original lecture about his detailed work on this fascinating bird to the Society in the 1960s. This was a re-analysis of the results. Although there were a lot of graphs the talk was given with a true storyteller's flare. The audience was spellbound.

On 2 February Errol Fuller lectured on 'The great auk'. The talk was based on his recent book on this extinct species and covered many aspects of its life and the story of its eventual destruction. Errol admitted that he had researched this subject to the point of obsession and his talk showed a deep love and interest in this bird. He also showed his artistic ability with examples of his paintings that epitomized how the great auk may have looked in life.

Finally the ornithological section hosted a lecture by David Knight on 'The earthworm: the farmer's and gardener's friend'. This was an unlikely ornithological topic except for the obvious connection! However a good number of members turned out to listen to an excellent and entertaining talk. Members hearing this will never be able to look at a worm in the same light again.

On 9 September Steve Westerberg led a trip to Blacktoft Sands and Wheldrake Ings. The morning was spent looking at the RSPB reserve on the edge of the Humber. The pools provided good numbers and a variety of waders including curlew sandpiper, spotted redshank, greenshank, little stint and ruff. Highlights included a water rail feeding in the open and several marsh harriers hunting over the reedbed. The group moved on in the afternoon to a very dry Wheldrake Ings, but the furthest hide from the car park did provide good views of a crane feeding along the water's edge.

On 1 October members led by David Noble-Rollin met on Holy Island to look for migrants. There had been a small fall of warblers and the usual species were seen on the Straight Lonnen. The highlight of the visit was towards the end of the day when every one who was still with the party had excellent views of an icterine warbler which sat clearly visible on a bush, to everyone's delight.

On 20 January Steve Westerberg led the Society's annual visit to Musselburgh and Aberlady Bay. At Musselburgh, on a crisp sunny winter's day, there were the usual views of grebes and sea duck. Less usual here was a ruff amongst the flock of roosting redshank. The walk along the beach to Aberlady Bay started with superb views of a flock of courting long-tailed ducks in the surf, just yards offshore. At dusk in Aberlady Bay, flocks of pink-footed and greylag geese came flying in overhead to roost on the sands. The annual field meeting to the Solway and Loch Ken was the first casualty of the foot-and-mouth outbreak.

The field meeting on 5 May was another ornithological meeting affected by foot-and-mouth disease. The venue had to be changed from the Druridge area to Newton by the Sea. Members walked from Newton to Embleton through the dunes, visiting the pool at Newton. The birds were not particularly unusual, but everyone was very pleased to get out into the country.

In May 2001, Anne and Steve Westerberg took seven members on a bird-watching holiday to Norfolk. There was much uncertainty as to whether the foot-and-mouth crisis would result in cancellation of this trip, but in the event participants were able to visit all the sites originally proposed. Three members from the Cairngorms holiday last May came with us to Norfolk, along with a further four participants.

On the way down by minibus, to break the journey, the group stopped for lunch and a couple of hours' birding at Rutland Water. Although we did not see the famous, recently introduced ospreys, we were rewarded with good views of garganey and the only tree sparrows of the trip. One party member joined us here and two others at the hotel in Weybourne, on the North Norfolk coast.

On Friday morning, as on the following two mornings, pre-breakfast walks from the hotel to the beach produced close views of a variety of singing warblers and wheatears. Later, the group visited the RSPB Titchwell reserve, where we enjoyed good views of avocet, whimbrel, little gull, marsh harrier, shoveler and a male garganey, with a brief view of a hobby.

On Saturday, the group visited the famous Norfolk Wildlife Trust reserve at Cley where we saw at close quarters a variety of wildfowl and waders and glimpsed bearded tits flitting through the reeds. We were also treated to superb views of two short-eared owls, one of which flew directly and purposefully towards the hide, veering off only at the last minute!

On Saturday evening, after a short bird quiz, a dusk outing rewarded us with both a churring nightjar (which had eluded us the previous evening), and also the rich, and very loud and beautiful song of a nightingale singing from high in a tree next to the road, providing a perfect ending to a full birding day.

On Sunday, before heading for home, we first diverted southwards to the Suffolk border and the NWT Weeting Heath reserve where we had good, although distant, views of stone curlew chicks and adults, and several adults flew low overhead, calling stridently. As we sat eating lunch, woodlarks sang around the car park. We arrived back in Newcastle on Sunday evening, tired but satisfied after another enjoyable and successful birding trip.

Again the planned meeting to the Harthope valley on 2 June had to be rearranged. The group went to Kielder Reservoir which had just reopened a number of its walks. Once again we had excellent weather and members saw breeding siskin in large numbers and had superb views of a singing wood warbler.

The meeting at Plessey woods 'An introduction to bird song' on 10 June was re-arranged at Thornley Woodlands Visitor Centre. This proved to be an improvement with lots of different species singing including blackcap and garden warbler. Also there was an accessible great spotted woodpecker's nest with calling young. However the highlight to many was not ornithological but a family of foxes sunning themselves.

The final outing on the evening of 24 June was a boat trip around Coquet Island to see the roseate terns. This was a joint venture with the North Northumberland Bird Club and so was limited to twelve people. It soon became apparent that a second trip would be necessary and this was scheduled for 9 July. Both evenings were very successful with excellent views of roseate terns and fledged young with an added bonus of a Manx shearwater on the second trip just as the boat came into Amble.

### **Mammal section**

On 6 October Sergeant Eddie Bell, Wildlife Liaison Officer for Durham Police, gave a talk entitled 'The Durham puma: fact or fiction'. Many circumstantial anecdotes began to build a convincing case, although only a few of them could be accepted as actually proving the existence of large cats in the county, presumably released by overawed pet-owners. The effect was greatly weakened by an account of a sheep with a badly crushed face, which the speaker solemnly attributed to the existence of wild, indeed indigenous, wolverines, lurking unobserved in the county since the last ice age.

On 19 January Jason Reynolds, Red Squirrel Conservation Officer with Red Alert North East gave an illustrated talk on the threats and opportunities for red squirrel conservation in the UK. This superb lecture had a particular emphasis on the north-east which retains the most significant proportion of England's surviving red squirrels, which continue to be threatened by encroachment from the grey squirrel.

This was followed on 23 February by Bob Wilkin, who addressed a full house on the past and present occurrence of otters in an eight-mile radius of Central Station. Using a fascinating selection of archive material, the speaker demonstrated that otters appear to be making a welcome return to the urbanised areas of Newcastle, an area they occasionally frequented in the past. This complemented last year's talk on current otter conservation measures given by Kevin O'Hara, of the Northumbrian Otters and Rivers Project.



There have been mixed fortunes for mammals in Northumbria. For example, otters continue to expand their range and it appears as if American mink numbers have taken a corresponding dip. This may be good news for water vole, as mink are undoubtedly one of the factors in the national decline in this species. Numerous reports of pine marten suggest they maintain a foothold in some parts of the region. Some interesting archival and research work on dormice suggests that their distribution may be worthy of further investigation. A muntjac deer, recently recovered as a road casualty near Castle Eden walkway, was also notable.

The meetings of the mammal section are a joint venture with the Northumbria Mammal Group. Due to the foot-and-mouth epidemic, the field visits planned by the Group were cancelled. A regional water shrew survey planned for this year was also postponed. However, there is considerable mammal activity at a national and local level, providing many opportunities for individual and group involvement. We look forward to the future and hope to continue to grow in numbers and activity. The Society's field meetings in Gosforth Park were able to go ahead. Bob Wilkin and Paul Drummond took small groups of members badger watching from 2 May. The foot-and-mouth disease presented potential problems because of the smell of the disinfectant. In the past we have asked members attending the Badger Watch to forego the use of perfume and aftershave because of the badgers' nasal sensitivity. As the members sat on the viewing platform the smell of disinfectant percolated to the ground and wafted through the trees, and one could almost imagine an invisible aura of this foul smelling chemical like a nuclear halo hanging above their heads. However, one should not generalise on badger behaviour because within minutes of members taking up their seats in the hide a boar badger appeared and it was business as usual. The first night was very successful with no fewer than nine different badgers, some of which were cubs. As with last year's Badger Watch, the badgers were nearly upstaged by the vixen and cubs. On other evenings there was less fox activity and more badger cub play.

On 6 June Bob Wilkin took a 'mammal walk in Gosforth Park'. Unfortunately on the selected evening the weather was wet and unsettled. As the five members met at Lake Lodge the dark skies gave some indication of the evening ahead, and by the time the party had disinfected themselves rain was beginning to fall. Along the south path the group observed badger prints, pathways and dung pits. Roe slots indicated where the deer had left the reserve to move into the arable farmland. In another area members viewed old otter spraint and fresh mink scats at selected points. Fox territory marking was noted at intervals along the boardwalk. The group also met a badger on the south path. Considering the very inclement weather the group concluded that they had a wet but interesting evening.

### **Geology section**

Mick Jones has stepped down as chairman of the Geology Section after many years of service. His contribution to the section has been invaluable and we will all miss his witty introductions and acerbic comments.

The last field meeting of the summer was a trip to the Irthing Gorge. Colin Richardson gave a clear and very informative account of the succession exposed by the stream and we even managed to find some fossils.

Once again we had a varied and enjoyable programme of winter talks. The season started off with an historical perspective. Norman Butcher gave us a talk on James Hutton, which demonstrated that his contribution to the development and understanding of geology was much more than the unconformity at Siccar Point. It also gave us an insight into the intellectual ferment of late 18th century Europe. Brian Young outlined the impact of mining on the region and reminded us that the environmental consequences are only now emerging and that geologists have a major role in understanding and solving these problems. George Reeves continued the theme of environmental impact with a thought-provoking account of ways in which radioactive waste might be disposed of in the future. The New Year started with a geological 'Any Questions'. A panel of four experts answered questions put by the audience. This is something we shall certainly run again. Jeff Warburton gave us an account of the impact of peat erosion in the North Pennines. The winter season finished with Steve McLean giving us

a look behind the scenes at the Hancock. Most of us had very little idea of the wealth of material held by the museum and the work required to maintain a collection of national importance.

The summer field programme started with a coastal walk to look at Permian rocks near Marsden Bay. Once again Maurice Tucker demonstrated that the key to understanding geology is to get out in the field and look at the rocks. The June meeting was a mapping exercise at Beadnell led by Mike Leddra, Andy Lane and Bill Scott. It started off with the entire party sheltering inside a minibus looking at the torrential rain. However, the weather soon cleared up and we had an excellent day. The enthusiasm and clarity of explanation of the three leaders gave us an insight into the mysteries of geological mapping and an understanding of the kind of information you can get from such maps. It was unanimously agreed that this kind of hands-on experience should be repeated. The July meeting should have been a visit to the Harthope Valley led by Trevor Hardy but it fell a victim to the foot-and-mouth restrictions and had to be cancelled. We hope this visit will be included in the programme next year.

### Botany section

The winter lecture programme began on 20 October, when Dr Angharad Gatehouse lectured on 'Transgenic crops: an environmentally-friendly method of pest control?' She explained how crop protection plays an integral role in modern-day agriculture, where the ever-increasing demands on yield and the intensification of farming practices have increased the problem of pest damage and therefore control. At present approximately 40% of crops grown world-wide are lost to pests and diseases, despite an annual pesticide budget of some \$7.5 billion. Transgenic plant technology was able to provide a major contribution to the production of inherently resistant/tolerant varieties. However, a serious concern limiting the potential of genetically-modified crops, notably in Europe, was the environmental impact such crops might have on non-target species.

Unusually, two of the programmed speakers were unable to deliver their lectures, in one case because of the broken-down railway system and in the other owing to illness. For the lecture on 17 November Dr David Knight kindly stood in with his talk on the 'Ecology and land use of the New Forest', in the news as shortly to become a National Park. He described the woodland, under various management regimes, and the heaths and grassy 'lawns' of this unique area.

Again, on 16 February, there was a substitute speaker, when Dr Angus Lunn spoke on 'Northumberland's Red Data Book plants'. He illustrated some of the 200 or so species, which feature in the county's Red Data Book – about a quarter of Northumberland's native flora – and indicated the species for which action plans were to be prepared.

Finally, on 16 March, Professor Brian Huntley lectured on 'Species responses to changing climate'. The Quaternary palaeoecological record provided clear evidence that species, including long-lived trees, had responded rapidly to past climate changes by adjustments of their geographical ranges. Recent investigations of the contemporary European distributions of higher plants and of animals had revealed that these are strongly related to climate. Modelling these relationships enabled the potential impacts of future climate changes to be assessed.

The summer programme equally did not go according to plan, this time because of foot-and-mouth disease. The projected June visit to Roudsea Wood in south Cumbria was replaced by one to the meeting of the North and South Tynes at Howford, with an informal consortium of leaders. We saw an impressive array of woodland and riverside plants but were alarmed by the spreading dominance of the naturalised Indian balsam *Impatiens glandulifera*, extending well back from the river banks. We were, however, able to undertake the scheduled visit to Holy Island at the end of June, led by Phil Davey, Site Manager of the National Nature Reserve, and were impressed by the very diverse dune and slack flora of The Snook, including coralroot orchid *Corallorrhiza trifida* and bog pimpernel *Anagallis tenella*. We also examined the salt marsh vegetation. The July trip to Crag Lough was another casualty of foot-and-mouth disease, and a substitute visit to Bishop Middleham quarry, a reserve of the Durham Wildlife Trust, was led by Dr Lunn. On a glorious afternoon we were rewarded by large numbers of the



reserve's speciality, dark-red helleborine *Epipactis atrorubens*, together with many other characteristic plants of the Magnesian Limestone. At the end of the afternoon, in a sheltered sun-trap, a number of Durham argus butterflies were on the wing.

The members who have formed an informal botanical group which meets between 'official' meetings made an inspirational early summer visit to Norfolk.

### **Lichen section**

In response to requests from members, our scope was extended this year to include fungi and lower plants. Thus the year commenced with a fungus foray in Chopwell Woods on 21 October, led by Dr Gordon Beakes. Only eight members attended, but they enjoyed a fascinating morning exploring a part of the woods that had not been surveyed for fungi for some years. A wide range of species was seen. For many of us the highlight was the black and white helvellas found growing together in a clearing, a must for the photographers in the party. This was followed by a talk on 3 November, also by Dr Beakes, in which he introduced a large audience to the world of 'Mushrooms and Toadstools: the Deadly and the Delightful'.

On March 2 we were visited by Plantlife's Lower Plants Officer, Dr Jenny Duckworth, who spoke to us about 'Back From The Brink', their species recovery programme. Members were particularly interested to hear about some of our local specialities, including petalwort, *Petalophyllum ralfsii*, a liverwort of sand dunes, Young's helleborine, *Epipactis youngiana*, the churchyard lichen *Calicium corynellum*, and the Baltic bog moss, *Sphagnum balticum*, which had been relocated on Muckle Moss just a few weeks before.

### **Entomology**

An entomology field day was held at Close House, Heddon-on-the-Wall on Saturday 23 June. The event was blessed with a brilliant sunny day and took place despite the foot-and-mouth epidemic. The event was billed as 'a day to get to know the insects'. Five members led by Drs Brian Selman and Gordon Port, representing the Natural History Society and the Royal Entomological Society respectively, spent a very enjoyable day emptying the moths out of light traps, sweeping insects off roadside verges, beating them from trees and retrieving ground beetles and lots more creepy-crawlies from pit-fall traps. All became conversant with and skilled in the use of that essential entomological tool, the pooter (a pocket suction device for catching insects). One even tried to poot-up a moorhen chick feeding on a plague of young frogs! Alas, the day was all too short though great strides were made by the gallant five in identifying their captures using a binocular microscope and the many identification keys to insects in the laboratory library. The day was a very successful beginning to the revival of the entomological section of the Society and we hope to repeat the event next summer. Thanks are due to the Department of Agricultural and Environmental Science of the University of Newcastle upon Tyne for the use of their field laboratory and equipment.

### **Teas before indoor meetings**

During the winter Stella Chambers and Margaret Stobbart prepared tea and biscuits in the Council room before every Friday evening lecture. This gives an opportunity to members to talk and relax before the lecture. We are very grateful to them both.

### **GOSFORTH PARK NATURE RESERVE**

This year will no doubt be remembered best for negative reasons: closure of the reserve in February as a precaution against spreading foot-and-mouth disease to the deer within the reserve. Fortunately, restrictions were eased at the end of March, allowing supervised access to work parties through a disinfectant welly-bath. As a wildlife habitat close to Newcastle city centre, the nature reserve is doing extremely well. Reserve management has been focused on improving the quality of the *Phragmites* habitat by maintaining water levels during critical periods of reed growth, and the programme of desilting. *Phragmites* growth was better than ever this year, and the reed is expanding into areas of previously-open water. This year, the ringing group reported good numbers of reed warblers but fewer sedge warblers; this may be a consequence of the higher water levels and vigorous reed growth pushing back the

successional vegetation more favourable to sedge warblers. With the desilting work carried out two years ago, the extensive area of open water has increased the numbers of winter wildfowl. Breeding waterbirds started off the season well, with at least two pairs of great-crested grebes attempting to nest. However, both these appear to have failed subsequently, one, at least, was washed out during a period of wet weather in June. Other waterbirds, apart from little grebe, also had a poor breeding success, possibly due to the presence of mink. Since the beginning of the year 2001, otter activity within the Park appears to be lower than the previous year and the Northumberland Wildlife Trust's Conservation Group, the Otter Project officer Kevin O'Hara, and Bob Wilkin built a two-entranced two-chambered artificial holt to supplement the one already built by Paul Drummond. These are well away from the *bona fide* paths on the reserve and should offer seclusion and security to any otters, yet give possible viewing from some of the hides.

The tern platform was occupied by a pair of common terns; although three eggs were laid, only one was incubated to hatching. The single chick was ringed and is believed to have fledged successfully. Although another pair of terns was present, they did not breed. The lesser-spotted woodpecker returned again this spring, and the reserve's complement of grebe species was increased by a splendid red-necked grebe in breeding plumage for a few weeks in late April and early May.

On 13 May David Noble-Rollin led a walk 'Gosforth Park Introduction'. This was aimed at new members of the Society to show them some of the important features of the reserve. We had an excellent morning with lots of birds singing and lesser and great spotted woodpeckers drumming and views of the red-necked grebe which had taken up residence.

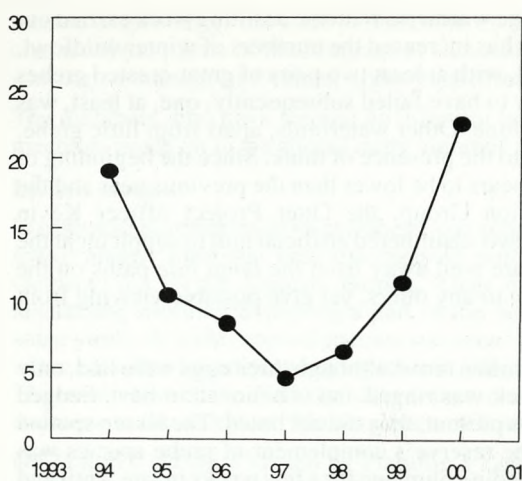
Lake Lodge is an important asset for the Society. In recent years the barge boards have begun to rot and needed replacing. With some funds from the Society and generous grants from the Joicey, Percy Hedley and Storrow-Scott Trusts, remedial work on these and other parts of the Lodge was started this year. Excellent barge boards carved to the original design were made and installed by Geoffrey Jackson, a cabinet maker from Langley on Tyne. We are extremely impressed with the quality of the boards and delighted to have had a craftsman of his calibre to carry out the work. Elsewhere in Lake Lodge, damp in the rear of the house continues to be a problem.

Management of the reserve is an ongoing task, and would not be possible without the hard work and dedication of the warden, Paul Drummond, and his teams of volunteers who take part in the work parties. Much of the conservation work planned for the reserve just before the spring this year was abandoned due to foot-and-mouth disease restriction, so we have much to do in time for next year. One increasingly urgent task will be to take out the birch trees growing on the bunds, which now threaten to overshadow various parts of the lake. We are also grateful to the members of the Gosforth Park Management Committee and the Society's secretary, David Noble-Rollin, for their hard work in the reserve on the Society's behalf. The Committee Chairman, Ian Moorhouse, stood down part way through the year and has been replaced by Chris Redfern, with Ian Davidson as deputy Chairman.

## RINGING GROUP

Seabird research based on the colonies on Coquet Island and the Farne Islands is one of the group's main activities and takes place mainly during a month of frantic activity from mid-June to mid-July. The species ringed were eiders, shags, kittiwakes, Sandwich, arctic and common terns, black-headed gulls and fulmars. Eiders (Inner Farne), shags (Staple Island) and adult arctic terns (Coquet Island) were ringed as 'Retrapping Adults for Survival' (RAS) projects, contributions to the BTO's population monitoring work. This year the group followed its now familiar pattern of ringing arctic tern chicks on Coquet Island and the Farnes to estimate chick survival and measure growth quality, part of a long-running project to discover what factors are important in the breeding success of this species. It has become clear that we need to know much more about what regulates the availability of sand-eels, the major food source of arctic terns and other seabirds. The Society is now participating in a major





**Figure 1** The number of reed buntings ringed as a percentage of the total birds ringed in each year.

out exploratory studies using radio-transmitters fitted to arctic terns, while the Farne wardens have been using an optical coincidence rangefinder, made for machine gunners in the second world war, to locate the positions of feeding areas by range and compass direction.

On dry land, the ringing group's other main activities are constant-effort netting in Gosforth Park, and the autumn coastal project at Low Newton by the Sea. As in previous years, the team worked hard on the Gosforth Park nature reserve's constant-effort site (CES) ringing project, and despite the difficulties posed by foot-and-mouth disease managed to complete all the required visits in the 2001 season. The period May to the end of July 2001 at Gosforth Park has certainly been an interesting one: two reed warblers caught during the first constant-effort visit at the end of April were our earliest ever. Numbers of adult reed warblers caught since then have been high, although few young reed warblers have been caught in the 2001 season so productivity may be substantially down on previous years. In contrast, sedge warblers have been noticeably fewer. This decrease in sedge warbler numbers might have been expected as in the last few years the *Phragmites* reed beds have expanded, at the expense of the successional vegetation favoured by sedge warblers. However, the reduction in sedge warblers has been rather sudden and we will need to await the results of the national CES data for this year to see if there has been a reduction in sedge warblers in the UK overall. Generally, the ringing totals for this year at Gosforth Park have been disappointingly low, with fewer of everything but in particular tits and willow warblers. These are worrying trends and it is important that we maintain these monitoring studies so that we have hard data with which to counter the continual pressure for 'development' of green belt and important wildlife sites.

During September and October 2000, the ringing group made seven weekend (Sunday) visits to Newton Pool. In addition, there were three weekday visits by one member of the ringing team (Ian Davidson). The total number of birds ringed was 321, a substantial increase on last year (198), although there were no marked 'falls' of migrating birds during the ringing visits. The increase in ringing total was mainly accounted for by a substantial increase in the numbers of long-tailed tits (34 compared to none the previous year) and reed buntings caught (75 compared to 22 the previous year). For reed buntings, this continues the trend of increasing numbers in recent years, as shown in Figure 1. Numbers of other species caught remained about the same. There was no marked movement of warblers through the reserve during ringing operations, but six reed warblers were caught and the numbers of chiffchaffs increased

slightly from last year. The season was good for chats with stonechat (2) and whinchat (1) ringed.

The Society's ringing group is making good progress with its various long-term monitoring projects, but is also widening its horizons with respect to obtaining a deeper understanding of seabird ecology in the North East. Another task that we must face is organising and storing the Society's ringing data that has accumulated in the office for many years. With the increasing power and availability of computers, this represents a considerable resource for the North East that is under-utilised. The challenge now is to convert these data into electronic form so that the information can be made available for analysis. The success of the ringing group over the years is due to the efforts of many people. We are grateful to the Sir James Knott Trust for supporting the sand-eel sampling project, and for the grant which enabled the Group to buy a 4-wheel drive vehicle which has proved essential for towing and launching the boat. Northumbrian Water continue to support the Group through the provision of the boat without which the team would be unable to reach the islands. We are grateful to the Farnes wardens for their continued enthusiasm and support - their hard work in collecting the foraging and range-finding data is greatly appreciated. On Coquet Island, Kathy and Dave Fletcher have made an immense contribution by ringing the arctic tern chicks in our study area as they hatched. None of monitoring and scientific work would be possible without the dedication and commitment shown by members of the Ringing Group; Ian Johnston deserves special mention for allowing himself to be 'marooned' on Coquet island for several days at a time in order to ring and retrap adult arctic terns for our RAS project. Finally, as autumn closes in, the group is very grateful to Major Carr Ellison for allowing it the use of his beach hut at Low Newton.

### **COQUET ISLAND MANAGEMENT COMMITTEE**

The Management Committee met on a number of occasions both at the RSPB Regional Office and at Amble prior to an island visit. One of the issues that have taken up the committee's time has been the preparation of a set of rules governing its remit. This has not been done since the formation of the reserve in the 1970. The three parties involved the RSPB, the Northumberland Wildlife Trust and the Society have debated the issues and the matter should be settled soon, giving clear guidance to the future members of the committee.

Coquet has had another successful year with a noticeable increase in the number of pairs of roseate terns. Forty-one (31 last year) pairs attempted to breed with a high success level but the most interesting feature is that by reading the ring numbers on the adults it became apparent that there were possibly as many as thirty more non-breeding birds on the island in July.

### **LINDISFARNE NATIONAL NATURE RESERVE**

#### **Lindisfarne Advisory Committee**

The Committee met on two occasions. The committee has a wider remit than the wildfowl panel, having representatives of as many interested parties as possible and covering all aspects of the effect that the nature reserve has on the local economy. The second meeting took place on Holy Island and was over-shadowed by the foot-and-mouth outbreak. Much of the island was still closed except for the village, castle and a route through the dunes to the north shore. After the business meeting, which was held in the new visitor centre on the island, the committee made a visit to the early settlement that has been excavated in the dunes near the north shore. It is hoped that it may be possible to add this to the attractions available on the island.

#### **Lindisfarne Wildfowl Panel**

The panel continues to monitor the refuge set in place a number of years ago. There have been increases in both wigeon and brent geese since the introduction of the non-shooting area and most of the criteria have been met to ensure its continuing as a non-shooting area. However there are concerns over the buffer zones and the amount of the area that is effectively a refuge. Further research on this and the sustainability of the *Zostera* eel-grass will be carried out in the



next few years. Important wader species have apparently also benefited from the creation of the refuge; certainly increased numbers have been counted.

David Gardner-Medwin  
Chairman of Council

## **FINANCIAL STATEMENTS**

**31 JULY 2001**



# **THE NATURAL HISTORY SOCIETY OF NORTHUMBRIA TRUSTEES' REPORT FOR THE YEAR ENDED 31 JULY 2001**

**CHARITY NUMBER 526770**

## **Review of Developments and Activities**

The detailed report of the Society's activities during the year appears on pages 5 to 28 of the Annual Report.

## **Accounts Presentation**

The format of the accounts complies with the requirements of Statement of Recommended Practice No. 2 – Accounting by Charities (SORP 2). SORP 2 requires investments to be valued at market value rather than cost (Note 1).

All investments held have been acquired in accordance with the powers available to the trustees.

## **Statement of Trustees' Responsibilities**

Law applicable to charities in England and Wales requires the trustees to prepare financial statements for each financial period which give a true and fair view of the charity's financial activities during the period and of its financial position at the end of the period, and adequately distinguish any material trust or other restricted fund of the charity. In preparing financial statements giving a true and fair view, the trustees should follow best practice and:

- select suitable accounting policies and then apply them consistently;
- make judgements and estimates that are reasonable and prudent;
- state whether the policies are in accordance with applicable accounting standards and statements of recommended practice on accounting by charities subject to any departures disclosed and explained in the financial statements;
- prepare the financial statements on the going concern basis unless it is inappropriate to presume that the charity will continue in operation.

The trustees are responsible for keeping accounting records which disclose, with reasonable accuracy at any time, the financial position of the charity, and which enable them to ensure that the financial statements comply with the Accounting Standards and Statements of Recommended Practice and the regulations made under s44 of the Charities Act 1993. They are also responsible for safeguarding the assets of the charity and hence for taking reasonable steps for the prevention and detection of fraud and other irregularities.

## **Investments**

All investment transactions during the year under review have been carried out in accordance with the trustees' powers.

## **Financial Review**

	<b>2001</b>	<b>2000</b>
Net Incoming Resources	£9736	£10386

## **Signed on behalf of the Trustees**

D Gardner-Medwin  
Chairman and Trustee

12 October 2001

**THE NATURAL HISTORY SOCIETY OF NORTHUMBRIA**  
STATEMENT OF FINANCIAL ACTIVITIES FOR THE YEAR ENDED 31 JULY 2001

	2001			2000
	Restricted	Unrestricted	Total	Total
	£	£	£	£
<b>Income and expenditure</b>				
<b>Incoming resources</b>				
Members' subscriptions		21070	21070	15840
Donations	5000	6777	11777	11131
Investment income		24862	24862	23757
Interest receivable		6306	6306	5582
University of Newcastle upon Tyne		8350	8350	8200
Proceeds from the sale of <i>Transactions</i>		1329	1329	998
<b>Total incoming resources</b>	5000	<u>68694</u>	<u>73694</u>	<u>65508</u>
<b>Resources expended</b>				
Direct charitable expenditure (note 2)	4351	50560	54911	46156
Management and administration (note 3)		9047	9047	8966
<b>Total resources expended</b>	<u>4351</u>	<u>59607</u>	<u>63958</u>	<u>55122</u>
<b>Net incoming resources for the year</b>	649	9087	9736	10386
<b>Other recognised gains and losses</b>				
Realised		6596	6596	24851
Unrealised		-36871	-36871	(7051)
<b>Total investment gains/ (losses)</b>		<u>-30275</u>	<u>-30275</u>	<u>17800</u>
<b>Net movement in funds</b>	649	-21188	-20539	28186
Balance brought forward	5000	702186	707186	679000
<b>Total funds carried forward 31 July 2001</b>	<u>5649</u>	<u>680998</u>	<u>686647</u>	<u>707186</u>



**THE NATURAL HISTORY SOCIETY OF NORTHUMBRIA**  
BALANCE SHEET AS AT 31 JULY 2001

	<b>2001</b>	<b>2000</b>
	£	£
<b>Fixed assets</b>		
Tangible assets for use by the charity (note 6)	11411	13467
Investments (note 7)	607452	632499
	<u>618863</u>	<u>645966</u>
<b>Current assets</b>		
Debtors	2461	10060
Cash at bank and in hand	73832	59492
	<u>76293</u>	<u>69552</u>
<b>Creditors:</b> Amounts falling due within one year	8509	8332
<b>Net Current Assets</b>	<u>67784</u>	<u>61220</u>
<b>Total Assets Less Current Liabilities</b>	<u>686647</u>	<u>707186</u>
<b>Funds</b>		
General Fund	213093	220335
Expendable Endowments:		
TB Short Memorial Fund	235708	228781
Grace Hickling Memorial Fund	206949	229051
	<u>655750</u>	<u>678167</u>
Life Members Fund	2322	1719
Designated Capital Funds (note 8)		
Gosforth Park Nature Reserve Restoration Fund	18926	19300
Deferred Repairs Fund	4000	3000
Restricted Funds		
Coquet/ Farnes Research Fund (note 9)	5649	5000
	<u>686647</u>	<u>707186</u>

Approved by Council on 12 October 2001

D GARDNER-MEDWIN - Chairman and Trustee

# THE NATURAL HISTORY SOCIETY OF NORTHUMBRIA

## NOTES TO THE ACCOUNTS FOR THE YEAR ENDED 31 JULY 2001

### 1 Accounting Policies

#### 1.1 Basis of Accounting

The accounts are prepared under the Historical Cost Convention as modified for the revaluation of Fixed Asset Investments and comply with the Statement of Recommended Practices "Accounting by Charities"

#### 1.2 Realised and Unrealised Gains and Losses on Investments are recognised in the Statement of Financial Activities in the period in which they arose.

#### 1.3 Quoted Investments are stated at market value at 31 July 2001.

#### 1.4 Tangible Fixed Assets

Tangible fixed assets are stated at cost less depreciation which is provided in equal annual instalments over the estimated useful lives of the assets.

No value was attributed to the Hancock Museum at the date of its completion in 1884. The building is leased to the University of Newcastle upon Tyne which is normally responsible for all repairs and improvements.

The cost of Lake Lodge, less donations and grants received, of £3899 is depreciated at 2% per annum. The cost of installing mains electricity at Lake Lodge, less donations received, of £5300 has been fully depreciated

The cost of the hides, equipment and office furniture is depreciated at 10% per annum and computers and office equipment at 20% per annum.

#### 1.5 Statement of Financial Activities

Donations are recognised when received unless the receipt is certain, when they are recognised as accrued income. Expenditure is accounted for on an accrued basis. Any excess of income over expenditure for the year is arrived at after making appropriations to special funds for the purpose of setting aside temporary surpluses of income to meet future expenditure.

#### 1.6 Fund Accounting

The General Fund is unrestricted, and is expendable at the discretion of the trustees in the furtherance of the objects of the charity. The T B Short and Grace Hickling Memorial Funds were created from legacies and are invested in accordance with the Trustee Investment Acts and are subject only to expenditure for special projects. The Life Members Fund consists of amounts received in payment of life subscriptions and they are released to income over a period of 20 years in equal annual instalments.

<b>Gosforth Park Nature Reserve Restoration Fund</b>	<b>2001</b>	<b>2000</b>
General Restoration	10426	10800
Sir James and Lady Steel donation for lake rejuvenation	8500	8500
	<u>£18926</u>	<u>£19300</u>



## 2 Direct Charitable Expenditure

	2001	2000
Salaries, pension contributions and national insurance (Note 4)	26084	24620
Printing and Stationery	2327	2385
Postage and Telephone	2684	2394
Insurance	1996	1858
Office Equipment maintenance	283	318
Subscriptions to societies	583	793
Lecture and Field Meeting expenses	1529	1466
Transactions	6319	5984
Library	2440	2668
Gosforth Park Nature Reserve	2083	
Less: Transfer from Restoration Fund	<u>374</u>	1709
Coastal Research (note 5)	2320	1108
Depreciation	<u>2286</u>	<u>1363</u>
	<u>£50560</u>	<u>£46156</u>

## 3 Administration Expenses

	2001	2000
Salaries, pension contributions and national insurance	6247	6135
Printing and stationery	122	125
Postage and telephones	142	126
Insurance	222	206
General Expenses	229	379
Accountancy Fees	1565	1500
Independent Review	<u>520</u>	<u>495</u>
	<u>£9047</u>	<u>£8966</u>

## 4 Information regarding Employees and Trustees

	2001	2000
Average number of employees during the year	3	5
Total emoluments	£32331	£30755

No trustee, or person related or connected by business to them, has received any remuneration from the charity during the year

During the year, payments were made to four (2000 – three) trustees as follows:

Salary costs	£nil	£nil
Reimbursement of speakers entertainment expenses	£104	£346
Library books	£27	£60
Office sundry expenses	£nil	£14
Gosforth Park Nature Reserve restoration expenses	£nil	£190

A payment was received during the year from one trustee of £100 (2000 - £100) in respect of photocopying carried out at a commercial rate.

## 5 Coastal Research

Coastal Research comprises boat costs and ringing expenses for Farne Islands and Coquet Island research.

## 6 Tangible Fixed Assets for use by the Society

	2001	2000
Hancock Museum	Not valued	
Lake Lodge: Cost	3899	3899
Electrical installation	<u>5300</u>	<u>5300</u>
	9199	9199
Less: Depreciation to date	<u>7172</u>	<u>7095</u>
Net book value	2027	2104
Hides, equipment, office furniture and computers		
Cost	37363	37134
Depreciation to date:	27979	25771
Net Book Value	<u>9384</u>	<u>11363</u>
Total Net Book Value	<u>£11411</u>	<u>£13467</u>

There were no capital commitments at 31 July 2001

## 7 Investments held as Fixed Assets

Investments in trustee securities, at market value, were held as follows:

	2001	2000
<b>Quoted</b>		
Narrow range	159780	143723
Wide range	255959	282681
Special range	94934	94198
<b>Unquoted</b>		
Charities Official Investment Fund		
9750 shares	<u>96779</u>	<u>111897</u>
	<u>£607452</u>	<u>£632499</u>
<b>Historical cost</b>	<u>£387338</u>	<u>£372,284</u>

## 8 Designated funds

	2000	New designations	Utilised	2001
Gosforth Park Nature Reserve	19300	-	374	18926
Deferred repairs	<u>3000</u>	<u>1000</u>	-	<u>4000</u>
	<u>£22300</u>	<u>1000</u>	<u>£374</u>	<u>£22926</u>

## 9 Restricted funds

	2000	Incoming Resources	Utilised	2001
Coquet/Farnes research	£5000	5000	4351	5649

This fund has been set up to accumulate funds for the purchase of a Land Rover, and to undertake research into sandeels. A restricted grant for this purpose of £5000 was received in 2001 from the Sir James Knott Trust (2000 £5000).



**Report of the Independent Examiner to the Trustees of The Natural History Society of Northumbria in respect of an examination carried out under Section 43 of the Charities Act 1993 and in accordance with directions given by the Charity Commissioners under subsection 7(b) of that Section**

I have examined the financial statements which comprise the Statement of Financial Activities and Balance Sheet for the year ended 31 July 2001

**Respective responsibilities of Trustees and Independent Examiner**

As described in page 30 as the charity's trustees you are responsible for the preparation of financial statements. It is my responsibility to carry out an examination of those financial statements and to issue a report based on that examination.

**Scope of examination**

I conducted my examination in accordance with directions given by the Charity Commissioners under section 43 (7) (b) of the Charities Act 1993 and my letter of engagement dated 3 September 2001. An examination is limited primarily to enquiries of the charity's personnel and analytical and review procedures applied to financial data and this provides less assurance than an audit. I have not performed an audit, and accordingly, I do not express an audit opinion.

**Report**

I report that nothing has come to my attention in connection with my examination:

- (1) that gives me reasonable cause to believe that in any material respect
  - i. accounting records have not been kept in respect of the charity in accordance with section 41 of the Charities Act 1993; or
  - ii. the financial statements do not accord with those records; or
  - iii. the financial statements do not comply with any of the requirements of regulation 3[4] of The Charities (Accounts and Reports) Regulations 1995 with the exception of paragraph 1 of Part III of these Regulations (requirement to give a true and fair view).
- (2) to which, in my opinion, attention should be drawn in this report in order to enable a proper understanding of the financial statements to be reached.

Mr R BUNTER  
Independent Examiner  
Chartered Accountant  
PricewaterhouseCoopers  
89 Sandyford Road  
Newcastle upon Tyne  
NE99 1PL

11 October 2001

## BIRDS ON THE FARNE ISLANDS in 2001

compiled by

ROBIN HARVEY<sup>1</sup>

National Trust Warden

ringing report by

CHRIS REDFERN<sup>2</sup>

edited by

MARGARET PATTERSON<sup>3</sup>

<sup>1</sup>Foresters Cottage, Doxford, Chathill, Northumberland NE67 5DS, <sup>2</sup>Medical Molecular Biology Group, Department of Medicine, University of Newcastle NE1 7RU and <sup>3</sup>The Natural History Society of Northumbria, Hancock Museum, Newcastle upon Tyne NE2 4PT

### INTRODUCTION

The wardens arrived on the islands on 26 March (after a two day delay due to rough seas) and both the inner and outer groups were manned until 8 December. Twenty-one species bred with an estimated population of around 70,000 pairs. Declines were noted for fulmar (-14%), arctic tern (-28%), common tern (-24%) and eider (-24%) but breeding numbers of cormorant (+34%), shag (+5%), kittiwake (+12%), Sandwich tern (+21%) and guillemot (+7%) all increased. It was a mixed breeding season with the island top nesters in particular hit hard by a spell of poor weather in mid-June. Chick mortality was high amongst the tern species and was exacerbated by an increase in predation by the larger gulls. Only three arctic tern chicks survived to fledging on Brownsman (from 189 pairs), and although Inner Farne fared better this is a cause for major concern. On a positive note oystercatchers did well, ringed plovers raised five chicks successfully, one pair of roseate terns produced a single fledgling and puffins had another bumper year.

Passage birds were represented by 168 species, the overall total of 189 species creating a new record. Although not a 'classic year' by any means there were a large number of highlights, many of them unexpected. Six species were added to the island list: white-billed diver, red-footed falcon, buff-breasted sandpiper, olive-backed pipit (two birds), Sardinian warbler (the first for Northumberland if accepted) and two-barred crossbill. Black-headed wagtail was a new sub-species for the Farnes and white-spotted bluethroat was seen for the second time. Woodlark and hobby made third appearances, Cory's shearwater and hen harrier were seen for the seventh time and the eighth Richard's pipit and Pallas's warblers were recorded. Other species of note included blue fulmar (3), Balearic shearwater (4), storm petrel (at least 17), garganey, buzzard, quail, corncrake (the first since 1994), grey phalarope, long-tailed skua (6), Mediterranean gull (2), yellow-legged gull (2), Iceland gull, black tern (4), stock dove (2), wryneck, great spotted woodpecker (a remarkable 10, the first since 1995), shore lark, blue-headed wagtail, red-spotted bluethroat (6), icterine warbler (2), barred warbler (3), yellow-browed warbler (5-6), firecrest, mealy redpoll (at least 9, the first records since 1997), common rosefinch, northern bullfinch (the first since 1994) and little bunting (2).

The year was also noteworthy for its record counts. A massive 1,025 sooty shearwaters passed the islands on 18 September and 8,186 little auks were noted on 9 November. Add to these day records for species as diverse as long-tailed duck and green sandpiper – all combined to make this a truly memorable season.



Thanks go to the 2001 wardening team of Mark Brown, Simon Davies, Michael Douglas, Maurits Fontein, Owain Gabb, Robin Harvey, Alein Shreeve, David Steel and Tim Sykes, as well as to various boatmen, for supplying the records which make up this report.

The following is a day-by-day summary of the highlights of 2001. 'First record' means the first record for the year and species in bold are of particular interest; for more details refer to the species accounts.

### February

- 13 Goldeneye (7), lapwing (52), woodcock (27), fieldfare, song thrush, redwing (5)

### March

- 26 Black redstart (2), stonechat (2), wheatear, chiffchaff (first record)  
27 Jack snipe, black redstart (2), stonechat (2), snow bunting  
28 Manx shearwater, woodpigeon (6), robin (28), **white-spotted bluethroat**, black redstart (7+), chiffchaff (spring peak of 9), goldcrest (9, first record), **firecrest**, starling (peak of 350)  
30 Black-throated diver, first Sandwich tern, grey wagtail, black redstart (6+), **hooded crow**, chaffinch (first record), goldfinch (first record)  
31 Woodpigeon (3), meadow pipit (186), black redstart (7)

### April

- 1 Meadow pipit (237), black redstart (2), mistle thrush  
2 Sand martin (first record), black redstart, goldcrest (peak spring of 10), greenfinch (2, first record)  
3 Tree pipit (first record), black redstart, siskin (2, first record)  
4 Gannet (1,922 in one hour, the heaviest passage of the year), black redstart, **hooded crow**  
5 Blackcap (first record)  
7 Great skua, black redstart (4), stonechat  
8 Turnstone (spring peak of 139), black redstart (2), stonechat, linnet (spring peak of 20)  
9 Black redstart  
10 First mallard eggs, black redstart  
11 Whimbrel, black redstart  
12 Black redstart  
14 **Glaucous gull**  
15 **Iceland gull**  
16 Arctic skua, great skua (3), lesser redpoll (only spring record)  
17 Siskin (spring peak of 13), lesser redpoll  
18 Arctic skua, great skua (2)  
19 First shag eggs, first ringed plover eggs, arctic skua (2), great skua, collared dove  
20 Sanderling (16), great skua, first guillemot egg  
21 Arctic tern (first record), swallow (first record), tree pipit, white wagtail, greenfinch

- 23 Common tern (first record), yellow wagtail (first record), black redstart, blackcap, willow warbler (first record), twite (only spring record), **mealy redpoll**
- 24 First puffin egg, black redstart, **crossbill**
- 25 **Stock dove**, brambling (19, first record)
- 26 Whitethroat (first record), willow warbler (spring peak of 10), greenfinch
- 27 Carrion crow (peak of 14), greenfinch
- 28 First cormorant eggs, first eider eggs
- 29 Common tern (peak of 150), house martin (first record), tree pipit, white wagtail, redwing (last spring record), lesser whitethroat (first record)
- 30 Shoveler (2), scaup, white wagtail, grasshopper warbler, brambling (3, last spring record)

## May

- 1 Sandwich tern (peak of 2,000), little tern (4, first record), white wagtail
- 2 Common sandpiper (first record)
- 3 Great northern diver, brent goose, tufted duck (24), scaup, goosander (2), black redstart, fieldfare (last spring record), goldcrest (last spring record)
- 4 Sanderling (17), **blue-headed wagtail**, white wagtail
- 5 Great northern diver, spotted redshank, arctic skua, white wagtail (2)
- 6 Goosander (6), Jack snipe, great skua, **short-toed lark**
- 8 Scaup (2)
- 9 Purple sandpiper (spring peak of 200), first razorbill egg, **red-spotted bluethroat** (3), redstart (first record), whinchat (first record), siskin (last spring record)
- 10 Greylag goose (3), red-breasted merganser, whimbrel (4), common sandpiper (spring peak of 7), great skua, first Sandwich tern eggs, **red-spotted bluethroat** (4), black redstart
- 11 **Garganey**, **red-spotted bluethroat** (2), black redstart, sedge warbler, lesser whitethroat (last spring record), **tree sparrow**
- 12 **Buzzard**, first ringed plover young, **Mediterranean gull**, first arctic tern eggs, **red-spotted bluethroat**, **tree sparrow**
- 13 Ruff, roseate tern (first record)
- 14 Great northern diver, black-tailed godwit (2), **black tern**, whitethroat (spring peak of 6), garden warbler (2, only spring record)
- 15 Scaup (5), first oystercatcher eggs, first common tern eggs, little tern (peak and record count of 90+), white wagtail, black redstart
- 16 Black redstart
- 17 Swift (2, first records), tree pipit
- 22 First kittiwake eggs
- 23 Ruff (2)
- 27 First eider young, **little stint** (5), song thrush (last spring record), chaffinch (last spring record)
- 28 Goldfinch (last spring record), linnet (last spring record)
- 29 First puffin young



30 First-summer arctic tern

#### June

- 3 Manx shearwater (70), first Sandwich tern young
- 4 Bar-tailed godwit (73), white wagtail, blackcap (last spring record)
- 5 Greylag goose (2), Canada goose (141), knot (70), first guillemot young
- 6 Pomarine skua (5), sedge warbler
- 7 First arctic tern young
- 8 Great skua, little tern (last spring record)
- 9 First common tern young, whitethroat (last spring record)
- 11 First oystercatcher young, first guillemot 'jumping'
- 12 First razorbill young
- 15 Start of poor weather - mass tern mortality over next three days, some puffin burrows flooded, **collared dove**
- 16 Great skua, **black-headed wagtail**, black redstart, **icterine warbler**
- 17 Arctic skua, great skua, first kittiwake young, black redstart
- 19 First-summer arctic tern (4), reed warbler (only spring record)
- 21 Manx shearwater (90), ruff
- 22 Manx shearwater (228), arctic skua
- 23 Arctic skua, great skua
- 25 Common scoter (174), arctic skua
- 26 Cormorant young near fledged
- 27 Starling (71)
- 29 First-summer arctic tern (19)
- 30 Siskin (7)

#### July

- 1 First puffin fledgling
- 2 First arctic tern fledgling
- 4 Black-tailed godwit
- 5 First razorbill 'jumping', stonechat
- 6 **Quail**, first-summer arctic tern (10)
- 7 **Quail**
- 8 **Quail, buff-breasted sandpiper**, first Sandwich tern fledgling, **black tern, two-barred crossbill**
- 9 **Quail, buff-breasted sandpiper**, whimbrel (2, first autumn record), common sandpiper (first autumn record), **two-barred crossbill**
- 10 Ruff, **two-barred crossbill**
- 12 Goosander (3), first common tern fledgling
- 13 **Storm petrel** (2, 1 tape lured)
- 14 **Storm petrel** (3), first mallard young, arctic skua (40), great skua (4)

- 15 **Storm petrel** (2)
- 16 Common scoter (644), little tern (2)
- 17 Manx shearwater (210), common scoter (408), arctic skua (11)
- 18 Arctic skua (15)
- 19 Great skua (6)
- 20 **Storm petrel** (3, tape lured), first kittiwake fledgling
- 22 Turnstone (autumn peak of 509)
- 24 **Storm petrel** (2, tape lured), green sandpiper (first record)
- 25 **Moorhen**, knot (peak of 152)
- 26 Greenshank (first record)
- 28 **Storm petrel** (tape lured), greylag (8), golden plover (first record)
- 30 Black-tailed godwit (18)

#### August

- 1 Goldfinch (first autumn record)
- 2 Most puffins departed from now until 4th, willow warbler (first autumn record)
- 3 Linnet (first autumn record)
- 4 Little tern
- 6 Roseate tern (12), wheatear (first autumn record)
- 7 Purple sandpiper (autumn peak of 150), yellow wagtail
- 8 **Storm petrel** (tape lured), arctic skua (15), great skua (18)
- 9 Manx shearwater (110), **storm petrel** (tape lured), roseate tern (13)
- 13 **Storm petrel**
- 14 Whinchat (first autumn record), chiffchaff (2, first autumn record)
- 15 Black-tailed godwit, last Sandwich tern fledgling, last arctic tern fledgling, pied flycatcher (first record)
- 16 Red-breasted merganser (5), white wagtail
- 17 Curlew (peak of 376), greenshank (peak of 3)
- 18 Sanderling (3), redshank (peak on inner group of 52), greenshank (3), pied flycatcher (2)
- 19 **Water rail**, sanderling, snipe (7), whimbrel (peak of 27), green sandpiper (11+), **wood sandpiper** (2), common sandpiper (50+), tree pipit (17), redstart (2, first autumn record), whinchat (20+), fieldfare (first autumn record), sedge warbler (3, first autumn record), reed warbler (8, first autumn record), **icterine warbler**, **barred warbler** (2), lesser whitethroat (3, first autumn record), whitethroat (2, first autumn record), garden warbler (27, first autumn), **wood warbler**, willow warbler (65), pied flycatcher (21+)
- 20 **Icterine warbler**, **Sardinian warbler**, lesser whitethroat, garden warbler (12), pied flycatcher (3)
- 21 Roseate tern, reed warbler (2), lesser whitethroat, whitethroat (3), garden warbler (2)
- 22 Ringed plover (peak of 62), **little stint**, **curlew sandpiper**, wheatear (22)



- 23 **Little stint**, snipe (17), roseate tern, reed warbler (4), pied flycatcher (3)
- 24 **Little stint**, redshank (peak on outer group of 45), martin sp. (45), reed warbler, garden warbler, chiffchaff (10), willow warbler (20) goldcrest (first autumn record), pied flycatcher
- 25 **Little stint**, reed warbler (2)
- 26 **Little stint**, sand martin (last record), reed warbler
- 27 **Little stint**
- 28 Arctic skua (11), pied wagtail (peak of 13)
- 29 Sooty (80-100) and Manx (80-100) shearwaters in feeding frenzy, sanderling, **black tern**
- 30 Wigeon (245), teal (188), shoveler (12), song thrush (first autumn record)

### September

- 2 Yellow wagtail (last record)
- 4 **Blue fulmar**, **Cory's shearwater**, sooty shearwater (121), Manx shearwater (129), oystercatcher (peak of 198), whitethroat
- 5 Teal (109), pintail (2), leucistic purple sandpiper, whitethroat, pied flycatcher
- 6 Whitethroat
- 7 Garden warbler
- 8 Pomarine skua, **black tern**
- 10 Manx shearwater (164), brent goose (23)
- 11 Grey wagtail (first autumn record)
- 12 **Common rosefinch**, wigeon (238)
- 13 **Common rosefinch**, golden plover (peak of 1,356)
- 14 Velvet scoter (2), redwing (first autumn record), **yellow-browed warbler**
- 15 Great crested grebe, pochard (5)
- 16 Great crested grebe
- 17 **Blue fulmar**, sooty shearwater (478), Manx shearwater (164), **Balearic shearwater**, pochard, **long-tailed skua**, great skua (22)
- 18 Great crested grebe, **blue fulmar**, sooty shearwater (1,025), Manx shearwater (161), **Balearic shearwater** (2), **storm petrel** (2-3), pomarine skua, arctic skua (11), **long-tailed skua** (5), great skua (82), **great spotted woodpecker**, ring ouzel, brambling (2, first autumn record)
- 19 Red-necked grebe (first record), sooty shearwater (300+), **storm petrel**, pomarine skua (2), **long-tailed skua**, great skua (13), kittiwake (thousands), **great spotted woodpecker**, lesser whitethroat, garden warbler (2)
- 20 **Balearic shearwater**, hobby, **corncrake**, great skua (18), **glaucous gull**, **great spotted woodpecker**, **Richard's pipit**, wheatear (20), blackcap (3, first autumn record), spotted flycatcher (first record), chaffinch (first autumn record), siskin (4, first autumn record), snow bunting (2, first autumn record)
- 21 **Red-footed falcon**, wryneck, **barred warbler**, garden warbler (5), spotted flycatcher, siskin (6, autumn peak)
- 22 **Red-footed falcon**, grey wagtail (8), spotted flycatcher, pied flycatcher

- 23 Barnacle goose (15), jack snipe (first autumn record), sedge warbler, **yellow-browed warbler**, spotted flycatcher, lesser redpoll (first autumn record), **little bunting**
- 24 Wigeon (102), mallard (22), lapwing (60, peak), pomarine skua, arctic skua (12), **great spotted woodpecker** (2), grasshopper warbler (2), reed warbler (2), **yellow-browed warbler**, spotted flycatcher (2), rook (11, peak), lesser redpoll, **little bunting** (2)
- 25 Common tern (last record), **great spotted woodpecker** (5), dunnoek (2, first autumn record), ring ouzel (3), grasshopper warbler, reed warbler (2), lesser whitethroat (3), garden warbler (11), **yellow-browed warbler** (2), goldcrest (70), spotted flycatcher (2), pied flycatcher, lesser redpoll, **little bunting** (2), reed bunting (2)
- 26 Short-eared owl (first record), **great spotted woodpecker** (2), redstart (13, peak), grasshopper warbler, reed warbler (5), lesser whitethroat (6), garden warbler (11+), chiffchaff (35), spotted flycatcher, pied flycatcher, lesser redpoll, **little bunting** (2)
- 27 **Hen harrier**, **great spotted woodpecker** (2), stonechat (2), sedge warbler (2), reed warbler (5), lesser whitethroat (5), whitethroat, garden warbler (10), **yellow-browed warbler**, chiffchaff (21), spotted flycatcher (3), lesser redpoll, **little bunting**
- 28 Ruff, common sandpiper (last record), **great spotted woodpecker** (4), **olive-backed pipit**, meadow pipit (52), stonechat (2), redwing (269), grasshopper warbler (2, last record), sedge warbler (2), reed warbler (3), lesser whitethroat (7), blackcap (16), chiffchaff (13), spotted flycatcher, lesser redpoll, **little bunting**
- 29 **Great spotted woodpecker** (3), **olive-backed pipit**, stonechat (2), redwing (420),  
sedge warbler, reed warbler (3), lesser whitethroat (5), spotted flycatcher, brambling (19), lesser redpoll, reed bunting (2)
- 30 **Great spotted woodpecker** (3), stonechat (2), sedge warbler, reed warbler, lesser whitethroat, lesser redpoll

## October

- 1 **Scaup**, **great spotted woodpecker** (2), black redstart, stonechat (2), sedge warbler, lesser whitethroat, lesser redpoll
- 2 Great crested grebe, great skua, short-eared owl, swift (last record), **great spotted woodpecker** (2), black redstart, stonechat (2), sedge warbler (last record), lesser whitethroat
- 3 Pink-footed goose (442), brent goose (114), **great spotted woodpecker** (2), stonechat (2), pied flycatcher (last record)
- 4 Sandwich tern (last record), **great spotted woodpecker**, meadow pipit (20 south per hour)
- 5 Great crested grebe, great skua, roseate tern, **great spotted woodpecker**, meadow pipit (48)
- 6 Tufted duck (14), **great spotted woodpecker**
- 7 Pochard, scaup, great skua (2), **great spotted woodpecker**, tree pipit (last record)
- 8 Red-throated diver (20+), great skua, arctic tern (7, last record), **great spotted woodpecker**, meadow pipit (56), redwing (108), spotted flycatcher
- 9 **Great spotted woodpecker** (last record)
- 11 Dunlin (40), lesser whitethroat (last record)



- 13 Barnacle goose (42), lesser redpoll (16)
- 14 Snipe (8), **olive-backed pipit**, ring ouzel (5), fieldfare (1,750), song thrush (55), redwing (3,250), garden warbler, chaffinch (15), brambling (500+), reed bunting (8)
- 15 Short-eared owl (3), **olive-backed pipit**, ring ouzel (3), fieldfare (520), song thrush (415), redwing (1,830), reed bunting (3)
- 16 Redstart (last record), ring ouzel, reed bunting
- 17 Black redstart, ring ouzel, fieldfare (226), lesser redpoll (2), reed bunting
- 18 Jack snipe (4), snipe (5), woodcock (5), short-eared owl (2), black redstart (4), ring ouzel, blackbird (400), fieldfare (605), redwing (3,215), whitethroat (last record), brambling (280+), lesser redpoll (4), **mealy redpoll** (6) **yellowhammer** (2), reed bunting (2)
- 19 Black redstart (4), ring ouzel, blackbird (300), fieldfare (400), redwing (750), brambling (90+), lesser redpoll (3), **mealy redpoll** (4), **yellowhammer** (2), reed bunting
- 20 Jack snipe (5-6), short-eared owl (2), **wood lark**, black redstart (2), ring ouzel, fieldfare (170), redwing (350), goldcrest (27), jackdaw (only autumn record), brambling (36), lesser redpoll, mealy redpoll (2), reed bunting (2)
- 21 Short-eared owl, black redstart, ring ouzel, starling (100), brambling (55), **mealy redpoll**, reed bunting
- 22 Pomarine skua (2), great skua, **stock dove**, woodpigeon, short-eared owl (2), skylark (52+), black redstart (2), ring ouzel, fieldfare (424+), redwing (260), garden warbler (last record), blackcap (32), goldcrest (110), brambling (100), twite (18, peak), lesser redpoll (2), **mealy redpoll** (4), reed bunting (5)
- 23 Mallard (47), goldeneye (18), jack snipe (12), woodcock (65), pomarine skua, great skua (2), little auk, woodpigeon, **long-eared owl** (2), short-eared owl (7), skylark (45+), wren (15), robin (420), black redstart, whinchat (last record), ring ouzel (4), blackbird (280), fieldfare (600+), redwing (800), mistle thrush, reed warbler, blackcap (129), **Pallas's warbler**, chiffchaff (50), goldcrest (350), brambling (80), lesser redpoll (2), **mealy redpoll** (3), **northern bullfinch**, **Lapland bunting**, **yellowhammer** (8), reed bunting (12)
- 24 Pink-footed goose (365), snipe (6), woodcock (7), wheatear (last record), mistle thrush, goldcrest (95), **mealy redpoll** (2), **Lapland bunting**, **yellowhammer**, reed bunting (4)
- 25 Pintail (4), great skua, skylark (15), swallow (last record), goldcrest (45), twite (4), lesser redpoll (2), **mealy redpoll** (2), **Lapland bunting**, reed bunting (2)
- 26 Pink-footed goose (1,074), **shore lark**, goldcrest (32), twite (17), lesser redpoll, **mealy redpoll**, **Lapland bunting** (2), reed bunting
- 27 Pink-footed goose (263), **water rail**, mistle thrush, goldfinch, linnet (18, October peak), lesser redpoll, **mealy redpoll**, **Lapland bunting**, reed bunting
- 28 Blackcap (last record), lesser redpoll, **mealy redpoll**, **northern bullfinch**, **Lapland bunting**
- 29 Chiffchaff (last record), lesser redpoll
- 30 Little auk, lesser redpoll
- 31 Great skua, goldcrest (3, last record), lesser redpoll (last record)

## November

- 1 Woodcock (11), snow bunting

- 2 Tufted duck (6), scaup, velvet scoter (10), little auk, goldfinch, snow bunting (2)
- 3 Mallard (48), black guillemot (first record), little auk, goldfinch, snow bunting
- 4 Red-throated diver (12), jack snipe (last record), **Mediterranean gull**, little auk (59), goldfinch, snow bunting
- 5 Snow bunting (4)
- 6 Long-tailed duck (3), arctic skua, great skua (2), little auk (56), starling (113), snow bunting (3)
- 7 Pink-footed goose (207), teal (226), pomarine skua, little auk (226), snow bunting (5)
- 8 Long-tailed duck (10), great skua (2), black guillemot (5), little auk (163)
- 9 Red-throated diver (17), black-throated diver (4), great northern diver (13), red-necked grebe (5), Slavonian grebe, **Leach's petrel**, wigeon (365), mallard (28), pintail, long-tailed duck (187), common scoter (219), velvet scoter (25), goldeneye (157), red-breasted merganser (17), dunlin (83), bar-tailed godwit (36), black guillemot (15), little auk (8,186)
- 10 Great northern diver (11), shelduck (64), wigeon (133), pintail, scaup, long-tailed duck (13), common scoter (140), velvet scoter (3), goldeneye (13), red-breasted merganser (4), dunlin (26), black guillemot (7), little auk (486), brambling, snow bunting
- 11 Little auk (10)
- 12 Sooty shearwater, great skua, little auk (85), house martin (last record), snow bunting
- 13 Little auk (1,055)
- 14 Little auk (35), chaffinch (last record), brambling (last record), goldfinch, snow bunting (4)
- 15 Linnet (40, November peak)
- 16 Siskin (last record), snow bunting (6)
- 17 **White-billed diver**, goldfinch (last record)
- 18 Snow bunting
- 19 Snow bunting (4)
- 21 Little auk (341)
- 22 Great skua, little auk (201)
- 23 Great northern diver (6), teal (255), common scoter (258), goldeneye (28), snow bunting, reed bunting (last record)
- 25 **White-billed diver**, common scoter (on Brownsman Pond), snow bunting
- 26 **White-billed diver**, purple sandpiper (150, autumn peak), snow bunting (4)
- 27 Black guillemot (last record)
- 28 Teal (156)
- 29 Teal (300)
- 30 Greylag, **grey phalarope**, snow bunting (last record)

## December

- 1 Grey plover (8, peak), linnet (42, peak)



- 2 Mallard (71)
- 3 Brent goose (8), arctic skua
- 4 Teal (300), dunlin (64), **glaucous gull**

Details of all the birds are given in the following list: this follows the order and scientific nomenclature of Professor Dr K H Voous' list of recent holarctic species (1977), except for the shearwaters and gannet which adopt the new changes recommended by *Ibis* 133, p438. Where appropriate, the figures for 2000 breeding birds are included for comparison, in brackets. The status of each species/sub species is classified using the following categories:

abundant	>1,000 occurrences per annum
common	101-1,000 occurrences per annum
well represented	11-100 occurrences per annum
uncommon	no more than 10 occurrences per annum but more than 10 in total
rare	6-10 occurrences
extremely rare	no more than 5 occurrences in total

Species marked with an asterisk (\*) have yet to be considered by the Rarities Committee.

#### SYSTEMATIC LIST

##### **Red-throated Diver** *Gavia stellata*

A common winter and passage visitor.

It was a good spring with 1-5 seen on fourteen days from 27 March-26 April, followed by two on 13 May and one on 7 June. Return passage began on 4 September when two flew south through Inner Sound. Thereafter 1-10 were seen on twenty days in September, twelve days in October, nineteen days in November and five days in December. Higher counts noted were of at least twenty south on 8 October, twelve on 4 November, seventeen (sixteen north, one south) on 9 November and twelve on 28 November.

##### **Black-throated Diver** *G. arctica*

A well represented winter and passage visitor.

There was one spring record - a bird off Roddam and Green on 30 March. Singles were noted on six days from 2-27 November with four north through Staple Sound/past Brownsman on 9 November.

##### **Great Northern Diver** *G. immer*

A well represented winter and passage visitor.

There were three spring records - singles north through Inner Sound on 3, 5 and 14 May. The first birds of the autumn were two south past Brownsman on 4 September and a single south there on 15 September. 1-2 were noted on four days in October before an influx in November produced 1-4 on twenty-four days, including up to two lingering in the Kettle and up to three off Brownsman. The peak count occurred on 9 November when a total of thirteen flew north (ten through Inner Sound and three through Staple Sound). Eleven on 10 November (seven of which were in/through Staple Sound) and six on 23 November were also noteworthy. The final record was one in Inner Sound on 2 December.

### **White-billed Diver** *G. adamsii*

An extremely rare visitor.

An adult discovered just off Brownsman west cliff on 17 November remained in the area all day, often associating with a great northern diver and showing at distances as close as fifty metres. Wardens' comments in the log range from 'wow!' to 'quite staggering!'. The bird reappeared on 25-26 November, when it was also seen from Inner Farne. First record for the islands of this long predicted species.

### **Great Crested Grebe** *Podiceps cristatus*

An uncommon visitor.

One was in Inner Sound on 15-16 September, one flew north through Staple Sound on 18 September and one was just off Brownsman west cliff on 2 and 5 October.

### **Red-necked Grebe** *P. grisegena*

A well represented winter and passage visitor.

There were no spring records. Singles were noted on eight days from 19 September-23 November. One flew north through Staple Sound on 7 November when another was off Brownsman, and a total of five were seen on 9 November: two north through Inner Sound, two south through Staple Sound and one off Brownsman.

### **Slavonian Grebe** *P. auritis*

An uncommon winter and passage visitor.

Just one record on 9 November – an adult flying north through Inner Sound before landing on the sea.

### **Fulmar** *Fulmarus glacialis*

A common breeder, abundant on passage. 'Blue phase' is an uncommon visitor.

Birds were noted at their breeding sites on 13 February and small numbers were present when the wardens arrived on 26 March. Following the usual brief 'honeymoon' period many were back holding territory by early May. The first eggs were found on 17 May on West Wideopens and on 18 May on the Wamses, with the first young on 10 July on West Wideopens. 226 (253) pairs nested as follows: Inner Farne 25 (24), Knoxes Reef 22 (26), West Wideopens 18 (8), East Wideopens 19 (18), Skeney Scar 0 (2), Staple Island 25 (43), Brownsman 57 (55), North Wamses 22 (33), South Wamses 34 (38), Big Harcar 4 (4), Longstone End 0 (2). The first young fledged on 26 August on Brownsman. 149 monitored nests produced an average of 0.54 young, a productivity very similar to 2000. There was a marked contrast between the inner and outer groups, with respective average productivities of 0.81 and 0.44. Following the breeding season there was the usual departure with few sightings in late September/early October. The first returning bird was off Brownsman on 20 October. Larger numbers arrived in November with counts of thirty-five on the inner group on 12 November, rising to 104 on 18 November and seventy-five on Brownsman on 16 November, increasing to 126 on Brownsman and Staple Island on 30 November. 'Blue phase' birds moved north past Inner Farne on 4 and 17 September with another north past Brownsman on 18 September.

### **Cory's Shearwater** *Calonectris diomedea*

A rare visitor.

One was observed flying north past the south end of Inner Farne at 1930 on 4 September. It was also seen from Brownsman a few minutes later as it navigated around Crumstone. Just reward for eleven hours of sea watching! Seventh record for the islands and last recorded in 1999.



**Sooty Shearwater** *Puffinus griseus*

A well represented to common passage visitor.

It was a truly remarkable year for this species. One north past the south end of Brownsman on 17 July was the first sighting. Records increased in August with 1-6 on six days from 8-30 August and 80-100 in a feeding frenzy off Northern Hares on 29 August. Unprecedented numbers followed with a total of at least 2,209 north and seven south on fifteen days in September. Inner Farne counts (all birds moving north) included 121 in eleven hours on 4 September, 373 in eight hours on 17 September and 251 in six hours on 19 September, while Brownsman produced 478 and 300+ on 17 and 19 September respectively. All these were eclipsed however, by a massive combined total of 1,025 north on 18 September (including 802 past Inner Farne in twelve hours twenty minutes). This represents a Northumberland (and of course Farnes) day record. The only sighting after 25 September was a very late single north through Staple Sound on 12 November.

**Manx Shearwater** *P. puffinus*

A common passage visitor.

An early single flew north past Longstone on 28 March. The species remained scarce in April and May with 1-7 noted on six days. Numbers increased in June with a total of 390 seen from Inner Farne on eleven days including ninety north in two hours on 21 June and 228 north in four hours on 22 June. The peak count from Brownsman during this period was seventy north-east in one hour on 3 June. Birds were noted almost daily from July-September with monthly totals for Inner Farne of 493, 140 and 828 respectively. The largest movements occurred on 17 July when 206 moved north and four south in six and three quarter hours, 9 August (110 north), 4 September (129 north in eleven hours ten minutes), 10 September (164 north in five hours), 17 September (202 north in eight hours) and 18 September (161 north in twelve hours twenty minutes). In addition, 80-100 were in the feeding frenzy with sooty shearwaters off Northern Hares on 29 August. Low numbers were recorded in October with singles on only three dates. Five flew north through Staple Sound on 9 November, one north and one south on 13 November, one north on 22 November and one south on 23 November.

**Balearic Shearwater** *P. mauretanicus*

An uncommon passage visitor.

Four birds were seen from Inner Farne: one flew north past the south end of the island on 17 September, with two north there the following day (one of which was also observed from Brownsman) and one north on 20 September.

**Storm Petrel** *Hydrobates pelagicus*

Formerly an uncommon passage visitor. Some evidence of possible breeding in 1998-99.

It was an excellent year for the species. 1-3 were observed feeding off Crumstone from 13-15 July with one watched at close range for over two hours on the latter date. Tape luring on Brownsman on six days from 13 July-9 August produced nine birds and one was attracted to Inner Farne in the same way on 21 July. Further singles flew north past Brownsman on 13 August and 19 September with two north on 18 September (when one also flew north past the south end of Inner Farne). Two birds tape lured on Brownsman (on 24 July and 9 August) came close enough to be caught by hand and both were found to be ringed: one at Filey Brigg on 31 July 2000 and the other at Cove, Aberdeen on 28 July 2000 (movements of 165 and 177km respectively).

**Leach's Petrel** *Oceanodroma leucorhoa*

An uncommon visitor.

One flew south through Staple Sound during strong northerly winds on 9 November.

### **Gannet** *Morus bassanus*

An abundant passage and non-breeding summer visitor.

Recorded almost daily throughout the season. Hourly passage rates increased from 559 (south) on 28 March to 1,922 (north) on 4 April and numbers remained high throughout the month. Counts were generally lower from May-July with the peak during this period being 959 moving north in one hour on 20 July. 1,106 flew north in one hour on 28 August and hourly rates from 8-10 September ranged from 1,347-1,429. Small numbers were recorded from October-December although there were higher counts of forty north on 3 November and sixty-two north in thirty minutes on 13 November.

### **Cormorant** *Phalacrocorax carbo*

A common breeding resident.

Nest building was well underway at the two colonies when the wardens arrived on 26 March. The first eggs were found on East Wideopens on 28 April with the first young there on 26 May. 196 (146) pairs nested as follows: East Wideopens 84 (68), North Wamses 112 (78). Many young were near fledging on North Wamses on 24 June and all had fledged there by the end of July. It was a similar story on East Wideopens with a few late stragglers in the colony until the second week of August. There were no significant counts outside the breeding season.

### **Shag** *P. aristotelis*

An abundant breeding resident.



Nest building was noted as early as 13 February and was well advanced when the wardens arrived. The first eggs were found at Kittiwake Gully on Staple Island on 19 April and at Inner Farne quarry on 21 April with the first young on 26 and 27 May at the same respective localities. 1,373 (1,310) pairs nested as follows: Megstone 28 (28), Inner Farne 323 (274), West Wideopens 74 (78), East Wideopens 75 (74), Skeney Scar 82 (43), Staple Island 320 (319), Brownsman 172 (149), North Wamses 24 (30), South Wamses 65 (64), Roddam and Green 26 (29), Big Harcar 117 (132), Longstone End 67 (90). The first fledgling was found on Inner Farne on 10 July with the last on Inner Farne on 28 September. It was a reasonably productive season with 313 monitored nests producing an average of 0.87 fledged young. As with last year, productivity was higher on the inner group than the outer (0.98 and 0.76 respectively). Good numbers remained around the islands after the breeding season.

### **Grey Heron** *Ardea cinerea*

A well represented visitor. Bred in 1894 (Hawkey, 1991).

The first record was not until 12 May when one was over Brownsman and then on Knoxes Reef before heading to the mainland. What was probably the same bird was on Knoxes Reef again on 14 May and the species remained scarce in June with records on only two dates. Groups of three flew west past Crumstone on 15 July, through Inner Sound on 24 August, west over Inner Farne on 5 September and west over Brownsman on 14 September with two north and one on Knoxes Reef on 23 September. A flock of six flying south-west through Inner Sound on 29 September was the highest count of the year. 1-2 were noted on many days from 8 July-18 November with the last on Knoxes Reef on 29 November.



**Mute Swan** *Cygnus olor*

An uncommon visitor.

There were four records: an adult and a juvenile flew north through Inner Sound on 4 May with two adults also north there later in the day. Inner Sound produced a further four on 15 May and two south on 24 August.

**Whooper Swan** *C. cygnus*

An uncommon winter and passage visitor.

A good year. One flew south then north through Inner Sound on 8 October and four flew north on 10 October. One moved south through Staple Sound on 23 October with sixteen south through Inner Sound on 31 October, and one roosted overnight on Brownsman Pond from 6-7 November.

**Pink-footed Goose** *Anser brachyrhynchus*

A well represented passage and winter visitor.

The first records were on 3 October when a total of 442 in seven skeins flew north through Inner Sound and thirty-five flew south over Brownsman. 1-61 were noted on six days from 4-13 October, then 365 flew south through Staple Sound on 24 October. Heavy movement was also observed on 26 October when a total of 1,074 moved south through Inner Sound in six skeins – a Farnes day record. A further 263 flew south on 27 October with five south on 4 November and 207 north on 7 November.

**Greylag Goose** *A. anser*

An uncommon passage and winter visitor.

Three flew west over Brownsman and Inner Farne on 10 May, two moved north over Brownsman on 5 June (with Canada geese), eight flew west past Inner Farne on 28 July and one circled over Brownsman on 30 November.

**Canada Goose** *Branta canadensis*

An uncommon passage visitor.

There was one early record of two north through Inner Sound and then on the sea off Stag Rocks on 9 April. The main passage period fell between 29 May and 6 June with seven skeins totalling 217 birds noted on four dates. The largest day count was 141 (four skeins) on 5 June. All were moving north. The last was a single off Staple Island on 9 June.

**Barnacle Goose** *B. leucopsis*

A well represented passage and winter visitor.

A quiet year. There were no spring sightings and only six records in autumn. Fifteen flew south through Inner Sound on 23 September, six circled low over Staple Island on 29 September with two south later in the day, five flew north over Brownsman on 10 October, forty-two moved west over Inner Farne on 13 October and one flew west over Brownsman on 4 November.

**Light-bellied Brent Goose** *B. bernicla hrota*

A well represented passage and winter visitor.

One north through Inner Sound on 3 May was the only spring record. Autumn passage began on 10 September when eight flew north through Staple Sound with fifteen north through Inner Sound. One was on Inner Farne on 16 September then 10-64 moved north on eleven days from 20 September-14 November. The only count to exceed these was when 114 flew north through Inner Sound on 3 October. The final record was eight on the sea off Knocklin Ends on 3 December.

### **Shelduck** *Tadorna tadorna*

A well represented visitor. Former breeder which last bred successfully in 1994 (Walton, 1995).

One to two were noted on eight days from 1-25 April including a pair on Inner Farne pond on three dates. Five flying north through Inner Sound on 10 May was the only other spring record. One was on Knoxes Reef on 4 July, a flock of thirty-seven flew east over Longstone on 8 July, twelve moved south through Inner Sound on 16 July and a juvenile was on Knoxes Reef from 28-30 July. The species was then absent until a total of eighty-nine flew north on five days from 2-28 November. The peak day count was sixty-four on 10 November, fifty-nine of which passed through Inner Sound.

### **Wigeon** *Anas penelope*

A common passage and winter visitor.

Spring passage produced 1-3 on eleven days from 26 March-10 May. Autumn movement began on 16 August when two flew north past Inner Farne and a total of 245 moved north through Inner and Staple Sounds on 30 August. The monthly total for September was 530 north and four south, including 238 on 12 September and 102 on 24 September. 204 moved north and two south during October including forty-three on 3 October and forty on 23 October. November produced 548 north and eight south including 365 on 9 November and 133 on 10 November. Although the majority of records involved fly-pasts, 1-13 lingered around the islands on fourteen days. The final record was a pair on Knoxes Reef on 2 December.

### **Teal** *A. crecca*

A common passage and winter visitor.

Light spring passage brought 1-7 to the outer group on nine days from 26 March-8 April and 1-2 to the inner group on 21 April and 8-9 May. The first autumn record was thirty-seven north through Staple Sound on 16 August with regular sightings thereafter until the end of the season. Significant passage counts were made on 30 August (188 north), 5 September (109 north), 7 November (twenty-eight north and 198 south), 23 November (255 south), 28 November (156 south) and 29 November (112 north). Lingered birds included up to 220 on Staple Island and 140 on Knoxes Reef during October, 250 on Knoxes Reef on 2 November and at least 300 there from 29 November-4 December.

### **Mallard** *A. platyrhynchos*

A common winter and passage visitor. Uncommon breeder, but up to thirteen pairs in the past (Hawkey, 1990, 1991).

Recorded almost daily throughout the season. The peak count in spring was six on Knoxes Reef on 4 May. There were at least five nesting attempts although only one was successful. On the outer group a female was flushed from two eggs on Brownsman on 10 April (but subsequently deserted) and nests with six eggs were found on North Wamses on 23 May, where two pairs were believed to be breeding, and South Wamses on 31 May. A female was flushed from eight eggs on Inner Farne on 4 June (but deserted) and a female with six small ducklings was discovered on East Wideopens on 14 July. Three young survived to fledging and were still around the Wideopens on 29 August. Autumn passage brought an increase in numbers with counts of eleven north on 16 August, twelve north on 30 August, twenty-five north on 17 September, eleven north on 18 September, and twenty-eight north on 9 November. Lingered birds were regularly on Knoxes Reef with monthly maxima of twenty-two on 24 September, forty-seven on 23 October, forty-eight on 3 November and seventy-one on 2 December. The highest outer group counts during this period were nineteen around the Wamses on 11 October and twenty-six in Staple Sound on 19 November.



**Pintail** *A. acuta*

An uncommon passage and winter visitor.

Two on Knoxes Reef on 5 September were followed by one flying north past Inner Farne on 11 September and two south on 23 September. One was flushed from Brownsman on 28 September. Four flew south through Inner Sound on 25 October and singles moved north through Inner and Staple Sounds on 9 and 10 November.

**Garganey** *A. querquedula*

An uncommon passage visitor.

A drake landed briefly on Longstone on 11 May and was rediscovered later in the day on Brownsman Pond. Last recorded in 1998.

**Shoveler** *A. clypeata*

A well represented passage and winter visitor.

A pair on West Wideopens on 30 April was the only spring sighting. Northerly passage through Staple Sound involved one on 16 August, twelve on 30 August, one on 11 September and one on 26 September. The only other records were two moving north past Longstone on 30 August and one south through Inner Sound on 23 September.

**Pochard** *Aythya ferina*

An uncommon passage visitor.

Autumn passage through Staple Sound produced five flying north on 15 September, one north on 17 September and one south on 7 October.

**Tufted Duck** *A. fuligula*

A well represented visitor.

The first sighting was a female on Inner Farne from 2-3 May and twenty-four flew north through Inner Sound on the latter date. Five circled Staple island on 15 May and two flew north past Brownsman on 3 June. Autumn passage (all birds moving north) began on 8 August when one flew through Inner Sound followed by another on 28 August. Staple Sound produced three on 9 September and one on 11 September. The final records were from Inner Sound: fourteen on 6 October and six on 2 November.

**Scaup** *A. marila*

An uncommon passage and winter visitor.

A good spring showing: a male circled Brownsman on 30 April, a male flew north though Inner Sound (with tufted ducks) on 3 May, a pair flew south through Staple Sound on 8 May and five more flew south there on 15 May. There were four autumn records: a female off the Wideopens on 1 October, an immature in Brownsman Haven on 7 October and single males moving north through Inner and Staple Sounds on 2 and 10 November respectively.

**Eider** *Somateria mollissima*

An abundant breeding resident.

Large numbers were around the islands when the wardens arrived (for example 636 at the inner group on 19 April) and prospecting ducks were on Inner Farne as early as 30 March. The first eggs were located on North Wamses on 28 April and on Inner Farne and Brownsman on 30 April. 802 (1,050) ducks nested (a twenty-four per cent decline) as follows: Inner Farne 561 (721), Knoxes Reef 5 (5), West Wideopens 21 (35), East Wideopens 5 (8), Staple Island 15 (40), Brownsman 171 (217), North Wamses 5 (5), South Wamses 12 (11), Big Harcar 3 (5), Longstone main rock 1 (1), Longstone End 3 (2). Large numbers of desertions were again

noted on Inner Farne. The first ducklings were found on Inner Farne on 27 May and on Brownsman on 29 May with the last on Inner Farne on 20 July and Brownsman on 1 August. Productivity was very similar to 2000 with 352 monitored nests producing an average of 2.6 ducklings each. Wetland Bird Survey counts in the autumn were much lower than in 2000 with a total of only 541 noted in November.

#### **Long-tailed Duck** *Clangula hyemalis*

A well represented passage and winter visitor.

There were no spring records. Autumn passage began on the late date of 6 November when three flew north through Staple Sound followed by ten also flying north through Inner and Staple Sounds on 8 November. The abatement of strong northerly winds led to a significant northerly movement on 9 November when a total of 187 passed the islands (102 through Inner Sound, eighty-four through Staple Sound and one past Longstone). This count represents a Farnes day record. Smaller numbers were noted thereafter with thirteen north on 10 November and 1-2 north on seven more November dates. A female lingered in the Kettle from 10-16 November, a male was at the same locality on 23 November and another female was present on 30 November.

#### **Common Scoter** *Melanitta nigra*

A common passage and winter visitor.

There were regular records throughout the period. Numbers were low in the first two months although seventy were in Inner Sound on 4 April with eight north and seventeen south on the same day. 1-11 were recorded on eight other April and May dates. June produced a total of 303 north including 174 on 25 June. Heaviest passage occurred in July with a total of 1,528 north including 644 on 16 and 408 on 17 July. Numbers tailed off from August-October with monthly totals of eighty-three north, 103 (ninety-nine north and four south) and sixty-four (forty north and twenty-four south) respectively. A total of 1,215 flew north and 103 south during November including 359 north on 9-10 November and 238 north and twenty south on 23 November. A 'raft' of birds in Inner Sound rose from eighty on 24 November to 200 by 2 December. An unusual record concerned an exhausted female found on Brownsman Pond on 25 November which later died.

#### **Velvet Scoter** *M. fusca*

A well represented passage and winter visitor.

Two flew north through Staple Sound on 14 September with another north there on 20 October. November produced a total of fifty-two north on eight days including ten on 2 November and twenty-five on 9 November (fifteen through Inner Sound and ten through Staple Sound). The last record was of a single in the large common scoter flock in Inner Sound on 2 December.

#### **Goldeneye** *Bucephala clangula*

A common passage and winter visitor.

Seven in the Kettle on 13 February was an indication that small numbers winter around the islands. Birds were still present when the wardens arrived with a peak of eleven on 28-29 March and 2-6 noted on most other days from 26 March-8 April. Two were also seen on 19-20 April. The species was then absent until 23 October when fifteen flew south through Staple Sound and three circled Brownsman. Northerly passage in November saw a total of 233 pass the islands on eleven days including 157 (133 of which were through Inner Sound) on 9 November. Twenty-seven north and one south on 23 November was the next best count. Small numbers also lingered with two males in Inner Sound on 8 November, two pairs in the Kettle from 14-16 November and one off the Bridges on 7 December.



**Red-breasted Merganser** *Mergus serrator*

A well represented passage and winter visitor.

A male north through Inner Sound on 10 May was the only spring sighting. One to three were noted on ten days from 8 July-25 November. There were higher counts of five north through Staple Sound on 16 August, sixteen north through Inner Sound on 9 November (when one also flew through Staple Sound) and four north on 10 November.

**Goosander** *M. merganser*

An uncommon passage visitor.

A pair flew north through Inner Sound on 3 May and six (four males and two females) flew north past Longstone on 16 May. Three north over Inner Farne on 12 July were the first autumn sightings. The only other records were singles on 1 October (south through Staple Sound), 20 October (west over Inner Farne) and 21 October (south over Staple Island).

**Hen Harrier** *Circus cyaneus*

A rare visitor.

On 27 September a 'ringtail' flew low over the Bridges and the Wideopens before passing south of Inner Farne and heading west over Inner Sound. It was last seen moving inland over Seahouses harbour. Thanks to the prompt actions of the finder, most of the Inner Farne wardens enjoyed good views. Seventh record for the islands and last recorded in 1994.

**Sparrowhawk** *Accipiter nisus*

An uncommon visitor.

There were two spring records from Inner Farne: a female flying west on 27 April and two east on 12 May. An apparently exhausted immature male arrived on Inner Farne on 13 August and was seen on Brownsman on 14 and 16 August. Sightings became more regular from 13 September with singles noted on twenty-eight days on Inner Farne until the last on 6 December. At least two birds were involved, one a large female and the other a smaller female/immature. Singles were seen on Brownsman on three additional autumn days with two, a male and female, present on 10 November. Kills included redshank, feral pigeon, redwing and brambling.

**Buzzard** *Buteo buteo*

A rare visitor.

One flew north-west through Staple Sound towards the mainland on 12 May.

**Kestrel** *Falco tinnunculus*

A well represented passage visitor. May have bred in 1916 (March, 1916).

Two spring sightings both came from Inner Farne: two flew north over Knoxes Reef on 3 April and a male was over West Wideopens before heading to the mainland on 27 April. The first bird of the autumn was a juvenile which landed in the courtyard on Inner Farne on 4 August – much to the annoyance of the breeding arctic terns. Singles were noted on a further fourteen days from 18 August-23 October before the last (a female) lingered on Brownsman from 27-30 October where it fed on exhausted thrushes.

**Red-footed Falcon** *F. vespertinus*

An extremely rare visitor.

A juvenile was discovered on Longstone End during the evening of 21 September and showed at ranges down to ten metres to the stunned outer group wardens before flying to roost on Longstone lighthouse. The inner group wardens could not be contacted until after dark so a pre-

dawn raid was organised and seven wardens assembled at the lighthouse as the sun rose the following day. An agonising twenty-minute wait followed before the bird emerged from an exhaust duct. The celebrations began! After posing for forty minutes the bird flew off towards Brownsman (mobbed by an arctic skua) where it was rediscovered on the artificial 'tree' on the south hill. It continued to perform there, catching a beetle and a large yellow underwing moth before departing, via Staple Island, to the mainland at 0930. First record for the islands and a real contender for the 'bird of the year' award.

#### **Merlin** *F. columbarius*

A well represented passage and winter visitor.

Single females/immatures were on Inner Farne and Brownsman on 13 February. Birds were still present when the wardens arrived with one to three (including an immature male) noted almost daily from 26 March-1 May. The first autumn sighting was a female/immature on Inner Farne, Knoxes Reef and Brownsman from 23-25 August. It or another was also seen around the inner group on 1 and 21 September and at the outer group in late September. Sporadic sightings continued from October-December and included a male on West Wideopens on 30 November. One mobbing a peregrine on Inner Farne on 2 December made for spectacular viewing. Kills throughout the year included purple sandpiper, snipe, turnstone, kittiwake, puffin, rock pipit, pied wagtail, blackbird, redwing, fieldfare, robin and starling.

#### **Hobby** *F. subbuteo*

An extremely rare visitor.

A juvenile flew along the east shore of Brownsman on 20 September but sadly did not linger. Third record for the islands and last recorded in 2000.

#### **Peregrine** *F. peregrinus*

A well represented passage and winter visitor. May have bred in 1925 (Hawkey, 1991).

An immature bird caught a puffin on Inner Farne on 31 March but was mobbed by a kittiwake and dropped its prey which promptly flew off! Further singles were recorded on five days from 11 April-11 June with all but one seen over the inner group. An immature male over Knoxes Reef and Inner Farne on 20 August was the first bird of the autumn. Frequent sightings of 1-2 were made from 1 September-6 December with three over Inner Farne on 6 October. At least four different birds were involved (two immatures, an adult male and an adult female). An immature male caught a little auk over Inner Sound on 10 October and remains discovered on many of the islands suggests a good number were taken. Other prey species during the year included teal, lapwing and feral pigeon.

#### **Quail** *Coturnix coturnix*

An uncommon passage visitor.

A female was on Brownsman from 6-9 July.

#### **Water Rail** *Rallus aquaticus*

An uncommon passage visitor.

Single adults were flushed from Inner Farne on 19 August and Brownsman on 27 October.

#### **Corncrake** *Crex crex*

An uncommon passage visitor.

One was seen dropping into cover on Brownsman on 20 September and was flushed from the walled garden after a twenty minute search on hands and knees by the three resident wardens. First record since 1994.



**Moorhen** *Gallinula chloropus*

An uncommon passage visitor. Bred in 1901 (Miller, 1959) and 1947-48 (Hawkey, 1991). An adult flushed from the 'Ladies Path' on Inner Farne on 25 July flew off to the Wideopens.

**Oystercatcher** *Haematopus ostralegus*

A common winter and passage visitor and well represented breeder.

Numbers were high when the wardens arrived with 110 on the inner group on 28 March and seventy-five on Longstone on 30 March. A slight increase followed with peaks of 144 on the outer group on 8 April and 112 on West Wideopens on 15 April before a decline to twenty-nine at the latter site by 28 May. The first eggs were found on Staple Island on 15 May and on Inner Farne on 17 May with the first chicks on East Wideopens on 11 June and on Brownsman on 26 June. 24 (24) pairs nested as follows: Inner Farne 4 (4), Knoxes Reef 2 (2), West Wideopens 7 (2), East Wideopens 2 (1), Staple Island 3 (4), Brownsman 5 (6), North Wamses 0 (1), South Wamses 1 (1), Big Harcar 0 (1), Northern Hares 0 (1), Longstone main rock 0 (1). It was an encouraging breeding season, particularly on the inner group where a total of twenty-eight young fledged (almost two per pair). On the outer group four monitored nests produced three fledglings (a productivity of 0.75). Numbers quickly increased during the autumn with monthly peaks on the inner group of 108 on 22 July, 183 on 20 August, 198 on 4 September, 100 throughout October and 121 on 30 November. Sixty-seven were at the outer group on 20 August, 155 were present on 11 October and 109 on 26 November.

**Ringed Plover** *Charadrius hiaticula*

A common passage visitor, uncommon and declining as a breeding species.

Display was noted from 26 March, the first eggs were found on Inner Farne on 19 April and the first young there on 12 May. 4 (4) pairs nested as follows: Inner Farne 2 (2), Knoxes Reef 1 (0) Staple Island/Brownsman 1 (2). On Inner Farne at least three nesting attempts produced seven chicks, two of which went on to fledge. On the outer group seven attempts eventually resulted in four young on Staple Island and amazingly all fledged. This was against all the odds after the original male of the pair had been found dead and had been replaced by a newcomer. Gull predation was again a problem with both eggs and chicks targeted. Numbers rose after the breeding season with a peak of sixty-two on the inner group on 22 August. Thirty were still present on 21 September, eighteen on 2 October and 3-7 on five more days up to and including 2 December. On Longstone thirteen were present on 11 October, falling to five by 26 November.

**Golden Plover** *Pluvialis apricaria*

A well represented passage visitor.

Post breeding arrival began with thirty-three south over Staple Island on 28 July and one on Knoxes Reef on 2 August. Numbers quickly rose to peaks of 484 on the outer group on 22 August and 500 on Knoxes Reef on 29 August. Even larger counts followed with highs of 1,356 on Staple Island and 800 on Knoxes Reef on 13 and 25 September respectively, the former being yet another Farnes day record. A decline followed although a total of 472 were on Staple Island and West Wideopens on 13 October. 1-44 were seen on four days in November and, unusually, 1-30 on four December days at the inner group.

**Grey Plover** *P. squatarola*

A well represented passage visitor.

Spring passage brought one to three to Longstone and Knoxes Reef on six days from 30 March-17 April with seven on Knoxes Reef on 8 April. The first birds of the autumn were three on Longstone and a summer-plumaged adult on Knoxes Reef on 17 August. Five were on Longstone on 20 August, one was on Inner Farne on 19 September with one on Knoxes Reef on 26 September, followed by 1-5 on Longstone and Knoxes Reef on six days during October.

**Common Sandpiper** *Actitis hypoleucos*

A well represented passage visitor.

Singles were on Inner Farne and Brownsman on 2 and 7 May. An influx on 11 May brought a total of seven to the islands (five on the outer group and two on Inner Farne), 1-2 were recorded daily until 17 May and singles were on Brownsman Pond on 18 and 26 May. The first birds of the autumn were on Inner Farne on 9 and 18 July and one to three were noted almost daily during August. A major arrival took place on 19 August with a flock of twenty-five over Brownsman and up to twenty-seven at the inner group. More were heard calling as they flew over in thick fog. One to two were on Inner Farne from 1-10 September and singles were there on 22, 23 and 28 September.

**Turnstone** *Arenaria interpres*

A common passage and winter visitor, uncommon in summer.

Present throughout with spring peaks of 139 and fifty-two on the outer group on 8 April and 25 June, and sixty and thirty-eight on the inner group on 17 April and 4 June. Small numbers remained to summer on the islands. A total of 509 were present on 22-23 July with 460 on Longstone on 28 July, 179 on the inner group on 8 August and 300 on Longstone on 17 August. Further peak counts were 158 on the inner group on 16 September, 209 on the outer group on 11 October and 111 there on 26 November.

**\*Grey Phalarope** *Phalaropus fulicarius*

An uncommon autumn passage and winter visitor, extremely rare in spring.

An adult flew south through Staple Sound, pausing briefly on the sea, on 30 November.

**Pomarine Skua** *Stercorarius pomarinus*

A well represented passage visitor, common in some years.

Early records involved two north over Crumstone and three past Megstone on 6 June. A juvenile flew past Brownsman on 8 September and an adult and juvenile passed Inner Farne on 18 September, followed by a juvenile on 19 September and two sub-adults on 24 September: all were moving north. The final three sightings were all of birds in Staple Sound: two flew south on 22 October, one north on 23 October and one north on 7 November.

**Arctic Skua** *S. parasiticus*

A common passage visitor.

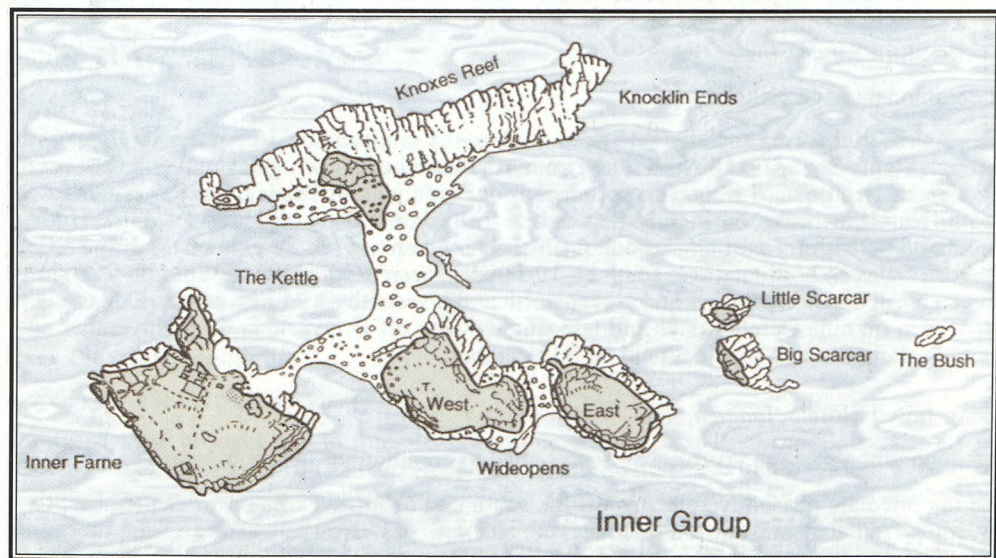
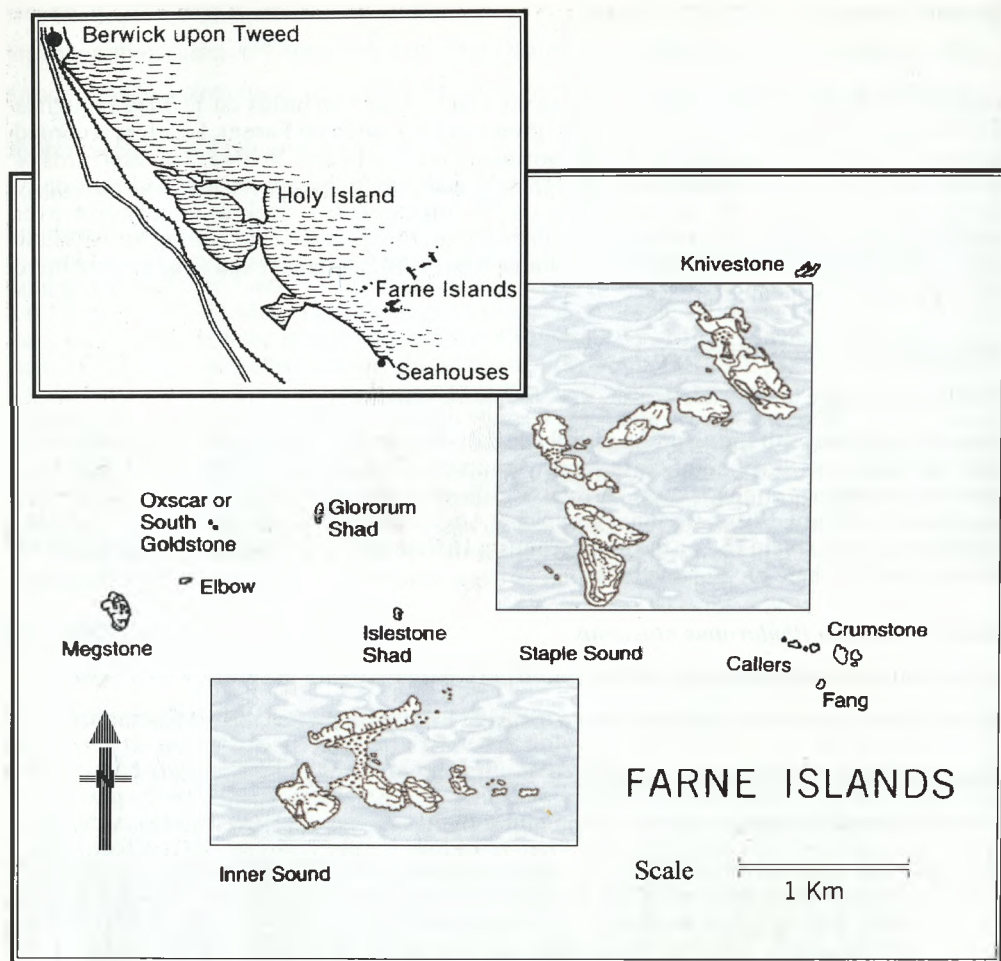
There were four spring records: one flew south past Longstone on 16 April, one flew north through Staple Sound on 18 April with two north there the following day and one flew north through the Kettle on 5 May. June produced four sightings of singles, three north and one south. Numbers increased in July-September with almost daily sightings of 1-10. Higher counts involved forty past Crumstone on 14 July, eleven off Inner Farne on 17 July and 28 August, fourteen north and one south on 19 July, thirteen north and two south on 8 August, eleven north on 18 September and eleven north and one south on 24 September. One to eight were seen on nine October days and late singles were off Brownsman on 6 November and moving north through Staple Sound on 3 December.

**Long-tailed Skua** *S. longicaudus*

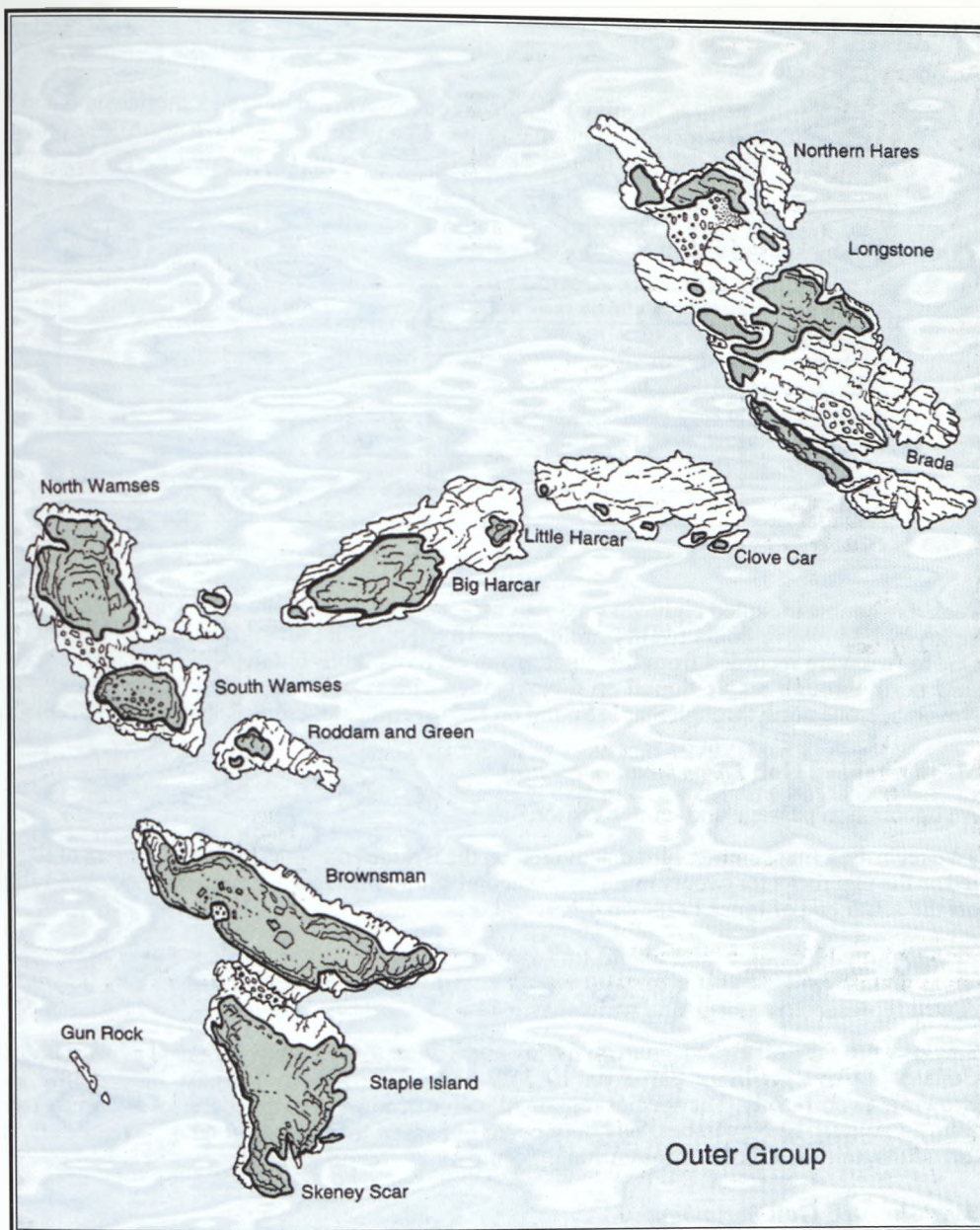
An uncommon passage visitor, well represented to common in 'invasion' years.

An intermediate phase juvenile was off the south end of Inner Farne on 17 September, five juveniles (four dark and one intermediate) moved north past Brownsman on 18 September and a dark juvenile flew north past Brownsman on 19 September.











### **Great Skua *S. skua***

A common passage visitor.

A good run of spring records involved 1-3 north on six April dates, and singles on 6 and 10 May. Passage continued with singles north on 8, 16, 17 and 23 June and 1-6 north on seven July days. As was to be expected, the largest numbers were recorded in August and September (Table 4).

**Table 4** Great skuas off Inner Farne, 2001.

Month	No. of days recorded	Total no. (all north)
April	4	4
May	1	1
June	4	5
July	5	12
August	5	41
September	14	188
October	3	3

Peak day counts included eighteen on 8 August, twenty-two in eight hours on 17 September, eighty-two in twelve hours twenty minutes on 18 September and eighteen on 20 September. One to two were recorded from the outer group on five additional days during October. Two flew north through Staple Sound on 6 November with two north through Inner Sound on 8 November, one north through Staple Sound on 12 November and three south on 22 November.

### **Mediterranean Gull *Larus melanocephalus***

An uncommon passage and winter visitor.

Two records: a first summer bird discovered on the Bridges on 12 May flew to Inner Farne and fed on the east rocks for twenty minutes. A second winter bird lingered with black-headed gulls off the south end of Inner Farne on 4 November.

### **Little Gull *L. minutus***

A well represented passage and winter visitor.

Singles were seen off Brownsman on 5 May and 2 June. A summer-plumaged adult was in St Cuthbert's Cove on Inner Farne on 10 July and adults flew north past Inner Farne and Brownsman on 14 July. The species remained scarce in autumn with records of 1-2 on six days from 27 August-12 November. The only count to exceed these was a total of seventeen north (all adults, in three flocks) through Inner Sound on 20 September.

### **Black-headed Gull *L. ridibundus***

A well represented breeding species and common visitor.

Display was noted from 27 March with the first eggs found on Inner Farne on 6 May. 57 (84) pairs nested as follows: Inner Farne 56 (70), Brownsman 1 (14). The first young were found on 6 June, the first fledgling on 2 July and the last bird fledged on 15 August. Breeding success was poor: on Inner Farne sixteen monitored nests produced forty-four eggs, twenty-nine of which hatched and six young fledged – an average productivity of 0.38 per pair. The main causes of failure were predation by the larger gull species and poor weather in June. Twenty-four fledglings were counted on Inner Farne on 15 July. Numbers quickly declined after the nesting season with only small numbers noted from August-October. An influx occurred in November with 150-200 noted daily around Inner Farne.

**Puffin *Fratercula arctica***

An abundant breeding summer and passage visitor.



Thousands were on the sea and at the breeding colonies when the wardens sailed out to the islands on 26 March. Unsettled weather resulted in several mass departures over the next couple of weeks but most were back by mid-April. The first eggs were found on Staple Island on 24 April and on Inner Farne on 28 April with the first young on Staple Island on 29 May and on Inner Farne on 31 May, and the first fledgling on Inner Farne on 1 July. No census was carried out in 2001 due to the fragility of the soil cap - the last population estimate

was 34,710 pairs in 1993. As with the year 2000 some burrow flooding was noted, particularly during the poor weather in mid-June. The monitored birds did well, however, with eighty-two per cent success on the outer group and eighty-eight per cent success on the inner group. Most adults had left the islands by early August. Three late orphans were flooded out of their burrows on Inner Farne on 19-20 August and there were almost daily sightings of very small numbers at sea until the end of the season.

**Feral pigeon *Columba livia***

A common breeding resident.

Large numbers were present all year with up to four hundred on Inner Farne in autumn. Many pairs bred.

**Stock Dove *C. oenas***

An uncommon visitor. Bred in seven years between 1928 and 1979 (Hawkey, 1991).

One was on Staple Island on 25 April and one flew east over Inner Farne on 22 October.

**Woodpigeon *C. palumbus***

An uncommon passage visitor.

Spring passage produced 1-6 on Brownsman from 28-31 March (when three flew over Inner Farne) and singles on 26, 29 and 30 April. One was on Staple Island on 15 May. In autumn singles were on Inner Farne on 19 October, a first winter bird was on Brownsman on 22 October and an adult was on Longstone End on 23 October.

**Collared Dove *Streptopelia decaocto***

An uncommon passage visitor.

Two records, both from Inner Farne: one was on the 'dock bank' on 19 April and another sheltered on the lighthouse benches during heavy rain and strong winds on 15 June.

**Long-eared Owl *Asio otus***

An uncommon passage visitor.

A quiet year: two were on Longstone and Northern Hares on 23 October.

**Short-eared Owl *A. flammeus***

An uncommon passage visitor.

The first bird of the year was flushed from Brownsman on 26 September and was later seen on Inner Farne. Another killed a redshank on Brownsman on 2 October. An influx on 15 October produced three on Brownsman/Staple Island, two were present on 18 October and singles were



seen on 20, 21 and 22 October, with singles also on Inner Farne on 20 and 22 October. The final records were on 23 October when a total of at least seven were on the outer group islands.

**Swift** *Apus apus*

A well represented summer and passage visitor.

Two were over Inner Farne on 17 May then 1-6 at both the inner and outer groups on twenty-four days from 11 June-23 August. Late singles were over Inner Farne on 6 September and over Inner Farne and Brownsman on 2 October.

**Wryneck** *Jynx torquilla*

An uncommon passage visitor.

One was seen briefly on the artificial 'tree' outside Brownsman cottage on 21 September.

**Great Spotted Woodpecker** *Dendrocopus major*

An uncommon passage visitor.

It was an amazing year for this species. A juvenile on Brownsman from 18-20 September was the first on the islands since 1995. However, the best was yet to come: two juveniles arrived on 24 September – one on Brownsman and one on Inner Farne – and on 25 September four (three juveniles and one female) were on Brownsman and another juvenile on Inner Farne (the female being found in Brownsman cottage under the head warden's bed!). Two remained on Brownsman until 3 October with one present until 9 October, by which time it had done its best to destroy one of the cottage door frames. Inner Farne produced two more juveniles on 28 September with one remaining until 30 September. Differing head patterns indicated that ten different birds were involved in the sightings. All of the juveniles were considered to be of the northern race *D. m. major*. The female, however, showed a tail pattern more similar to the British race.

**Short-toed Lark** *Calandrella brachydactyla*

A rare passage visitor.

On 6 May one circled briefly over Staple Island before heading towards the mainland. Tenth record for the islands and last recorded in 1999 (Walton, 2000).

**\*Wood Lark** *Lullula arborea*

An extremely rare visitor.

One arrived on Brownsman on 20 October, flying in from the south-west and landing near the cottage. Two of the wardens had good views, both in flight and on the ground, before the bird dropped out of sight below the ridge above the north cove. A careful stalk only succeeded in flushing the quarry, which flew off rapidly to the Wamses helped by a strong following wind. Third record for the islands and last recorded in 2000.

**Skylark** *Alauda arvensis*

A common passage visitor. May have bred in 1865 and 1883 (Brown, 1866).

Four to five were on Inner Farne on 12 February, 1-5 were seen on most days from 27 March-30 April and singles were on Longstone on 9, 10 and 11 May. The first autumn birds were two juveniles on Brownsman from 16-21 July and an adult was present from 25 July-6 August. There were regular sightings of 1-10 from mid-August until the end of the season. An influx on 22 October produced up to thirty-five on Inner Farne and seventeen on Brownsman where twenty-five also flew west. Twenty-five were on Inner Farne and 15-20 on Brownsman the following day and fifteen still on Inner Farne on 24 October.

**Shore Lark** *Eremophila alpestris*

An uncommon passage and winter visitor.

One was discovered on South Wamses on 26 October. It soon moved to Brownsman where it remained for just over one hour, before flying west towards the mainland with two skylarks.

**Sand Martin** *Riparia riparia*

A well represented summer and passage visitor.

One to three were seen on four days on Inner Farne and two days on the outer group from 2 April-10 May. The remaining records all came from Inner Farne: singles on 5 and 13 June, four north on 7 July and one east on 26 August.

**Swallow** *Hirundo rustica*

A common summer and passage visitor. Bred in 1857, 1984 (Hawkey, 1991, 1998) and 1990-1997 (Walton, 1991-1998).

There were regular sightings from 21 April-15 June and from 12 August-4 October. Peak counts in spring included thirteen on 28 April, sixteen on 1 and 10 May and eleven on 12 May, all moving north. Autumn passage produced higher counts of 12-26 on four days in August, thirty-three south on 1 September and twenty-one on 14 September. A late single was on Brownsman on 25 October.

**House Martin** *Delichon urbica*

A well represented summer and passage visitor. Six pairs attempted to breed in 1950 (Watt, 1950).

Spring sightings involved 2-4 on nine days from 29 April-6 June. One was on Inner Farne on 17 August, three flew south on 1 September and one moved north on 18 September. Forty-five martin sp. flying east over Inner Farne on 24 August were either this species or sand martins and a further eight flew east on 30 August. 1-2 were seen on five days from 1-25 October and a very late bird flew north through Staple Sound on 12 November.

**Richard's Pipit** *Anthus novaeseelandiae*

A rare visitor.

One was on Brownsman and Staple Island on 20 September. Eighth record for the islands and last recorded in 2000.

**Olive-backed Pipit** *A. hodgsoni*

An extremely rare visitor.

One found on Brownsman at 1415 on 28 September showed well all afternoon to the full complement of wardens. It was seen again briefly the following day. Remarkably, a second bird arrived on Brownsman flats at 1235 on 14 October during a day of heavy thrush passage. It proved equally obliging and remained on the island until 0935 the next day when it flew off west. First and second records for the islands, and fifth and sixth for Northumberland. Often predicted in the past, a welcome addition to the Farnes list.

**Tree Pipit** *A. trivialis*

A common passage visitor.

Scarce in spring with singles north over Inner Farne on 3 and 21 April and on Brownsman on 29 April and 17 May. An influx on 19 August brought fourteen to Brownsman and three to Inner Farne, and a single was on Brownsman the following day. Singles were recorded on Inner Farne on five days from 18-28 September and on Brownsman on nine days from 20 September-7 October (thirteen days in total).



**Meadow Pipit *A. pratensis***

A common passage visitor. Bred in fifteen years from 1946-1972 (Hawkey, 1991).

There were regular spring sightings of 1-50 from 26 March-13 May and higher counts from Inner Farne of 186 north in one hour forty minutes on 31 March and 237 north in one hour forty minutes on 1 April. One on Brownsman flats on 16 June was unusual. Autumn passage produced 1-30 on many days from 9 August-11 November. There were higher counts, all from Inner Farne, of fifty-two (forty-two south and ten on the island) on 28 September, twenty south per hour on 4 October, forty-eight south-west on 5 October and fifty-six south-west on 8 October. The last was one on Brownsman on 26 November.

**Rock Pipit *A. spinoletta***

A common resident, well represented as a breeding species.

Present throughout the season. 20 (24) pairs nested as follows: Inner Farne 3 (5), West Wideopens 1 (1), Staple Island 6 (6), Brownsman 7 (9), North Wamses 1 (1), South Wamses 1 (1), Longstone main rock 1 (1). The first eggs were found on Inner Farne on 14 April and the first young on 18 May with the first fledgling on Brownsman on 9 June. On Inner Farne nine eggs were laid in two monitored nests, all of which hatched and eight young fledged - a very productive breeding season. Eighteen were counted on Inner Farne on 9 October and up to fifteen were on Brownsman and eight on Inner Farne during November.

**Yellow Wagtail *Motacilla flava flavissima***

A well represented passage visitor.

Singles were on Brownsman and Inner Farne on 23 April, singles were on the outer group on 1, 10 and 23 May and two flew north over Inner Farne on 2 May. A first winter bird on Inner Farne on 7 August was the first of the autumn. There were only two other records, both from Inner Farne: one on 14 August and one on 2 September.

**Blue-headed Wagtail *M. f. flava***

An uncommon passage visitor.

One was on Brownsman on 4 May.

**\*Black-headed Wagtail *M. f. feldegg***

An extremely rare visitor.

A male was seen briefly on Brownsman on 16 June. If accepted this will be the first record of this distinctive sub-species for the islands, and only the second for Northumberland.

**Grey Wagtail *M. cinerea***

An uncommon passage visitor. May have bred in the 1890s (Miller, 1952).

One north over Brownsman on 30 March was the only spring record. 1-2 were seen on six days in autumn from 11 September-14 October and eight were on the outer group on 22 September.

**Pied Wagtail *M. alba***

A well represented summer and passage visitor and uncommon breeding species.

Recorded regularly from March- September with fewer sightings from October-November. 3 (9) pairs nested as follows: Inner Farne 1 (3), West Wideopens 0 (1) Staple Island 1 (2), Brownsman 1 (2), Longstone main rock 0 (1). The pair on Inner Farne raised two broods and six young fledged. Two broods were also noted on Brownsman. The highest counts of the year came from Inner Farne where eight roosted on the 'dock bank' on 7 August and thirteen on 28 August. The last record of the year was two on Inner Farne on 3 November.

### **White Wagtail** *M. alba alba*

An uncommon passage visitor. Pure pairs bred in 1991-2 and mixed pairs (with *M. a. yarrelli*) in 1994 (Walton 1991, 1992, 1995) and 2000 (two) (Harvey and Walton, 2001).

Singles were on Inner Farne on 21, 29 and 30 April, 1, 4 and 15 May and 4 June. The only multiple record was of two males on Inner Farne on 5 May. One on Staple Island on 16 August was the only autumn sighting.

### **Wren** *Troglodytes troglodytes*

A common visitor and passage migrant. May have bred in the 1880s (Hawkey 1991).

One on Inner Farne on 13 February was an indication that small numbers may winter on the islands. 1-7 were noted daily from 26 March-19 April and singles were on Inner Farne on 29 April and 2 May. One on Staple Island on 25 July was noteworthy. Autumn passage began on 22 September and there were daily sightings until the wardens left the islands on 8 December. The highest count was a total of fifteen on 23 October.

### **Dunnock** *Prunella modularis*

A common passage visitor. May have bred in the 1890s (Miller, 1959).

One to two were present from 26 March-5 April. Higher numbers were recorded in autumn with 1-10 seen daily from 25 September-2 October and 1-5 on twenty days from 3 October-4 November.

### **Robin** *Erithacus rubecula*

A common passage visitor. Bred in 1951 Watt (1951).

One was on Inner Farne on 13 February, 1-10 were noted daily from 26 March-15 April with a peak of twenty-eight on 28 March. 1-2 were seen on five days in May and one was on Inner Farne on 14 June. Autumn arrival brought singles to Inner Farne on 24, 26 and 29 August followed by daily sightings of 2-20 on the islands from 1-24 September and 1 October-14 November. 20-44 were present from 25-30 September and the biggest influx of the year occurred on 23 October when 300-400 were on the outer group and at least seventy on the inner group. The final records came from Inner Farne where there were daily sightings of 1-2 from 20 November-7 December.

### **Red-spotted Bluethroat** *Luscinia svecica svecica*

An uncommon passage visitor, well represented in some years.

Males on Brownsman and Inner Farne on 9-10 May (the latter often singing in the lighthouse compound) and Staple Island on 10 May were followed by an immature male on Brownsman on 11 May. Two different females were on Brownsman on 9-10 and 11-12 May.

### **White-spotted Bluethroat** *L. svecica cyaneola*

An extremely rare visitor.

A male was found on Inner Farne on 28 March. Initially it proved elusive, giving only the briefest of views just after 0900. Fortunately it was relocated on the north-east rocks at 1730 and performed for some minutes in front of several appreciative wardens – an excellent start to the year! Second record for the islands following the discovery of a 'lost' record – a male on Brownsman on 17 May 1988 (Farne Islands Outer Group Bird log 1988 unpublished).

### **Black Redstart** *Phoenicurus ochruros*

A well represented passage visitor.

Two to six were on Brownsman and 1-5 on Inner Farne daily from 26-31 March. Singles followed on fifteen days on the outer group from 1 April-16 May and eight days on Inner Farne



from 1-24 April with three on Inner Farne on 7 April. The only adult male of the year was on Inner Farne on 16-17 June. Autumn passage began with one on Brownsman on 1-2 October. An influx from 17-23 October produced 1-3 daily on Brownsman and one was on Inner Farne from 18-21 October.

**Redstart** *P. phoenicurus*

A common passage visitor.

Singles were on the outer group on six days from 9-16 May (three different birds). Two on Longstone on 19 August were the first of the autumn and singles were on Brownsman on 20, 22 and 25 August. Sightings became more regular in September with a peak of thirteen (seven on Inner Farne and six on Brownsman) on 26 September. 1-2 were present from 1-3 October and the last was on Inner Farne from 14-16 October.

**Whinchat** *Saxicola rubetra*

A common passage visitor.

Singles were on the outer group on four days from 9-16 May and one was on Inner Farne on 25 May. One was on Brownsman on 14 August then an influx on 19 August produced at least fifteen on Inner Farne, four on Brownsman and one on Longstone. 2-4 were still present from 20-24 August and 1-4 were seen on four days in September. The final records were singles on Brownsman on 14, 18 and 23 October.

**Stonechat** *S. torquata*

An uncommon passage visitor. Bred in 1946 (Hawkey, 1991).

An excellent year. Two females were on Brownsman on 26-27 March, a female was on Inner Farne on 7 April and a male was on Longstone on 8 April. A juvenile on Brownsman on 5 July was an unusual summer record. 1-2 were present on Inner Farne daily from 27 September-3 October.

**Wheatear** *Oenanthe oenanthe*

A common passage visitor. Bred in six years from 1931-59 (Hawkey, 1991).

Spring passage produced regular sightings of 1-14 from 26 March-28 May and singles were seen on Staple Island and Brownsman on 16 and 24 June. One was on Brownsman on 6-7 August then 1-15 were recorded almost daily from 13 August-30 September and 1-6 from 1-24 October. There were higher counts of twenty-two on 19 August and twenty on 12 September.

**Ring Ouzel** *Turdus torquatus*

An uncommon passage visitor.

There were no spring records. A male was on Brownsman on 18 September and three arrived on 25 September: a male and a first winter female on Inner Farne and a juvenile on Brownsman. A major thrush arrival on 14 October produced four on and over Brownsman and a first winter male on Inner Farne which remained in residence until 23 October. Two (male and first winter male) were on Brownsman on 15 October and three flew west (two pausing briefly) on 23 October.

**Blackbird** *T. merula*

An abundant passage visitor. Bred in four years from 1893-1914, in 1962 then annually from 1964-74 (Hawkey, 1991).

One to forty were on the islands from 26 March-15 April including twenty on Brownsman on 27 March and twenty-five on Inner Farne on 29 March. The last spring records were one on Inner Farne on 22 April, two on 24 April and one on 9 May. Autumn arrival began with a male on Inner Farne on 21 September. 1-100 were noted almost daily from 24 September-7

December. More significant arrivals occurred on 18 October when 300 flew west over the outer group and a hundred were on Inner Farne, 19 October when 200-300 flew west over Brownsman and fifty were on Inner Farne, and 23 October when 280 were on the islands.

#### Fieldfare *T. pilari*

A common passage visitor.

One was on Inner Farne on 13 February. 1-18 were recorded on eight days from 27 March-11 April, then 1-3 on 24, 25, 26 and 28 April with the last spring sighting on Inner Farne on 3 May. An early autumn arrival was on Brownsman on 19 August. More typical passage began on 18 September with regular sightings until 30 November. Daily counts generally involved 1-30 birds. More significant movement occurred on 14 October with at least 1,500 west over Brownsman and 250 on Inner Farne. A further 500 flew west over Brownsman the following day and heavy passage continued until 24 October (Table 6). The last was one on Brownsman on 7 December.

**Table 6** Peak fieldfare arrival on the Farne Islands, October 2001.

Date	14	15	16	17	18	19	20	21	22	23	24
IF	250	20	-	6	50	50	70	60	365**	600**	40
Br	1500**	500**	30	220**	545**	350**	100**	-	424**	500**	20

IF = Inner Farne, Br = Brownsman, \*\*westerly passage.

#### Song Thrush *T. philomelos*

A common passage visitor.

A single was on Inner Farne on 13 February. 1-20 were noted almost daily from 26 March-15 April, then 1-4 on 23, 25, 26 and 29 April and singles on Staple Island on 11 and 27 May. The first autumn bird was on Longstone on 30 August. More typical arrival took place from 18 September with daily sightings until 14 November and 1-4 on eight more days until the end of the season. 3-20 were seen on most days with more significant passage from 14-24 October (Table 7) producing a peak of 400 west over Brownsman and fifteen on Inner Farne on 15 October.

**Table 7** Peak song thrush arrival on the Farne Islands, October 2001.

Date	14	15	16	17	18	19	20	21	22	23	24
Br	40	400**	20	40	30	50	20	-	10	12	8
IF	15	15	2	8	30	10	20	20	20	20	10

Br = Brownsman, IF = Inner Farne, \*\*westerly passage.

#### Redwing *T. iliacus*

An abundant passage visitor.

Five were on Inner Farne on 13 February. 1-20 were present daily from 26 March-4 April with two on Inner Farne on 7 and 10 April and one on Brownsman on 29 April. The first autumn bird was on Inner Farne on 14 September. Arrival from 18 September produced daily sightings until the end of the season. 2-67 were recorded on most days with more significant counts of 269 west on 28 September, 420 west on 29 September, 108 west on 8 October and 80-3,250 per day from 14-23 October (Table 8).



**Table 8** Peak redwing arrival on the Farne Islands, October 2001.

Date	14	15	16	17	18	19	20	21	22	23
Br	3000**	1750**	50	50	2915**	650**	250	-	160	500**
IF	250	80	30	50	300	100	100	100	100	300

Br = Brownsman, IF = Inner Farne, \*\*westerly passage.

**Mistle Thrush** *T. viscivorus*

An uncommon passage visitor.

One flew west over Inner Farne on 1 April. There were two sightings in autumn: one on Inner Farne on 23-24 October and another briefly on Brownsman on 27 October.

**Grasshopper Warbler** *Locustella naevia*

A well represented passage visitor.

It was a poor year for this species. One on Brownsman on 30 April was the only spring sighting. Two arrived on 24 September (one on Inner Farne and one on Brownsman, with the latter remaining until 26 September). There were further sightings of singles on Inner Farne and Brownsman on 28 September.

**Sedge Warbler** *Acrocephalus schoenobaenus*

A well represented passage visitor.

One to three were on the outer group on nine days from 11-29 May then one was on Staple Island on 6 June. A light influx on 19 August brought singles to Inner Farne, Brownsman and Longstone with one still on Inner Farne the following day. Further singles were on Brownsman on 23 and 27-29 September, Inner Farne from 27 September-1 October and Brownsman on 2 October.

**Reed Warbler** *A. scirpaceus*

A well represented passage visitor.

One on Staple Island on 19 June was the only spring record. An arrival on 19 August produced four on Brownsman, three on Inner Farne and one on Longstone. Birds remained on Inner Farne until 26 August with a peak of four on 23 August. Further passage brought daily sightings of 1-3 on Inner Farne from 24-30 September and 1-2 on Brownsman from 25-29 September (five were present in total on 26-27 September). A late bird was on North Wamses on 23 October.

**Icterine Warbler** *Hippolais icterina*

An uncommon passage visitor.

One showed well on Inner Farne on the unusual date of 16 June. More typical was one on Longstone and Brownsman on 19-20 August.

**\*Sardinian Warbler** *Sylvia melanocapala*

An extremely rare visitor.

A female found in the vegetable garden on Inner Farne on the evening of 20 August was the stuff dreams are made of! Unfortunately the bird showed only briefly, and to a single stunned observer. This will be the first record for Northumberland if accepted by the relevant rarities committees.

**Barred Warbler** *S. nisoria*

An uncommon passage visitor.

The fall on 19 August brought single first winter birds to Inner Farne and Brownsman. Both were elusive with the first seen only in flight and the second skulking in the vegetable garden. A much more cooperative first winter bird was on Inner Farne on 21 September.

**Lesser Whitethroat** *S. curruca*

A common passage visitor.

Singles were seen on six days from 29 April-11 May, all but one on the outer group. The fall on 19 August produced two on Inner Farne and one on Staple Island with one on Inner Farne until 21 August. One on Brownsman from 19 September-1 October was joined by two more on 28 September and 1-5 were seen daily on Inner Farne from 25 September-2 October. The last bird of the year was on Inner Farne on 11 October.

**Whitethroat** *S. communis*

A common passage visitor.

Singles were on Inner Farne on 26 April, 10 and 17-18 May with two present on 14 May. On the outer group 1-4 were noted daily from 30 April-16 May and one was on Staple Island on 9 June. Autumn passage began with singles on Inner Farne from 19-21 August (when it was joined by a second), and on Brownsman on 19-24 August, with an additional bird on Staple Island on 22 August. One was on Inner Farne from 4-6 September and one on Brownsman on 27 September. The last was a late bird on Brownsman on 18 October.

**Garden Warbler** *S. borin*

A common passage visitor.

Just two birds in spring: singles on Brownsman and Staple Island on 14 May. An influx on 19 August produced a total of twenty-seven (fifteen on Inner Farne, six on Brownsman and six on Longstone). Twelve were still present the next day with two on 21 and one on 24 August. One on Inner Farne on 7 September was followed by daily sightings of 2-11 from 19-30 September. Late singles were on Brownsman on 14 and 22 October.

**Blackcap** *S. atricapilla*

A common passage visitor.

On Inner Farne a male was found on 5 April and a female on 23 April. 1-2 followed on the outer group on six days from 28 April-4 June. Autumn passage produced regular sightings from 20 September-28 October. Most daily counts involved 2-16 birds but a major arrival brought thirty-two to the islands on 22 October and 129 on 23 October (110 on the outer group, fifteen on Inner Farne and four on West Wideopens).

**Pallas's Warbler** *Phylloscopus proregulus*

A rare visitor.

A much admired bird found on Brownsman on 23 October spent the day feeding around the pond and vegetable garden. Eighth record (ninth individual) for the islands and last recorded in 1999 (Walton, 2000).

**Yellow-browed Warbler** *P. inornatus*

An uncommon passage visitor. Fourteen in 1999 was exceptional (Walton, 2000).

Singles were on Brownsman on 14 and 23 September and on Inner Farne on 24 and 27 September with two present on Inner Farne on 25 September. At least five different birds were involved.



**Wood Warbler** *P. sibilatrix*

An uncommon passage visitor.

One was on Brownsman on 19 August.

**Chiffchaff** *P. collybita*

A common passage visitor.

There were regular sightings of 1-3 from 26 March-18 May with the last bird of the spring on Staple Island on 29 May and a peak of eight on Inner Farne on 28 March. Autumn passage began with two on Inner Farne on 14 August and thereafter birds were recorded on numerous dates until the last on Brownsman on 29 October. 1-5 was the norm, but ten were on Inner Farne on 24 August, a total of thirty-five were present on 26 September (with twenty-one and thirteen on the following two days), and fifty were counted on 23 October (twenty-six on Inner Farne, twenty on the outer group and four on West Wideopens).

**Willow Warbler** *P. trochilus*

A common passage visitor.

There were regular records of 1-10 from 23 April-29 May, the peak count being on 26 April. The species was more numerous in autumn with almost daily sightings from 2 August-2 October. The peak count was recorded on 19 August when at least forty-five were on Brownsman and twenty on Inner Farne. Eighteen were still on Brownsman on 24 August but numbers quickly dropped and only 1-3 were present during September.

**Goldcrest** *Regulus regulus*

A common passage visitor.

Six were on Inner Farne and three on Brownsman on 28 March, ten on Inner Farne on 2 April and 1-3 on Inner Farne on twelve other days from 29 March-3 May. The first autumn record was one on Brownsman on 24 August. More typical passage occurred from 12 September-31 October. Daily totals for the islands were generally below twenty but seventy were present on 25 September (fifty on Inner Farne, twenty on Brownsman) and a major arrival from 20-26 October produced up to 350 (Table 9).

**Table 9** Peak goldcrest arrival on the Farne Islands, October 2001.

Date	20	21	22	23	24	25	26
Inner group	12	15	90	150	70	25	20
Outer group	15	-	20	200	25	20	12
Total	27	15	110	350	95	45	32

**Firecrest** *R. ignicapillus*

An uncommon passage visitor.

One was watched flying in off the sea on Brownsman on 28 March. After a couple of minutes clinging to the cottage wall it headed out to sea again – an all too brief sighting of what is always a sought after species. Last recorded in 1998.

**Spotted Flycatcher** *Muscicapa striata*

A well represented passage visitor.

A very disappointing year. None was seen in spring. Singles were recorded daily on Brownsman from 20-29 September, on Inner Farne on 24 and 25 September and on Staple Island on 8 October. The only multiple record was three birds on Brownsman on 27 September.

**Pied Flycatcher** *Ficedula hypoleuca*

An uncommon passage visitor.

There were no spring records. One was on Inner Farne on 15 August, two on Brownsman on 18 August then a total of at least twenty-one on the islands on 19 August (ten on Inner Farne, ten on Brownsman, one on Longstone). Three were still on Brownsman the following day, three on Brownsman and Inner Farne on 23 August and one on Inner Farne on 24 August. 1-2 were recorded on four days in September and the last was on Inner Farne on 3 October.

**Jackdaw** *Corvus monedula*

A well represented visitor. Former breeder (last in 1966) (Hawkey, 1991).

One to three were seen on six days from 5 April-4 May. The only autumn record was a single on Brownsman on 20 October.

**Rook** *C. frugilegus*

A well represented visitor.

One to two were noted on eight days from 8 April-2 May (all but one on the inner group), and 2-3 on four days from 26 September-6 October. The highest count was on 24 October when eleven flew south-east over Inner Farne.

**Carrion Crow** *C. corone*

A well represented visitor.

Regularly recorded throughout the season with a peak count of fourteen over Brownsman on 27 April.

**Hooded Crow** *C. corone cornix*

An uncommon visitor.

Singles flew north through Staple Sound on 30 March and west over Inner Sound on 4 April.

**Starling** *Sturnus vulgaris*

A common visitor, extremely rare breeder.

Recorded regularly throughout the season. There was an early peak of 350 roosting on Brownsman and Staple Island on 28 March. A pair prospected at Inner Farne chapel early in the year but soon disappeared (one may have been taken by the resident merlin) and a pair with fledged young in the lighthouse compound on 4 June were thought to have come from the mainland. Post breeding arrival brought seventy-one to Brownsman on 27 June and up to forty-five to Inner Farne from June-August. Continental immigrants swelled numbers from September to December with peak counts of a hundred on Inner Farne on 21 October and 113 on and/or west over Brownsman on 6 November.

**Tree Sparrow** *Passer montanus*

An uncommon visitor.

One was on Brownsman on 11 May and Inner Farne on 12 May.



**Chaffinch *Fringilla coelebs***

A common passage visitor.

One to two were seen on seventeen days from 30 March-27 May. Numbers were higher in the autumn with daily sightings of 1-11 from 20 September-10 October and 15 October-4 November with the last, a tailless female, lingering on Brownsman from 27 October-14 November. The peak count was fifteen on Brownsman on 14 October.

**Brambling *F. montifringilla***

A common passage visitor.

The first arrivals were four on Brownsman and fifteen on Inner Farne on 25 April, then 1-3 were noted daily until 30 April. Autumn passage produced regular sightings from 18 September-25 October with the peak arrival between 14 and 23 October (Table 9) when a total of 668 flew west over Brownsman (including 432 on 14 October) and up to 200 were on Inner Farne. 1-9 were recorded on all other dates except 29 September when nineteen were on the islands. The last birds of the year were both on Brownsman: a male on 10 November and a female on 14 November.

**Table 10** Peak brambling arrival on the Farne Islands - October 2001.

Date	14	15	17	18	19	20	21	22	23
IF	150	-	2	200	50	6	30	60	50
Br	432** (120)	6	5	156** (80)	80** (40)	30	25	40	30
Total	500+	6	7	280+	90+	36	55	100	80

IF = Inner Farne, Br = Brownsman, \*\* = westerly passage; figures in brackets are lingering birds.

**Greenfinch *Carduelis chloris***

A well represented passage visitor.

Two were on Inner Farne on 2 April, one flew north there on 21 April, a single was present on 26 April and one flew over Brownsman on 27 April. The only autumn records were one on Brownsman on 15 October and two on Inner Farne and West Wideopens on 22-23 October.

**Goldfinch *C. carduelis***

A well represented passage visitor.

One to five were seen on at least twenty days from 30 March-28 May. One was on Brownsman on 1 August, and singles were on Inner Farne on 27 October, 2-4 and 14-17 November.

**Siskin *C. spinus***

A common passage visitor.

Recorded on six days from 3 April-9 May with a peak of thirteen north over Inner Farne on 17 April. Seven flew over Staple Island on 30 June, then more typical autumn passage produced 1-6 on thirteen days from 20 September-16 November.

**Linnet *C. cannabina***

A common passage and winter visitor. May have bred in the 1890s (Miller, 1952).

Recorded almost daily from 26 March-16 May and from 30 September until the end of the season. Peak counts were all on Inner Farne: twenty on 8 April, eighteen on 27 October, forty

on 15-19 November and forty-two on 1 December. In the intervening period singles were on Inner Farne on 28 May and 3 August and two were present on 20 August.

**Twite** *C. flavirostris*

A well represented passage visitor.

One flew over Brownsman on 23 April. An arrival on 22 October produced a flock of seventeen on Inner Farne and a single on Brownsman. Four were on Brownsman on 25 October and seventeen flew over (fifteen west, two south) on 26 October.

**Lesser Redpoll** *C. cabaret*

An uncommon passage visitor.

The only spring record was one on Brownsman on 16-17 April. The first bird of the autumn was on Brownsman from 23 September-1 October and sixteen were on Staple Island on 13 October. There were almost daily sightings of 1-2 on Brownsman from 18-31 October and on Inner Farne from 17-23 October. Most were first winter birds but an adult male was on Brownsman on 25 October.

**Mealy Redpoll** *C. flammea flammea*

An uncommon passage visitor.

A female lingered around Brownsman cottage on 23 April. An autumn influx, in association with the above species, began on 18 October when four were on Brownsman and two on Inner Farne – the latter were also present the following day. Thereafter birds were seen daily on Brownsman until 28 October (Table 11) and a single was on Inner Farne on 22-23 October. At least eight (all aged as first winter birds) were involved. First records since 1997 (Inner and Outer Group Birdlog 1997, unpublished).

**Table 11** Mealy redpolls on Brownsman, October 2001.

Date	18	19	20	21	22	23	24	25	26	27	28
No.	4	2	2	1	3	2	2	2	1	1	2***

\*\*\* one found dead

**Two-barred Crossbill** *Loxia leucoptera*

An extremely rare visitor.

An adult male was discovered on Brownsman on 8 July (on the same day as the buff-breasted sandpiper – a remarkable double bill) and remained on the island until 10 July. It was also seen on Inner Farne during the afternoon and evening of 10 July, apparently settling down to roost in a patch of dock, but sadly had gone by the following day. The combination of its stunning plumage and confident nature made it a real contender for 'bird of the year' and a truly memorable experience for the wardens. First record for the islands and the fourth for Northumberland.

**Crossbill** *L. curvirostra*

An uncommon passage visitor.

One flew over Brownsman on 24 April.



**Common Rosefinch** *Carpodacus erythrinus*

An uncommon passage visitor.

A female/immature was on Brownsman on 12 September. What was presumably the same bird was seen briefly on Inner Farne the following day.

**Northern Bullfinch** *Pyrrula pyrrula pyrrula*

An uncommon passage visitor.

A female on Longstone End from 23-28 October was believed to be this race (based on its large size and cold plumage tones). The species was last recorded on the islands in 1994 (Walton, 1995).

**Lapland Bunting** *Calcarius lapponicus*

An uncommon passage visitor.

A first winter bird was on Brownsman from 23-26 October and was joined by a male on the last date, the latter bird remaining until 28 October. Both spent the majority of their stay feeding on the 'flats'. The first bird was seen in the company of two reed buntings and a yellowhammer on 24 October – an interesting Farnes triple!

**Snow Bunting** *Plectrophenax nivalis*

A well represented passage visitor.

A male on Brownsman on 27 March was the only spring sighting. Singles flew north over Brownsman and west over Inner Farne on 20 September. There were regular records during November with sightings of 1-4 on thirteen days on Inner Farne (including a female resident from 1-7 November) and nine days at the outer group. The peak count was six over Brownsman and South Wamses on 16 November.

**Yellowhammer** *Emberiza citrinella*

An uncommon passage visitor.

A pair was in the Inner Farne vegetable garden on 18-19 October, seven flew west over Brownsman on 23 October when one was also on Longstone End, and one was on Brownsman on 24 October.

**Little Bunting** *E. pusilla*

An uncommon passage visitor.

One flushed from Staple Island on 23 September remained on Brownsman until 26 September. Another very confident 'resident' on Inner Farne from 24-28 September could often be found feeding in the vegetable garden.

**Reed Bunting** *E. schoeniclus*

A well represented passage visitor.

There were no spring records. Autumn arrival began with singles on Brownsman and Inner Farne on 25 September and two on Inner Farne on 29 September. There were almost daily sightings on Brownsman from 14-27 October with eight present on 14, four on 22 and ten on 23 October and 1-3 on the other dates. 1-2 were seen daily on Inner Farne from 19-25 October. The last was one over Brownsman on 23 November.

**Exotica**

**Bar-headed Goose** *Anser indicus*

One was off Brownsman on 29 April.

### Rarities Committee decisions 2001

The following records for 2000 were not accepted:

**Blue Fulmar** *Fulmarus glacialis*, Brownsman 7 November.

**Tundra Bean Goose** *Anser fabalis rossicus*, Northern Hares, 15 November.

**Yellow-legged Gull** *Larus cachinnans michahelis*, East Wideopens 20 May-4 August. (The committee was of the opinion that hybrid lesser black-backed x herring gull had not been ruled out.)

**Crag Martin** *Ptyonoprogne rupestris*, Inner Farne, 25 April.

**Melodious Warbler** *Hippolais polyglotta*, Brownsman 11 September.

### FARNE ISLANDS RINGING REPORT FOR 2001

As in previous years, the ringing team focused on three main objectives in 2001: arctic tern monitoring work, 'retrapping adults for survival' (RAS) projects on eider and shag, and ringing samples of Sandwich terns and kittiwakes for ringing-recovery analyses of movements and survival rates.

#### Monitoring studies

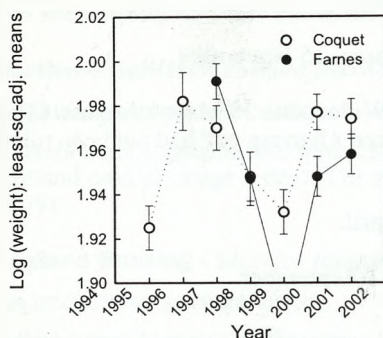
One of the objectives of the arctic tern ringing work is to compare chick growth and estimate chick mortality from year to year. Preliminary analyses of chick ringing and recapture data for 2001 indicates a chick survival of 75-78% per five day interval (95% confidence interval 53-91%) in the first couple of weeks of life. However, the accuracy of these estimates is dependent on sample size, and we need to put more effort into ringing chicks within a few hours of hatching so that we can estimate the proportion of second- or third-hatched chicks from each nest that survive; experience from Coquet Island suggests that this is likely to be a more-sensitive indicator of environmental conditions.

A 'growth index', representing the weight of chicks aged from approximately 9-20 days and standardized for age (estimated from total head length), is shown in Figure 1, together with similar data for Coquet Island. From a disastrous year in 1999, where the majority of arctic tern chicks on the Farnes died, there has been a gradual recovery, although this seems to lag behind Coquet Island. Whether the trends shown represent underlying long-range processes in sandeel stocks from year to year is unknown. However, it is interesting that both the Farnes and Coquet show similar overall trends. The Farne Islands Marine Research Group (FIMRG), a collaborative venture between the National Trust, the University of Newcastle and the Natural History Society of Northumbria, is attempting to address this question by identifying seabird foraging locations and surveying sandeel availability and abundance in relation to seabed mapping data. National Trust staff again collected data on relative sandeel sizes and intervals between feeds (a function of food availability) for arctic tern chicks. These data showed that feeding intervals (intervals between feeds brought by both parents) were fairly short, and were similar to last year (median feeding interval five minutes, Fig. 2). However, the sizes of sandeels brought back (estimated relative to beak length then converted to mm) appeared to be smaller than last year (median 32 mm compared to 38 mm in 2000).

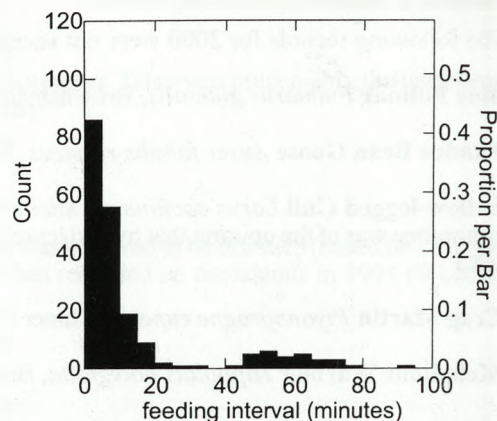
In addition, National Trust staff made a major contribution to the further development of this project by testing out a method of collecting more-accurate data on the foraging locations of arctic terns, puffins and shags. To do this, the FIMRG team obtained an optical-coincidence rangefinder: originally built for machine-gunners in 1939, this device proved effective in estimating distances to foraging birds, allowing their map positions to be plotted using compass bearings and estimates for distance (Fig. 3). These pilot data show that the technique



Arctic Tern growth index: 1995-2001  
Farnes and Coquet Island



**Fig. 1.** Growth index (weight on a log scale for chicks aged approximately 9-20 days old, and corrected for age using total head length) for arctic terns on the Farnes between 1997 and 2001, with Coquet Island data for comparison.



**Fig. 2.** Interval (minutes) between feeds for arctic tern chicks on the Farnes in 2001. The median interval between feeds was 5 minutes (n=268 observations).

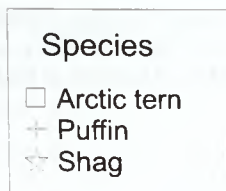
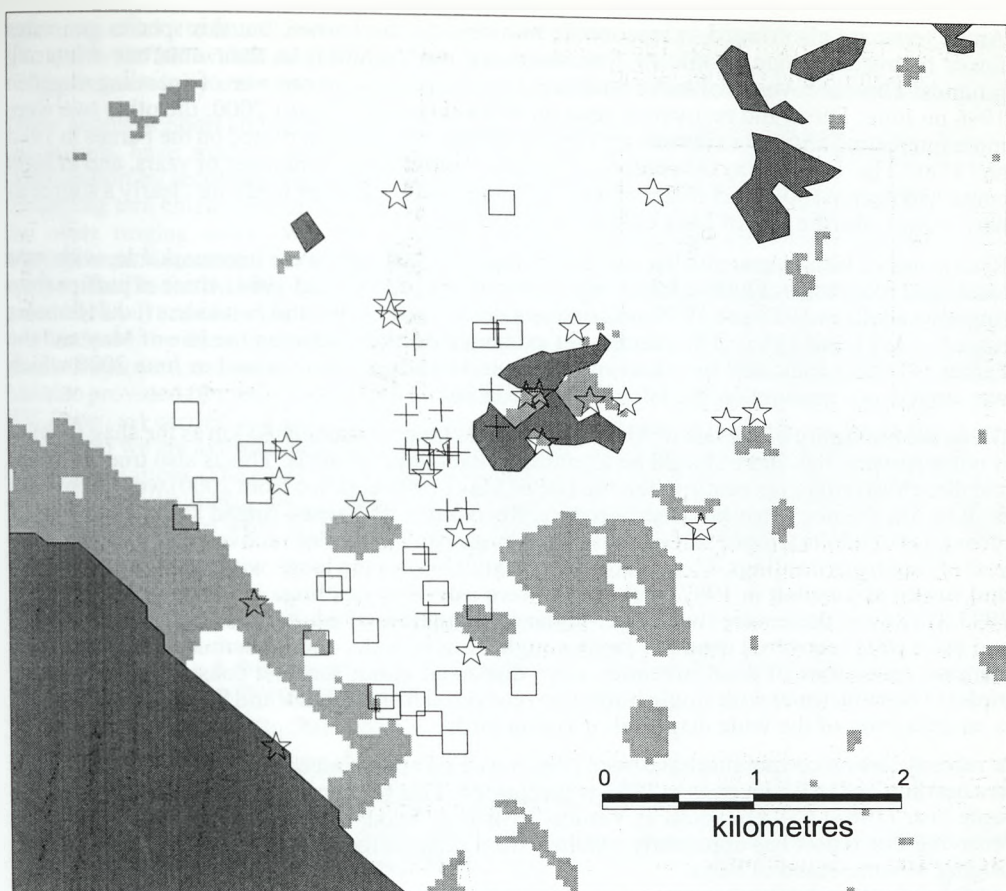
can be used to obtain unbiased estimates of foraging locations and will be a valuable tool for understanding what factors regulate fish availability from year to year, and how we can best maintain the superb wildlife resources of the Farne Islands and north-east coast.

#### Recoveries of ringed birds: movements and survival analyses

Sandwich terns generated the greatest number of recoveries (birds found dead, recaptured or identified in the field from reading the ring number (sight records)) since the last report. These fell into four broad categories: birds recovered locally, recoveries from the east coast of Scotland, birds controlled or sighted in Griend in the Netherlands, and African recoveries. Two of the three local recoveries were controlled at Seal Sands, Teesmouth in July 2001 and were ringed as nestlings in 1985 and 1996 (the third is described below). Recoveries of birds from Edinburgh north to the Fife coast were mainly sight records: four were identified in Edinburgh during September and October 2001, three of which were nestlings ringed on Inner Farne the same year and the other an adult ringed (as a nestling) in 1986. There were also three June sight records from the Isle of May of birds ringed on Inner Farne as nestlings in 1996, and a dead recovery of a 1996 bird on the Fife coast just north of the Isle of May at East Wemyss. Sandwich terns breed from about three to four years old, so these records presumably relate to Farnes-bred birds that have joined a new and expanding colony on the Isle of May.

The well-watched Sandwich tern colony at Griend in the Netherlands has provided sight records of Farnes birds for many years. This last year was no exception and there were sightings from April-June 2001 of Sandwich terns ringed on the Farnes as nestlings in 1984, 1980 (two separate birds) and 1985. In addition, a bird ringed on the Farnes in 1982 and controlled (retrapped) at Griend in May 1995, was recovered dead in Amble in May 2001. It is interesting to speculate that this could have been breeding at Griend, and then decided to return to its natal colony to breed. However, this is only speculation and we will never know the extent to which adult birds move breeding colonies without more-extensive trapping and retrapping of adults at their breeding colonies.

Recoveries of Sandwich terns in their African wintering quarters follow the usual pattern, with birds being recovered dead or injured along the west African coast. Birds ringed as nestlings in



**Fig. 3.** Locations of foraging arctic terns, puffins and shags in water around the Farnes, estimated from compass direction range-finder distances. Land is indicated by dark grey areas bounded by solid lines, lighter grey areas are underwater sandy sediments suitable for sandeels. Figure prepared by Bob Foster-Smith.

1998 were recovered in Monrovia, Liberia (May 2000), Ghana (September 2000) and Luanda, Angola (recovered in 1998). Two others ringed in 1997 were also recovered in Angola. These, together with another ringed in 1997 and controlled much further south near Cape Town, RSA, in November 2000, were all immature (prebreeding) birds. Three older ringed birds from 1982, 1984 and 1986 were recovered in Sierra Leone (controlled), Angola and Senegal, and one immature bird from 2000 was also recovered dead in Sierra Leone in June the following year. The recoveries of birds in west Africa from Senegal east to Ghana, and further south in Angola, follow the usual pattern and apparently relate to major plankton-rich ocean upwellings which support economically-important pelagic fisheries. Many recoveries of Sandwich terns in these areas result from human activities (trapping and fishing). The extent to which the prevalence of trapping in these areas, and differences in human population density, biases our understanding of the winter range and density distribution of Sandwich terns is presently unknown, but it is clear that the winter range extends much further south to Cape Town and potentially eastwards and north to Mozambique.



Arctic terns are also ringed in reasonable numbers on the Farnes, but this species generates fewer recoveries since people to find them are not common in their antarctic wintering grounds! Three recoveries of arctic terns were reported last year: one was of a nestling ringed in 1996 on Inner Farne and recovered dead on Brownsman in August 2000; the other two were more interesting and were controls on the Isle of May of nestlings ringed on the Farnes in 1984 and 1986. The Isle of May tern colony has been expanding for a number of years, and in 2000 contained nearly 1000 pairs of arctic terns (Thorne, 2000); Farnes birds are clearly a source of new recruits for the Isle of May colony.

Recoveries of kittiwakes, puffins and eiders reported last year were unremarkable, with two local dead recoveries of kittiwakes (ringed as nestlings in 1981 and 1984), three of puffins (two ringed as adults in 1976 and 1979, and one as a nestling in 1979), and two eiders (adult females ringed in 1982 and 1985). The continuing exchange of birds between the Isle of May and the Farnes is further indicated by a herring gull found dead on Staple Island in June 2000 which was ringed as a nestling on the Isle of May in 1996.

Given the proximity of the Isle of May to the Farnes (approximately 84 km as the shag flies), it is not surprising that there should be a continual exchange of birds. This is also true for shags and three birds ringed as nestlings on the Isle of May (1996 and two from 2000) were recovered dead on the Farnes since last year's report. Recoveries of Farnes-ringed shags consisted of recoveries of adults (ringed three or more years ago) and juveniles recovered within their first year of ringing as nestlings. Most recoveries of adult birds were local; with the exception of one bird ringed as an adult in 1997, these birds were ringed as nestlings in 1984, 1996 (two) and 1997. However, there were two longer-distance recoveries of adults: nestlings ringed in 1997 and 1998 were recovered dead at Flamborough, Humberside, and Fraserburgh, Grampian. In contrast, recoveries of dead juveniles were dispersed along the east coast from Fife (three birds) to Norfolk (one) with single birds also recovered from Dunbar and Filey, Yorkshire, and is an indication of the wide dispersal of young birds.

In recent years no cormorants have been ringed on the Farnes, but one recovery of a bird ringed as a nestling on the Wideopens in 1983 was reported. This bird was recovered in November the same year (1983) 658 km south at Veules-les-Roses, Seine-Maritime, France. The delay in receiving this report has apparently resulted from difficulties with the running of the French ringing scheme based in Paris.

#### **RAS (Retrapping of Adults for Survival) projects and ringing totals for 2001**

The two RAS projects in progress on the Farnes are for eiders and shags. Numbers of both species ringed were substantially down on the 2000 total, with thirty-five adult female eiders and thirty-seven adult shags ringed. In addition, forty-eight eiders and thirty-three shags ringed in previous years were retrapped.

**Table 12** Ringing totals for 2001 compared to 2000.

Species	Ringed in 2001	Ringed in 2000
Arctic Tern	198	645
Sandwich Tern	196	440
Roseate Tern	1	0
Kittiwake	233	224
Shag	122 (+ 33 retraps)	213
Eider	35 (+ 48 retraps)	158

Ringing totals for all species in 2001 are shown in Table 12. Compared to last year, the numbers of arctic and Sandwich terns ringed was substantially down; this was due to a combination of factors, particularly weather which resulted in the death of the first wave of

arctic tern chicks to hatch, reduced synchrony within the colonies and fewer pairs breeding. The number of kittiwakes ringed was about the same as in 2000. The single roseate tern ringed fledged successfully and was seen on Coquet Island with other roseate terns later in the season.

Many people support and encourage the ringing studies on the Farnes. National Trust staff on the islands have made a major contribution to developing the project and enabling its continuation by recording fish sizes, feeding intervals and foraging locations of arctic terns, retrapping tern chicks on our behalf (under licence), and by their support and assistance with the other ringing work. We are grateful to John Walton and the Farne Islands Local Management Committee for their support and encouragement to continue the work. It would not be possible for the ringing team to gain access to the islands without the boat generously provided by Northumbrian Water. The handling and launching of the boat has been helped tremendously by the award of a grant from the Sir James Knott Trust to purchase a vehicle for use in the project, and we are very grateful for their confidence in us. The Sir James Knott Trust has also provided funding to pay for the costs of the boat-based, sandeel survey work (using the RV *Bernicia*) carried out around the Farnes last year. These various sources of funding are essential if we are to find out how best to manage the Farnes environment for the enjoyment of future generations. The costs of rings and other equipment has been met by the Natural History Society of Northumbria, and by personal contributions from the team. The ringing team put in many hours of hard work to continue these studies and we are extremely grateful for their continued support.

#### REFERENCES

- BROWN, W (1866). A short account of a visit to the Farne Islands during the breeding season of 1865. *Zoologist*, 2nd edition series **1**, 483.
- GODDARD, T R (1925-48). Field notes. Ms.
- HAWKEY, P (1990). *Birds on the Farne Islands in 1989*. Natural History Society of Northumbria.
- (1991). *Birds of the Farne Islands*. *Trans. nat. Hist. Soc. Northumbria*. **55**, 155-192.
- KERR, I (2001). *Northumbrian Birds: their history and status up to the 21st century*. The Northumberland and Tyneside Bird Club.
- MARCH, H (1916). Ms letter to E Miller. Natural History Society of Northumbria archives (NEWM: 1996. H314.4).
- MILLER, E (ca 1959). Ms letter to G Hickling, n.d. Natural History Society of Northumbria archives, (NEWHM: 2002. H1002).
- (1915). A list of Summer Birds Observed on the Outer Farne Islands. *Brit. Birds*. **XII**, 132-136.
- THORNE, D (2000). *Isle of May Bird Observatory Report 2000*. Isle of May Bird Observatory.
- WALTON, J (1991). *Birds on the Farne Islands in 1990*. Natural History Society of Northumbria.
- (1992). *Birds on the Farne Islands in 1991*. Natural History Society of Northumbria.
- (1993). *Birds on the Farne Islands in 1992*. Natural History Society of Northumbria.
- (1994). *Birds on the Farne Islands in 1993*. *Trans. nat. Hist. Soc. Northumbria*. **56**, 115-133.
- (1995). *Birds on the Farne Islands in 1994*. *Trans. nat. Hist. Soc. Northumbria*. **56**, 205-224.
- (1996). *Birds on the Farne Islands in 1995*. *Trans. nat. Hist. Soc. Northumbria*. **56**, 393-414.
- (1997). *Birds on the Farne Islands in 1996*. *Trans. nat. Hist. Soc. Northumbria*. **57**, 93-113.
- (1998). *Birds on the Farne Islands in 1997*. *Trans. nat. Hist. Soc. Northumbria*. **58**, 323-345.
- WATT, G (1950). *The Farne Islands Ornithological Report for 1950*. Prepared for the Farne Islands Committee of the Natural Trust.
- WILSON, A E (2000-02). A History of the Bird Numbers on the Farne Islands. (Ms and computer database).





TRANSACTIONS  
OF THE  
NATURAL HISTORY SOCIETY  
OF  
NORTHUMBRIA

Editor:

B J SELMAN

Assistant Editors:

D C NOBLE-ROLLIN

M A PATTERSON

Volume 62

Part 3

THE NATURAL HISTORY SOCIETY OF NORTHUMBRIA  
THE HANCOCK MUSEUM  
NEWCASTLE UPON TYNE NE2 4PT

2002



**Front Cover:** Argus Brown Butterflies by Mrs Joan Holding

ISSN 0144-221X

©The Natural History Society of Northumbria, 2002.  
This publication is copyright. It may not be  
reproduced in whole or in part without the  
Society's permission.

Printed by Pattinson and Sons, Newcastle upon Tyne.

## CONTENTS

	Page
<b>The distribution, size and structure of Northern Brown Argus butterfly <i>Aricia artaxerxes</i> populations in North East England</b>	89
by S ELLIS	
<b>The importance of exposed riverine sediments for beetles (Coleoptera) in Northumberland</b>	103
by M D EYRE AND M L LUFF	
<b>The future of farm grassland as a diverse, productive environment</b>	115
by R S SHIEL	
<b>Specimens of bird species now threatened, or made extinct in recent times, in the collections of the Hancock Museum, Newcastle upon Tyne</b>	123
by L JESSOP AND R H STOBART	
<b>The parasites of pastureland Leatherjackets (<i>Tipula</i> spp., Tipulidae: Diptera) in the North East of England and their potential for biological control</b>	153
by M K ER, B J SELMAN, G R PORT AND A GÖKÇE	
<b>Dental anomalies in the Chillingham Wild White Cattle</b>	169
by B INGHAM	
<b>Corrections to 'The Durham Flora - Corrigenda et Addenda'</b>	177
by G G GRAHAM	
<b>Corrections to 'A Supplement to the Flora of Northumberland'</b>	177
by G A SWAN	





## THE DISTRIBUTION, SIZE AND STRUCTURE OF NORTHERN BROWN ARGUS BUTTERFLY *ARICIA ARTAXERXES* POPULATIONS IN NORTH EAST ENGLAND

S Ellis

Ecology Centre, School of Sciences, University of Sunderland SR1 3SD

(Present Address: Butterfly Conservation, Manor Yard, East Lulworth, Wareham, Dorset BH20 5QP)

### SUMMARY

A regional survey of the distribution and habitat of the scarce northern brown argus butterfly *Aricia artaxerxes* was undertaken in north-east England between 1991 and 1994. Mark-recapture techniques and transect counts were used to study population size and structure. The butterfly was recorded from thirty-three of forty-two historical sites, suffering a loss rate of 21% sites per decade. A more rapid decline on inland (35%) than coastal sites (8%) was detected. Five of the nine extinctions occurred on the most isolated sites, and six occurred on sites where habitat area was less than about 0.1 ha. Although extinct sites were more isolated than extant sites, there was no significant difference in habitat area. Most populations were small and density very variable. Population size ranged from 25-1900 individuals, but 55% of sites supported less than a hundred adults at the peak flight period, with only two populations greater than 500. Population density ranged from 8.9-941.2 ha<sup>-1</sup> and was generally higher than for the closely related brown argus *Aricia agestis*. Populations appeared to be 'closed', with relatively long-lived adults (adult residence time of 15.9 days on one site) largely concentrated within sheltered habitat patches where the larval hostplant common rockrose *Helianthemum nummularium* was abundant. Adults appeared to be more sedentary than *A. agestis*, with mean minimum same-day recapture distances for both males and females of about 30 m, although some butterflies were recorded moving between habitat patches separated by up to 100 m of dense scrub. The implications of these results for the conservation of *A. artaxerxes* at a landscape scale are discussed.

### INTRODUCTION

The young stages of most rare butterflies studied in Britain require specialised conditions which restrict them to narrow niches within their biotopes (Thomas, 1991). Oviposition is frequently limited to larval hostplants existing in a preferred growth form or microhabitat. The majority of rare species are dependent on early successional seral stages to provide these specialised conditions. Local extinctions are most frequently attributed to direct habitat loss or to changes in habitat quality, which reduces either the carrying capacity of the habitat patch or the population's intrinsic rate of increase (Thomas, 1991). At a landscape scale, habitat loss and declining habitat quality are usually associated with fragmentation of the remaining suitable habitat and in the event of extinction, isolated patches are not easily recolonised (Thomas *et al.*, 1992).

The northern brown argus butterfly *Aricia artaxerxes* Fabricius (Lepidoptera: Lycaenidae) is one of a small group of resident British butterflies with a northern distribution. In Scotland, the northern brown argus occurs in the Borders and along the coast in Dumfries and Galloway; further north it has an easterly distribution occurring in Fife, Tayside, Grampian and Highland. In northern England the species is confined to a small number of widely separated areas, including the north-east (County Durham and Tyne and Wear), where the butterfly occurs both inland and on the coast.

The butterfly suffered a national decline from 172 pre-1970 10 km squares to 106 for the period 1970-1988 (Emmet and Heath, 1989), representing a 38% loss. More recently, there has been an overall increase of 102% from sixty 1970-82 10 km squares to 121 for the period 1995-99, but this is mainly attributable to past under-recording in Scotland (Asher *et al.*, 2001). During that same period, *A. artaxerxes* underwent a regional decline of 30% previously recorded 10 km squares in northern England and southern Scotland.

The reasons for this regional decline were unclear but, as with other threatened species, knowledge of the ecological requirements of the butterfly was limited and most extant colonies were believed to be small and isolated (Heath *et al.*, 1984). *A. artaxerxes* occurs on



well-drained base-rich slopes, free from agricultural improvement. In northern England this habitat is largely confined to limestones but in Scotland it also occurs on neutral and acidic soils. Coastal valleys, sand dunes, limestone pavements, quarries (Emmet and Heath, 1989) and roadside verges (Ellis, 1995) also provide suitable habitat. The common feature of all sites is the presence of the larval hostplant, common rockrose *Helianthemum nummularium* Miller. Other hostplants have been reported, including bloody cranesbill *Geranium sanguineum* L., a common species on the Durham coast. Although *A. artaxerxes* oviposits on *G. sanguineum* in captivity (Jarvis, 1969), there is no evidence that this species is utilised in the wild (e.g. Selman *et al.*, 1973). The butterfly is univoltine with adults flying in June and July. Eggs are laid singly on the hostplant, usually on the upperside of the leaf (Ellis, 1995) and hatch after one to two weeks. Larvae enter diapause in the late second or early third instar and recommence feeding in the spring. Pupation takes place on the ground in May. As with other lycaenid species, *A. artaxerxes* larvae are tended by ants. There are few data, but attendant ants include *Lasius flavus* F. in Cumbria (Cooch, 1995) and *Formica lemani* Bondroit in Scotland (P Summers, pers. comm.) and north-east England (Ellis, 1997). *Myrmica ruginodis* Nylander and *Myrmica scabrinodis* Nylander (B J Selman and M L Luff pers. comm.; Dunn and Sheppard, 1982) have also been suggested for north-east England.

This paper describes a regional survey of the distribution, size and structure of adult *A. artaxerxes* populations in north-east England. The principal aims of this study were to (1) describe the current distribution and extent of available habitat, (2) assess population size and density of extant colonies, (3) describe the population structure of the butterfly and (4) assess the implications for conservation at a landscape scale.

## METHODS

### Distribution

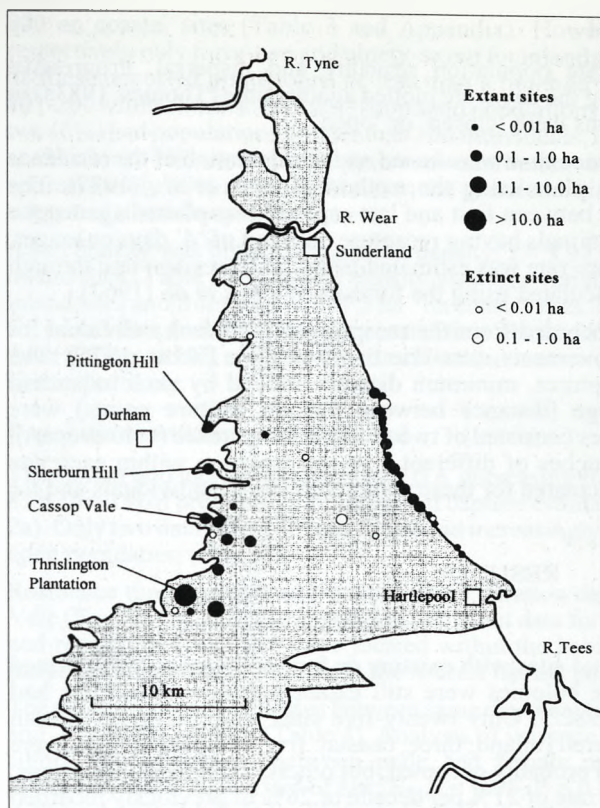
The current distribution of *A. artaxerxes* in north-east England was mapped by searching potential breeding habitat for adult butterflies during the peak flight period. Sites were classified as extant or extinct by the presence or absence of adults; 'presumed extinctions' were checked by egg searches, which are very visible in this species. All historical sites, where the habitat remained extant, and other apparently suitable areas of biotope were surveyed once in good weather during 1991 (inland sites) or 1994 (coastal sites). Sites were considered to support distinct 'colonies' if they were separated by more than approximately 150 m of unsuitable (hostplant absent) habitat. Selman *et al.*, (1973) found no evidence of migration between two Durham coastal sites separated by a similar distance. Two thirds of sites consisted of single habitat patches, with the remainder supporting between two and four separate patches less than 150 m apart. Habitat area (ha) at each site was therefore the sum of the patch areas mapped at a scale of 1:2500. Habitat patches were defined as homogeneous stands of vegetation where the larval hostplant *H. nummularium* was abundant (>5% cover). Distances (km) to the nearest neighbouring site and the nearest occupied site were measured.

### Population size and density

Estimates of absolute adult population size and other population parameters were made between 1991 and 1993 at four separate study sites (Fig. 1) in inland north-east England using mark, release and recapture (MRR). Where possible each site was sampled over a period of several weeks during a single season. These four inland colonies represented a range of patch sizes, and were more isolated than coastal sites and therefore more likely to support discrete populations.

Population parameters were estimated using frequency of capture techniques, initially employing models that assume either a Poisson (Craig, 1953) or geometric (Eberhardt, 1969) distribution of data. Although estimates did not differ significantly using either model,  $\chi^2$  tests showed that a Poisson distribution best fitted the observed data (Ellis, 1995), typical of many butterfly species (Pollard and Yates, 1993), so all other results are based on this model.

Relative estimates of population size and density for each extant inland and coastal colony were made using transect counts (Thomas, 1983a), an adaptation of the Butterfly Monitoring



**Fig. 1** The distribution of *Aricia artaxerxes* sites in north-east England. Inland sites were surveyed in 1991 and coastal sites in 1994. The locations of the four main study sites are indicated. Shaded area represents the extent of magnesian limestone.

Scheme (BMS) transect method (Pollard, 1977). 5 m wide transect routes sampled the entire flight area and at least one transect count, following BMS criteria (Hall, 1981), completed per site. Excessively steep and dangerous terrain prevented three coastal transects being walked (Leakey and Ellis, 1994); these sites were surveyed by scanning the transect route with binoculars (maximum distance of 20 m).

Transect counts (N) were expressed as density (D): numbers per 100m transect (i.e. numbers per 500 sq. m), multiplied by 20 (numbers per ha) and the habitat area (A) to give a Population Index (P):

$$P = D \times 20 \times A \text{ (ha)}$$

The reliability of the transect counts were tested by comparing Population Indices with absolute estimates made by MRR on the same day using regression analysis. Population Indices (P) were then converted to relative estimates of population size using the regression equation:

$$\text{RELATIVE ESTIMATE} = 16.89 + 4.68 P \text{ (} r = 0.9596, df = 16, P < 0.001 \text{)}$$

Transect counts on different sites were made at different stages of

the flight period, so butterfly density and relative estimates were adjusted to numbers expected at the peak flight period (PFP) following Thomas (1983a):

$$\text{RELATIVE} = (16.89 + (P \times 4.68)) \times \text{PFP ADJUSTMENT}$$

ESTIMATE

(CORRECTION FACTOR)

The correction factor is the peak numbers at a key study site divided by the numbers at the same site on the same date as the transect count to be adjusted. The day of peak numbers for inland sites was determined each year by regular sampling at Thrislington Plantation through the flight period (Ellis, 1995). The butterfly emerges later on the coast (Selman *et al.*, 1973) and Limekiln Gill and Hartlepool Point was regularly sampled to determine peak numbers (Leakey and Ellis, 1994). The unexpectedly small size of this colony (maximum transect count of six adults) made it difficult to establish the day of peak numbers. However all surveys of other coastal sites were undertaken during twelve days coinciding with the main flight period at Limekiln Gill and Hartlepool Point, so no adjustments were made to relative estimates for coastal sites.



### Population structure and dispersal

MRR data were used to investigate population structure and dispersal. Progressive frequency of capture estimates during the day were plotted against time (Thomas, 1983a) in order to ascertain whether populations were 'closed' or 'open'.

Estimates of adult life-span or residence time were based on the calculation of the residence rate from recapture duration decay plots using the method of Watt *et al.*, (1977). The recapture duration 'd' (time interval between first and last capture) was plotted against the natural logarithm of the number of animals having recapture duration of 'd' days or longer. The natural logarithm of the residence rate was estimated from the regression line through the points. Residence times were calculated using the formula of Cook *et al.* (1967).

Several mobility parameters were recorded from the recapture data of each individual for both same-day movements and movements over one or more days (Scott, 1975). The minimum distance (m) between captures, minimum distance moved by each individual during the day and minimum range (distance between farthest capture points) were calculated. Since some habitat patches consisted of two or more sub-patches (< 40 m apart), movements between patches/sub-patches of different size and isolation within each site could also be assessed. Means were calculated for these parameters for all individuals and for each sex at the four study sites.

## RESULTS

### Distribution

Twenty inland and twenty-two coastal sites with existing or former colonies were located (Fig. 1 and Appendix). Thirty-three colonies were still extant but nine extinctions had occurred since the last survey in 1982/3. Only twenty-five sites were occupied in both surveys, with eight new sites discovered (inland: three; coastal: five). Several of these were overlooked in the 1982/3 survey and probably occupied, but others could be colonisations. Nevertheless, these data show a loss rate of 21% per decade or 26% of previously recorded sites. Most extinctions were on inland sites (loss rate = 35% per decade or 41% of previously recorded sites), whereas the coastal distribution remained largely unchanged with only two extinctions (loss rate = 8% per decade or 12% of previously recorded sites).

The total area of habitat occupied by *A. artaxerxes* in north-east England was 17.31 ha, with only 0.96 ha of known habitat unoccupied. The butterfly was present on less than 10% of the 177 ha of magnesian limestone grassland in the region (Pritchard, 1989) and on only 0.03% of the Durham Magnesian Limestone Plateau Natural Area (56400 ha).

Total habitat areas for each site were small, with 88% of sites less than 0.5 ha and 55% less than 0.1 ha. All extinctions except one occurred when habitat area was less than 0.12 ha and five were on the most isolated sites. Although habitat area was greater on extant than extinct sites (Table 1) this difference was not significant ( $\log_{10}$  habitat area,  $t = 1.84$ ,  $df = 14$ ,  $P = 0.087$ ). However extinct sites were significantly more isolated than extant sites ( $\log_{10}$  distance to nearest site,  $t = 2.52$ ,  $df = 11$ ,  $P = 0.028$ ;  $\log_{10}$  distance to nearest occupied site,  $t = 2.51$ ,  $df = 10$ ,  $P = 0.031$ ). Furthermore, inland sites were significantly more isolated than coastal sites ( $\log_{10}$  distance to nearest site,  $t = 5.40$ ,  $df = 27$ ,  $P < 0.001$ ;  $\log_{10}$  distance to nearest occupied site,  $t = 5.01$ ,  $df = 27$ ,  $P < 0.001$ ), but there was no difference in habitat area ( $\log_{10}$  habitat area,  $t = 1.03$ ,  $df = 32$ ,  $P = 0.309$ ).

### Population size and density

MRR absolute estimates of daily population size for the four study sites ranged from <10 to nearly 1000 individuals (Poisson model, Table 2), with sample sizes varying from four to eighty-three marked adults. The populations at Cassop Vale and Sherburn Hill (max <100) are clearly both small in comparison to those at Pittington Hill (max 300) and Thrislington Plantation (max 1000).

Relative estimates of population size, calculated from transect data, on the thirty-three extant sites ranged from approximately twenty-five to 1900 individuals on inland sites and thirty to

800 on coastal sites (Table 3 and Appendix). However, median population sizes were respectively only forty-two and ninety-seven for inland and coastal sites. The majority (55%) of sites supported populations of less than a hundred adults, with 27% of sites recording 101-200 adults. Four sites (12%) supported populations of between 201-500 adults, but only two (6%) had populations greater than 500 individuals. In addition, one of the larger colonies at Sherburn Hill was probably an overestimate, being based on an assumption of approximately 50% suitable habitat in the grassland/scrub mosaics; MRR studies (Table 2) suggested a smaller population.

Adult density was higher ( $\log_{10}$  adult density:  $t = 3.97$ ,  $df = 22$ ,  $P < 0.001$ ) on coastal than inland sites (Table 3). However density was very variable ranging from 8.9 to 300.0  $ha^{-1}$  on inland sites and from 23.5 to 941.2  $ha^{-1}$  on coastal sites. Median densities were only 37.6  $ha^{-1}$  for inland sites and 156.3  $ha^{-1}$  for coastal sites. Particularly dense populations were recorded from Pittington Hill and Dawdon Bay North, at least twice that of any other inland or coastal site respectively.

### Population structure and dispersal

The similar and increasingly accurate (i.e. decreasing standard errors) population sizes from 87% ( $n = 15$ ) of progressive frequency of capture estimates suggest a closed population (Fig. 2a). Only two data sets produced larger and increasingly fluctuating estimates, suggesting an open population (Fig. 2b).

Residence times calculated from recapture duration decay plots was 15.9 days for Cassop Vale (Fig. 3), the only site to provide sufficient data for this analysis. Over 80% of captures and recaptures ( $n = 700$ ) were located within the habitat patches and only 5% located at distances greater than 10 m from the nearest habitat patch.

The mean minimum distances between same day recaptures for all sites was 30.8 m for males and 28.6 m for females (Table 4). Analysis of variance on log-transformed data showed no significant differences between male and female mobility or between the four sites (Two-way ANOVA: effect of sex:  $F_{1,167} = 0.05$ ,  $P = 0.825$ ; effect of site:  $F_{3,167} = 1.55$ ,  $P = 0.203$ ). At Sherburn Hill adults and adult movements were virtually confined to small, isolated habitat patches, including those areas recently cleared of dense scrub. However there were some inter-patch movements over nearly 100 m of scrub by both males and females at Pittington Hill (Fig. 4).

The majority of movements were within habitat patches and sub-patches (68%,  $n = 166$ ) but 25% were between patches with a further 7% outside patches. Fewer movements were recorded between more isolated patches ( $<30$  m apart: 76% recaptures;  $>30$  m: 24%;  $n = 41$ ). The maximum recorded distances (sum of distances between recaptures) and ranges (distance between farthest capture points) for individuals were for between habitat patch movements at Cassop Vale. For same day recaptures the maximum distance was 268 m for males and 343 m for females; maximum ranges at the same site were 124 m for males and 140 m for females. The maximum distance for movements over several days was 509 m for a female recaptured three times.

## DISCUSSION

### Distribution

*A. artaxerxes* has a patchy distribution in north-east England, occupying many small and a few large sites. Overall, these sites amount to only a small proportion of the magnesian limestone habitat and a fraction of the wider landscape. Most of the larger sites are inland, where the majority of sites supported a minimum 0.2 ha of habitat, and extinctions occurred with one exception on sites below 0.1 ha in size. In contrast, many coastal colonies appear to survive on even smaller areas of habitat (less than 0.1 ha), but apparently suffer a lower extinction rate than inland sites. These area data are broadly comparable with the results from a recent study of the butterfly in Scotland (Ellis, 1998), where all sites were less than 1.0 ha in size, and half of which were less than 0.5 ha. In both studies, habitat areas are much less than the minimum 1.0-2.0 ha suggested by other sources (Warren, 1992). Extinct sites were



**Table 1** The presence/absence of *A. artaxerxes* in north-east England according to habitat area (ha) and distance to nearest occupied site (km).

	n	Area		Distance	
		Mean	SE	Mean	SE
All sites	42	0.44	0.25	1.31	0.31
Extant	33	0.52	0.31	0.76	0.15
Extinct	9	0.11	0.06	3.26	1.12
Inland sites	20				
Extant	13	1.10	0.78	1.38	0.29
Extinct	7	0.12	0.07	4.12	1.27
Coastal sites	22				
Extant	20	0.15	0.04	0.35	0.05
Extinct	2	0.07	0.06	0.22	0.05

significantly more isolated than extant sites, and inland sites, where most extinctions occurred, were more isolated than those on the coast. This suggests that isolation from occupied sites may be sufficient to reduce the chance of recolonisation following extinction.

#### Population size and structure

Although a wide variation in *A. artaxerxes* population size and density (Tables 2 and 3) was recorded from north-east England, the majority of populations were small (< 100 adults at peak flight period). A recent survey of four Scottish sites (Ellis, 1998) and a re-survey of three Durham coastal sites (Ellis, 1999b) also recorded populations of a similar magnitude. Small north-east England populations are unsurprising since suitable habitat in the region is generally limited to small, isolated fragments of magnesian limestone grassland. Wherever habitat areas are large, as at Thrislington Plantation, then large populations are supported.

Variation in population density suggest there may be wide differences in habitat quality on these sites. Surveys of inland and coastal sites were undertaken in different years, so the influence of weather on short-term population fluctuations should also be considered. However, transect count data from Thrislington Plantation for the period 1990-98 (Ellis, 1999a) suggests that *A. artaxerxes* populations are not subject to the wide fluctuations typical of many other grassland butterflies (Pollard and Yates, 1993).

Both population size and density were on average greater than those recorded for the brown argus *Aricia agestis* Denis & Schiff. in southern England. The maximum population size recorded for *A. agestis* on Dorset sites was 300 with density ranging from 1.92 to 14.80 ha<sup>-1</sup> (Bourn and Thomas, 1993). However even large colonies of *A. artaxerxes* and *A. agestis* are small in comparison to some British populations of other calcareous grassland species (eg adonis blue *Lysandra bellargus* Rott.: 2000, Thomas, 1983b; Lulworth skipper *Thymelicus acteon* Rott.: >10000, Thomas, 1983c).

Progressive frequency recapture estimates assume that errors are reduced in closed populations, as the number of recaptures increases whereas in open populations estimates increase as marked animals are presumed to emigrate and unmarked ones immigrate. However, estimates may also increase in closed populations if only a small proportion of butterflies are caught, either because fresh emergences occur during the day or because the population is very large. Nevertheless, the recapture data generally support the hypothesis of a closed population with nearly all data sets showing progressively reduced errors.

**Table 2** Absolute (frequency of capture) and relative estimates (Population Indices) of population size for adult *A. artaxerxes* butterflies on four inland north-east England sites during 1991-93. Absolute estimates were calculated using both Poisson (Craig, 1953) and geometric (Eberhardt, 1969) distribution models and Population Indices from transect counts. Significant ( $P < 0.001$ ) differences between observed and expected recapture distributions by  $\chi^2$  goodness of fit are indicated \*.

Site name and date	Total marked	Total recaptures	Absolute estimates				Population index (transect counts)
			Poisson model		Geometric model		
			N	SE	N	SE	
<i>CASSOP VALE</i>							
20.07.91	4	2	6.9 ± 3.6		10.0 ± 6.1		1.34
06.07.93	26	16	40.0 ± 7.0		66.4 ± 16.3		4.01
12.07.93	16	5	36.7 ± 13.6		64.0 ± 8.8		6.69
13.07.93	21	19	27.3 ± 3.8		43.1 ± 9.7 *		3.26
17.07.93	18	3	66.2 ± 34.3		120.0 ± 67.3		4.01
22.07.93	13	11	17.4 ± 3.3 *		27.2 ± 7.9 *		5.35
<i>PITTINGTON HILL</i>							
07.07.91	74	12	272.5 ± 71.0		511.0 ± 148.0		60.76
21.07.91	80	42	133.7 ± 15.2		230.5 ± 35.4		25.70
13.06.92	56	13	159.4 ± 38.3		292.9 ± 80.6		16.36
20.06.92	83	24	201.4 ± 34.4		366.6 ± 71.3		46.74
27.06.92	68	16	200.7 ± 45.1		371.5 ± 95.1		81.80
06.07.92	74	18	199.0 ± 40.3		365.0 ± 85.4		39.73
13.07.92	31	9	75.1 ± 21.0		134.3 ± 44.0		7.01
17.07.92	34	15	62.6 ± 12.4		105.6 ± 27.2		7.01
<i>SHERBURN HILL</i>							
02.07.93	18	9	30.9 ± 7.7		52.0 ± 16.8		9.32
05.07.93	12	8	17.7 ± 4.3		28.5 ± 9.7		3.28
07.07.93	14	5	29.5 ± 10.6		50.4 ± 21.7		3.11
13.07.93	7	2	17.1 ± 10.1		28.0 ± 18.3		3.11
<i>THRISLINGTON PLANTATION</i>							
26.07.91	71	9	327.7 ± 100.6		623.2 ± 206.1		56.22
15.07.92	43	1	964.9 ± 956.0		1849.0 ± 1900.8		NO DATA

Furthermore, most adult butterflies were aggregated within habitat patches, typical for species whose resource requirements are located in the same patch (Shreeve, 1992). Adult nectar sources and larval hostplants were abundant and males patrolled for females within these patches. Captures of both males and females were made more frequently at the base of slopes and where scrub provided a degree of shelter. Other areas outside the patches were sometimes used for mate location and roosting but they were usually between patches and situated in long swards at the base of sheltered slopes (Ellis, 1995).

Residence time data from Cassop Vale suggests adults were relatively long-lived in comparison to other British butterflies (Warren, 1992). However sampling intensity was higher at this site with a large proportion (78%) of marked butterflies ( $n = 38$ ) being recaptured at least once and Brakefield (1982) suggests that repeated recapture of some individuals introduces bias to the estimate of residence time.



**Table 3** Adult population density and size of *A. artaxerxes* on north-east England sites. Inland sites were surveyed in 1991 and coastal sites in 1994.

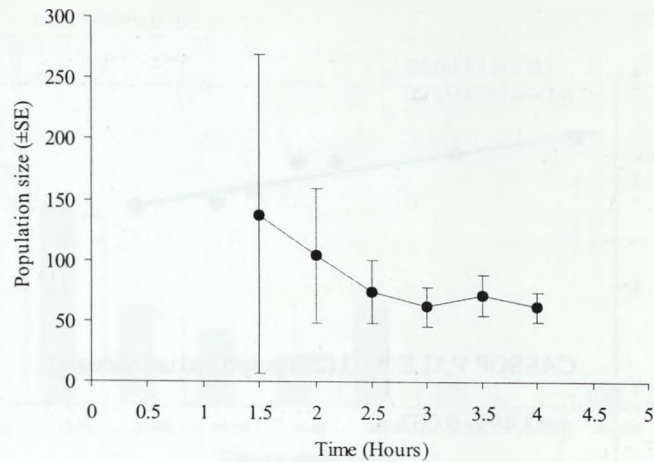
	Population parameter	
	Density ( $\text{n ha}^{-1}$ )	Peak flight population size
All sites (n = 33)		
Mean (SE)	167.0 (34.0)	180.4 (59.6)
Median	107.2	62.1
Range	8.9 - 941.2	24.4 - 1872.9
Inland sites (n = 13)		
Mean (SE)	62.9 (22.3)	235.9 (140.3)
Median	37.6	42.0
Range	8.9 - 300.0	24.4 - 1872.9
Coastal sites (n = 20)		
Mean (SE)	234.6 (49.0)	144.4 (40.4)
Median	156.3	96.5
Range	23.5 - 941.2	31.4 - 809.8

### Dispersal

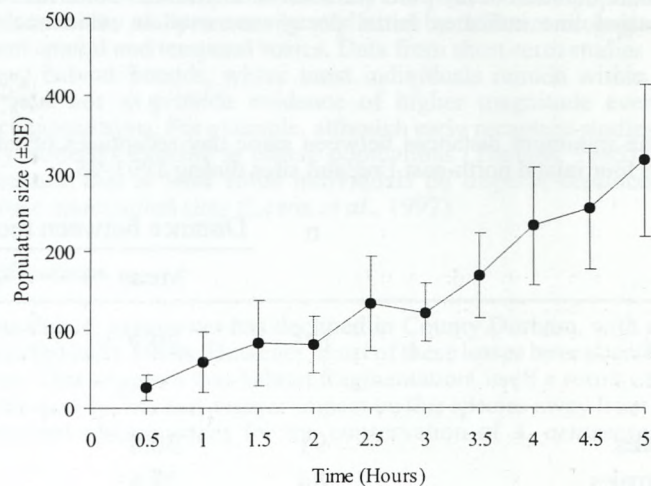
MRR techniques inevitably underestimate mobility (Gall, 1984) because sampling is usually restricted to a discrete area, individuals that leave the habitat are not recaptured and widening the sample area would be too time consuming. Nevertheless, the mean recorded same-day movements of about 30 m for both *A. artaxerxes* males and females is typical of the low dispersal shown by species with resources located in the same patch (Shreeve, 1992). In the only other MRR study of *A. artaxerxes* in north-east England, Selman *et al.* (1973) found no migration between two populations approximately 200 m apart at Castle Eden Dene on the Durham coast; however, conditions are inevitably more windy in such localities and mobility may be much reduced. The present study suggests a greater degree of mobility with some movements over 100 m (Fig. 4) to at least 150 m, including flights over dense scrub.

Mean adult mobility in *A. agestis* for both males (89 m) and females (114 m) (Bourn and Thomas, 1993) was much greater than *A. artaxerxes* (mean = 30 m). 30% of *A. artaxerxes* movements were less than 10 m, 67% between 10-100 m with only 3% (six recaptures) greater than 100 m (Fig. 4). The equivalent figures for *A. agestis* were approximately 33% for each category (Bourn, 1989), though *A. agestis* sites were much larger. In contrast 89% of marked adult silver-studded blues *Plebejus argus* L. on the Great Orme in North Wales moved less than 20 m and none greater than 50 m (Thomas, 1985). These data suggest that *A. artaxerxes* is intermediate in mobility, at least for same-day movements, in comparison to other calcareous grassland butterflies. However, mobility comparisons between species should be treated with caution because mobility may vary by site or within networks of sites.

a) Pittington Hill: 17.07.92



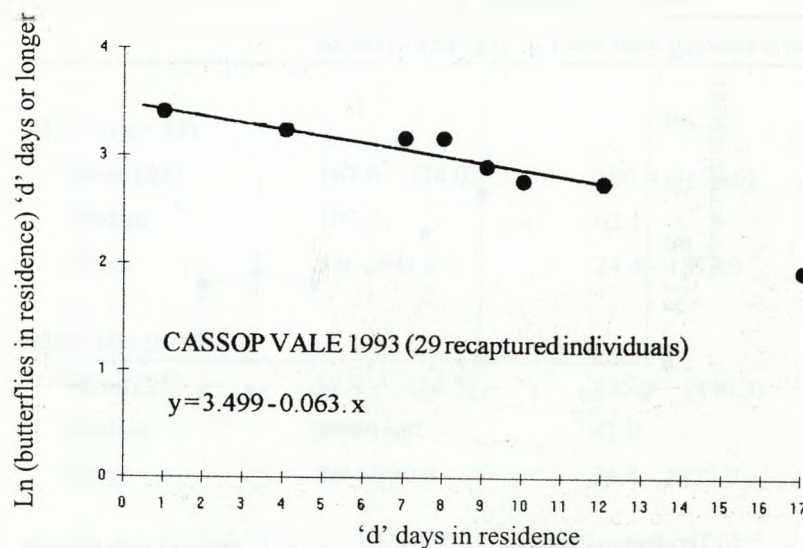
b) Thrislington Plantation: 26.07.91



**Fig. 2** Selected progressive frequency of capture estimates for size of *A. artaxerxes* populations at two inland north-east England sites during 1991-92.

Wilson *et al.* (in press) reanalysed the area and isolation data for *A. artaxerxes* in north-east England by considering habitat patches as separate if they were more than 40 m apart (sub-patches in this study). This analysis showed that small isolated patches were less likely to be occupied than large, well-connected patches, a spatial pattern of occupancy indicative

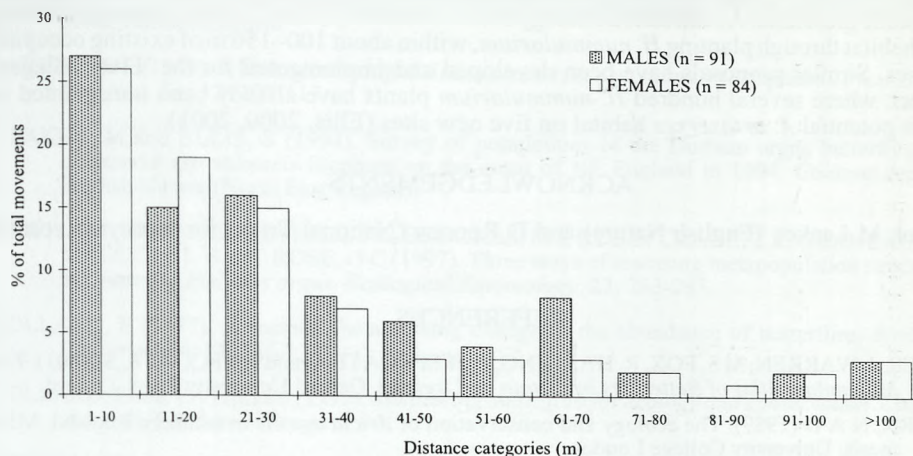




**Fig. 3** Recapture duration decay plots for adult *A. artaxerxes* butterflies at Cassop Vale in 1993. Regression line indicates initial decay rate used in residence time (15.9 days) calculation.

**Table 4** Mean minimum distances between same day recaptures of adult *A. artaxerxes* butterflies on four inland north-east England sites during 1991-93.

	n	Distance between recaptures (m)	
		Mean	SE
All sites	175	29.7	2.2
Sex:			
Males	91	30.8	2.9
Females	84	28.6	3.3
Site:			
Cassop Vale	56	35.4	3.8
Pittington Hill	87	27.7	2.3
Sherburn Hill	23	17.7	4.6
Thrislington Plantation	9	45.3	16.0



**Fig. 4** Number of adult *A. artaxerxes* same-day movements in distance categories on four inland north-east England sites during 1991-93.

of a metapopulation structure. The apparent anomaly between the metapopulation analysis and the recapture data in this study are easily explained by different ecological processes operating at different spatial and temporal scales. Data from short-term studies may be very useful in delineating habitat bounds, where most individuals remain within the defined habitat, but they tend not to provide evidence of higher magnitude events, such as colonisation of unoccupied sites. For example, although early recapture studies of *P. argus* suggest a sedentary butterfly existing in closed populations (Thomas, 1985), more recent work provides evidence that at least some individuals do disperse distances of several kilometres to colonise unoccupied sites (Lewis *et al.*, 1997).

### Conservation implications

This study confirms that *A. artaxerxes* has declined in County Durham, with a substantial loss of colonies since the early 1980s. However, most of these losses have occurred on small, isolated, inland sites. This suggests that habitat fragmentation, itself a result of habitat loss and declining habitat quality, has had a major impact on this species away from the Durham coast. There are several consequences for the conservation of *A. artaxerxes* in County Durham.

Firstly, recommendations for a minimum area of habitat are difficult, because even small areas will support local populations, providing they are not isolated. However, since few extinctions were recorded over 0.1 ha, then 0.1 - 0.2 ha is proposed as a minimum, increasing to 1.0 ha for more isolated sites.

Secondly, large persistent sites must be conserved, since these will act as reservoirs for future colonisations of unoccupied sites. Thirdly, scarce resources should not be directed to unoccupied, isolated sites unless the problem of habitat fragmentation at the landscape scale can be resolved, because these are less likely to be colonised or recolonised naturally. Fourthly, opportunities to reclaim extant, but unsuitable magnesian limestone grassland habitat or to create new habitat should be examined, especially where these can act as 'stepping stones' between existing sites.



Habitat creation schemes include natural colonisation of disused limestone quarries and re-seeding grassland on spoil, landfill sites and roadside cuttings and verges. Examples include Durham County Council's 'Turning the Tide' and 'Five Villages' projects. The former includes a large-scale cliff-top habitat creation scheme of paramaritime magnesian limestone grassland. A restoration strategy for *A. artaxerxes* (Ellis, 1999c) proposed creating new habitat through planting *H. nummularium*, within about 100–150 m of existing occupied patches. Similar proposals have been developed and implemented for the 'Five Villages' project, where several hundred *H. nummularium* plants have already been transplanted to create potential *A. artaxerxes* habitat on five new sites (Ellis, 2000, 2001).

#### ACKNOWLEDGEMENTS

I thank M Leakey (English Nature) and D Rooney (National Trust) for surveying coastal sites.

#### REFERENCES

- ASHER, J, WARREN, M S, FOX, R, HARDING, P, JEFFCOATE, G and JEFFCOATE, S (2001). *The Millennium Atlas of Butterflies in Britain and Ireland*. Oxford University Press, Oxford.
- BOURN, N A D (1989). The ecology and conservation of *Aricia agestis* in southern England. MSc thesis, University College London.
- BOURN, N A D and THOMAS, J A (1993). The ecology and conservation of the brown argus butterfly *Aricia agestis* in Britain. *Biological Conservation*, **63**: 67–74.
- BRAKEFIELD, P M (1982). Ecological studies on the butterfly *Maniola jurtina* in Britain. 2 Population dynamics: The present position. *Journal of Animal Ecology*, **51**: 727–738.
- COOCH, S (1995). The ecology of the Northern Brown Argus butterfly *Aricia artaxerxes* subsp. *salmacis* (Lepidoptera: Lycaenidae) on Warton Crag. BSc thesis. University of Lancaster.
- COOK, L M, BROWER, L P and CROZE, H J (1967). The accuracy of a population estimate from multiple recapture data. *Journal of Animal Ecology*, **36**: 57–60.
- CRAIG, C C (1953). On the utilisation of marked specimens in estimating populations of flying insects. *Biometrika*, **40**: 170–176.
- DUNN, T C and SHEPPARD, D A (1982). Insects. In *The magnesian limestone of Durham County* ed by T. C. Dunn. Durham County Conservation Trust, pp. 69–71.
- EBERHARDT, L L (1969). Population estimates from recapture frequencies. *Journal of Wildlife Management*, **33**: 28–39.
- ELLIS, S (1995). Ecological studies of the butterflies of magnesian limestone grassland. PhD thesis. University of Sunderland.
- (1997). The northern brown argus in north-east England. *British Wildlife* **9**: 22–27.
- (1998). Surveys of sites for the northern brown argus (*Aricia artaxerxes* F.) in northern Scotland. Scottish Natural Heritage Commissioned Report.
- (1999a). Metapopulation structure and grazing management of the Durham argus butterfly *Aricia artaxerxes* ssp *salmacis* Stephens in north-east England. Contract report to English Nature (Lowlands Team).
- (1999b). Durham coastal populations of the northern brown argus butterfly *Aricia artaxerxes* on National Trust properties. Contract report to National Trust.
- (1999c). A restoration strategy for the Durham argus butterfly *Aricia artaxerxes* ssp *salmacis* on the Durham coast. Contract report to Durham County Council.
- (2000). The five villages project: A restoration strategy for the Durham argus butterfly *Aricia artaxerxes* ssp *salmacis*. Contract report to Durham County Council.
- (2001). Five villages project: Progress report on the restoration of the Durham argus butterfly *Aricia artaxerxes* ssp *salmacis*. Contract report to Durham County Council.
- EMMET, A M and Heath, J (1989). *The moths and butterflies of Great Britain and Ireland (Hesperiidae to Nymphalidae)*. Vol 7 Part 1. Colchester: Harley Books.

- GALL, L F (1984). The effect of capturing and marking on subsequent activity in *Boloria acrocnema* (Lepidoptera: Nymphalidae), with a comparison of different numerical models that estimate population size. *Biological Conservation*, **28**: 139-154.
- HEATH, J, POLLARD, E and THOMAS, J A (1984). *Atlas of butterflies in Britain and Ireland*. Viking Press, Harmondsworth.
- JARVIS, F V L (1969). A biological study of *Aricia artaxerxes ssp. salmacis* (Stephens). *Proc. Br. Ent. Nat. Hist. Soc.*, **2**: 107-117.
- LEAKEY, M and ELLIS, S (1994). Survey of populations of the Durham argus butterfly *Aricia artaxerxes ssp salmacis* Stephens on the coast of NE England in 1994. Contract report to English Nature (North East Region).
- LEWIS, O T, THOMAS, C D, HILL, J K, BROOKES, M I, ROBIN CRANE, T P, GRANEAU, Y A, MALLET, J L B and ROSE, O C (1997). Three ways of assessing metapopulation structure in the butterfly *Plebejus argus*. *Ecological Entomology*, **22**: 283-293.
- POLLARD, E (1977). A method for assessing change in the abundance of butterflies. *Biological Conservation*, **12**: 115-134.
- POLLARD, E and YATES, T J (1993). *Monitoring butterflies for ecology and conservation*. Chapman and Hall, London.
- PRITCHARD, A (1989). *A strategy for the magnesian limestone grasslands*. Nature Conservancy Council.
- SCOTT, J A (1975). Flight patterns among eleven species of diurnal Lepidoptera. *Ecology*, **56**: 1367-1377.
- SELMAN, B J, LUFF, M L and MONCK, W J, (1973). The Castle Eden Argus butterfly *Aricia artaxerxes salmacis* Stephens. *Vasculum*, **58**: 17-22.
- SHREEVE, T G (1992). Monitoring butterfly movements. In *The ecology of butterflies in Britain*, ed by R. L. H. Dennis. Oxford University Press, Oxford, pp. 120-138.
- THOMAS, C D (1985). The status and conservation of the butterfly *Plebejus argus* L. (Lepidoptera: Lycaenidae) in north west Britain. *Biological Conservation*, **33**: 29-51.
- THOMAS, C D, THOMAS, J A and WARREN, M S, (1992). Distribution of occupied and vacant butterfly habitats in fragmented landscapes. *Oecologia*, **92**: 563-567.
- THOMAS, J A (1983a). A quick method of estimating butterfly numbers during surveys. *Biological Conservation*, **27**: 195-211.
- 1983b). The ecology and conservation of *Lysandra bellargus* (Lepidoptera: Lycaenidae) in Britain. *Journal of Applied Ecology*, **20**: 59-83.
- (1983c). The ecology and status of *Thymelicus acteon* (Lepidoptera: Hesperidae) in Britain. *Ecological Entomology*, **8**: 427-435.
- (1991). Rare species conservation: case studies of European butterflies. In *The scientific management of temperate communities for conservation*, ed by I. F. Spellerberg, F. B. Goldsmith and M. G. Morris. Blackwell Scientific Publications, Oxford, pp. 149-197.
- WARREN, M S (1992). Butterfly populations. In *The ecology of butterflies in Britain*, ed by R. L. H. Dennis. Oxford University Press, Oxford, pp. 73-92.
- WATT, W B, CHEW, F S, SNYDER, L R G, WATT, A G and ROTHSCCHILD, D E (1977). Population structure of Pierid butterflies. *Oecologia*, **27**: 1-22.
- WILSON, R J, ELLIS, S, BAKER, J S, LINEHAM, M E, WHITEHEAD, R and THOMAS, C D (in press). Large-scale patterns of distribution and persistence at the range margins of a butterfly. *Ecology*



## Appendix

Habitat and population parameters for *A. artaxerxes* sites in north-east England. Inland sites were surveyed in 1991 and coastal sites in 1994. Main MRR study sites indicated \*.

	Habitat patch size (ha)	Distance nearest occupied patch (km)	Distance nearest patch (km)	Population parameter		
				Density (n/ha)	Peak flight population size	
a) Extant sites						
INLAND						
Bishop Middleham Quarry	1.17	1.10	1.10	27.6	179.1	Medium
Cassop Vale *	0.18	0.90	0.90	14.2	31.8	Small
Cassop Vale	0.20	0.74	0.70	37.6	52.6	Small
Hawthorn Dene	0.01	0.10	0.10	58.3	24.4	Small
Pig Hill	0.02	3.45	2.69	70.0	32.5	Small
Pittington Hill *	0.28	2.66	2.66	300.0	451.5	Large
Quarrington Hill	0.21	0.74	0.72	17.2	35.4	Small
Raisby Hill Grassland	0.39	2.20	2.20	8.9	38.2	Small
Rough Furze Quarry	0.08	0.15	0.15	16.5	25.4	Small
Sherburn Hill *	0.67	2.32	2.32	40.1	143.9	Medium
Silent Bank	0.02	1.60	1.60	152.3	42.0	Small
Thrislington Plantation *	10.40	0.15	0.15	38.2	1872.9	Very large
Town Kelloe Bank	0.70	1.86	1.86	36.5	136.8	Medium
COASTAL						
Dawdon Bay North	0.18	0.18	0.18	941.2	809.8	Very large
Dawdon Bay South	0.08	0.18	0.17	235.2	105.0	Medium
Hawthorn Hive	0.03	0.10	0.10	200.0	45.0	Small
Hive Point	0.02	0.13	0.13	230.8	38.5	Small
Beacon Point	0.05	0.21	0.21	304.4	88.1	Small
Shippersea Point	0.01	0.29	0.29	666.6	48.1	Small
Shot Rock	0.06	0.29	0.29	372.0	121.4	Medium
Foxholes	0.21	0.74	0.74	274.0	286.2	Large
Horden Point	0.02	0.46	0.46	148.2	30.7	Small
Ash Gill	0.71	0.19	0.19	100.0	349.2	Large
Whiteside Gill	0.31	0.19	0.19	158.8	247.3	Large
Blackhills Gill	0.09	0.31	0.31	291.6	139.7	Medium
Horden	0.07	0.42	0.42	44.4	31.4	Small
Limekiln Gill & Hartlepool Point	0.38	0.17	0.17	65.8	133.9	Medium
Castle Eden Dene	0.38	0.17	0.17	64.0	130.7	Medium
Blue House Gill	0.19	0.64	0.64	107.6	112.6	Medium
Blackhall Rocks	0.03	0.64	0.59	153.8	38.5	Small
Cross Gill	0.03	0.87	0.28	146.4	37.4	Small
Hart Warren North	0.09	0.42	0.42	107.2	62.1	Small
Hart Warren South	0.04	0.42	0.42	80.0	31.9	Small
b) Extinct sites						
INLAND						
Castle Eden Dene	0.12	4.58	2.76			
Hastings Hill	0.55	10.08	3.74			
Hesleden Dene	0.07	3.32	2.76			
High Haining Hill	0.05	6.66	3.74			
Old Quarrington	0.02	0.70	0.70			
Steeley Ponds	0.01	0.84	0.84			
Tuthill Quarry	0.01	2.69	2.69			
COASTAL						
Chourdon Point	0.12	0.17	0.17			
Green Stairs	0.01	0.28	0.28			

## THE IMPORTANCE OF EXPOSED RIVERINE SEDIMENTS FOR BEETLES (COLEOPTERA) IN NORTHUMBERLAND

M D Eyre<sup>1,2</sup> and M L Luff<sup>1</sup>

<sup>1</sup>Department of Agricultural and Environmental Science, The University, Newcastle upon Tyne NE1 7RU

<sup>2</sup>EMS (Entomological Monitoring Services), 13 Manor Grove, Benton, Newcastle upon Tyne NE7 7XQ

### INTRODUCTION

Some habitats are important for invertebrates but tend not to be interesting for the more usual conservation priorities such as birds and plants. Amongst these few habitats are exposed sediments by rivers. These are known to be important for invertebrates, especially beetles (Fowles, 1989, 1994; RSPB, NRA and RSNC, 1995), and have recently received considerable attention (Eyre and Lott, 1997; Sadler and Bell, 2000) with regard to the distribution of rare invertebrate species and of sediments.

Beetle collectors have known for some time that a number of rare species occur on the sediments by some Northumberland rivers (Eyre, Luff and Ball, 1986) and riverine sediments were present in the classification of ground beetle habitats in north-east England (Luff, Eyre and Rushton, 1989). There have been attempts at national classifications of ground beetle habitats on sediments (Eyre, Lott and Garside, 1996; Eyre and Lott, 1997) with sites on Northumberland rivers providing considerable data. Since 1995 the unstandardised recording of beetles from sediments has been replaced by a more rigid procedure using pitfall traps (Luff, 1996) and a considerable amount of survey work has been carried out in Northumberland. This work has resulted in the recording of many nationally rare and scarce beetle species, reported in a number of publications (Luff, Eyre and Jessop, 1996; Eyre, Luff and Lott, 1998, 2000). However, these were restricted to reports of species distribution in the United Kingdom context. This paper describes the sediment types along some Northumbrian rivers and the rare and scarce species recorded from them, as well as observations on species and site rarity value and the potential effects of river management on species distribution and site quality.

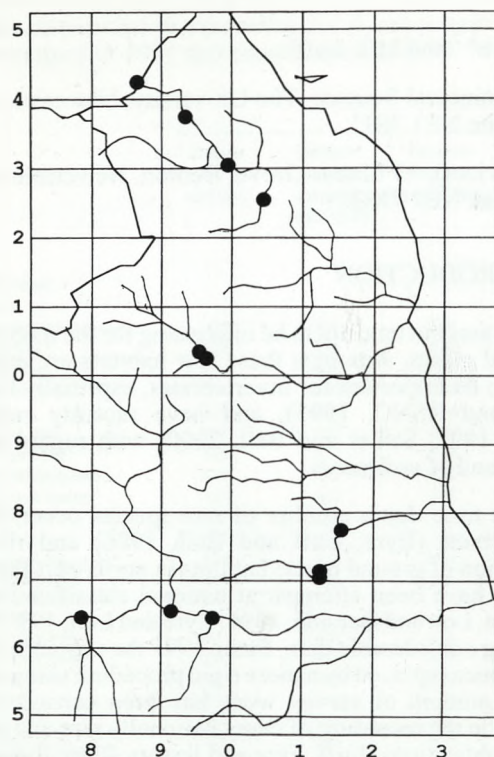
### Survey work

Pitfall trapping (Luff, 1996) with ten traps (8.5 cm diameter, 10 cm deep, part-filled with ethylene glycol) was used on various types of sediments by eight rivers in Northumberland (Fig. 1). The traps were set in April and sampling continued to the end of August.

In 1995 three sets of traps were set just below the confluence of the North and South Tynes (Tynemeet) (NY9165) on sand-dominated sediments and by the Devil's Water just before it joins the Tyne (NY9764), also in sandy sediments. Six sets of traps were set in varying sediments, from dry pebble/gravel to fine sand/silt, on the South Tyne at Beltingham (NY7864) in 1996. Silty sediments by the Rivers Pont (NZ1270/1271) and Blyth (NZ1577) were sampled using three sets of traps in 1996 and three sets were also used on sand/silt sediments by the River Tweed near St Cuthbert's (NT8642) in both 1996 and 1997. Sediments of mainly damp sand were sampled at three sites by the River Till in 1997; two sets at Newtown (NU0425), three sets at Doddington Bridge (NT9930) and two sets near Ford (NT9337). A further four sets of traps were set by the River Coquet (NT9503/9602) in 1997 in sediments that were dry with a mixture of cobbles, pebbles and gravel with some sand.

In addition, the sediments at Doddington Bridge have received considerable attention in 1990 from a number of beetle recorders and the results were collated by Professor John Owen. These records have also been used in this paper.





**Fig. 1** Map showing the location of the Northumberland exposed riverine sediment sites, with 10km National Grid squares shown. Site names and grid references are given in the text.

which site rarity totals (SRT) and species quality scores (SQS) can be generated in order to rank sites for conservation purposes. Geometric scales have been used previously by Eyre, Lott and Garside (1996) and Eyre and Lott (1997) with riverside beetle data. If a score of 1 is assigned to the commonest species, then Ns and Nb species are scored 2, Na is 4, RDBK and RDB3 is 8, RDB2 is 16 and RDB1 would be 32. The species scores for a site are summed to give the SRT and this total is divided by the number of species to give the SQS.

### Species recorded

A total of eighty-five species with national rarity or scarcity species were recorded from sediments by rivers in Northumberland in the 1990s. The list is shown in the Appendix, together with the appropriate statuses. The nomenclature follows that used by Hyman and Parsons (1992, 1994).

The national statuses were generated from pre-1990 data, before the advent of more standardised invertebrate survey work. Problems have been encountered with the accuracy of these statuses (Eyre, 1998; Eyre, Luff and Lott, 2000), affecting a number of species in the Appendix list. This means that the records of a number of species in Northumberland need to be interpreted carefully. Examples of these, and other interesting species, are given below.

### Rare and scarce species and site quality

National rarity and scarcity statuses were designated for beetles in the United Kingdom by Hyman and Parsons (1992, 1994). These were:

Red Data Book 2 (RDB2), Vulnerable. Species declining throughout their range or in vulnerable habitats

Red Data Book 3 (RDB3), Rare. Localised species estimated to exist in fifteen or fewer post-1970 10 km squares.

Red Data Book K (RDBK). Insufficiently known. Species where there is not enough data for a more precise status to be assigned.

Nationally Scarce A (Na). Species thought to occur in between sixteen and thirty 10 km squares.

Nationally Scarce B (Nb). Species thought to occur in between thirty-one and a hundred 10 km squares.

Nationally Scarce (Ns). Species thought to occur within sixteen and a hundred 10 km squares but where subdivision was not possible.

These rarity and scarcity statuses can be used to generate species rarity scores from

*Amara fulva* (Nb)

A ground beetle species thought to be declining in the UK (Hyman and Parsons, 1992), it has been found frequently on sandy river sediments as well as dunes and on inland sand workings.

*Bembidion schueppeli* (Na)

This ground beetle species has a distribution limited in the UK to northern England and Scottish border riversides (Reid and Eyre, 1985) but within this restriction it appears to be common on nearly all rivers within vegetated sediments.

*Bembidion testaceum* (Nb)

There are few recent records of this ground beetle in the UK (Luff, 1998) with most on the Tyne and South Tyne. It appears to be far rarer than its status implies.

*Pterostichus cristatus* (Nb)

This is a ground beetle thought to have been introduced into the UK in the mid 1800s via ballast by the Tyne. It has become very common in north-east England (Eyre, Luff and Ball, 1986) and is found in woods and unmanaged grasslands, as well as riversides.

*Thalassophilus longicornis* (Na)

The previous records for Northumberland for this river shingle ground beetle species were from Cumberland (Eyre and Luff, 1987) and this record from beside the River Coquet is the first authentic one for Northumberland (Eyre, Luff and Lott, 2000).

*Barynotus squamosus* (Nb), *Brachysomus echinatus* (Nb), *Grypus equeseti* (Nb), *Omiomima mollina* (Na), *Otiorhynchus desertus* (Nb), *Tropiphorus obtusus* (Na), *Tropiphorus terricola* (Nb)

These weevil species are all examples of beetles which have previously been difficult to find but which occur readily in pitfall traps. They are generally dry soil species and occur in Northumberland in other dry grassland habitats on the coast and on post-industrial land and are not as rare as Hyman and Parsons (1992) infer.

*Hypera diversipunctata* (RDB3)

Another under-recorded weevil species, the records from beside the Tyne and South Tyne are the first for Northumberland. However, it is not confined to riversides with a record from a hay meadow in Upper Teesdale (Luff, Eyre and Jessop, 1996) and is probably not as rare as previously thought.

*Dryops nitidulus* (RDB3)

This is a water beetle found by stream and riversides and the record from the Tyne is the first for Northumberland (Eyre, Luff and Lott, 2000).

*Fleutiauxellus maritimus* (Na)

This click beetle has proved to be common by rivers in northern England and Scotland (Eyre, Luff and Lott, 2000) where the sediment is dominated by cobbles and pebbles.

*Negastrius sabulicola* (RDB2)

A nationally rare click beetle (Mendel and Clarke, 1996) found by the Devil's Water and Till in Northumberland, the presence of this species in the area indicates the availability of natural habitat.

*Georissus crenulatus* (Na)

A burrowing water beetle found in damp sand, this species is abundant by the Till and was also found by the Devil's Water.



*Helophorus arvernicus* (Nb), *Ochthebius bicolon* (Nb)

These water beetles are examples of species which were thought to be scarce until pitfall traps were used in standardised sampling. They are both common, both nationally and regionally.

*Choleva glauca* (Ns)

A beetle associated with mammal runs and nests, and therefore difficult to collect. It has been taken from a number of habitat types in northern England and Scotland (Eyre, Luff and Lott, 1998, 2000) using pitfall traps.

*Actidium aterrimum* (RDBK)

A tiny ptiliid beetle found in damp sand and shingle, the record from beside the River Till at Doddington Bridge is the only one in the UK in the twentieth century (Hyman and Parsons, 1994).

*Aegialia sabuleti* (Nb)

A scarabaeid beetle burrowing in sand and silty sediments that is far more common than indicated in Hyman and Parsons (1992).

*Aleochara ruficornis* (Ns), *Erichsonius signaticornis* (Nb), *Gabrieus bishopi* (Nb), *Ilyobates subopacus* (Ns), *Quedius longicornis* (Nb)

These rove beetles are examples of species which occur in a number of habitat types and which have proved to be more common than previously thought because of the use of pitfall traps.

*Aloconota eichhoffi* (Ns), *Atheta ebenina* (RDBK), *Atheta obfuscata* (Ns), *Atheta sylvicola* (RDBK), *Myllaena elongata* (Ns), *Neohilaria subterranea* (RDBK), *Ocyusa hibernica* (Ns), *Omalium rugatum* (Ns), *Oxypoda exsoleta* (Ns)

These are examples of rove beetle species with few Northumberland records (Luff, Eyre and Jessop, 1996; Eyre, Luff and Lott, 1998, 2000) but which have been recorded on sites where the sediments tend to be silty and replicate other wetland habitat types. There are records from other regions of the UK (Hyman and Parsons, 1994) in other habitat types.

*Deleaster dichrous* (Nb)

Although only recorded from two sites in Northumberland, this rove beetle species has been found to be common on a number of dry shingle sediments in northern England and Scotland (Eyre, Luff and Lott, 1998, 2000).

*Hydrosmeeta delicatula* (RDBK), *Hydrosmeeta fragilis* (Ns), *Hydrosmeeta thinibioides* (Ns), *Hydrosmeeta septentrionum* (Ns), *Tachyusa scitula* (RDBK), *Thinobius bicolor* (Na), *Thinobius praetor* (Ns), *Thinobius strandi* (Ns)

These rove beetles are specialist river sediment animals, living within shingle/sand deposits. They are difficult to find and do not readily fall into pitfall traps. This may explain their supposed rarity and they may be under recorded.

*Lathrobium angusticolle* (Nb)

Another specialist rove beetle, found at only one site on the Tweed. However, there are a number of other records from the Scottish borders on other rivers and streams in the Tweed catchment (Eyre, Luff and Lott, 1998, 2000).

*Lathrobium dilutum* (RDB3)

This is a nationally rare river shingle rove beetle species with the only Northumberland record from Beltingham on the South Tyne (Eyre, Luff and Lott, 2000).

### *Ocypus nero* (Na)

Another rove beetle species which appears to have little habitat fidelity. It has also been recorded from beside the River Nith in south-west Scotland (Eyre, Luff and Lott, 2000) and is at the northern limit of its range in Northumberland.

### Site quality

The Site Rarity Totals (SRT) and Species Quality Scores (SQS) for the ten sites are given at the end of the Appendix. The highest SRT (116) was for the Till at Doddington Bridge with another large total (100) for the South Tyne at Beltingham. These high totals may reflect the amount of effort put into sampling these sites but they indicate high value conservation areas for invertebrates. The Tynemeet and Devil's Water both had SRTs of 72, indicating other high value sites in the Tyne valley. The Ford and Newtown sites on the Till had SRTs of 38 and 34 respectively whilst the SRT of the St Cuthbert's site on the Tweed was 36. The lowest SETs were on the Coquet (26), Blyth and Pont (both 24).

The Species Quality Scores (SQS) for the ten sites had a smaller range than the SRT values but the two highest were again for Doddington Bridge (2.97) and Beltingham (2.94). The next highest were for Newtown (2.83) and Devil's Water (2.77) whilst the ones for the Coquet (2.60), Tynemeet (2.57) and St Cuthbert's (2.57) were very similar. The SQS for the Pont (2.40) and at Ford (2.38) were higher than that for the Blyth (2.18).

### Sediment types and distribution

It was obvious from the field work associated with the surveys of sediments beside Northumberland rivers that a variety of sediment types were present by different rivers in the county. The variation appeared to be due to differences in geology and topography.

The rivers draining the sandstones of the Pennines (Tyne, South Tyne, Devil's Water, Tweed) all had a variety of sediments. The sediments at Beltingham on the South Tyne were a mixture of dry pebbles, shingle and sand near the main channel but the variety of sediment types was increased by an island near the southern side. The island slowed water flow and a number of damp sand and silt sediments with considerable vegetable detritus were deposited. These had a different beetle assemblage compared to the drier sediments and species were recorded with a wider habitat range than those on sand/shingle/pebble sediments. The drier types of sediment dominated the Tynemeet and Devil's Water sites but there was a deposition of sand/silt sediments beside the Tweed where there was an old cut-off bend with little flow.

The River Till is a peculiar river, draining the Cheviot massif into a basin before flowing into the Tweed. Most of the sediments deposited by the Till are sandy, with some shingle but few sites with pebbles and cobbles. The water levels on this river depend on rainfall on the Cheviot and fluctuate readily. This means that sediments along this river tend to remain damp but vegetation cover remains limited because they are so often under water. These sandy 'beaches' by the river are a habitat not present on other rivers in Northumberland, and probably not in the UK, and provide a diverse invertebrate habitat with a high number of rare and scarce species. The Coquet also drains the Cheviot but because the flow is not restricted by the curious topography seen along the Till, the sediments are those more usually seen by fast-flowing rivers. However, the sediments sampled in the survey tended to be less consolidated than those by the Tynes, with a loose mixture containing a considerable amount of cobbles and pebbles. These sites were very dry with little vegetation and appeared to be more disturbed than the Tyne sites.

The rivers draining the hills of Northumberland contrast with the sediments by the Rivers Pont and Blyth. These rivers flow through lowland boulder clay areas and the sediments sampled were dominated by silt and/or clay. There was far less diversity of sediment beside these rivers compared to either the Tweed or Tynes but a number of scarce species were still recorded.



### Effects of river management

One aspect of Northumberland rivers, when compared with both the Scottish and the more southern English rivers, is that there has been relatively little river management, either by impoundment or by bank engineering. The South Tyne and Tyne, including the confluence with the Devil's Water, remain generally unaffected by river engineering until nearing the upper tidal limit, well downstream of the sediments with important beetle assemblages. There has been some bank strengthening on the Tyne, especially near roads and the North Tyne has been dammed at Kielder where the flow is now regulated. The Tweed, however, is a highly engineered river, especially in Scotland. It has been straightened and has bank resectioning, producing right-angled banks, from near its source. In contrast, on the downstream stretches that form part of the Northumberland border there appears to be only intermittent bank strengthening with a reasonable flood plain and the presence of a variety of sediment types. On the Tweed this sediment variety is enhanced by a number of cut-offs whilst on the South Tyne it is increased by the presence of islands. Cut-offs and islands reduce flow rate so that the deposition of sediments is slowed and finer particle sediments are formed.

Earth banks have been constructed along the line of the River Till along a number of stretches, presumably to try to limit flooding. However, these are back from the riverbank and do not include any engineering by the river itself. The earth banks appear to be a sufficient distance from the water so that natural deposition of sediments by the Till is still possible. The River Coquet appears to be unaffected by engineering upstream of Rothbury but rivers such as the Blyth and Pont tend to be engineered to prevent flooding of productive agricultural land and urban areas. On the Blyth and Pont the sediments are limited to silt and clay because of the topography and slow-flowing conditions.

There may be future problems along some Northumberland rivers brought about by the need to prevent the flooding of urban and intensively managed agricultural areas. This would require riverbank engineering and possibly river straightening. Both these measures increase river flow, in an effort to remove the potential for flooding. The increased flow results in either the removal of riverine sediments or a change in sediment structure to ones dominated by cobbles and boulders which are a poor invertebrate habitat.

### CONCLUSIONS

It is obvious from the data presented in the Appendix and from the Site Rarity Totals that some Northumberland rivers, especially the Till, South Tyne and Tyne, are very important for invertebrate conservation. Riverine sediments generally have little interest for birds and plants, although on the River South Tyne some sediments are sites for metalliferous plants. This lack of importance for popular conservation species has limited the understanding of the importance of these sites. However, there have been some recent attempts to publicise the importance of riverine sediments for invertebrates, especially beetles (Eyre and Lott, 1997; Sadler and Bell, 2000).

One feature that should ensure that riverine sediments are taken seriously in a conservation context is that, on rivers such as the Tynes and Till, they are an example of one of the few natural habitats still extant. In rural counties such as Northumberland the landscape is still highly managed with few natural areas and habitats. Sediments on unmanaged rivers provide invertebrate habitats relatively unaffected by man. This may explain why there are so many rare and scarce beetle species on the sediments of the rivers of Northumberland and why so many of these are not solely sediment specialist species. Sediments appear to be providing, for instance, the most natural inland dry grassland habitat on some sites and silty, wetland substrates on others. Care will need to be taken if management procedures are to be carried out in future on rivers to ensure that valuable sediment sites of considerable conservation importance are not negatively affected.

## REFERENCES

- EYRE, M D (1998). Invertebrates and the environment: a time for reassessment? *Antenna*, 22, 63-70.
- EYRE, M D and LOTT, D A (1997). Invertebrates of Exposed Riverine Sediments. Project Record W1/i525/1. 140pp. Environment Agency, Bristol.
- EYRE, M D, LOTT, D A and GARSIDE, A (1996). Assessing the potential for environmental monitoring using ground beetles (Coleoptera: Carabidae) with riverside and Scottish data. *Annales Zoologici Fennici*, 33, 157-163.
- EYRE, M D and LUFF, M L (1987). Additions and corrections to the Carabidae (Coleoptera) of north-east England. *Entomologist's Gazette*, 38, 75-81.
- EYRE, M D, LUFF, M L and BALL, S G (1986). An Atlas of the Carabidae (Ground Beetles) of Northumberland and County Durham. Hancock Museum, Newcastle upon Tyne.
- EYRE, M D, LUFF, M L. and LOTT, D A (1998). Rare and notable beetle species records from Scotland from survey work with pitfall traps, 1992-1996. *Coleopterist*, 7, 81-90.
- (2000). Records of rare and notable beetle species from riverine sediments in Scotland and northern England. *Coleopterist*, 9, 25-38.
- FOWLES, A P (1989). The Coleoptera of shingle banks in the River Ystwyth, Dyfed. *Entomologist's Record and Journal of Variation*, 101, 209-221.
- (1994). Invertebrates of Wales: a review of important sites and species. 157pp. Joint Nature Conservation Committee, Peterborough.
- HYMAN, P S and PARSONS, M S (1992). A review of the scarce and threatened Coleoptera of Great Britain. Part 1. UK Nature Conservation, 3, 1-484.
- (1994). A review of the scarce and threatened Coleoptera of Great Britain. Part 2. UK Nature Conservation, 12, 1-248.
- LUFF, M L (1996). Environmental assessments using ground beetles (Carabidae) and pitfall traps. In: Eyre MD (ed.) *Environmental Monitoring, Surveillance and Conservation using Invertebrates*, 42-47. EMS Publications, Newcastle upon Tyne.
- (1998). Provisional Atlas of the Ground Beetles (Coleoptera: Carabidae) of the British Isles. Institute of Terrestrial Ecology, Huntingdon.
- LUFF, M L, EYRE, M D and JESSOP, L. (1996). Records of new and local Coleoptera in north-east England. *Entomologist's Gazette*, 47, 257-265.
- MENDEL, H and CLARKE, R E (1996). Provisional Atlas of the Click Beetles (Coleoptera: Elateroidea) of Britain and Ireland. Ipswich Borough Council, Museums, Ipswich.
- SADLER, J and BELL, D (2000). A comparative site assessment of Exposed Riverine Sediment (ERS) beetle faunas in south-west England. *English Nature Research Reports*, No. 383, 1-27.
- REID, C A M and EYRE, M D (1985). Distribution of *Bembidion schueppeli* Dejean (Coleoptera : Carabidae) in the British Isles. *Entomologist's Gazette*, 36, 197-200.
- RSPB, NRA and RSNC (1995). *The New Rivers & Wildlife Handbook*. 426pp. Royal Society for the Protection of Birds, Sandy.



## Appendix

Records of nationally rare and scarce beetle species (RDB2, Red Data Book 2; RDB3, Red Data Book 3; RDBK, Red Data Book K; Na, Nationally Scarce A; Nb, Nationally Scarce B; Ns, Nationally Scarce) from exposed riverine sediments on rivers in Northumberland (South Tyne, Beltingham NY7864; Tyne, Tynemeet NY9165; Devil's Water NY9764; Pont NZ1270/1271; Blyth NZ1577; Coquet NT9503/9602; Till 1, Newtown NU0425; Till 2, Doddington Bridge NT9930; Till 3, near Ford NT9337; Tweed, St. Cuthbert's NT8642).

Species	South Tyne	Tyne	Devil's Water	Pont	Blyth	Coquet	Till 1	Till 2	Till 3	Tweed
<b>Anthribidae</b>										
<i>Anthribus nebulosus</i> Nb								+		
<b>Carabidae</b>										
<i>Amara fulva</i> Nb	+	+	+				+	+		
<i>Asaphidion pallipes</i> Nb	+	+	+							
<i>Bembidion bipunctatum</i> Nb								+		+
<i>Bembidion litorale</i> Nb	+						+	+		+
<i>Bembidion lunatum</i> Nb								+		
<i>Bembidion monticola</i> Nb	+	+	+		+			+		
<i>Bembidion schueppeli</i> Na	+		+	+	+	+	+	+	+	+
<i>Bembidion stomoides</i> Nb	+		+							
<i>Bembidion testaceum</i> Nb	+	+	+							
<i>Pterostichus cristatus</i> Nb	+	+	+	+	+					
<i>Thalassophilus longicornis</i> Na						+				
<i>Trechus rubens</i> Nb			+		+			+		+
<b>Chrysomelidae</b>										
<i>Aphthona nigriceps</i> Na							+			

[illegible]



*Paraphotistus impressus* Nb

*Riolus cupreus* Nb

*Georissus crenulatus* Na

*Helophorus arvernicus* Nb

*Ochthebius exsculptus* Nb

*Cercyon ustulatus* Nb

*Liocytusa minuta* Ns

*Actidium aterrimum* RDBK

*Lathrobium dilutum* RDB3





## THE FUTURE OF FARM GRASSLAND AS A DIVERSE, PRODUCTIVE ENVIRONMENT

R S Shiel

Agriculture Department, Newcastle University, Newcastle upon Tyne NE1 7RU

### SUMMARY

The Palace Leas meadow hay plots at Cockle Park experimental farm in Northumberland demonstrate that a large diversity of flora and fauna can be associated with high yields of herbage of good quality hay from an old meadow fertilised only with farmyard manure. The farmyard manure plots provide a yield equivalent to about 75% of a modern ley which has been heavily fertilised. However, the herbage is also diverse on the manure plots, although not so diverse as on plots receiving only phosphate fertilisers, which have the largest diversity, but only 68% of the yield of land manured annually. The additional broad-leaved species on plots with a greater botanical diversity have a larger mineral content than the grasses and are grazed preferentially by the livestock. Plots with no input of manure or fertiliser not only have a small yield, they lack botanical diversity, contain few broadleaved species and are not particularly attractive to grazing livestock. The meso- and micro-organisms of the plots are also related to the treatments. Micro-organism activity is much greater on the plots which are supplied with manure, even months after the manure is applied, and worm and insect populations also are greatest on the most productive plots.

### INTRODUCTION

Until the popularisation of rotational farming by visionaries such as Townshend in the 18th century, grass was permanent. This category of grassland remains today in the Agricultural Statistics (published annually by the British Government since 1866), but old grassland has been viewed as less productive than the leys that are now so common (Moore, 1944). Part of the reason for low productivity is that permanent grass is usually produced in a situation where there is some good reason for not cultivating the land – the risk of flooding for example (Coppock, 1976). Leys, however, are species-poor and often are left for too short a time to develop the rich associations of plants and other organisms that can be found in environments such as the Dales hay meadows (Smith, 1988). Since the coming of cheap nitrogen fertilisers, even the diversity of the 'Cockle Park seeds mixtures' (Pawson, 1947), popular in the first half of the 20th century, and the presence of dicots including legumes in seed mixtures have been lost. Today, many leys contain only one or two species of grasses. However, with growing interest in ecology from the wider community, the introduction of environmental and 'stewardship' payments by Government (DEFRA, 2001) and the growth of organic farming, could there be a future for the more traditional permanent grass? Could it provide productivity and diversity? A site where this can be studied is the Palace Leas meadow hay plots at Newcastle University's Cockle Park experimental farm (Pawson, 1960). This site consists of a field, described as 'old land hay' in 1896, and it has been managed as a hay meadow with a range of manure and fertiliser treatments ever since. The yield of hay has been recorded every year and, over the century, a long list of other measurements has been made, including some fourteen botanical analyses of the plots.

### The experiment at Palace Leas

Part of the field was marked out in 1896 into plots that are now each about 120 m by 15 m. On each a manure, fertiliser, or combination of two or more was applied, apart from one plot which was left as an untreated 'control' (Table 1). The amounts of fertiliser are small by modern standards but were considered generous at the time. The fertiliser treatments have continued unchanged apart from the change from basic slag to triple superphosphate as the phosphorus-containing fertiliser in 1976.



**Table 1** Manure and fertilisers applied to the plots, and the amount of nutrients supplied in them.

Plot	Manure t/ha	Fertilisers currently applied – kg/ha				Nutrients supplied kg/ha		
		AS <sup>1</sup>	TSP <sup>2</sup>	MP <sup>3</sup>	CN <sup>4</sup>	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
1	20		40	44	46	55	117	80
2	20		0	0	0	0	100	60
3	20/0*		0/40	0/44	0/46	0/55	58	40
4	20/0		0	0	0	0	50	30
5	40/0/0/0	0/40/40/40	0/44/44/44	0/46/46/46	0/55/55/55		62	23
6	0		0	0	0	0	0	0
7	0		160	0	0	0	34	0
8	0		0	87	0	0	0	41
9	0		0	0	93	0	0	0
10	0		160	87	0	0	34	41
11	0		160	0	93	0	34	0
12	0		0	87	93	0	0	41
13	0		160	87	93	0	34	41

<sup>1</sup>Ammonium sulphate, <sup>2</sup>Triple superphosphate, <sup>3</sup>Potassium chloride, <sup>4</sup>Sodium nitrate. \*Plots 3-5 receive different materials on a two or four year cyclic basis. In this case, the plot receives 20 t/ha FYM in one year and chemical fertilisers in the next.

The farmyard manure is applied in the winter and the fertilisers in the spring just as growth begins. The field is grazed with young stock or sheep after the hay harvest, usually in mid-July, until the field is shut up for hay in about the following March. The hay yield has been measured each year and samples are occasionally taken from the cut hay for analysis of its nutritional value. At irregular intervals, samples have also been taken at or just before hay harvest for botanical assessment, though the methods used have not been identical between years. The aftermath regrowth has also been measured by caging the plots with exclosures that are moved between grass cuts (Shiel and Batten, 1988). Also, the chemical composition of the major species has been compared between plots (Thomas and Thompson, 1948). Taken together this information allows consideration to be given to both the agricultural and ecological value of the plots.

### The botanical composition

There was, unfortunately, no measurement made before the experiment began, but analyses were carried out biennially over the first ten years. These observations fail to indicate any consistent trend in botanical composition as a result of treatment (Shiel and Hopkins, 1991). There was then a long gap until 1947, and all the analyses carried out subsequently have indicated a consistent pattern (Table 2).

The plots which receive farmyard manure (1-5) all tend to be dominated by the taller, agriculturally productive grasses, and this is most marked on plots 1 and 2 which receive annual applications of manure. Short grasses, typical of unfertilised grasslands, dominate the untreated control plot, and it contains few broadleaved plants: the potash plot is somewhat similar. The floras of the plots receiving phosphate but no nitrogen (plots 8 and 12) are much more diverse as measured by the Shannon-Weiner index (Magurran, 1988) and contain large numbers of broadleaved plants including legumes. Nitrogen fertiliser application has tended to result in extreme acidification of the soil: its use without phosphate, which has a liming value, has resulted in a species-poor sward, particularly on plots 7 and 11. These results are not surprising and are similar to those obtained on comparable treatments at the Park Grass experiment at Rothamsted (Warren and Johnston, 1965). The soil acidification resulting from the use of nitrogen, particularly as sulphate of ammonia, is classic (Gasser, 1985), but as the effect takes several years the absence of effect on the botanical composition of the sward in the first years is not surprising. The diverse sward is rich in broadleaved plants on the

**Table 2** Simplified botanical composition of the more common species on the plots in 1984 based on the Domin scale (Shimwell, 1971) and the diversity for the same year.

Plot	1	2	3	4	5	6	7	8	9	10	11	12	13	
<i>Agrostis tenuis</i>	-	-	-	4	4	5	5	-	5	4	8	5	4	
<i>Alopecurus pratensis</i>	4	5	2	4	2	-	-	1	-	-	-	1	1	
<i>Anthoxanthum odoratum</i>	4	-	5	4	3	4	6	4	2	5	6	3	5	
<i>Bromus mollis</i>	6	4	5	6	4	1	-	1	-	-	-	1	1	
<i>Cerastium holosteoides</i>	3	4	4	5	4	1	1	4	-	-	-	2	1	
<i>Cynosurus cristatus</i>	-	-	-	-	-	-	-	6	-	1	-	5	1	
<i>Festuca</i> spp.	3	-	2	4	3	8	5	5	8	8	8	4	4	
<i>Holcus</i> spp.	6	6	7	8	7	6	6	3	4	5	-	4	9	
<i>Lolium perenne</i>	8	8	6	7	7	-	-	6	-	3	-	5	3	
<i>Plantago lanceolata</i>	-	-	-	-	3	5	-	5	3	2	-	4	-	
<i>Trifolium</i> spp.	-	-	-	-	4	3	-	5	3	2	-	4	-	
Shannon index	Weiner	2.43	2.31	2.03	2.12	2.16	1.67	1.67	2.45	1.70	2.12	1.55	2.59	1.99

Data from Shiel and Hopkins, 1991.

phosphate-treated plots, particularly where no nitrogen is given. This is partly due to the effect of this element in encouraging the activity of legumes (Gilchrist and Louis, 1917). The presence of broadleaved plants tends to encourage close grazing of the sward (see below) and this results in an open surface in which other plants can establish. The surprise result is the diversity found on the farmyard manure plots. It is commonly believed that increased use of nitrogen and phosphate fertilisers and manures reduces diversity (Smith, 1988), yet here we have moderate amounts of both (even by modern standards) resulting in diversities which on plots 1, 2 and 3 are only exceeded by the phosphate with no nitrogen plots (8 and 12). The reason for the large diversity on plots 1 to 3 may be that the combination of use of solid manure and aftermath grazing has caused numerous niches from hoofprints, dung and urine patches and manure-fall, all of which allow a diverse flora to establish. A similar argument can be hazarded to explain the diversity on the phosphate-treated plots with no manure-fall. The intensive grazing of these plots does result in dung fall and urine patches, though less than on the plots with unpalatable grasses which are used as rest areas (Shiel and Batten, 1988). It must also be noted that the time for change in the botanical composition to become visible was substantial, even with the extreme differences of treatment applied here.

### Grazing behaviour and herbage regrowth on the plots

Palace Leas is unique in being grazed: the Park Grass experiment is cut twice a year (Warren and Johnston, 1965). The problem with the grazing of the plots is that as they are not separately fenced the animals select which to graze based on their preference. Where data is available, they graze the farmyard manure and phosphate-treated plots hard (Shiel and Batten, 1988) and the phosphate-only plot (8) is often like a bowling green (Table 3). Herbage regrowth is greatest on the plots receiving farmyard manure (2), which has a residual effect (Hall, 1921) and on phosphate treated plots receiving no nitrogen (8), which have an on-going supply of nitrogen fixed by legumes (Table 2). The aftermath regrowth on plots receiving nitrogen without phosphorus (7) is shunned, only half being eaten, and the plots are used as a place to lie up and to defecate (Shiel and Batten, 1988). These plots have no lumbricid worms (Standen, 1982) because of the acid conditions, and as a result the manure lies on the surface and is very slowly consumed by insects and enchytraeid worms. The result of this is that plots 7 and 11 have a fibrous matted surface with numerous bare patches. Ruderal plants sometimes become established on the edge of the dung and urine patches, but do not survive the returning acidity. It seems from this that the animals have a critical role in facilitating at least part of the botanical divergence of the swards.



### The agricultural value of the swards

The yield of Metabolisable Energy (GJ/ha) is based on a combination of the nutritional value of the hay (Metabolisable Energy of herbage, MJ/kg) and the yield. From the first year of harvest differences appeared in the hay yield which have been maintained ever since (Table 4). Though the botanical composition changed only slowly, the Metabolisable Energy (ME) yield and protein content, as measures of agricultural value, changed quickly. As the ME of the herbage differs little between the plots but is negatively correlated with yield ( $P=-0.636^*$ ), the increase in ME yield is due to the increased growth resulting from the applied nutrients and this is present in a herbage with a low energy concentration. The energy content of the herbages are similar to or slightly below the 'average' figure (8.6 MJ/kg) suggested by SAC (1999), probably as a result of the hay being cut rather late to allow maturity of herbage on all the plots. The protein content varies more strongly between plots than does the ME of the herbage, and is more strongly negatively related to yield ( $P=-0.798^{***}$ ). The content of the two major minerals shown are both correlated with the yield (P,  $P=0.801^{***}$ ; K,  $P=0.672^*$ ) and are related to the amount and type of manures and fertilisers supplied (Table 1), some of which contain these nutrients.

Phosphorus, in particular, is correlated with the ME of the herbage ( $P=-0.625^*$ ) and with ME yield ( $P=0.844^{***}$ ) whereas potassium is not correlated significantly with either. Where analyses of the mineral content of individual species has been carried out (Table 5), it is clear that much of the difference between bulk measurements occurs due to differences in the

**Table 3** Dry matter (DM) growth and consumption after the hay cut on selected Palace Leas plots.

Measurement	Plot					
	2	6	7	8	10	13
Growth t/ha	2.91	1.94	2.14	2.56	2.19	2.32
Grazed t/ha	2.22	1.23	1.06	2.06	1.43	1.53
Ungrazed t/ha	0.69	0.71	1.08	0.50	0.76	0.79
% of grazed	76	63	50	80	65	66

Data from Shiel and Batten, 1988.

individual species rather than being due to changes in the species mixture. The increase in herbage phosphorus is proportionately larger as a result of nutrient application than is the increase in potassium and the content of both tends to be greater in the dicot than in the monocot species. These trends are common to other species examined (Thomas and Thompson, 1948). The mineral-rich broadleaved plants are favoured by the livestock and are grazed accordingly (Shiel and Batten, 1988). The mineral composition is not, however, usually considered a major factor in valuing herbage; metabolisable energy and digestible protein are the dominant factors (SAC, 1999). The farmyard manure plots, especially the annually-treated plots, have consistently given the largest yields (Table 4) and these remain good by modern standards when the reduced costs of crop establishment and nutrient purchase are taken into account.

The very good aftermath growth of the farmyard manure plots (Table 3) is not surprising as the repeated use of farmyard manure builds up large reserves of easily degraded nitrogen compounds in the soil (Hopkins, 1988) which continue to increase growth even in subsequent years. The plots (3-5) which receive farmyard manure on a biennial or quadrennial basis (Table 1) do not give a clear yield cycle with low yields in the years when they are not manured (Coleman *et al.*, 1987).

**Table 4** Hay yield, nutritional value and mineral content of hay samples Palace Leas meadow hay plots.

Plot	Average yield kg/ha	***Metabolisable energy		**Digestible crude protein %	***P g/kg	***K g/kg
		MJ/kg	GJ/ha			
1	6496	8.09	52.6	4.41	2.79	16.02
2	5920	7.63	45.2	4.52	2.40	14.77
3	5142	8.04	41.3	5.13	2.44	13.44
4	4824	7.98	38.5	4.10	2.44	9.63
5	5120	8.21	42.0	4.61	2.27	11.04
6	2554	8.33	21.3	6.89	1.44	8.13
7	3049	8.43	25.7	6.33	1.31	10.21
8	3463	8.16	28.3	5.10	2.53	6.14
9	2317	8.89	20.1	5.87	1.35	10.79
10	4113	8.08	33.2	5.51	2.49	5.14
11	2928	8.52	24.9	6.03	1.48	8.38
12	3873	7.92	30.7	4.71	2.44	9.13
13	4415	8.73	38.5	4.50	2.40	9.29

\*Data from Coleman *et al.*, 1987. \*\*Data from Thomas *et al.*, 1955a. \*\*\*Data adapted from Thomas *et al.*, 1955b.

## General Discussion

Plot 2 has given an average yield of hay plus autumn aftermath of some 9 t/ha with no input other than farmyard manure; this is similar to the estimated yield of rotational grass receiving 70 kg N/ha (SAC, 1999). Ignoring the cost of the fertiliser, the amount of nutrients applied at Palace Leas is similar, then there is a saving of some £60/ha per annum at Palace Leas because there have been no costs of resowing for over a century. The Palace Leas result can be compared with a three year average yield of 10.24 t/ha DM at Cockle Park farm for leys cut six times and fertilised with 300 kg N/ha, (Shiel *et al.*, 1999) that is only slightly lower than the 12 t/ha equivalent for hay and aftermath grazing suggested by SAC (1999) at 200 kg N/ha. The higher yields on these rotational grasslands not only incur the cost of establishment every four or so years, they also have the cost of the extra nitrogen (£36 in the latter case (SAC, 1999)).

The botanical diversity of the farmyard manure plots is high, but there are fewer of the dicots and few legumes due to the ongoing availability of soil nitrogen and presence of taller grasses when compared to the fertilised plots. In addition, these plots have active and diverse meso- and micro-faunas (Standen, 1982; Hopkins and Shiel, 1996). Furthermore, these plots yield well in dry years; their yield has a smaller coefficient of variation than does that of the less-diverse and poorer yielding plots (Coleman *et al.*, 1987). This has been attributed to differences in the rooting depth and soil structure, probably as a result of the variation in worm population with manure application. There is no doubt that the low-yielding plots 8 and 12 have the more-diverse flora (Table 2) and, being subjective, they do appear more attractive in spring because of the large numbers of flowers present. These plots are also attractive to the stock (Table 3) and provide a hay and aftermath with a larger energy density, more protein and more minerals (Table 4). The composition of the grass from the farmyard manure plots is not, however, considered to be in the 'inadequate' range for any nutrients. If the level of diversity and attractiveness of plots 8 and 12 is sought, then the farmer will certainly have to be compensated for the loss of output, which is 68% of that on plot 2. However, the plots are not at present managed individually because of the layout of the field. If it were possible to treat each separately and to graze them intensively at the time appropriate for each, then it is likely that the farmyard manure plots could be grazed harder, encouraging more of the shorter broadleaved perennials to become established. Also, the



quality of the hay cut could be improved by cutting it somewhat earlier, though here a compromise would have to be sought so as not to disadvantage seed set in herbage and possibly to allow the fauna to breed successfully.

**Table 5** The Phosphorus and potassium content (mg/kg) of *Plantago lanceolata* and *Festuca rubra* on some of the Palace Leas plots.

Plot	<i>P. lanceolata</i>		<i>F. rubra</i>	
	P	K	P	K
2	3.49	16.02	1.92	13.94
6	2.10	12.94	1.18	11.95
7	2.84	12.70	1.44	11.12
8	4.15	12.78	1.83	12.94
9	2.44	20.75	1.35	14.27
13	3.49	15.27	2.10	13.77

Data from Thomas and Thompson, 1948.

#### ACKNOWLEDGEMENTS

I would like to thank the foresighted originators of the Palace Leas experiment and the many who have come after them to record yields and to make measurements on the herbage, soil and fauna of the plots. Without their efforts we would have had a much poorer view today of the relationship between ecology, economics and grassland management.

#### REFERENCES

- COLEMAN, S Y, SHIEL, R S and EVANS, D A (1987). The effect of weather and nutrition on the yield of hay from Palace Leas meadow hay plots, at Cockle Park Experimental Farm, over the period from 1897 to 1980. *Grass and Forage Science* **42**, 353-358.
- COPPOCK, J (1976). *An Agricultural Atlas of England and Wales* London: Faber & Faber. Revised edition.
- DEFRA 2001 The Countryside Stewardship Scheme: traditional farming in the modern environment.
- GASSER, J K R (1985). Processes causing loss of calcium from agricultural soils. *Soil Use and Management* **1**, 14-17.
- GILCHRIST, D A and LOUIS, H (1917). Basic slag as affecting agricultural development. *Journal of the Society of Chemical Industry* **XXXVI**, 13pp.
- HALL, A D, (1921). *Fertilisers and Manures*. London, John Murray 2nd edition.
- HOPKINS, D W, (1988). Nitrogen transformations in upland pastures on stagnogley and stagnohumic-gley soils. Unpublished Ph.D thesis, University of Newcastle upon Tyne.
- HOPKINS, D W and SHIEL, R S (1996). Size and activity of microbial communities in long-term experimental grassland plots treated with manure and inorganic fertilisers. *Biology and Fertility of Soils* **22**, 66-70.
- MAGURRAN, A E (1988). *Ecological diversity and its measurement*. Princeton: Princeton University Press.
- MOORE, H I (1944). *Grassland Husbandry*. London: George, Allen and Unwin. 2nd edition.

- PAWSON, H C (1947). Fifty years' work on grassland at Cockle Park. *Journal of the British Grassland Society* **2**, 5-10.
- (1960). *Cockle Park Farm*. London: Oxford University Press
- SAC 1999 *The Farm Management Handbook 1999/2000*. Edinburgh: SAC.
- SHIEL, R S and BATTEN, J C (1988). Redistribution of nitrogen and phosphorus on Palace Leas meadow hay plots as a result of aftermath grazing. *Grass and Forage Science* **43**, 105-110.
- SHIEL, R S, EL TILIB, A M A and YOUNGER, A (1999). The Influence of Fertilizer Nitrogen, White Clover Content and Environmental Factors on the Nitrate Content in Perennial Ryegrass and Ryegrass/White Clover Swards; *Grass and Forage Science* **54**, 275-285.
- SHIEL, R S and HOPKINS, D W (1991). Effect of long-term fertiliser and manure treatments on the botanical composition of the Palace Leas meadow hay plots. *North of England Soils Discussion Group Proceedings*, 35-56.
- SHIMWELL, D W (1971). *Description and Classification of Vegetation*. London: Sidgwick and Jackson.
- SMITH, R S (1988). The effect of fertilisers on the conservation interest of traditionally managed upland meadows. In: Bell, M. and Bunce, RGH (eds) *Agriculture and conservation in the hills and uplands*, ITE symposium 23, 38-43 NERC. ITE Merlewood Research Station.
- STANDEN, V (1982). Association of enchytraeidae (Oligochaetae) in experimentally fertilized grasslands. *Journal of Animal Ecology* **51**, 501-522.
- THOMAS, B and THOMPSON, A (1948). The ash content of some grasses and herbs on the Palace Leas hay plots at Cockle Park. *Empire Journal of Experimental Agriculture* **16**, 221-239.
- THOMAS, B, HOLMES, W B and CLAPPERTON, J L (1955a). A study of meadow hays from the Cockle Park plots. Part I. Proximate constituents and digestibility. *Empire Journal of Experimental Agriculture* **23**, 25-33.
- (1955b). A study of meadow hays from the Cockle Park plots. Part II. Ash Constituents. *Empire Journal of Experimental Agriculture* **23**, 101-108.
- WARREN, R G and JOHNSTON A E (1965). The park grass experiment. Annual report of Rothamsted Experimental Station for 1964 pp240-261.





**SPECIMENS OF BIRD SPECIES NOW THREATENED, OR MADE EXTINCT  
IN RECENT TIMES, IN THE COLLECTIONS OF THE HANCOCK MUSEUM,  
NEWCASTLE UPON TYNE**

L Jessop and R H Stobart

The Hancock Museum (Tyne & Wear Museums), Barras Bridge, Newcastle upon Tyne  
NE2 4PT

INTRODUCTION

**The collection**

The Hancock Museum holds over 12,000 catalogued specimens of birds, as mounts and study skins, and when all have ultimately been catalogued this figure is likely to rise to over 13,000. Most of the specimens came to the museum as part of a small number of major donations, although individual specimens and small collections have been accruing since the 1820s.

As far as representation of rare and endangered species is concerned, it is interesting to note that there are only two major donors, John Hancock and Herbert Stevens. A third, Abel Chapman, contributed a small but significant number of specimens.

John Hancock (1808-1890) will need no introduction to anyone even vaguely familiar with the history of natural history in north-east England, and those who do need an introduction should consult the biographical notices by Embleton (1890), Welford (1895) or Russell Goddard (1929).

John Hancock's interest in ornithology was sustained over several decades, and he developed an international reputation as a skilled taxidermist who was concerned with, as Russell Goddard said 'creating a semblance of life in his specimens'. He was a major influence on the development of the Newcastle Museum throughout much of the 19th century, his first donation (a female blackbird) being listed in Fox's *Synopsis of the Newcastle Museum* in 1827. In 1881, as the development of a new, major, purpose-built museum was being planned, John Hancock offered to donate his whole collection of birds. His mounted specimens occupied one of the three major galleries in what was to be called the Hancock Museum, and still provide most of the specimens making up the synoptic British series around the balcony of the bird room.

In addition to the mounted birds, Hancock's collection also contained a number of study skins. Unfortunately, in many individual instances it is not possible to distinguish his small individual donations from specimens that came with the bulk of his donation in 1881. Lacking other evidence (e.g. from accessions registers) we presume that specimens like the eastern imperial eagle *Aquila heliaca* he obtained in 1869 from E W Brooks through Canon Tristram was kept by him until 1881 rather than being immediately donated to the Newcastle Museum.

The Herbert Stevens (? - 1964) bequest is somewhat of an anomaly. Stevens was a tea planter in Assam, and had an interest in both the ornithology and entomology of that region. He was a FZS, a FGS and member of the British Ornithologist's Union, and published several books and papers on his travels (see Davis and Brewer, 1986 for a list). He also built up an impressive collection of reference material of the birds of Assam. Following his death in 1964, one would have expected his collection to go to the National Collection. However, instead the Hancock Museum was bequeathed 20,000 Assamese butterflies and 4,050 study skins. Many of the skins have labels with full provenance data, and the collection is backed up with a body of papers that includes his annotated copy of the birds volume of the *Fauna of British India*.

Stevens did not collect all of his own specimens, and an interesting side-light is shown on the history of ornithology by the presence among his papers of dealers' lists of study skins for sale. We presume that most of his material that is not from south-east Asia was bought in this way.



The Stevens collection is by far the major component of the Hancock Museum's exotic study skin collection, and its significance is reflected in its domination of the list of the specimens of rare and endangered species.

Some of the Assamese place names are spelt in different ways on Stevens's labels, presumably the result of errors in copying and lack of a standardised spelling at that time. The main examples are: Daphla, Duphla; Gagaldhubi, Gagaldubie, Gogaldhubie; Hersamara, Hersamaram, Hessamara; Komlabari, Komlabarie, Momlabari; Subansiri, Subsaniiri.

Abel Chapman (1851-1929) is remembered as a hunter-naturalist, traveller and author, although his talents as a wildlife artist have probably been underestimated (for obituary notices see Bolam, 1929 and Russell Goddard, 1930). The material he presented to the Hancock Museum may have been small in number compared with other donations, but it is notable for its quality. His collection of game heads, for instance, did not include large series of common species, and his bird collection was free of the ornamental game birds and ducks that fill many a museum storeroom. Several of the specimens of rare and endangered species he donated were mentioned in his books *Wild Spain* and *Unexplored Spain*.

Unfortunately, many birds in the Hancock Museum (especially the mounts) are without provenance. They may have been traded from one collector to another and their original data lost in the process, or they may have been given, unlabelled, to the Hancock by the original collector. Where the name of the collector of a specimen is known, it is given in italics within parentheses.

### Inclusion and exclusion

The aim of this list was to document the specimens representing rare and endangered species of birds, and a small number of specimens representing extinct species has also been included.

The project has concentrated on the bird mounts and study skins. The egg collection has been excluded, mainly because of the risk of releasing precise information on nesting sites to modern egg collectors. It might be noted that access to the egg collection at the Hancock Museum is severely limited, and visitors may be required to submit *bona fides*.

Where material is represented in the osteology collection, this is noted but not listed in detail.

Some species like the mandarin duck and nene are on the endangered list yet are not uncommon in wildfowl parks. Where the Hancock Museum holds specimens obtained from 'ornamental' birds, their presence in the collection is noted, but full details are not given.

The question sometimes arises as to the status of individual species and how this is expressed within a system that categorises species as to their rarity. Not only do bird populations and ranges vary over time, but there will inevitably be disagreements between various authors as to what is the precise status of each species. It was decided to use two publications that contain appropriate assessments: the World Conservation Monitoring Centre's *World Checklist of Threatened Birds* of 1993, and the series of *Handbooks of Birds of the World* by del Hoyo *et al.* (1992-1999).

Threat categories are given as in the references used: Ex (extinct); E (endangered); V (vulnerable); R (rare); Id (indeterminate); K (insufficiently known); K\* (under review); S (of special concern). Sometimes the terms are qualified, as e.g. critically E, at other times a mixed categorisation has been used as e.g. V/R (vulnerable or rare).

It might be stressed that no research was undertaken during the preparation of the present paper to determine the threat category of any species, nor are the authors responsible for devising or maintaining systems of categorisation.

### Arrangement

The orders (and suborders in the case of Passeriformes) are listed systematically. Within orders (or suborders) the families are listed alphabetically, as are subfamilies within Muscicapidae. Within families or subfamilies the species are listed alphabetically.

A summary of the distribution of each species, as given in the checklists used as reference, is given together with the status.

Each specimen is listed, with the catalogue number of the specimen given in bold type (as, e.g. **2000.H1402**), together with a brief description (e.g. study skin, male). The provenance and acquisition data are given as far as is known.

## SYSTEMATIC LIST

### DINORNITHIFORMES

The osteological collection includes seventeen samples of Moas, mainly comprising leg bones but there is one complete articulated skeleton and a second, almost complete, mount. None of the material has been investigated in detail in recent years, and some of the identifications are therefore open to doubt.

### APTERYGIIFORMES

#### Apterygidae (Kiwis)

##### **Little Spotted Kiwi** *Apteryx owenii* Gould, 1847

*Distribution:* New Zealand. Present range is: Kapiti Island, off the southwest coast of North Island (possibly introduced); South Island, West of main divide (probably extinct); introduced to three other islands (del Hoyo *et al.*, 1992).

*Status:* K\* (World Conservation Monitoring Centre, 1993), V (del Hoyo *et al.*, 1992).

**B109.55:** Study skin; New Zealand, xi 1892 (*E.T. Wythes*); presented by R.Y. Green.

**B109.61:** Study skin; no locality data; presented by W.P. Mail, 13.xi.1945 (accession number 1945.39).

**2000.H1401** Mount; purchased at Glasgow by Richard Howse. A label, now housed with the card index of bird mounts, records 'The bird, from South Island, New Zealand had been kept alive for some time by the man it was bought from'. The specimen was on display in the Hancock Museum in 1899 (Howse, 1899, p. 135), where the note 'J.H., fecit' indicates that John Hancock prepared the mount.

**2000.H1402, 2000.H1408** Two mounts; specimens lacking data.

**2000.H434, 2000.H1043:** Two mounts; East Coast of South Island, New Zealand; presented by E.B. Cargill, 1877; the two specimens were on display in the Hancock Museum in 1899 (Howse, 1899, p. 135).

**2000.H1044** Mount; specimen lacking data.

A printed display label for the three following specimens reads: 1. Male 2. Female 3. Sex undetermined. East Coast of South Island. Julia Boyd's collection, 1892.

**2000.H1045** Mount, male; presented by executors of Miss Julia Boyd, 1892.

**2000.H1046** Mount, female; presented by executors of Miss Julia Boyd, 1892.

**2000.H1047** Mount, sex undetermined; East Coast of South Island, New Zealand; presented by executors of Miss Julia Boyd, 1892.

**2000.H1048** Mount; specimen lacking data.

**2000.H1049** Mount; no locality data; a pale (or faded?) individual.



## PROCELLARIIFORMES

### Procellariidae (Shearwaters, etc.)

#### **Black-capped Petrel** *Pterodroma caribbaea* Carte, 1866

*Distribution:* Formerly bred Jamaica and possibly on Dominica and Guadeloupe; probably extinct (Stattersfield & Capper, 2000).

*Status:* E/Ex (World Conservation Monitoring Centre, 1993), probably Ex (del Hoyo *et al.*, 1992).

**B106.48** Study skin [one of only 22 extant known specimens: B. Zonfrillo, pers. comm.]; labelled NHS Trinidad W.C. Trevelyan.

Possibly part of the package of Trinidadian bird specimens presented to the Newcastle Museum by Sir Walter Trevelyan in 1863 (*teste* accessions register). It is doubtful whether the specimen was collected on Trinidad; if so, it was evidently a stray. One of two other entries in accessions registers may refer to this specimen: (i) a donation of a 'Booby Duck from Jamaica' in 1848 by R. Atkinson, and (ii) a donation of 61 Jamaican bird skins in 1836 by R. Atkinson of Jamaica. We are grateful to Dr Zonfrillo for alerting us to the presence of this specimen (previously misidentified) in the Hancock's collections and for confirming the correct identification. The last confirmed sighting of this species was in 1879 (Stattersfield & Capper, 2000).

## PELECANIFORMES

### Pelecanidae (Pelicans)

#### **Dalmatian Pelican** *Pelecanus crispus* Bruch, 1832

*Distribution:* 1) Breeding: Albania; Armenia; Azerbaijan; Bulgaria; China; Greece; Iran; Kazakhstan; Mongolia; Romania; Russia; Turkey; Turkmenia; Ukraine; Uzbekistan; Yugoslavia. 2) Non-breeding: Afghanistan; Bangladesh; Egypt; Hong Kong; India; Iraq; Lebanon; Pakistan; Syria. 3) Vagrant: Algeria; Cyprus; Czech Republic; Hungary; Israel; Italy; Korea; Kuwait; Latvia; ?Norway; Slovak Republic; Taiwan; Tajikistan; United Arab Emirates; Western Sahara (World Conservation Monitoring Centre, 1993).

*Status:* V (World Conservation Monitoring Centre, 1993), E (del Hoyo *et al.*, 1992).

**B033.85** Study skin, immature, nestling in the down; South Russia (*Edward Bidwell*); no acquisition data. Bidwell made a donation of several birds (but not this one) via John Hancock in 1888; broken at neck.

**B033.86** Study skin; specimen lacking data.

**B033.87** Study skin; specimen lacking data.

**B108.53** Study skin, immature, in juvenile plumage; specimen lacking data.

#### **Spot-billed Pelican** Grey Pelican *Pelecanus philippensis* Gmelin, 1789

*Distribution:* 1) Breeding: China (extinct); India; Malaysia, Peninsular Malaysia (extinct); Myanmar (extinct); Philippines (extinct); Sri Lanka. 2) Non-breeding: Bangladesh; Cambodia; China; Indonesia; Java; Sumatra; Lao P.D.R.; Malaysia, Peninsular Malaysia; Myanmar; Nepal; Thailand; Viet Nam (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993), Id (del Hoyo *et al.*, 1992).

**B087.72** Study skin, male; Buri bhill Digillarung, Dibrugarh, Assam, India, 10.iv.1904 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 3051.

**B087.75** Study skin, female; Bramapootra River, Dibrugarh, Assam, India, 8.xii.1902 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 3050.

## CICONIIFORMES

### Ardeidae (Herons, Bitterns)

**White-bellied Heron, Imperial Heron** *Ardea insignis* Hume, 1878 (= *Ardea imperialis* Baker, 1929)

*Distribution:* Bangladesh; Bhutan; India; Myanmar; Nepal (extinct) (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993), E (del Hoyo *et al.*, 1992).

**B038.17** Study skin, adult female; [label partly illegible] Subansiri R., *Pathalipani*, North Lakhimpur, Assam, India, 19.xii.1910 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 3483. Labelled by Stevens - Colour of parts: Iris pale ochreous yellow; bill mussel black tinged greenish at base; underside lower mandible pale horn; tarsi and claws black.

**B038.18** Study skin, immature male; Runganuddie, Joyhing, North Lakhimpur, Assam, India, 3.xii.1910 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 3478. Labelled by Stevens - Colour of soft parts: Iris dull ochreous yellow; palal skin eyelids and base of lower mandible greenish; bill upper mandible and inner margin of lower mandible blackish slaty; tip of lower mandible underneath greenish ochre; remaining portion of lower mandible mussel grey; tarsi black with horny patches; claws black.

### Ciconiidae (Storks)

**Lesser Adjutant** *Leptoptilos javanicus* (Horsfield, 1821)

*Distribution:* 1) Breeding: Bangladesh; ?Cambodia; China; India; Indonesia; Bali; Kalimantan; Sumatra; Peninsular Malaysia; Sabah; Sarawak; ?Lao P.D.R.; Myanmar; Nepal; Sri Lanka; Thailand; Viet Nam. 2) Non-breeding: Bhutan; Brunei; Singapore (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993), V (del Hoyo *et al.*, 1992).

**B109.36** Study skin, male (?); Degoo, North Lakhimpur, Assam, India, 18.x.1908 (*Herbert Stevens*) "procured in the bhil in Luckibagan at the back end of the rains"; acquired with Herbert Stevens bequest; Stevens's cat. no. 3275.

**B109.37** Study skin, male; Gagaldhubie, North Lakhimpur, Assam, India, 9.xii.1905 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 3003. Labelled by Stevens - Iris pearl white; orbital skin and gular around ears cabbage red; neck yellow ochre, lower portion cabbage red; bill horny yellowish dirty at base; tarsi black as if coated with a limy wash.

**B108.52** Study skin; label present, but severely faded, and illegible; acquired with Herbert Stevens bequest; Stevens's cat. no. 3275.

### Threskiornithidae (Ibises, Spoonbills)

**Northern Bald Ibis, or Hermit Ibis** *Geronticus eremita* (Linnaeus, 1758)

*Distribution:* 1) Breeding: Algeria (extinct); Greece (extinct); Morocco; Turkey. 2) Non-breeding: Ethiopia; Syria; Yemen. 3) Vagrant: Africa (North, East and West); Azores; Cape Verde; Europe (Central and Southern); Middle East. (World Conservation Monitoring Centre, 1993).

*Status:* E (World Conservation Monitoring Centre, 1993; del Hoyo *et al.*, 1992).

**B081.13** Study skin; Africa, 1871; presented by Thomas Craster.



## ANSERIFORMES

### Anatidae (Ducks, Geese and Swans)

#### Mandarin Duck *Aix galericulata* (Linnaeus, 1758)

*Distribution:* 1) Breeding: China; Japan; D.P.R. Korea; Korea Republic; Russia. 2) Non-breeding: Taiwan. 3) Vagrant: Hong Kong; India; Myanmar; Nepal; Thailand; Viet Nam. 4). Introduced: Austria; Belgium; Netherlands; U.K. (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993), K (del Hoyo *et al.*, 1992).

The Hancock Museum holds six specimens, four of which are probably feral or 'ornamental' birds.

**B006.69** Study skin, male, probably immature coming into breeding plumage; labelled with date 1883 and name of Captain Noble; acquired presumably with John Hancock collection.

**B006.69** Study skin, male; labelled as 'Japan, brought by Captain St John, 1877'; acquired presumably with John Hancock collection. Admiral Henry Craven St John was one of John Hancock's friends and correspondents.

#### Baikal Teal *Anas formosa* Georgi, 1775

*Distribution:* 1) Breeding: Russia. 2) Non-breeding: China; Japan; D.P.R. Korea; Korea Republic. 3) Vagrant: Afghanistan; Bangladesh; France; Hong Kong; India; ?Ireland; Italy; Malta; Netherlands; Spain; U.K.; Uzbekistan (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993), V (del Hoyo *et al.*, 1992).

**B003.50** Study skin, female; Vladivostok, Siberia, 18.iii.1902 (*Herbert Stevens?*); acquired with Herbert Stevens bequest; Stevens's cat. no. 4349.

#### Lesser White-fronted Goose *Anser erythropus* (Linnaeus, 1758)

*Distribution:* 1) Breeding: Finland; Norway; Sweden; Russia. 2) Non-breeding: Eurasia (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993), R (del Hoyo *et al.*, 1992).

**2000.H1403** Mount, immature male; Fenham Flats, Northumberland, 16 September 1886 (*Alfred Crawhall Chapman*); acquired with Abel Chapman collection. The provenance data were cited by Bolam (1932, p.78), who gave the weight as 2¾ lbs. This was the only Northumberland record known to Bolam; Chapman, in his *Bird Life of the Borders* (1889, p.212) claimed it as the [then] only known British specimen. See also illustrations in *The Borders and Beyond* (1924), pp 174-174.

**2000.H1404** Mount, mature; South Russia, 1882; acquired with Abel Chapman collection.

#### Baer's Pochard *Aythya baeri* (Radde, 1863)

*Distribution:* 1) Breeding: China; ?D.P.R. Korea; Russia. 2) Non-breeding: Bangladesh; Hong Kong; India; Japan; Myanmar; Nepal; Korea Republic; Thailand; Viet Nam. 3) Vagrant: Pakistan; Philippines. (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993), V (del Hoyo *et al.*, 1992).

**B006.39** Study skin, female; Bhimpura bhill, North Lakhimpur, Assam, India, 13.i.1905 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 993. Labelled by Stevens - Iris bright yellow.

**B006.41** Study skin, female; Gagaldhubie, North Lakhimpur, Assam, India, 23.xii.1905 (*Herbert Stevens*); acquired with Herbert Stevens's bequest.

#### Red-breasted Goose *Branta ruficollis* (Pallas, 1779)

*Distribution:* 1) Breeding: Russia. 2) Non-breeding: Southeastern Europe; Asia Minor (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993), K (del Hoyo *et al.*, 1992).

**1995.H2079** Mount; this bird was "shot in the severe frost in the beginning of the year 1776, near London" (Fox, 1827), and was even at that date considered to be a rare British bird. The specimen in the Hancock Museum represents the first British record of the species (*vide* Yarrell, 1882-84). Bewick, who figured our specimen in his *History of British Birds*, stated: 'They are very rare in this country, only three of them (so far as our knowledge extends) having ever been met with in it, and those all by the late M. Tunstall, Esq. of Wycliffe, in Yorkshire, in whose valuable museum the first of these birds, in high preservation, was placed. (footnote: the foregoing figure was taken from this specimen, now in the Newcastle Museum). It was shot near London in the beginning of the hard frost in the year 1766 [*err. pro* 1776]'; acquired with George Allan collection, part of the founding collection of the Newcastle Museum in 1822 (for discussion, see Jessop, 1999a; Jessop, 1999b).

**Nene, or Hawaiian Goose** *Branta sandvicensis* (Vigors, 1834)

*Distribution:* Hawaiian Islands (World Conservation Monitoring Centre, 1993).

*Status:* V (World Conservation Monitoring Centre, 1993, del Hoyo *et al.*, 1992).

An adult and two immature specimens are on display, all donated by a local wildfowl park in 1979.

**White-winged Duck, White-winged Wood Duck** *Cairina scutulata* (Müller, 1842)

*Distribution:* 1) Breeding: Bangladesh; ?Cambodia; India; Indonesia - Java (extinct), Sumatra; Laos; Myanmar; Thailand; Viet Nam. 2) Vagrant: Peninsular Malaysia (World Conservation Monitoring Centre, 1993).

*Status:* V (World Conservation Monitoring Centre, 1993, del Hoyo *et al.*, 1992).

**B036.16** Study skin, male; Rungagora, Dibrugarh, Upper Assam, India, 13.i.1904 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 1258. Labelled by Stevens - Iris red orange yellow, weight 6lbs 5¼oz.

**B036.17** Study skin, male; Rungagora, Dibrugarh, Upper Assam, India, 5.iv.1903 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 1262. Labelled by Stevens - Bill orange yellow, spotted with black, nail slaty horny streaked darker, tarsi dirty yellow with bright yellow spots.

**B036.18** Study skin, male; Rungagora, Dibrugarh, Upper Assam, India, 13.i.1904 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 1260. Labelled by Stevens - Iris red orange yellow, weight 6lbs 1oz.

**B036.19** Study skin, female; Rungagora, Dibrugarh, Upper Assam, India, 30.i.1904 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 1263. Labelled by Stevens - weight 3lbs 15oz.

**B107.51** Study skin, female; Rungagora, Dibrugarh, Upper Assam, India, 10.iii.1903 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 1259.

**B107.52** Study skin, male; Rungagora, Dibrugarh, Upper Assam, India, 3.iv.1903 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 1261. Labelled by Stevens - Iris orange yellow.

**White-headed Duck** *Oxyura leucocephala* (Scopoli, 1769)

*Distribution:* 1) Breeding: Afghanistan; Algeria; France; Corsica (extinct?); Hungary (extinct); Iran; Italy; Sardinia (extinct); Kazakhstan; Romania; Russia; Spain; Tunisia; Turkey; Turkmenia; Uzbekistan; Yugoslavia (extinct). 2) Non-breeding: Albania; Bulgaria; China; Cyprus; Egypt; Greece; India; Iraq; Italy; Morocco; Pakistan; Syria; Tajikistan. 3) Vagrant: Austria; Belgium; Czechoslovakia; ?Denmark; France; Germany; Israel; Libya; Malta; Mongolia; Netherlands; Poland; Portugal; Saudi Arabia; Switzerland; Yugoslavia. (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993), V (del Hoyo *et al.*, 1992).



- B007.39** Study skin, female; Santolalla lagunas, Andalucia, Spain, 8.v.1883 (*Abel Chapman*); presented by Abel Chapman, November 1907 (*Trans. nat. Hist. Soc. Northumb.* 2, p. 245). This and the following specimen are labelled with the binomen *Erismatura mersa*. They are cited in Chapman's *Wild Spain* (1893, pp. 269-270), and a figure is given (plate 33): the provenance is taken from that book.
- B007.40** Study skin, male; Santolalla lagunas, Andalucia, Spain, 8.v.1883 (*Abel Chapman*); presented by Abel Chapman, November *Trans. nat. Hist. Soc. Northumb.* 2, p. 245).

## FALCONIFORMES

### Accipitridae (Eagles, Hawks, Vultures)

#### Eurasian Black Vulture, Cinereous Vulture *Aegypius monachus* (Linnaeus, 1766)

*Distribution:* 1) Breeding: Southeast and Southwest Europe; Asia Minor; Russia; Mongolia; China; Uzbekistan. 2) Non-breeding: Arabia; Asia; Egypt. 3) Vagrant: Europe; Sudan; Taiwan; Viet Nam; Yemen. (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993), V (del Hoyo *et al.*, 1994).

**2000.H1409** Mount; shot in Spain, 4.i.1883; presented by Abel Chapman, 29 April 1892 (*Trans. nat. Hist. Soc. Northumb.* 2, p. 245). The shooting of this specimen is described in Chapman's *Wild Spain* (1893, pp. 199-203).

#### Adalbert's Eagle, Spanish Imperial Eagle *Aquila adalberti* Brehm, 1861

*Distribution:* 1) Breeding: Algeria (extinct); Portugal; Spain. 2) Vagrant: Gibraltar; France (World Conservation Monitoring Centre, 1993).

*Status:* E (World Conservation Monitoring Centre, 1993, del Hoyo *et al.*, 1994).

**2000.H1030** Mount, adult male; Coto Doñana, Spain, 6.v.1883 (*Abel Chapman*); acquired with Abel Chapman bequest.

**2000.H1031** Mount, immature; Coto Doñana, Spain; acquired with Abel Chapman bequest.

**2000.H1410** Mount, immature male; Coto Doñana, Spain, iv. 1891 (*Abel Chapman*); acquired with Abel Chapman bequest.

#### Eastern Imperial Eagle, Imperial Eagle *Aquila heliaca* Savigny, 1809

*Distribution:* 1) Breeding: ?Albania; Azerbaijan; Bulgaria; China; Cyprus; Czechoslovakia; Georgia; Greece; Hungary; Iran; Kazakhstan; Moldova; Romania; Russia; Turkey; Turkmenia; Ukraine; Uzbekistan; Yugoslavia. 2) Non-breeding: Afghanistan; Bangladesh; Djibouti; Egypt; Ethiopia; Hong Kong; India; Iraq; Israel; Jordan; Kuwait; Lao P.D.R.; Lebanon; Nepal; Oman; Pakistan; Saudi Arabia; Sudan; United Arab Emirates; Viet Nam; Yemen. 3) Vagrant: Austria; Cameroon; Denmark; Finland; France; Germany; Italy; Japan; Kenya; D.P.R. Korea; Korea Republic; Libya; Malaysia; Peninsular Malaysia; Malta; Mongolia; Morocco; Poland; Singapore; Sweden; Syria; Taiwan; Tanzania (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993), R (del Hoyo *et al.*, 1994).

**B033.11** Study skin, immature female; Doman Jheel, near Etawah, North-West Province, India, 31.i.1868 [*E.W. Brooks*]; labelled as: 'from Tristram 14 Dec 1869' and 'shot at Sarmun 68. From Brooks, 14 Dec. 1869 through Tristram'; acquired with John Hancock's collection. 'Brooks' was probably E.W. Brooks, a correspondent of John Hancock's who lived in India in the early 1870s. 'Tristram' was Canon H.B. Tristram.

**B033.15** Study skin, immature, probably female; Mynpoory [=Mainpuri, Uttar Pradesh], India 29.i.1868 [*E.W. Brooks*]; received by John Hancock from Brooks at Etawah, India, 23.xi.1868; acquired with John Hancock's collection. Labelled: 'in striped plumage. Length 2"6 [sic], wing 242 in. Another shot at Sarmun on 31 Jan. with white wing was female. This bird I should say is a female'. A note

by John Hancock adds: 'this is undoubtedly a young bird in first plumage'.

**B033.16** Study skin, female; Mirzapore, India, 1865 [*E.W. Brooks*]; presented by Brooks to John Hancock; acquired with John Hancock's collection.

**B033.18** Study skin, male; "Belgrade, Turkey, Europe"; received by John Hancock from J. Robertson in Constantinople through Thompson of Winlaton in 1867; acquired with John Hancock's collection.

**2000.H1411** Mount, immature; specimen lacking data.

**White-tailed Sea Eagle, Grey Sea Eagle or White-tailed Eagle** *Haliaeetus albicilla* (Linnaeus, 1758)

*Distribution:* Eurasia; Greenland; Iceland (World Conservation Monitoring Centre, 1993).

*Status:* V (World Conservation Monitoring Centre, 1993, del Hoyo *et al.*, 1994).

**B031.48** Study skin, female, immature; Iceland, 1841; acquired with John Hancock's collection?

**B031.49** Study skin, male, immature; Iceland; bought [by John Hancock?] off W. Proctor, 1872; acquired with John Hancock's collection?

**B031.50** Study skin, male; Sarpas Steppe, Astrakhan, South Russia, March 1911; acquired with Herbert Stevens bequest; Stevens's cat. no. 4124.

**B031.51** Study skin; Korea, Sept 16th [year not stated]; acquired with John Hancock collection. Labelled by John Hancock: Shot Sep. 16th. Brought from Japan by H.C. St John R.N. in 1877. If a female as stated on the original label it is somewhat smaller than the European bird. Labelled, presumably by H.C. St John: Female, Irides Hazel. Korea Sept. 16th.

**B031.52** Study skin, male, immature; Iceland; bought [by John Hancock?] off W. Proctor, 1872; acquired with John Hancock's collection?

**B031.53** Study skin, female; Sarpas Steppe, Astrakhan, South Russia, March 1911; acquired with Herbert Stevens bequest; Stevens's cat. no. 4125.

**1995.H2088** Mount; acquired with George Allan collection, part of the founding collection of the Newcastle Museum in 1822. Allan had acquired the specimen in 1791 along with the remainder of Marmaduke Tunstall's bird collection. It was figured by Thomas Bewick in 1791 (for discussion, see Jessop, 1999a; Jessop, 1999b).

**2000.H1412** Mount, male in first plumage; trapped in Scotland, 26.iii.1878; presented by G.E. Crawhall, x.1885.

**2000.H1413** Mount, adult female; Orkney, 1865; acquired with 'Old Museum' collection, i.e. predating acquisition of John Hancock's collection; Stuffed by T. Bates.

**2000.H1414** Mount, juvenile; specimen lacking data.

**2000.H1415** Mount; specimen lacking data.

**2000.H1416** Mount; specimen lacking data. Labelled, in error, as *Hieraaetus fasciatus*.

**2000.H1417** Mount with 2000.H1418; specimen lacking data.

**2000.H1418** Mount with 2000.H1417; specimen lacking data.

**Pallas's Sea Eagle, Pallas's Fish Eagle, Band-tailed Fish-Eagle** *Haliaeetus leucoryphus* (Pallas, 1771)

*Distribution:* 1) Breeding: Bangladesh; Bhutan; China; India; Kazakhstan; Mongolia; Myanmar; Nepal; Pakistan; ?Russia; Tajikistan; Uzbekistan. 2) Non-breeding: Afghanistan. 3) Vagrant: Cambodia; Finland; Iran; Iraq; Israel; Norway; Oman; Poland; Saudi Arabia; Thailand; United Arab Emirates; Viet Nam (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993), R (del Hoyo *et al.*, 1994).



- B032.09** Study skin, immature; India, Punjab, 23.i.1868 (*W.E. Brooks*); acquired with John Hancock collection?
- B032.10** Study skin, immature male?; India, Uttar Pradesh, Mirzapore, 1865 (*W.E. Brooks*); acquired with John Hancock collection?
- B032.11** Study skin, female; India, ?Uttar Pradesh, Etawah, 23.xi.1868 (*W.E. Brooks*); acquired with John Hancock collection?
- B032.12** Study skin, immature male; India, Sungma, Nagri Spur, Rungbong Valley, Darjiling, 4500 feet altitude, 16.vi.1919 (*C.E. Brown*); acquired with Herbert Stevens bequest.

**Red Kite *Milvus milvus* (Linnaeus, 1758)**

*Distribution:* Europe, Asia Minor (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993), K (del Hoyo *et al.*, 1994).

**B032.17** Study skin, male; France, Dieppe, Bunel; acquired with John Hancock donation.

**B032.44** Study skin, female; Little Tosson Moor, Thropton, Northumberland; presented by George Carter, 12.iv.1944. Label information - weight 2lb 3oz; stomach empty; wing 512 mm, tarsus 60 mm, tail 365 mm-285 mm, alar expanse 4ft 6"; caught in trap; gape cadmium-orange; cere buff yellow; legs and feet buff yellow; claws black.

**B032.25** Study skin, female; Rome, Italy, January 1911; no acquisition data.

**B112.80** Study skin, female; Hamsterley Forest, County Durham (NZ086313), 12.iv.1985; presented by Forestry Commission (accession number 56/85). Label information - WL 552 [mm]; tail 349 [mm]; E.C. 29 [mm]; tarsus 69 [mm].

**1985.H2087** Mount; acquired with George Allan collection, part of the founding collection of the Newcastle Museum in 1822. Allan had acquired the specimen in 1791 along with the remainder of Marmaduke Tunstall's bird collection. It was figured by Thomas Bewick in 1791 (for discussion, see Jessop, 1999a; Jessop, 1999b).

**2000.H1419, 2000.H1420**

Two mounts; adult male and female shot off nests, Spain, 1883; acquired with Abel Chapman bequest.

**2000.H1421** Mount; specimen lacking data.

**2000.H1422 & 2000.H1425**

Two mounted females. There are two data labels and two birds, but they have become separated and it is unclear which specimen is from which location.

*specimen a -*

caught in a trap, Bishop Auckland, County Durham, England, midsummer, circa 1832; acquired with John Hancock collection?

*specimen b -*

Cardiff, Wales, 14.iv.1853; acquired with John Hancock collection.

**2000.H1423** Mount; specimen lacking data.

**2000.H1424** Mount, young in first plumage; a British specimen, but no further data; acquired with John Hancock collection.

**Falconidae (Falcons, Caracaras)**

**Lesser Kestrel, *Falco naumanni* Fleischer, 1818**

*Distribution:* 1) Breeding: Afghanistan; ?Albania; Algeria; Armenia; Austria; Azerbaijan; Bulgaria; China; ?Czechoslovakia; France; Georgia; Gibraltar; Greece; Hungary; Iran; ?Iraq; Israel; Italy; Jordan; Kazakhstan; Kyrgyzstan; ?Lebanon; Libya; Moldova; Mongolia; Morocco;

?Poland; Portugal; Romania; Russia; Saudi Arabia; Spain; ?Switzerland; Syria; Tajikistan; Tunisia; Turkey; Turkmenia; Ukraine; Uzbekistan; Yugoslavia. 2) Non-breeding: Africa; Egypt; India; Iraq. 3) Vagrant: Europe; Japan (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993), R (del Hoyo *et al.*, 1994).

**B037.39** Study skin, male; Foggia, Italy, April 1909 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 4518.

**B037.40** Study skin, male; no locality data; acquired with John Hancock's collection; purchased by him from S. Steenberg, May 1853.

**B037.41** Study skin, male; no locality data; presented by Abel Chapman.

**B037.42** Study skin, male; South Russia, May [year not stated]. Labelled "recd 6/09 H.W.M. No. 830T"; acquired with Stevens bequest.

**B037.43** Study skin, male; no locality data; acquired with John Hancock's collection; received by him from S. Steenberg, May 1853.

**B037.44** Study skin, immature male; Lake Elmsentsita [*err. pro* Elmenteita], Gilgil, Kenya, 1.xii.1951, altitude 6000 feet, from flock of 30 : hovering in field (*MWR*); *MWR* is, presumably, Matthew White Ridley, who made several donations of birds to the Hancock Museum between 1946 and 1970.

**B037.53** Study skin, male; specimen lacking data.

**B037.56** Study skin, immature male, changing plumage; Ismidt, (50 miles from Constantinople, on Marmora) Asia Minor [Turkey], 14.ix.1866 (*J. Robson*); acquired with John Hancock's collection.

**B037.57** Study skin, female (?); Lake Elmsentsita [*err. pro* Elmenteita], Gilgil, Kenya, 1.xii.1951, altitude 6000 feet, from flock of 30 : hovering in field (*MWR*); *MWR* is, presumably, Matthew White Ridley, who made several donations of birds to the Hancock Museum between 1946 and 1970; labelled - Iris brown; feet yellow; claws white; bill blue-grey, pale tip; cere yellow.

**B037.62** Study skin, immature ?male; no locality data; presented by Abel Chapman.

**B039.04** Study skin, female; labelled - Francois Xavier Naturaliste preparateur et marchand d'objets d'histoire naturelle nord Afrique, Tangier. This implies a North African origin; bought of Stevens [auction house] 1852, 3/-; acquired with John Hancock's collection.

## GALLIFORMES

### Cracidae (Curassows, Guans, Chachalacas)

#### Wattled Curassow *Crax globulosa* Spix, 1825

*Distribution:* South America - Bolivia; Brazil; Colombia; Ecuador; Peru (World Conservation Monitoring Centre, 1993).

*Status:* Id (World Conservation Monitoring Centre, 1993, del Hoyo *et al.*, 1994).

**2000.H1426** Mount, male; specimen lacking data; it is entered in a book (number SL7) in the archive of the Hancock Museum listing bird specimens in the collection as 'Old Museum', i.e. predating John Hancock's donation.

### Phasianidae (Pheasants)

#### Cheer (=Chir), or Wallich's Pheasant *Catreus wallichii* (Hardwicke, 1827)

*Distribution:* India; Nepal; Pakistan.

*Status:* E (World Conservation Monitoring Centre, 1993, del Hoyo *et al.*, 1994).



There are two mounted specimens in the collection, with no evidence that they are other than examples prepared from 'ornamental' birds.

**Swamp Francolin** *Francolinus gularis* (Temminck, 1815)

*Distribution:* Bangladesh; India; Nepal (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993), V (del Hoyo *et al.*, 1994).

**B081.65** Study skin, male; Hersamara, North Lakhimpur, Upper Assam, India, 6.i.1906 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 2814.

**B081.66** Study skin, male; Hersamara, North Lakhimpur, Upper Assam, India, 7.i.1906 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 2816.

**B081.67** Study skin, female; Hersamara, North Lakhimpur, Upper Assam, India, 8.i.1906 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 2815.

**B081.68** Study skin; Assam or Burmah [Myanmar], xi. 1890 (*Alfred Straker*); acquired with Herbert Stevens bequest.

**Reeves's Pheasant** *Syrnaticus reevesii* (Gray, 1829)

*Distribution:* China; introduced to Czechoslovakia and France (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993), R (del Hoyo *et al.*, 1994).

There are four mounted specimens and a study skin in the collection: there is no evidence that any is other than a specimen prepared from an 'ornamental' bird.

**Western Tragopan, Western Horned-Pheasant, Black-headed Tragopan** *Tragopan melanocephalus* (Gray, 1829)

*Distribution:* China; India; ?Nepal; Pakistan (World Conservation Monitoring Centre, 1993).

*Status:* E (World Conservation Monitoring Centre, 1993, del Hoyo *et al.*, 1994).

**B009.08** Study skin, male; specimen lacking data.

**B009.09** Study skin, female; Western Himalayas; acquired with Herbert Stevens bequest; Stevens's cat. no 4453. The lack of precise locality data is untypical of Stevens, suggesting that he may have purchased the specimen from a dealer rather than collected it himself.

**2000.H1429, 2000.H1430**

Two mounted males; specimens lacking data.

## GRUIFORMES

### Gruidae (Cranes)

**Siberian Crane, Siberian White Crane** *Grus leucogeranus* Pallas, 1773

*Distribution:* 1) Breeding: China; ?Mongolia; Russia. 2) Non-breeding: Afghanistan; India; Iran; Pakistan. 3) Vagrant: Japan; Mongolia (World Conservation Monitoring Centre, 1993).

*Status:* V (World Conservation Monitoring Centre, 1993), E (del Hoyo *et al.*, 1996).

**B010.36** Study skin, female; Rahun, Northwest India [?Pakistan], 22.ii.1869 (*W.G. Drodts*); acquired with John Hancock collection? Labelled - Irides straw coloured; legs pale pinkish; bill purplish red and blackish towards the tip.

**2000.H1431** Mount; specimen lacking data.

## Otididae (Bustards)

### Houbara Bustard *Chlamydotis undulata* (Jacquin, 1784)

**Distribution:** 1) Breeding: ?Afghanistan; Algeria; Armenia (extinct); Canary Islands; China; Egypt; Iran; Iraq; Israel; Jordan; Kazakhstan; Kuwait (extinct); Kyrgyzstan; Libya; Mauritania; Mongolia; Morocco; Oman; Pakistan; Russia; Saudi Arabia; Sudan; Syria; Tajikistan; Tunisia; Turkmenia; Uzbekistan; Western Sahara; Yemen. 2) Non-breeding: Afghanistan; Bahrain; India; Kuwait; Qatar; United Arab Emirates. 3) Vagrant: Belgium; Cyprus; Czechoslovakia; Denmark; Finland; France; Germany; Greece; India; Italy; Latvia; Lebanon; Malta; Netherlands; Poland; Portugal; Romania; Sweden; Switzerland; U.K.; Yugoslavia (World Conservation Monitoring Centre, 1993).

**Status:** K\* (World Conservation Monitoring Centre, 1993), not listed as threatened by del Hoyo *et al.* (1996).

**2000.H1432** Mount; shot south of Marske-by-the Sea, Yorkshire, about 12 o'clock on 5 October 1892 (*J. Richardson*) in a grass field near the edge of the sea-banks, where it was feeding on grass; Howse (1899, p. 68) gave the history of this bird, which he stated was 'slightly in the moult'. Richardson sent it at once to Mr Pearce Coupe. After skinning, the body was cooked and eaten by Coupe and friends; the bones were presented to the Hancock Museum. The mount was purchased by Richard Howse in November 1892 for the Museum, and was cleaned and re-stuffed by John Jackson. It is the second recorded British specimen (See Howse, 1894, for a detailed account of this bird; British records were summarised in Dymond, Fraser & Gantlett, 1989).

### Bengal Florican *Eupodotis bengalensis* (Gmelin, 1788)

**Distribution:** ?Bhutan; ?Cambodia; India; Nepal; Viet Nam (World Conservation Monitoring Centre, 1993).

**Status:** E (World Conservation Monitoring Centre, 1993, del Hoyo *et al.*, 1996).

**B079.90** Study skin, female; Rungagora, Dibrugarh, Assam, India, 29.ii.1904 (*H. Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 2859.

### Great Bustard *Otis tarda* Linnaeus, 1758

**Distribution:** 1) Breeding: Algeria (extinct); Austria; Bulgaria (extinct); China; Czechoslovakia; Denmark (extinct); France (extinct); Germany; Greece (extinct); Hungary; Iran; Iraq (extinct); Kazakhstan; Kyrgyzstan; Moldova; Mongolia; Morocco; Poland (extinct); Portugal; Romania; Russia; Ukraine; U.K. (extinct); Uzbekistan; ?Yugoslavia. 2) Non-breeding: Afghanistan; Azerbaijan; Bulgaria; Iraq; Syria; Turkmenia; Yugoslavia. 3) Vagrant: Albania; Algeria; Belgium; Cyprus; Denmark; Finland; France; Gibraltar; Greece; Ireland; Israel; Italy; Japan; Jersey; D.P.R. Korea; Korea Republic; Latvia; Lebanon; Luxembourg; Malta; Myanmar; Netherlands; Pakistan; Saudi Arabia; Sweden; Switzerland; Tunisia; U.K. (World Conservation Monitoring Centre, 1993).

**Status:** R (World Conservation Monitoring Centre, 1993), V (del Hoyo *et al.*, 1996).

**B033.80** Study skin, female; Asia Minor, 6.xii.1867; purchased from T. Robson. Labelled: quantity of moss and pebbles in crop.

**B033.81** Study skin, male; no locality data; acquired with John Hancock collection.

**B033.82** Study skin, female; Kalmückensteppe, Russia, April 1909; acquired with Herbert Stevens bequest; Stevens's cat. no. 4445.

**B033.83** Study skin, male; Gibraltar, 17.vii.1889 (*Captain St John*); presented in July 1889. Listed in Accessions Register as from North Africa; presenter's name given as Admiral St John.

**B033.84** Study skin, male; Southern Spain (*Abel Chapman*); presented by Abel Chapman, July 1905.



- 1995.H2091** Mount, male; acquired with George Allan collection, part of the founding collection of the Newcastle Museum in 1822. Allan had acquired the specimen in 1791 along with the remainder of Marmaduke Tunstall's bird collection. It was figured by Thomas Bewick in 1791 (for discussion, see Jessop, 1999a; Jessop, 1999b); in poor condition; feet broken off and some feathers loose.
- 2000.H1433** Mount, female; specimen lacking data.
- 2000.H1434** Mount, male; specimen lacking data.
- 2000.H1435** Mount, male; Odessa, Russia, January 1833; presented by Antony Atkinson.
- 2000.H1436** Mount, female; Brampton, Cumbria, England, 8.iii.1854; in 1875 it was bought at Col. Coulson's sale at Blenkinsop Hall by Mrs Hugh Lee Pattinson, and presented to John Hancock 5.xii.1875; acquired with John Hancock's collection.
- 2000.H1437** Mount, downy young; Volga district, Russia; no acquisition data.
- 2000.H1438** Mount, male; specimen lacking data.
- 2000.H1439** Mount, female; specimen lacking data.
- Little Bustard** *Tetrax tetrax* (Linnaeus, 1758)
- Distribution:* 1) Breeding: ?Albania; Algeria; Bulgaria (extinct); China; Czechoslovakia (extinct); France; Greece (extinct); Iran; ?Iraq; Italy; Kazakhstan; Kyrgyzstan; Morocco; Portugal; Romania (extinct); Russia; Spain; Tunisia (extinct); Turkey; Ukraine; ?Uzbekistan; Yugoslavia (extinct). 2) Non-breeding: Azerbaijan; Egypt; Georgia; Israel; Libya; Pakistan; Romania; Tajikistan; Tunisia; Turkmenia; Yugoslavia. 3) Vagrant: Afghanistan; Austria; Belgium; Cyprus; Czechoslovakia; Denmark; Finland; Germany; Greece; Guernsey; Hungary; India; Iraq; Ireland; Japan; Jersey; Latvia; Lebanon; Luxembourg; Malta; Netherlands; Norway; Poland; Sweden; Switzerland; Syria; U.K (World Conservation Monitoring Centre, 1993).
- Status:* R (World Conservation Monitoring Centre, 1993), not listed as threatened by del Hoyo *et al.* (1996).
- B010.40** Study skin, female; Belgrade, 30.iii.1867; purchased from T. Robson.
- B010.41** Study skin, male in breeding plumage; Dieppe, Bunel; acquired with John Hancock's collection? Labelled: Purchased Dieppe.
- B010.42** Study skin, male; Sarpas Steppe, South Russia v.1908; acquired with Herbert Stevens bequest; Stevens's cat. no. 4446.
- B010.43** Study skin, female; Nagaïen Steppe, Russia, 19.vi (?or 19.xi) 1907 (*Terek?*); acquired with Herbert Stevens bequest. Labelled Terek Gebiet. Stevens's cat. no. 4447.
- B010.44** Study skin, male in breeding plumage; Andalucia, Spain, 19.v.1883 (*Abel Chapman*); acquired with Abel Chapman bequest? Labelled: Shot from horseback.
- B010.45** Study skin, female; no locality data; acquired with John Hancock collection; purchased by Hancock from Currie & Bourne.
- 2000.H1487** Mount, female; shot at Marsden (Tyneside, England) by William Sisterton about 1860; presented by W.R. Pape, May 1935.
- 2000.H1488** Mount; specimen lacking data.
- 2000.H1489** Mount; specimen lacking data.
- 2000.H1440** Mount, male; Turkey; 'Old Museum' collection (a term historically used for material predating acquisition of John Hancock's collection in 1884).
- 2000.H1441** Mount, female; Twizell (Northumberland, England), 1 February 1823; *ex* Prideaux John Selby collection.
- 2000.H1442** Mount; Shot on Link Farm, Amble (Northumberland, England), November 1906 by John Douglas; presented by Algernon Noble.

## Rallidae (Rails)

### **Inaccessible Island Rail** *Atlantisia rogersi* Lowe, 1923

*Distribution:* Inaccessible Island, Tristan d'Acunha island group (World Conservation Monitoring Centre, 1993).

*Status:* R (World Conservation Monitoring Centre, 1993); V (del Hoyo *et al.*, 1996).

**2000.H1443, 2000.H1444** Two specimens, mounted separately on plaster bases; Inaccessible Island, Tristan d'Acunha island group; presented by Rev. A.G. Partridge, 1933 as spirit specimens; mounted by the Hancock Museum's taxidermist, S.E. Cook.

### **Corn Crane** *Crex crex* (Linnaeus, 1758)

*Distribution:* 1) Breeding: Afghanistan; ?Armenia; Azerbaijan (?extinct); China; Europe (most of); Georgia; Iran; Kazakhstan; Kyrgyzstan; Tajikistan; ?Turkey. 2) Non-breeding: Afghanistan; Africa (widespread in); Iraq; Israel; Saudi Arabia; Turkmenia; Uzbekistan. 3) Vagrant: Africa (parts of); Azores; Iceland; Mongolia; Seychelles (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993), V (del Hoyo *et al.*, 1996).

**B008.96** Study skin, female; Sarpas Steppe?, South Russia, v.1907; acquired with Herbert Stevens bequest; Stevens's cat. no. 3795.

**B008.97** Study skin, male; Otterburn, Northumberland, England, 28.viii.1890 (*Cookson*).

**B008.98** Study skin; Ulgham, Northumberland, England, 25.ix.1971 (*W. Gordon*); accession no. 40/1971; Taxidermist G. Scuddon. Weight 209g., Wing length 138 mm.

**B008.99** Study skin; Sandisyke, 21.vi.1910 (*H.V.C.*); H.V.C. was Lt. Hugh V. Charlton, who was killed in 1915. Birds from his collection were donated to the Hancock Museum in 1917.

**B009.00** Study skin, female in first year; Northumberland (found dead on motor lorry travelling from Berwick to Newcastle), England, 6.x.1951; presented by Jas. Galloway. Accession number 41/1951.

**B011.01** Study skin, male; Croydon, Surrey, 30.ix.1904; caught alive; accession number 148/1969.

**B011.02** Study skin, female; Malta market, 5.v.1863 (*Captain O. Carr*); acquired with John Hancock collection?

**B011.03** Study skin, male; Sarpas Steppes, Astrakhan, South Russia, May 1908; acquired with Herbert Stevens collection; Stevens's cat. no. 3794.

**B011.04** Study skin; Shiremoor, Tyne & Wear, xi.1969 (*T. Goonan*); accession number 257/1959; taxidermist J. McC.

**B011.05** Study skin; labelled as being questionably from Hugh V. Charlton collection [donated 1917].

**B011.06** Study skin, immature male; shot at Mulgrave, 28.ix.1877 (*T. Vaughan*); acquired with John Hancock's collection; skin damaged at neck.

**1999.H1159** Mount; specimen lacking data.

**1999.H1162** Mount, male; shot, Jesmond, Newcastle upon Tyne, England, 28.v.1891; presented by J. Duncan.

**1999.H1193** Mount; no locality data; presented by Miss A. Freeman, 15.ii.1938.

**1999.H1203** Mount, female; found dead after being attacked by a stoat, near Craster, Northumberland, 22.ix.1954; presented by J.M. Craster.

**1999.H1499.01** Mount, adult; specimen lacking data.



- 2000.H1445** Mount, adult; specimen lacking data.  
**2000.H1446** Mount, adult; specimen lacking data.  
**2000.H1447** Mount, immature; specimen lacking data.  
**2000.H1448, 2000.H1449, 2000.H1450, 2000.H1451, 2000.H1452, 2000.H1453**  
 Six mounted nestlings; specimens lacking data.

### Turnicidae (Buttonquails)

#### Chestnut-backed Buttonquail *Turnix castanota* (Gould, 1840)

- Distribution:** Northwest and north-central Australia, and offshore islands (World Conservation Monitoring Centre, 1993).  
**Status:** V (del Hoyo *et al.*, 1996), not listed as threatened in World Conservation Monitoring Centre (1993).  
**B099.95** Study skin; locality given, incorrectly, as 'Borneo'; no acquisition data.

## CHARADRIIFORMES

### Alcidae (Auks)

#### Great Auk *Alca impennis* Linnaeus, 1758

- Distribution:** Formerly North Atlantic, extinct since 1840s (Fuller, 1999).  
**Status:** Ex.  
**1995.H2095** Mount, juvenile, plus skeletal preparation; acquired with George Allan collection, part of the founding collection of the Newcastle Museum in 1822. Allan had acquired the specimen in 1791 along with the remainder of Marmaduke Tunstall's bird collection. It was figured by Thomas Bewick in 1791 (for discussion, see Jessop, 1999a; Jessop, 1999b). With the exception of a bird with disputed juvenile status in the National Museum of Prague, this is the only surviving immature specimen of a Great Auk in existence (Grieve, 1885, 1897; Hanzák, 1980; Fuller, 1999). It was re-stuffed in 1863 by John Hancock, when the bones of the head, wings and feet were removed (Howse, 1899).  
**2000.H1454** Mount, adult in summer plumage, plus skeletal preparation. This bird was received by John Hancock from Mecklenberg, an apothecary of Flensburg in April 1844. It, and another specimen with two eggs were said to have been brought from an island off the northeast coast of Iceland a year or two previous to 1844. There are doubts as to the date and place of provenance, which have been summed up by Fuller, 1999 (see also Howse, 1899, p.133); acquired with John Hancock's collection. The bones were entirely removed by John Hancock during re-mounting. Some skeletal material was passed to Sir Richard Owen, who included it in his monograph (1865).  
**G148.51** Upper beak (maxilla); Marsden, Tyne & Wear, England, 9.iv.1878; passed to John Hancock by J. DalGLISH; acquired with Hancock's collection.

### Charadriidae (Plovers)

#### New Zealand Dotterel, Red-breasted Dotterel, Red-breasted Plover *Charadrius obscurus* Gmelin, 1789

- Distribution:** New Zealand (del Hoyo *et al.*, 1996).  
**Status:** E (del Hoyo *et al.*, 1996), not listed as threatened in World Conservation Monitoring Centre (1993).

**B095.43** Study skin, male in breeding plumage; New Zealand; presented by G.C. Atkinson, 1856; it is not been possible to assign this specimen to the northern or southern subspecies of *C. obscurus*.

**B095.44** Study skin, male in breeding plumage; New Zealand; presented by G.C. Atkinson, 1856; It is not been possible to assign this specimen to the northern or southern subspecies of *C. obscurus*.

**Southern Lapwing, Sociable Plover** *Vanellus gregarius* (Pallas, 1771)

*Distribution:* 1) Breeding: Kazakhstan; Russia. 2) Non-breeding: Ethiopia; India; Iran; Iraq; Israel; Kyrgyzstan; Oman; Pakistan; Saudi Arabia; Sudan; Tajikistan; Turkey; Turkmenia; Uzbekistan; Yemen. 3) Vagrant: Afghanistan; Europe; Middle East; North Africa (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993), V (del Hoyo *et al.*, 1996).

**B012.83** Study skin, female; Lucknow; acquired from William Inger (listed by Herbert Stevens as part of his collection, so presumably passed from Inger to Stevens); acquired with Herbert Stevens bequest; Stevens cat. no. 3106.

**2000.H1455** Mount cased; specimen of unknown origin; there is no entry for such a bird in any of the catalogues consulted. A card index, prepared at the time the Bird Gallery was developed in the early 1980s, indicates that this specimen was taken from a box in the store of reserve material.

**Scolopacidae (Sandpipers etc.)**

**Slender-billed Curlew** *Numenius tenuirostris* Viellot, 1817

*Distribution:* 1) Breeding: Russia. 2) Non-breeding: Greece; Hungary; Italy; Morocco; Romania; Tunisia; Turkey, Yugoslavia. 3) Vagrant: Algeria; Austria; Azores; Belgium; Bulgaria; Canada; Cyprus; Czech and Slovak republics; Egypt; France; Germany; Iran; Iraq; Israel; Italy; ?Japan; Jordan; Kuwait; Latvia; Libya; Malta; Netherlands; Oman; Poland; Seychelles; Aldabra; Spain; Switzerland; Yemen (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993), critically E (del Hoyo *et al.*, 1996).

**B016.40** Study skin, female; Foggia (Puglio), South Italy, 21.iii.1921; acquired with Herbert Stevens bequest.

**B016.69** Study skin, male; Foggia (Puglio), South Italy, iv.1921; acquired with Herbert Stevens bequest.

**2000.H1456, 2000.H1457** Two mounts; Coto Doñana, Spain, ii.1898 (*Abel Chapman*); acquired with Abel Chapman bequest; figured by Chapman & Buck (1910, facing page 250).

**COLUMBIFORMES**

**Columbidae (Doves, Pigeons)**

**Purple-winged (or Purple-barred) Ground Dove** *Claravis godefrida* (Temminck, 1811)

*Distribution:* Argentina; Brazil; Paraguay (extinct?).

*Status:* E/Ex (World Conservation Monitoring Centre, 1993) critically E (del Hoyo *et al.*, 1997).

**B096.91** Study skin, male, made from a mounted specimen; specimen lacking data.

**Pale-backed Pigeon** *Columba eversmanni* Bonaparte, 1856

*Distribution:* 1) Breeding: southern Kazakhstan; Turkmenia; Uzbekistan. 2) Non-breeding: south-eastern Afghanistan; northwestern India; eastern Iran; Pakistan (del Hoyo *et al.*, 1997).



*Status:* V (del Hoyo *et al.*, 1997), not listed as threatened in World Conservation Monitoring Centre (1993).

**B023.03** Study skin, female; Baghownie, Darbhanga, Tirhut, Bihar, India, 17.i.1902 (*Charles M. Inglis*); acquired with Herbert Stevens bequest; Stevens's cat. no. 2895.

**B023.04** Study skin, male; Baghownie, Darbhanga, Tirhut, Bihar, India, 17.i.1902 (*Charles M. Inglis*); acquired with Herbert Stevens bequest; Stevens's cat. no. 2896. Labelled: L 11.9; W 7.9; t 4.2; tars 1; B at G 9; Exp. 23 7; colours bill yellowish base ... [label torn] yellow round eye and legs and feet fleshy yellow.

**Pale-capped Pigeon, Purple Wood-Pigeon** *Columba pumicea* Blyth, 1842

*Distribution:* China; India; Lao P.D.R.; Myanmar; Thailand; Viet Nam (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993), V (del Hoyo *et al.*, 1997).

**B083.74** Study skin, female; Rungagora, Dibrugarh, Assam, India, 29.6.1903 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 2897. Labelled: The pair were shot off nest which contained a single egg HS.

**B083.75** Study skin, male; Rungagora, Dibrugarh, Assam, India, 29.6.1903 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 2899. Labelled: One of a pair shot off nest which contained a single egg HS.

**B083.76** Study skin, male; Rungagora, Dibrugarh, Assam, India, 10.xi.1901 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 2898. Labelled: Irish greyish white orbits grey brown; bill reddish plum colour pale at tip. Tarsi and claws purplish lake; soles whitish brown HS.

**Passenger Pigeon** *Ectopistes migratorius* Linnaeus, 1766

*Distribution:* U.S.A. (extinct) (Fuller, 1987).

*Status:* Ex (1914).

**2000.H1458, 2000.H1459**

Two mounts, male and female; specimens lacking data.

**2000.H1460** Mount, male; specimen lacking data.

**2000.H1461** Mount, female; shot Mulgrave Castle, Yorkshire on 12 Oct 1876 by Lord H[ar]ry Phipps. Mounted by JH for collection of Rt Hon. the Earl of Ravensworth. This Yorkshire bird was the subject of a short note by John Hancock (1877 *Trans. nat. Hist. Soc. Northumb.* 5, pp.337-338). Hancock received the bird on 13 October 1876 from the Dowager Marchioness of Normanby, who gave the provenance. The quill feathers in the wings were said to be 'much worn and broken' and on the forehead above the bill they were worn 'off to the skull', which led Hancock to conclude that the bird had been trying to get out of a cage.

Although, like many of the bird mounts on display in the museum, the provenance data have been separated from the specimen, this bird is the only one to show the damaged head as noted by Hancock; acquired with John Hancock's collection.

**2000.H1462** Mount, male; specimen lacking data.

**2000.H1463** Mount, female; specimen lacking data.

**2000.H1464** Mount male. Labelled: found in skin collection, November 1940. No history S.E.C. [Stephen Cook, formerly taxidermist at the Hancock Museum].

**Southern (or Maroon-breasted, or Scheepmaker's) Crowned Pigeon** *Goura scheepmakeri* Finsch, 1876

*Distribution:* Indonesia - Irian Jaya; Papua New Guinea - Papua (World Conservation Monitoring Centre, 1993).

- Status:* K\* (World Conservation Monitoring Centre, 1993), V (del Hoyo *et al.*, 1997).
- B093.42** Skin, from crest, head and shoulders only; British New Guinea [Papua], 1888 (*Captain N.R. Sayers*); presented by Captain Neville R. Sayers, 1888.
- B093.43** Four crests, only; ; specimen lacking data; identification not definite, could be from *G. cristata* (Pallas, 1764), but probably from *G. scheepmakeri* as crests were found together with head and crest of B093.42.
- 2000.H1465** Mount; specimen lacking data.

### Raphidae (Dodos, Solitaires)

**Dodo** *Raphus cucullatus* Linnaeus, 1758

*Distribution:* Mauritius (extinct) (Fuller, 1987).

*Status:* Ex (1690).

**Material:** bones from an indeterminate number of individuals; Mauritius; presented H.H. Slater, 18.vi.1875. Material comprises bones from limbs, mandible, pelvic and pectoral girdles: 21 pieces including two leg bones and part of pelvis on public display.

## PSITTACIFORMES

### Psittacidae (Parrots)

**Glossy Black Cockatoo** *Calyptorhynchus lathami* (Temminck, 1807)

*Distribution:* Eastern Australia, excluding Cape York Peninsula and Tasmania (del Hoyo *et al.*, 1997).

*Status:* V (del Hoyo *et al.*, 1997), not listed as threatened in World Conservation Monitoring Centre (1993).

**B109.44** Study skin, male; specimen lacking data.

**B109.45** Study skin, ?female; specimen lacking data; plumage slightly abnormal; the yellow mottling on neck (characteristic of female) is present but black barring of red tail panel (also characteristic of female) is absent; probably a female, but could be a young male acquiring adult coloration. Specimen is damaged at neck.

**Swift Parrot** *Lathamus discolor* (White, 1790)

*Distribution:* 1) Breeding: Tasmania. 2) Non-breeding: southeast coastal areas of Australian mainland (del Hoyo *et al.*, 1997).

*Status:* V (del Hoyo *et al.*, 1997), not listed as threatened in World Conservation Monitoring Centre (1993).

**B095.32** Study skin; specimen lacking data.

**B095.33** Study skin; specimen lacking data.

**B095.34** Study skin; specimen lacking data.

**Kaka** *Nestor meridionalis* (Gmelin, 1788)

*Distribution:* New Zealand, restricted to native forests (del Hoyo *et al.*, 1997).

*Status:* V (del Hoyo *et al.*, 1997), not listed as threatened in World Conservation Monitoring Centre (1993).

**B108.68** Study skin; no locality data; presented to John Hancock by Dr Newton, 1879. Acquired with John Hancock's collection.

**B109.50** Study skin; no locality data; presented by G.C. Atkinson, 1856.

**B109.51** Study skin; no locality data; presented to John Hancock by Dr Newton, 1879; acquired with John Hancock's collection. Pencilled note by John Hancock:



This species is alive at the Zoological Gardens. I saw it on the 23rd Sep 1885 - J.H.

- B109.52** Study skin; no locality data; presented by G.C. Atkinson, 1856.  
**2000.H1466** Mount, probably female; no locality data; acquired with Julia Boyd bequest, 1892; belongs to South Island subspecies, *N. meridionalis meridionalis*.  
**2000.H1467** Mount; no locality data; acquired with Julia Boyd bequest, 1892; belongs to South Island subspecies, *N. meridionalis meridionalis*.  
**2000.H1468** Mount, probably male; no locality data; acquired with Julia Boyd bequest, 1892; belongs to North Island subspecies, *N. meridionalis septentrionalis*.

**Ground Parrot *Pezoporus wallicus* (Kerr, 1792)**

*Distribution:* Australia (World Conservation Monitoring Centre, 1993).

*Status:* E (World Conservation Monitoring Centre, 1993), not listed as threatened in del Hoyo *et al.* (1997).

- B095.16** Study skin; specimen lacking data.  
**B095.17** Study skin; specimen lacking data.  
**B095.18** Study skin; specimen lacking data.  
**B095.19** Study skin; no locality data; presented by Miss Brown of Darlington.  
**2000.H1469** Mount; specimen lacking data.

**Superb Parrot, Barraband Parakeet, Green Leek Parrot *Polytelis swainsonii* (Desmarest, 1826)**

*Distribution:* Interior of southeast Australia (del Hoyo *et al.*, 1997).

*Status:* V (del Hoyo *et al.*, 1997), not listed as threatened in World Conservation Monitoring Centre (1993).

- 2000.H1470** Mount, female; specimen lacking data.

**Kakapo *Strigops habroptilus* Gray, 1845**

*Distribution:* New Zealand, formerly North, South and Stewart Islands; now extinct in its natural range, survives as introduced populations on Little Barrier Island and the predator-free Codfish and Maud Islands (del Hoyo *et al.*, 1997).

*Status:* E (World Conservation Monitoring Centre, 1993), critically E (del Hoyo *et al.*, 1997).

- B108.60** Study skin; no locality data; acquired with Julia Boyd bequest, 1892.  
**B108.61** Study skin; specimen lacking data.  
**B108.62** Study skin; New Zealand, xi.1878 (*M.W. Nesham*); William Nesham gave two study skins of Kakapos, listed in *Trans. nat. Hist. Soc. Northumb.* (7, p. 423) as being donated between June 1877 and June 1878. As the specimen is labelled November 1878 there seems to have been an error. Presumably, the second skin is one of the several unlabelled specimens.  
**B108.63** Study skin; specimen lacking data.  
**B108.64** Study skin, female; specimen lacking data. Labelled: Hazel eye female.  
**B108.65** Study skin, male; specimen lacking data. Labelled: Hazel eye male.  
**B108.66** Study skin; specimen lacking data; skull and legs missing from skin.  
**2000.H1471** Mount; specimen lacking data.  
**2000.H1472** Mount; specimen lacking data.  
**2000.H1473** Mount; specimen lacking data.  
**2000.H1474, 2000.H1475, 2000.H1476, 2000.H1477, 2000.H1478, 2000.H1479** Six mounts; label attached to one specimen reads: presented to J. Hancock by E.B. Cargill, 1877.

## APODIFORMES

### Trochilidae

**Black-breasted Puffleg**, *Eriocnemis nigriventris* (Boursier & Mulsant, 1852)

*Distribution:* Ecuador (World Conservation Monitoring Centre, 1993).

*Status:* E (World Conservation Monitoring Centre, 1993), critically E (del Hoyo *et al.*, 1999).

**B102.27** Study skin, male; specimen lacking data.

## CORACIIFORMES

### Alcedinidae (Kingfishers)

**Blyth's Kingfisher** *Alcedo hercules* Laubmann, 1917

*Distribution:* Bangladesh; Bhutan; China; Lao P.D.R.; India; Myanmar; ?Nepal; Thailand; Viet Nam (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993).

**B088.45** Study skin, male; Panchnoi River, Dafla Hills, Upper Assam, India, 22.xi.1905 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 1713.

**B088.46** Study skin, male; Panchnoi River, Dafla Hills, Upper Assam, India, 23.xi.1905 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 1714. Labelled: Iris brown; bill black, red at gape; tarsi pale coral red; claws reddish horny, middle claw darkest 11/12/04 H.S. A further note gives details of other specimens in Stevens' collection as at May 1906.

**B088.47** Study skin, female; gully off the Panchnoi River, Dafla Hills, Upper Assam, India, 24.xi.1905 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 1712. Labelled: Lower mandible pale horny orange red H.S.

## PICIFORMES

### Picidae (Woodpeckers, Wrynecks)

**Red-cockaded Woodpecker** *Picoides borealis* (Viellot, 1809)

*Distribution:* U.S.A. (World Conservation Monitoring Centre, 1993).

*Status:* E (World Conservation Monitoring Centre, 1993).

**B103.20** Study skin, male; Wayne County, Georgia, v.1865; no acquisition data.

## PASSERIFORMES : EURYLAIMI

### Eurylaimidae (Broadbills)

**Grauer's Broadbill, African Green Broadbill** *Pseudocalyptomerus graueri* Rothschild, 1909

*Distribution:* Uganda; Zaire (World Conservation Monitoring Centre, 1993).

*Status:* R (World Conservation Monitoring Centre, 1993).

**B099.15** Study skin; specimen lacking data.

**B099.16** Study skin; specimen lacking data.

**B099.75** Study skin; specimen lacking data.



## PASSERIFORMES : TYRANNI

### Formicariidae (Antbirds)

**Ashy Antwren** *Myrmotherula grisea* Carricker, 1935

*Distribution:* Bolivia (World Conservation Monitoring Centre, 1993).

*Status:* V/R (World Conservation Monitoring Centre, 1993).

**1995.H2067** Mount; specimen lacking data.

### Furnariidae (Ovenbirds)

**White-throated Barbtail** *Premnoplex tatei* Chapman, 1925

*Distribution:* Breeding: Venezuela (World Conservation Monitoring Centre, 1993).

*Status:* V/R (World Conservation Monitoring Centre, 1993).

**B106.72** Study skin; specimen lacking data.

## PASSERIFORMES : PASSERES

### Callaeidae (Wattle Birds)

**South Island, or Orange-wattled Kokako** *Callaeas cinerea cinerea* (Gmelin, 1788)

*Distribution:* South Island, New Zealand (Falla, Sibson & Turbott, 1979; Fuller, 1987).

*Status:* Probably Ex (1961) (Falla, Sibson & Turbott, 1979; Fuller, 1987).

**2000.H1480** Mount; specimen lacking data. An Orange-wattled Crow that was included in the Julia Boyd bequest of 1892 (*Trans. nat. Hist. Soc. Northumb.* **11**, p. 245) possibly equates to this bird.

**North Island, or Blue-wattled Kokako** *Callaeas cinerea wilsoni* (Bonaparte, 1851).

*Distribution:* North Island, New Zealand (World Conservation Monitoring Centre, 1993).

*Status:* E (World Conservation Monitoring Centre, 1993).

**2000.H1062** Mount; specimen lacking data. The wattles have been painted blue, possibly because of fading.

**2000.H1482** Mount; specimen lacking data.

A male and female Blue-wattled Crow were presented to John Hancock by G.H. Swan of Napier, New Zealand in May 1884. These were passed to the Natural History Society in 1886 [a later entry, in the list of donations for June 1889 refers to the same specimens].

**Saddleback** *Creadion carunculatus* (Gmelin, 1789)

*Distribution:* New Zealand (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993) (perhaps a more appropriate threat category would be V or perhaps E; cf. Falla, Sibson & Turbott, 1979).

**B094.67** Study skin; New Zealand, 1855 (*Blackett*); probably acquired with John Hancock's collection. The specimen belongs to the South Island subspecies *C. carunculatus carunculatus*. The wattles are missing and the lower bill is detached.

**Huia** *Heterolocha acutirostris* (Gould, 1836)

*Distribution:* formerly North Island, New Zealand (Fuller, 1987).

*Status:* Ex (1907).

**2000.H1483** Mount, male, mounted with 2000.H1484.

**2000.H1484** Mount, female, mounted with 2000.H1483.

**2000.H1485** Mount, male : mounted with 2000.H1486.

**2000.H1486** Mount, female, mounted with 2000.H1485.

Howse (1899, p.137) listed two Huia specimens on display, a male and female presented to John Hancock by G.H. Swan of Napier, New Zealand in May 1884. These were presented to the Natural History Society in 1886 [a later entry, in the list of donations for June 1889 refers to the same specimens]. The stomach contents of two Huia's, a male (S362) and female (S363), presented by Swan, have been preserved.

The donor of the second pair is unknown.

### Corvidae (Crows, Jays)

**Hawaiian Crow** *Corvus hawaiiensis* Peale, 1848 (= *C. tropicus* Kerr, 1792)

*Distribution:* Hawai'i ('big island' of Hawaiian Islands) (World Conservation Monitoring Centre, 1993).

*Status:* E (World Conservation Monitoring Centre, 1993).

**B101.72** Study skin, male; Kona, Hawai'i, Hawaiian Islands, 1888 (*Scott Wilson*); presented by Scott Wilson of Weybridge, via John Hancock, November 1889 (*Trans. nat. Hist. Soc. Northumb.* **11**, p. 56). According to the label, the crow then inhabited only the Kona district of the island of Hawai'i.

### Emberizidae (Buntings and Tanagers)

**Yellow Bunting, Japanese Yellow Bunting** *Emberiza sulphurata* Temminck & Schlegel, 1848

*Distribution:* 1) Breeding: Japan. 2) Non-breeding: China; Hong Kong; D.P.R. Korea; Korea Republic; Philippines; Taiwan (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993).

**B070.78** Study skin; China, Amoy, iv.1861; no acquisition data.

**B070.79** Study skin; China, Amoy, iv.1861; no acquisition data. In poor condition, legs separated from rest of skin.

**B070.80** Study skin; China, Amoy, iv.1861; no acquisition data.

### Estrildidae (Waxbills and their allies)

**Gouldian Finch** *Chloebia gouldiae* (Gould, 1844)

*Distribution:* Australia (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993).

**B093.31** Study skin, male; no locality data; presented by J.E. Nowers, 12.iii.1934; the red-faced form.

Two further study skins (male and female) of the usual, black-faced form, originated in a local aviary.

### Icteridae

**Pampas Meadowlark, Lesser Red-breasted Meadowlark** *Sturnella militaris* (Linnaeus, 1771)

*Distribution:* 1) Breeding: Argentina; ?Brazil; ?Uruguay. 2) Non-breeding: Brazil; Uruguay (World Conservation Monitoring Centre, 1993).

*Status:* Id (World Conservation Monitoring Centre, 1993).



**1999.H1211** Mount; no locality data; presented by Douglas Dickinson, xi.1891; specimen has an abnormally long upper bill.

**1999.H1219** Mount; specimen lacking data.

#### **Meliphagidae (Honey eaters)**

**Stitchbird** *Notiomystis cincta* (De Bus & Gisignies, 1839)

*Distribution:* New Zealand (World Conservation Monitoring Centre, 1993).

*Status:* V (World Conservation Monitoring Centre, 1993).

**B097.15** Study skin, male; New Zealand; presented by J.C. Atkinson, 1856.

#### **Muscicapidae - Paradoxornithinae (Parrotbills)**

**Black-breasted Parrotbill** *Paradoxornis flavirostris* Gould, 1836

*Distribution:* Bangladesh; India; Myanmar; Nepal (extinct?) (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993).

**B087.43** Study skin, female; Hersamara, North Lakhimpur, Upper Assam, India, 27.xii.1905 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 117.

**B087.44** Study skin, male; Hersamara, North Lakhimpur, Upper Assam, India, 10.i.1906 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 152.

**B087.45** Study skin, male; Hersamara, North Lakhimpur, Upper Assam, India, 11.xii.1905 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 168.

**B087.46** Study skin, female; Hersamara, North Lakhimpur, Upper Assam, India, 5.ii.1904 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 123.

**B087.47** Study skin, male; Bhimpooora bhill, Gogaldhubie, North Lakhimpur, Upper Assam, India, 7.xii.1905 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 155.

**B087.48** Study skin, male; Hersamara, North Lakhimpur, Upper Assam, India, 9.iv.1905 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 126. Labelled: brought in along with the nest by a Mori but both eggs were broken H.S.

**B089.04** Study skin, female; Chaprigaon, Hersamara, North Lakhimpur, Upper Assam, India, 4.ii.1905 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 131. Labelled: One out of a flock shot on the left bank of the Subansiri in part grass and ekra jungle. This day I saw a fine female hog deer with her two young. H.S.

**B089.05** Study skin, female; Gagaldhubie, North Lakhimpur, Upper Assam, India, 7.xii.1905 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 202.

**B089.06** Study skin, female; Chaprigaon, Hersamara, North Lakhimpur, Upper Assam, India, 9.iv.1905 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 169. Labelled: Iris olivaceous brown; bill bright horny yellow; lips and culmen of upper mandible horny white; claw bluish olive. All these birds from 9th-14th/4/05 were procured on the left bank on island in the Subsaniri opposite Hersamara.

- B089.07** Study skin, male; Hersamara, North Lakhimpur, Upper Assam, India, 27.xii.1905 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 119. Labelled: This series 1-16 *P. flavirostris* were collected with two exceptions within a five mile radius of Hersamara chiefly on the 'chaurs' and left bank of the Subsaniri in dense cagri and lui grass.
- B089.08** Study skin, male; Dejoo, North Lakhimpur, Upper Assam, India, 26.iii.1905 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 102. Labelled: One of a small party of five or six and after great difficulty found this one; they frequented some heavy cagri and tara jungle in one of the garden 'hoolahs' H.S. Nearly all of these "hoolahs" have been cleared for 'dhan' H.S. 5/09.
- B089.09** Study skin, female; Dejoo, North Lakhimpur, Upper Assam, India, 29.xii.1905 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 132.
- B090.00** Study skin, female; Puttimarigam, Hersamara, North Lakhimpur, Upper Assam, India, 4.ii.1905 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 125. Labelled: Stomach contd flowers seeds of 'knul' grass H.S.
- B090.01** Study skin, male; Hersamara, North Lakhimpur, Upper Assam, India, 19.i.1905 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 128.
- B090.08** Study skin, female; Momlabari, Sibsagar, Upper Assam, India, 1-15.ix.1904 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 157. Labelled: Evidently in poor plumage at this time H.S.
- B090.09** Study skin, male; Hersamara, North Lakhimpur, Upper Assam, India, 5.i.1906 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 124.
- B090.10** Study skin, sex unknown; Komlabari, Sibsagar, Upper Assam, India, 1-15.ix.1904 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 120.
- B090.11** Study skin, female; Hersamara, North Lakhimpur, Upper Assam, India, 10.iv.1905 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 154.
- B090.12** Study skin, female; Hersamara, North Lakhimpur, Upper Assam, India, 11.iv.1905 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 171.
- B090.13** Study skin, male; Hersamara, North Lakhimpur, Upper Assam, India, 5.ii.1905 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 122. Labelled: Iris olivaceous brown; bill yellow; tarsus plumbeous H.S.
- B090.14** Study skin, male; Hersamara, North Lakhimpur, Upper Assam, India, 11.iv.1905 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 129.
- B090.15** Study skin, female; North Lakhimpur, Upper Assam, India, 5.ii.1904 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 121.
- B091.23** Study skin, female; Gogalhubie, North Lakhimpur, Upper Assam, India, 10.i.1905 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 112. Labelled: Iris light brown; bill pale yellow; tarsus olivaceous green; stomach cont'd grass and seeds masticated; one of a pair procured in cagri & nul grass in the bhil. H.S.



- B091.24** Study skin, female; Hersamara, North Lakhimpur, Upper Assam, India, 3.ii.1905 (*Herbert Stevens*); acquired with Herbert Stevens bequest. Labelled: Stomach cont'd vegetable substance seeds & small larvae H.S.

**Rufous-headed Parrotbill, or Greater Rufous-headed Parrotbill** *Paradoxornis ruficeps* Blyth, 1842

*Distribution:* Bangladesh; Bhutan; China; India; Lao P.D.R.; Myanmar; Viet Nam (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993).

- B076.25** Study skin, male; Margherita, Upper Assam, India, 21.xi.1903 (*H. N. Coltact*?); acquired with Herbert Stevens bequest; Stevens's cat. no. 189. Determined by Stevens as subspecies *bakeri* (Hartert). Labelled: Iris crimson; feet blue grey; bill max. dark horny, paler at tip; mandible pale horny H.N. Coltact.

**Muscicapidae - Sylviinae (Old World Warblers)**

**Aquatic Warbler** *Acrocephalus paludicola* (Viellot, 1817)

*Distribution:* 1) Breeding: Austria; Belarus; Germany; Hungary; Latvia; Lithuania; Moldova; Poland; Russia; Ukraine. 2) Non-breeding: France; Iran; Italy; Latvia; Mali; Morocco; Netherlands; Portugal; Senegal; Spain; Switzerland; U.K. 3) Vagrant: Algeria; Azores; Belgium; Bulgaria; Canary Islands; Cyprus; Czechoslovakia; Denmark; Egypt; Finland; Ghana; Greece; Guernsey; Ireland; Israel; Jersey; Jordan; Luxembourg; Malta; Oman; Norway; Romania; Sweden; Tunisia; Turkey; Yugoslavia (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993).

- B048.28** Study skin, male; Cremona, Italy, 15.ix.1910 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 4360.

- B048.33** Study skin, female; Cremona, Italy, 17.ix.1910 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 4361.

**Bristled Grassbird, Bristled Grass-Warbler** *Chaetornis striatus* (Jerdon, 1841)

*Distribution:* Bangladesh; India; Nepal; Pakistan (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993).

- B093.13** Study skin, male; Darbhanga, Tirhut, India, 1904 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 2639.

**Muscicapidae - Timaliinae (Babblers)**

**Jerdon's Babbler** *Chrysomma altirostre* (Jerdon, 1862)

*Distribution:* India; Myanmar (extinct?); Nepal; Pakistan (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993).

[Some Northumbrian naturalists might be interested to learn that Dr T.C. Jerdon (1811-1872) had local connections, being born at Biddick in County Durham. For a biographical memoir see Elliot (1876). Unfortunately, there appear to be no specimens in the Hancock Museum collected by Jerdon].

- B087.57** Study skin, female; Gagaldhubie, North Lakhimpur, Upper Assam, India, 11.i.1905 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 899. Labelled: Procured in the early morning when the fog bank thick over the bhil H.S.

- B087.58** Study skin, female; Dejoor River, North Lakhimpur, Upper Assam, India, 4.xii.1904 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 896. Labelled: Procured towards dusk in the bed of the Dejoor R. in a

thick grass and reed bed H.S. Iris yellowish pink; orbital skin greenish-yellow; bill horny; upper mandible darker than lower mandible; tarsus pinkish-horny H.S.

- B087.59** Study skin, female; below Hersamaram, left branch Subansiri, Upper Assam, India, 30.xii.1905 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 893. Identified as subspecies *griseigularis*.
- B087.60** Study skin, male; Hessamara, North Lakhimpur, Upper Assam, India, 1.i.1906 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 892. Identified as subspecies *griseigularis*. Data on other specimens in Stevens' collection in May 1906 are given as: Lilabari, North Lakhimpur, 18.xi.1905 (male); Hessamara, 5.i.1906 (male), 27.xii.1905 (male), 1.i.1906 (female), 8.i.1906 (male), 28.xii.1905 (female), 7.i.1906 (male), 29.xii.1905 (female), 3.i.1906 (female), 28.xii.1905 (female).
- B087.61** Study skin, male; Gagaldhubie, North Lakhimpur, Upper Assam, India, 10.i.1905 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 895. Labelled: Iris brown; orbital skin greenish-yellow; bill purplish-horny; tarsus similar; stomach contained green vegetable substance (small seeds only) H.S.
- B087.62** Study skin, male; Hersamara, North Lakhimpur, Upper Assam, India, 27.xii.1905 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 894. Identified as subspecies *griseigularis*.
- B087.66** Study skin, male, immature; Komlabarie, Sibsagar, Upper Assam, India, 1-15.ix.1904 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 897. Identified as subspecies *griseigularis*.

**Marsh Babbler** *Pellorneum palustre* Gould, 1872

*Distribution:* Bangladesh; India (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993)

- B040.71** Study skin, male; Hersamara, North Lakhimpur, Upper Assam, India, 11.iv.1905 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 924.
- B040.72** Study skin, female; Hersamara, North Lakhimpur, Upper Assam, India, 8.i.1906 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 919. Labelled: coloration of soft parts: iris brown; bill and tarsus purplish-horny H.S.
- B040.73** Study skin, male; Hersamara, North Lakhimpur, Upper Assam, India, 8.i.1906 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 920. Label includes a long list of specimens present in Stevens's collection in May 1906.
- B040.74** Study skin, female; Hersamara, North Lakhimpur, Upper Assam, India, 11.iv.1905 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 923.
- B040.75** Study skin, female; Hersamara, North Lakhimpur, Upper Assam, India, 8.i.1906 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 921.
- B040.76** Study skin, male; Hersamara, North Lakhimpur, Upper Assam, India, 11.iv.1905 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 925.
- B040.77** Study skin, female; R. Dejoo, base of Duphla Hills, North Lakhimpur, Upper Assam, India, 17.iv.1904 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 922. Labelled: Iris brown; bill and tarsus purplish-horny H.S.



**B040.78** Study skin, female; Rungagora, Dibrugarh, Upper Assam, India, iii.1903 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 926.

**Snowy-throated Babbler, Austen's Babbler *Stachyris oglei* (Godwin-Austen, 1877)**

*Distribution:* India (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993).

**B087.64** Study skin, female; Margherita, Dibrugarh, Upper Assam, India, 19.xi.1902 (*H.N. Coltact?*); acquired with Herbert Stevens bequest; Stevens's cat. no. 928. Labelled: Iris crimson; feet brown; bill, upper mandible black horny, lower mandible grey horny H.N.C[oltact].

**B087.65** Study skin, male; Margherita, Dibrugarh, Upper Assam, India, 22.xi.1903 (*H.N. Coltact?*); acquired with Herbert Stevens bequest; Stevens's cat. no. 927. Labelled: Iris crimson; feet brown; bill dark horny, paler at tip. H.N. Coltact.

**Muscicapidae - Turdinae (Thrushes)**

**Rusty-bellied Shortwing, Rusty-breasted Shortwing *Brachypterix hyperythra* Jerdon & Blyth, 1861**

*Distribution:* China; India (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993).

**B075.79** Study skin, male; Hessamara, North Lakhimpur, Upper Assam, India, 9.i.1905 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 1017. Labelled: Procured in dense reeds at close range and in consequence damaged H.S.

**B075.81** Study skin, male; Panchnoi, Dafla Hills (low elevation), North Lakhimpur, Upper Assam, India, 30.xi.1905 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 1018. Labelled: Iris hazel; bill black; tarsus horny. Procured in a forest stream at sides of the bed H.S.

**B075.80** Study skin; Nepal; labelled as No. 455. In poor condition, head detached.

**Spotted Ground-thrush, Natal Thrush, Spotted Forest Thrush *Zoothra guttata* (Vigors, 1831)**

*Distribution:* 1) Breeding: Malawi; ?Mozambique; South Africa; Sudan; Zaire. 2) Non-breeding: Kenya; Tanzania (World Conservation Monitoring Centre, 1993).

*Status:* R (World Conservation Monitoring Centre, 1993).

**B094.96** Study skin; labelled in ?John Hancock's handwriting as being bought at Redcar, March 1870 for 2/6; acquired with John Hancock's collection.

**Ploceidae (Old World Seed eaters)**

**Yellow Weaver, Finn's Baya Weaver, Himalayan Weaver *Ploceus megarhynchus* Hume, 1869**

*Distribution:* India (World Conservation Monitoring Centre, 1993).

*Status:* K\* (World Conservation Monitoring Centre, 1993).

**B086.29** Study skin, male; Dejoo, North Lakhimpur, Upper Assam, India, 28.v.1904 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 2749.

**B086.30** Study skin, female; Dejoo, North Lakhimpur, Upper Assam, India, 28.v.1904 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 2951.

- B086.31** Study skin, male in immature plumage; Chota Tingrai, Dibrugarh district, Upper Assam, India, 15.ii.1904 (*Herbert Stevens*); acquired with Herbert Stevens bequest; Stevens's cat. no. 2750.

## REFERENCES

- BOLAM, G, (1929). Obituary. Abel Chapman, M.A. 1851-1929. *The Vasculum* 15: 89-96.
- BOLAM, G, (1932). A Catalogue of the Birds of Northumberland. *Trans. nat. Hist. Soc. Northumb.* 8: 1-160.
- CHAPMAN, A and BUCK, W J, (1910). *Unexplored Spain*. London: Arnold.
- CHAPMAN, A, (1893). *Wild Spain*. London: Gurney and Jackson.
- (1889). *Bird Life of the Borders*. London: Gurney and Jackson.
- (1924). *The Borders and Beyond*. London: Gurney and Jackson.
- DAVIS, P S and BREWER, C, (1986). *A Catalogue of Natural Science Collections in North-East England with Biographical Notes on the Collectors*. Newcastle: North of England Museums Service.
- DEL HOYO, J, ELLIOTT, A and SARGETAL, J (Eds), (1992). *Handbook of the Birds of the World. Volume I, Ostrich to Ducks*. Barcelona: Lynx Edicions.
- (1994). *Handbook of the Birds of the World. Volume II, New World Vultures to Guinea Fowl*. Barcelona: Lynx Edicions.
- (1996). *Handbook of the Birds of the World. Volume III, Hoatzin to Auks*. Barcelona: Lynx Edicions.
- (1997). *Handbook of the Birds of the World. Volume IV, Sandgrouse to Cuckoos*. Barcelona: Lynx Edicions.
- (1999). *Handbook of the Birds of the World. Volume V, Barn-owls to Hummingbirds*. Barcelona: Lynx Edicions.
- DYMOND, J N, FRASER, P A and GANTLETT, S J M, (1989). *Rare Birds in Britain and Ireland*. Calton: Poyser.
- ELLIOT, SIR W, (1876). Memoir of Dr. T. C. Jerdon. *Hist. Berwicksh. Nat. Cl.* 7: 143-151.
- EMBLETON, D, (1890). Memoir of the life of John Hancock. *Trans. nat. Hist. Soc. Northumb.* 11: 1-20.
- FALLA, R A, SIBSON, R B and TURBOTT, E G, (1979). *The New Guide to the Birds of New Zealand*. Auckland and London: Collins.
- FOX, G T, (1827). *Synopsis of the Allan Museum, late the Allan, formerly the Tunstall, or Wycliffe Museum*. Newcastle: Charnley.
- FULLER, E, (1987). *Extinct Birds*. London: Viking/Rainbird.
- (1999). *The Great Auk*. Southborough: Fuller.
- GRIEVE, S, (1885). *The Great Auk or Garefowl (Alca impennis Linn.)*. London: Jack.
- (1897). Supplementary note on the Great Auk or Garefowl (*Alca impennis* Linn.). *Trans. Edinburgh Field Naturalists' and Microscopical Society.* 3: 237-273.
- HANZAK, J, (1980). History of the Prague National Museum, with special regard to zoology. *J. Soc. Bibliog. Nat. Hist.* 9(4): 369-373.
- HOWSE, R, (1894). On the occurrence in the North-East coast of Yorkshire of a Ruffed-Bustard, *Otis houbara*, Gmelin, commonly known as Macqueen's Bustard, *Otis Macqueeni*, J.E. Gray. *Trans. nat. Hist. Soc. Northumb.* 11: 345-350.
- (1899). *Index-catalogue of the birds in the Hancock collection*. pp 138. Newcastle: Natural History Society (also published in 1900, in *Trans. nat. Hist. Soc. Northumb.* 13: 273-410).
- JESSOP, L, (1999a). The Fate of Marmaduke Tunstall's collections. *Archives of Natural History* 26: 33-49.
- (1999b). Bird specimens figured by Thomas Bewick surviving in the Hancock Museum, Newcastle upon Tyne. *Trans. nat. Hist. Soc. Northumb.* 59(3): 65-82.



- OWEN, R, (1865). Description of the Skeleton of the Great Auk. *Proc. Zool. Soc. Lond* V: 317-315).
- RUSSELL GODDARD, T, (1929). *History of the Natural History Society of Northumberland, Durham and Newcastle upon Tyne*. Newcastle: Reid.
- (1930). Abel Chapman (1851-1929). *Trans. nat. Hist. Soc. Northumb.* 7: 1-15.
- STATTERSFIELD, D A J and CAPPER, D R (Eds), (2000). *Threatened birds of the World (Birdlife International)*. Barcelona and Cambridge: Lynx ediciones.
- WELFORD, R, 1895. *Men of Mark 'twixt Tyne and Tweed. Volume 2*. London: Walter Scott.
- WORLD CONSERVATION MONITORING CENTRE, (1993). *World Checklist of Threatened Birds*. Peterborough: Joint Nature Conservation Committee.
- YARRELL, W, (1882-1884). *A History of British Birds*. 4th edition, four volumes. London: Walter Scott.

**THE PARASITES OF PASTURELAND LEATHERJACKETS (*TIPULA* SPP.,  
TIPULIDAE: DIPTERA) IN THE NORTH EAST OF ENGLAND AND THEIR  
POTENTIAL FOR BIOLOGICAL CONTROL**

M K Er<sup>1</sup>, B J Selman<sup>2</sup>, G R Port<sup>2</sup> and A Gökçe<sup>3</sup>

<sup>1</sup>Department of Crop Protection, Agricultural Faculty, Kahramanmaraş Sutcu Imam University, Kahramanmaraş, Turkey; <sup>2</sup>Department of Agricultural and Environmental Sciences, Faculty of Agriculture and Biological Science, University of Newcastle upon Tyne, NE1 7RU, England; <sup>3</sup>Department of Crop Protection, Faculty of Agriculture, Gazi Osman Pasa University, Tokat, Turkey

**ABSTRACT**

A survey of the pathogens of *Tipula* spp. Larvae was conducted in five selected fields after initial samplings in eleven fields in Northumbria and Cumbria in 1997-1999. During the survey 6 protozoa (*Gregarina longa*, *Hirmocystis ventricosa*, *Actinocephalus tipulae*, *Diplocystis tipulae*, *Nosema binucleotum*, *Rasajeyna nannyla*), 2 viruses (TIV (*Tipula* Iradescent Virus) and NPV (Nuclear Polyhedrosis Virus)), 1 fungus (*Conidiobolus osmodes*) and one possible exoparasitic protozoan parasite were encountered. Also 1 parasitoid (*Bucantes geniculatus*) and 1 nematode (*Agamomermis tipulae*) parasite were found. The level of incidence and species of parasites differed with location. TIV and *C. osmodes* appeared only once causing epizootics in the last year of the survey. Leatherjacket parasites were described and discussed for their importance in the biological control of tipulid larvae.

**INTRODUCTION**

Tipulid larvae (leatherjackets) are a major pest of established grassland (Blackshaw, 1991; Blackshaw and Coll, 1999). These larvae can be serious pests of grass (French, 1969; Newbold, 1981), cereals (Rayner, 1975) and various other crops (Blackshaw *et al.*, 1996). They were reported as pests in many parts of the UK (Mayor and Davies, 1976), in Europe (Lange, 1963; Ricou and Douyer, 1975; Pol-van Dasselaar *et al.*, 1998), North America (Jackson and Campbell, 1975) and Northern Ireland (Blackshaw, 1983, 1990). Chemical insecticides and cultivation are the currently available control options for leatherjackets (Blackshaw, 1991; Blackshaw and Coll, 1999). Candidate organisms have been sought (Sherlock, 1973; Brownbridge, 1985; Carter, 1976; Kelly, 1989, 1990) as biological control agents against leatherjackets in the search for alternative control techniques.

These studies to find the natural pathogens of leatherjackets were conducted over a decade ago and the current situation of the pathogens of leatherjackets is not known. Some new pathogen species were found in this period and later (Sherlock, 1973; Carter, 1976b; Borisov and Tarasov, 1997) and the existence of other undiscovered pathogens is therefore possible. Carter (1976b) suggested that more investigations would yield new parasite species of tipulid larvae. In the present work a survey was designed to find and bring into culture the current pathogens of tipulid larvae in Northumberland and Cumbria in 1997-1999 as a part of a larger project on the microbial control of leatherjackets.

**MATERIALS AND METHODS**

The pathogens of tipulid larvae were surveyed in five selected fields in Northumberland and Cumbria in 1997-1999 (Table 1). This was after an initial sampling in eleven fields where leatherjacket infestation was either expected or known to exist. All the fields were established pasturelands except for Close House which was a sports field. Two of the sampling sites were damp fields. Standing water was present at Woodhouse during wet periods due to poor drainage and also at North Walbottle for the whole year, the water becoming confined to a small pond in the middle of the field in summer. The other sampling sites were wet enough to support leatherjacket populations throughout the year but the water level did not rise higher than the soil surface at any time of the year.



Table 1 Collection sites and periods of the survey of tipulid larval parasites.

Sites	O/S Reference	Period
Close House	NZ 127 658	March 1997 - May 1998
North Walbottle	NZ 174 686	//
Cockle Park	NZ 195 920	//
Nafferton Farm	NZ 065 656	//
Woodhouse	NY 475 336	Nov. 1998 - May 1999

The fields were sampled at intervals of about four weeks during the active larval period. Sampling plots in the fields were chosen each time without bias. The larvae were brought to the surface by applying 0.15% of irritant orthodichlorobensine (ODCB) solution emulsified with the same amount of detergent. Prior to pouring the solution, the vegetation was cut to about 1-2cm in order to detect the larvae easily, especially in the early larval stages. The larvae were collected in a sieve on their emergence and washed by spraying on water to reduce the possible harmful effect of ODCB on the larvae, as suggested by some previous workers (Brownbridge, 1985). Then the larvae were transferred to plastic boxes on moist paper for transport to the laboratory. After the survey the Close House and Woodhouse populations were also checked in autumn 1999-spring 2000 as the population levels were high enough to induce a possible outbreak of a pathogen that had not been detected in the survey.

The larvae were maintained in the cool (11-15°C) for a few days to reduce initial sudden deaths to a negligible level. They were identified according to the keys of Brindle (1958, 1959) and Chiswell (1956). Some of the larvae were placed individually in petri dishes lined with wet filter paper before dissection. This was performed within a week of collection. The rest of the larvae were transferred to sand culture boxes according to their place of collection. The larvae were observed for any disease development.

Prior to the dissection of the larvae, the body fluid was examined under a phase contrast microscope. The larvae were dissected in saline to keep the tissues in the closest possible condition to their living state. The alimentary canal, the malpighian tubules, the muscles, the nerve chord and the fat body were delicately dissected and examined using initially a high magnification dissection microscope and then a phase contrast microscope. Sample tissue slides were prepared when needed.

Yates correction for continuity (Zar, 1996) was used to calculate chi-square values to perform pairwise chi-square tests in order to assess the differences in prevalence between collection sites.

## RESULTS

Almost all of the larvae collected during the survey were *Tipula paludosa* with a few *T. lunata* and some *Nefrotoma* spp. The average overall efficiency of ODCB technique is around 80% for leatherjacket recovery (Milne *et al.*, 1958; Carter, 1976b). This was lower in the winter when leatherjackets take around thirty minutes to emerge. With rising temperatures the efficiency increased, falling again towards the prepupal stage. The comparison of the larvae recovered with those left behind by this method showed the independence of sampling efficiency from larval pathogenicity (Beesley, 1975; Carter, 1976b). Therefore the failure to recover a few larvae probably had little effect on the final results. Although the efficiency of ODCB varied over the year, there was no noticeable change in the larval density in each location between years except for 2000 when the population level was greatly increased at Close House. All sampling fields were sufficiently wet in all years and a drought did not occur at critical periods during the survey.

The general picture of overall infection levels of all the parasites found throughout this study can be seen in Figure 1. All the high infection levels belong to the protozoan pathogens. The incidences of *Conidiobolus osmodes* and TIV seem to be as high as the protozoan pathogens but the reason for this is the epizootics that they caused in 1999-2000, each at one location. In the previous years they did not appear in any populations sampled while the protozoan pathogens were stable at the locations where they existed. The other parasites showed occasional low level appearances. The incidence of individual parasites in *T. paludosa* larvae according to the collection sites is given in Table 2. As can be seen from this table, the diversity of parasitism was higher at Close House and Woodhouse. Leatherjacket populations at these two locations were higher than the others during the survey period enabling the parasites to encounter the host more easily, to increase in number and to spread. Also the resulting possible stress may have allowed low virulence pathogens to appear in the population.

Since some of the gregarine gamonts were intermediate in morphology between *Gregarina longa* and *Hirmocystis ventricosa*, these two species were grouped together. Protozoan pathogens were recorded from almost all dissected larvae. In the majority of larvae the dominating species were gregarines, especially cephalon gregarines. Table 2 shows that all the gregarine diseases were found at all the locations and almost all the highest incidences were recorded from Cockle Park where no other kinds of parasitism were present. Amongst the gregarine diseases only *Actinocephalus tipulae* did not show any statistically significant difference between the different sites with prevalence ranging between 11-17% of the leatherjackets infected. The prevalence of the other cephalon gregarines was in the range of 70-78% of larvae infected except for Woodhouse where almost 44% were infected. The infection level at this location was statistically significant from the other locations. In the case of *Diplocystis tipulae*, the only statistical significance occurred between Cockle Park and Nafferton Farm at  $p < 0.05$  ( $X^2 = 6.14$ ). The incidences varied between 24% and 51%. Two other protozoan diseases (*Nosema binucleatum* and *Rasejeyna nannyla*) were restricted to individual fields. As can be seen from table 2, *N. binucleatum* was present at three locations (Close House, North Walbottle and Nafferton Farm) which are in the same district and they did not show any statistically significant difference. The range of incidences was 18-26%. *R. nannyla* was found at two locations (North Walbottle and Woodhouse), both of which had standing water at least in the wet periods of the year. The infection incidence at Woodhouse (67%) was significantly higher than at North Walbottle (20%) at  $p < 0.001$  ( $X^2 = 22.45$ ).

### Protozoa

Three cephaline and one coelomic gregarine, one microsporidian and one coccidian pathogen of leatherjackets were observed in this study. At least one of these organisms was found to exist in almost every single larva dissected.

**Cephaline gregarines:** The gamonts were easily recognisable between the gut epithelial cells and the peritrophic membrane while the cysts can be found in the alimentary canal or in the faeces. *Actinocephalus tipulae* is distinct with its white appearance and tapered deutomerite (Figures 2a,b). The others are less opaque with a long and cylindrical deutomerite (*Gregarina longa*) (Figure 2c) or a bulging and more squat deutomerite (*Hirmocystis ventricosa*) (Figure 2d). Some gregarines had an intermediate morphology between the latter two species. Because of the absence of an additional criterium these were not named separately. The gametocysts and the cysts (Figures 2 f, g) were observed mainly in the alimentary canal and rarely in the tissue. In the caeca of one *T. paludosa* larva one rather big gamont belonging to an unknown species was also encountered (Figure 2e). On most occasions, although the number of gregarine gamonts in an individual was quite high, no harm was noticed to the larvae.

*Diplocystis tipulae* is the only coelomic gregarine and was observed in the gamont and gametocyte stages (Figure 3). These could generally be seen through the cuticle prior to dissection unless the infection was premature. Identification was based on the description of Sherlock (1973). The further stages could only be seen in the pupae and adult flies. Infection can be so high that all the mid-gut can be covered with the pathogen (Figure 3b). Heavy infections like this (over 100 gamonts) can lead to the death of the larva (Sherlock, 1973). In



**Table 2** Percentage incidence of parasites recorded from *Tipula paludosa* larvae collected from different sites in Northumberland and Cumbria between March 1997 and April 2000.

	Collection sites			
	Close House 60	North Walbottle 54	Cockle Park 47	Woodhouse 55
Dissected larvae				
<i>Gregarina longa</i> and <i>Hirmocystis tipulae</i>	70.00a	77.78a	76.59a	43.64b
<i>Actinocephalus tipulae</i>	15.00a	11.11a	17.02a	12.73a
<i>Diplocystis tipulae</i>	40.00ab	40.74ab	51.06a	41.82ab
<i>Nosema binucleatum</i>	18.33a	25.93a	-	-
<i>Rasajeyna nannyla</i>	-	20.37a	-	67.27b
<i>Agamomermis tipulae</i>	1.15*	-	-	-
Entomophthorales	-	-	-	0.67†
<i>Conidiobolus osmodes</i>	18.43§	-	-	-
<i>Bucentes geniculatus</i>	3.44*	-	-	-
NPV	0.46*	-	-	-
TIV	-	-	-	51.80‡

-Different letters in each row indicate a difference at  $p < 0.01$ , and at  $p < 0.05$  for *D. tipulae* according to pairwise chi-square tests.  
 -Calculations out of \*436, §1384, †743 and ‡376 examined larvae.

some instances some of the gamonts/gametocytes were melanised (Figure 3c).

The microsporidian disease, *Nosema binucleatum*, was found to be attached to the gut muscles as cysts full of spores (Figures 4a, b). Up to 60 cysts were counted in one infected larva. Some larvae had free spores in their haemocoel in late spring. In such cases, the number of haemocytes seemed to be higher and some of the spores were phagocytosed (Figure 4c). The infected larvae did not exhibit any other disorder.

The coccidian *Rasajeyna nannyla* is an intracellular pathogen of the gut epithelial cells. The observed stages were the micro- and macrogametes, the merozoites, the zygotes and the oocysts (Figures 5b-g). Rupturing the oocysts artificially exposed the sporocysts and sporozoites (Figure 5a). After completion of its development, this protozoan is excreted as zygotes or immature oocysts in the faeces and an additional period outside the host is needed for maturation of the oocysts. High infections are destructive and lower infections may have a debilitating effect on the larvae (Beesley, 1975). The mid-gut is shortened and has a white appearance (Figure 6c) when infected heavily. The infection at Woodhouse was generally heavier than at North Walbottle.

A single larva had external parasites attached in groups to its head capsule and the dorsal surface of the first body segment (Figure 7a). The larval behaviour was like that of a healthy larva. Examination of a few parasites under a phase-contrast microscope revealed finely granulated double layered unicellular organisms bearing a nucleus closer to the attachment point (Figure 7b). These were possible protozoan parasites. The appearance of these organisms was very similar to another one found in the alimentary canal of another tipulid larva (Figure 7c). The latter parasite was observed once in a single tipulid larva with a number of elongate structures inside (Figure 7d) which might have been the infective stages. The larva was kept under observation for further development but after a week the larva died and decayed along with the parasites. The death was unlikely to have been due to this parasite.

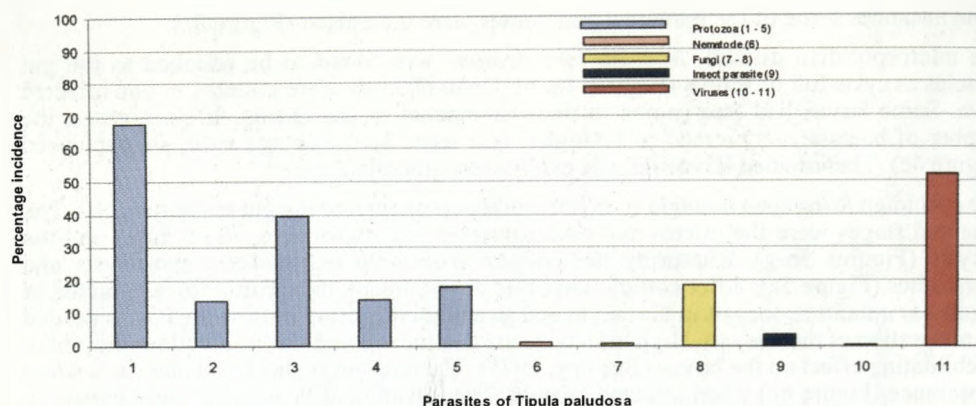
Investigating the diseases of *Nephrotoma* spp. was not the primary intention of this study but during the survey several *Nephrotoma* larvae were collected and dissected. One of them was infected by a protozoan. Ten irregularly shaped protozoan cysts were attached to the muscles (Figure 8a). While the large cysts were filled with spores (Figure 8b), the small cysts had spherical to ovoidal cells (Figure 8c), eventually producing four to eight ovoidal spores in each cell. The protozoan must have found its entrance through the gut. Development in the gut tissues is possible but reproduction is doubtful as the number of cysts is not high. However, low reproduction followed by loss of some protozoa may have occurred. If the spores are not excreted after a possible liberation into the haemocoel, the protozoa can be expected to leave its host after its death. Before the dissection, the larva was alive and did not exhibit any disorder.

### Fungi

Fungal growth on the corpses of larvae kept in the laboratory was not infrequent. The interiors of these cadavers were liquefied and full of bacteria. Most of these fungi, if not all, were probably saprotrophic fungi (e.g. Mucorales, *Penicillium* spp.) that developed after the death of the larvae.

One pathogenic fungus was recovered at Woodhouse in winter samples. On the first occasion, in February 1998, one larva was found on vegetation and died in the laboratory at 5°C a few days after collection and became a yellowish orange fragile cadaver. The body of the larva was converted to a sack full of spherical fungal bodies with short hyphal projections plus the contents of the alimentary canal and the cuticle (Figure 9d). At this stage the specimen decayed and no further results were obtained. The following year collection of a large sample of larvae from the same location revealed four more larvae developing the same symptoms. This time the fungus proceeded to develop and sporulated on the surface of all the infected larvae (Figure 9a) giving an overall incidence of 0.67% out of 743 larvae collected from the same site. The larvae were completely covered with a white short profuse mycelial mass (Figure 9b). It sporulated without producing noticeable conidia producing bodies providing a number of spores (Figure 9c). This incidence was considered to be caused by a





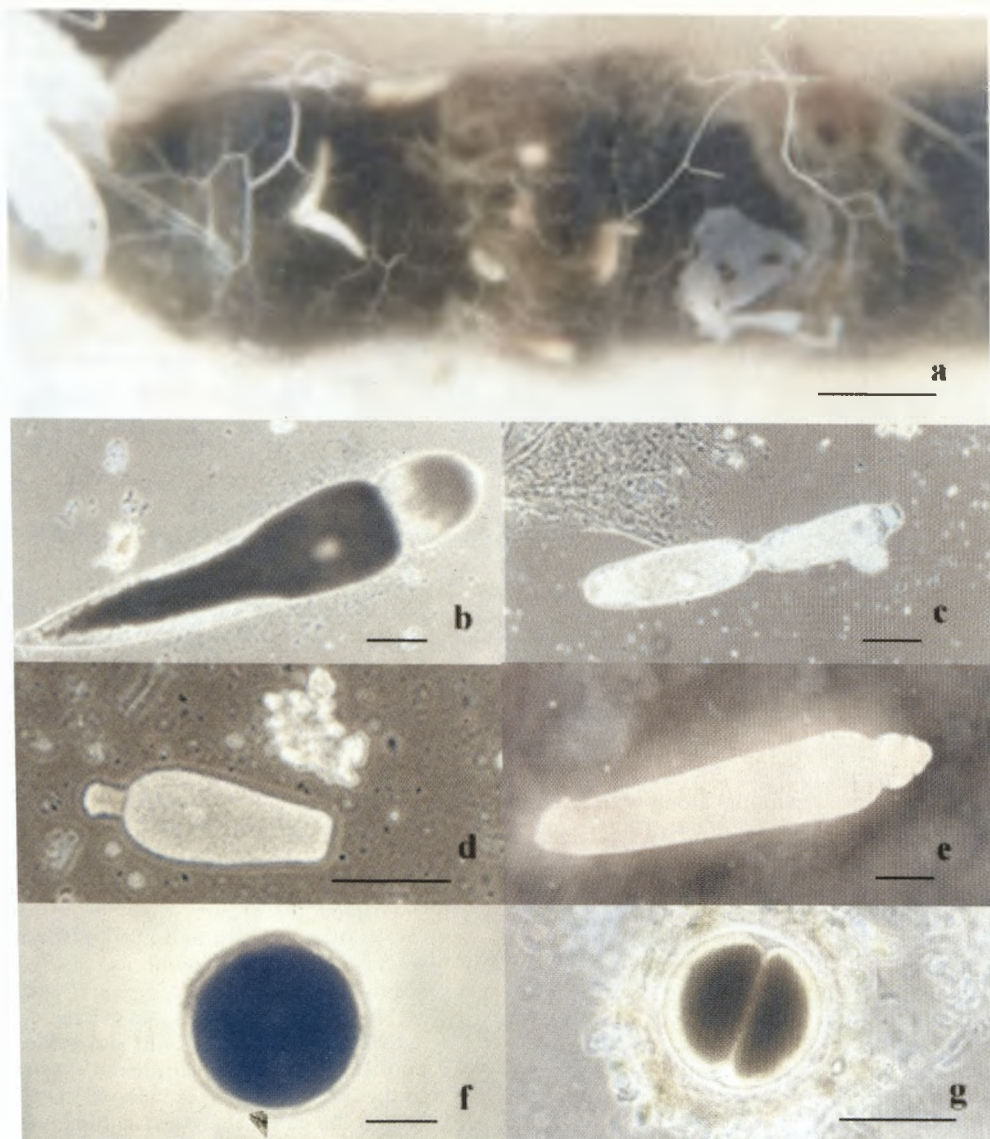
**Fig. 1** Prevalence of the percentage parasitism recorded throughout the survey of larval parasites of *Tipula* species collected from different sites in Northumberland and Cumbria between March 1997 and April 2000. 1: *Gregarina longa* and *Hirmocystis tipulae*, 2: *Actinocephalus tipulae*, 3: *Diplocystis tipulae*, 4: *Nosema binucleatum*, 5: *Rasajeyna nannyla*, 6: *Agamomermis tipulae*, 7: *Entomophthorales*, 8: *Conidiobolus osmodes*, 9: *Siphona geniculata*, 10: NPV, 11: TIV.

mixed infection of two fungi one of which may have developed on the cadaver killed by the other species. With the increased leatherjacket population at Close House in 1999-2000 season, an epizootic by *Conidiobolus osmodes* was found. Details of this infection and the epizootic are to be published somewhere else.

### Viruses

One of two viral pathogens of leatherjackets, *Borrelinavirus tipulae*, a nuclear polyhedrosis virus of haemocytes, was found in only one location, Close House. Two fourth instar larvae out of 436 collected larvae developed the disease a few weeks after collection with the colour changing to "chalky white" (Figure 10a) due to the liberation of the inclusion bodies into the haemocoel. Dissection of one infected larva, when it was alive, showed no symptoms other than infected haemocytes (Figure 10b). The inclusion bodies were mostly located on the periphery of the cells whilst some had a less regular distribution. The autopsy of the second infected larva soon after death showed the body fluid to almost completely consist of viral inclusion bodies producing a milky appearance. The inclusion bodies had no regular shape or size (Figure 10c). The adipose tissue and the muscles had also started to break down. The confirmation of the virus by applying NaOH (Smith and Xeros, 1954) for elongation of the polyhedra was negative. This phenomenon was also encountered by Carter (1976b).

*Tipula* Iridescent Virus (*Pseudomoratorvirus tipulae*), the second known viral pathogen of tipulids, was only encountered during spring 2000 at Woodhouse. The colour of the infected larvae was bluish in gross appearance because of the iridescent coloration of the fat body due to the presence of viral particles (Figures 10d,e) (Xeros, 1954). More larvae developed this symptom in the laboratory 2-5 days after collection. Infected larvae appeared to be normally active. In the dissection when the adipose tissue was exposed to reflected light the iridescent coloration was obvious (Figures 10d,e). In the examination under transmitted light the tissue appeared orange in colour (Figure 10f). The infection level on collection was 38.0 % of 376 examined larvae and rose to 51.8 % in the laboratory. Although younger larvae are more susceptible to the virus (Carter, 1974) the autumn collections did not reveal its presence in the larvae. According to Kelly (1989) infected larvae do not display recognisable coloration if the infection is mild, which may also be the reason that some infected larvae could not be detected at the time of collection.

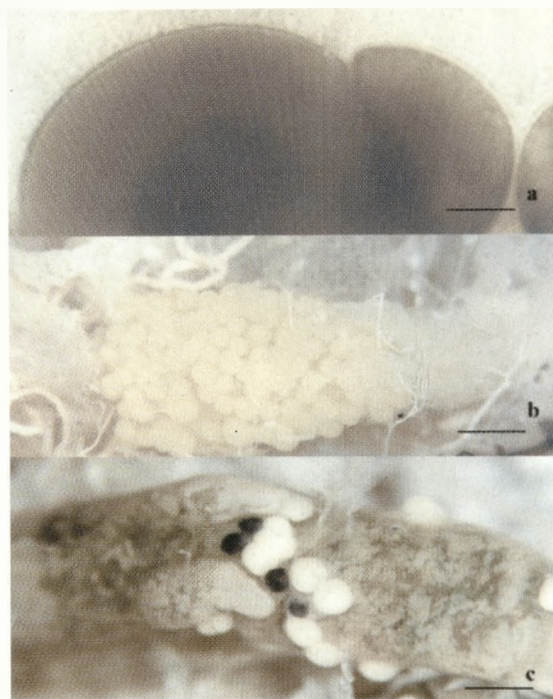


**Fig. 2** Appearance of *Actinocephalus tipulae* gamonts in *Tipula paludosa* larval mid-gut tissues (a). A gamont of *A. tipulae* (b), *Gregarina longa* (c), *Hirmocystis tipulae* (d) and an unidentified gregarigarine species (e) found in the caeca of a *Tipula paludosa* larva. An *A. tipulae* cyst (f) and a gregarine gametocyst (g). Scales: 1000 (a), 100 (b-d, f-g: phase contrast), 250 (e: phase contrast).

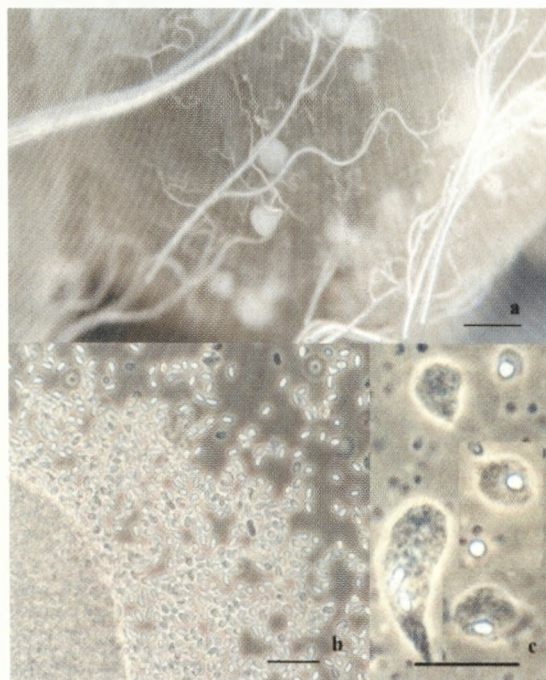
### Bacteria

The only bacteria found during the survey were those in the cadavers. The bacteria were small elongate and mobile and their identification has not been attempted as they were assumed to be saprotrophic. All cadavers showed the same symptoms; the colour is dark brown and the inside is partially or completely liquefied and smelly. Since the decay is very





**Fig. 3** A gametocyst of *Diplocystis tipulae* (a), a *Tipula paludosa* mid-gut covered by *D. tipulae* (b), and its melanised gamonts along with live ones (c). Scales: 100 (a: phase contrast), 1000 (b,c).



fast the primary cause of death could not be ascertained. The alimentary canal of live larvae has a high number of bacteria inside which made the decaying process of the cadavers very fast.

#### Nematodes and Insect Parasitoids

Although these are not microorganisms, they were encountered in the course of this survey. They were found occasionally at a low incidence in limited locations.

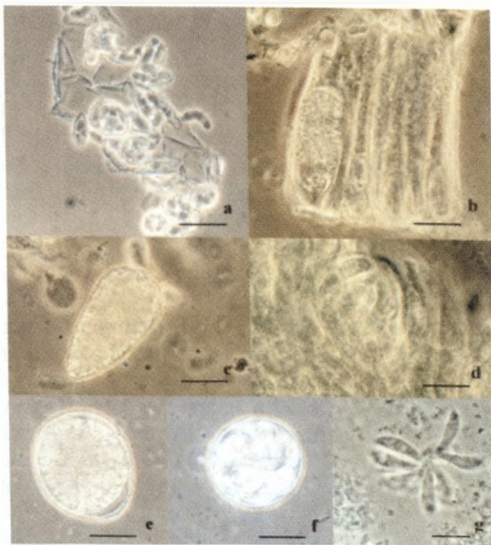
One or two mermithid nematodes were located in the coelome curled up in the shape of a figure '8' and their presence was obvious when seen through the cuticle of the larvae (Figure 11a). The nematodes were alike and fitted the description of Rennie (1925) who named it *Agamomermis tipulae*. This species is lethal when it emerges from its host. Five of 436 larvae collected at Close House were found to be infected with mermithid nematodes. On one occasion a larva had eight juvenile nematodes each enclosed in a sheath attached to the host's muscles at both ends (Figures 11c, d). These may have been juveniles of a mermithid nematode which also live in a sheath in the coelome.

Two cadavers of larvae which died in the laboratory were found to be full of rhabditid nematodes of all stages (Figure 11b). Further observations showed that death was not caused by the nematodes but that the nematodes could be found in the alimentary canal of the live larvae and developed in and fed on the cadavers once the host was dead.

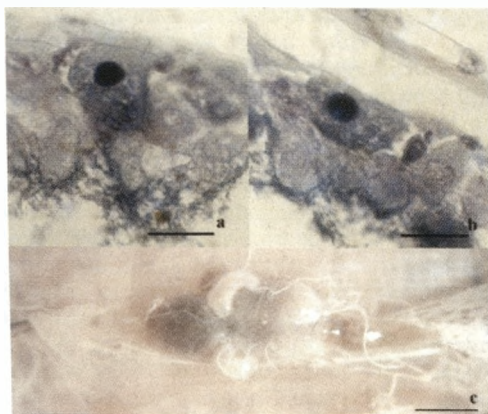
In two samples in the autumn, seventy-one tipulid larvae were collected at Close House and fifteen of them had the larvae of a tachinid parasite, *Siphona geniculata* (Figure

**Fig. 4** On a *Tipula paludosa* larval mid-gut, attached cysts of *Nosema binucleatum* (a), its spores (b) and phagocytised spores by tipulid haemocytes (c). Scales: 200 (a), 20 (b, c: phase contrast).





**Fig. 5** *Rasajeyna nannyla*: sporocysts and sporozoites (a), micro- and macro- gamete in a *Tipula paludosa* larval mid-gut epithelial cell (b), macrogamete (c), shizont (d), zygote (e), oocyst (f), merozoites escaping after shizogony (g). Scales: 10 (a), 20 (b-g), phase contrast.



**Fig. 6** *Nosema binucleatum* in *Tipula oleracea* larval mid-gut tissues three weeks after infection (a, b). A *T. paludosa* mid-gut infected by *Rasajeyna nannyla* resulting in a smaller and whitish mid-gut (c). Scales: 20 (a, b: Giemsa's stain), 2000 (c).

11g), in their haemocoel. One to five larvae were attached to one of the main trachea of each host larva (Figure 11e). When the larvae were kept in the laboratory, the parasitoids pupated outside the host very soon after emergence (Figure 11f). The adults lived for less than a week and attempts to breed them in the laboratory did not result in further parasitism.

### Some Other Symptoms

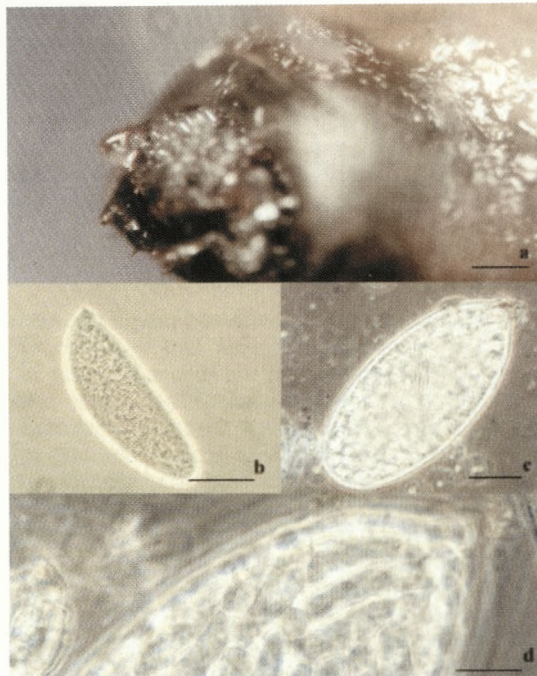
The dissection of collected larvae showed that several individuals had numbers of nodules attached to the internal tissues in the haemocoel (Figure 12a). These are generally formed as a defensive response to a parasite invasion in an attempt to eliminate the invading microorganisms. In all cases the larva did not show any disorder. This may be a very effective defence mechanisms for leatherjackets, the dissected larvae being the survivors from infections.

Some of the 'abnormal conditions' reported by Carter (1976b) were also encountered in this survey. These are blackened spiracular discs and / or anal papillae and small black spots on the cuticle. Small black spots were also observed on the mid-gut (Figure 12b). Microscopic examinations revealed melanised single or groups of epithelial cells but no microorganisms appeared to be associated with them (Figure 12c). Nevertheless, the cells are believed to be melanised in response to a past infection.

### DISCUSSION

This survey and previous studies show that leatherjackets face a range of parasite organisms of varying virulence. Since *T. paludosa* is the most common leatherjacket and is the one considered to be most troublesome to agriculture, the pathogens infecting this species have the most importance. It can be concluded from Carter's work (1976b) that the pathogens of this species can also be infective against *T. oleracea* and some other species of the Tipulidae attacking farm crops. Therefore discovering the pathogens of *T. paludosa* provides the pathogens most likely to be important in terms of both the population regulation and biological control of pest leatherjackets. This is the case in this study and a wide range of infective microorganisms was found including all the





**Fig. 7** An external protozoan parasite on the head capsule and the first body segment of a *Tipula paludosa* larva (a), and microscopic appearance of the protozoan (b). A protozoan found in the alimentary canal of a tipulid larva (c) and its closer appearance revealing the elongated structures inside (d). Scales: 200 (a), 50 (b), 20 (c), 10 (d). b-d: phase contrast.

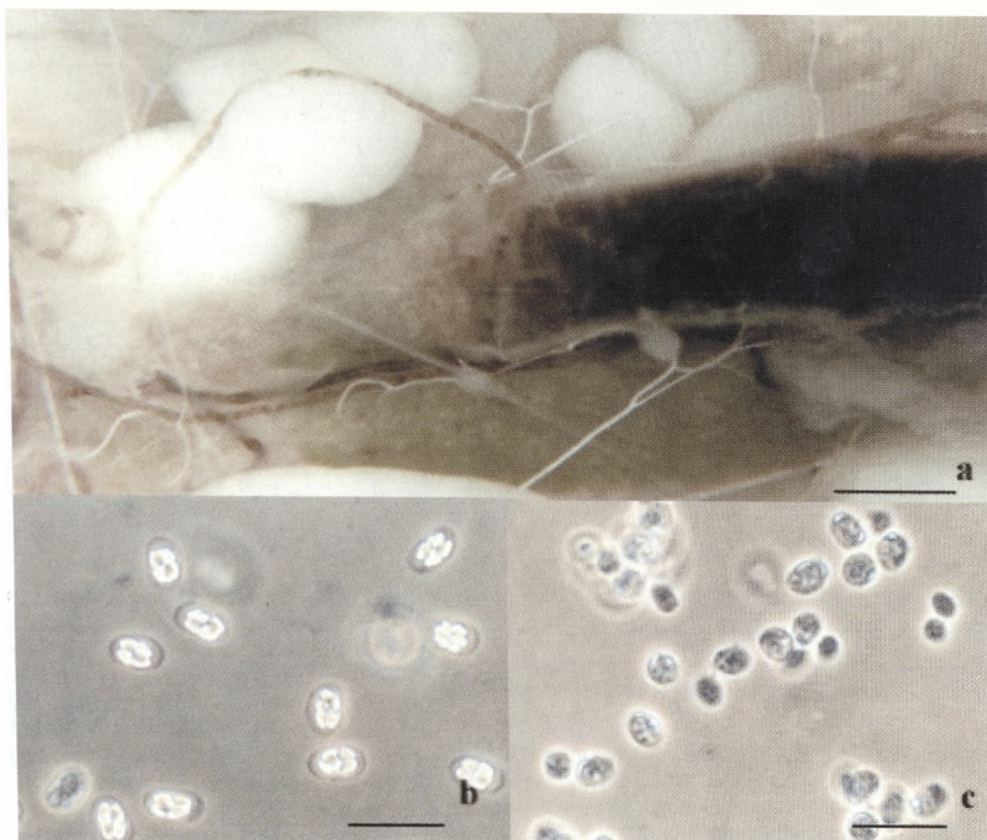
virulence and sometimes even harmless to their hosts. Gregarine pathogens are found abundantly in tipulid larvae. The cephaline gregarines did not exhibit any symptoms in this study to suggest any virulence at all, even in high numbers. Similar conclusions were made by all the previous workers (Sherlock, 1973; Carter, 1976; Brownbridge, 1985). This is mostly the case for other insects. In this study one species from each of two protozoan groups, the Microsporidia and the Coccidia, was encountered. The conclusion of previous workers (Weissenberg, 1926; Sherlock, 1973; Brownbridge, 1985) that *Nosema binucleatum* is a non-virulent organism against leatherjackets was also found in this study. Lack of virulence is possibly because reinfection in the host does not occur in this species (Sherlock, 1973). The spread of the pathogen is limited because of its slow growth, observed in preliminary experiments. Three weeks postinfection they had not even passed through the gut wall (Figures 6). The spores also can not leave the host easily and insect coccidian infections have always been found to be difficult to induce artificially (Beesley, 1975). Most coccidian pathogens of insects remain as bare descriptions and few have been cultured in vivo in the laboratory. Observations showed that *R. nannyla* was able to destroy gut tissues at high infection levels though an artificial infection could not be repeated in the laboratory (Beesley, 1975). This is a precursor to understanding its possible effect in population regulation. In terms of pathology, *R. nannyla* may be the most harmful to infected individuals of all the encountered protozoa.

common pathogens of leatherjackets.

Gregarines were the most common pathogens in the present and previous studies (Sherlock, 1973; Carter, 1976). Their non or low virulence with high incidences may imply that these organisms are perfectly adapted to their hosts and their environments. Gregarines are generally considered to be hardly pathogenic to insects and even a commensal relationship could exist for cephaline gregarines (Tanada and Kaya, 1993). The other two protozoan pathogens, *Nosema binucleatum* and *Rasajeyna nannyla* were only present at some sampling sites. Similarly Sherlock (1973) found *N. binucleatum* and *Adelina tipulae* to be absent from some of his collection sites. Carter (1976b) found that coccidian infections showed a large variation (7.1-59.0%) in percentage presence at his sites. *A. tipulae* and *R. nannyla* are almost the same at all stages of their biology. The only major difference is the number of sporozoites in each sporocyst (Beesley, 1975, 1977b). The occurrence of the coccidian pathogens in particular fields may imply that they are restricted by environmental factors. The presence of *R. nannyla* infections coincided with those fields with either a high water level or poor drainage in both this study and Beesley's study (1975, 1977a) suggesting that the protozoan may need free water to survive or complete its life outside the host.

Most protozoan pathogens of insects are generally considered to be of low





**Fig. 8** The cysts of a protozoan attached to the muscles of a *Nephrotoma* sp. larva (a). Spores in the large cysts (b) and the cells in the small cysts (c). Scales: 1000 (a), 20 (b, c: phase contrast).

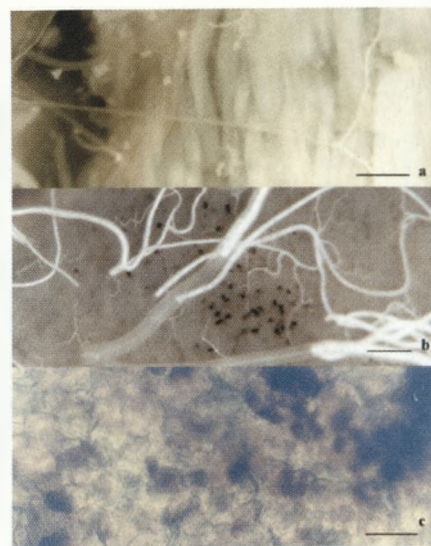


**Fig. 9** Fungal infection of *Tipula paludosa* larvae in Woodhoe. The fungus is growing out of the larval cuusticle (a). The larval body is almost completely covered by the sporulating fungus (b). The spores produced by the fungus (c). The fungal bodies filled the larval cadaver (d). Scales: 1000 (a), 2000 (b), 10 (c), 100 (d). c, d: phase contrast.

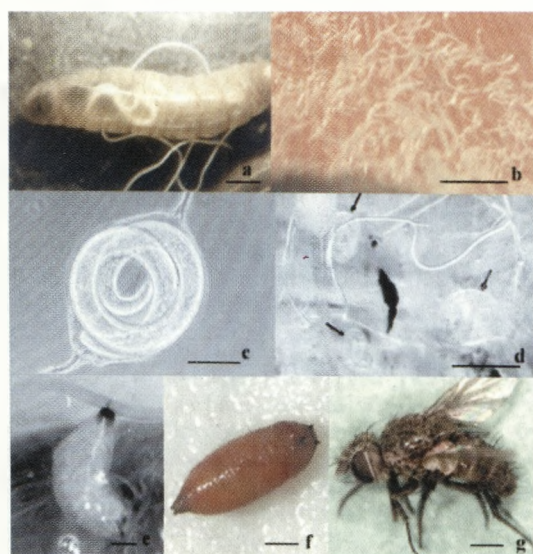




**Figure 10** A *Tipula paludosa* larva infected by NPV (white larva) and a healthy larva (grey) (a). Inclusion bodies of the virus in the haemocytes (b) and in the haemolymph in later stages (c). Appearance of TIV infection in a *Tipula paludosa* larva (d), adipose tissues under reflected light (e) and transmitted light (f). Scales: 2X (a), 20 (b,c), 500 (e), 100 (f). b, c, f: phase contrast.



**Fig. 12** Nodules formed and attached to internal tissues in a *Tipula paludosa* larva to eliminate an invading parasite (a). Mid-gut wall of a *T. paludosa* larva, showing the black spots formed by melanisation (b). Melanised mid-gut epithelial cells (c). Scales: 1000 (a), 200 (b), 20 (c: phase contrast).



**Fig. 11** Mermithid nematodes in- and out-side a *Tipula paludosa* larva (a). Rhabditid nematodes leaving a tipulid cadaver (b). A juvenile nematode showing the enclosing sheath with two ends extended for attachment (c) and attached juveniles to the larval muscles (d). A *Siphona geniculata* larva attached to one of the main trachea of a *Tipula paludosa* larva (e). The pupa (f) and the adult (g) of *S. geniculata*. Scales: 500 (a, b, d, e), 100 (c: phase contrast).



On a few occasions fungi, mostly entomophthoralean species, were recorded from leatherjackets. Except for a *Cordyceps* sp. (Stewart, 1969) all the larval infections were reported outside Britain and they have not been investigated as biocontrol agents because either they could not be isolated or at the time the biological control concept was not the primary concern. One *Paecilomyces* species was isolated by Borisov and Tarasov (1997) but laboratory experiments showed no promising results (personal communication). Therefore, in conclusion, previous studies have failed to recover a promising fungus species.

Although two viral diseases have been studied, most attention was given to TIV. Field studies with this virus resulted in few infections (Carter, 1978) and until the reasons for natural epizootics are found it has no use in practice. Infection by NPV was rare in nature agreeing with Carter's (1976b) finding. He found only ten infected larvae out of over 1400 larvae examined. Infected larvae live without interruption until they die which occurs after a very long period. Both of the diseases, TIV and NPV, could not be shown to be useful for use in the field for controlling leatherjackets.

There are no bacteria isolated from leatherjackets and the two most likely sources of pathogenic bacteria of tipulid larvae, dead larvae (Brownbridge, 1985) and the pathogens of other Diptera (e.g. *Bacillus thuringiensis*), did not yield a promising control agent (Lam and Webster, 1972; Chard et al., 1990; Smits et al., 1993).

It is logical to consider nematodes as biological control agents for soil pests. However the nematodes recovered from leatherjackets in previous (Rennie, 1925; Bovien, 1937; Chiswell, 1956; Desportes and Jarry, 1962; Lam and Webster, 1971; Sherlock, 1973; Carter, 1976) and the present study are unlikely to be important as control agents. The testing of entomopathogenic nematode-bacteria complexes has shown that they are also not useful for field application (Gerritsen and Smits, 1994; Ehlers et al., 1997) and it is concluded that there are no promising nematodes at present for biological control of leatherjackets.

None of the insect parasitoids of the larvae of tipulids have been recorded at high levels in the field. Although *S. geniculata* was established in Canada (Wilkinson, 1984) the level of parasitism was far below the level required for an effective control agent. The egg parasitoid *Aoples* sp. found by Kelly (1990) may have some effect where it exists in the field, but justifying its use at the time of egg laying by tipulids is not practical. Further the biology of *Aoples* after parasitising tipulid eggs is not known and any establishment is unpredictable. Therefore at present it has little known value for the biological control of leatherjackets.

Statistical analysis showed differences between the collection sites for disease incidence. The sampling method employed in addition to the sample size should be kept in mind when making an assessment of these differences. Also the sampling period at Woodhouse is different from the other sites. In spite of these limitations, similar results were also obtained by previous researchers (Sherlock, 1973; Carter, 1976b). The effect of sampling site on infection prevalence may be explained by several reasons such as environmental differences, tipulid population history and current level, recent history of the infection at the site and the presence of other diseases.

The survey results of this study show a close similarity with the previous surveys (Sherlock, 1973; Carter, 1976b; Brownbridge, 1985) of the leatherjacket pathogens even after more than a decade. This excludes occasional increases in some pathogen levels, (e.g. Carter et al., 1983) and the addition of new pathogens (e.g. Carter, 1976a; Borisov and Tarasov, 1997) in this period. The commonly found microorganisms probably have little effect on larval populations but manipulation of occasional pathogens, which generally have been found to be more virulent (TIV, bacteria, fungi) is probably more promising.

When the high reproductive potential of tipulids is considered, a successful biological control agent needs to cause high levels of mortality in leatherjacket populations to reduce the population level (Carter, 1976). However except for occasional viral epizootics none of the previously recorded organisms was shown to have such an effect and the results of detailed studies did not suggest that the present pathogens would have this effect. On the other hand the majority of natural pathogens may have a joint impact on the pest population either by increasing its sensitivity to other factors or reducing the reproduction of the adults. The screenings against tipulid larvae of bacteria and nematodes successful against other



insects also failed to indicate a promising species as a control agent for field use. Further studies either by using other broad spectrum successful insect pathogens or by taking different approaches to discover any undescribed pathogens or by manipulating pathogens at low incidences, might be useful in searching for a biological control for this pest species. Of the organisms found, the protozoan *Rasajeyna nannyla* was shown by Beesley (1975, 1977a, b, 1978) to have potential as a control agent but has been little studied. Fungal infections on tipulids, reported here and before, raised the possibility that broad spectrum fungi successful against a range of crop pests might have the potential to control leatherjackets. The fungus *Conidiobolus osmodes* deserves further studies to find its potential for the control of leatherjackets.

#### ACKNOWLEDGEMENTS

We thank to Mr R E Coggins for his advice on sampling leatherjackets, Dr B A Borisov for the information about *Paecilomyces borysthenicus* and farmers who allowed sampling in their fields.

#### REFERENCES

- BEESLEY J E, (1975). *Adelina tipulae*, a coccidian pathogen of pastureland Tipulidae. PhD thesis, The University of Newcastle upon Tyne.
- (1977a). The incidence of *Rasajeyna nannyla* in *Tipula paludosa* and *Tipula vittata* at two sites in Northumberland, England. *Journal of Invertebrate Pathology* **30**: 249-254.
- (1977b). The life-cycle of *Rasajeyna nannyla* n. gen., n. sp., a coccidian pathogen of *Tipula paludosa* Meigen. *Parasitology* **74**: 273-283.
- (1978). Seasonal abundance of three life cycle stages of *Rasajeyna nannyla* (Coccidia) in *Tipula paludosa* and *T. vittata*. *Journal of Invertebrate Pathology* **31**: 255-259.
- BLACKSHAW R P and COLL C, (1999). Economically important leatherjackets of grassland and cereals: biology, impact and control. *Integrated Pest Management Reviews* **4**: 143-160.
- BLACKSHAW R P, (1983). The annual leatherjacket survey in Northern Ireland, 1965-82, and some factors affecting populations. *Plant Pathology* **32**: 345-349.
- (1990). Observations on the distribution of leatherjackets in Northern Ireland. *Annals of Applied Biology* **116**: 21-26.
- (1991). Leatherjackets in grassland. *Strategies for Weed Disease and Pest Control in Grassland. Proceedings of the BGS Conference February 1991*, pp 6.1-6.12.
- BLACKSHAW R P, COLI C, HUMPHREYS I C and STEWART R M, (1996). *The epidemiology of a new leatherjacket pest (Tipula oleraceae) of winter cereals in Northern Britain*. HGCA Project. Project No: 120.
- BORISOV B A and TARASOV K L, (1997). Notes on Ascomycetes and their anamorphs on invertebrates in eastern Europe. I. *Paecilomyces borysthenicus* sp. n., a new entomogenous hyphomycete from the Dnieper delta. *Mikologiya i Fitopatologiya* **31**: 16-21.
- BOVIEN P, (1937). Some types of association between nematodes and insects. *Videnskabelige Meddelelser-dansk Naturhistorisk Forening i Kobenhavn* **101**: 1-114.
- BRINDLE A, (1958). A field key for the identification of *Tipula* larvae (Dipt. Tipulidae). *Entomologist's Gazette* **9**: 165-182.
- (1959). Notes on the larvae of the British Tipulinae (Dipt., Tipulidae). Part 6. The larvae of the *Tipula oleracea* group. *Entomologist's Monthly Magazine* **95**: 176-177.
- BROWNBRIDGE M, (1985). *Evaluation of bacteria as control agents of pasture leatherjackets (Tipula sp. Diptera: Tipulidae)*. PhD thesis, University of Newcastle upon Tyne.
- CARTER J B, (1974). *Tipula* iridescent virus infection in the developmental stages of *Tipula oleracea*. *Journal of Invertebrate Pathology* **24**: 271-281.
- (1976). A survey of microbial, insect and nematode parasites of Tipulidae (Diptera) larvae in north-east England. *Journal of Applied Ecology* **13**: 103-122.

- (1978). Field trials with *Tipula* iridescent virus against *Tipula* spp. larvae in grassland. *Entomophaga* **23**: 169-174.
- CARTER J B, GREEN E I and KIRKHAM A J, (1983). A *Tipula paludosa* population with a high incidence of two pathogens. *Journal of Invertebrate Pathology* **42**: 312-318.
- CHARD J M, MCKINLAY R G and BATY J, (1990). Observations on the effects of *Bacillus thuringiensis* subsp. *israelensis* on crane fly larvae. *Aspects of Applied Biology* **24**: 277-278.
- CHISWELL J R, 1956. A taxonomic account of the last instar larvae of some british Tipulidae (Diptera: Tipulidae). *Transactions of the Royal Entomological Society of London* **108**: 409-484.
- DESPORTES I and JARRY D, (1962). *Cephalobellus brevicaudatus* (Leidy) Thelostomatidae parasite d'une larve de tipule de la region de la Massane. *Vie et Milieu* **13**: 811-812.
- EHLERS R, WULFF A and PETERS A, (1997). Pathogenicity of axenic *Steinernema feltiae*, *Xenorhabdus bovienii*, and the bacto-helminthic complex to larvae of *Tipula oleracea* (Diptera) and *Galleria mellonella* (Lepidoptera). *Journal of Invertebrate Pathology* **69**: 212-217.
- FRENCH N, (1969). Assessment of leatherjacket damage to grassland and economic aspects of control. *Proceedings of the 5th British Insecticide and Fungicide Conference* **2**: 511-521.
- GERRITSEN L J M and SMITS P H, (1994). Pathogenicity of new combinations of *Heterorhabditis* spp. and *Photorhabdus luminescens* (*Xenorhabdus luminescens*) against *Galleria mellonella* and *Tipula oleracea*. *International Organisation for Biological Control, West Palaearctic Regional Section (IOBC/WPRS) Bulletin* **17**: 56-60.
- JACKSON D M and CAMPBELL R L, (1975). Biology of the european crane fly, *Tipula paludosa* Meigen, in western Washington (Tipulidae: Diptera). *Washington State University Technical Bulletin* no **81**: 1-23.
- KELLY M S, (1989). *Studies on the natural enemies of Tipulidae (Diptera: Nematocera) in northern Ireland*. PhD thesis, The Queen's University of Belfast.
- (1990). The biological control of leatherjackets. *Proceedings of Meeting on Biological Control of Pests and Diseases*. 1990, pp: 42-47.
- LAM A B Q and WEBSTER J M, (1971). Morphology and biology of *Panagrolaimus tipulae* n. sp. (Panagrolaimidae) and *Rhabditis (Rhabditella) tipulae* n. sp. (Rhabditidae), from leatherjacket larvae, *Tipula paludosa* (Diptera: Tipulidae). *Nematologica* **17**: 201-212.
- (1972). Effect of the DD-136 nematode and of a -exotoxin preparation of *Bacillus thuringiensis* var. *thuringiensis* on leatherjackets, *Tipula paludosa* larvae. *Journal of Invertebrate Pathology* **20**: 141-149.
- LANGE B, (1963). Der heurige stand der *Tipula* - Bekämpfung in Hinblick auf die Befallslage 1962/63. *Anzeiger Fur Schadlinskunda Pflanzenschutz Umweltschutz* **36**: 88-93.
- MAYOR J G and DAVIES M H, (1976). A survey of leatherjacket populations in south-west England, 1963-74. *Plant Pathology* **25**: 121-128.
- MILNE A, COGGINS R E and LAUGHLIN R, (1958). The determination of numbers of leatherjackets in sample turves. *Journal of Animal Ecology* **27**: 125-145.
- NEWBOLD J W, (1981). The control of leatherjackets in grassland by winter pesticide applications. *Proceedings of Crop Protection in Northern Ireland*, pp 207-211.
- POL-VAN DASSELAAR A VAN DEN, WEL C VAN DER and WOUTERS B, (1998). Controlling leatherjackets if the number exceeds 350 per m<sup>2</sup>. *Praktijkonderzoek Rundvee, Schapen en Paarden* **11**: 30-32.
- RAYNER J M, (1975). Chemical control of leatherjackets (*Tipula* species) in cereals. *Proceedings of the 8th British Insecticide and Fungicide Conference* **1**: 231-236.
- RENNIE J, (1925). A mermithid parasite of *Tipula paludosa*, Meigen. *Proceedings of the Royal Physical Society of Edinburgh* **21**: 1-3.
- RICOU G and DOUYER C, (1975). Production de *Tipula paludosa* (Meig.) en prairie en fonction de l'humidite du sol. *Revue d'Ecologie et de Biologie du Sol* **12**: 69-89.
- SHERLOCK P L, (1973). *Tipula paludosa* Meigen (Diptera: Tipulidae). A survey of its pathogens and a study of the gregarines of the family Diplocystidae. PhD thesis, University of Newcastle upon Tyne.



- SMITH K M and XEROS N, 1954. An unusual virus disease of a dipterous larva. *Nature* (London) **173**: 866-867.
- SMITS P H, VLUG H J and WIEGERS G L, (1993). Biological control of leatherjackets with *Bacillus thuringiensis*. *Proceedings of the Section Experimental and Applied Entomology of the Netherlands Entomological Society* **4**: 187-192.
- STEWART K M, (1969). *Studies on the biology of British crane-flies (Tipulidae; Diptera)*. PhD thesis, University of Glasgow.
- TANADA Y and Kaya H K, (1993). *Insect pathology*. Academic Press, USA.
- WEISSENBERG R, (1926). Microsporidien aus tipulen larven. (*Nosema binucleatum* n. sp., *Thelohania tipulae* n. sp.). *Archiv Fuer Protistenkunde* **54**: 431-467.
- WILKINSON A T S, (1984). *Tipula paludosa* Msigen, european crane-fly (Diptera: Tipulidae).
- KELLEHER J S and HULME M A (eds.) *Biological control programmes against insects and weeds in canada, 1969-1980*. Commonwealth Agricultural Bureaux, pp 85-88.
- XEROS N, (1954). A second virus disease of the leatherjacket, *Tipula paludosa*. *Nature* (London), **174**: 562-563.
- ZAR J H, (1996). *Biostatistical analysis*. (3rd ed.). Prentice-Hall international, inc. USA.

## DENTAL ANOMALIES IN THE CHILLINGHAM WILD WHITE CATTLE

B Ingham

Sandwood Cottage, Greenbank, Eggleston, Barnard Castle, Co Durham DL12 0BQ

### SUMMARY

The teeth of forty adult Chillingham cattle were examined at autopsy or as museum specimens between July 1995 and September 2000. Dental anomalies, all considered to be congenital, were found in thirty-two animals. One or more cheek teeth were missing in twenty-five animals, with the first lower premolar being involved in twenty-one cases. Rotated incisors, malocclusion resulting in hooked third molars, malpositioned cheek teeth, interdental spaces and multiple abnormalities creating bizarre cheek tooth arcades, were also found. Published reports of absent first lower premolars in archaeological specimens suggest that the Chillingham cattle are the descendants of animals which had roamed the forests of Britain for thousands of years.

### INTRODUCTION

The Chillingham Wild White cattle have been a closed herd for several centuries. Microsatellite studies by Visscher et al (2001) calculated the expected proportion of ancestral heterozygosity remaining as 1.3%, confirming that the animals are highly inbred. Over the last 200 years the cattle have been the subject of numerous papers and chapters in books. The majority have considered the origins and history of the herd, eg Bielby and Bewick (1790), Storer (1877), Whitehead (1953) and Bilton (1958), and the ethology, Hall (1986), Hall and Hall (1988) and Hall (1989), but there have been very few publications dealing with veterinary matters. Beasley et al (1953) mentioned the occurrence of congenitally absent second premolars in mandibles of the Wild cattle. That observation led to a study, reported here, of the nature and prevalence of dental abnormalities in these animals.

### METHODS

Between July 1995 and September 2000, the teeth of most of the adult cattle, defined as those with a fully erupted permanent dentition, which died at Chillingham Park, were examined at autopsy. The skin was reflected from the maxillary and mandibular areas on each side of the head, and the underlying muscles were dissected away to expose the cheek teeth. If necessary, teeth were rinsed with water to remove blood and food residues. The incisor, premolar and molar teeth, and the occlusal surfaces, were carefully examined. Written descriptions and photographs or sketches were used to record significant departures from the normal dentition. Skulls and, with a few exceptions, mandibles of Chillingham cattle, collected between 1870 and 1988, were also examined at a number of museums in Britain, as were four skulls in the possession of the Warden at Chillingham, and similar records were made. In some instances, teeth appeared to have been lost from these specimens during storage. Where a normal alveolus was present, that tooth was assumed to have been present during life. Incisors (rostral teeth) were designated right (R) and left (L) 1 to 4, progressing from central to lateral (Fig. 1). Premolars (P) were numbered 2 to 4 (P1 was assumed to be lacking in all cases (Miles and Grigson, 1990)), and molars 1 to 3, from mesial to distal (Fig. 2).

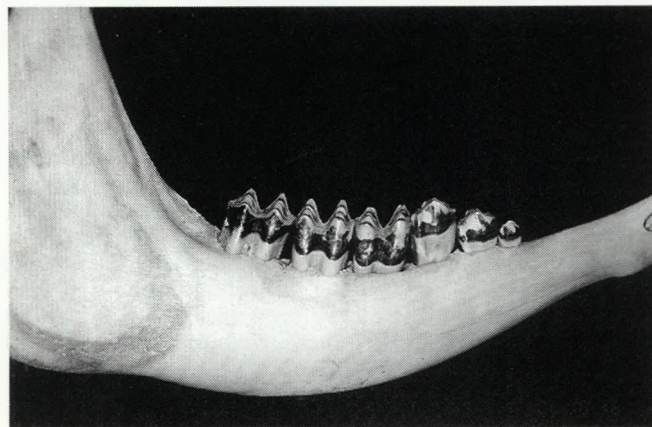
### RESULTS

Table 1 shows the origins (Park or museum) and sex of the forty cattle in the survey. All autopsied animals and museum specimens had a full complement of rostral teeth. Dental anomalies, varying from a simple gap between cheek teeth to multiple defects, were found in thirty-two animals – 80% of the sample.





**Fig. 1** The normal incisor arcade.



**Fig. 2** Mandible with premolars 2 to 4, and molars 1 to 3.

© The Natural History Museum, London.

### Incisor Rotation

Incisor rotation was observed in three cattle. In two males found dead on the same day, R3, L3 and L4 in one, and R4 and L4 in the other, were rotated 30 to 45 degrees, resulting in the lingual surfaces of those teeth facing postero- laterally. L4 was rotated 90 degrees in a deceased cow but, in this instance, the lingual surface of the tooth faced medially.

### Incisor Attrition

Incisor attrition was common, and usually even and symmetrical, being seen in its most extreme form as stumps at or slightly above the gingiva (Fig. 3). Occasionally, attrition resulted in individual crowns being pointed, cupped or otherwise misshapen.

**Table 1**

Origins and Sex of the Specimens

	Skull and Mandible		Skull only	
	Male	Female	Male	Female
Chillingham Park	9	9		
Museums/Warden	7	11	1	3

### Absent Cheek Teeth

Twenty-five animals (62.5%) had one or more missing cheek teeth. There were no autopsy findings to suggest that a tooth had been lost during life, and no signs of a pre-existing alveolus in any of the museum specimens. P2 lower alone was absent unilaterally in four males (one right and three left) and four females (two right and two left), and bilaterally in one male and eight females. A female with LP2 lower missing was also lacking RP4 upper, and a bull with bilaterally absent P2 lower was without LP4 upper. Left P3 upper only was absent in a bull and a cow. In the latter case, the opposing premolar was much enlarged and projecting into the space where P3 upper should have been (Fig. 4). P4 upper alone was missing on both sides in a male and right unilaterally in a female.

### Malocclusion

Malocclusion, with one cheek tooth arcade slightly mesial to the opposing row of teeth, was common. In these cases, attrition led to the development of hooks at the posterior extremity of either upper or lower M3. Hooked upper M3 (Fig. 5) was recorded unilaterally in two cows and bilaterally in three males and three females. The lower tooth was hooked unilaterally in one bull and two cows and bilaterally in one male. The posterior surface of the opposing tooth was always correspondingly angled and highly polished. In two museum specimens it was evident that the point of the hook on upper M3 had penetrated the gingival mucosa and eroded the bone of the dorsal surface of the ramus of the mandible (Fig. 6).

### Malpositioned Cheek Teeth

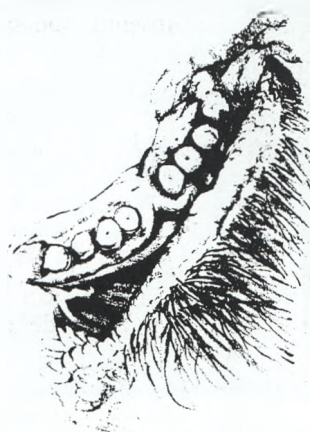


Fig. 3 Marked incisor attrition.



Fig. 4 Absent premolar 4, with overgrowth of the opposing tooth.

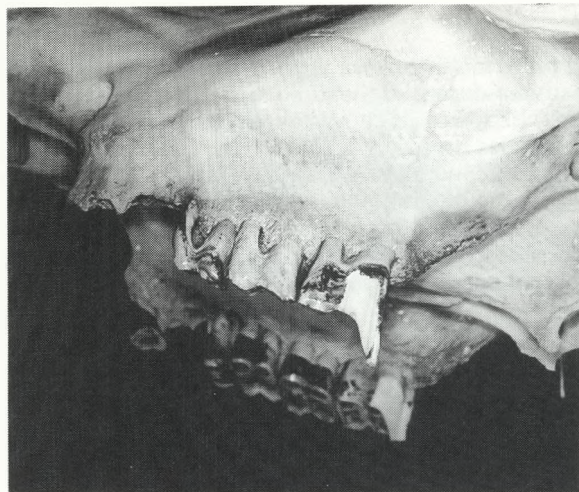
In one male skull, the alveolus of LP4 upper was medial to all other teeth in the arcade, with a diastema (gap) of almost 2 cm between it and M1 (Fig. 7). LM3 lower as displaced from the horizontal ramus of the mandible on to the lower part of the vertical ramus in a female skull (Fig. 8). Another male skull exhibited mesial (forward) inclination of right and left lower M3. RM3 lower was similarly positioned in a cow.

### Multiple Abnormalities

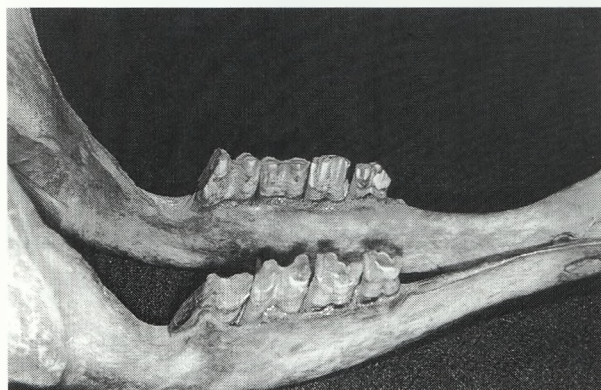
In the cheek teeth, attrition, and missing or overgrown teeth resulted in some bizarre arcades. (Missing premolars and molars mentioned here are repeat references to those listed under Absent Cheek Teeth.)

In a male found dead in April 1998, RP2 upper was worn to gingival level except for a small posterior fragment. P3 was very small and P4 was missing. In the lower right arcade P2 and 3 were unremarkable, but P4 was overgrown with a pointed crown posteriorly. M1 was slightly enlarged with an anterior point, and impacted against P4. The occlusal surfaces of M2 and 3 were very irregular. On the left side upper P4 was absent, but the other five teeth in the arcade were of normal appearance as were P2 and 3 lower. There was a gap between P3 and 4 lower. P4 was markedly overgrown and was intruding into the space where P4 upper should have been. The anterior extremity of





**Fig. 5** Hooked upper molar 3. © The Natural History Museum, London.



**Fig. 6** Four toothed lower jaw, with erosion of bone on the dorsal surface of the mandible to the rear of molar 2.

© The Natural History Museum, London.

M1 lower was pointed and overlapped the labial surface of P4 (Fig. 9). M2 and 3 were of the expected shape and size.

P2 lower was absent bilaterally in a male which died in February 1999. On the right, M3 upper was hooked at the distal extremity. There was a 12 mm gap between M1 and 2 lower. On the left side P2 and 3 upper were well worn, and P4 was missing. Upper M2 was longer than M1, creating a step, and M3 was hooked. The posterior half of the occlusal surface of P4 lower was overgrown and the tooth was impacted into the mesial surface of M1. The table of the latter tooth was L-shaped.

In another male skull, dated 1939, right upper P3 was unusually long, M1 was angled 45 degrees medially (Fig. 10), and M2 was overgrown medially. On the left side, lower M3 was situated on the corner of the vertical ramus of the mandible.

The most abnormal dentition occurred in a bull gifted to a museum in 1875. On the right side there were six teeth in the upper arcade. M3 was huge, being 46 mm long (Fig. 11), whereas M2 measured 21 mm. In the opposite row of teeth there was no P2 or M3. The upper half of the posterior surface of M2 was angled forwards and highly polished as a result of abrasion from the anterior surface of upper M3. The configuration of the left upper arcade mirrored that of the right. M3 was, again, 46 mm long, and M2 measured 23 mm. The left lower teeth were an exact copy of the right side.

### Interdental Spaces

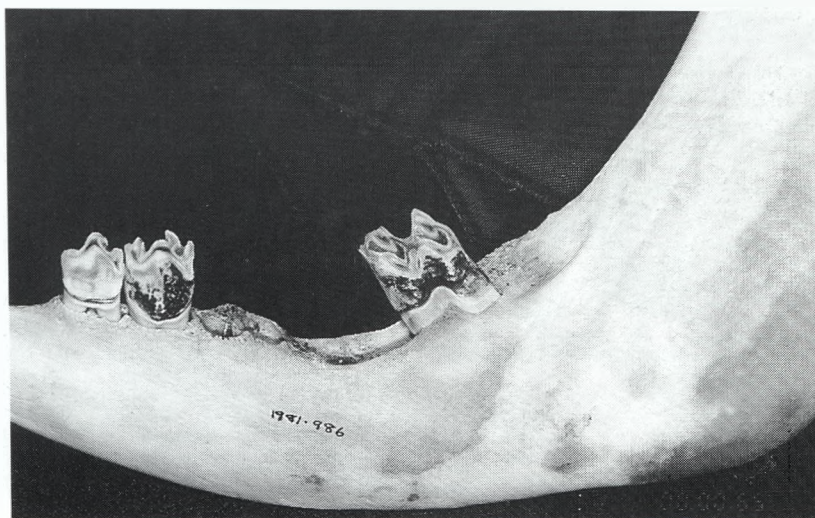
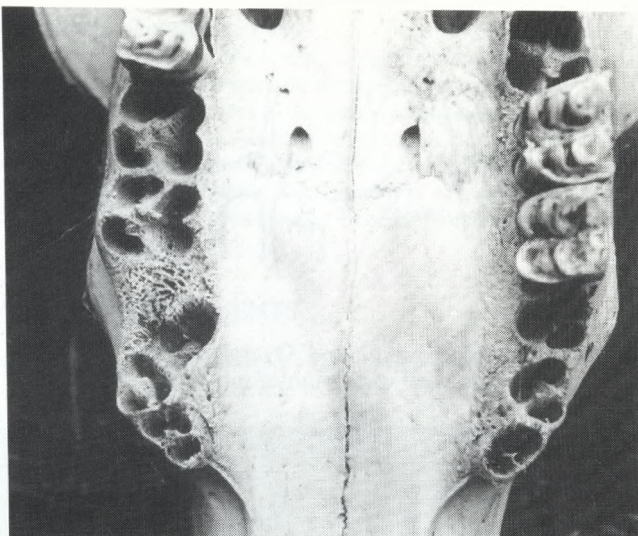
In older cattle with well worn rostral teeth, usually with root exposure, spaces between incisors were common. Spaces, not already mentioned, of at least 1 cm were found in the cheek tooth arcades of three other animals.

### Periodontitis

Periodontitis was evident in a majority of animals in the form of varying degrees of gingival inflammation or, in museum specimens, roughening of peri-alveolar bone.



**Fig. 7** Malpositioned fourth left upper premolar.

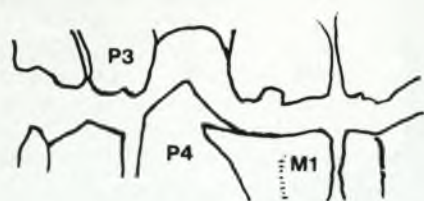


**Fig. 8** Displaced third molar. © The Natural History Museum, London.

#### DISCUSSION

Many of the simpler anomalies observed in the Chillingham cattle occur in contemporary dairy and beef breed females (Ingham, 2001) and, possibly, males. In an abattoir survey, twenty-four of 501 cull cows had one or more rotated incisors. P2 lower was unilaterally or bilaterally absent in twenty-six animals, and a further nine cows had one or more other cheek teeth missing. M3 was hooked posteriorly in eight animals. All the wild cattle had a full set of rostral teeth, whereas one or more incisors were absent in seventy-three of the cull cows. With three exceptions, the latter were believed to be acquired losses. In the Chillingham cattle, all missing teeth were considered to be congenitally absent as there were no findings to suggest accidental loss. The second lower pre-molar was congenitally absent in 21 (52.5%) of the wild cattle, but the true prevalence is probably greater than that figure as mandibles were not available for all of the museum specimens. This anomaly has been occurring for at least the last 125 years and, given the high level of inbreeding in the herd, it is perhaps





**Fig. 9** Absent upper premolar 4. Overgrowth of lower premolar 4, with impaction of molar 1.



**Fig. 10** Molar 1 angled medially.



**Fig. 11** Absent lower molar 3, with massive overgrowth of upper molar 3.

surprising that it is not even more common. The absence of this tooth may provide a clue to the origins of the cattle, a matter which has led to much speculation for well over a century. Storer (1877) believed the cattle to be direct descendants of the aurochs which roamed Britain in prehistoric times and which, he considered, probably erroneously, may well have survived in northern regions into the eighth or ninth centuries. Other authorities took the Celtic Shorthorn, introduced from the continent by Neolithic tribes, to be the progenitors of the white cattle which were

enclosed in a number of parks during the reign of Henry III and later. The Romans used white cattle for sacrificial purposes and Whitehead (1953) thought that the various herds of wild bovines might have originated from stock brought into Britain by them.

Andrews and Noddle (1975) reported that P2 lower was absent from some cattle remains from prehistoric sites. Alderson (1997) noted that this anomaly was present in cattle bones from the first to the third century BC, found near Salisbury. Meek and Gray (1911) reported on bones found in excavations of Roman sites at Corbridge. In some adult cattle skulls, the

'first' lower premolar (P2) was absent, a feature then known to be associated with the Chillingham cattle, but which was said, as far as was known, to distinguish them from all other members of *Bos*. These cattle were said to have been so similar in form and size to the then Chillingham cattle that there could be no question as to their having been wild. Their conclusion was that the wild cattle were represented during the Roman period. Based on these reports, it is my opinion that the Chillingham cattle, and the other wild herds, were the direct descendants of animals which had roamed Britain for thousands of years. The latter cattle must also have been one of the ancestors of present day breeds, given that the same dental anomaly occurs in some of these animals.

#### ACKNOWLEDGEMENTS

I am indebted to the late Honourable Ian Bennet, the late Miss Barbara Noddle and Dr Susan Kempson for advice and encouragement. My thanks are due to Mrs P Cottam at the Hancock Museum, Mr R Sabin at the Natural History Museum, London and Mr R J Symonds at the University Museum of Zoology, Cambridge, for providing access to specimens. Mr Austen Widdows provided invaluable assistance with autopsies.

#### REFERENCES

- ALDERSON, L (1997). *A breed of distinction: White park cattle: Ancient and modern*. Shrewsbury, Country Wide Livestock Ltd. p14.
- ANDREWS, A H and NODDLE, B A (1975). Absence of premolar teeth from ruminant mandibles found at archaeological sites. *Journal of Archaeological Science*, 2, 137-144.
- BEASLEY, M J, BROWN, W A B and LEGGE, A J (1993). Metrical discrimination between mandibular first and second molars in domestic cattle. *International Journal of Osteoarchaeology*, 3, 303- 314.
- BEILBY, R and BEWICK, T (1790). *A general history of quadrupeds*. Newcastle, Hodgson, Beilby & Bewick.
- BILTON, L (1957). The Chillingham herd of wild cattle. *Transactions of the Natural History Society of Northumbria*, 12, 137-160.
- HALL, S J G (1986). Chillingham cattle: Dominance and affinities and access to supplementary food. *Ethology*, 71, 201-215.
- (1989). Chillingham cattle: Social and maintenance behaviour in an ungulate that breeds all year round. *Animal behaviour*, 38, 215- 225.
- HALL, S J G and HALL, J G (1988). Inbreeding and population dynamics of the Chillingham cattle (*Bos Taurus*). *Journal of Zoology, London*, 216, 479- 493
- INGHAM, B (2001). Abattoir survey of dental defects in cull cows. *Veterinary Record*, 148, 739- 742
- MEEK, A and GRAY, R A H (1911). Corstorphitum: report on the excavations in 1910: Animal remains. *Archaeologia Aeliana*, vii, 88-107
- MILES, A E W and GRIGSON, C (1990). *Colyer's variations and diseases of the teeth of animals*. Revised edition. Cambridge, Cambridge University Press, pp114- 115 and 292-295.
- STORER, Reverend J (1877). *The wild white cattle of Britain*. London, Cassell, Petter & Gilpin.
- VISSCHER, P M, SMITH, D, HALL, S J G and WILLIAMS, J L (2001). A viable herd of genetically uniform cattle. *Nature*, 409, 303
- WHITEHEAD, G K (1953) *The ancient white cattle of Britain and their descendants*. London, Faber & Faber Ltd





CORRECTIONS TO

'THE DURHAM FLORA – CORRIGENDA ET ADDENDA', VOLUME 61 PART 3

The following errata were discovered after the note on the Durham Flora was published in the *Transactions* volume 61 part 3.

<b>Minuartia verna</b> (L.) Hiern. "Upon Widdybank about a mile from Watgarth to ye west".	} All three grow in Yewy-Crag in Chopwell Wood, <i>Ep Dunelm.</i> "
<b>Pellia epiphylla</b> (L.) Corda	
<b>Equisetum hyemale</b> L.	
<b>Asplenium scolopendrium</b> L.	

**Lactuca virosa** L.

"Grows plentifully in the hedges about Stockton, Norton etc."

**Fagopyrum esculentum** Moench

**Anagallis arvensis** L.

**Galeopsis angustifolia** Ehrh. Ex Hoffm.

**Bartsia odontites** (L.) Hudson =

**Odontites vernus** (Bellardi) Dumort  
subsp. **Serotinus** (Syme) Corbière

} "Among gravel on the Roads about  
Norton and between it and Blakston  
plentifully".

**Lycopus europaeus** L. "Nesom [Neasham] about a Well at ye east end of ye Town".

CORRECTIONS TO

'A SUPPLEMENT TO FLORA OF NORTHUMBERLAND', VOLUME 61 PART 3

- p.123 **A. trichomanes** '45/00.55' (under 85) should be at top of NZ column.  
'45/00.55' in NZ column and '46/00.35' in NU  
column  
should be in the corresponding columns of **A. ruta-muraria** immediately below.
- p.151 top line '95.35' should be under NT  
'05.20' should be under NU.
- p.152 top line '30.80' should be under NZ.
- p.85 **R. vestitus**: on re-examination the Eglington specimen has proved to be **R. anisacanthos**. Therefore the entry for 68 should be deleted, as should the dot for 46(NU)11 on the map on p117 and the NCR entry for this species on p.155.

*Minor corrections*

- p.108 **Triglochin palustris** second line from bottom - 'raodside' should be  
'roadside'.
- p.110 **Sisyrinchium montanum** 'Havanah' should be 'Havannah'.
- p.114 **Carex spicata** 'Havanah' should be 'Havannah'.
- p.115 **Ophrys apifera** 'Dr Q J Groom' should be 'Dr Q J GROOM' and  
'Howden' should be 'Howdon'.
- p.143 **Sambucus racemosa** the second '15.00' in NU column to be deleted.
- p.103 **Plantago lanceolata** 'Havanah' should be 'Havannah'.
- p.105 **Pulicaria dysenterica** 'Havanah' should be 'Havannah'.
- p.115 **Epipactus leptochila** 'Narrow-leaved Helleborine' should be 'Narrow-  
lipped Helleborine'



