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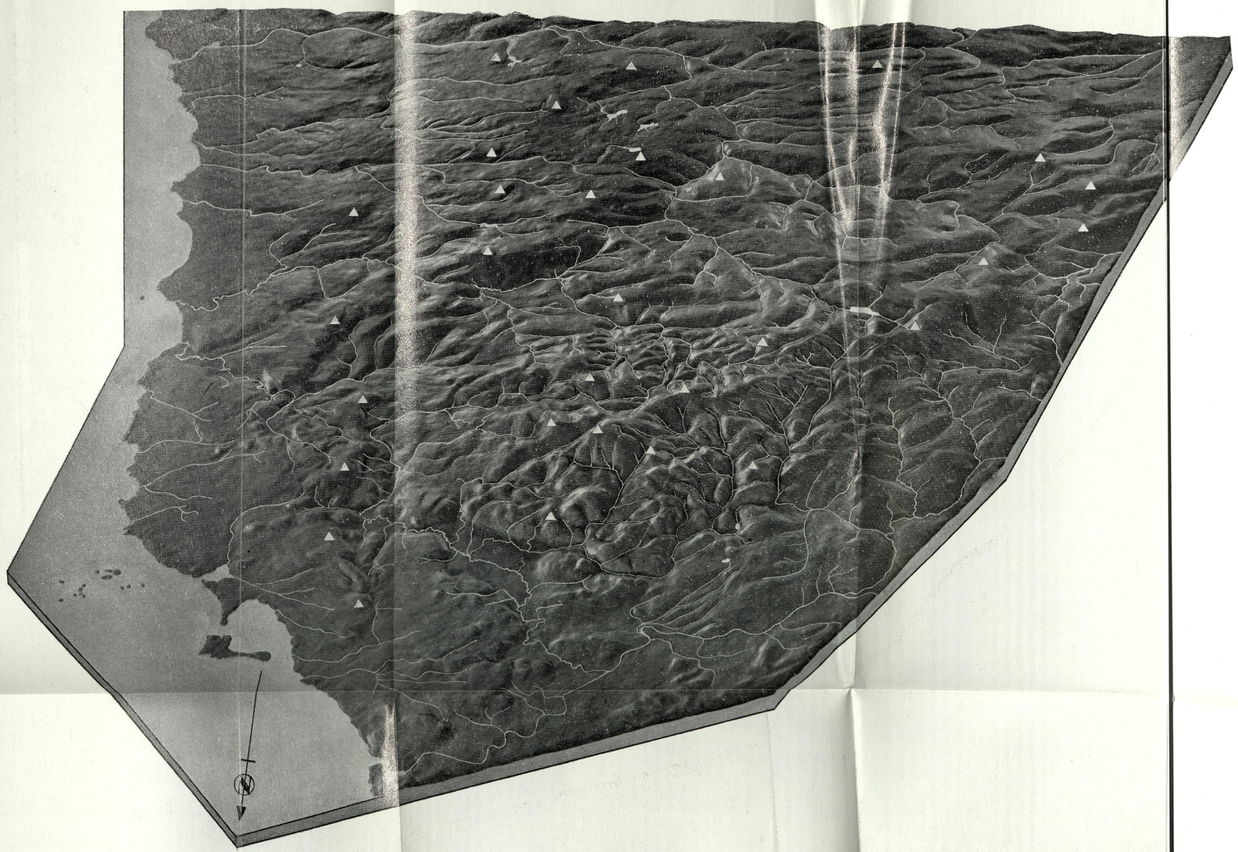

A GUIDE TO THE GEOLOGY OF NORTHUMBERLAND AND THE BORDERS

by

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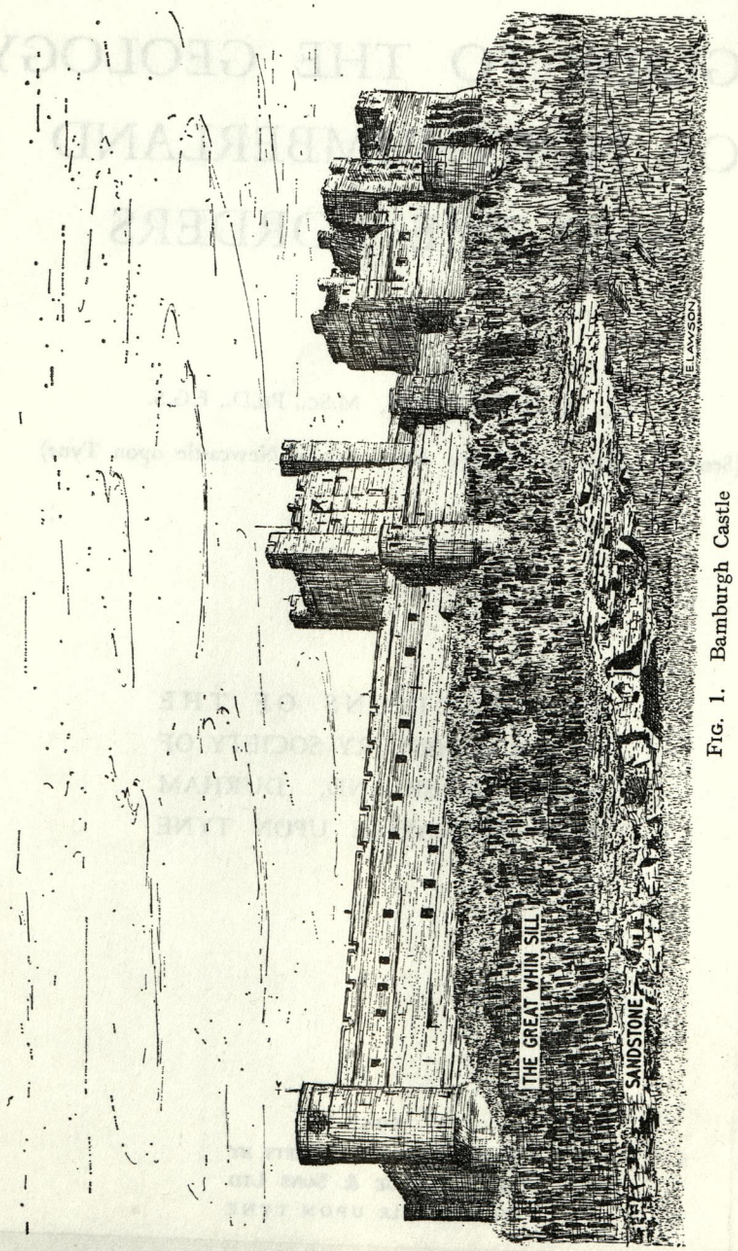

FIG. 1. Bamburgh Castle

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D. A. ROBSON

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I INTRODUCTION

It is a far cry from the peat hags of Cheviot to the industry of Tyneside and no less, in geological time, from the rocks which form the Border Hills in the north to the Coal Measures of the south-east. It is to the Coal Measures that Tyneside owes its wealth—and its spoliation. It is the poor soil from granite and lava—and their lack of material of economic value—which preserves Cheviot for the hill shepherd and the fell walker.

Eras	Periods	Millions of Years		Earth Movements
QUARTERNARY	Holocene (Recent) Pleistocene (Glacial)	0	0·025 1	
TERTIARY	Pliocene Miocene Oligocene Eocene	70	69	ALPINE
MESOZOIC	Cretaceous	135	65	
	Jurassic	180	45	
	Trias (New Red Sandstone)	225	45	ARMORICAN
PALAEOZOIC — UPPER	Permian (Sandstone)	270	45	
	Carboniferous	350	80	
	Devonian Old Red Sandstone	400	50	CALEDONIAN
PALAEOZOIC — LOWER	Silurian	440	40	
	Ordovician	500	60	
	Cambrian	600	100	
PRE-CAMBRIAN				

FIG. 3. Table showing the succession of rocks forming the earth's crust

The **periods*** of geological time when the rocks of Northumberland were formed embrace the **Silurian**, the **Old Red Sandstone**, the **Carboniferous** and earliest **Permian** (Fig. 3). There are contrasting groups of strata within each of these **systems** of rock (the succession of rock laid down during a period of geological time constitutes a system) and each provides its own variety of topography and vegetation. Every hill, every depression, indeed every change of slope tells its story to the geologist.

The old nineteenth century masters of the science of geology were, above all, field men. They not only read the rocks, but they were also knowledgeable about the animals and plants of the countryside. Even today, in spite of the specialist developments in geology, the layman who is interested in the countryside can easily gain a knowledge of geological processes.

This guide is written primarily for the layman and so technical terms are explained. Such is the variety of the rocks of the region, however, that their description almost provides an elementary text-book of geology.

The aims of this guide are threefold :

1. To summarise the geological history of the region.
2. To lead the reader to some of the localities where the rock succession is best exposed.
3. To show how closely the hills and valleys and plains reflect their rocky foundation.

The reader should go into the country and climb some of the high viewpoints indicated on the map (Plate 2) which is a tracing of the drainage system shown in Plate 1, with the geological boundaries added. Plate 1 is itself a photograph of a scale model of Northumberland, a copy of which may be seen in the Hancock Museum, Newcastle upon Tyne. The viewpoints represented on Plate 1 by triangles are shown in the same manner on Plate 2. From these hilltops one may not only contemplate the Northumbrian scene, but also understand how the rocks beneath have contributed to its configuration.

*Where they first occur in the text all technical terms are printed in bold and their meaning is explained. There is also an index to these terms on p. 75

II STAGES IN GEOLOGICAL DEVELOPMENT

The sub-divisions of this section describe the processes by means of which the rocks of Northumberland and the Borders were formed. Each sub-division embraces at least one geological system. The story begins far back in the earth's history and ends with the Ice Age, the effects of which have moulded the countryside as we know it today.

NORTHUMBERLAND BEFORE THE CHEVIOT HILLS

In the very remote past, some 600 million years ago, a great sea stretched across north-west Europe, bounded by continental land-masses whose parallel shores ran north-east to south-west across the northern hemisphere. The western shore lay out in the Atlantic and the eastern shore stretched across what is now European Russia. The study of the deposits subsequently laid down in that sea has shown that the following cycle of events occurred.

Deposition (Fig. 2a and 2b). Into the huge trough-like depression (**geosyncline**) of this pre-historic ocean, several hundred miles wide and several thousand miles long, rivers from the adjoining land-masses poured their load of pebbles, sand and mud. The pebbles piled up at the river mouths, forming **deltas** which jutted out into the sea. The lighter sand was carried beyond the limit of pebble deposition by gentle currents, and the still lighter mud was spread outwards over many square miles of sea-bed. Away from the muddy influences of the shore, sea-creatures flourished, and when they died their shells sank and accumulated on the sea-bed. These processes were slow and continued for millions of years. The deposits gradually became hardened so that pebbles formed **conglomerate**, sand became **sandstone**, mud became **clay** and **shale**, while the shelly layers were transformed into compact **limestones**. The break between each layer or **bed** of rock is described as a **bedding plane**. A particular deposit of rock, such as sandstone, shale or limestone, is known as a **formation.** A single formation may contain numerous bedding planes. These layered rocks are the most important among those classified as **sedimentary**. Deposition of this material in the geosyncline kept pace with the sinking of its floor, for in the end some 30,000 feet of sediment were built up.

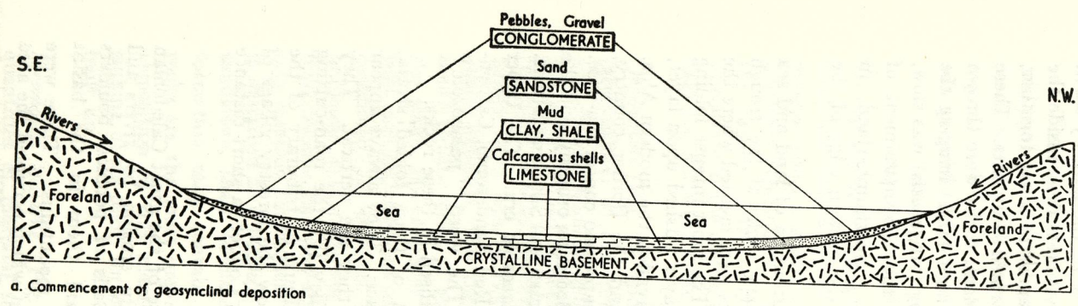
Mountain building (Fig. 2c). The gradual transfer of enormous quantities of material from land to geosynclinal trough upset the balance of the earth's **crust**. The crust is a skin of light rock some

30 miles thick, resting upon heavier rock which constitutes the underlying **mantle**. This imbalance, aided, so it used to be thought, by earth shrinkage or, in the more modern view, by movements deep inside the globe, caused the adjacent land-masses (**forelands**) to draw together, producing folding and wrinkling of the newly-formed sediments. These plastic sediments overlying the crystalline foreland rocks were thrown into two great parallel, contorted chains of high land, fringing the geosyncline. This process of mountain building (**orogenesis**) was slow, continuing for perhaps 40 million years, to the accompaniment of violent earthquakes and volcanic eruptions. Northumberland, in relation to these catastrophic events, lay on the eastern edge of the north-western zone of folding.

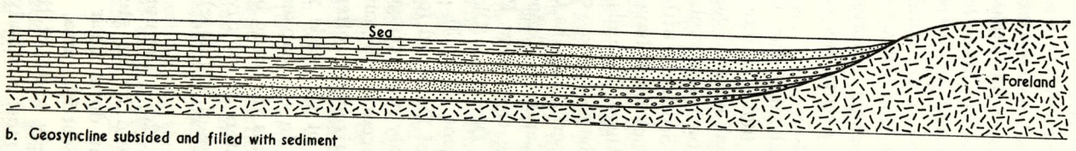
So a great change came about in the distribution of land and sea over the whole region. The folded sedimentary rocks of the trough now formed high land, and small isolated basins were created where the ground had not been raised above sea-level. The most intense folding occurred in the highlands of Scotland, with layer pushed upon layer, to form a mountain chain which must have rivalled the modern Alps. Southwards, across the Southern Uplands and the Border country, folding was less severe, and the rocks were compressed concertina-wise. The whole great episode is described as the **Caledonian orogeny**, and the rocks involved belong to the **Cambrian, Ordovician** and Silurian systems. They were laid down during the **Lower Palaeozoic era**. The **Upper Palaeozoic** era embraces the **Devonian** (Old Red Sandstone), Carboniferous and Permian systems (Fig. 3). The word "palaeozoic" refers to the ancient forms of life found fossilised in these rocks.

In Northumberland, only the youngest of these folded strata, namely the Silurian rocks, occur at the surface. They always appear strongly inclined to the horizontal; often they are vertical. They can be seen near the head of the Rede valley (by the road-cutting above Catcleugh reservoir), in the Canker Burn (a tributary of the Cottonshope Burn which joins the Rede below the forestry village of Byrness) and in the headwaters of the River Coquet (a short distance above the shepherd's cottage of Philhope).

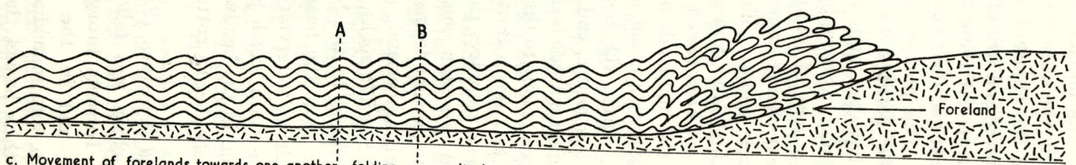
Erosion and deposition (Fig. 2d). The uprise of the great Caledonian mountain chain was followed by its steady erosion by rivers and streams. Torrents brought down their loads of pebbles, boulders and sand, and in the Scottish area, laid them in the basins adjacent to, and immediately south of the mountains. There were several of these basins, the most southerly of which occupied the area which is now the Scottish Lowlands and the Cheviot Hills.



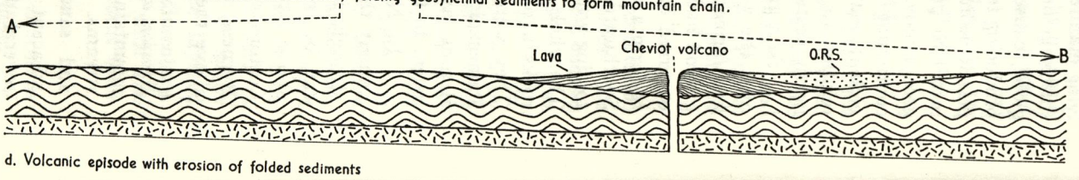
a. Commencement of geosynclinal deposition



b. Geosyncline subsided and filled with sediment



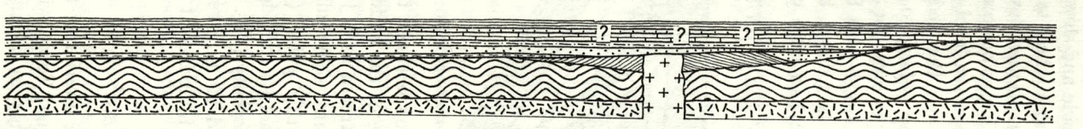
c. Movement of forelands towards one another, folding geosynclinal sediments to form mountain chain.



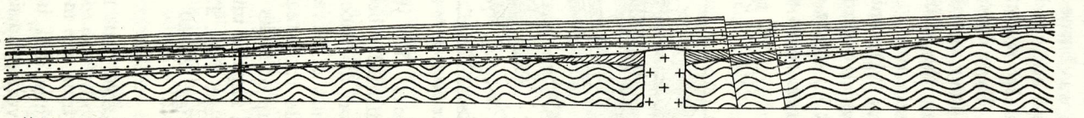
d. Volcanic episode with erosion of folded sediments



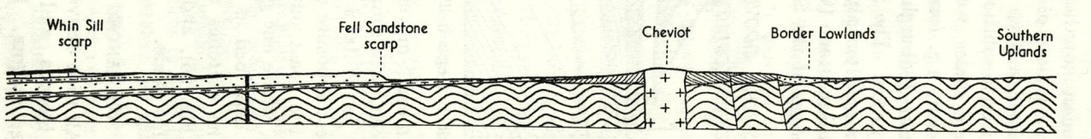
e. Intrusion of Cheviot granite followed by erosion and exposure at surface



f. Subsidence followed by deposition of Carboniferous across Northumberland



g. Uplift and faulting of Cheviot followed by intrusion of Whin Sill



h. Erosion of Carboniferous from Border country and western Northumberland; features emphasised by glaciation

FIG. 2. Diagramatic sections through northern England and Scotland, illustrating the geological history of the area

The material laid down in this basin (which lay against the foothills of the Caledonian mountains) was borne by wide and slow-flowing rivers and consisted mainly of sand and mud. Later, these sands and muds became stained a deep red by waters percolating downwards and charged with iron in solution. These deposits, long since compacted into sandstones and shales, were later raised above sea-level and can now be clearly seen, e.g. forming the cliffs above the Jed Water, near the Carter Bar–Jedburgh main road. They belong to the Old Red Sandstone system. The term " Devonian " is used for rocks of the same age, dominantly shaly, which outcrop in south-west England.

The Old Red Sandstone (O.R.S.) strata were laid down, horizontally, across the edges of the Silurian rocks which had been upturned

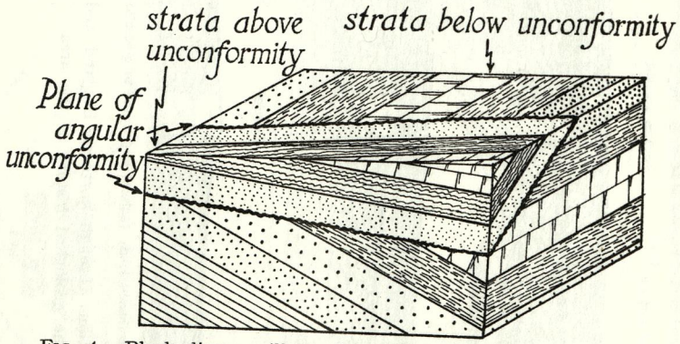


FIG. 4. Block diagram illustrating an angular unconformity

by the Caledonian earth-movements. The junction between these two systems can be seen, with some difficulty because of the undergrowth, in the bed of the Jed Water a short distance upstream from Jedburgh, but by far the best exposure occurs at Siccar Point, some miles north of Berwick, on the coast outside the area of this guide (Fig. 27). This relationship, where one group of rocks lies across the edges of an earlier group, is described as an **angular unconformity** (Fig. 4). The location of all the sketches except Figs. 27 and 29 is given on the block diagram (Fig. 25), and Figs. 25–40 are included at the end of the text of this guide.

VOLCANOES ALONG THE BORDER

Classification. All rock derived from the molten interior of the earth is described as **igneous**, and while still in liquid form within the earth it is termed **magma**. It varies considerably in chemical composition from **acid** (over 65% silica) through **intermediate** (55-65%)

to **basic** (45-55%) and **ultra-basic** (under 45%). Other chemical compounds of igneous rocks which decrease in percentage with decrease in silica are the oxides of sodium, potassium and aluminium, while those which increase with a fall in silica are mainly of iron, magnesium and calcium. These oxides combine to form substances, generally crystalline, known as **minerals**, which are sometimes of considerable chemical complexity. Minerals are the bricks of which a rock is formed. They are generally so small, a fraction of a millimetre in diameter, as to be identifiable only by examining them in a thin section or transparent shaving of rock under the **petrological microscope**. This type of microscope is provided with optical equipment for testing the properties of minerals. In particular, it is equipped with two special prisms which polarise the light before it reaches the observer as he looks down the tube of the microscope. Minerals can be identified according to the way they respond to polarised light. For example, under this type of light some minerals appear opaque, others show shades of grey, others bright colours. Minerals most commonly found in igneous rocks include **quartz**, **feldspar**, **mica**, **pyroxene**, **amphibole**, **olivine** and **iron ore**. They are termed the rock-forming minerals.

During, and following, a period of mountain building, magma may be forced up from the interior of the earth, under enormous pressure, into the rocks of the earth's crust. If, during this process, it should reach the surface as a lava flow, it is described as a **volcanic** or an **extrusive** rock and, in the case of an active volcano, it can be examined by the geologist while it is still in the liquid state. On the other hand, igneous rock which is injected into the crustal rocks, but which is halted before reaching the surface, is described as **intrusive**. Such igneous rocks can only be examined if, long after they have solidified, subsequent erosion should remove the overlying material and eventually expose them at the surface.

The size of the mineral grains or crystals in an igneous rock is determined by their mode of origin. An igneous rock which has cooled slowly is found to be made up of large crystals visible to the naked eye. More rapid cooling produces smaller crystals, while extremely rapid cooling, such as occurs sometimes when a lava flow is poured out over a cold surface, produces a non-crystalline substance, or **glass**. The rule is that slow cooling promotes crystallisation. All glass is in a state of strain and in time undergoes **devitrification** or a change to the crystalline state.

Large igneous bodies, with a vast amount of heat stored within them, cool slowly. Small bodies lose their heat more rapidly. Therefore measurement of the size of the constituent minerals provides a

key to the form of the igneous body. The classification of igneous rocks is based upon their chemical composition and upon their grain-size. The following table illustrates how chemical composition and grain-size or **texture** can be combined to form a comprehensive classification. This table includes the main varieties of igneous rocks found in Northumberland. Varieties not occurring in Northumberland are shown in brackets.

	Acid Silica Over 65%	Intermediate Silica 55-65%	Basic Silica 45-55%	Ultrabasic Silica under 45%
Major Intrusion i.e. Coarse Grain ...	Granite	(Diorite)	(Gabbro)	(Peridotite)
Minor Intrusion i.e. Medium Grain ...	Felsite	Porphyrite	Dolerite formerly Diabase	
Extrusion i.e. Fine Grain or Glassy	Rhyolite	Andesite (Trachyte)	Basalt	

The Cheviot lavas. The great stresses to which the earth's crust had been subjected along the belt of the old, so-called Caledonian geosyncline led, not only to strong folding, but also to intense igneous activity. Scotland and the Border country became a safety valve for the enormous pressures of molten rock within the earth. This molten rock forced its way upwards through the folded Silurian strata by way of circular **vents** until it reached the surface. There it poured out over the surface as a volcano (Fig. 2d). Similar volcanoes developed over central and southern Scotland during the deposition of the earliest part of the Old Red Sandstone and, in the Cheviot area alone, a great mass of lava, hundreds of feet thick, still covers some 350 square miles of country today. Lavas of similar age in Scotland form the Ochil and Sidlaw Hills, the highland foothills of Kincardine, the hills of Lorne and parts of Ayrshire.

The study of modern volcanoes provides a key to the past. The ancient lava flows of the Cheviot Hills possess the characteristics of many modern volcanic products. For example, the tops of successive flows can be traced by their slaggy or **vesicular** appearance, caused by the gas from the body of the flow escaping through the surface as the hot lava advanced. Again, in the Cheviot lavas, as in their modern counterparts, the lath-shaped crystals of feldspar are aligned parallel to the direction of flow, forming a characteristic feature known as **flow-texture**.

Some of the Cheviot flows were poured out into shallow water and fine sediment was washed into their cracked surfaces. This fine sediment is generally stained a green shade owing to the presence of the mineral chlorite, derived through decomposition of some of the less stable minerals in the lava. A particularly good example of these **sandstone dykes** can be seen at the bend of the River Coquet above Carshope (Fig. 28).

The most spectacular episode in the history of the Cheviot eruptions occurred right at the outset when the volcano burst into activity with explosive violence. Rock was torn from the walls of the vent and, together with the uprushing lava, was hurled into the air to form a widely scattered deposit of angular fragments varying in size from a football to a pea. This deposit forms the eastern half of Thirl Moor at the head of the Coquet, and the accumulated material, known as **agglomerate**, is admirably exposed there, in Raven's Cleugh. It also extends to the Scottish side and is well exposed on Gaisty Law. At this time the surface appearance of Northumberland must have somewhat resembled the artist's impression which is illustrated overleaf (Fig. 5).

In mineral content, the bulk of the Cheviot lavas resemble many of the Scottish volcanics of Old Red Sandstone age which are classed as **andesites** (page 12). However, because of their considerable chemical alteration, they do not lend themselves to very satisfactory detailed microscopic investigation. Generally they are grey or purple in colour, often flecked with white spots where the feldspars have altered to a clay-like substance.

There is, however, a fresh and extremely compact lava flow which not infrequently outcrops in the southern half of the Cheviot Hills. It is dark grey or even black in colour and forms bold, rounded blocks on the hillsides. It can readily be recognised by the red veins, about 0.1 ins. wide, which invariably interpenetrate it. It forms the lower part of the scar at the river bend above Carshope (Fig. 28) and outcrops on the flanks of Shillhope Law, Wardlaw, and in numerous other localities north and south of the River Coquet. It is known as the **Blindburn glassy andesite**.

A small group of lava flows, much more restricted in area, forms the belt of country along the Border, extending for several miles between Thirl Moor and Windy Gyle. These lavas are richer in silica than the andesites, and therefore more acid. They are here described as **rhyolites**, but the Geological Survey calls them " mica felsites." In colour they resemble the andesites, but can be distinguished from them by the presence of minute flakes of black mica (**biotite**), whose

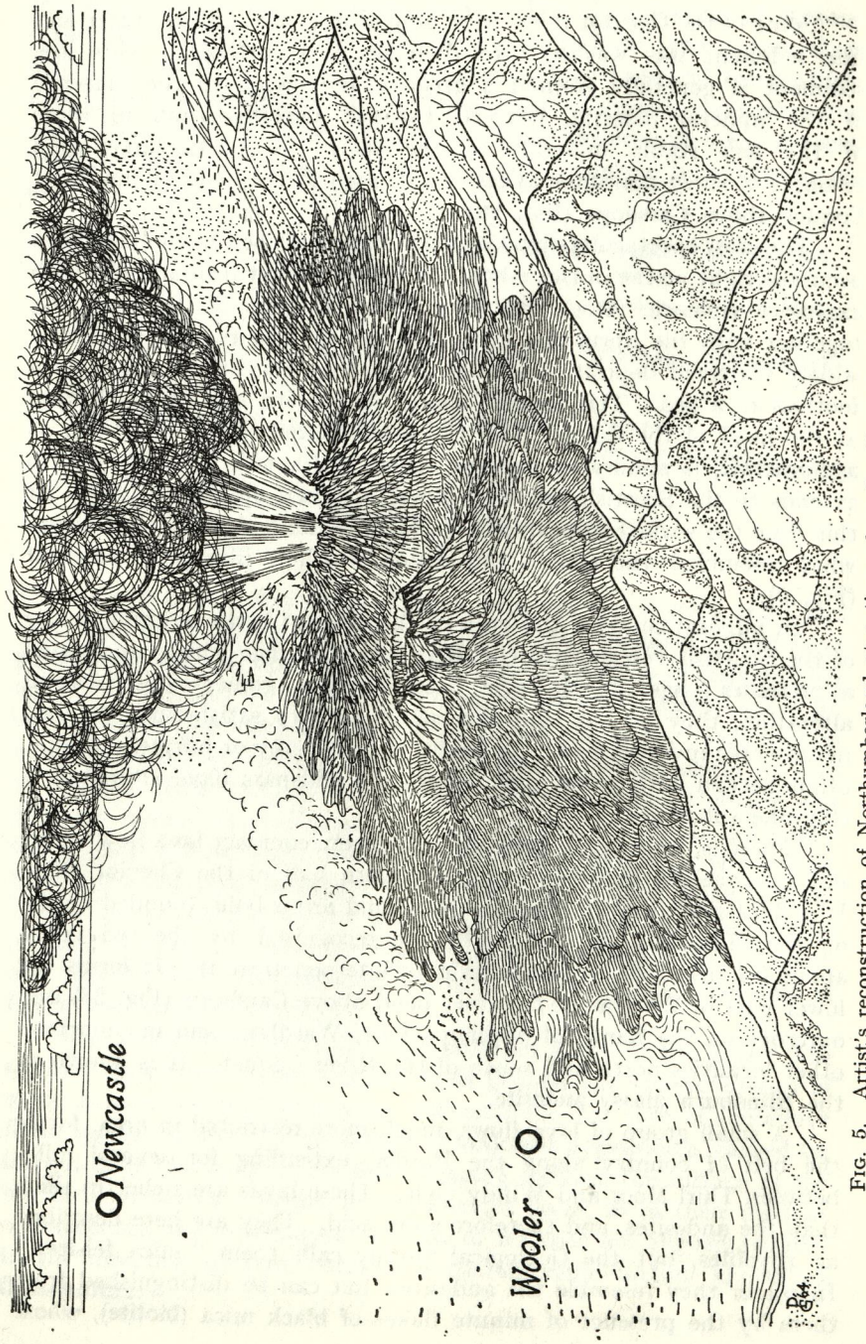


FIG. 5. Artist's reconstruction of Northumberland at a time when the Cheviot volcanoes were active

shiny surfaces reflect the light with a glassy lustre. They directly overlie the agglomerate at Thirl Moor, and are well exposed in the hillside immediately south of the shepherd's cottage of Philhope. Along the Border towards Windy Gyle these lavas are more easily recognisable for the biotite micas become much more abundant. They are crumbly rocks and the hillsides which are composed of them form long, loose screes.

The Cheviot granite. Another indication of the pressure exerted by the magma in the interior of the earth is to be seen in what is known as a **major intrusion**. A major intrusion is a great mass of molten rock, often many miles in diameter, which is forced upwards, melting and absorbing the rock in its path, and coming to rest perhaps some thousands of feet below the surface (Fig. 6a). Major intrusions may,

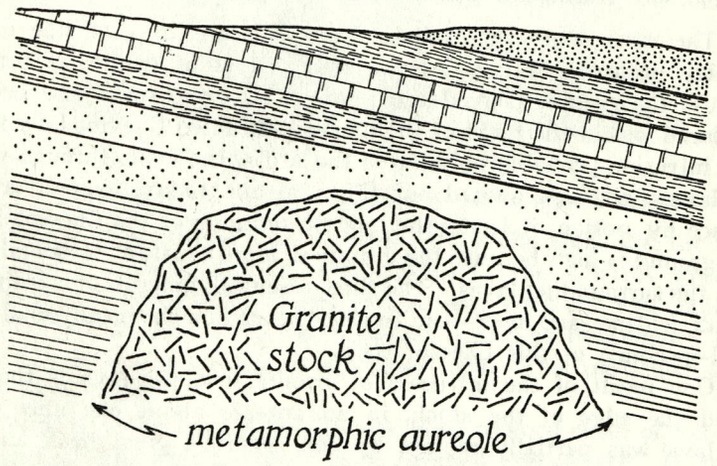


FIG. 6a. Diagramatic section through a major intrusion

therefore, also be described as **deep-seated** or **plutonic**. Because of their enormous heat, the surrounding rocks undergo mineral changes or **metamorphism**, forming an **aureole** or altered zone round the intrusion. These intrusions possess as wide a range of chemical composition as the lava flows, but they also include the ultra-basic rocks. These latter have an especially low silica content and are found only in deep-seated intrusions.

Major intrusions took place during Old Red Sandstone times in various areas of Scotland, and many of these have subsequently been

exposed at the surface by erosion of the overlying rocks (Fig. 6b). Most of these major intrusions are several miles in diameter and are known as **stocks**. They are rich in silica and are therefore **granitic** in composition. They have been quarried extensively for building-stone, particularly in Aberdeen, Peterhead, Criffel and Dalbeattie. Tynemouth pier is built of blocks of Aberdeen granite.

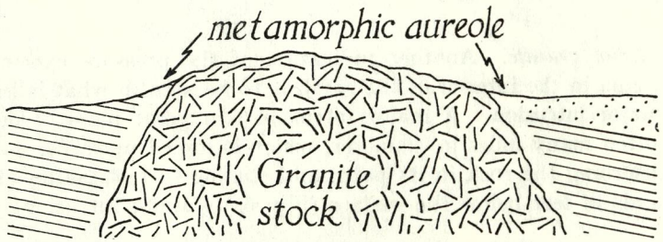


FIG. 6b. Diagramatic section through a major intrusion after erosion

The most southerly of these intrusions on the east side of the country occurred in the Cheviot area. It is of particular interest because the granite pierced the Lower Palaeozoic rocks and became emplaced within the body of the long-consolidated Cheviot lava flows. This intrusion probably obliterated the site of the vents through which the lavas had been poured out (Fig. 2e) and today, exposed at the surface by erosion, it forms the highest summits of the Cheviot Hills. The ground is high because the granite is more resistant to denudation than the surrounding lavas. The three essential minerals of a granite—quartz, feldspar and mica—can be clearly seen in a chemically unaltered hand-specimen of this Cheviot rock.

One result of the intrusion of granite into the lava is that all round the edge of the stock, in an aureole about one mile wide, the lava was partially melted by the granite's great heat, and recrystallised into a much more durable rock. In this belt, therefore, it forms sharp crags quite foreign to the topography of the rest of the lava country.

The Cheviot minor intrusions. A second type of igneous intrusion occurs in which magma is injected into vertical fissures in the rock. This form of intrusion, though it may have a lateral extension of many miles, is more restricted in volume than the stock and is termed a **minor intrusion**. Cooling is naturally more rapid than in the major intrusions and the crystalline texture is, therefore, finer. Like the stock, it is only exposed by subsequent erosion of the overlying rocks. This type of wall-like minor intrusion, which in different periods

of geological time and in different areas of the earth's crust varies in width from a few inches to a quarter of a mile, is known as a **dyke** (Fig. 7). In cases where the molten dyke material actually reaches the surface and pours out from the open fissure, it is described as a **fissure eruption**, but this type of eruption probably did not occur in the Cheviot area.

Two sets of dykes pierce the lava and granite of the Cheviot Hills (Plate 2). In chemical composition they are similar to the granite, but are finer in grain and are described as **felsites**. Others, more akin to the andesites in chemical composition, are termed **porphyrites**.

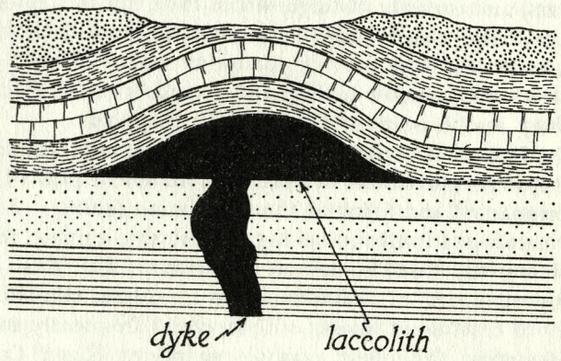


FIG. 7. Diagramatic section illustrating a dyke feeding a laccolith

They are found chiefly in the southern half of the area, and the map shows them converging northwards towards the Cheviot granite. Outcrops are generally poor, but occasionally they are well exposed where cut by streams. The best example occurs at Policeman's Pool in the Coquet Valley, south of Shillhope Law. This particular dyke is over 80 ft. wide.

Imagine the surface of the Cheviot Hills scraped clean of soil and vegetation. Bare rock would then be exposed everywhere. It would be possible to trace, foot by foot, the contact of granite and lava; to plot the course of each felsite dyke through the lava and into the granite. The scene would be not unlike that in the peninsula of Sinai, Egypt, where dark-coloured dykes pierce the lighter country rock and can be mapped for many miles without interruption (Fig. 29).

Occasionally, the distribution of pressures associated with the intrusion of a dyke may cause the magma to billow out in the form of an elongated dome with a flat base, arching the rocks above it (Fig. 7). An intrusion of this type is known as a **laccolith** and there is strong evidence for such a structure near the southern margin of the lavas, east of Alwinton, at Biddlestone. Here, in two large

quarries in the hillside, the " **Harden redstone** " is exposed (Fig. 30). In composition it is similar to the Cheviot felsite dykes and its junction with the overlying lavas can be traced in a great arch, rising eastwards from the Biddlestone Burn, reaching a crest just east of, and below, Cold Law, and thence falling again eastwards. The arching of the lavas caused by the intrusion can be traced northwards, as far back into the lava hills as Cushat Law.

The rock of the Harden laccolith, like many of the dykes which cut the lavas west and east of it, is a pink felsite (due to the colour of the feldspars) and is easily distinguishable from the surrounding purple or grey lava. The rock is chemically unaltered and where sufficiently extensive, as at Harden, provides a useful source of road metal. In contrast, the lavas weather readily and are generally liable to fracture easily. They are thus unsuitable as road chippings.

All the igneous activity in the Cheviot area was associated with the great upward movement of magma from the depths of the earth which accompanied and followed the Caledonian folding. As has been shown, it manifested itself first as a great volcanic episode, followed by a major intrusion, then by minor intrusions. The final stage was marked by a series of **siliceous veins** or dykes, consisting almost exclusively of crystals of quartz. These veins frequently form strong wall-like features. The best example occurs at Raker Crag, above Carshope, in the Upper Coquet Valley (Fig. 28). In geological terminology, a " **vein** " or " mineral vein " is any vertical fracture in the earth's crust in which there is a concentration of mineral substances such as quartz, fluorspar or metallic ores. This concentration is the result of the upward movement of gases or hot waters from a deep-seated intrusion. In their field relationships, veins are similar to dykes.

ANCIENT DELTA AND OPEN SEA: A CHANGING PATTERN (Fig. 2f)

Gravel from mountain torrents. The igneous activity which produced the Cheviot Hills was followed by a long period during which the great pile of volcanic mountains underwent erosion by streams and rivers. These water-courses descended from the high ground towards the shallow seas which now probably surrounded the hills on every side. The debris brought down by the fast-flowing torrents —boulders, sand and mud—was laid down over the shallow sea-bed, heralding the beginning of the Carboniferous deposition.

The gravel beds which these rivers deposited are present today as conglomerates. Good outcrops of this conglomerate can be examined at Windy Rigg, near Windy Gyle (Plate 2). The **Windy Rigg Conglomerate** contains boulders of lava and also of granite, proving that,

even in earliest Carboniferous times, the lava lying over the Cheviot granite had been eroded, thus " unroofing " the latter. Better and more widespread exposures of conglomerate occur in the cliffs of Roddam Dene, south of Wooler, on the eastern edge of the lava massif. The **Roddam Dene Conglomerate** (Fig. 31), which is replaced eastwards by sandstone and shales, forms the lowest member of the **Cementstone Group.**

Products from a distant delta. The Cementstone Group consists largely of the sand and mud from the Cheviot peninsula augmented by similar material brought by rivers from Scotland (Fig. 8). Gradually a succession of deposits was built up as the sea-bed subsided, and these eventually consolidated into thin (1 ft.) sandstones and thicker (3-5 ft.) clays and shales. Occasionally there was a pause in this deposition, during which the waters cleared sufficiently to permit the growth of **algae** (a seaweed-like type of life) together with various lime-secreting organisms. The accumulating shells from these organisms eventually produced the foot-thick limestones so characteristic of the Cementstone succession. These deposits formed the lowest division of the Carboniferous in Northumberland. The Cementstones are admirably exposed in the Coquet Gorge, one mile west from Alwinton (Fig. 32). Here the cliff rises 150 ft. above the river bed, and the steady alternation of shales and thin sandstones, with occasional thin limestones, can be clearly seen and examined. This is by far the best exposure of Cementstones in Northumberland. Elsewhere, these rocks are exposed only in rather rare stream sections.

Although the Coquet Gorge succession is typical of the Cementstones, occasional thick **lenses** (beds which become thinner and thinner laterally until they finally pinch out altogether) of sandstone replace the more shaly beds, but with only limited lateral persistence. They are best developed at Glanton Pike, west of Titlington Mount, though they also occur in the Rede valley, near the base of the succession, where they are termed the **Lower Freestones** (a local name for sandstone). A very local thickening of sandstone can be seen at the west end of the Coquet Gorge itself, forming the cliff known as Kay Crag. A few of the limestones also, as at Glebe quarry, Rothbury, increase in thickness to as much as fifteen feet. The Cementstone deposits are probably altogether about 2,000 ft. thick. Laid down in shallow water, their accumulation must have kept pace with the steady subsidence of the sea-bed. These conditions of subsidence persisted throughout Carboniferous times, giving rise to what are referred to as the deposits of the **Northumbrian Trough.**

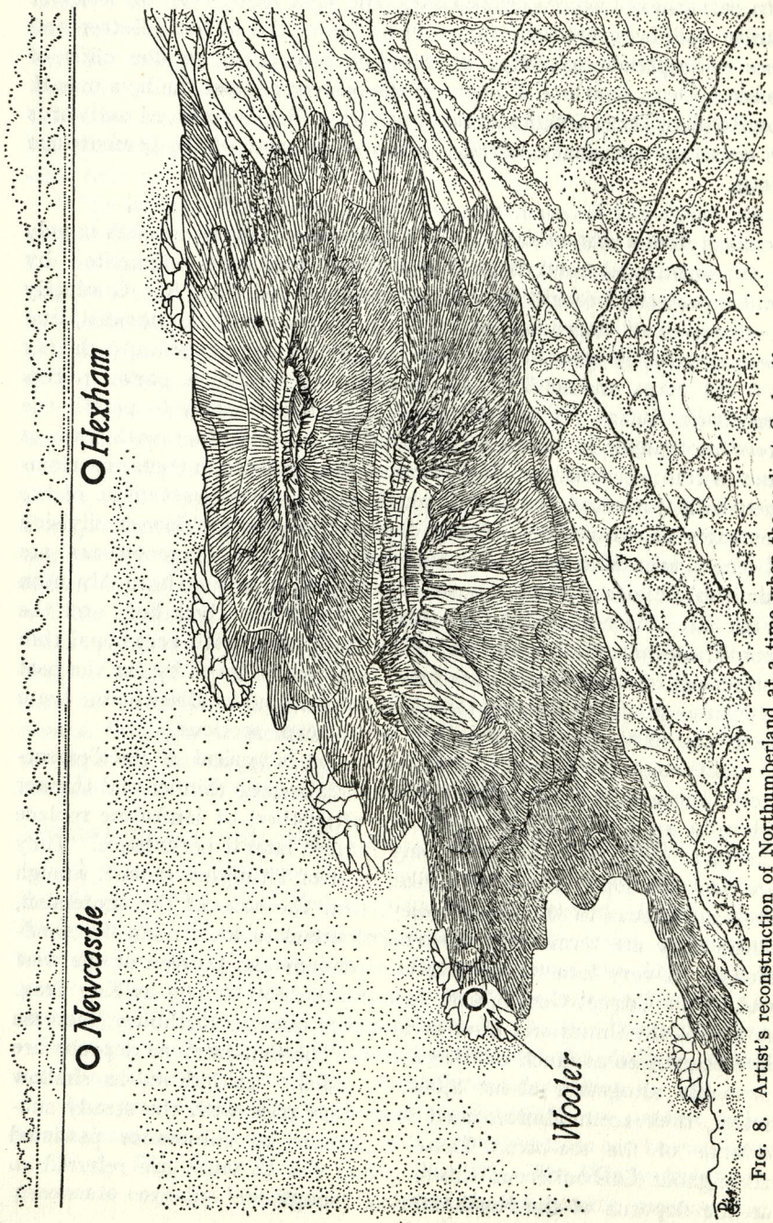


FIG. 8. Artist's reconstruction of Northumberland at a time when the earliest Carboniferous sediments were being laid down in the sea around the extinct Cheviot volcanoes

A short volcanic episode occurred in the middle of Cementstone times during which lava was poured out onto the Lower Freestones. These lavas, best exposed in the Cottonshope valley, a tributary of the Rede, may be seen in an old quarry near the roadside at Cottonshope Head. They are highly vesicular and crumbly.

Northumberland's Mississippi. Whereas the Cementstones were characterised by quiet deposition of sand and mud, the succeeding deposits were almost exclusively sandy. A vast river developed in the north-east, comparable in size with the Mississippi. It spread out its load of sand in a wide sweep across the Cementstone beds to the east and south of the Cheviot Hills. These deltaic sands were laid down in water which was rarely more than three or four feet deep yet, because of the continued subsidence of the sea-floor, the deposits reached a total thickness of about 1,000 ft. In the high crags which these consolidated sandstones now form, the pattern of deposition can be well seen and is illustrated in the accompanying sketch of a block of this material (Fig. 9). This pattern proves how the river, bringing material from the north-east, across what is now the North Sea, dumped the

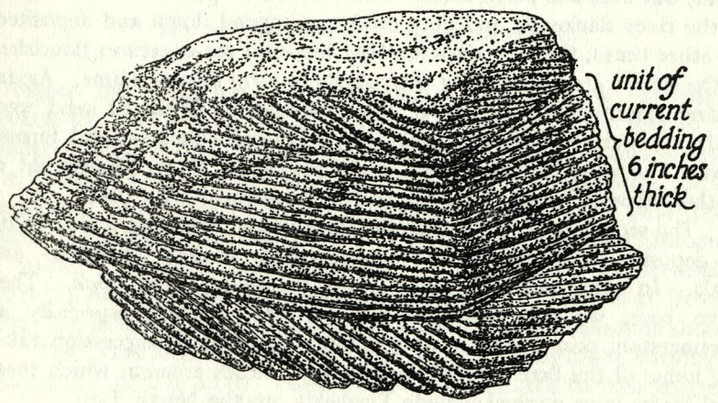


FIG. 9. Block of sandstone from the Fell Sandstone Group, showing current-bedding

sand in a series of inclined layers, some parallel, some lensing out and being replaced by others. Each separate layer forms what is known as a unit of **current-bedding**. The pattern can be produced by sand-laden water in a laboratory tank, and is also described as **cross-bedding, cross-lamination, cross-stratification** or **false-bedding.** A specimen of the sandstone can be readily broken up so that its constituent grains

are separated from one another, and can be examined microscopically (Fig. 10). These sandstones are classed as the **Fell Sandstone Group**, and are among the best exposed rocks of Carboniferous age in Northumberland.

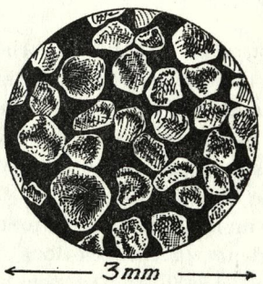


FIG. 10. Grains of sand, Fell Sandstone Group

The large river which was responsible for the Fell Sandstones continued to flow during the deposition of the succeeding group of rocks, but with less persistence. There were now periods when the pace of the river slackened and only mud was carried down and deposited. At other times, the flow ceased altogether, and sea-creatures flourished in the clear water, depositing their shells to form layers of lime. Again, during intermittent periods of river deposition, deltas of sand were built up over an extensive area, and vegetation decayed and formed **peat.** The peat became buried and compressed under the weight of further deposits and was eventually transformed into **coal.**

The sequence of rock which finally emerged from this wide variety of deposits included, therefore, sandstones, shales, limestones and coals. In some areas the coal seams are several feet thick. They have been worked commercially for many years, especially at Scremerston, near Berwick, from which the 1,000 ft. succession takes the name of the **Scremerston Coal Group.** Other areas in which these coal seams were worked include Plashetts, up the North Tyne.

The rhythmic sequence. Clear, shallow seas always provide conditions for the deposition of limestone and, so long as there is no silting of the waters by materials derived from the land, sea-creatures will flourish. Their shells, mainly calcareous, may accumulate to a thickness of many hundreds of feet. Where such lime-rich deposits are laid down in the path of an advancing delta they become overlain first by mud and then by sand, as described on page 6. Finally, if

the sandy material is built up to sea-level, swampy conditions develop with the growth of vegetation. A complete succession in a marine basin in which sediment is accumulating should, therefore, yield limestones followed by shales, sandstones and coal seams. No further deposition can then take place unless there is subsidence of the sea-bed, in which case the whole sequence, or part of it, may be repeated (Fig. 11). It is described as a **rhythmic** or **cyclic sequence.**

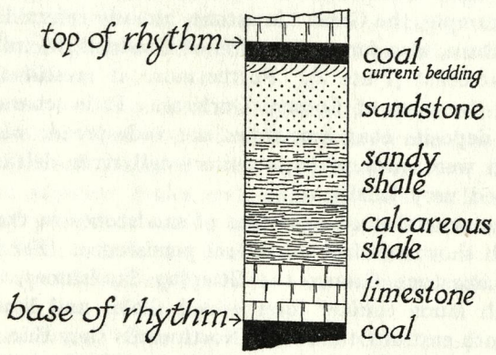


FIG. 11. Diagram of a rhythmic sequence

Fringing the open sea. The rhythmic sequence can be traced repeatedly, not only in the Scremerston Coal Group, but also in the group of rocks, some 3,000 ft. thick, which overlies it. This is termed the **Carboniferous Limestone Group**, something of a misnomer, for the limestones themselves form only a small proportion of the total thickness. The succession in the Haltwhistle Burn above the **Great Limestone** is probably the best inland exposure. On the coast, the succession from the **Acre** to the **Sandbanks Limestone** is very complete at Howick (Fig. 33), as is that above the **Oxford Limestone** on the Beadnell shore.

The Limestone Group contains some thirty limestones, varying in thickness from 3 to 35 ft. These individual limestones thicken progressively southwards with corresponding thinning of the sandstones and shales. In north Yorkshire, they merge with one another to form the well-known **Great Scar Limestone** of Ingleborough. This progression, north to south, of deltaic to open-sea deposits, indicates that there must have been a land-mass to the north of Northumberland at these times and open sea on the south.

The Limestone Group is classified for convenience into the Lower, Middle and Upper divisions. Each division is about 1,000 ft. thick.

The base of the **Lower** division is marked by the **Redesdale** or **Dun Limestone**, that of the **Middle** division is the Oxford Limestone, whilst the Great Limestone is assigned to the base of the **Upper** division. Some of these limestones have a distinctive appearance and the practised eye can recognise many of them in the field. Apart from their **lithology** (appearance due to colour, texture and bedding) many of the limestones can be distinguished by their fossil content.

Some of these limestones can be traced right across Northumberland. For example, the Great Limestone, already referred to from the Haltwhistle Burn, also forms the cliffs of Beadnell, 60 miles away on the north-east coast (Plate 2). Furthermore, it is still a distinctive limestone in the west of County Durham. It is characteristic of sedimentary deposits that limestones are widespread, whereas sandstones, which were once perhaps quite small river deltas, are often only developed very locally.

There are several good examples of sandstones in the Limestone Groups which show this lack of lateral persistence. For instance, in the Lower Limestone Group, the **Ottercop Sandstones**, approaching 1,000 ft. with much thinner interbedded shales and limestones, are developed south-east of Otterburn. Northwards they thin out rapidly, but to the south-west they continue as far as the Cumberland border. Each was laid down by a river which formed a local delta in that area. Again, in the Upper Limestone Group, in mid-Northumberland, a succession of 150 ft. of **grits** is developed. These are sandstones in which some of the grains exceed 2mm. in diameter. They are known as the **Ingoe Grits** and are well developed at Rothley and Shaftoe as well as in the cliff below the village of Ingoe. Elsewhere in Northumberland these grits are represented by sandstones of the same age, but they are quite different in character and were derived from a different river system.

The great age of swamps. The sequence of rocks laid down on top of the Upper Limestone Group consists mainly of shales and sandstones with subsidiary coal seams. In Northumberland, the sandstones are rather poorly developed, but the delta which laid down these deposits elsewhere must have rivalled its Fell Sandstone predecessor. Vast amounts of sand were swept across Northumberland and were finally deposited in the Yorkshire area. The only locality in Northumberland where the succession outcrops continuously is along the shore by the fishing village of Boulmer, north of Alnmouth. These deposits, about 500 ft. thick, are known as the **Millstone Grit.**

Above the Millstone Grit, some 2,000 ft. of a repetition of

sandstones, shales and coal seams were deposited. They mark a continuation of Millstone Grit conditions and the shallows, as subsidence slowly continued, were repeatedly filled up to water-level. The shallows were never sufficiently free of sand and mud to allow shelled creatures to flourish ; hence there are no limestones. The filling-up of the shallows produced repeated swampy conditions with the consequent growth of vegetation. Decay and consolidation of this vegetation led to the eventual formation of coal seams (see page 22), many of which are 6 ft. or more in thickness. The succession forms a large number of incomplete cyclic sequences and is collectively known as the **Coal Measures.**

In contrast to the coal seams found in other parts of the Carboniferous succession, those of the Coal Measures are much more numerous and the individual seams are thicker. Furthermore, ironstones are found in the adjacent shales and, although these beds are no longer worked, they provided, during last century, an important source of iron ore. Indeed, it is to the coal and iron deposits of the area lying in close juxtaposition, that Tyneside owes its initial industrial growth.

The Permian desert. The Coal Measures came to a close with a change of climate. The hot, wet, swampy conditions were superseded by hot dry deserts and sand dunes were formed. These desert dunes mark the base of a new system of rocks, the Permian, and they make up the deposits known as the **Yellow Sandstones** or **Millet-seed Sandstones.** They appear in the cliffs of Cullercoats Bay and are well exposed above high-water mark on the shore below Tynemouth Castle. The overlying **Magnesian Limestone** was laid down (probably as a pure limestone, but subsequently altered by the penetration of magnesia-bearing solutions) when subsidence caused the sea to encroach upon the desert land surface from the east ; it forms strong outcrops in the upper half of the cliffs at Tynemouth. It was formerly quarried at Marden, a mile inland from Cullercoats, and forms the prominent **scarp** (or cliff, Fig. 14 page 31) running into County Durham through Cleadon, Penshaw and southwards.

Apart from the restricted outcrops of Permian rocks in south-east Northumberland, the Carboniferous deposits are the youngest of the county's sedimentary strata. The **Jurassic** limestone and shales, the **Cretaceous Chalk**, the **Tertiary clastic** (or mechanically formed) deposits including **London Clay**, all of which outcrop over parts of central and southern England, are entirely absent from Northumberland. At one time, some or all of them may have covered the area. If so, they have since been completely removed by erosion.

RENEWED EARTH-MOVEMENTS

Classification of earth-movements.—As described on page 6, the sedimentary rocks of the earth's crust are laid down horizontally, but in the course of time they are subjected to earth-movements which invariably cause them to tilt in one direction or another. This tilt is known to geologists as the **dip** of the strata, measured in degrees from the horizontal. The direction and amount of dip is indicated on a geological map by an annotated arrow. This direction is always that of **true dip** whereas any other direction of dip is said to be the **apparent dip**. The block diagram illustrates this (Fig. 12): the section A is cut along the direction of true dip; B is one of many possible directions of apparent dip, while C is the one direction along which the rocks appear horizontal as indicated by the water-level. This is known as the **strike** direction. The strike is the fundamental direction and the true dip, the maximum dip, is always measured in a direction at right angles to it.

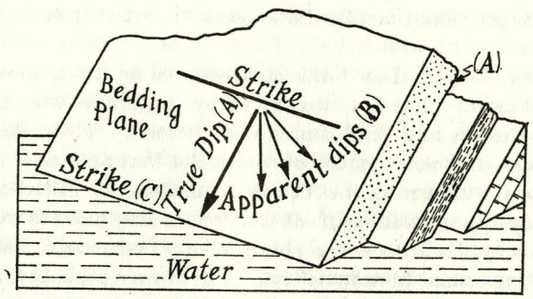


FIG. 12. Block diagram illustrating dip and strike

Earth-movements can be broadly classified into two types:

1. Those due to horizontal pressure (Fig. 2c).
2. Those due to vertical pressure which may be either up or down.

Horizontal pressure may cause a sliding movement of one block of country past another, along a vertical or near-vertical fracture. This produces the so-called **transcurrent** or **tear fault** (Fig. 13a). On the other hand, strong horizontal pressure may cause the strata to fold into a gentle **symmetrical** or **assymmetrical anticline** (arch) and **syncline** (Figs. 13b and 13c), according to the degree of compression. The highest part of the arch of rock is the **crest**, while the dip away from the crest forms the **flanks**. The lowest part of the adjacent inverted

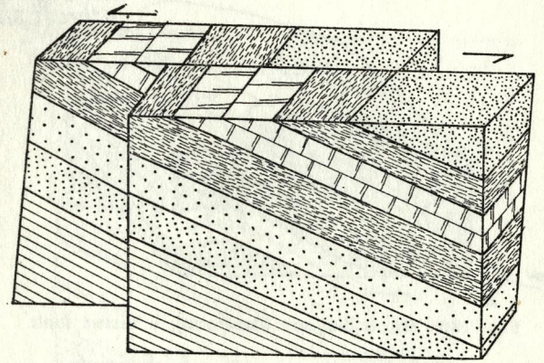


FIG. 13a. Block diagram illustrating transcurrent or tear faulting

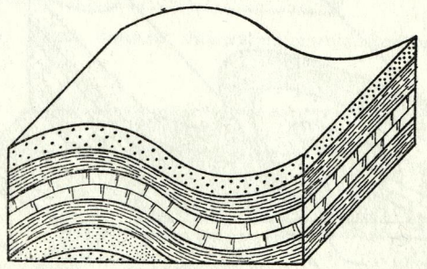


FIG. 13b. Block diagram illustrating symmetrical folds

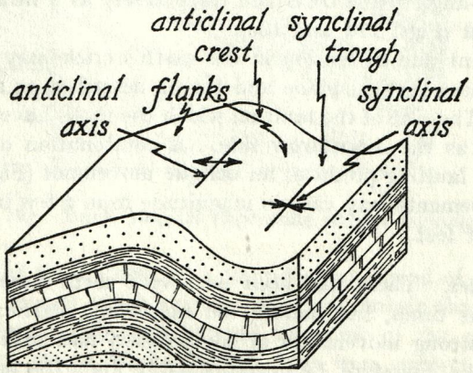


FIG. 13c. Block diagram illustrating symmetrical folds

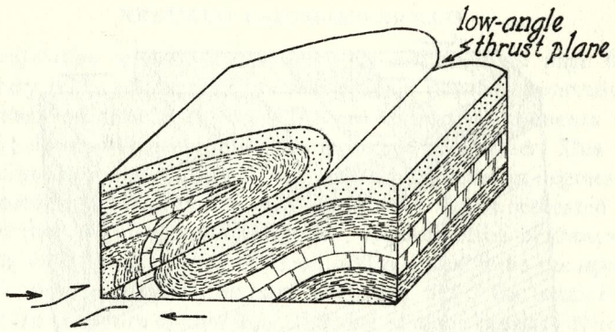


FIG. 13d. Block diagram illustrating a thrust fault

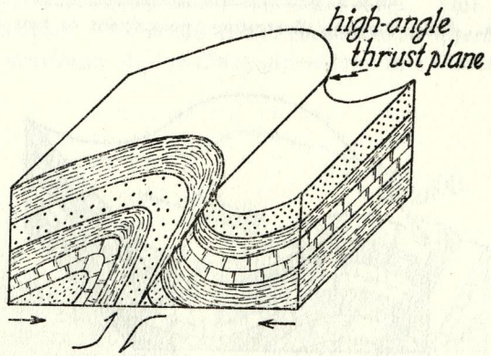


FIG. 13e. Block diagram illustrating a reversed fault

arch is the **trough**. The strata may break and move forward along a low- or high-angle plane described respectively as a **thrust fault** and a **reversed fault** (Figs. 13d and 13e).

Movement due to tension in the earth's crust may occur down a vertical or near-vertical plane and this is described as a **normal fault** (Fig. 13f). The side of the fault on which the rocks have been dropped is described as the **downthrow** side. A combination of vertical and transcurrent faulting produces an **oblique** movement (Fig. 13g). Each of these movements may vary in magnitude from a few inches to many thousands of feet.

Border tremors. There had been no severe earth-movements during Carboniferous times, but, before the succeeding Permian rocks were laid down, strong movements of compression had taken place. The Permian rocks, therefore, lie unconformably upon the beds of Carboniferous age (Fig. 4). These so-called **Armorican** earthquakes (Fig. 3)

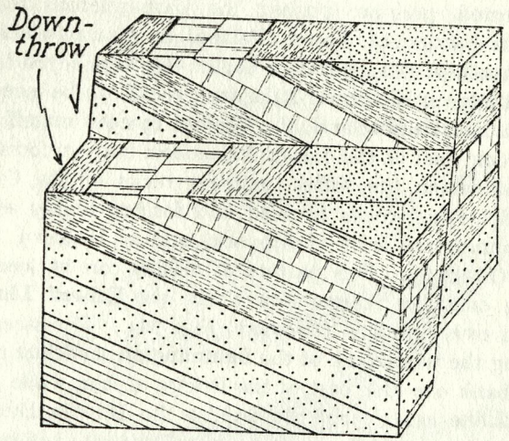


FIG. 13f. Block diagram illustrating normal faulting

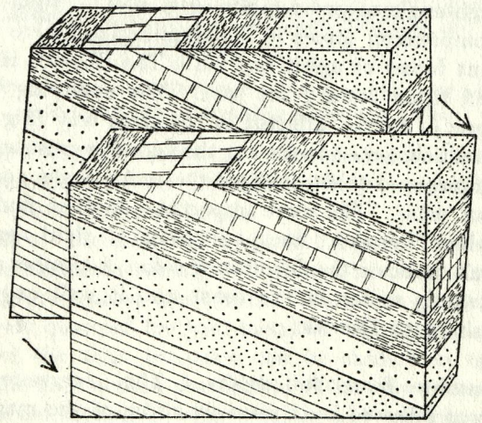


FIG. 13g. Block diagram illustrating oblique faulting

accompanied the final stages of a second great period of geosynclinal deposition in a trough which extended south of Britain through central Europe into Asia. Although beyond the limit of the most violent movements, the strata of the British Isles were subjected to much wrenching and tilting. In central and north-central England, the

Pennines were raised up. Meanwhile in northern England, a north-westerly-directed pressure pushed the Carboniferous rocks against the resistant barrier of Lower Palaeozoic strata which lies from Bewcastle (north of Brampton) to Carter Bar and beyond. (Only the eastern-most edge of the Lower Palaeozoic rocks can be seen on Plate 2).

In north Northumberland, the Cheviot igneous **massif** or upstanding area of rock, east of the Lower Palaeozoic barrier, formed a strong block against which the softer, younger rocks of the Carboniferous were pressed. These rocks buckled and formed highly asymmetrical folds at Lemmington, west of Alnwick, and at Holborn, west of the Kyloe Hills (Plate 2). This pattern of folding can be seen on a small scale on the coast at Scremerston where the **Eelwell Limestone** has been pushed over towards the west (Fig. 34). The steeply dipping rocks forming the west flank of the **Lemmington anticline** may be seen in the road-bank one mile east of the Bridge of Aln, while those of the **Holborn anticline** are clearly exposed in the Hetton Burn. In the extreme south-west at Bewcastle, as well as at Lemmington and Holborn, the pattern is the same : anticlinal folds with steep, perhaps vertical, westerly flanks, but with gentle easterly dip slopes, accompanied by high-angle reversed faults (Fig. 13e).

These compression forces in Northumberland were succeeded by equally violent forces of uplift and tilt. The Cheviot Hills were now raised up and tilted toward the east. The overlying Carboniferous sediments were, of course, affected in the same way (Fig. 2g). At the same time, great east-west faults cut through the crust and, in association with the forces of uplift, lowered the rocks to the north and south of the Cheviot mass. The more important of these faults are shown on Plate 2 where the short lines, extending at right angles from the line of the fault, indicate the downthrow side. A number of these faults extends eastwards as far as the coast and is well exposed in cliffs and on the shore at Howick.

Renewed invasion from the depths. This succession of earth-movements was followed by a renewed rising of the magma from the depths of the earth into the crustal rocks but, unlike the Cheviot episode of Old Red Sandstone times, this later activity in Northumberland was confined to minor intrusions. The dykes, some as much as 100 ft. in width, as for example that at Holy Island (Fig. 35), were intruded along the east-north-east fractures which accompanied or followed the Cheviot uplift. But the weight of the overlying rock or **overburden** must have been insufficient to prevent the magma from spreading out along the bedding planes of the sedimentary rocks.

This resulted in the formation of a **sill** (Fig. 14) or a series of sills along different levels of strata. This group of sills is known collectively as the **Great Whin Sill**. It is found in the south of Northumberland between beds of the Middle Limestone Group, while in the north of Northumberland it is on a much lower horizon, namely in the Fell Sandstone Group. Often the sill is over 100 ft. thick. Usually it is

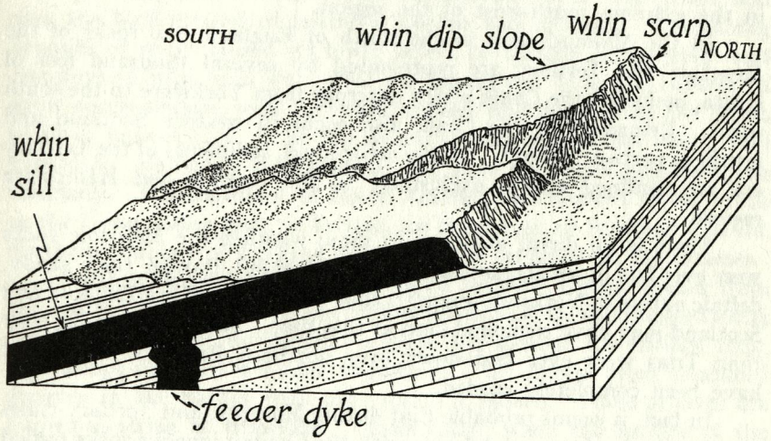


FIG. 14. Block diagram illustrating a sill intrusion with its effect upon the subsequent glacial moulding of the land surface

in the form of a single intrusion, as in the Roman Wall country and in north Northumberland ; at Throckrington, however, there are two intrusions of sill at different levels.

The rock of the whin sill and its " **feeder** " dykes is a **quartz dolerite**. It is medium-grained, very resistant to weathering and is an attractive blue-grey colour when fresh. When fine-grained it is **basalt**. It is extensively quarried for road metal in many parts of the county.

Details of the whin intrusion can be studied in many quarries throughout the area and in the coastal cliffs. Ewesley quarry shows a straightforward section of whin overlain and underlain by sediment (Fig. 36). Barrasford quarry reveals " rafts " of limestone within the whin. These rafts were probably broken off the main limestone bed and carried along before the whin finally solidified. Some of the coastal sections provide more detail about the relationship between whin and sediment. At Cullernose Point, near Howick, for example, the thin shale bed over which the liquid whin advanced is seen to have been caught up within the body of the whin itself and baked hard by the heat from the intrusion.

A TWO HUNDRED MILLION YEAR GAP

Although the rocks of the Upper Palaeozoic are so well represented over Northumberland and the Borders, those of the succeeding eras, namely the **Mesozoic** and Tertiary (Fig. 3), are almost entirely absent. Only the **Trias** sediments, the earliest of the Mesozoic system, are represented and its red sandstones outcrop in the Brampton district in the extreme south-west of the region.

In the Midlands and in the south of England, the rocks of the Mesozoic and Tertiary are represented by several thousand feet of strata, including the Chalk which outcrops from Yorkshire to the south coast. Remnants of the Chalk also occur in western Scotland and northern parts of Ireland. On the other hand, sediments of the Tertiary era are confined almost exclusively to the London and Hampshire regions.

There is no direct evidence to show whether the Mesozoic rocks were ever laid down across northernmost England, though their sandy, deltaic nature in Yorkshire suggests that much of northern England and Scotland may have remained land at this time. If Mesozoic rocks later than Trias were ever laid down over northern England, they must have been completely eroded.

In fact, it seems probable that during Mesozoic and Tertiary times Northumberland was a land area with the Cheviot igneous rocks buried under thousands of feet of Carboniferous sediment (Figs. 2f and 2g). Gradually these sediments must have been removed by erosion until, by late Tertiary, conditions were reached as we know them today, with the Cheviot igneous rocks themselves becoming eroded.

In Tertiary times sedimentation was probably rare outside the regions of the Thames and Hampshire, but extensive volcanic activity took place in the extreme west of Scotland and in northern Ireland. A great radial system of dykes, known as a **dyke swarm**, developed with the Isle of Mull as its centre. Many of these dykes reached the surface, forming extensive fissure eruptions. Some of them extended outwards as far as eastern Scotland and northern England. One, the **Acklington Dyke**, cuts through the southern margin of the Cheviot lavas and can be traced eastwards as far as the village after which it is named. These dykes are dolerites, similar in composition to those of the whin. They are almost indistinguishable from one another in the field.

CHILL WINDS FROM THE NORTH

The final moulding of hill and valley was achieved by the great glaciers which moved southwards across the region at the beginning of

the **Ice Age**. The Ice Age began about a million years ago and while it lasted there was a number of warm and cold phases. The latest of these cold phases ended about 25,000 years ago. Only rarely in the geological history of the earth has the climate been cold enough to cause the formation of ice fields even across the polar regions.

With the lowering of temperature that heralded the coming of the Ice Age, snow began to accumulate over the poles and over the high ground of northern Europe and America. Thickening deposits of snow caused its lower layers to become compressed and transformed into solid ice. This ice flowed out from the centres of snow accumulation, over the polar regions and down from the heads of steep valleys high up in the mountainous areas of the world, and eventually blanketed Scandinavia, the Low Countries and northern Germany. The continent of North America was covered as far south as the Great Lakes and, in Britain, ice lay across all Scotland and the northern counties of England and almost as far south as the Thames.

Northumberland became submerged beneath a great glacier from the Scottish Highlands, and the broken debris, torn up and dragged along by the moving ice, worked like a giant file against the surface rock, now swept clean of soil and vegetation. This debris often produced grooves in the harder rock over which it passed. These grooves are known as **striae** or **striations**. Occasionally, when the surface of the whin sill is stripped clean before a new quarry is opened for road metal, these striae can still be clearly seen.

As the ice advanced, shales were scooped up in its path, but the more resistant rock (like the whin sill and other igneous bodies) withstood better the erosive process. This led to the formation of the so-called glacial features which are so well developed over the higher ground of Northumberland (Fig. 2h and Fig. 14).

When the ice finally melted (**retreated** is the technical term), vast deposits of powdered rock and fragments of rock, described as **boulder clay**, remained behind. It filled valleys and changed rivers' courses. In some areas the boulder clay became moulded by the ice into great hummocks and hollows, 100 yds. across and as many feet in height. These are described as **drumlins**, forming what is known as **basket-of-eggs topography**.

In the broad plains between the Cheviot igneous area and the Fell Sandstone ridges, " stagnant " ice still blocked the seaward passage of the rivers which had once more begun to flow. Lakes were formed whose levels rose until they flowed over into adjacent valleys, carving deep gashes in the solid hillsides. These are described as **glacial drainage** or **overflow channels**, many of which occur round the eastern slopes of

the Cheviots. The deepest channel of all, the Powburn channel, cuts through a sandstone scar, providing an easy passage for the Newcastle-Wooler road and, formerly, for the Cornhill railway (Fig. 40).

The boulder clay lies thin over the hills, but thick across the lowland areas of south-east Northumberland. It has smothered many ancient river channels, whose courses have been subsequently discovered during mining operations. Along the Tyne, great ridges of **moraine**, composed of clay, boulders and sand, piled up wherever the melting front or **snout** of the occupying glacier lay. One such morainic ridge lies across the valley east of Hexham, near Riding Mill. Until recently, the Newcastle-Carlisle railway ran in a tunnel through it. Another similar moraine stretches across the North Tyne, just north of Acomb.

Outcrops of boulder clay can be seen along the shores of Northumberland, especially at the northern end of Whitley Bay sands, and at many points further north. At Howick, for example, below Seahouses farm, thin bedded sandstones dip seawards in the cliff. The uppermost six feet of these sandstones has been thrown into a disturbed mass of rock by the power of the ice moving over it. Above this disturbed mass lies the boulder clay, lying just as it was deposited—a clear example of the twin effects of ice erosion followed by deposition (Fig. 37).

Not only can the direction of ice movement be plotted by means of the rock striations, but also the area from which the ice began its journey can be determined by examining the contents of the boulder clay. For example, because rock from the Lakeland hills is found in the boulder clay of Northumberland and Durham, it may be concluded that ice from the Lake District streamed through the Tyne and Stainmore gap. Similarly, the predominance of Cheviot rock in the boulder clay of mid-Northumberland indicates that a Cheviot glacier must have moved south-east.

Since the retreat of the ice from Northumberland and the Borders, there has been little change in the topography of the region. Nevertheless, the removal of the great weight of ice, by melting, has caused the land to rise in places and this in turn has caused the rivers to cut more deeply into their valleys, often into or even through the boulder clay which had been deposited in them. This material was carried away down the valleys and redeposited in the form of gravel beds. These post-glacial deposits are known as **Recent** or **Holocene**, while the boulder clay itself is assigned to the system of rock described as the **Pleistocene** or **Glacial** (Fig. 3). The era during which these systems were laid down is known as the **Quaternary**.

Subsequent uplift of the land has often caused the rivers to cut down through their own gravel deposits. The remains of these gravels

are sometimes preserved along the margins of the valleys and are known as **river terraces**. In south Northumberland, this is nowhere better demonstrated than in the Tyne valley at Hexham, where two such terraces can be seen—at railway level and at the level of Hexham town itself.

The last chapter of the history of the Ice Age has still to be written. If the ice over the poles and in the mountainous regions of the world should finally melt away, the configuration of the coastlines would be altered beyond recognition. The level of the oceans and seas of the world would, it has been established, rise about 100 ft. through the addition of melt-waters from the ice fields. For example, the sea would encroach over Northumberland westwards to Wallsend and from thence north to Backworth, continuing northwards to Warkworth and so on, forming a great estuary up the Tweed valley. If, on the other hand, the full rigour of the Ice Age should once more come upon the world, much, if not the whole of Britain might once more be scraped clean of the works of man, of forests and grassland, of the fertile soil upon which so much of man's activities depend.

But we need not be unduly concerned. We shall have warning. The change will not come suddenly, nor will it be complete within 20,000 years !

III REFLECTIONS OF THE ROCKY FOUNDATION

THE SCENERY

Northumberland affords a splendid illustration of the way in which the **topography**, that is the configuration of the ground, is influenced by the underlying solid rocks. No rock can indefinitely resist the processes of erosion—but some varieties are more resistant than others. In general, igneous rocks withstand the wearing effect of ice, wind, river and sea better than sandstones and limestones, while sandstones and limestones are themselves far more durable than beds of clay or shale.

This can be seen along the Northumbrian coast-line. Every promontory owes its origin to hard rock ; every bay to the presence of softer sediments easily attacked and removed by the action of the sea. What the coastline can illustrate with dramatic effect, the configuration of the country inland can show also, even where soil and vegetation cover the outcrop of the solid rock.

Plate 1 is an attempt to indicate the dependence of topography upon the rocky foundation over Northumberland and the Borders (as far south as the Tyne). It shows Northumberland viewed from an

unusual angle, the north-west—the only position from which the cliffs and scarp features can be clearly shown by appropriate lighting. On this photograph, as mentioned on page 5, the main viewpoints have been indicated by triangles, and these also appear on the accompanying geological map (Plate 2) with the names of the hills they represent. Since the photograph is oblique its scale decreases to the south. This is indicated on the map which is based upon a tracing of the photograph. On it, only the broad geological divisions, the main faults and the regional dips have been included. The order of deposition, the positions of the unconformities and the relationship of igneous to sedimentary rock are shown in the stratigraphical column in the bottom right hand corner of the map. The key to the geological symbols has been inserted above the column.

The rock formation of Northumberland is like a vast multi-layered sandwich cake which has been punched strongly upwards near its north-western boundary, and depressed to the east and south (Fig. 25). The layers of this earthy cake, represented by sedimentary rocks, tilt away, therefore, from the centre of this punched-up area. The dip arrows on Plate 2 indicate the direction of this downward tilt. The ground to the north-west, where the uplift was greatest, must, initially, have been much higher than it is today. However, its level has been reduced by the wearing away of the overlying sedimentary rocks, finally revealing the more durable igneous rocks, the Cheviot rocks, beneath (Fig. 2h).

The sedimentary rocks themselves, as described above, are by no means of uniform durability and, therefore, give rise to marked variations in the configuration of the land. These variations are reflected in the topography, as can be seen by comparing Plates 1 and 2. The rock groups of Northumberland are described below in order of decreasing age.

The Cheviot igneous massif. The Cheviot Hills form the wildest and most inaccessible area of Northumberland and the Borders. The rock of which they are made is entirely igneous, providing a surface of about 400 sq. miles. The granite stock forms the highest ground, including Cheviot itself (2,676 ft.) and the adjacent hills of Hedgehope (2,348 ft.), Comb Fell (2,132 ft.) and Dunmoor (1,880 ft.). The surrounding lava country has an average height of around 1,500 ft., though Windy Gyle, Bloodybush Edge and Cushat Law each rise to over 2,000 ft.

The granite provides uniformly high heather land. Although generally covered by peat, the granite (and especially the adjacent lava

within the aureole) forms a number of striking tors. Of these, Coldlaw Cairn, Great Standrop and Little Standrop on the south and Dunmoor Hill and Long Crags on the east are the most prominent. Within the circle of these rocky crags, embracing 30 sq. miles of windswept moor, there are less than half a dozen hill-shepherds' cottages. The crags formed from the lava immediately surrounding the granite (see page 16) include Auchope Cairn on the west, Hanging Stone on the south, Langlee Crags on the east and the Schil on the north.

The lava country is a plateau deeply dissected by numerous streams. Hillsides are steep and the hills themselves have rounded summits. Occasionally, the long dip slopes of the easterly-tilting lava flows can be seen, as at Alwinton (Fig. 39). The lavas produce a soil with more lime than that derived from the granite and they support coarse bent and bracken, but no heather. The valleys are warm and sheltered in summer, but in winter the snow may drift deep from January to March.

The minor intrusions which cut both lava and granite are seldom seen clearly on the ground. The most notable exception is Raker Crag, as described above (Fig. 28). The pink felsite dykes, which are numerous in the valleys of Coquet and Alwin, are generally exposed only in the beds of the streams.

The drainage of the Cheviots is radial and the elongated watershed includes the ridge from Cheviot itself to Thirl Moor. From almost any point on that ridge, the view encompasses the whole of south-east Northumberland on the one hand and, on the other, the rich country of the Scottish borderlands. The Cheviots fall away abruptly towards the plains of Tweed, Till and Coquet and only in the south-west, beyond Catcleugh, do they merge with the high ground formed of sedimentary rocks.

The Cementstone Group. The soft shales and thin sandstones of the Cementstones form the low country surrounding the Cheviot Hills on every side except the south-west. Because this succession of rock is easily eroded, it forms the low-lying ground across which the main rivers of the region (the Tweed, the Till and Breamish, the Aln and the Coquet) slowly flow, often in a winding course or **meander belt**, towards the sea. Frequently, the solid rock is covered by boulder clay and in the district south of Wooler, drumlins are common. Unlike the igneous uplands which it surrounds, the Cementstone country is marked by hedges, trees and cultivated hills.

Much of the Cementstone country is ill-drained. Twice yearly, with melting snows and August rains, rivers may overflow their banks,

so that the old glacial lake of Milfield Plain, below Yeavering Bell, may once again (although only temporarily) become a sheet of water.

The Fell Sandstone Group. The country of the Fell Sandstones contrasts markedly both with the Cheviot uplands and with the Cementstone lowlands. Since the Fell Sandstone Group is composed almost entirely of sandstone with extremely little shale, it weathers to a poor sandy soil and the high ground which it forms is almost invariably left uncultivated. This thick sandstone provides high scars facing inwards towards Cheviot, with long gentle dip slopes (like those formed by the whin sill in Fig. 14) tilting outwards to the sea and towards the Tyne Valley. These scars appear in shadow on the photograph (Plate 1) and can be traced right across the county. From Berwick to Wooler they trend in a south-westerly direction, while east of Wooler they are repeated by the fault which is associated with the Holborn anticline and they form successively the Kyloe Hills, Ros Castle, Titlington Mount, Corby Crags, Simonside and the crags above Harbottle. Beyond these they produce a series of prominent outcrops between Coquet and Rede and then the high country above Carter Bar, including Peel Fell and Christianbury Crag. Finally, they are overlain south of Bewcastle by the Trias Sandstone.

The Fell Sandstones form heathery, craggy, angular topography in marked contrast with the rounded outlines of the grassy Cheviot lavas. Outcrops are numerous and most of the rock surfaces show current-bedding (Fig. 9). From the Fell Sandstone scarps there are expansive views across the Cementstone country to the Cheviot Hills, especially from Ros Castle, Corby Crags, Simonside and Harbottle crag. The panorama from Corby Crags (Fig. 40) is especially good, for it shows the distant Cheviots with the low Cementstone country (Whittingham Vale) in the foreground, stretching to the middle distance ; while overlying the Cementstones, the Fell Sandstones can be seen forming Callaly Crags (dipping south) and Titlington Mount (dipping east). Far to the west, from Christianbury Crag and Peel Fell on the Scottish Border, views of the whole of south-west Northumberland are the reward for the climber who struggles up through the heather.

The Scremerston Coal Group and Limestone Groups. The Scremerston Coal Group overlies the Fell Sandstones. Before the development of modern transport its thin coal seams were worked in small drift mines on the dip slopes of the Fell Sandstone. Until recently, there were shepherds living in the remote valleys of Coquetdale who could recall the days when coal was carried in sacks on the backs of ponies

along the " Swire " from a pit high above Harbottle Lake.

Sandstones of the Fell type are found in the Scremerston succession (page 22) and occasionally they also form areas of heather moorland. But there is no other sandstone formation in Northumberland which has the persistence and the thickness of that of the Fell Sandstone Group. However, in the Limestone Groups, both the Ottercop Sandstones (page 24) and the Ingoe Grits (page 24) provide areas of moor reminiscent of the more extensive Fell Sandstone country. The Ottercop Sandstones are responsible for the high dip-and-scarp moor which stretches southwards from the Ottercops themselves to the Wannies. Of the many crags shaped by these sandstones, Great Wannie, with its scarp facing north-west and its long dip-slope falling towards Sweethope Lough, is the most notable.

The Ingoe Grits form the more isolated crags of Rothley, Shaftoe and Ingoe, each with its dip-and-scarp features clearly seen. In addition, there is a group of thick sandstones north of Winshiels in the Roman Wall country which forms prominent crags, while eastwards, above the Whin Sill in the Upper Limestone Group, there are also occasional " knots " of sandstone which form high ground such as the Longhorsley moors, Harlow Hill and Whittington Fell.

The most persistent feature in the Limestone Groups is the Great Whin Sill itself. Although in the far north of the area it occurs within the Fell Sandstones, over the greater part of its course it is intruded into the Middle or the Upper Limestone strata. It forms the bluffs on which the castles of Bamburgh and Dunstanburgh stand, while the Farne Islands, and the two-mile stretch of coastline from Dunstanburgh to Castle Point, are composed entirely of whin. In this area, the sedimentary rocks (and thus the whin) dip at low angles towards the sea. The hard upper surface of the whin forms a gently east-dipping platform, which at Castle Point has been upfaulted. It is on this higher portion that Dunstanburgh Castle itself stands (Fig. 38).

South of Longhoughton, the whin forms the prominent crags of Ratcheugh but, thereafter, it becomes thinner and no strong feature occurs until the crags of Thockrington, Bavington, Swinburn, Gunnerton and Barrasford are reached, beside the North Tyne. From the high ground above Humshaugh, to Greenhead on Northumberland's western border, the whin sill is responsible for the great crags of Sewing Shiels, Winshiels and the Nine Nicks of Thirlwall. In this area, because of the general swing of the Carboniferous rocks round the Cheviot centre, the beds dip south, and the whin forms long dip slopes descending towards the South Tyne (Fig. 26).

Millstone Grit and Coal Measures. These two formations, composed predominantly of shale, produce few features worthy of note, but occasional thick lenses of sandstone, especially in the Coal Measures, form the few low hills in south-east Northumberland. These hills were probably much more prominent before the glacial boulder clay levelled off the depressions and valleys. Before the days of piped-water, these sandstone rises provided the only sources of local water-supply, and many villages—e.g. Earsdon, Old Hartley, Backworth, Chirton, Cramlington, Killingworth and Benton—were built on them.

THE RIVER PATTERN

Folding and faulting can influence the drainage pattern of an area quite as much as the distribution of hard and soft rock. In the case of Northumberland and the Borders, all these factors have played a part in the development of the river systems.

As already described, the great resistant mass of the Cheviot Hills is responsible for the drainage pattern of that area. All the main rivers on either side of the Border rise at, or near, Cheviot itself. Generally they follow a winding path towards the low-lying Cementstone country, but occasionally they become diverted along depressions formed by pre-existing fault-lines. The Harthope Burn is a good example of this ; it pursues a very straight course north-east from Cheviot towards Wooler along a fault which has probably cut the Cheviot granite in two. There are numerous other examples, though on a smaller scale, within the igneous area.

On the eastern side of the Cheviot massif, the seaward course of the rivers has been blocked by the high Fell Sandstone scarp which eventually dies out round the pitching northern end of the Holborn anticline. Only the Coquet and the Aln have succeeded in cutting a path eastwards (along fault-lines, incidentally) through this barrier. The Breamish, with its northern tributaries, is deflected northwards, parallel to the Fell Sandstone scarp, becoming known as the Till before it enters the Tweed, ten miles south-west from Berwick. Between Alnmouth and Berwick, therefore, the only water-courses which enter the North Sea are the small streams which drain eastwards off the long dip slopes of the Fell Sandstones.

In mid-Northumberland, the main rivers follow the general dip of the rock, but near Otterburn the path of the Rede changes abruptly through a right-angle, while that of the North Tyne is similarly deflected at Chollerton, north of Whittington Fell. These are both good examples of **river-capture**. The Rede formerly flowed eastwards to enter the sea via the Wansbeck, while the North Tyne at Chollerton used to flow

through the gap now occupied by the Erring Burn, to reach the sea as a tributary of the Blyth. It was the vigorous backward erosion of the then small tributary of the Tyne (now forming the lower reaches of the North Tyne) which caused the " capture," successively, of the head-waters of the Blyth and Wansbeck.

In the southern part of Northumberland, the course of the main Tyne and of the South Tyne in the Hexham area is almost certainly governed by the west-east depression created by the Tertiary earth-movements along the line of the **Stublick** and **Ninety Fathom faults**. These faults separate the Northumbrian Trough from the high eastward-dipping plateau which forms County Durham, and which is generally known as the **Alston block**.

The rivers of Northumberland flowed along their present valleys long before the onset of the great Ice Age. The piling-up of debris by ice, and the movement of the ice itself, caused certain streams to be deflected and created temporary lakes. These were minor changes, however, in a developing river system whose pattern had been established many millions of years before.

IV EVIDENCE FROM THE DEAD

Even by Old Red Sandstone, Carboniferous and Permian times there were still many forms of life which had not yet appeared upon the earth. Creatures with backbones, including fish and reptiles, were becoming more abundant, but the mammals, from which man himself is the latest to evolve, were still two hundred million years away. Carboniferous times were marked, not only by an abundance of vegetation, but also by a great increase in the variety of sea-living creatures, of shellfish and corals.

Since the bulk of the deposits which were laid down in the Northumbrian region were muddy or sandy, conditions were generally unfavourable for life. However, during the intervals of time when sand and mud ceased to be brought down from the adjacent northern land-mass (it is assumed through lack of rainfall), the sea-water became clear and, as has been explained (page 6), life flourished. Evidence for the existence of these creatures of the past is preserved in the rocks in the form of **fossils**.

ORIGIN OF FOSSILS

The process of fossilisation is a slow one. When a shelled creature dies, its soft parts rapidly dissolve away, while the hard shell becomes covered by mud as it lies on the sea-bed. In time, the mud becomes

compacted and hardened into clay, forming a **mould** around the shell. Solutions within the clay may later dissolve the lime of the shell, leaving a cavity whose clay walls bear the exact imprint of its surface—with muscle-scars, lines of growth and decorative ridges all perfectly reproduced : so it may remain. More often, however, the cavity may become occupied by some natural substance like iron oxide, lime or silica which, at a much later stage, percolates as a solution into the fossil-bearing rock, filling up the moulds and forming solid **casts.**

Two other ways in which fossils are formed are by chemical replacement and by carbonisation. **Chemical replacement** involves slow chemical change in the substance of the shell in such a way that its pattern remains unaltered. This is commonly found in limestones, and again provides a record of the most delicate structures in the shell. **Carbonisation** is a process associated with plant remains in which the nitrogen, oxygen and hydrogen in the original material is driven off, leaving a concentration of carbon. This process not only preserves the patterns on the bark of ancient trees, but also the most delicate veining of their foliage.

Use of fossils. In the world today, different forms of life are adapted to specific climatic conditions ; the polar bear to high latitudes and the ape to the tropical forests, the cactus to the hot desert and the pines to cold temperature regions. The same is true of life in the past. Using his knowledge of the environments under which creatures of the past lived the **palaeontologist** (that is the geologist with a special knowledge of living as well as fossil organisms) can reconstruct past climates.

More important is the key which fossils provide for the age of the sedimentary rocks. Throughout the history of the earth since life began, new forms of living organisms have been evolving and old forms dying out. The shells that were trapped all over the world in the sediments of Carboniferous times were very different from those of the Cambrian, while the gigantic creatures, whose fossilised bones are found in the Jurassic rocks, vanished from the earth long before our present era began. In short, rocks of the same age contain the same fossils. By detailed analysis of fossil remains, the palaeontologist can work out the **stratigraphy** (the succession of rocks in the order in which they were deposited) of any series of sedimentary rocks as it occurs on the surface or as it is encountered in boreholes. He can prove, for example, that the coalfield of New South Wales is of the same age as that of Northumberland ; that the chalk cliffs of Dover date from the same period as those of the Sinai desert. Such information

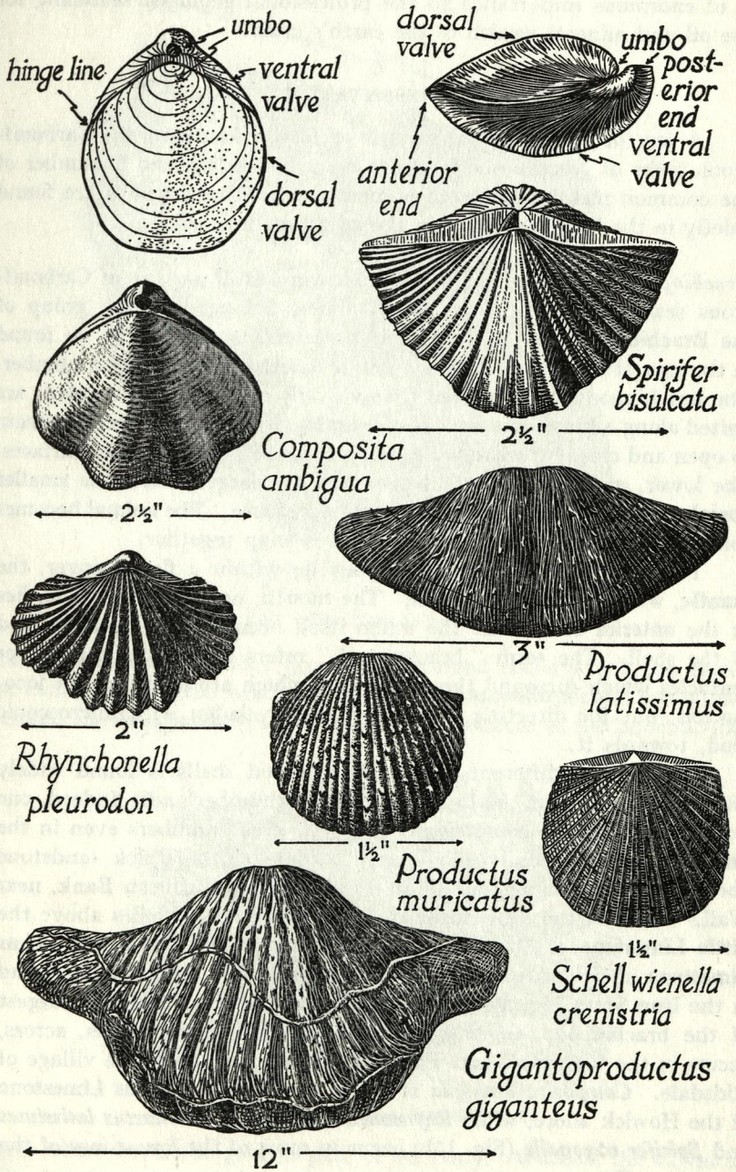


FIG. 15a. A group of local brachiopods

is of enormous importance to the professional geologist searching for the oil and mineral wealth of the earth's crust.

LOCAL REPRESENTATIVE FOSSILS

A few of the principal groups of fossils found in the Carboniferous rocks of Northumberland are described below and a number of the common members of each is mentioned. These groups are found chiefly in the limestones and in the adjacent limy shales.

Brachiopoda. Certain shellfish, which were as abundant in Carboniferous seas as is the oyster in our times, belonged to the group of the **Brachiopoda** (Fig. 15a). Their descendants are still to be found in the seas of today, but are far more restricted in type and in number. The brachiopods are **bi-valved** (two-valved) creatures. The valves are united along a **hinge-line** next to the **umbo** or beak, which enables them to open and close by means of muscles attached to their inner surfaces. The lower, or **ventral** valve, is generally the larger, while the smaller **dorsal** valve covers the upper part of the creature. The animal becomes completely enclosed when the two valves snap together.

The soft parts of the brachiopods lie within a fleshy cover, the **mantle**, which secretes the shell. The mouth, opposite the umbo, lies at the **anterior** end, while the umbo itself occupies the **posterior** end of the shell. The term " brachio-pod " refers to the " arm-feet " or tentacles which surround the mouth and which are used, not for locomotion, but for directing currents of water, laden with microscopic food, towards it.

A number of different types of brachiopod shells is found widely scattered throughout the limestones of Northumberland. Indeed, one form, ***Schellwienella crenistria***, is found in great numbers even in the **limonite**-stained beds (yellow iron oxide) of the thick sandstone above the Great Limestone formerly quarried at Brunton Bank, near Wall. Shells of the same form are also found in the shales above the **Little Limestone** at Ratcheugh, near Alnwick, and above the **Lickar Limestone** at Seahouses, near Howick. ***Productus muricatus*** is found in the **Iron Scars Limestone** of the Howick Bay area, while the largest of the brachiopods, ***Gigantoproductus giganteus***, up to 12 ins. across, occurs in the Redesdale and **Fourlaws Limestone** above the village of Ridsdale. ***Composita ambigua*** is found in the **Sugar Sands Limestone** of the Howick shore, while ***Rhynconella pleurodon, Productus latissimus*** and ***Spirifer trigonalis*** (Fig. 15b) occur in most of the limestones of the Limestone Group.

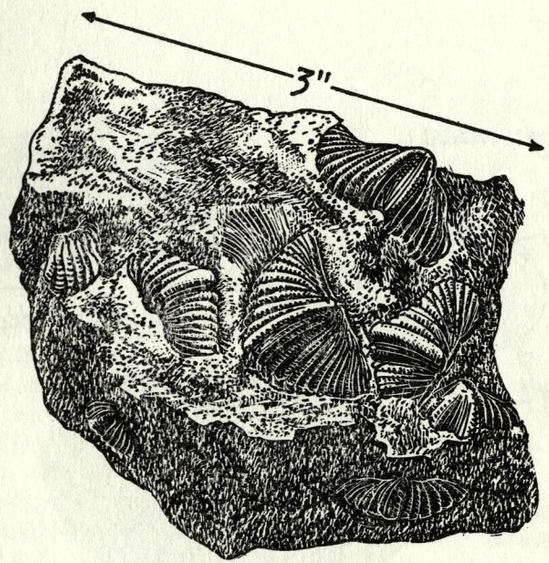


FIG. 15b. Brachiopods in limestone

Lamellibranchia. Another group of bi-valved shells which can easily be confused with the brachiopods are the **Lamellibranchia**, sometimes termed the **Pelecypoda** (Fig. 16a), so called because of the lamellae-like

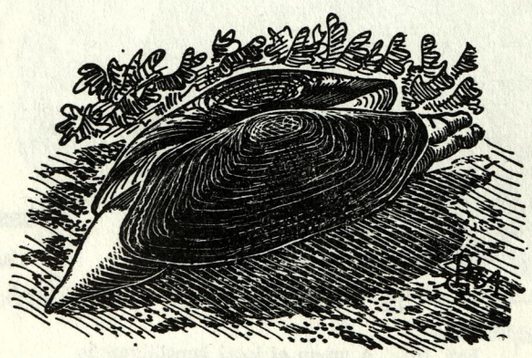


FIG. 16b. A living lamellibranch

gills which cover the greater part of the body. Whereas the valves of the brachiopods are generally unequal in size and are symmetrical

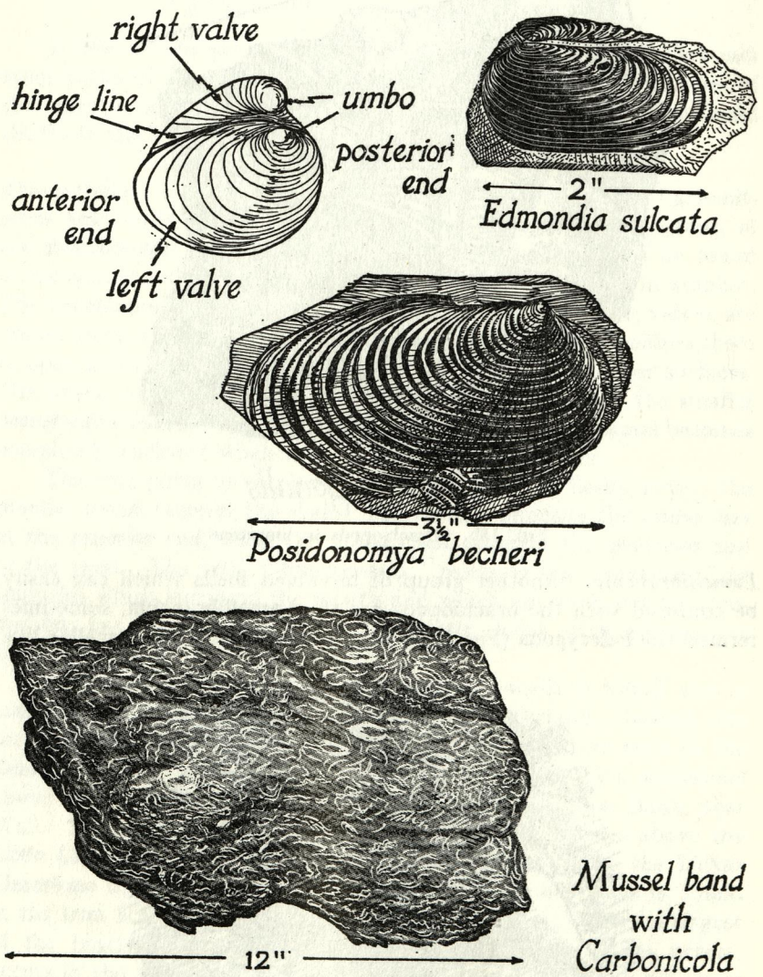


FIG. 16a. A group of local lamellibranchs

about a plane cut through the centre of each, those of the lamellibranchs are usually of the same size and are mirror-images of one another. The umbo generally points towards the anterior end of the animal and the shell is symmetrical about a plane cut along the junction of the two valves, which are termed **left** and **right**. As with the brachiopods, the soft parts of the body are surrounded by the mantle which secretes the shell. The modern oysters and the enormous clam shells belong to this group (Fig. 16b).

In the Carboniferous limestones, the commonest members of the group are ***Edmondia sulcata*** in the **Corbridge Limestone**, near the village of that name, and ***Posidonomya becheri*** from the shales above the Oxford Limestone north of Beadnell Bay. A fresh-water form, ***Carbonicola***, is found in abundance in certain shale bands of the Coal Measures, forming the so-called "**mussel bands.**" One of them is well exposed on the shore north of St. Mary's Island and is illustrated in Fig. 16a.

Gastropoda. The group of creatures termed the **Gastropoda** (Fig. 17a) are related to the lamellibranchs. They possess **univalved** (single-valved) shells and include the modern snails and slugs. The term "gastro-pod" literally means "belly-footed," so named because the

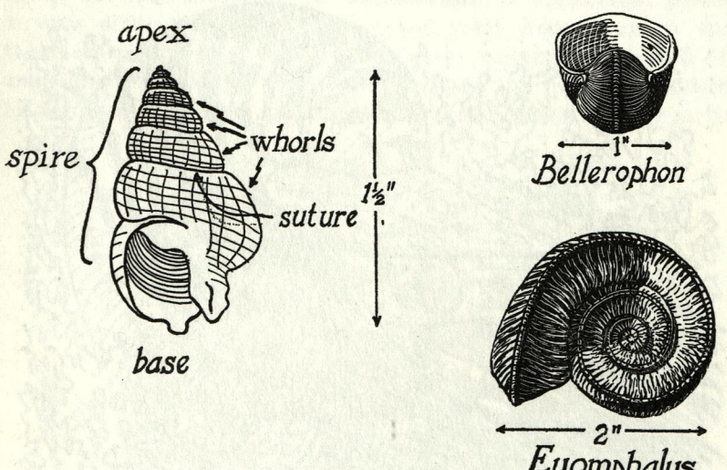


FIG. 17a. Local gastropods

ventral surface of the animal is flattened and is used for locomotion (Fig. 17b). The shell of the Gastropoda is in the form of an

expanding tube, usually coiled in a **spire**. The top of the spire is termed the **apex** and the wide, open end is the **base**. The line of junction between adjacent coils of the shell is described as the **suture**. The animal lives at the wide, open end of the tube which it carries on its back and into which it can retreat in the face of danger. It is a more advanced type of organism than either the Lamellibranchia or the

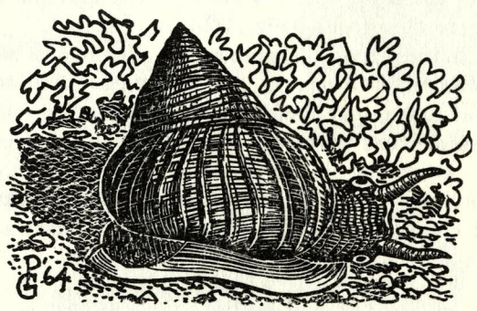


FIG. 17b. A living gastropod

Brachiopoda in that it possesses a distinct head with a well-developed nervous system. ***Euomphalus*** and ***Bellerophon*** are two members of

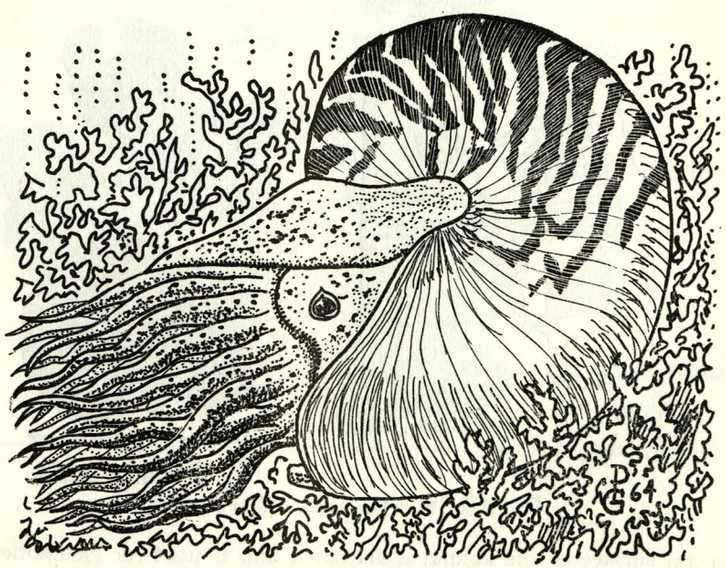


FIG. 18a. Nautilus, a modern cephalopod

the group which are found in the **Foxton Limestone** at its outcrop near Foxton Hall, north of Alnmouth.

Ammonoidea. The **Cephalopoda**, a term which means " head-footed," includes all the modern squids and cuttle-fish (Fig. 18a). The overwhelming preponderance of these organisms are naked forms, without

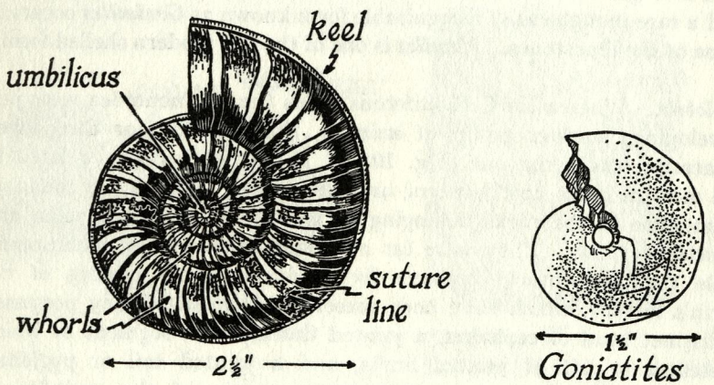


FIG. 18b. Ammonites

shells, but their ancestors the **Ammonoidea**, or ammonites, possessed a very distinctive shell which is of great importance in dating the rocks of the Jurassic and Cretaceous systems. The shell of an ammonite (Fig. 18b) is generally coiled in a flat plane and is divided by numerous partitions into **chambers**. The junction of each partition

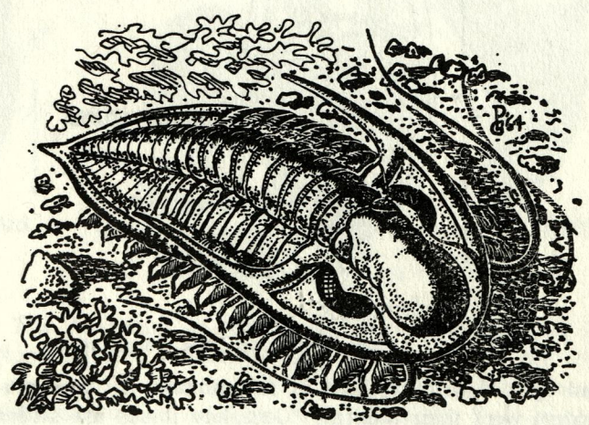


FIG. 19a. Restoration of a Carboniferous trilobite

or **septum** with the inside of the shell wall is described as the **suture line** and its pattern forms a reliable basis in the classification of these animals. As with the Gastropoda each revolution of the tube of the shell is termed a **whorl** and the depression in the centre is described as the **umbilicus**. Often the outside rim of the shell is provided with a **keel** or ridge. In Carboniferous times these creatures were just evolving, and a rare though easily recognisable form known as ***Goniatites*** occurs in some of the limestones. ***Nautilus*** is one of the few modern shelled forms.

Trilobita. Whereas in Carboniferous times the Ammonoidea were just developing, another group of animals, the **Trilobita**, or three-lobed creatures, was dying out (Fig. 19a). The trilobites were related to the modern crabs and lobsters, and their fossil remains are found in abundance in the rocks belonging to the Cambrian, Ordovician and Silurian systems. They were far more advanced in the evolutionary scale than any other creatures living during these periods of the earth's history, which have been preserved as fossils. They possessed a distinct head or **cephalon**, a jointed **thorax**, each segment of which possessed a pair of jointed limbs, and a jointed tail or **pygidium** (Fig. 19b). In some types the outer margin of the cephalon is extended backwards to form the **genal spine**. Their magnificent

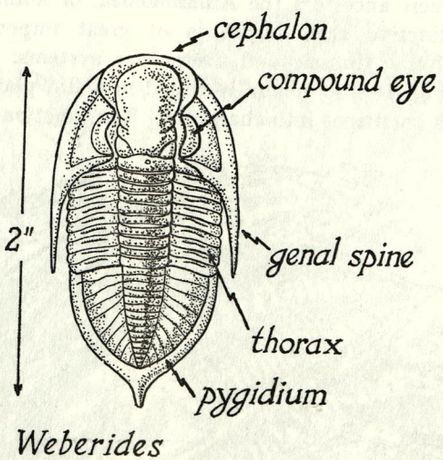
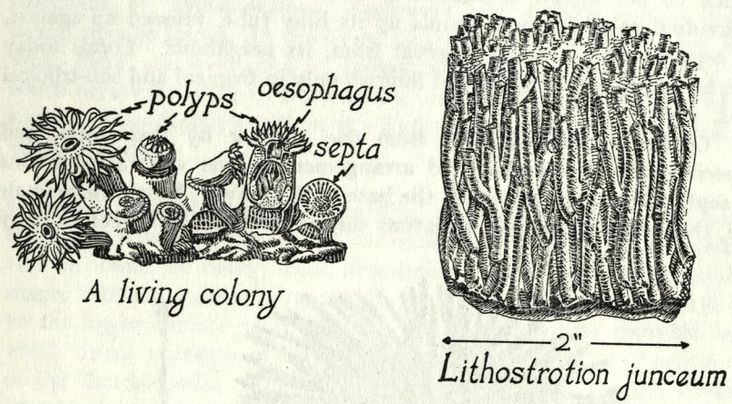


Fig. 19b. A Carboniferous trilobite, dorsal view

compound eyes resembled those of the modern fly, and muddy and sandy waters were their habitat. Complete fossils are seldom found in the Carboniferous rocks, but partially preserved specimens of

Weberides, especially the pygidia, occur in the shaly portions of the Sandbanks Limestone immediately south of Cullernose Point. The diagram shows (Fig. 19b) a dorsal view of *Weberides*. Trilobites are also found in the shore outcrops of the Lickar Limestone below the farm of Seahouses, beside Howick.



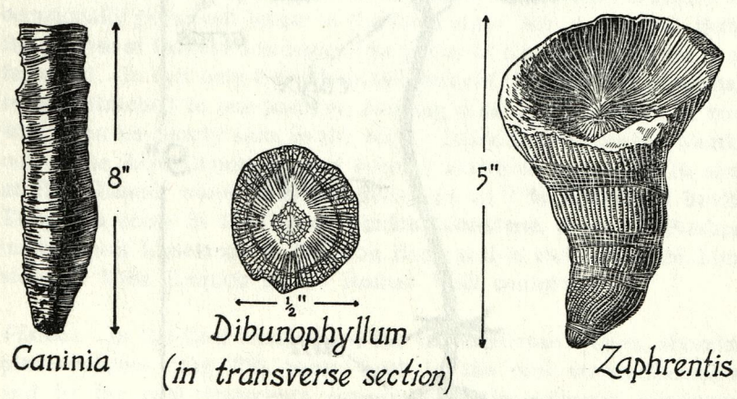


Fig. 20. Carboniferous corals and a living colony

Corals. The **Anthozoa** or coral group is well represented in some of the Northumbrian limestones (Fig. 20). Many of the corals are colonial organisms. They belong to the animal sub-kingdom known as the **Coelenterata**, or creatures with a sac-like body-cavity. The mouth of the cavity narrows upwards into a restriction called the

oesophagus or throat, and is surrounded by tentacles. The walls of the sac are made up of two layers : an inner layer which digests food and an outer which secretes the skeleton of the coral.

While many members of the Coelenterata are grouped in colonies, some live singly, and they include such animals as the sea-anemones which do not secrete a calcareous shell. In the colonial forms, each individual **polyp** (animal) builds up its limy tube, pressed up against, or separated by a small interval from, its neighbour. Corals today live at or near water-level, and flourish only in tropical and sub-tropical seas.

Corals are distinguished from one another by their form, and especially by the number and arrangement of the vertical partitions or septa which are secreted at the base of the polyp. When the animals die, their hard calcareous skeletons survive to form coral reefs. Many

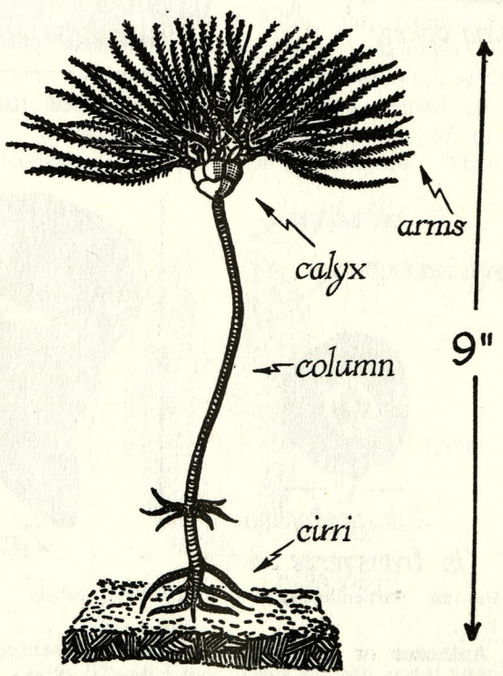


FIG. 21. A living crinoid

examples of these fossilised reefs occur in the limestones of Northumberland. In order to identify a coral accurately, a section is cut across

its length and the surface is polished so as to show up the pattern of the septa.

A variety of coral forms can be recovered from the limestones of Northumberland. From a quarry in the **Four Fathom Limestone** (=Sandbanks of Cullernose), north of Crindledykes near Bardon Mill, specimens of ***Dibunophyllum***, ***Zaphrentis*** and ***Caninia*** (single polyp forms) may be found. In the Great Limestone quarry at Brunton, near Wall, there are specimens of ***Lithostrotion junceum*** (a colonial form) which occurs not only in this locality, but also in the **Five Yard Limestone** of Moss Kennels and in the Redesdale and Fourlaws Limestone above Ridsdale.

Crinoidea. **Crinoidea** or sea-lilies (Fig. 21) were common in Carboniferous seas whenever conditions favoured their growth ; their remains can be found in many local limestones. Crinoids have a cup-like shape, with the animal lying within the cup or **calyx**. The mouth lies on the upper surface of the cup and is surrounded by **movable arms** which direct currents of water downwards, as with the " arm-feet " of the Brachiopoda. The calyx is supported by a flexible **column**, (**stem**) attached to the sea-bed by **cirri** or roots. The arms, the calyx and the stem are composed of calcite plates. The whole creature was occasionally preserved intact in the fossil state, but more often, before the process of fossilisation began, the plates of the calyx, and the arms, fell apart. In fact only the individual plates of the stem, the **columnals**, remain attached to one another, forming a string of a dozen or more which can be clearly seen in the rock. Individual columnals weather out of the Acre Limestone and become scattered about on the shore at Holy Island, where they are described as " **St. Cuthbert's beads.**" They also occur in the **Upper Foxton Limestone**, north of Boulmer, in the Great Limestone at Brunton Bank and in the Five Yard Limestone at Moss Kennels in the Roman Wall country.

Plantae. In the Coal Measures of the Carboniferous system, abundant plant remains (Fig. 22) occur, both in the coal seams themselves and in the coal fragments preserved in the adjacent sandstones. The lush vegetation which grew on the swampy, sheltered Carboniferous deltas was as prolific as that of the tropical swamps of the present time. However, many of the ancient forms of plant life have died out and have been replaced by others which did not exist then.

The modern horse-tail, belonging to the group known as the **Equisetales,** is a low-growing type of vegetation. Yet in Coal Measure times its ancestor was a tall, slender tree rising to a height of 50 ft.

or more. The best known of these is ***Calamites***, whose fossil remains are widely distributed. Another commonly-preserved tree, easily recognised by the diamond-shaped pattern of the **leaf cushions** (with the **leaf scar** at its centre, the point to which the leaf was attached) is ***Lepidodendron***, and yet another, with parallel ribbing, is ***Sigillaria*** (Fig. 22).

Occasionally, the foliage of the Coal Measure plants is preserved in iron carbonate nodules, as in the quarry at Crawcrook just across the southern border of Northumberland, in County Durham. Among them, ***Neuropteris*** is common. In these specimens the detailed pattern of the **frond** or compound leaf is beautifully preserved.

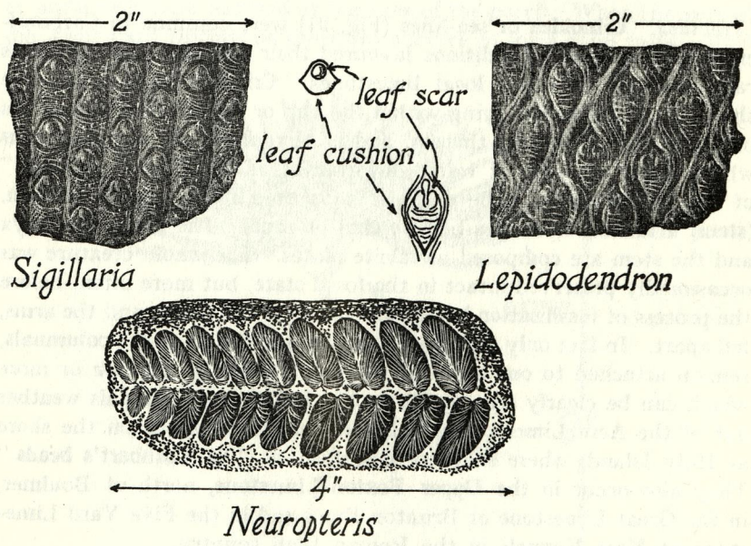


FIG. 22. A group of Carboniferous plants

Microfossils. In addition to the great variety of **macrofossils**, or large fossils, which are found in the sedimentary rocks from Cambrian times onwards, there are also vast numbers of **microfossils** which can be satisfactorily identified only with the aid of a strong hand-lens, or better, a microscope. The shells of these organisms are widespread in Carboniferous rocks and they increase in abundance in the later strata. Many of the creatures which provided themselves with these hard shells were primitive, jelly-like forms and almost infinitesimally minute. To the naked eye the smallest of them appears as a fine grain of dust.

In the Carboniferous rocks of Northumberland, two groups of microfossils are well represented, namely the **Foraminifera** and the **Ostracoda**. The " forams," as they are generally called, are single-celled creatures which secrete a shell or **test** in the shape of a tube which in the more advanced forms is divided into chambers. The tube may be straight or curved ; it may form a flat or an extended spiral. The ostracods, on the other hand, are creatures considerably more advanced in the evolutionary scale and are related to the **Crustacea**, which include the modern crabs as well as the ancient trilobites. Their shells exhibit much less variety of form, in that they are restricted to a simple, elongated shape. Even among these shells, however, there are many variations in detail which patient examination can reveal. Dr. J. E. Robinson, who has made a study of both the Foraminifera and the Ostracoda of the Carboniferous of Northumberland, writes as follows : " To many people, the study of microfossils is regarded as a modern aspect of palaeontology. But H. B. Brady, for example, wrote several papers between 1869 and 1880, dealing with Carboniferous Foraminifera and many illustrations in his ' Monograph of Carboniferous and Permian Foraminifera ' (1876) were of Northumberland specimens. Likewise, T. R. Jones in collaboration with J. W. Kirby, wrote some ten papers upon local Carboniferous ostracods between 1860 and 1890." Robinson continues :

" This literature was essentially descriptive, and it was left to later generations to apply the lessons of stratigraphical palaeontology to the recorded microfossils, using them in fact to identify particular horizons." (See page 42).

" Foraminifera occur in marine calcareous rocks, and are seen most readily in thin microscope sections of any of the limestones of the Limestone Groups. One notable exception, however, which is obvious in hand specimens, is the globular test of ***Saccaminopsis***." (Fig. 23). " Described originally by Brady from the Four Fathom Limestone of Elf Hills, near Cambo (1871), the tests either weather out as bead-like objects, or stand out against the dark fresh broken surface of the limestone by reason of the filling of clear white calcite. The occurrence of these fossils is the reason for the miners' name ' **spotted post** ' for the Four Fathom Limestone of Alston Moor. In the same limestone at Stagshaw Bank (in the quarry beside the A68 road, opposite to the Stagshaw wireless station) *Saccaminopsis* is again present, and indeed may occur in equal abundance in other limestones of Northumberland, as for example, in the Acre Limestone at Beadnell, at Howick, and in north Northumberland generally.

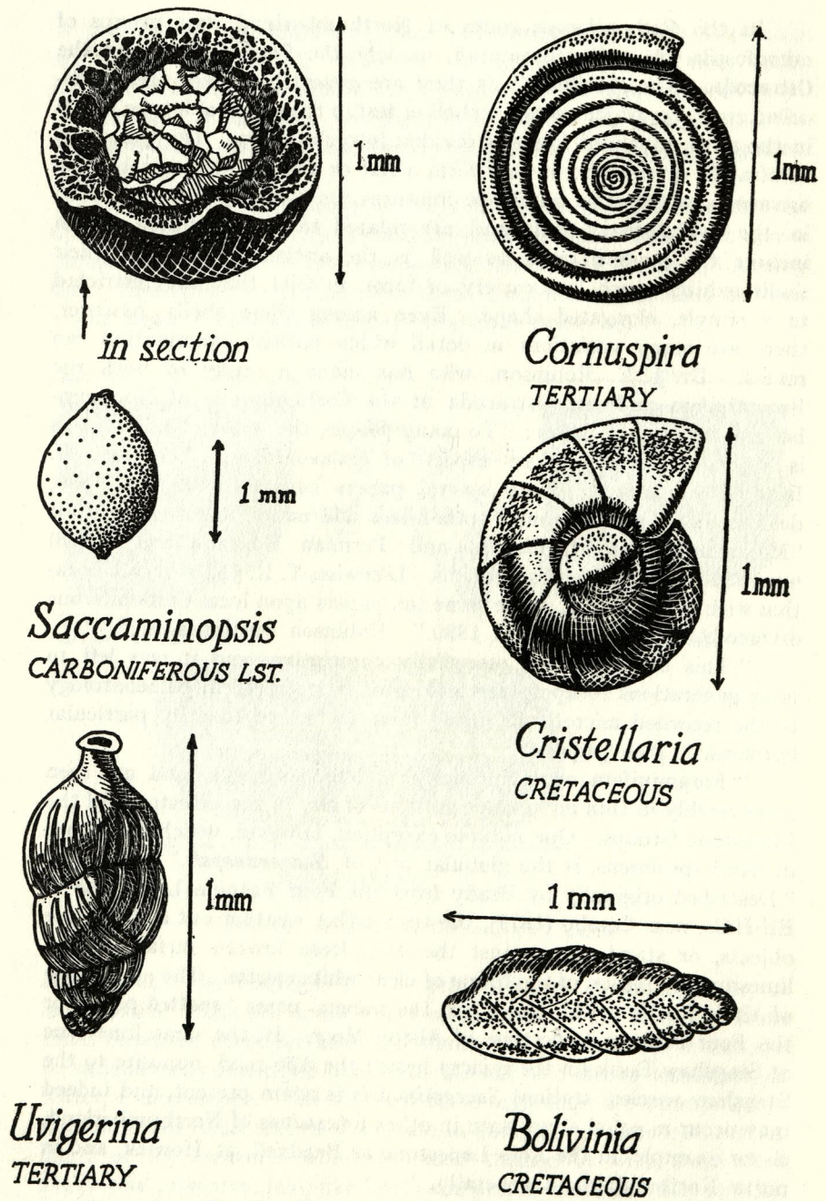


FIG 23. Some varieties of Foraminifera.

" Ostracods occur in abundance in a wide range of rock types and may either be marine or non-marine in origin. In Northumberland, they are most clearly visible in the Cementstone shales and limestones, where they may be strewn upon bedding planes in great abundance. Good exposures of such occurrences are to be found on the banks of the Tweed east of Coldstream Bridge, where '**entomostraca**' (an old name for Ostracoda) were recorded by Winch (1831) and by the Geological Survey. Similar occurrences are to be found to the west in Peel Burn, near Deadwater, north of Myredykes.

" In the Scremerston Coal Group, ostracods are found in abundance in the roof of the Plashetts Coal (at Plashetts near Kielder) in the Falstone Burn and in the Tarset Burn at the Comb. High in the succession, in the Coal Measures, what are considered non-marine

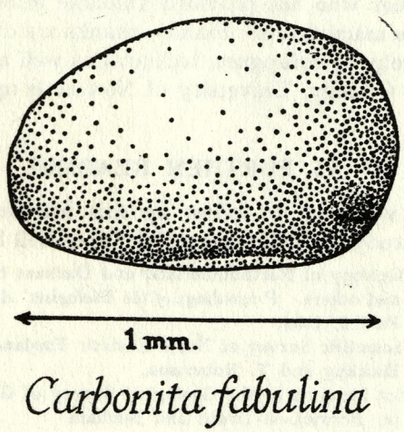


FIG. 24. A Carboniferous ostracod shell

ostracods often occur in the mudstones of coal seam roofs. A recently recorded instance of these last assemblages is the **Hopkins Shell Band** above the **Harvey Seam**, a horizon crowded with the **carapaces** (horny covers) of the ostracod ***Carbonita***." (Fig. 24). Thus ends Dr. Robertson's comments.

V ACKNOWLEDGEMENTS

I am grateful to Mr. Paul Geraghty, of the Department of Geology in the University of Newcastle upon Tyne, for his technical skill and artistry in producing the majority of the figures. In addition, I acknowledge, with much thanks, contributions from Mr. John Lee (Fig. 2), Mr. J. W. Pallister, a fellow-Northumbrian (Figs. 26, 38 and 40), Mr. Eric Lawson (the sketch of Bamburgh Castle) and from Dr. Noah Farmer who has provided valuable information about the localities for the macrofossils. Finally, thanks are due, both for advice and practical help, to colleagues, technical as well as academic, in the Department of Geology, University of Newcastle upon Tyne.

VI FURTHER READING

For those who care to follow up this introductory Guide with more detailed study, the following publications will be found useful :

1. The Geology of Northumberland and Durham by H. G. A. Hickling and others. *Proceedings of the Geologists' Association*, Vol. XLII, Part 3, 1931.
2. The Scientific Survey of North-Eastern England, 1949, by H. G. A. Hickling and T. Robertson.
3. District Memoris of the Geological Survey of Great Britain :
   (*a*) Berwick-on-Tweed and Norham
   (*b*) Cheviot Hills and Ford
   (*c*) Belford and Holy Island
   (*d*) Alnwick
   (*e*) Plashetts and Kielder
   (*f*) Elsdon

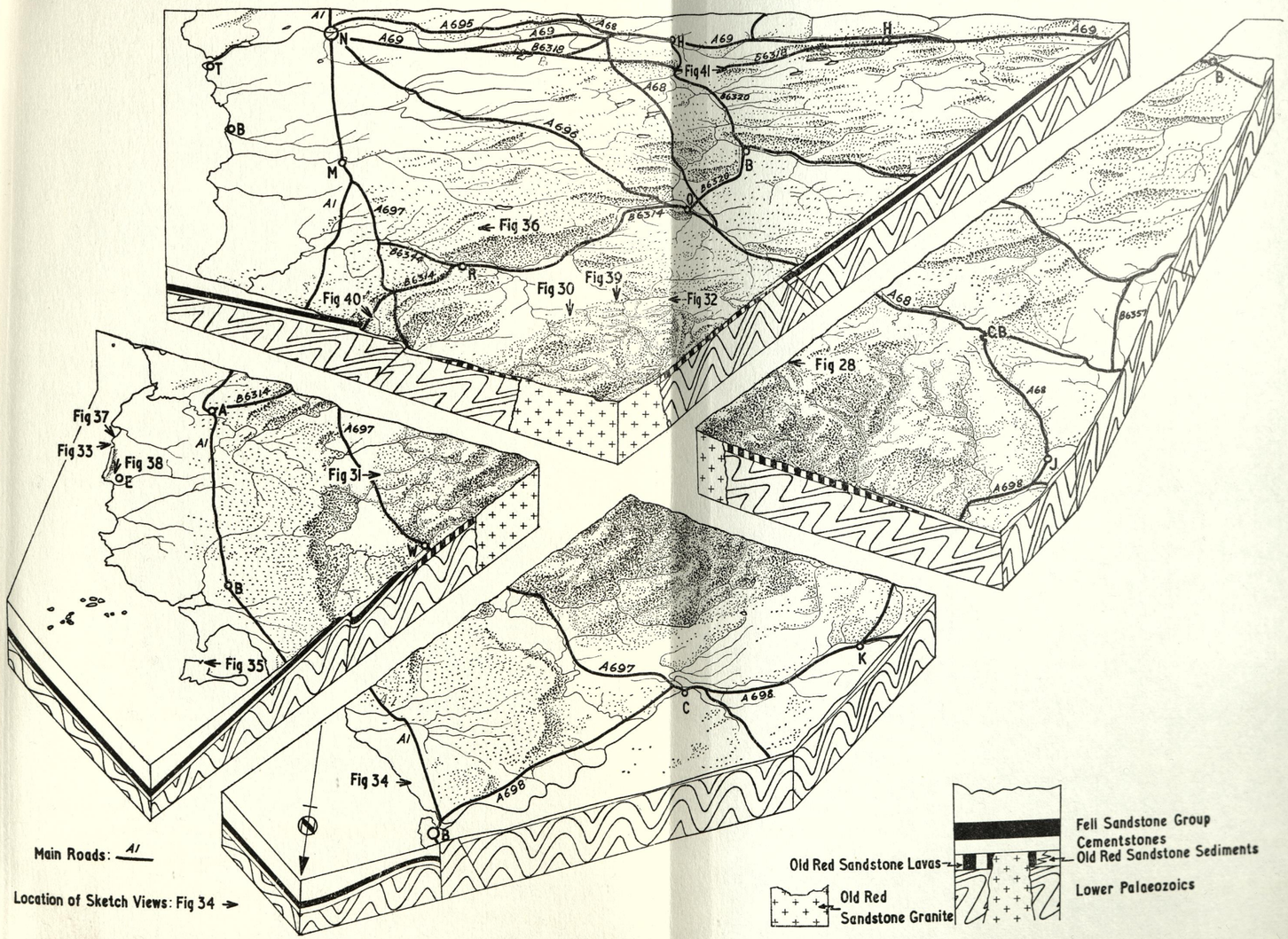
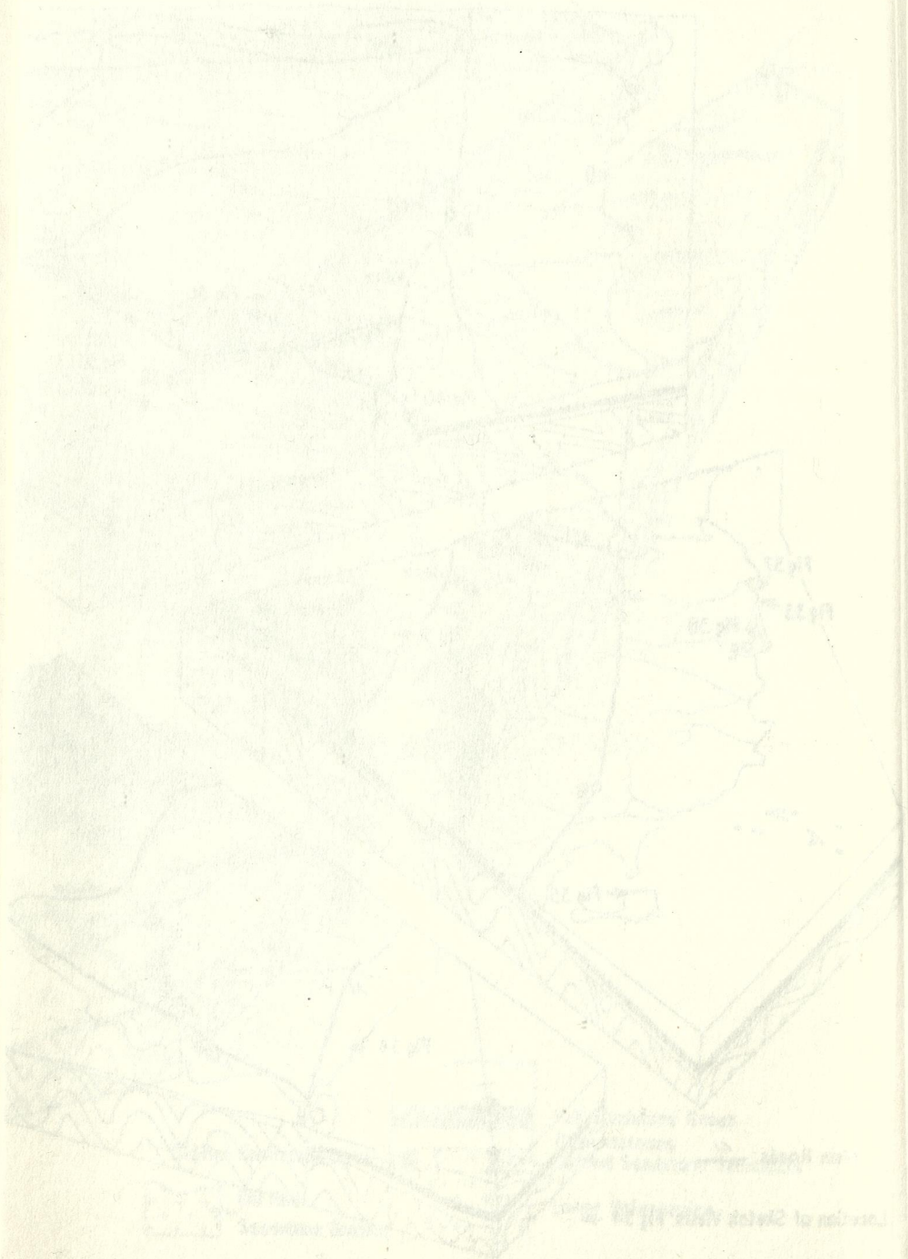


FIG. 25. Block diagram of Northumberland and the Borders



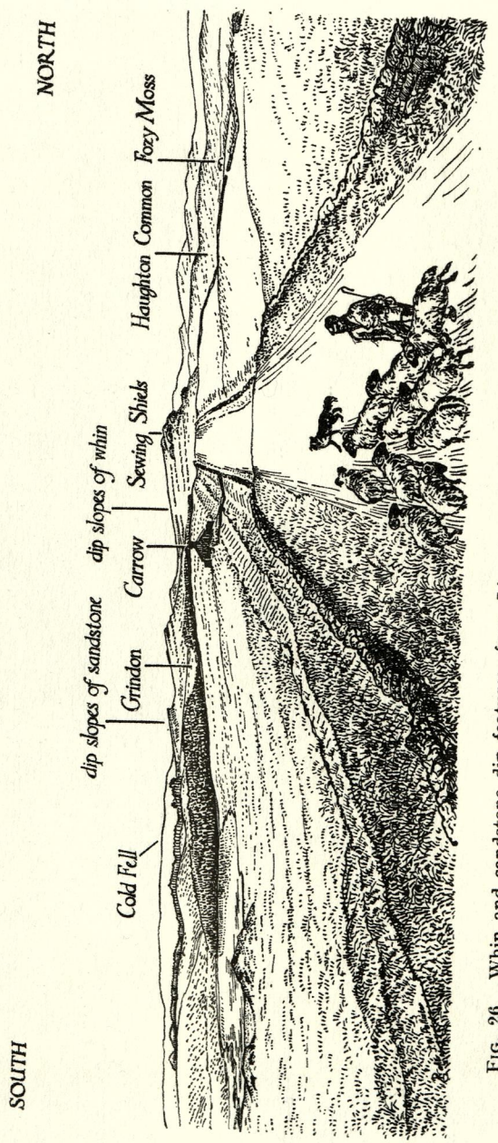


FIG. 26. Whin and sandstone dip features, from Limestone Bank, above Chollerford, looking westwards

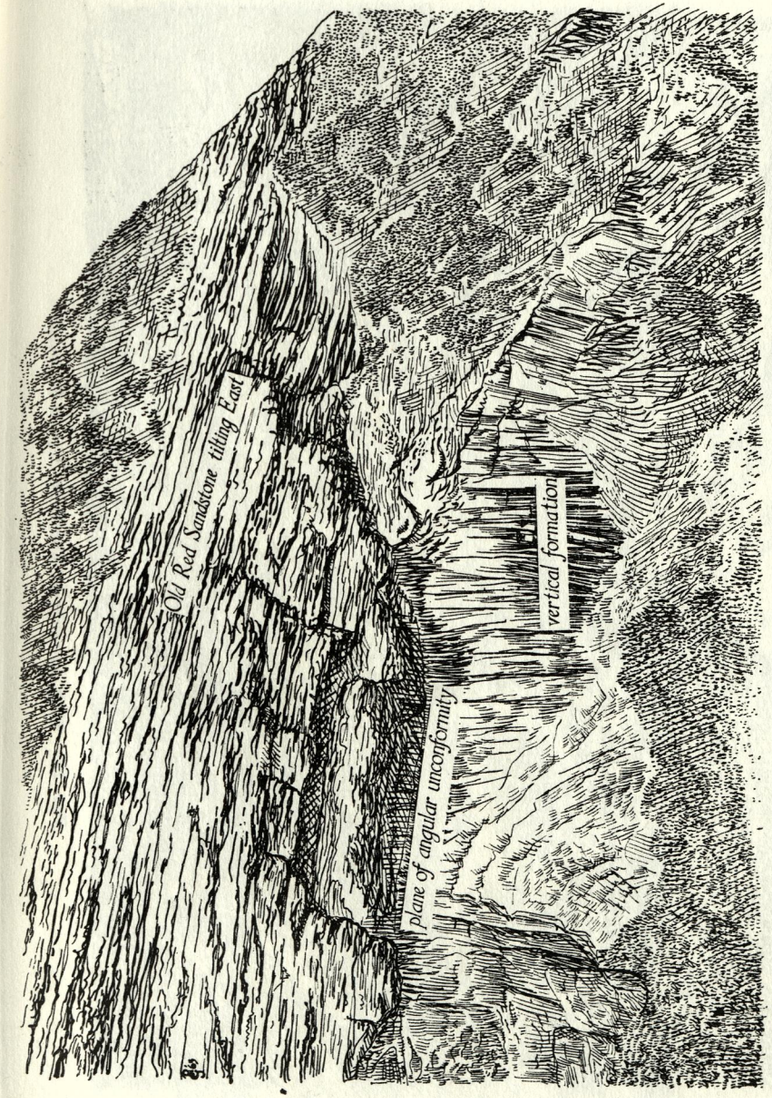


FIG. 27. The angular unconformity at Siccar Point, Berwickshire

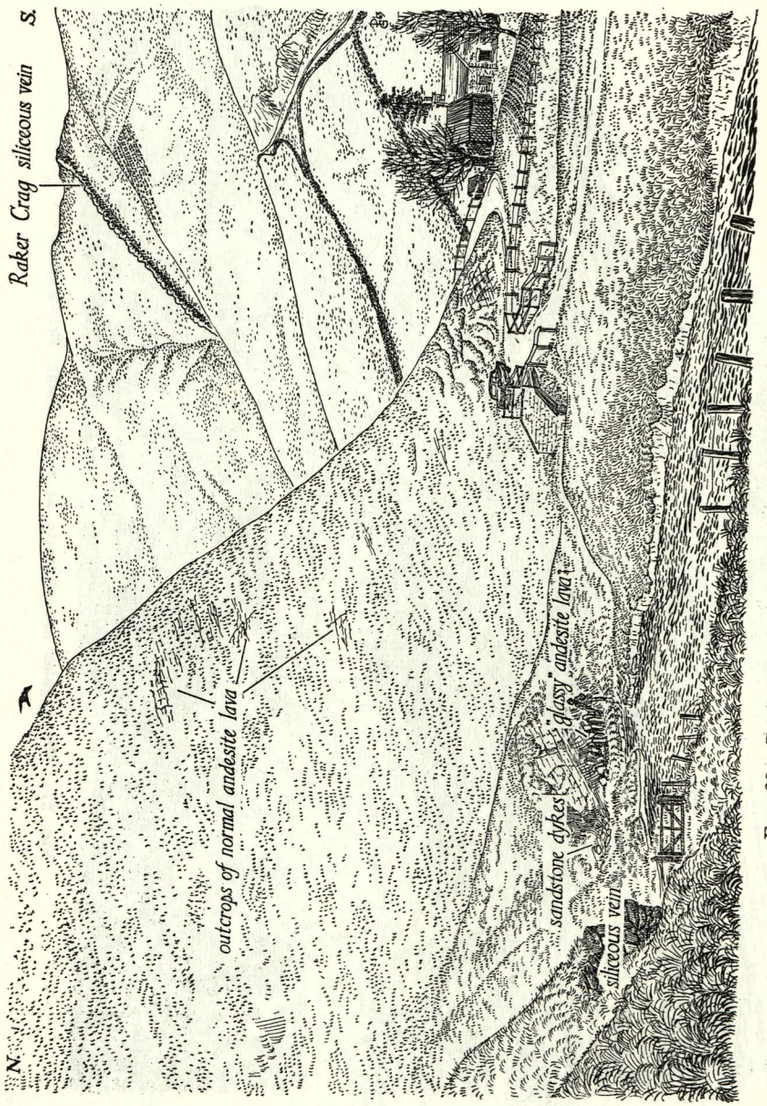


FIG. 28. Rock outcrops at Carshope, Upper Coquetdale

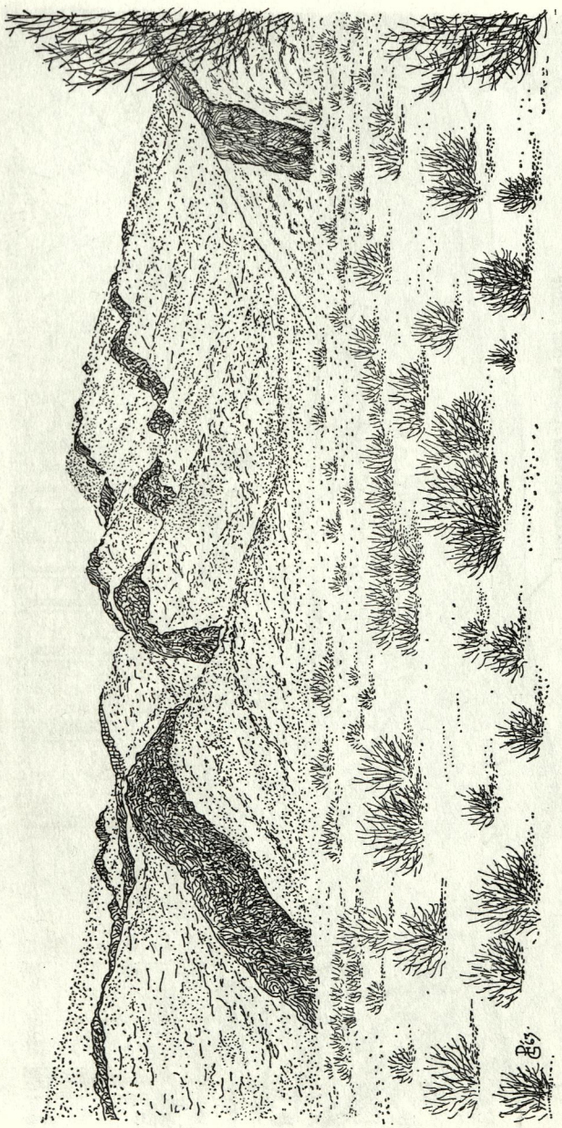


FIG. 29. Dykes in the Sinai Desert, Egypt

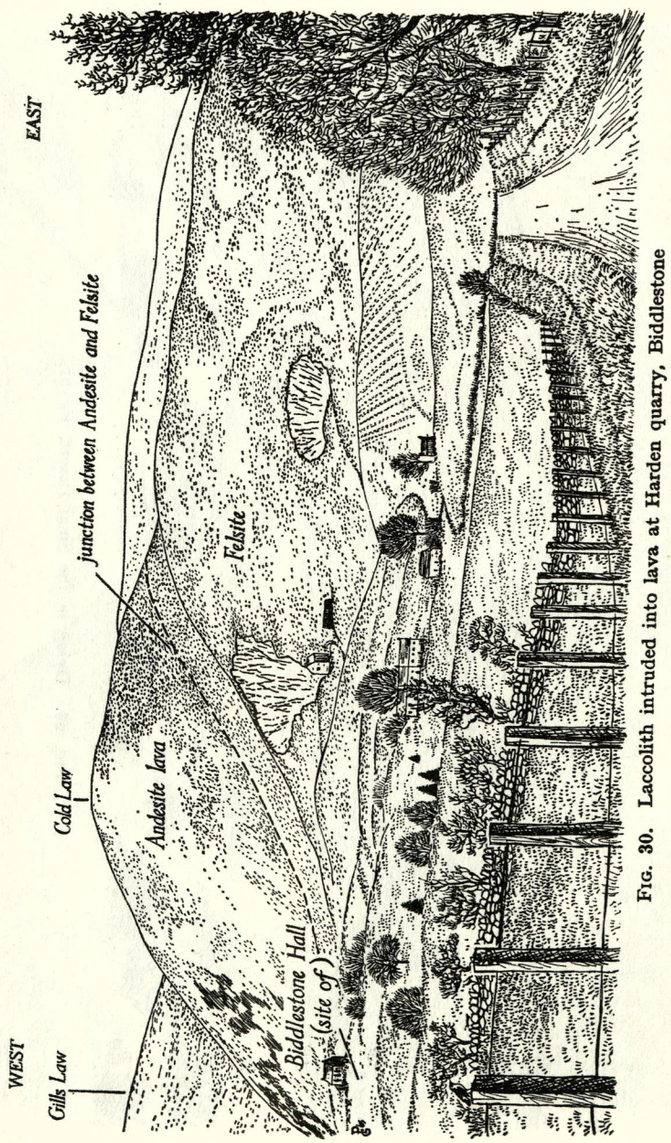


FIG. 30. Laccolith intruded into lava at Harden quarry, Biddlestone

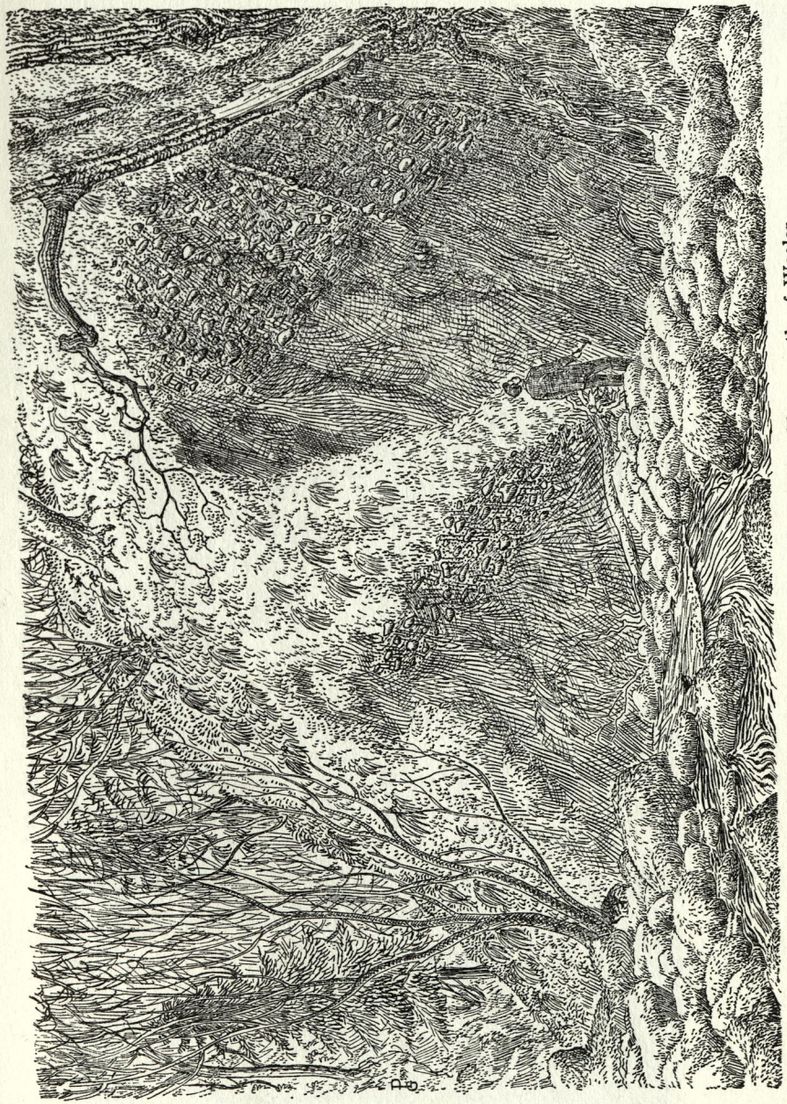


FIG. 31. The Roddam Dene Conglomerate, Roddam, south of Wooler

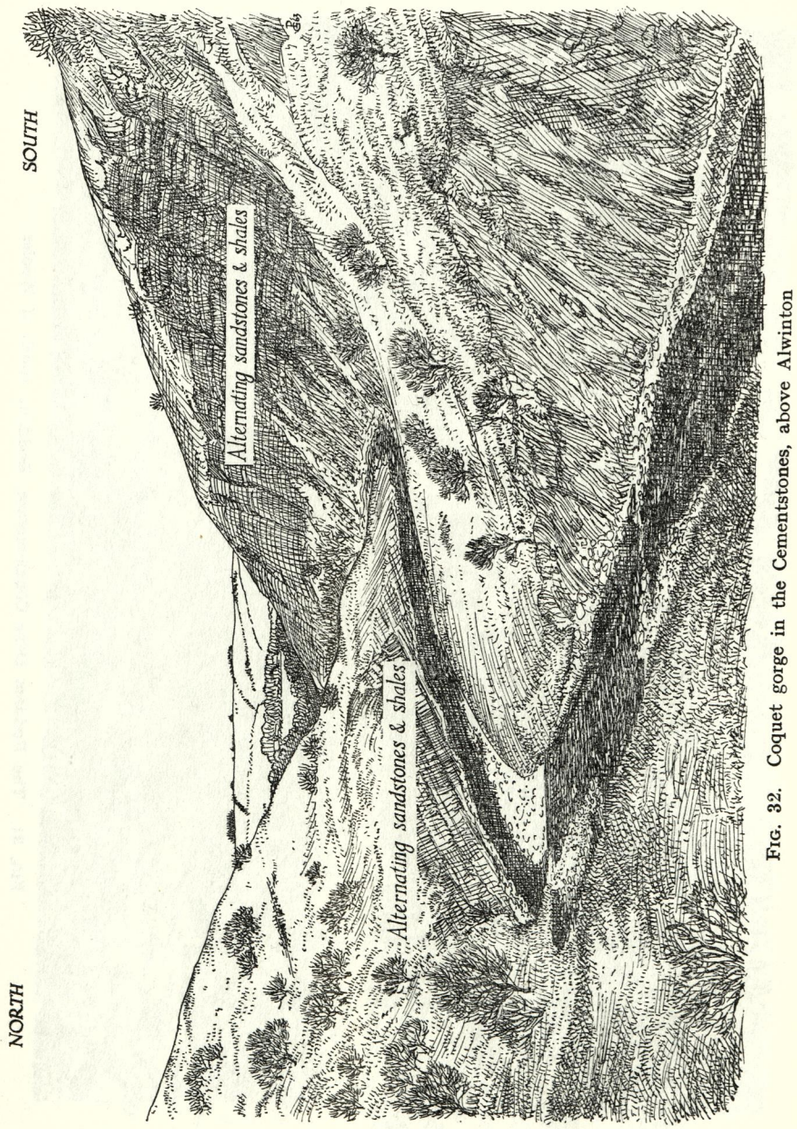


FIG. 32. Coquet gorge in the Cementstones, above Alwinton

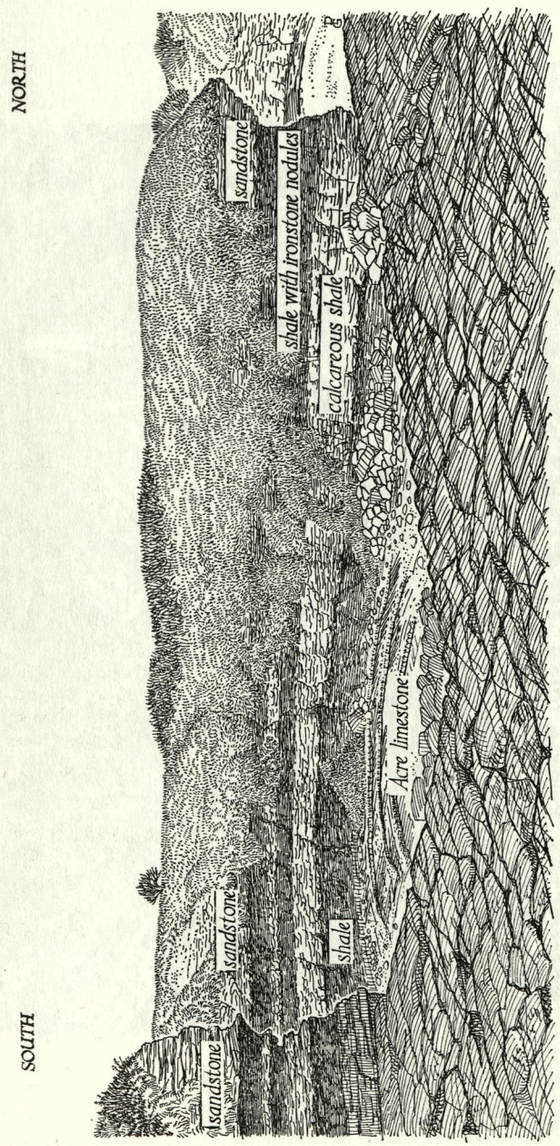


FIG. 33. Rock outcrops in the cliffs on the Howick shore



FIG. 34. An asymmetrical anticline in the Eelwell Limestone, Scremerston shore

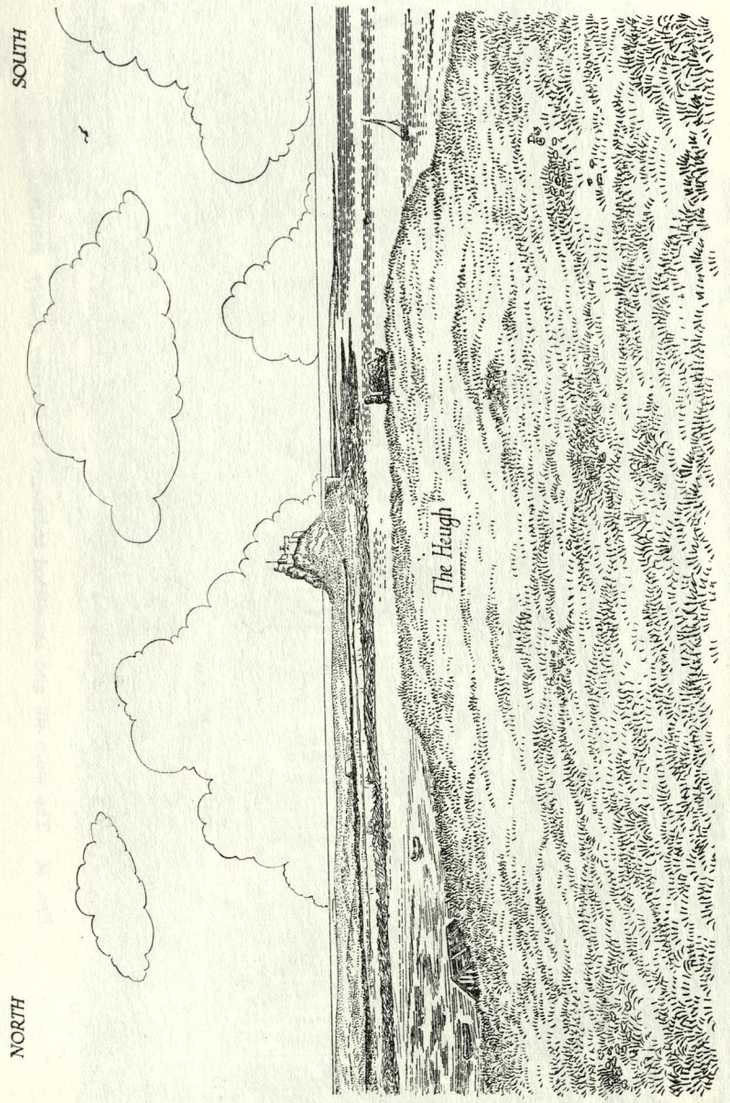


FIG. 35. The Heugh and Castle Hill, Holy Island, formed by a whin dyke

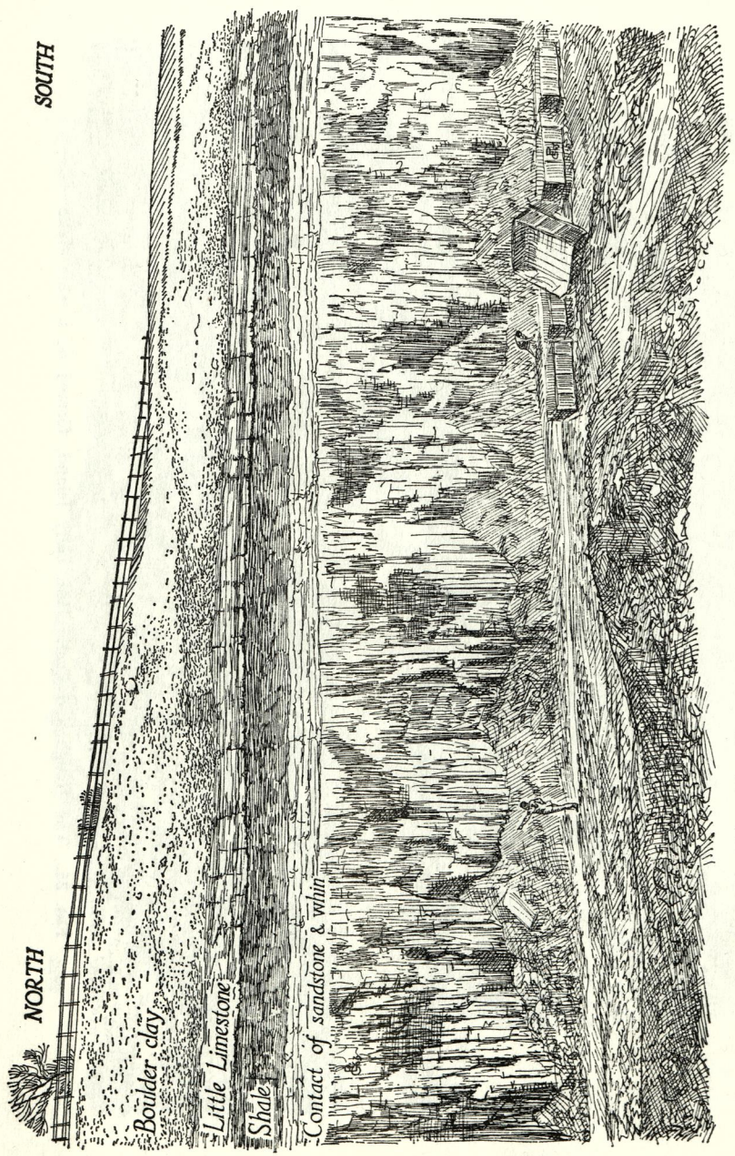


FIG. 36. The whin sill and associated sediments in Ewesley quarry, Rothley

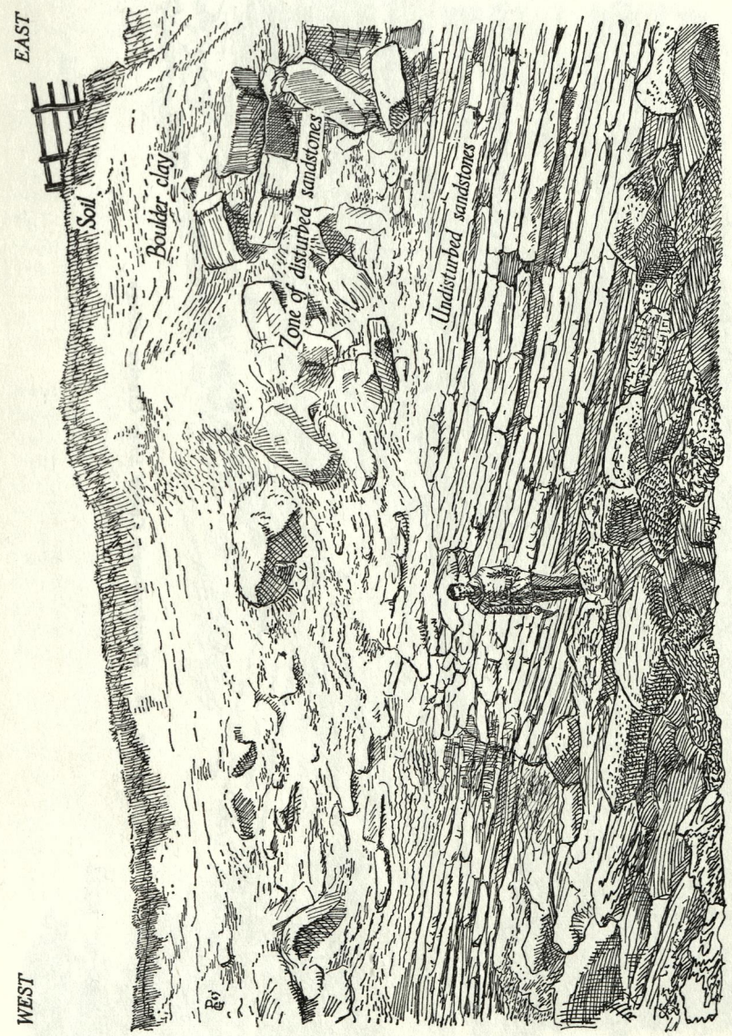


FIG. 37. Disturbed sedimentary rocks underlying boulder clay, Howick shore

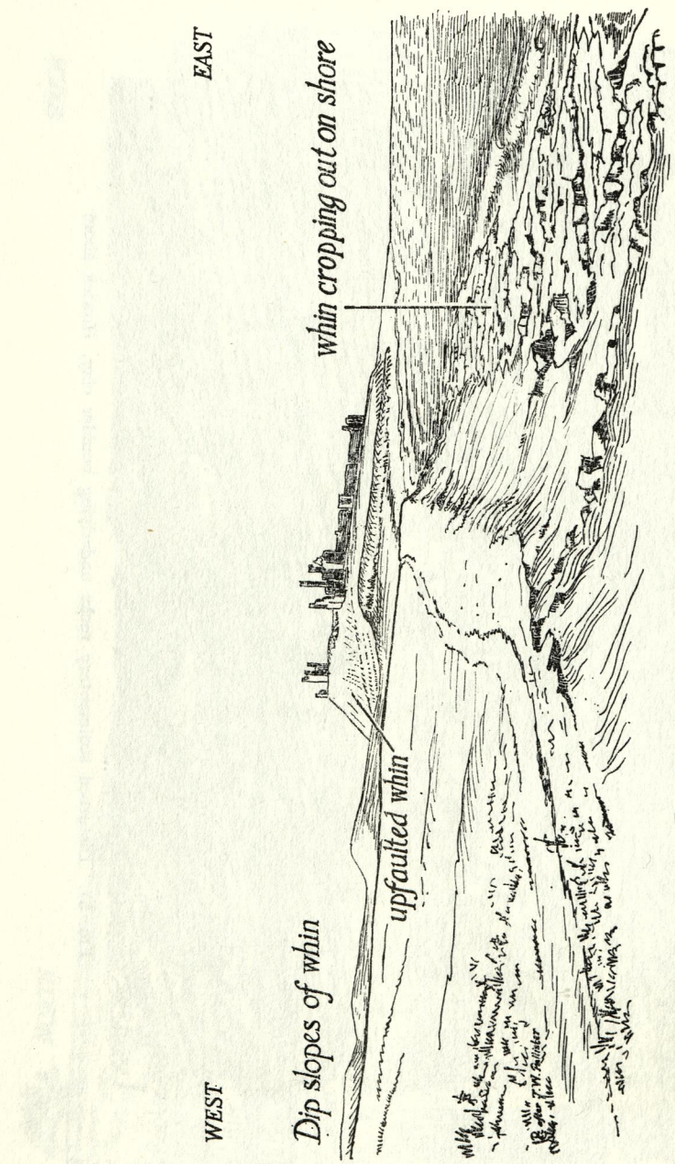


FIG. 38. Dunstanburgh Castle from Craster village

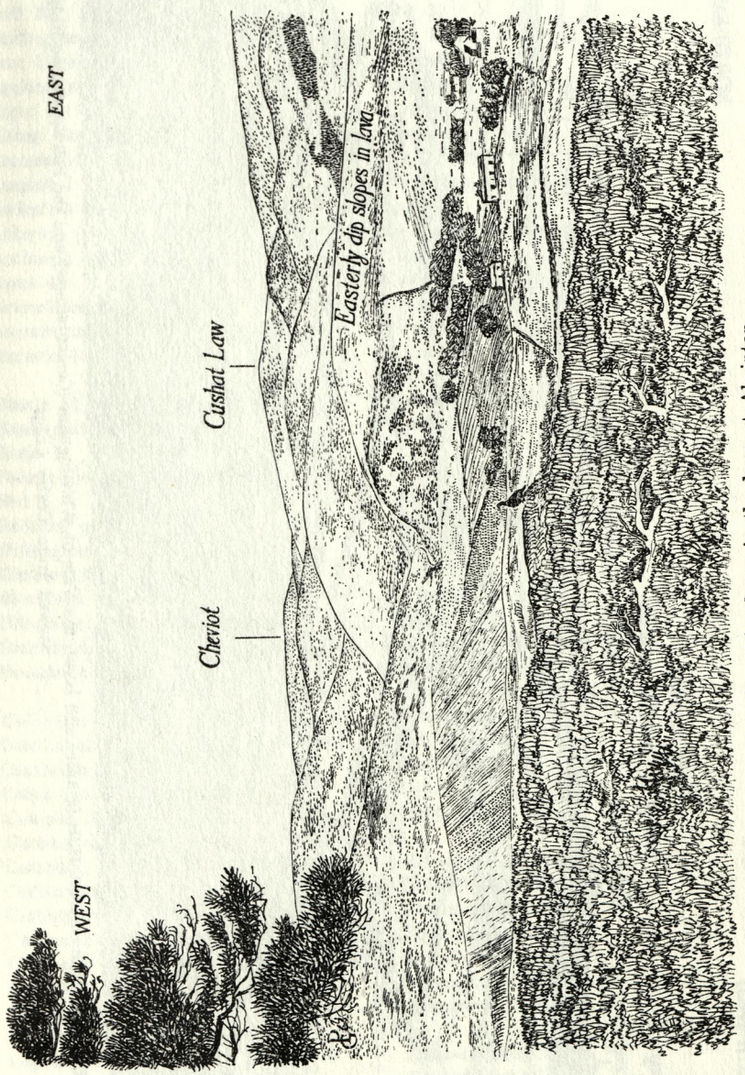
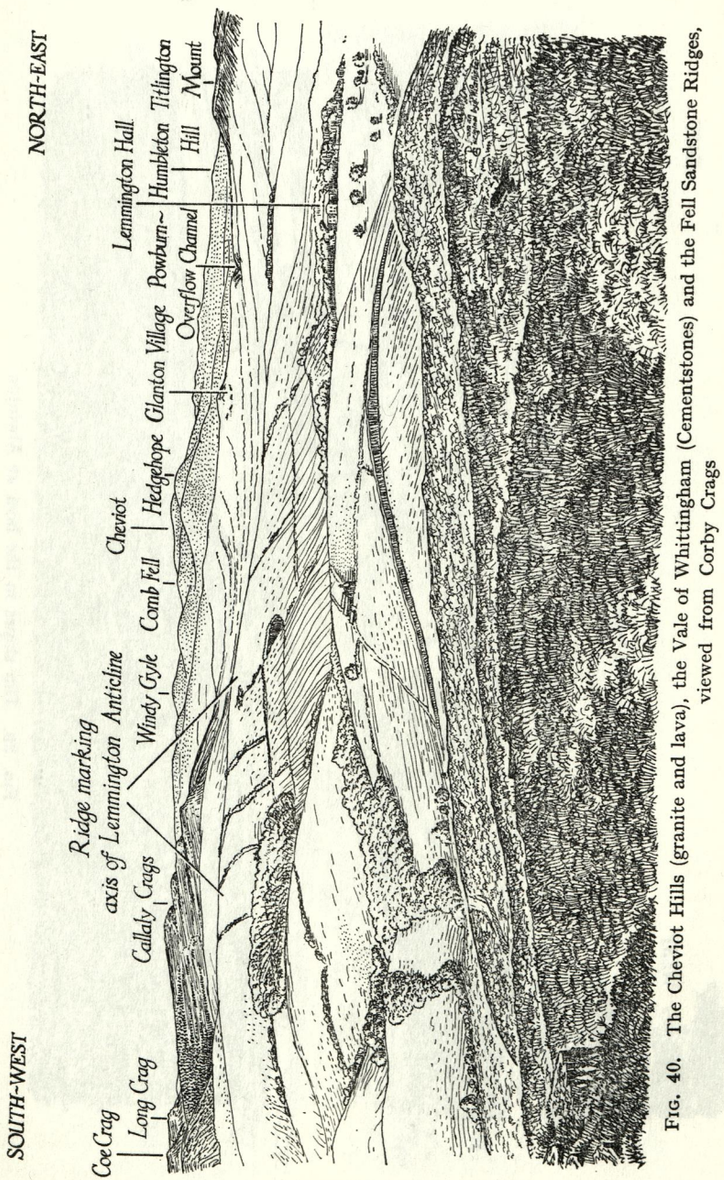


FIG. 39. Dip slopes in the lava at Alwinton



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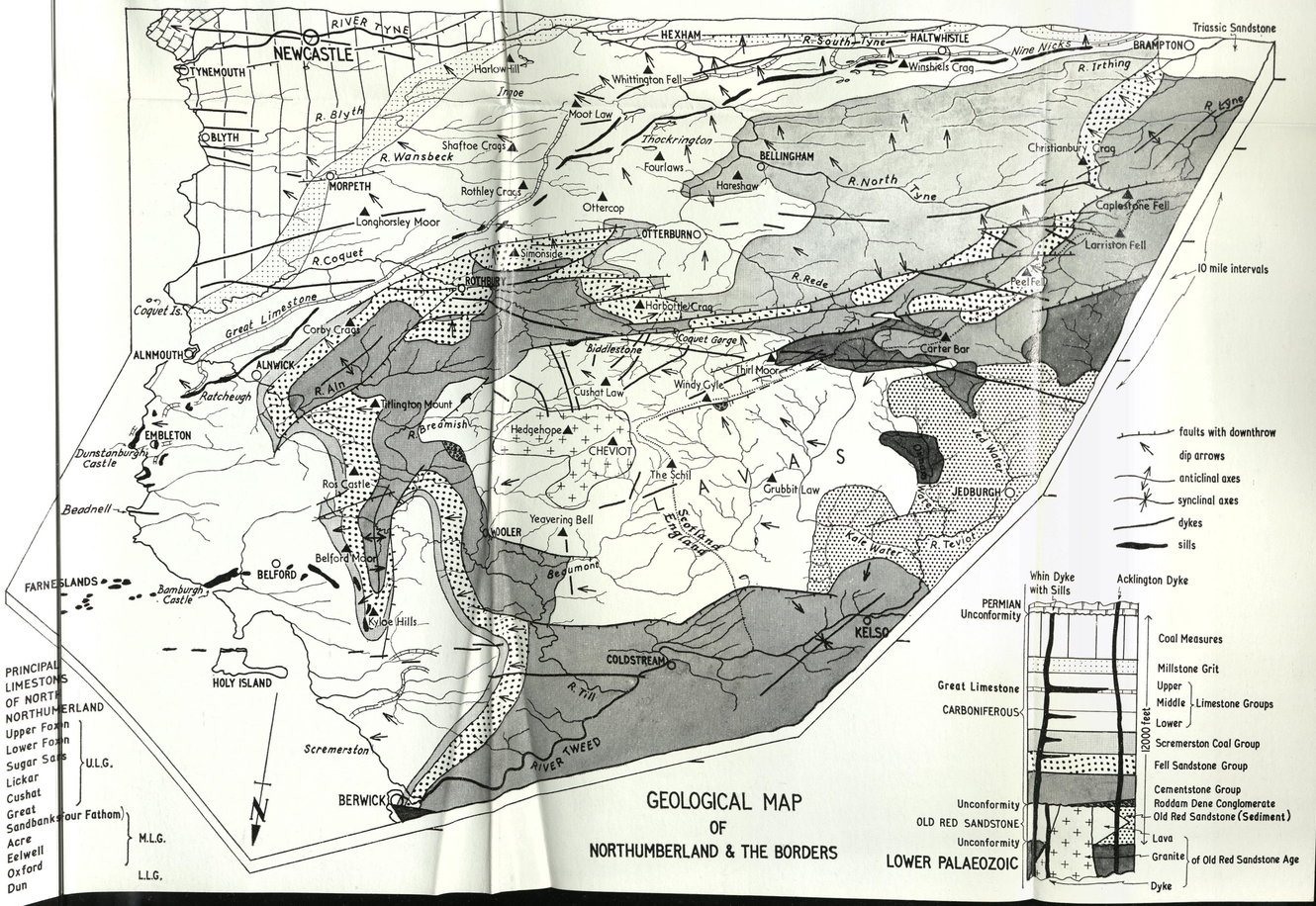
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MORPETH
Longhorsley Moor
R. Coquet
Coquet Is.
ALNMOUTH
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R. Aln
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Hedgehope
CHEVIOT
The Schil
Yeavering Bell
COQUET
Grubbit Law
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R. Jed Water
R. Teviot
Kale Water
Beaumont
England
Scotland
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M.L.G.
L.L.G.
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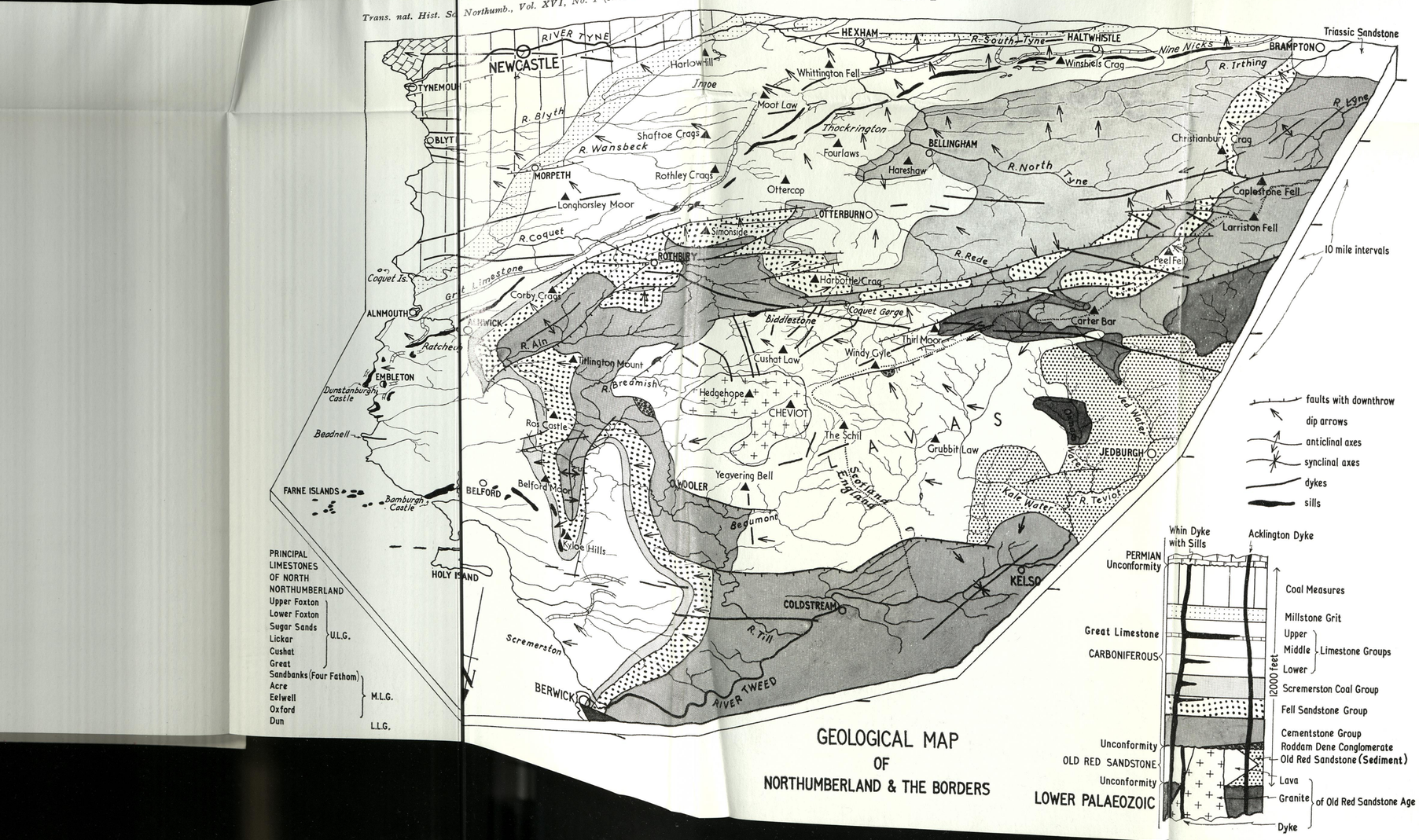
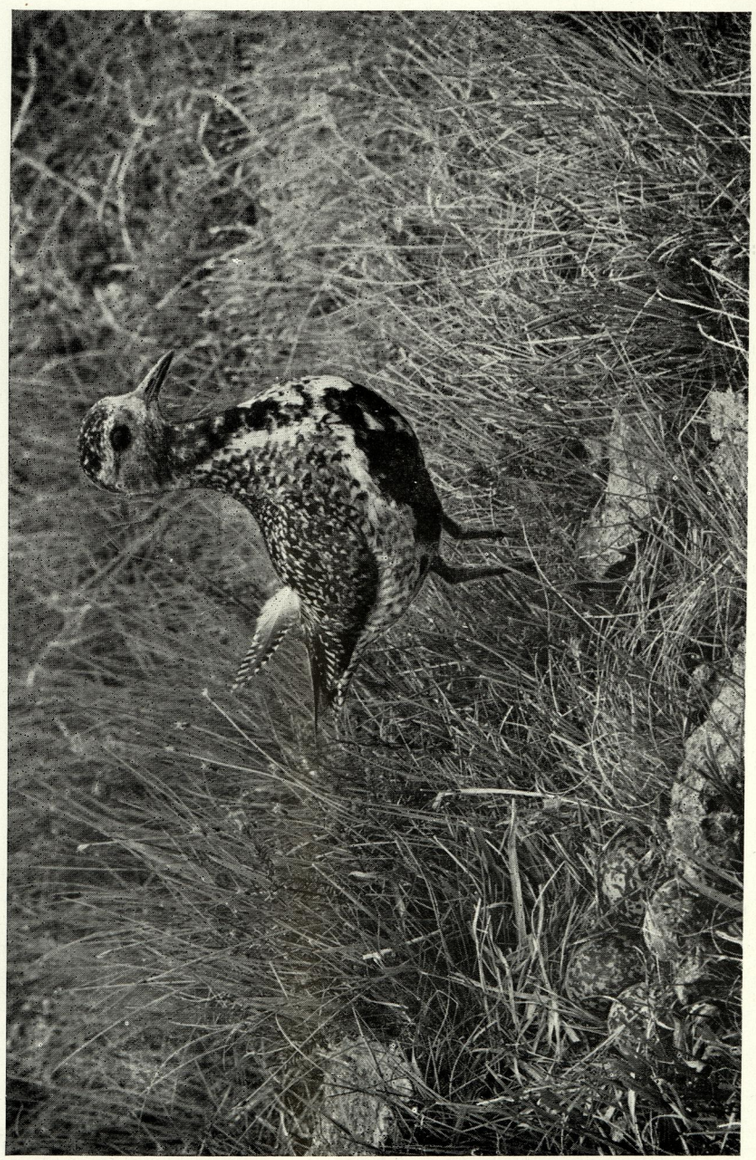
Old Red Sandstone (Sediment)
Unconformity
OLD RED SANDSTONE
Unconformity
Lava
Granite
of Old Red Sandstone Age
Dyke



GEOLOGICAL MAP OF NORTHUMBERLAND & THE BORDERS

PLATE 3



Photograph by G. W. Chambers.

MALE GOLDEN PLOVER at nest. Co. Durham, 1960.

ORNITHOLOGICAL REPORT FOR NORTHUMBERLAND AND DURHAM FOR 1965

Compiled from the notes and records of members of the Natural History Society of Northumberland, Durham and Newcastle upon Tyne, the Teesmouth and Tyneside Bird Clubs, and other observers

by

D. G. BELL

INTRODUCTION

Most of the species whose numbers were depleted in the 1962-3 winter now appear to have recovered more or less from that natural catastrophe, though grey wagtail and all three woodpeckers are still much reduced, and kingfisher virtually absent altogether. As stated last year, so many factors may be involved—toxic chemicals, weather, competition from other species, decrease in suitable habitat—that it would be unwise to assign the cause of population changes without considerable evidence and research. However, provided enough records are available, it is at least possible to record the changes themselves and all observers are urged to send in their observations of the above species.

Those breeding birds which have a particularly local distribution in the two counties are also in need of much fuller documentation: cormorant, shag, heron, goosander, sparrow-hawk, merlin, black grouse, common tern, little tern, turtle-dove, all species of owls, nightjar, marsh-tit, willow-tit, nuthatch, stonechat, lesser whitethroat, chiffchaff, wood-warbler, hawfinch, siskin, crossbill, and (inland) corn-bunting. Observers are therefore urged to help to plot the distribution of these species by sending in their observations regularly, particularly those relating to breeding.

Spring came late in 1965, the bulk of summer-visitors arriving fully a fortnight later than usual—though, of course, odd individuals could not wait to get here.

The autumn passage provided two spectacular falls of continental migrants. After an overnight strong north-east wind, with continuous rain, 3 September was a cloudy, misty, wet day, with a north-north-east wind. Migrants were all along the coast, but most numerous on the southern part. After a cloudy night, 4 September brought new arrivals to south Durham and, as the deep depression moved north,

the main fall of migrants reached Northumberland. Rain cleared early, and sunny weather for the rest of the day gave excellent opportunities for observing both the new arrivals and those that remained from the previous day. The commonest passerine species were willow-warblers, garden-warblers, redstarts, wheatears, pied flycatchers and whinchats—all present in hundreds, probably thousands. Whimbrels and swifts figured prominently in the movement, while sedge-warblers (maximum eighteen on Holy Island) and spotted flycatchers were in larger numbers than usual. There was an exceptionally generous sprinkling of red-backed shrikes, barred warblers, lesser whitethroats, wrynecks and reed-warblers, while a honey-buzzard and an occasional osprey gave added zest. Goldcrests, tree-pipits, grasshopper-warblers, siskins, blue and great tits, ring-ouzels, odd fieldfares, robins and crossbills, also occurred coastally at this time, and there was simultaneous movement among sea-birds and waders.

Migration continued throughout September, but no further major fall occurred before 1 October. On this day, as a depression moved across the country with south-east winds and low cloud, a very wide variety of both winter-visitors and passage-migrants arrived. Numbers at Teesmouth dwindled rapidly on 2 October, but in Northumberland, again, the peak came later—on 2-3 October. The commonest species involved were redwings, fieldfares, song-thrushes, goldcrests, robins, garden-warblers, redstarts and *Phylloscopi*, but kestrels (eight in Prior's Park, Tynemouth), lapwings, golden plover, swallows, late whinchats (some thirty in Northumberland), blackcaps (scarce in the September movement), dunnocks, pied flycatchers, siskins, chaffinches, bramblings and crossbills also figured. Of the scarcer species, a few great grey shrikes, red-breasted flycatchers, barred warblers, lesser whitethroats, a black redstart and a yellow-browed warbler arrived, while a thrush-nightingale—the second in a week—was trapped at Hauxley, and late individuals of wryneck, spotted flycatcher, sedge-warbler and whitethroat also occurred.

These two falls of migrants from the continent were perhaps the most spectacular features of the year, but other outstanding events included the occurrence of Leach's petrel, Balearic shearwater, bittern, snowy owl, bearded tit, arctic warbler, woodchat-shrike and arctic redpoll. Unfortunately, the Joint Records Committee again had to reject a number of insufficiently documented records. In order that unusual occurrences be accepted, and the evidence filed away as a permanent record, it is essential for full details to be made available—preferably on the "Unusual Record" forms obtainable from the Society's office at the Hancock Museum.

CLASSIFIED NOTES

2. Great Northern Diver *Gavia immer*
1 flew north at Hartlepool on 7 Nov. (ECG, CB)—the only Durham record. In Northumberland, the usual few were seen in the Holy Island area at the beginning and end of the year ; maximum 4 close inshore on 12 Dec. (CW, LGM, MN).

4. Red-throated Diver *Gavia stellata*
Reported every month. Big numbers occurred at Teesmouth at the start of the year : 53 flew north at Hartlepool on 24 Jan., and 30 flew north and 50 south there on 30 Jan. Next day there were 46 on the ¾-mile stretch of sea at Crimdon Dene. Druridge Bay was again attractive to this species, e.g. 40 were there on 9 Oct., including a close raft of 26 (DGB, PJS), increasing to over 100 by 16 Oct. (MN, CW) ; numbers in excess of 100 also occurred there in Dec.

5. Great Crested Grebe *Podiceps cristatus*
A pair reared 3 young in Durham, and another pair was robbed ; 3 pairs nested in Northumberland.

6. Red-necked Grebe *Podiceps griseigena*
No Durham records and in Northumberland seen only in Mar. and Sept.-Dec. : up to 4 in the usual area between Bamburgh and Holy Island.

7. Slavonian Grebe *Podiceps auritus*
10 off Budle Bay in Jan.; 1 off Ross Back Sands on 7 Feb.; 3 off Bamburgh on 25 Feb. and 20 on 6 Nov. No other reports.

8. Black-necked Grebe *Podiceps nigricollis*
1 in breeding plumage on Cowpen Marsh on 21 Aug. (PJS). Another at Cresswell and Holywell Ponds at about the same time was in first-year plumage (EM, ER, CED) ; of 2 at Cresswell on 11 Sept., 1 stayed until 16 Sept. (BL, CW, LGM).

12. Leach's Petrel *Oceanodroma leucorrhoa*
5 at Hartlepool on 20 Nov. (ECG, KB) and 1 on 21 Nov. (KB, PJS) flew south in strong winds ; 3 petrels which flew north through Hartlepool docks on 27 Nov. were probably also Leach's (EB).

16a. Manx Shearwater *Procellaria puffinus puffinus*
Mainly northerly movement again regular, beginning in April (Northumberland) and May (Teesmouth), and increasing in intensity in June. The peak was 245 in 3½ hours off Seaton Sluice on 27 June, including close-inshore flocks of 80 and 28 (MN, CW, RN). In July, birds were seen on 9 out of 18 days sea-watching at Hartlepool—total 136 north and 7 south—while in the same month many were reported from the St. Mary's Island—Seaton Sluice area (maximum 60-70 on 4 July). Surprisingly, in Aug. there are only 3 records from Northumberland, and none from Durham. Larger movements were resumed in Sept. (maximum 137 in 4 hours off Hauxley on 19 Sept.), but no birds were seen after that month.

16b. Balearic Shearwater *Procellaria puffinus mauretanicus*
1 flew north at Hartlepool on 1 Sept. (RTM, RJL).

19. Great Shearwater *Procellaria gravis*
1 flew north at St. Mary's Island on 17 Sept. (JDP).

21. Sooty Shearwater *Procellaria grisea*
At Hartlepool, 1 on 20 Apr., 1 on 30 July, 12 on 1 Sept., 21 on 2 Sept. and 2 on 3 Sept. and in Northumberland, 1 off St. Mary's Island on 1 Sept. and 3 on 17 Sept., and 4 at Hauxley on 19 Sept. all flying north. In addition, 1 flew south off St. Mary's Island on 18 Sept. and 2 followed a fishing-boat into Amble harbour on 21 Sept.

26. Fulmar *Fulmarus glacialis*
Steady northerly movements noted in Northumberland in Apr. and May (up to 200 per hour in latter month). At Hartlepool, 305 flew north on 2 Sept. and, next day, over 350 (including an all-white bird) also flew north (RTM, DGS, EB). Inland, fulmars were seen flying west near Heddon-on-the-Wall on 12 June (BM) and at Shotton on 27 June (DWS).

27. Gannet *Sula bassana*
Recorded all months. Up to 7 again wintered in the Holy Island area. On other parts of the coast northerly movement began in Feb., reaching a peak of several hundred per hour at Bamburgh on 19 Apr. On 16 June southerly passage at the rate of 180 per hour was noted off Holy Island—probably birds on a fishing expedition from the Bass Rock. Mainly northerly movement was resumed in July-Aug., while in the first 3 days of Sept., 380, 640 and 280 respectively flew north.

28. Cormorant *Phalacrocorax carbo*
About 100 flew south at Hartlepool in a force 6 north-east wind on 21 Nov., when 27 were concentrated inside Hartlepool docks (PJS).

29. Shag *Phalacrocorax aristotelis*
Though shags must outnumber cormorants by about 10 to 1 in the Holy Island area, it is unusual for more than odd birds to occur as far south as Teesmouth. However, on 8 Oct. 6 flew north and 31 south at Hartlepool (ECG). Exceptional numbers occurred in Nov. : during a gale on 20 Nov., 7 immatures were forced down into Darlington power station (1 of them had been ringed on the Farnes on 29 June). They were rescued, cared for, and released at Hartlepool next day, when 102 others flew south, including a party of 51 (ECG, EB, KB) ; of *ca.* 250 *Phalacrocorax* sp. which flew south at South Gare the same day, all the nearer birds (*ca.* 70) were shags, while 7 were in Hartlepool docks (TB, IB, PJS) ; next day 30 flew south at Hartlepool (JCN).

30. Heron *Ardea cinerea*
As is 1964, only 6 nests in use at the Durham colony and only 1 in the traditional Northumberland colony. By late Aug. numbers visiting Cowpen Marsh increased to 6. 1 at Hartlepool on 18 Aug. tried to land on rocks and was mobbed by terns and a skua (DGS). The biggest number recorded together (away from the Durham colony) was 8 at Bolam Lake on 19 Dec. (MN), but odd birds occurred widely.

38. Bittern *Botaurus stellaris*
A bird seen near Stannington on 17 Jan. was either this or the American species (CW, LM). 1 on the River Blyth on 19 June remained for about a week (R).

45. Mallard *Anas platyrhynchos*
Peak number on Seal Sands was 1,168 on 1 Jan. (ECG, PJS). In Dec. they had built up again to 903. Inland the main areas were : Hallington (730 in Nov. and Dec.), Fontburn (450 in Jan.), Whittledene (425 in Jan.), Hartburn (400 in Jan.), Gosforth Park (300 in Jan.) and Holywell Ponds (300 in Feb.). An interesting feature was the regular occurrence of a resting flock on the sea off Seaton Sluice, with peaks of 400 in Jan. and 600 in Dec. This flock may well consist of birds disturbed from local waters as a result of hard weather and shooting.

46. Teal *Anas crecca*
127 on Seal Sands on 17 Jan. (PJS) was the Durham maximum for the year. In Gosforth Park, 220 on 1 Jan. had risen to *ca.* 400 by 17 Jan, (ER, MH). Budle Bay had 230 on 31 Jan. (MM) and Cresswell 300 in Aug. 340 were at Holburn Moss on 20 Oct. (PB, IHA).

47. Garganey *Anas querquedula*
First noted on 27 Mar. : a pair at Teesmouth (WA, DD, TF). From Apr. onwards small numbers occurred at Cresswell, Linton, Blaydon, Gosforth, Prestwick Carr, Havannah Ponds and Seaton Burn, but the only nesting attempts proved were in Northumberland : 1 successful and 1 unsuccessful.

49. Gadwall *Anas strepera*
Odd birds at Teesmouth in Jan., May and Aug. and up to 6 in Northumberland in Jan., Apr., May, July and Aug. Only breeding report : a pair reared 6 young at a pond in Northumberland.

50. Wigeon *Anas penelope*
Present all months. The Durham maximum was only 144 (on 13 Mar.), but exceptional numbers massed in the Fenham Flats area. After easterly winds on 15-17 Nov. *ca.* 8,000 arrived, and these built up to *ca.* 15,000 in late Dec. (HD, ER). Several thousand, in flocks of up to *ca.* 100, flew north off Hauxley 9-10 Oct.

52. Pintail *Anas acuta*
No records between 31 May and late July. At Teesmouth, 16 in Jan. increased to 22 in Feb. and 40-50 in Mar. No party larger than 25 (at Holburn on 23 Jan. : MN) was recorded in Northumberland, although odd birds and small parties were fairly widespread. Bred at Rossmere Park, West Hartlepool, but all the young died.

53. Shoveler *Spatula clypeata*
No reports for Jan., Sept. or Dec. Never more than 11 (in Aug.) seen at Teesmouth—the only Durham locality where shoveler were recorded. More widespread in Northumberland ; maximum 30 at Cresswell on 31 July (LGM, MN, CW) and 45 at Gosforth Park by 25 Aug. (LGM). 2 pairs bred in Northumberland, but (so far as is known) for the first time since 1930, none bred at Teesmouth.

54. Red-crested Pochard *Netta rufina*
In West Hartlepool, 3 broods hatched in Rossmere Park, but only 2 ducklings survived ; a brood of 4 ducklings was successfully reared in Ward Jackson Park, an area to which the species has spread on its own.

55. Scaup *Aythya marila*
Scarcer than usual. No reports before 13 Mar. and none in Dec. Biggest flocks were 20 flying south off Bamburgh on 20 Sept. and 20 at Hartlepool on 9 Oct. Inland, odd birds occurred at Ashington and Cresswell Sept.-Oct.

56. Tufted Duck *Aythya fuligula*

243 at Whittledene on 3 Jan. (JSB, IHA) was by far the biggest concentration in the 2 counties, but numbers were curiously low on that reservoir at the end of the year; often there was none, even in mild weather—perhaps as a result of civil engineering operations at the reservoir. In Jan., Capheaton Lake had 91 and Gosforth Park 70, while Holywell Ponds reached 150 in Dec. Biggest Durham concentration was 136 on Hurworth Burn on 3 Apr. Broods were reared on at least 7 Northumberland waters. In Durham, 5 broods totalling 29 ducklings were seen on 17 July in the West Hartlepool park lakes; 1 brood consisted of 11 ducklings, survivors of 17 which hatched.

57. Pochard *Aythya ferina*

Much scarcer than usual, and no breeding reports. County maxima were 60 at Seaton Burn in Mar. and 30 at Hurworth Burn in Nov.

60. Goldeneye *Bucephala clangula*

None recorded between 29 Apr. (2 at Grindon) and 25 July (4 off Cresswell), and there are 2 isolated Aug. records. Widely distributed in small numbers at both ends of the year, though concentrations in excess of 20 were noted only twice: at Colt Crag on 6 Feb. (22) and at Capheaton on 28 Mar. (35).

61. Long-tailed Duck *Clangula hyemalis*

Surprisingly scarce in the main wintering area (off Skate Road) in Jan.-Feb.—never more than 5 seen. At 1600 on 6 Mar., however, 2 flocks of 117 and 37 flew in, and by 1700 there were *ca.* 180 (MB, IHA). Thereafter, numbers fluctuated between 40 on 7 Mar. and 130 on 13 Apr. None reported elsewhere between 1 May (1 at Hauxley) and 9 Oct. (2 at Hartlepool), but numbers up to 35 were seen off Skate Road until the end of the year. Few appeared further south, except at Teesmouth, where birds were recorded Jan.-Mar. and Oct.-Dec.; maximum 13 flying north at Hartlepool on 10 Jan.

62. Velvet Scoter *Melanitta fusca*

Rather scarce: no records between 12 Apr. and 16 July. Noted in small numbers in all other months, but only 1 Durham record in the first half of the year—a lone bird at Hartlepool on 6 Feb.

64. Common Scoter *Melanitta nigra*

Recorded all months. In the usual wintering stronghold—the Bamburgh area—170 in Jan. reached a peak of 400 in late Mar. A marked northerly movement from July until late autumn was again noted all along the coast from Hartlepool to Hauxley, totals of 200-300 per day being often recorded; comparatively few flew south. Scoter became generally scarce, however, in Nov.-Dec. Inland, 3 swam on Hurworth Burn on 17 July (PJS), a day when 250 flew north at Hartlepool.

67. Eider-Duck *Somateria mollissima*

Small numbers seen at Teesmouth every month, though never more than 8 per day. Up to 17 recorded at Tynemouth (TG). At least 18 broods reared on the Northumberland mainland.

69. Red-breasted Merganser *Mergus serrator*

No records for June. As in 1964, a flock assembled off Skate Road in late summer—at least 70 on 28 Aug. (AHB)—although numbers subsequently declined. 6 at Crimdon Dene throughout Jan., but few thereafter. Odd birds seen regularly at Teesmouth; maximum 16 flying north on 9 Oct.

70. Goosander *Mergus merganser*

Only Durham record: 1 at Hartlepool on 22 and 23 Nov. In contrast, in Northumberland, Whittledene had 23 on 24 Jan. (TH, JSB), Hallington 38 in Feb. (MH, DH), Hauxley 6 on 27 Mar., Colt Crag 54 on 14 Mar. (RG) and Bondicar 1 on 2 May. Scarce in autumn until 19 Dec. when small parties appeared on the usual Northumberland waters—Greenlee Lough had 28 on 26 Dec. (CW). 8 pairs are known to have bred in Northumberland.

71. Smew *Mergus albellus*

A "redhead" seen intermittently on Hartburn and Capheaton lakes, Northumberland, until 26 Mar. (TH, MB, CW); this was, no doubt, the bird recorded at Hartburn on 30 Apr. (BL).

73. Sheld-Duck *Tadorna tadorna*

The Seal Sands population reached 1,980 by 2 Jan. (ECG, PJS) and 1,200 by 14 Feb. At the end of the year, numbers there built up to 1,600 by 5 Dec. 31 juveniles were present in Greatham Creek on 11 Aug. (RTM). A few pairs bred in Northumberland, and in both winters over 400 gathered on Fenham Flats.

75. Grey Lag-Goose *Anser anser*

1 at Seaton Burn on 1 and 7 Apr. (BM, CJG), 1 with Canada geese at Colt Crag on 22 Aug. (FS), 4 at Fenham Flats in Jan. and over 200 wintering in this area at the end of the year. Northumberland had a few scattered autumn records, but none was recorded in Durham during the year.

76. White-fronted Goose *Anser albifrons*

1 at Teesmouth 10-27 Apr. (ECG, PJS). On 29 Oct., a party of 7, and another of 22, flew inland from the north over Fenham Flats; most, if not all, were of the European race (DGB, SAB). On the same day, 6 off Beal Point, reported by a wildfowler, were probably the 6 seen off Cresswell (MN, CW). Next day, 9 flew west over Whittledene (IHA, JSB). 21 seen in the Holy Island area 1-5 Nov. (HD) were probably part of the big flock already mentioned.

78a. Bean-Goose *Anser fabalis*

At Grindon Lough, 7 on 9 Feb. (BEY) and 10 on 28 Feb. (MGR); 2 of these still present on 18 Mar. (BEY).

78b. Pink-footed Goose *Anser arvensis brachyrhynchus*

Among the few skeins of grey geese in the autumn, 41 on 2 Oct., 110 on 3 Oct., 56 on 11 Oct. and 50 on 30 Oct., all flew south at Teesmouth; they were identified as pinkfeet. In Northumberland, 60 flew south over Ellington on 3 Oct. (BG) and 5 were seen at Holywell Ponds on 9 Oct. (MN).

[79. Snow-Goose *Anser caerulescens*

On 5 Mar. 1 fed with mute swans at Detchant, near Belford; on 25 Apr. it was seen at Berwick, and remained for about 10 days (being also seen along the Tweed as far as Kelso: HD); on 6 Mar. 3 flew south-east over Ford (TGQ) and over a week later these turned up at Berwick and became extremely tame (BL); 15 at Swinhoe, near Belford, on 20 Dec. (J. Collins *per* HD) were seen on 28 Dec. a mile away at Detchant (HD). The origin of these birds is unknown.]

80. Brent Goose *Branta bernicla*
Monthly peak numbers on Fenham Flats were 700 on 2 Jan. (ER), 274 on 25 Feb. and 120 on 7 Mar. (MH, RN, MN) ; 93 still present on 13 Mar. (DB). Apart from 1 at the Farnes on 13 June (BL), no reports thereafter until *ca.* 200 appeared on 5 Dec. (ER). The only other record concerns an individual on Seal Sands, Teesmouth, 11-19 Dec. (PJS).

81. Barnacle-Goose *Branta leucopsis*
1 flew north at Hartlepool on 24 Jan. (DD) ; 1 on Fenham Flats on 7 Mar. (MH) ; a barnacle-goose accompanied each of the whitefront flocks over Fenham Flats on 29 Oct. (DGB, SAB) ; 9 flew north at Teesmouth on 30 Oct. (TB, IB) ; 2 at Cresswell (TH) and 8 on the Farnes (GH) on 5 Nov. ; 1 on Holy Island lough in Dec. (PRE).

82. Canada Goose *Branta canadensis*
Among many parties the largest were 20 on Colt Crag reservoir on 22 Aug. (FS) and 23 (12 adults and 11 young) on Sweethope on 13 June (BG). On 6 Oct. several came down on the roads in Billingham and Wolviston during fog, and had to be rescued (DGB, TAB).

84. Mute Swan *Cygnus olor*
On 30 Oct., 654 out of 800 swans on Fenham Flats were mutes (KY). 275 were in Berwick harbour on 10 Sept.

85. Whooper-Swan *Cygnus cygnus*
Widespread in Northumberland ; over 200 on Fenham Flats in both winters. Elsewhere the largest herds seen were 41 at Bolam in Jan. and 28 at Gosforth Park in Dec. The first autumn birds were 5 at Plessey on 9 Oct. (SM). The flightless female is still living at Hartburn ; she has developed a much quieter call than that of other whoopers (BL). Only Durham records : 2 at Houghall and 1 at Teesmouth in Dec.

86. Bewick's Swan *Cygnus columbianus*
2 at Fenham Flats in Jan. and again in Dec. Up to 18 swam on Holy Island lough in Feb. (PJS, KH) and 13 in Dec. (LGM, CW, MN). 1 at Linton on 28 Nov. (TH). No Durham records.

91. Buzzard *Buteo buteo*
2 near Pity Me on 23 Jan. (JR) ; a pair in the North Tyne valley in Mar. did not stay to breed (BL) ; of 2 at Bamburgh on 21 Aug., 1 remained until end of month, and 1 seen there again on 30 Sept. ; 3 circled over Dunstanburgh Castle on 28 Aug. with 2 present until 3 Sept. and 1 until early Oct. (WSC, PRE) ; 1 near Radcliffe on 3 Oct. (BL) ; 1 at Ellington on 9 Oct. (CW) ; 1 near Holywell in Dec. (2 records : JKJ, CED).

93. Sparrow-Hawk *Accipiter nisus*
11 sightings reported : at Sunderland, Stannington and Dipton in Jan. ; at Darlington and Plankey Mill in Mar. ; at Shepherd's Dene (near Riding Mill) in June ; at Whittledene in July and Nov. No nesting proved, although a pair may have bred at Devils' Water (BL.)

98. Honey-Buzzard *Pernis apivorus*
On 4 Sept., during the drift, 1 flew in from the sea, low over buckthorn near the North Gare (ECG, JVH).

99. Marsh-Harrier *Circus aeruginosus*
An immature female on Cowpen Marsh 12-20 Aug. (CB, PJS, RTM, JCN).

100. Hen-Harrier *Circus cyaneus*
A male on Simonburn Moor on 3 Feb. (PJS) and another on Holy Island from Feb. to mid-Mar. ; a female at Ross on 5 Dec. (ER).

103. Osprey *Pandion haliaetus*
1 at Seaton Burn 3-15 June (ER, PJS) was perhaps the bird seen there on 16 July and 9 Aug., and at Blagdon Hall on 20 June and 13 Sept. In early Sept., 1 flew into pylons near Ponteland ; it later died. A tired bird, which flew in from the east at Hauxley on 4 Sept., may have been the individual seen flying south at Hartlepool on same day (PS, EB). 1 flying up Killhope Burn on 18 Sept. was followed by car for 15 minutes before it flew across the county boundary into Cumberland (GWC). Another at Swinhoe Lakes in late Sept. was present for up to 3 weeks (DCS, HD).

105. Peregrine *Falco peregrinus*
1 stooped at redshanks on the Reclamation Pond on 26 Oct. (TAB) ; 1 over Fenham Flats on 29 Oct. and 30 Dec. (DGB, PRE) ; 1 at Chirdon on 17 Dec. (WLM) ; 1 killed a black-headed gull at Ross Links on 27 Dec. (BGo.).

107. Merlin *Falco columbarius*
Scattered records throughout the year. Of 9 pairs in Northumberland, 7 fledged young.

110. Kestrel *Falco tinnunculus*
Numbers fairly good in both counties ; 17 nests found in the North Tyne valley (BL). Some of the birds seen coastally in autumn may have been immigrants, e.g. in half an hour on 2 Oct., during the fall of migrants, 5 flew in off the sea at Hartlepool. (EB, DGS).

113. Black Grouse *Lyrurus tetrix*
Common in Hamsterley S.F. (VFB). Small numbers in upper Teesdale (VFB) and 2 nests (3 eggs, 8 eggs) found in upper Weardale. Present in the North Tyne valley all year and a greyhen found dead on a road in June (DGB). A greyhen seen near Kimmer Lough, Alnwick, on 9 Oct. (JR).

115. Red-legged Partridge *Alectoris rufa*
J. S. Ash, of the Game Research Association, reported that a covey of 11 was present at Matfen all winter 1965-66 ; 2 were shot, but the remaining 9 are (or were) still about.

117. Quail *Coturnix coturnix*
1 calling near Sadberge, Darlington, on 22 June (DWS), but not heard subsequently. Heard calling at Milbourne Grange, near Ponteland, June-July and may have bred (WGT).

120. Water-Rail *Rallus aquaticus*
Records for Gosforth Park (maximum 6 in Nov.), Cresswell, Bolam, Bamburgh (maximum 7 in Dec.), Hauxley, Inner Farne, Shotton, Hurworth Burn, Crimdon Dene and Teesmouth, but none between 21 Mar. and 28 Aug.

125. Corncrake *Crex crex*
1 calling near Greenhead on 8 June (CJG) ; 2 calling at New Haggerston and 1 at Fenwick on 13 June (BL) ; 1 heard near Sinderhope, Allendale, on 1 July (WB, RG, EL) ; a farmer said he had a corncrake on his land between Barnard Castle and Cotherstone (*per* VFB) ; 1 found dead near Blagdon on 22 Aug.

126. Moorhen *Gallinula chloropus*
Biggest counts : 60 at Cresswell and 70 at Swallow Ponds in Jan., and 60 at Holywell Ponds in Feb. The rare occurrence of a moorhen on the sea was noted at North Gare on 8 Nov. and at Hartlepool on 22 Nov. (JCN). 1 became hopelessly entangled in nylon fishing line carelessly left beside Billingham Pond in Mar. It was released, but became entangled there again in Apr. and had to be destroyed, having swallowed a baited hook and line (DIG).

127. Coot *Fulica atra*
Biggest counts : 240 at Seaton Burn on 28 July (ER), 210 at Broomlee Lough on 22 Sept. (BEY), over 240 at Holywell Ponds on 26 Sept. (CED) and 132 on Bolam Lake on 14 Nov.—this last being the highest number since counts began there in 1955 (AM). 2 on the sea near the Emblestones, Newton, on 31 Dec. during hard weather (PRE).

131. Oystercatcher *Haematopus ostralegus*
Bred inland in river valleys in both counties, but eggs often disappeared. A pair nested in a cornfield near Hart Reservoir, Durham (EB, KR).

133. Lapwing *Vanellus vanellus*
Only 11 pairs located at the end of May from roadsides in the Alnwick-Wooler-Lowick area and eastwards to the coast (PRE). Increase in pairs on Hepburn Moor (PRE). Numbers in south-west Durham back to pre-1962-63 winter average, and numerous on uplands (*per* VFB). Northerly passage off Bamburgh 12 June, when parties totalling 118 passed. Much north and north-west movement in Northumberland in Oct., with concentrations of *ca.* 1,000 in the Cresswell, Druridge and Blyth cemetery areas. The only other big flocks reported were 700 at Whitley Bay on 18 Oct. and 500 at Darlington sewage farm on 28 Nov.

140. Golden Plover *Charadrius apricarius*
Fair numbers nesting in west Durham. Biggest concentrations : *ca* 1,000 at St. Mary's Island and *ca.* 700 at Holywell in Jan., 500 at Boulmer in Sept., 1,000 at Hauxley in Oct. and 800 at St. Mary's Island in Nov. At Teesmouth, the maximum was 385 in Feb.

143. Turnstone *Arenaria interpres*
Biggest numbers at St. Mary's Island on 21 Mar. (150), on Holy Island on 31 July (100), on Inner Farne on 12 Aug. (*ca.* 550), at Embleton on 26 Sept. (211) and at Craster on 24 Oct. (100). As usual, a few birds summered.

145. Common Snipe *Capella gallinago*
Rather scarce at the start of the year. General increase in Aug. and peak numbers in Oct. : maxima over 80 on a marsh near Sedgefield and *ca.* 150 in Gosforth Park. Birds noted coming in off the sea on 6 days in Oct.

147. Jack Snipe *Lymnocryptes minimus*
Absent between 22 Apr. (1 at Bamburgh) and 25 Aug. (1 at Tanfield Ponds, Stanley). Scattered records for all other months in the usual localities.

150. Curlew *Numenius arquata*
Biggest numbers near Greatham Creek on 28 Feb. (200) and 19 Mar. (250), on Long-stone End on 18 and 29 Mar. (*ca.* 300) and 11 Oct. (400-500) and at Holy Island on 12 Dec. (220). Common breeder on south-west Durham moors (VFB), and *ca.* 10 pairs with young noted in the Brenkley area in June (MH).

151. Whimbrel *Numenius phaeopus*
First noted in Northumberland on 7 Apr. (2 over Hauxley) and in Durham on 29 Apr. (1 or 2 at Hartlepool). Spring passage continued until 31 May ; maximum 19 at Teesmouth on 8 May. Autumn passage was exceptionally good, with the Teesmouth monthly maxima being 19 on 14 July (ECG), 65 on 11 Aug. (RTM) and a single flock of 70 on 4 Sept. (DSS, DGB, SAB, PJS, ECG)—the largest party ever recorded there. In Northumberland, where whimbrel passage is usually rather thin, a flock of 21 flew south at Hauxley on 2 Aug. A very late individual was seen at Seaton Snook, Teesmouth, on 24 and 27 Oct. (PJS, JCN).

154. Black-tailed Godwit *Limosa limosa*
Spring passage : 1 at Teesmouth on 27 Apr. and 2 on 1 May ; 1 at Bamburgh on 25 Apr. ; 6 at Cresswell on 26 Apr. and 1 on 13 May ; 1 at Amble on 14 May. Autumn passage lasted from 27 July until 11 Sept., involving a total of *ca.* 20 birds.

155. Bar-tailed Godwit *Limosa lapponica*
The total in the Holy Island area was estimated at *ca.* 2,000 in Jan. (MM) and again in Dec. (ER) ; these are exceptionally high figures. 300 were at Holy Island causeway on 28 Oct. (DGB). At Teesmouth, Seal Sands had a spring maximum of 190 on 14 Mar. and there were still 55 on 29 May (DD), while the autumn peak was over 280 on 24 Sept. (ALC). As usual, a few summered.

156. Green Sandpiper *Tringa ochropus*
1 at Whittledene on 5 dates Jan.-Mar. (JSB, IHA) and 1 near Ponteland in late Feb. (ER). No other records before July-Aug., when passage birds passed through many places, particularly in Northumberland. Passage was mostly over by Sept., with the last bird at Stanley on 24 Oct. (RMP).

157. Wood-Sandpiper *Tringa glareola*
6 in May, 2 in June and 7 in July. Aug. was the peak month, the biggest flock being 13 near Stanley on 25 Aug. (RMP), when 3 were at Druridge Bay. The last were 2 at Holywell Ponds on 18 Sept. (CED).

159. Common Sandpiper *Tringa hypoleucos*
First noted on 15 Apr. : 2 at Bamburgh. Appears to have been present in good numbers on breeding grounds in both counties.

162. Spotted Redshank *Tringa erythropus*
1 remained at Teesmouth throughout both winters. Widespread July-Sept. : up to 4 at a time in many localities.

165. Greenshank *Tringa nebularia*
Recorded between 10 Apr.—1 at Whitley Bay (CED)—and 24 Oct.—1 near Graythorp (PJS, PR). 9 occurred Apr.-June, and dozens in both counties July-Sept.

169. Knot *Calidris canutus*
The Teesmouth wintering population was *ca.* 10,000 in Feb. (PJS). Regular southerly passage at Hartlepool in Aug., e.g. 18 flocks totalling 267 on 6 Aug. (JCN). This coincided with an increase in the estuary population. 5,000 were estimated to be on Fenham Flats in Nov. Up to 800 frequented St. Mary's Island.

170. Purple Sandpiper *Calidris maritima*
Biggest concentrations were 65 at Hartlepool in Jan., 90 on Inner Farne in Aug. and 100 at Bamburgh in Nov.

171. Little Stint *Calidris minuta*
1 at Teesmouth 13-15 May and 13 June (DD, RT). Autumn passage from 25 July into early Oct.—the last being 1 on Brownsman on 5 Oct. (PRE) and 1 at Cresswell on 7 Oct. (TH.) Not more than 10 individuals noted in Northumberland, but more numerous at Teesmouth where up to 9 occurred in Sept. 1 arrived at Stanley on 31 July and stayed overnight (RMP).

178. Dunlin *Calidris alpina*
Nested plentifully in its usual Durham haunts and young seen in June.

179. Curlew-Sandpiper *Calidris testacea*
3 at Teesmouth on 9 May, 1 remaining until 19 May (ECG, DD, ALC). Regular there from 19 July, with maximum daily peaks of 14 in Aug. and of 9 in Sept. The only other records are from Stanley—1 on 18 Aug. and 2 on 22 Aug. (RMP)—and from Fenham Flats—a very late bird on 29 Oct. (DGB).

181. Sanderling *Crocethia alba*
As usual, occurred in far smaller numbers than dunlin, though regular on most sandy shores. Biggest count : 159 at Seaton Carew on 5 Dec.

184. Ruff *Philomachus pugnax*
Teesmouth : 1 on 6 and 21 Feb., increasing to 2 in Mar. Up to 17 occurred regularly in Apr., with a peak of 18 on 1 May ; none after 23 May until 2 July, when the first of the autumn birds appeared : up to 20 per day in Aug., 38 per day in Sept. and 19 per day in Oct. In Northumberland, records cover all months Apr.—Nov., with Sept. the peak month (maximum 35 at Cresswell).

185. Avocet *Recurvirostra avosetta*
2 on Fenham Flats on 12 June (BL).

187. Grey Phalarope *Phalaropus fulicarius*
1 at Seahouses 20-21 Nov. (PJB, RE). Single immatures occurred at Amble 21-28 Mar. (BG, ER, BL) and at Hauxley on 6 Nov. (BL).

193. Arctic Skua *Stercorarius parasiticus*
A number of records Jan.-Apr. may concern the same individual(s) seen Dec. 1964. Autumn passage was heavy : 48 congregated together in the air over Seal Sands on 13 and 14 Aug. (JCN, PJS), attracted by the gulls and terns fishing for sprats ; *ca.* 100 flew south at Hauxley on 29 Aug. ; 241 flew south and 112 north at Hartlepool on 1 Sept.—the biggest daily total—and passage continued (in much diminished numbers) throughout Oct. The last were 4 flying north at Hartlepool on 6 Nov. (DGS, BF). Interesting observations concerning arctic skuas bullying land-birds were made when 7 mobbed a short-eared owl on Holy Island on 24 July (JKJ) and when 2 harrassed small waders at Dorman's Pool and the Reclamation Pond for over an hour on 5 Aug. (DL).

194. Great Skua *Catharacta skua*
1 flew south at Hartlepool on 2 Jan. (WA, DME, DD, DGS). No others before 28 June, when 1 flew north over the Farnes. Odd birds seen regularly in Northumberland until late Sept., but more numerous at Teesmouth : at Hartlepool 27 flew north (and 23 south) on 1 Sept., and 13 north on 2 Sept. Surprisingly, only 1 observed there in Oct., but 2 on 2 Nov., 4 on 3 Nov., 4 on 4 Nov., 3 on 20 Nov. and 2 on 21 Nov. all flew north, while on 20 Nov. 9 also flew south (IB, TB, ECG, KB).

195. Pomarine Skua *Stercorarius pomarinus*
At Teesmouth 1 on 20 July, 1 on 22 and 27 Aug., 2 on 12 Sept., 19 on 2 Nov. and 22 on 3 Nov.—the Nov. birds all flying north. Of a party of 4 skuas flying north at Boulmer on 24 July, at least 2 were pomarines (WSC). The only other Northumberland records concern a few in Sept. and 1 at Hauxley on 6 Nov.

199. Lesser Black-backed Gull *Larus fuscus*
Again wintered in the Holy Island area (KH).

200. Herring-Gull *Larus argentatus*
A first-year bird at Ashington Pond on 27 June had a beak twice as long as normal and downcurved ; the usual dark gonys patch was half way along lower mandible (DGB).

202. Glaucous Gull *Larus hyperboreus*
1 at Teesmouth on 4 dates Jan.-Feb., and another on 3 dates Oct.-Nov. In Northumberland, 1 in Jan., 1 in Mar., 6 in Apr., 2 in May and 1 in Nov.

205. Mediterranean Gull *Larus melanocephalus*
The Hartlepool bird was seen 5 times Jan.-Mar. (on 21 Mar. in full breeding plumage). It returned on 27 Aug. (JCN) and was seen once more in Aug., twice in Sept., and for the last time on 30 Nov. (JCN, ECG). This bird has appeared at Hartlepool each winter since Oct. 1956, arriving in early autumn and departing in spring. Its summer whereabouts are unknown.

207. Little Gull *Larus minutus*
None before 16 May when 1 appeared at Teesmouth. Up to 3 occurred there June-July, and odd birds Aug.-Sept. 5 at Hartlepool in the gales of 20-21 Oct. No big concentration built up at Hurworth Burn this year, the only records being 2 on 17 July, 2 on 1 Aug., 1 on 8 Aug. 4 on nearby floods on 12 Aug. and 4 on 12 Sept. In Northumberland, 1 in July, 1 in Aug. and 2 in Sept.

208. Black-headed Gull *Larus ridibundus*
Over 400 eggs were taken by the owners at Capheaton Lake.

211. Kittiwake *Rissa tridactyla*
A restless, noisy, compact flock of 24 (including at least 2 immatures) was at Smiddyshaw Reservoir from 1530 to 1630 on 27 Mar. (AHB). This reservoir, near Waskerley, is some 26 miles from the sea. The building at Gateshead—9 miles from the sea—on which kittiwakes have nested for the last 3 years was demolished in Mar., but at least 2 nests were built on the Newcastle side of the river (on the C.W.S. factory) and 1 young reared. About 10 nests were started on warehouses a mile downriver at the mouth of Ouseburn, but only 3 young flew successfully (AM). Birds (presumably from these nests) seen up the Tyne as far as Newburn. In Aug., a marked southerly movement took place throughout the month at Hartlepool involving thousands of birds. There were 3,000-4,000 on Seaton Snook on 14 Aug., and thousands gathered in Hartlepool docks, feeding on fish, in the latter half of the month.

212. Black Tern *Chlidonias niger*
Rather scarce this year. Only 3 spring records : 2 near Durham City on 3 May (DLS), 1 at Colt Crag on 11 May (FS) and 1 in Greatham Creek on 8 June (ALC). In Aug., a total of only 10 occurred, and 16 in Sept.

217. Common Tern *Sterna hirundo*
As usual, a scattering of inland records : 4 at Holywell on 2 May, 1 at Billingham Pond on 8 June, 18 adults fished in Seaton Burn for an hour on 24 July (BL), 1 at Havannah Ponds and 2 at Seaton Burn on 8 Aug. (3 on 16 Aug.), and 2 at Billingham Pond on 9 Aug. Of 600 "comic" terns on Seaton Snook on 24 July, 80% were arctics (PJS). 2 pairs again bred in the Tyne valley.

219. Roseate Tern *Sterna dougallii*
Away from the Farnes seen in Aug. at Seaton Sluice (1), Hartlepool (3), Cresswell and Hauxley (dozens).

222. Little Tern *Sterna albifrons*
5 pairs attempted to nest at a Northumberland locality and at least 1 egg was laid. Still scarce, and although birds were seen all along the coast, 10 was much the largest single party recorded.

223. Sandwich Tern *Sterna sandvicensis*
2 flew over Seaton Delaval on 5 June (BG)—2 miles inland. At Teesmouth, the maximum number seen together was *ca.* 350 at the Slurry Pond on 11 Aug. (RTM). 2 late birds flew south at Hartlepool on 24 Oct. (PJS).

226. Little Auk *Plautus alle*
1 found dead at Hauxley on 30 Mar. A northerly movement on 3-5 Nov. was noted on the Yorkshire side of Teesmouth, involving a total of 102 birds.

229. Black Guillemot *Cepphus grylle*
As in many previous years, a bird was seen irregularly in the Farnes—Holy Island area between May and Sept., but this species has never been known to breed in either county.

232. Stock Dove *Columba oenas*
About 60 at Graythorp village, Teesmouth, on 3 Jan. (ECG) was much the largest concentration.

—. Collared Dove *Streptopelia decaocto*
Records from Sunderland (up to 19), Holywell (up to 52), Hauxley, Killingworth, Newcastle, Ponteland (roost of *ca.* 40 in May), Tynemouth, Lesburn (near Lesbury) and Acomb. The largest population, however, is still at West Hartlepool, where 120 pairs nested. Here there seems to have been some withdrawal from the town gardens since last year, possibly because of insufficient nest-sites. Nevertheless, on the edges of the town—in Ward Jackson Park, for example—numbers have increased : in a nearby row of Scots firs there were 42 on 24 Mar. compared with 27-29 in the same week last year (RTM).

235. Turtle-Dove *Streptopelia turtur*
Occurred at a number of places in both counties. 4 pairs nested at Shotton, and others probably did so near Hurworth Burn and Witton-le-Wear.

237. Cuckoo *Cuculus canorus*
First record : 1 at Langleeford on 19 Apr. (PB). 6 young cuckoos occupied meadow-pipits' nests in the Hamsterley area.

244. Snowy Owl *Nyctea scandiaca*
The remarkable sight of a snowy owl† being mobbed by a barn-owl was seen at Hauxley on 28 Nov. (ER, PY). During this century there has been only 1 previous record of this species in either county—a bird seen on Holy Island in May 1922 (Bolam, 1932). Nevertheless, it must be pointed out that snowy owls are now imported in some numbers by aviculturists, and so the possibility that the Hauxley bird was an escape cannot be ruled out.

247. Tawny Owl *Strix aluco*
For the first winter in 11 years F. Stabler heard and saw none at the edge of Jesmond Dene (Newcastle) in 1964-65. No apparent decline in south-west Durham.

248. Long-eared Owl *Asio otus*
A juvenile at Crookfoot Reservoir on 8 July (PJS) ; 3 pairs bred successfully in Northumberland ; birds seen at Gosforth Park (up to 7), Holy Island, Bamburgh, Hauxley and Hurworth Burn.

249. Short-eared Owl *Asio flammeus*
Occurred widely and nested in both counties (*ca.* 15 pairs in Northumberland). A pair in Durham produced 4 young from 5 eggs, and these safely left the nest.

252. Nightjar *Caprimulgus europaeus*
Noted at Hamsterley S.F., Dipton, Kielder, Rothbury and Blagdon Hall.

255. Swift *Apus apus*
Present from 1 May. Conspicuous in the early Sept. drift : 200, with some martins, over Hartlepool—and others coming in—on 4 Sept., when there was also a heavy southerly movement in Northumberland. Next day, 150-200 moved slowly north over Hartlepool, again with a few martins, and 40 more on 6 Sept. A few late birds were seen in Oct.

258. Kingfisher *Alcedo atthis*
No reports.

264. Lesser Spotted Woodpecker *Dendrocopos minor*
1 in Gosforth Park in Mar. and Sept., 1 at Bywell in May and 1 on the Durham bank of the Tees near Winstone in Mar.

265. Wryneck *Jynx torquilla*
Migrants on 4 Sept. (3 Holy Island, 2 Bamburgh), 5 Sept. (2 Holy Island, 1 Craster, 3 Cullernose), 8 Sept. (1 Holy Island, 1 Hauxley), 12 Sept. (2 near Whitley Bay, 1 Hurworth Burn—5 miles inland), 15 Sept. (1 Bamburgh), 3 Oct. (1 Tynemouth, 1 Teesmouth) and 4 Oct. (1 Teesmouth). These records do not all concern different individuals.

273. Shore-Lark *Eremophila alpestris*
Only record : 2 near the Zinc Works pools, Teesmouth, on 28 Nov. (JCN, ECG).

274. Swallow *Hirundo rustica*
A late bird was watched at Morpeth for 10 minutes on 14 Nov. (MGB).

277. Sand-Martin *Riparia riparia*
First noted at Wingates Moor on 26 Mar. (IH).

279. Raven *Corvus corax*
Young fledged from 5 sites in Northumberland.

281. Hooded Crow *Corvus corone cornix*
Very scarce : 2 at Chevington Burn on 20 Mar. ; 1 summered at Bamburgh Apr.—Aug. ; 5 in north Northumberland Nov.—Dec., when a lone individual was seen on 2 occasions on Seaton Carew tip—the only Durham records for the year.

282. Rook *Corvus frugilegus*
The Haymarket (Newcastle) colony contained 16 occupied nests in the spring—twice as many as last year (RMP).

293. Willow-Tit *Parus montanus*
Reported from Craster—an adult (caught there last year) with a juvenile, Seaton Delaval, Bolam, Cresswell, Hauxley, Gosforth Park and Shincliffe.

295. Bearded Tit *Panurus biarmicus*
A male, caught at Bamburgh on 9 Oct. and present until 19 Oct., is the first known occurrence in either county. It was also caught at Hauxley on 10 Oct. A pair was in Gosforth Park from 23 Oct. until 21 Nov.

296. Nuthatch *Sitta europaea*
In June, 2 juveniles visited a bird table near Hamsterley S.F., while young were being fed in south Northumberland in the same month. This is the only positive evidence of breeding this year, but birds were seen at Corbridge, Stocksfield, south-west Durham, Wynyard Park, Castle Eden Dene, Chester-le-Street and Durham City.

302. Fieldfare *Turdus pilaris*
Stayed late in spring and arrived early in autumn. 35 at Cresswell on 1 May, 75

on Inner Farne on 3 May (of which 1 remained until 9 May), *ca.* 100 at Holy Island on 4 May, 40 at Hauxley on 8 May and 1 at Bamburgh on 16 May. 1 at Hartlepool on 15 and 16 Aug. was followed by another on 4 Sept. Seen daily from 27 Sept., with heavy immigration Oct.-Nov.

303. Song-Thrush *Turdus philomelus*
A good year for movement at Hauxley, particularly during the period end Sept.—early Oct. On 26 Sept., 160 came in and on 2 Oct., 750 (BL).

304. Redwing *Turdus iliacus*
2 late lingerers on Inner Farne on 3 May. 1 at Hauxley on 16 May was possibly the bird seen there throughout Aug.—perhaps having summered.

307. Ring-Ouzel *Turdus torquatus*
A remarkable influx occurred in the first few days of Oct., with totals reaching the hundreds all along the coastline of the 2 counties.

311. Wheatear *Oenanthe oenanthe*
Present from 26 Mar. (Wingates Moor and Tow Law) until late autumn.

317. Stonechat *Saxicola torquata*
Bred successfully at Bamburgh. Numerous coastal records for first 5 and last 5 months of year. The only inland report was of a male at Darlington sewage farm in Aug. (DIG).

318. Whinchat *Saxicola rubetra*
Some 200 reported in the early Sept. drift. There was a further influx (*ca.* 30) coinciding with the *Turdidae* immigration of 2-3 Oct. The last were 2 at Graythorp on 17 Oct. (TF, PR, BF).

320. Redstart *Phoenicurus phoenicurus*
The first was a male at Beamish on 6 Apr. (TH) and the last was 1 at Hartlepool on 31 Oct. (ECG). Many hundreds in the early Sept. drift.

321. Black Redstart *Phoenicurus ochruros*
Scarce : 2 on Holy Island on 7 Feb. (BG, KY), 1 on Brownsman on 29 Mar. and 2 on 14 May, 1 at Tynemouth on 25 Sept., 1 at Hartlepool on 2 Oct. (EB, DGS, CB), 1 at Hauxley on 23 Oct. and 1 at Bamburgh on 6 Nov.

323. Thrush-Nightingale *Luscinia luscinia*
1† trapped at Hauxley on 26 Sept. (PY, GB, BG, ER *et al*) was retrapped there next day ; another† was trapped in the same place on 2 Oct. (BG, ER). These are the first records of this continental species for the British mainland ; the previous 5 occurrences have been on Fair Isle in May.

324. Bluethroat *Cyanosylvia svecica*
2 at Hartlepool on 4 Sept. and 1 on 5 Sept. In Northumberland, 1 at Hauxley on 4 Sept. and 1 on 26 Sept., when another was at Dunstanburgh; 1 on Holy Island on 2 Oct. (BG, KY).

325. Robin *Erithacus rubecula*
A very large fall on 1-2 Oct. : over 200 at Hartlepool, and over 300 in both the Hauxley and St. Mary's Island areas.

333. Reed-Warbler *Acrocephalus scirpaceus*

Migrants as follows :

3 Sept. : 1 dead at Hartlepool (PR).
4 Sept. : 1 Hauxley.
5 Sept. : 1 Hauxley, 1 Hartlepool (RT, JVH, PJS).
6 Sept. : 1 trapped Inner Farne (PRE).
7 Sept. : 1 trapped Craster (PRE), 2 Bamburgh (also on 8 Sept.).
26 Sept. : 1 trapped Craster (PRE).
2 Oct. : 1 trapped Graythorp (PR, TF).
9 Oct. : 1 trapped Hauxley.

340. Icterine Warbler *Hippolais icterina*

1 near Whitley Bay on 7 Sept. (JDP, AB) was considered to be a different bird from the *Hippolais* warbler seen there on 11 Sept. (JDP).

343. Blackcap *Sylvia atricapilla*

1 presumably wintering, was seen at Fenham (Newcastle) on 27 Feb. On 10 Apr. males sang in Gosforth Park and Horsley Wood. Numerous on autumn passage, with the last migrant—a male—at Hauxley on 14 Nov.

344. Barred Warbler *Sylvia nisoria*

Now known to be a regular autumn passage migrant.

17 Aug. : 1 on Brownsman (PRE).
1-8 Sept. : up to 3 Holy Island (PRE).
4 Sept. : 3 Hauxley, 2 Bamburgh.
5 Sept. : 1 Hauxley, 1 near Whitley Bay.
6 Sept. : 2 near Whitley Bay, 1 on Inner Farne.
15 Sept. : 1 Bamburgh.
26 Sept. : 2 Hauxley.
1 Oct. : 1 St. Mary's Island (HP).
2 Oct. : 1 Craster, 1 Hartlepool (CB), *ca.* 3 Holy Island (KY), 1 St. Mary's Island (SM), 2 Hauxley.
15 Oct. : 1 Hauxley.

There is no doubt some overlap among these records.
Correction to (Bell, 1965), page 170 : the adult on Holy Island was on 3 Sept.

348. Lesser Whitethroat *Sylvia curruca*

1 at Craster on 6 June was retrapped in Aug., with another adult and 4 juveniles—almost certainly bred locally (PRE). As in previous years, 1 sang near Beal on 29 and 30 May (MGR), while birds also occurred at Bamburgh and Cresswell in the same month. Probably bred at Blaydon, Tarset, Alnwick and Fenwick. Single individuals were trapped at Rock and Arcot Hall in June (CED). Occurred daily in the autumn drift from 30 Aug., and again 2-4 Oct., with the last 1 at Hauxley and 1 on Holy Island on 9 Oct.

354. Willow-Warbler *Phylloscopus trochilus*

Occurred daily from 10 Apr.—3 in Gosforth Park. Numerous in the early Sept. rush.

355. Greenish Warbler *Phylloscopus trochiloides*

1† trapped at Bamburgh on 4 Sept. remained until 7 Sept. (MB, MM, JMB). First record for Northumberland.

356. Chiffchaff *Phylloscopus collybita*

First recorded on 3 Apr. : 1 at Hauxley and 1 at Mitford. 1 near Beal on 5 Apr., after making an orthodox start, regularly lapsed into notes resembling song of willow-warbler (MGR). Many in the Sept. and Oct. drift movements. 1 in full song in Gosforth Park on 30 Oct. was probably the bird noted there 21-27 Nov. (BG).

357. Wood-Warbler *Phylloscopus sibilatrix*

First noted 14 May and thereafter fairly widespread in suitable areas.

359. Arctic Warbler *Phylloscopus borealis*

1† seen at Hauxley on 15 Aug. (BL). 1† trapped at Low Hauxley on 16 Sept. was kept there overnight and taken next morning to Gosforth where it was released, staying in the area until at least 18 Sept. (BL, EM, ER). These are the fourth and fifth records for Northumberland and it has never been recorded from Durham.

360. Yellow-browed Warbler *Phylloscopus inornatus*

1 in West Hartlepool cemetery on 2 Oct. (ECG, CB, EB) ; 1 trapped near Graythorp 9-10 Oct. (ECG, JCN, PJS, PR) ; 1 trapped at Bamburgh on 10 Oct. (JDP).

364. Goldcrest *Regulus regulus*

The breeding population appears more or less to have recovered its numbers since the 1962-63 winter. A spectacular influx in the first few days of Oct.—thousands all along the coastline.

365. Firecrest *Regulus ignicapillus*

An adult at Hauxley 22-23 Oct. (BG, BM, BL).

366. Spotted Flycatcher *Muscicapa striata*

Not noted before 12 May—2 in Hopeshield Burn Dene, Simonburn (IHA). Unusually numerous on autumn passage, with 10 late birds in Oct., the last being 1 in Whitley Bay cemetery 23-24 Oct. (BG, JKJ).

368. Pied Flycatcher *Muscicapa hypoleuca*

First at Holywell Dene on 21 Apr. (PB). 29 young were ringed in the Hamsterley S.F. Numerous on autumn passage into Oct.

370. Red-breasted Flycatcher *Muscicapa parva*

2 on Holy Island on 22 Sept., 2 at Hauxley on 25 Sept., 2 trapped at Craster on 27 Sept. (PRE), 1 at Craster and 4 at Hauxley on 2 Oct. (PRE), 1 on Brownsman and 1 on Inner Farne on 5 Oct. (PRE), 1 at Hartlepool on 8 Oct. (PR) and 1 near Graythorp on 23 Oct. (DM, RAS, JM).

373. Meadow-Pipit *Anthus pratensis*

Northerly movement at Bamburgh in late Mar. and in Apr. Much movement in Oct., maximum 300 at Hauxley on 2 Oct. and "many hundreds" at Whitburn on 8 Oct.

380. Pied Wagtail *Motacilla alba*

About 40 seen while motoring in the Kielder district on 26 June (DGB), but unusually scarce in the Alnwick area (EM).

381. Grey Wagtail *Motacilla cinerea*

This species is still scarce since its numbers were drastically reduced in the 1962-63

winter. Recorded throughout the year, but many records in autumn (e.g. 6 at Hartlepool on 13 Oct.) concerned non-local birds. Only 3 breeding records: a family of 6 at Alnwick on 27 June (DGB), a pair at Chirton Burn (MN) and 1 feeding a fledgling in Hamsterley S.F. on 16 July (*per* VFB).

382. Yellow Wagtail *Motacilla flava*
First record: 5 at Holywell Ponds on 4 Apr.

383. Waxwing *Bombycilla garrulus*
None until late autumn, when the heralds of a large invasion arrived on 13 Oct.—7 in South Shields (FGG). After 16 Oct., seen daily over a large part of both counties. The records are far too numerous to detail here, but the biggest Northumberland flock was *ca.* 150 in Throckley Dene on 23 Nov. (BL) and the biggest Durham flock, several hundred in Castle Eden Dene about the same time. Birds dispersed over a wide area, and no such large flocks were reported in Dec.

384. Great Grey Shrike *Lanius excubitor*
1 at Kielder during Apr. (per BL). 1 at Holy Island on 4 May (TH) was perhaps the bird seen at Bamburgh 1-9 May. Influx on 2 Oct.: 1 on Holy Island (AJR), 2 at St. Mary's Island (JDP), 1 at Hauxley and 1 at North Gare (DGS, CB, PR); also 1 at Druridge on 4 Oct. (TH), 1 at Ellington on 9 Oct. (CW) and 1 at Ross on 23 Oct. (IHA). In winter, 1 was at Widdrington on 2 Dec. (FGG) and 1 at Billingham Pond 7-19 Dec. (DIG, PJS).

386. Woodchat-Shrike *Lanius senator*
1† on Brownsman 25-26 May, after 3 days of strong north winds; it took shelter in the house, and was caught and photographed (FYB). A first-winter bird was on Holy Island 21-24 Sept., with a red-backed shrike present for comparison. (RN, MN, LCM, PRE). These are the sixth and seventh records for Northumberland.

388. Red-backed Shrike *Lanius cristatus*
About 17 recorded—more than in any previous year. 3 occurred on Holy Island 4-8 Sept. and 1 on 24 Sept.; also 1 at Hartlepool 4-5 Sept., when 3 occurred in south-east Northumberland (1 again on 14 Sept.); 1 on Ross Links on 9 Sept.; 5 at Chevington 9-10 Sept.; 1 at Graythorp 11-12 Sept.; 1 at Hauxley on 26 Sept.; 1 at Bamburgh on 27 Sept.

391. Hawfinch *Coccothraustes coccothraustes*
2 at Bywell on 29 Apr. and 4 May, and 3 on 26 June (IHA, CW).

393. Goldfinch *Carduelis carduelis*
Widespread throughout the year; maximum 30 at Graythorp in Dec.

394. Siskin *Carduelis spinus*
At least 4 males held territory in Northumberland. A female at Bamburgh on 8 May was the only other record before 4-5 Sept., when odd birds flew in at Hartlepool. Others arrived daily 10-14 Sept. and 26 Sept.-5 Oct. (maximum 60 at Bamburgh on 2 Oct.). Apart from a few birds later in Oct. none was recorded before late Dec., when small parties were seen near Stannington and Morpeth.

397. Redpoll *Carduelis flammea*
A flock of *ca.* 100 at Roughtinglinn on 27 Aug. built up to 300-400 by 12 Sept., decreasing to *ca.* 200 by 23 Sept., and breaking up by 27 Sept. (PRE). Rather scarce in Kielder in 1965 (BL).

398. Arctic Redpoll *Carduelis hornemanni*
1† trapped at Bamburgh 10-16 Oct. showed the characteristics of this redpoll.

401. Bullfinch *Pyrrhula pyrrhula*
Appears to be increasing everywhere. Flocks of up to 30 visited gardens in Alnwick in Jan. (ER). A flock of 30 fed on heather seeds at Rothbury on 27 Nov. (LGM). About 25 at Graythorp on 11 Dec. (PR, EB).

404. Crossbill *Loxia curvirostra*
Small numbers in Gosforth Park in Jan. and Mar., and at Dipton in Jan.,; 4 in West Hartlepool cemetery on 1 Oct., and 1 on 3 Oct., during the continental migrant fall, which also brought 16 to Hauxley on 4 Oct. 2 pairs, with young, seen in Northumberland in June.

408. Brambling *Fringilla montifringilla*
A good brambling year. Absent from late Apr. to early Oct., apart from a pair on Inner Farne for 2 or 3 days (the male for 10 days) from 23 May (CMA). Big numbers were 200 at Cleadon Hills in Jan. (MLC), 350 near Morpeth in Feb. (BE), over 300 in Holywell Dene and *ca.* 100 in Durham City in Nov. (PB, HMJ), and over 1,000 (with a similar number of greenfinches) at Graythorp 4-5 Dec. (EB, PR). This last remarkable concentration was undoubtedly due to the hard weather—none was left at Graythorp on 11 Dec. when the snow inland had melted.

[**413. Red-headed Bunting** *Emberiza bruniceps*
A male with house-sparrows at Hartlepool on 11 Sept. (ECG, PJS) was presumably an escape.]

416. Ortolan Bunting *Emberiza hortulana*
1 at Hauxley on 5 Sept. (BG).

422. Lapland Bunting *Calcarius lapponicus*
2 at Hauxley on 9 Oct.; 3 on Holy Island on 17 Oct. (TVBW); 10 near Beal on 29 Oct. (DGB, SAB) and 6 on 8 Nov. (MGR). No other records.

423. Snow-Bunting *Plectrophenax nivalis*
No records between late Mar. and 25 Sept. (1 on St. Mary's Island: RMP). Whitburn was the main wintering area: 400 in Jan., in which month 100 also frequented South Shields (MLC). The Teesmouth population was again low: maximum 52 in Feb. Inland, snow-buntings occurred as usual on Newcastle Town Moor, maximum 70 in Dec. (LGM); also *ca.* 60 at West Boldon on 27 Jan. (PH).

425. Tree-Sparrow *Passer montanus*
Again nested in the open in a hawthorn hedge at Beal (MGR).

† signifies a record accepted by the *British Birds* Rarities Committee.

RINGING

The following authorised ringers have contributed information to this section of the report :—Bamburgh Ringing Group, A. Belshaw and F. Colley, T. A. Bowbeer, P. R. Evans (Monk's House Bird Observatory), C. J. Gent, Natural History Society of Northumberland, Durham and Newcastle upon Tyne, Northumbria Ringing Group, P. Reid, J. Richardson, Tyne/Tweed Ringing Group and P. Yeoman.

The continuing increase in the numbers of birds ringed in the two counties has meant a corresponding increase in recoveries and it has not been possible to detail all ringed birds found in 1965; a selection of the most interesting recoveries (including some made in 1964, but not previously reported) is, however, given below. Lack of space also makes it impossible to give the various methods of recovery, but the letter **A** has been used to indicate that a bird has been found alive (in some cases controlled by another ringer).

The Sand Martin Enquiry has continued and, as a result, sand-martins have provided the largest number of recoveries of any single species. The list of recoveries includes details of controlled recoveries of five locally-ringed birds and, in addition, twenty sand-martins from the area were retrapped at a large roost at Wiggenhall, near King's Lynn, Norfolk. Eight of these came from Prudhoe, four from Corbridge, two from Rothbury and two from Shincliffe, while Staward, Wark, Slaley and Branch End each provided single birds. Birds recovered at local colonies had been ringed as follows :—

Corbridge : Fairburn, Castleford, Yorks. (1) ; La Chapelle sur Erdre, Loire Atlantique, France (1)

Branch End : Cornhill-on-Tweed, Northumberland (1) ; Fairburn (1) ; Pagham, Sussex (2) ; Ashford, Middlesex (1)

Prudhoe : Carlton in Lindrick, Worksop, Notts. (1) ; Averham, Newark, Notts. (1) ; Coylton, Ayrshire (1) ; Chichester, Sussex (1) ; Elm Park, Romford, Essex (1)

Mickley : Kelso, Roxburghshire (1)

One of the most interesting recoveries is that of the dipper (apparently killed by striking a viaduct wall) found at Barnard Castle. The bird had travelled 24 miles south-east—probably the longest recorded journey of a bird of this species in Great Britain. Another interesting recovery is the kittiwake found nesting on a warehouse at the mouth of the Ouseburn (see page 101) for it suggests that this recently formed colony is probably an off-shoot of the well-established colony at Smith's Dock, North Shields.

RECOVERIES OF RINGED BIRDS

(a) Ringed in Northumberland and Durham

Date and place ringed	*Place recovered*	*Date recovered*
MALLARD		
29.8.64 (w)Low Hauxley, Northd.	Pihtipudas, Reski-Suomi, Finland	22.8.65
KESTREL		
2.7.65 Kimblesworth, Co. Durham	Moreton Morrell, Warwickshire	29.11.65
LAPWING		
6.6.58 Langdon Beck, Co. Durham	Newbiggin-in-Teesdale, Co. Durham	(15.5.65)
COMMON SNIPE		
22.8.64 *Cresswell, Northd.	Nr. Castle Douglas, Kirkcudbrightshire	9.3.65
REDSHANK		
12.6.65 Edmondbyers, Co. Durham	Wardley, Gateshead, Co. Durham	24.11.65
DUNLIN		
6.9.60(juv.)Seahouses, Northd.	Insel Sylt, N. Frisian Islands, Germany	16.5.65
2.5.65 *Dorman's Pool, Teesmouth, Co. Durham	Grand Camp, Calvados, France	27.7.65
14.8.65 *Cresswell	L'Aiguillon, Vendée, France	28.8.65
RUFF		
27.8.60 *Bamburgh, Northd.	Luimen, Noord Holland, Netherlands	2.5.65
HERRING-GULL		
19.1.65 *Wallsend, Northd.	Aberdeen	27.8.65
BLACK-HEADED GULL		
16.11.59 (w)Seahouses	Asker, Akershus, Norway	20.5.65
5.7.64 Blanchland, Northd.	Ballyduff, Waterford, Eire	12.1.65
KITTIWAKE		
13.6.57 N. Shields, Northd.	Ouseburn, Newcastle upon Tyne **A**	25.6.65
WOOD-PIGEON		
24.6.62 *Fenwick, Northd.	Fenwick	23.7.65
14.10.62 (w)Bamburgh	Nr. Berwick upon Tweed, Northd.	12.4.65

Date and place ringed		*Place recovered*	*Date recovered*
Cuckoo			
17.7.65	Bedburn, Hamsterley S.F., Co. Durham	Pool, Otley, Yorks.	22.8.65
Barn-Owl			
29.7.64	Longbenton, Northd.	Ellington, nr. Morpeth, Northd.	9.2.65
27.6.65	Kielder, Northd.	Falstone, Northd.	30.11.65
,,	Kielder (same brood)	Witton-le-Wear, Co. Durham	4.12.65
Little Owl			
8.6.64	Kirkley, nr. Ponteland, Northd.	Wardley	26.4.65
Swift			
17.7.62	*Holywell, Northd.	Cullercoats, Northd.	July 1965
6.8.62	*Seaton Burn, Northd.	Blaydon-on-Tyne, Co. Durham **A**	6.7.65
Swallow			
12.8.61	*N. Teesside	N. Teesside **A**	6.6.65
2.8.65 (w)	Low Hauxley	Tweespruit, Orange Free State, S. Africa **A**?	15.11.65
Sand-Martin			
9.6.65	*Branch End, Northd.	Fairburn, Castleford, Yorks. **A**	25.8.65
3.7.65(juv.)	Corbridge, Northd.	Bradwell-on-Sea, Essex	21.7.65
,, (juv.)	Corbridge	Downham Market, Norfolk	5.8.65
26.7.65(juv.)	Prudhoe, Northd.	Chichester, Sussex	6.8.65
10.8.65(juv.)	Prudhoe	Holme Pierrepoint, Notts. **A**	15.8.65
Magpie			
15.4.64	Tranwell, nr. Morpeth	Longwitton, Northd.	27.6.65
Blue Tit			
9.1.65	*N. Shields	Riding Mill, Northd.	21.3.65
Willow-Tit			
25.4.62	*Gosforth, Northd.	Gosforth **A**	6.11.65
Bearded Tit			
10.10.65	*Bamburgh	Low Hauxley **A**	26.12.65
Wren			
31.10.65	*Bamburgh	Stannington, Northd.	23.11.65
Dipper			
18.5.64	(s) Rowley Burn, Northd.	Cockfield Fell, nr. Barnard Castle, Co. Durham	18.1.65

Date and place ringed		*Place recovered*	*Date recovered*
Song-Thrush			
10.6.63	*Gosforth	Llwyngwril, Merionethshire	2.3.65
21.3.64	*Bamburgh	Terras do Bousco, Portugal	Jan. 1965
27.3.64	*Low Hauxley	Adamuz, Cordoba, Spain	Oct. 1964-Apr. 1965
17.5.64	*Hartley, Northd.	S. Mitford, Leeds, Yorks.	(30.12.64)
4.10.64	*Low Hauxley	Médoc, Gironde, France	early Apr. 1965
15.11.64	*Bamburgh	Whitby, Yorks.	25.7.65
2.10.65	*Low Hauxley	Barcelos, Minho, Portugal	20.11.65
Redwing			
14.10.64	*Gosforth	Torrelavega, Santander, Spain	Mar. 1965
Blackbird			
22.2.61	*Gosforth	Harklau, Sogn og Fjordane, Norway	7.4.65
26.5.62	Hartley	Redcar, Yorks.	21.6.65
1.12.62 (w)	Gosforth	Augustenborg, Als, Denmark	5.1.65
17.2.63	*Gosforth	Romeriki, Akershus, Norway	10.10.65
26.10.63 (w)	Low Hauxley	Hauge i Dalane, Rogaland, Norway	(12.11.64)
16.11.63	*Killingworth, Northd.	Crossmilina, Co. Mayo, Eire	20.11.64
19.1.64 (w)	Gosforth	Haukivuori, Mikkeli, Finland	19.6.64
28.3.64 (w)	Low Hauxley	Masfjorden, Hordaland, Norway	21.3.64
11.10.64 (w)	Low Hauxley	Messanges, Landes, France	2.1.65
18.10.64 (w)	Low Hauxley	Nr. Brechin, Angus	31.3.65
29.10.64 (w)	Low Hauxley	Nr. Stewartstown, Co. Tyrone, N. Ireland	26.12.65
31.10.64	*Bamburgh	Nr. Horncastle, Lincs.	28.2.65
22.11.64 (w)	Whitley Bay, Northd.	Vaksdal, Hordaland, Norway	27.3.65
20.1.65 (w)	Gosforth	Lindas, Hordaland, Norway	20.11.65
22.1.65	*Gosforth	Moss, Østfold, Norway	July 1965
25.1.65	Whitley Bay	Lau, Gotland, Sweden	28.3.65
14.2.65	*Rock, nr. Alnwick, Northd.	Melholt, Jutland, Denmark	20.8.65
24.10.65	*Bamburgh	Ballyhaise, Co. Cavan, Eire	26.12.65
Redstart			
4.7.65	Hamsterley S.F.	Padern, Algarve, Portugal	(14.10.65)
2.10.65(juv.)	Whitley Bay	Djidjelli, Constantine, Algeria	24.10.65

Date and place ringed	*Place recovered*	*Date recovered*
ROBIN		
2.10.65 *Craster, Northd.	Zanhoven, Antwerpen, Belgium	18.11.65
BLACKCAP		
8.8.63 *Gosforth	Miranda de Ebro, Burgos, Spain	22.9.65
WILLOW-WARBLER		
12.9.64 *Low Hauxley	Minsmere, Suffolk **A**	7.5.65
24.7.65 *Bamburgh	Chichester **A**	16.8.65
PIED FLYCATCHER		
5.7.64 Hamsterley S.F.	Bamburgh **A**	16.5.65
5.9.65 *Bamburgh	Mogofores, Beira Litoral, Portugal	20.10.65
DUNNOCK		
8.9.65 *Bamburgh	St. Abbs, Berwickshire	31.12.65
WAXWING		
21.11.65 *Low Hauxley	Nr. Doncaster, Yorks.	(10.12.65)
STARLING		
5.1.62 (w)Bamburgh	Feragen, Sör-Tröndelag, Norway	29.6.65
26.1.64 *Hartburn, Northd.	Vester Alling, Jutland, Denmark	28.8.65
GREENFINCH		
31.12.61 (w)Graythorp, nr. W. Hartlepool, Co. Durham	Middleton-on-the-Wolds, Driffield, Yorks.	9.3.65
20.10.63 *Low Hauxley	Ferryhill, Co. Durham **A**	*ca.*30.1.65
22.2.64 (w)Wallsend	Nr. Knaresborough, Yorks.	*ca.*20.5.65
25.10.64 *Low Hauxley	Nr. N. Berwick, E. Lothian	13.4.65
25.10.64 (w)Low Hauxley	Between Coldstream and Greenlaw, Berwickshire	22.6.65
,, (w)Low Hauxley	Morebattle, Kelso, Roxburghshire **A**	(2.9.65)
4.1.65 *Hartley	Lancaster, Lancs.	9.6.65
GOLDFINCH		
4.6.65 *Bellingham, Northd.	Nr. Hawick, Roxburghshire	3.7.65
LINNET		
28.7.64 *Gosforth	St. Geours de Marenne, Landes, France	Oct. 1965

Date and place ringed	*Place recovered*	*Date recovered*
LINNET—*continued*		
2.10.65 *Graythorp	Winestead Patrington, Yorks.	18.12.65
LESSER REDPOLL		
25.4.64 *Arcot Hall, nr. Seaton Burn, Northd.	Aubenas, Ardèche, France	*ca.*8.3.65
2.8.64(juv.)Craster	Buchholz-Losheimergraben, Liège, Belgium	2.10.64
27.8.64 (w)Gosforth	Chisseaux, Indre et Loire, France	2.3.65
30.8.64 (w)Craster	Athus, Luxembourg	6.10.64
6.9.64 (w)Howick, Northd.	Bracquegnies, Hainant, Belgium	6.11.64
,, (juv.)Howick	Canterbury, Kent	24.3.65
12.9.64 (w)Howick	Lamain, Hainant, Belgium	*ca.*10.11.64
,, *Gosforth	Oignies, Namur, Belgium	2.11.64
,, *Gosforth	Méru, Oise, France	Dec. 1964
15.5.65 *Bamburgh	Antoins, Hainant, Belgium	30.10.65
11.7.65 (w)Low Hauxley	Marcourt, Limburgh, Belgium	4.11.65
12.9.65(juv.)Ford, Northd.	Guignies, Hainant, Belgium	23.10.65
,, (juv.)Seahouses	Vichte, W. Flanders, Belgium	3.11.65
,, (juv.)Ford	Houthem, W. Flanders, Belgium	6.11.65
14.9.65 (w)Ford	Geel, Antwerpen, Belgium	22.11.65
BULLFINCH		
3.9.64(juv.)Craster	Kelso, Roxburghshire	2.9.65
YELLOW HAMMER		
31.12.60 *Graythorp	Graythorp **A**	24.7.65
HOUSE-SPARROW		
3.12.60 *Billingham, Co. Durham	Billingham	8.3.66
TREE-SPARROW		
26.10.64 *Low Hauxley	Warkworth, Northd.	16.7.65

(b) Interesting local recoveries of birds ringed outside the two counties (including foreign-ringed birds).

Date and place ringed	*Place recovered*	*Date recovered*
FULMAR		
12.7.60 *Foula, Shetland	Seahouses	20.6.65
TEAL		
15.8.65 *Nr. Copenhagen, Denmark	Fenham Mill, Northd.	1.9.65

Date and place ringed		*Place recovered*	*Date recovered*
GOLDENEYE			
16.7.63	Meraker, Nord-Trondelag, Norway	Berwick upon Tweed	6.1.64
ARCTIC TERN			
June 1964	Poel Island, Mecklenburg, Germany	Cresswell, Northd.	23.7.64
LONG-EARED OWL			
9.6.63	Zwonitz, Sachsen, Germany	S. Hetton, Co. Durham	27.12.64
GREENFINCH			
26.10.64	*Cark in Cartmel, Lancs.	Sunderland	(3.3.65)
BLACK-HEADED GULL			
21.6.64	Foteviken, Malmöhus, Sweden	Greatham Creek, Teesmouth, Co. Durham	18.1.65

NOTES : 1. * Indicates bird ringed as adult or full grown
2. (w) Indicates bird ringed as 1st winter
3. (s) Indicates bird ringed as 1st summer
4. (juv.) Indicates bird ringed as juvenile
5. All other birds have been ringed as pullus
6. Where the date of recovery is unknown, the date of the reporting letter is given in brackets

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REFERENCES

BELL, D. G. (1965). Ornithological report for Northumberland and Durham for 1964. *Trans. nat. Hist. Soc. Northumb.* **15**, 170.

BOLAM, G. (1932). A catalogue of the birds of Northumberland. *Trans. nat. Hist. Soc. Northumb.* **8**, 1.

ORNITHOLOGICAL REPORT FOR THE FARNE ISLANDS FOR 1965

Compiled by

GRACE HICKLING

INTRODUCTION

Principal contributors to this report are C. M. Adamson, F. Y. Bodger, J. C. Coulson, P. R. Evans, I. K. Marshall, E. Meek, G. R. Potts, W. Shiel, Miss J. Spriggs and the compiler. The Study Centre was manned continuously from 8 April, when I. K. Marshall went out to Inner Farne, until 13 August, when the watchers (among whom had been C. M. Adamson and E. Meek) returned to the mainland. G. R. Potts stayed on Brownsman from 14 to 26 April ; he was followed by F. Y. Bodger who remained on the Outer Group throughout the season. In addition to those already mentioned, among others who have helped with the ringing, or provided records, were visitors to the Study Centre, students from Durham University and members of the Natural History Society, including C. Almond, Mrs. H. E. Almond, Miss S. Appleby, W. H. Barnett, M. and T. H. Bell, W. Carr, Mrs. A. M. Clark, Mr. and Mrs. S. Dale and M. Dale, C. L. Davidson, W. J. Douglas, J. A. Gledson, A. E. Hingston, P. Hurley, B. Little, M. Marquiss, B. Mortimer, J. H. Neesham, M. Riley and J. D. Tully. As in previous years, the initials of an observer are given only when a species is either difficult to identify or occurs infrequently.

In this report, as in the county ornithological report, the classified notes, and ringing recoveries, are arranged in the order given in the *Check-list of the birds of Great Britain and Ireland* (1952), published by the British Ornithologists' Union.

GENERAL

As in 1964, shags began nesting early and on 25 January, despite bitterly cold weather, ten nests had been started on Brownsman and there were others on Staple Island. 10 February was milder and there were signs of growth in the campion ; the usual winter-residents were present, while a flock of about twenty greenfinches, and another of some fifty snow-buntings, were on Brownsman. By 29 March, although the greenfinches were still there, most of the snow-buntings had left. On the other hand, the presence of a black redstart, as well as small

numbers of wheatears, meadow-pipits, chaffinches, dunnocks and goldcrests, showed that the spring passage had begun.

The first swallow was seen on Inner Farne on 26 April ; this was followed on 28 April by a large influx of robins and dunnocks together with smaller numbers of other passerines. Inner Farne arrivals during 28-29 April included twelve fieldfares, three ring-ouzels, at least twenty-seven robins, four dunnocks and three bramblings while among birds seen on Brownsman were fifty or sixty robins, several spotted flycatchers and up to twenty dunnocks.

On Brownsman, both common and arctic terns were reduced in numbers while the Sandwich tern colony contained fewer clutches of two than usual, probably about sixty per cent. of the eggs being singletons ; moreover, many of the Sandwich eggs were infertile. Breeding success among the terns, especially on Brownsman, provided a marked contrast with 1964. Despite apparently favourable weather conditions, considerable numbers of tiny young died in mid-June and on 23 June F. Y. Bodger wrote that he had "never seen so many dead chicks, both Sandwich and arctic." Mortality decreased during the next fortnight, but suitable food seemed to be scarce and adults were bringing in comparatively large fish—for example, small herrings—rather than sand-eels. One unusual result was a tendency for the Sandwich chicks to vomit when handled. On Inner Farne, in order to encourage eider ducks to settle in areas where they would not be disturbed by visitors, I. K. Marshall constructed some experimental nests in wooden "stalls" and these proved very successful. In one group, seven out of eight spaces were occupied, the ducks sitting side by side, separated only by low partitions.

Although there were no students in residence after mid-August, P. R. Evans made four autumn visits and his observations show that movement on the Farnes followed the pattern reported elsewhere on the east coast. For example, on 17 August, following a fall of Scandinavian birds (mainly willow-warblers and pied flycatchers, but also including icterine and barred warblers) among the birds he recorded were one or two pied flycatchers, a barred warbler and at least sixteen willow-warblers. A similar situation prevailed in early September, when many tens of thousands of small birds (including redstarts, wheatears, whinchats, garden-warblers and pied flycatchers) arrived, for on 6 September there were some ten redstarts, two wheatears, two whinchats, at least ten garden-warblers and two pied flycatchers on Inner Farne. By October, the winter-visitors were coming in and on 5 October, among the large numbers of birds on Inner Farne and Brownsman, were over seventy song-thrushes, tens of redwings and thirteen or fourteen siskins.

As mentioned in the last report, the Wild Birds (Farne Islands Egg Sanctuary) Order 1964 came into force on 16 August 1964 and, on the whole, its provisions have been observed. One result is that local fishermen are no longer allowed to collect gulls' eggs on the Wamses, Harcars and Wideopens. In the past there was little discrimination in the kinds of eggs taken and it is hoped that this prohibition will mean that species such as eiders, terns, and oystercatchers will, once again, nest successfully on some of these islands. It is, however, becoming apparent that the large numbers of nesting lesser black-backed and herring-gulls provide a serious threat to other species and the Farne Islands Local Committee has consulted the Nature Conservancy in an attempt to control these birds.

CLASSIFIED NOTES

4. Red-throated Diver *Gavia stellata*
1 in the Fairway on 1 July (IKM).

7. Slavonian Grebe *Podiceps auritus*
2 near the Swedman and Megstone on 11 Feb. (GRP). Fourth record for the Farnes and last seen in 1954.

9. Little Grebe *Podiceps ruficollis*
1 in Cairngorm Hole (off Staple Island) on 5 Nov. (CMA, JCC, GRP). Grebes are seldom seen near the Farnes and this is, so far as is known, the first definite record of this species. The only previous reference is by Bolam (1912) who wrote "Odd ones met with at the Farnes in winter."

16a. Manx Shearwater *Procellaria puffinus puffinus*
Recorded from June to Aug., largest party being 20 flying north off Inner Farne on 22 June.

26. Fulmar Petrel *Fulmarus glacialis*
24-30 pairs nested on Inner Farne, 12 on Staple Island and Brownsman, 1 on South Wamses and 1 on West Wideopens, but only 10 young were reared (8 on Inner Farne, 1 on South Wamses and 1 on West Wideopens).

28. Cormorant *Phalacrocorax carbo*
Some 204 pairs attempted to nest. There were 10 nests on North Wamses on 18 Mar., 65 on 22 Apr. and 128 on 2 June. Laying began about 8 Apr. The brood size was 2.36 compared with an average of 2.34 (based on 271 broods). (GRP).

29. Shag *Phalacrocorax aristotelis*
G. R. Potts reports as follows :—
Nesting began in late Jan. and 22 per cent. of the nests were started by the end of Jan., the early nesters being the older birds.
All nests were complete by 1 June when there were 234 nests on Staple Island, 88 on Brownsman, 42 on Inner Farne, 2 on East Wideopens and 1 on Megstone. The total—367—was 11 per cent. up on 1964 and, for the first time, young were successfully fledged from Wideopens. The brood size of 2.06 was higher than in 1963 and 1964, and is the result of a correspondingly higher clutch size. The number of young produced by birds breeding for the first time in 1963 and 1964 was $\frac{1}{3}$ that of birds that had bred at least twice. In 1965, after a good start, the clutch size declined, with several 1 egg clutches in June. In July, rain flooded several nests and caused desertion. Since young shags lay later in the season, these factors accentuated the age differences. The laying season finished early and the autumn immigration to the Farnes was smaller than usual, although 3,100 shags were counted in early Oct.
On 20-21 Nov., most of the shag population between the Moray Firth and Flamborough Head irrupted and dispersed. 150 shags found dead on the Farnes in early Dec. were, like most of the 1,000 live birds seen, of Scottish origin. A notable feature of the numerous recoveries (see page 120) was the dispersal into the Irish Sea and north Channel, and into County Durham and Yorkshire. Most of the shags dying in Nov. were 6 months of age, whereas many of the older birds died early in 1966.

45. Mallard *Anas platyrhynchos*
A pair seen on Brownsman and Staple Island in late Mar. and Apr., but no nest found.

52. Pintail *Anas acuta*
A drake was among a small flock of mallard on Little Harcar on 25 Jan. and 2 were near Megstone on 23 Apr. Sixth and seventh records for the Farnes and last seen in 1955.

56. Tufted Duck *Aythya fuligula*
2 flying north off Inner Farne on 26 July.

60. Goldeneye *Bucephala clangula*
2 further records—4 near the Swedman and Megstone on 11 Feb. and 10 off Inner Farne on 15 Apr.

61. Long-tailed Duck *Clangula hyemalis*
2 in the Swedman-Megstone area on 11 Feb. (GRP).

67. Eider-Duck *Somateria mollissima*
Nesting started on Inner Farne on 24 Apr. when 3 ducks laid. This is 3 days sooner than in 1964, but early nests suffered heavy predation from gulls. The first ducklings hatched on Brownsman on 17 May and on Inner Farne on 23 May. Some 200 ducks nested on Brownsman, there were 667 on Inner Farne and at least 1 on Staple Island. For the first time a duck ringed (as an adult) on Coquet Island was found nesting on Inner Farne while 2 other ducks on this island had been ringed, again as adults, in 1953.

69. Red-breasted Merganser *Mergus serrator*
1 near Megstone on 11 Feb. and 4 in the Kettle on 17 July.

73. Sheld-Duck *Tadorna tadorna*
No definite proof of nesting, but 2 pairs probably bred on Inner Farne and 1 on Wideopens. A juvenile seen on Brownsman in early Aug.

75. Grey Lag-Goose *Anser anser*
No reports of the usual summering party.

80. Brent Goose *Branta bernicla*
On 13 June 1 flew from Inner Group towards Seahouses (BL). Sixth record since 1883 and last seen in 1963.

81. Barnacle-Goose *Branta leucopsis*
A party of 8 on the Scarcars on 5 Nov. allowed the boat to approach quite closely. Sixth known occurence since 1882 and last seen in 1963.

84. Mute Swan *Cygnus olor*
Fourth record for the Farnes—1 flying over Wideopens on 1 June.

85. Whooper-Swan *Cygnus cygnus*
Inner Farne : 1 on 14 Apr. Only 2 previous records—1 shot in Jan. 1893 and 1 seen on Northern Hares on 31 Oct. 1949.

110. Kestrel *Falco tinnunculus*
Single birds seen on Brownsman on 29 Apr. and 16 Aug. and on Inner Farne on 31 July and 5-6 Aug.

120. Water-Rail *Rallus aquaticus*
Inner Farne : 1 on 5 Oct. (PRE). An infrequent visitor, last seen in 1962.

131. Oystercatcher *Haematopus ostralegus*
7 pairs nested on Brownsman, 2 on Staple Island, at least 1 on Longstone and 5-6 on Inner Farne, but there is no information about other islands. A flock roosted regularly on Inner Farne from early Apr. to mid-June. Numbers reached a maximum of *ca.* 100 on 23 Apr. and fell to 30 by 17 June ; they built up again to about 50 in early Aug.

134. Ringed Plover *Charadrius hiaticula*
At least 13 pairs nested.

140. Golden Plover *Charadrius apricarius*
Among several records were 2 unusually large (for the Farnes) flocks—some 30 flying over the Kettle on 13 Aug. and at least 50 on Longstone End on 11 Oct.

143. Turnstone *Arenaria interpres*
As in 1964, maximum numbers present on 12 Aug. when about 550 were on Inner Group and 20-30 on North Wamses.

150. Curlew *Numenius arquata*
Several records, the largest flocks being 300-500 on Longstone End in Mar. and 400-500 on the same island on 11 Oct.

155. Bar-tailed Godwit *Limosa lapponica*
A further record : a male on Inner Farne on 24 Apr.

159. Common Sandpiper *Tringa hypoleucos*
Inner Farne : 1 on 8 May and 12 Aug. Brownsman : 3 on 17 Aug.

165. Greenshank *Tringa nebularia*
Inner Farne : 1 on 11 and 13 Aug.

170. Purple Sandpiper *Calidris maritima*
Maximum count on Inner Farne : *ca.* 90 on 13 Aug.

171. Little Stint *Calidris minuta*
Brownsman : 1 on 5 Oct. (PRE). Last recorded in 1957.

181. Sanderling *Crocethia alba*
Brownsman : 2 on 26 Apr. (FYB). An infrequent visitor and last recorded in 1962.

208. Black-headed Gull *Larus ridibundus*
Several records between Apr. and Aug. Although no nest was found, F. Y. Bodger believed that a pair had bred on Brownsman.

211. Kittiwake *Rissa tridactyla*
The Staple Island sites, first used in 1964, were again occupied and 6 pairs were at the north end and 2 (of which at least 1 was successful) in the "gut". The main Brownsman colony continues to spread and *ca.* 24 pairs nested on the north cliff. The first eggs were laid about 9 May.
As in 1964, considerable numbers remained near the islands until late autumn and on 6 Nov. a bird was carrying nesting material.

217. Common Tern *Sterna hirundo*
Fewer than usual nested on Brownsman.

218. Arctic Tern *Sterna macrura*
On Brownsman, the first birds were seen on 18 Apr. ; eggs were laid here on 19 May and on Inner Farne on 20 May. There was again a small colony on Staple Island, but Brownsman numbers have undoubtedly decreased during recent years and areas that formerly contained many young birds were completely deserted. The numbers of fledged young also fell, F. Y. Bodger estimating that these averaged less than 1 per pair.
The Inner Farne colony had the distinction of providing the oldest British-ringed bird to date. This was YS 581, ringed as young by Mrs. Hodgkin on 26 June 1938 and found nesting on 11 June. The Witherby ring was still in excellent condition.

219. Roseate Tern *Sterna dougallii*
37 nests were found on Brownsman : 24 in the main colony above the lower garden, 7 in the vicinity of the windlass and 6 near the upper garden. There were 10 clutches of 2 and 27 singletons. There are no figures for Inner Farne, but 25 young were ringed here and 44 on Brownsman.

223. Sandwich Tern *Sterna sandvicensis*
First recorded on 8 Apr. The whole colony (estimated at 1,750-2,000 pairs) was again on Brownsman, about 500 pairs being near the upper garden and the remainder at the north end. Birds settled on the nesting ground on 3 May, eggs being laid on 15 May. The first young were seen on June 9-10, but hatching was still taking place on 16 July and on 9 Aug. adults were feeding a group of 4-6 youngsters.
For the first time, a Farne-bred Sandwich tern was found nesting on the continent—

in a newly-formed colony in Mecklenburg. 6 others were also found in "alien" colonies—4 in Ireland and 2 in Aberdeenshire (see page 123). N. P. E. Langham continued his colour-ringing project and during Aug. and Sept. his red-ringed birds were reported in Aberdeenshire, at Teesmouth and at Rhos-on-Sea.

226. Little Auk *Plautus alle*
1 in Staple Sound on 5 Nov. Last recorded in 1960.

227. Guillemot *Uria aalge*
First eggs laid on 17 Apr. Once again no complete count was made of nesting birds, but 50-60 pairs were on the south-east cliff of Brownsman and *ca.* 6 at the north end.

230. Puffin *Fratercula arctica*
First eggs laid on Outer Group on 21 Apr.

232. Stock-Dove *Columba oenas*
A further record—3 on Brownsman on 10 Feb.

237. Cuckoo *Cuculus canorus*
Inner Farne : a juvenile on 1 Aug.

249. Short-eared Owl *Asio flammeus*
Brownsman : 1 on 5 Oct.

276. House-Martin *Delichon urbica*
A pair spent 3-4 weeks on Brownsman in late May and June. They roosted inside the cottage, and under the eaves, but did not nest.

280. Hooded Crow *Corvus corone cornix*
Inner Farne : 1 on 15 Apr.

294. Long-tailed Tit *Aegithalos caudatus*
Inner Farne : 1 on 17 Apr. (IKM). First definite record for the Farnes, only previous reference being by Bolam (1932) who wrote "Has occurred at the Farnes."

301. Mistle-Thrush *Turdus viscivorus*
Inner Farne : 1 on 18 Mar. and 2 on 28 Sept. Brownsman : 1 on 28 Apr.

302. Fieldfare *Turdus pilaris*
On 5 Nov. some 20-30 first-winter birds were found recently dead on Brownsman. They were very light in weight and it seemed obvious that they had died from exhaustion soon after arrival.

308. Blackbird *Turdus merula*
No attempt at nesting on Outer Group. On Inner Farne, a nest was found inside a shed on 21 Apr. ; 4 eggs were seen on 5 May, but were afterwards deserted. Another nest (again deserted later) was found near the Cove on 13 May ; the birds apparently relaid, for on 14 June a recently fledged young was found among the docken.

317. Stonechat *Saxicola torquata*
A male on Inner Farne on 2 May. Fifth record since 1946 (when pair nested on West Wideopens) and last seen in 1952.

321. Black Redstart *Phoenicurus ochruros*
Brownsman : a male on 29 Mar. and 2 females on 14 May.

333. Reed-Warbler *Acrocephalus scirpaceus*
A bird caught on Inner Farne on 6 Sept. was released without ringing as it's weight was 3 gm. below normal (PRE).

337. Sedge-Warbler *Acrocephalus schoenobaenus*
Single birds on Brownsman on 17 Aug. and on Inner Farne on 6 Sept.

343. Blackcap *Sylvia atricapilla*
Inner Farne : 1-2 between 3 and 6 May ; *ca.* 6 on 5 Oct.

344. Barred Warbler *Sylvia nisoria*
Further records—an immature on Brownsman on 17 Aug. and an adult on Inner Farne on 6 Sept. (PRE).

346. Garden-Warbler *Sylvia borin*
Inner Farne : 1 on 17 Aug. ; *ca.* 10 on 6 Sept ; 1 on 5 Oct.

347. Whitethroat *Sylvia communis*
Single birds on Inner Farne on 11 May and on Brownsman on 17 Aug.

348. Lesser Whitethroat *Sylvia curruca*
Inner Farne : 1 on 1 June.

357. Wood-Warbler *Phylloscopus sibilatrix*
Inner Farne : 1 on 3 May. Sixth occurrence on the Farnes and last recorded in 1960.

370. Red-breasted Flycatcher *Muscicapa parva*
Single birds on Inner Farne and Brownsman on 5 Oct. (PRE). Only 1 previous record—a female or immature male on Brownsman on 20 Sept. 1949.

380. White Wagtail *Motacilla alba alba*
Inner Farne : 1 on 28 Apr.

382. Yellow Wagtail *Motacilla flava*
Single birds on Inner Farne on 2-3 May and on Staple Island on 14 May.

386. Woodchat-Shrike *Lanius senator*
A male came into the Brownsman cottage on 25 May and remained until the following day (FYB). Second record for the Farnes.

392. Greenfinch *Chloris chloris*
A flock of *ca.* 20 frequented Brownsman and Staple Island in Feb. and Mar. Small numbers (maximum 5) seen occasionally on Brownsman and Inner Farne in Apr. and early May.

394. Siskin *Carduelis spinus*
Inner Farne: *ca.* 6 on 28 Sept. and 5 Oct. Brownsman : 7-8 on 5 Oct. A bird with a broken wing found on Brownsman on 11 Nov. Last recorded in 1960.

397. Redpoll *Carduelis flammea*
4 lesser redpolls on Inner Farne on 3 May and a pale-coloured bird on Brownsman on 20 Dec. An infrequent visitor ; last recorded in 1958.

421. Reed-Bunting *Emberiza schoeniclus*
Staple Island: 1 on 18 Mar. (GRP). Fourth occurrence on Farnes and last recorded in 1959.

424. House-Sparrow *Passer domesticus*
Single birds on Inner Farne on 29 Apr. and on Brownsman on 7 Aug. House-sparrows are infrequent visitors to the islands and, so far as is known, this is the first record for the Outer Group since 10 Aug. 1914.

OTHER SPECIES

The following species, although not dealt with in detail, were recorded : gannet, heron, teal, wigeon, common scoter, lapwing, common snipe, woodcock, whimbrel, redshank, knot, dunlin, arctic skua, great skua, greater black-backed gull, lesser black-backed gull (breeding), herring-gull (breeding), common gull, razorbill (breeding), black guillemot, wood-pigeon, swift, skylark, swallow, sand-martin, carrion-crow, jackdaw (breeding), wren, song-thrush, redwing, ring-ouzel, wheatear, whinchat, redstart, robin, willow-warbler, chiffchaff, goldcrest, spotted flycatcher, pied flycatcher, dunnock, meadow-pipit, rock-pipit (breeding), starling (breeding), linnet, chaffinch, brambling, snow-bunting.

RINGING

During the year 6,528 young, 21 juveniles and 528 adults were ringed : this is 431 fewer than in 1964. The numbers of individual species were as follows, the 1964 figures being given, for comparison, in brackets :—fulmar 3 (1) ; cormorant 143 (218) ; shag 509 (382) ; eider-duck 652 (70) ; ringed plover 1 (5) ; lesser black-backed gull 487 (630) ; herring-gull 81 (88) ; kittiwake 1,234 (1,109) ; common tern 118 (348) ; arctic tern 1,751 (2,406) ; roseate tern 70 (60) ; Sandwich tern 1,726 (1,550) ; guillemot 118 (101) ; puffin 128 (528) ; song-thrush 8 (—) ; redwing 1 (—) ; blackbird 8 (—) ; redstart 5 (—) ; robin 18 (2) ; sedge-warbler 1 (—) ; willow-warbler 6 (—) ; pied flycatcher 1 (—) ; red-breasted flycatcher 1 (—) ; dunnock 1 (—) ; siskin 6 (—). In addition, 63 adults (47 in 1964) were re-ringed.

The lists that follow show that 811 Farne-ringed birds were recovered in 1965. In addition, Dr. Potts, who re-trapped many shags, saw over 300 birds which he had colour-ringed in previous years ; details of these are not yet available and, accordingly, they are not included in the totals.

From the point of view of recoveries, the most notable event of the year was the shag "wreck" of late November and early December. Dr. Potts has mentioned that large numbers of Scottish birds were found dead on the Farnes ; these included one ringed on the Bass Rock and nine on the Isle of May (see page 125). Four Farne-ringed birds are known to have died on the islands and another was seen (on 13 December) unable to fly. However, recoveries show that many of the Farne birds had moved south, or south-west. Several were found in places well away from the sea, inland recoveries being made in Co. Durham, Yorkshire, Leicestershire, Rutland, Huntingdonshire, Norfolk, Suffolk and Essex. In a few cases the Farne bird was accompanied by other, unringed shags ; for example, M 0541 arrived at Saddington in company with ten others while M 0487 was one of seven rescued from a small pool near the cooling tower at Darlington power station.

It is hoped that an erstwise fruitful source of recoveries will now disappear for in March 1966 the River Tweed Commissioners decided to discontinue paying the 5/- award for cormorants (shags were included as the marksmen were unable to distinguish between the two species) on the ground that "research has shown that the damage done by cormorants to fisheries is not sufficient to justify the cost." Latest figures from the Commissioners show that during 1964-65 36 ringed cormorants and 24 ringed shags were shot near Berwick.

Three more cormorants have been found in France, two of them birds of the year. The three lesser black-backed gulls recovered on the Farnes were ringed in 1961 and 1962 : they were among several gulls shot on Brownsman in an attempt to protect other nesting birds. Two kittiwakes were recovered in the Newfoundland area and the letter reporting the bird taken at Francois included the enlightening comment that "ticklaces (the local name for the kittiwake) are a favourite food." It will be remembered that in June 1962 a two-year old arctic tern was found in the Urals, over 550 miles north of the Caspian Sea, and this year another arctic tern, also a two-year old, took the same unusual route, turning up in the Urals (but some 300 miles further north) in July. An interesting recovery (reported in 1965) is that of the redwing ringed in April 1963 and killed in France in the following February. Only two redwings have been ringed on the Farnes by the Society and, with a British recovery rate of less than two per cent., there was little expectation that one would be found.

RECOVERIES OF RINGED BIRDS

Date ringed	*Place recovered*	*Date recovered*
(a) Ringed on the Farne Islands		
CORMORANT		
	(Total : 55 ; Farne Is. : 1 ; local : 1)	
21.7.58	Sneaton, Whitby, Yorks.	14.3.65
10.7.59	Nr. Berwick upon Tweed, Northd. (shot)	Mar.-Dec. 1965
,,	Nr. Alnmouth, Northd.	21.6.65
14.8.61	Berwick upon Tweed (shot)	21.7.65
23.7.62	Monkwearmouth, Sunderland, Co. Durham (drowned on fishing tackle)	9.5.65
14.6.63	Nr. Berwick upon Tweed—2 birds (shot)	Mar.-Dec. 1965
16.6.63	Nr. Berwick upon Tweed (shot)	Mar.-Dec. 1965
22.6.63	Tynninghame, Dunbar, E. Lothian	14.2.65
18.7.63	Nr. Berwick upon Tweed—2 birds (shot)	Mar.-Dec. 1965
,,	Nr. Whiteabbey, Belfast Lough, Co. Antrim	17.7.65
24.7.63	Nr. Berwick upon Tweed (shot)	Mar.-Dec. 1965
12.8.63	Nr. Berwick upon Tweed (shot)	Mar.-Dec. 1965
11.6.64	Nr. Berwick upon Tweed—2 birds (shot)	Mar.-Dec. 1965
16.6.64	Flamborough, Yorks. (oiled)	6.3.65
,,	Greatham Creek, Teesmouth, Co. Durham	22.3.65
,,	Nr. Berwick upon Tweed (shot)	Mar.-Dec. 1965
,,	Roker, Sunderland	5.4.65
,,	Bognor Regis, Sussex (drowned in fishing net)	(1.5.65)
13.7.64	St. Germain sur Ay, Manche, France	late Feb. 1965
,,	Nr. Montrose, Angus	(4.3.65)
,,	Spurn Point, Yorks.	30.5.65
,,	Poole Harbour, Dorset (shot)	13.11.65
16.7.64	Cloughton, Scarborough, Yorks. (oiled)	(6.1.65)
,,	Berwick upon Tweed—6 birds (shot)	6.1.65 ; 18.3.65 ; Mar.-Dec. 1965
,,	Tentsmuir, Fife	*ca.* 28.2.65
,,	Burnmouth, Ayton, Berwickshire	27.3.65
,,	Walton-on-the-Naze, Essex (ring only found)	(11.9.65)
17.7.64	Usan, Montrose (shot)	(18.1.65)
,,	Caldy, W. Kirby, Cheshire	15.3.65
25.7.64	Nr. Berwick upon Tweed—2 birds (shot)	Mar.-Dec. 1965
8.6.65	Nr. Berwick upon Tweed—2 birds (shot)	June-Dec. 1965; *ca.* 1.12.65
,,	Largo, Fife (caught in salmon net)	(25.8.65)
,,	La Couarde, Ile de Ré, Charente Maritime, France (drowned in trammel net)	31.12.65
9.6.65	Blyth, Northd.	(2.12.65)
,,	Coldingham, Berwickshire (presumed shot)	(14.12.65)
,,	Nr. Berwick upon Tweed (shot)	June-Dec. 1965
21.6.65	Nr. Berwick upon Tweed—2 birds (shot)	July-Dec. 1965
29.6.65	Nr. Berwick upon Tweed (shot)	July-Dec. 1965
,,	Pointe de Gavres, Lorient, Morbihan, France (killed)	11.11.65

Date ringed	*Place recovered*	*Date recovered*
CORMORANT—*continued*		
29.6.65	Montrose Basin (shot)	20.11.65
,,	(1) Grindon, nr. Sunderland (found alive—released by R.S.P.C.A.)	*ca.* 27.11.65
	(2) Seaton Sluice, Northd.	11.12.65
,,	S. Shields, Co. Durham	*ca.* 10.12.65
SHAG		
	(Total : 367 ; Farne Is. : 257 ; local : 16)	
29.7.64	Nr. Berwick upon Tweed (shot)	Mar.-Dec. 1965
9.6.65	S. Bersted, Bognor, Sussex (1) (seen alive)	25.11.65
	(2) (,, ,,)	3.1.66
14.6.65	Gullane, E. Lothian	Nov. 1965
,,	Dun Laoghaire, Dublin, Eire	27.11.65
,,	Rowardennan, Loch Lomond, Stirlingshire (**inland recovery**)	*ca.* 28.11.65
,,	Lowestoft, Suffolk (oiled)	5.12.65
,,	Belfast, N. Ireland (drowned trapped in steel grill in dock)	(10.12.65)

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RECOVERIES OF RINGED BIRDS

Date ringed	*Place recovered*	*Date recovered*
SHAG Page 119 should read		
9.6.65	S. Bersted, Bognor, Sussex (1) (seen alive)	25.11.65
	(2)	3.1.66
SHAG Page 120 should read		
(i) 29.6.65	Skegness (1) (seen alive)	23.11.65
	(2)	26.11.65
(ii) 1.7.65	Thrybergh Reservoir, nr. Rotherham, Yorks. (1) (seen alive—**inland recovery**)	15.12.65
	(2)	22.12.65
LESSER BLACK-BACKED GULL Page 121 should read		
	(2) Nr. Las Cabezas de San Juan, Sevilla, Spain (shot)	11.1.65

RECOVERIES OF RINGED BIRDS

Date ringed	*Place recovered*	*Date recovered*

(a) Ringed on the Farne Islands

CORMORANT

(Total : 55 ; Farne Is. : 1 ; local : 1)

21.7.58	Sneaton, Whitby, Yorks.	14.3.65
10.7.59	Nr. Berwick upon Tweed, Northd. (shot)	Mar.-Dec. 1965
,,	Nr. Alnmouth, Northd.	21.6.65
14.8.61	Berwick upon Tweed (shot)	21.7.65
22.7.62	[illegible]	

[illegible] June-Dec. 1965; *ca.* 1.12.65

,,	Largo, Fife (caught in salmon net)	(25.8.65)
,,	La Couarde, Ile de Ré, Charente Maritime, France (drowned in trammel net)	31.12.65
9.6.65	Blyth, Northd.	(2.12.65)
,,	Coldingham, Berwickshire (presumed shot)	(14.12.65)
,,	Nr. Berwick upon Tweed (shot)	June-Dec. 1965
21.6.65	Nr. Berwick upon Tweed—2 birds (shot)	July-Dec. 1965
29.6.65	Nr. Berwick upon Tweed (shot)	July-Dec. 1965
,,	Pointe de Gavres, Lorient, Morbihan, France (killed)	11.11.65

Date ringed	*Place recovered*	*Date recovered*
CORMORANT—*continued*		
29.6.65	Montrose Basin (shot)	20.11.65
,,	(1) Grindon, nr. Sunderland (found alive—released by R.S.P.C.A.)	*ca.* 27.11.65
	(2) Seaton Sluice, Northd.	11.12.65
,,	S. Shields, Co. Durham	*ca.* 10.12.65

SHAG

(Total : 367 ; Farne Is. : 257 ; local : 16)

1952 or 1953	Nr. Crail, Fife (released)	17.12.65
15.6.57	*Marsden, S. Shields	(20.2.65)
10.7.58	St. Abbs Head, Berwickshire	23.8.65
22.7.59	Hauxley, Amble, Northd.	9.11.65
25.6.60	Chapel St. Leonards, Skegness, Lincs.	(4.12.65)
23.6.62	N. Berwick, E. Lothian	14.5.65
,,	Bass Rock, E. Lothian (controlled)	10.7.65
,,	Nr. Amble	1.12.65
28.7.62	Cresswell, Northd.	20.5.65
3.5.63	*Pettycur, Kinghorn, Fife	18.12.65
10.6.63	Nr. Berwick upon Tweed—3 birds (shot)	Mar.-Dec. 1965
12.6.63	Nr. Berwick upon Tweed (shot)	Mar.-Dec. 1965
18.6.63	Easington, Peterlee, Co. Durham	11.5.65
1.7.63	Druridge Bay, Northd. (oiled)	(23.2.65)
,,	Nr. Berwick upon Tweed (shot)	Mar.-Dec. 1965
12.7.63	Hartlepool, Co. Durham	14.7.65
13.7.63	Alnmouth	21.2.65
22.7.63	*Isle of May, Fife (controlled)	22.5.65
20.6.64	Barmston, nr. Bridlington, Yorks.	4.12.65
30.6.64	Filey, Yorks.	(12.1.65)
,,	Isle of May (controlled)	22.5.65
1.7.64	(1) Leith, Edinburgh, Midlothian (ring no. read on live bird)	26.3.65
	(2) Longniddry, E. Lothian	29.5.65
,,	Nr. Berwick upon Tweed—2 birds (shot)	Mar.-Dec. 1965
2.7.64	Bridlington	27.3.65
13.7.64	Nr. Hartlepool	(27.7.65)
14.7.64	Inverkeithing, Fife	13.6.65
23.7.64	Flamborough Head (ring only found)	25.4.65
29.7.64	Nr. Berwick upon Tweed (shot)	Mar.-Dec. 1965
9.6.65	S. Bersted, Bognor, Sussex (1) (seen alive)	25.11.65
	(2) (,, ,,)	3.1.66
14.6.65	Gullane, E. Lothian	Nov. 1965
,,	Dun Laoghaire, Dublin, Eire	27.11.65
,,	Rowardennan, Loch Lomond, Stirlingshire (**inland recovery**)	*ca.* 28.11.65
,,	Lowestoft, Suffolk (oiled)	5.12.65
,,	Belfast, N. Ireland (drowned trapped in steel grill in dock)	(10.12.65)

Date ringed	*Place recovered*	*Date recovered*
SHAG—*continued*		
14.6.65	Nr. St. Neots, Huntingdonshire—(**inland recovery**)	*ca.* 20.12.65
,,	Alexandra Dock, Grimsby, Lincs.	31.12.65
16.6.65	Nr. Berwick upon Tweed—2 birds (shot)	June-Dec. 1965; 27.11.65
,,	Montrose Basin (shot)	*ca.* 5.11.65
,,	Gibraltar Point, Skegness, Lincs. (? shot)	26.11.65
,,	Withernsea, Yorks. (oiled)	1.12.65
,,	Whickham Bishops, Witham, Essex (released)	1.12.65
,,	Montrose	5.12.65
,,	Hales, nr. Loddon, Norfolk (found exhausted—**inland recovery**)	(7.12.65)
,,	Shoreham-by-Sea, Sussex	9.12.65
,,	Redcar, Yorks.	(15.12.65)
29.6.65	Nr. Berwick upon Tweed—2 birds (shot)	July-Dec. 1965
,,	St. Abbs Head	10.9.65
,,	Tantallon Castle, N. Berwick	29.9.65
,,	Eyemouth, Berwickshire	15.11.65
,,	Darlington, Co. Durham (released—**inland recovery**)	20.11.65
,,	Winteringham, nr. Winterton, Humber, Lincs.	22.11.65
,,	Skegness (1) (seen alive)	23.11.65
	(2) (,, ,,)	26.11.65
,,	St. Monance, Fife	(24.11.65)
,,	Alnmouth	28.11.65
,,	Ketton, Rutland (released—**inland recovery**)	8.12.65
,,	Flamborough Head	8.12.65
,,	R. Ure, Bishop Monkton, nr. Ripon, Yorks. (**inland recovery**)	*ca.* 8.12.65
,,	Thorpeness, Leiston, Suffolk	*ca.* 10.12.65
,,	Thimbleby, nr. Northallerton, Yorks. (killed by fox—**inland recovery**)	21.12.65
1.7.65	Nr. Berwick upon Tweed (shot)	July-Dec. 1965
,,	St. Andrews, Fife	*ca.* 20.10.65
,,	Montrose, (shot)	13.11.65
,,	Saddington Reservoir, nr. Leicester (released—**inland recovery**)	21.11.65
,,	Great Ryburgh, Fakenham, Norfolk (released—**inland recovery**)	23.11.65
,,	Pickenham, Swaffham, Norfolk (released—**inland recovery**)	24.11.65
,,	Elvedon. Brandon, Suffolk (**inland recovery**)	27.11.65
,,	Wiggenhall St. Germans, Kings Lynn, Norfolk (**inland recovery**)	4.12.65
,,	Heacham, Hunstanton, Norfolk	5.12.65
,,	Dover, Kent	10.12.65
1.7.65	Rosehearty, Fraserburgh, Aberdeenshire	(14.12.65)
,,	Thrybergh Reservoir, nr. Rotherham, Yorks.	
	(1) (seen alive—**inland recovery**)	15.12.65
	(2) (,, ,, ,, ,,)	22.12.56

Date ringed	*Place recovered*	*Date recovered*
SHAG—*continued*		
6.7.65	Broughty Ferry, Angus	24.11.65
,,	Sunderland (oiled)	(2.12.65)
,,	Frampton Marsh, Boston, Lincs.	30.12.65
16.7.65	Nr. Berwick upon Tweed—3 birds (shot)	July-Dec. 1965
,,	Robin Hood's Bay, nr. Whitby	5.11.65
,,	Stansted, Essex (**inland recovery**)	(29.11.65)
,,	Goxhill, Humber	(30.11.65)
,,	Mablethorpe, Lincs.	4.12.65
,,	Stokesley, Yorks. (**inland recovery**)	30.12.65
22.7.65	Cove Bay, nr. Aberdeen	20.10.65
,,	Ferryden, Montrose (shot)	(20.11.65)
,,	Musselburgh, Midlothian (released)	22.11.65
,,	Anderby Creek, Skegness	24.11.65
1.8.65	Nr. Berwick upon Tweed (shot)	Aug.-Dec. 1965
,,	Cramond, Edinburgh	10.10.65
,,	Nr. Brora, Sutherland	20.12.65
EIDER-DUCK		
	(Total : 176 ; Farne Is. : 169 ; local : 6)	
2.6.58	*Dirleton, N. Berwick	(1.2.65)
LESSER BLACK-BACKED GULL		
	(Total : 25 ; Farne Is. : 3 ; local : –)	
31.7.61	Vila Real de Santo Antonio, Algarve, Portugal (found)	(1.2.65)
14.8.61	Masham, Ripon	(12.7.65)
22.8.61	St. Denis, Île d'Oléron, Charente Maritime, France (found wounded)	20.11.65
13.8.62	Jerez de la Frontera, Cadiz, Spain (killed)	24.1.65
,,	Gafanha da Nazaré, Aveiro, Beira Litoral, Portugal ("found on the sea")	*ca.* 30.5.65
,,	Thropton, Rothbury, Northd.	8.6.65
8.8.63	Prescot, St. Helens, Lancs.	1.6.65
9.8.63	(1) Sidi Ifni, Spanish W. Africa (caught and released)	29.1.64
	(2) Nr. Las Cabezas de San Juan, Sevilla, Spain (shot)	11.1.56
,,	Viana do Castelo, Minho, Portugal	(26.3.65)
,,	Wester Quarff, Mainland, Shetland	*ca.* 10.6.65
12.8.63	Silloth, Cumberland	(29.6.65)
,,	Lake Albufera, Valencia, Spain (killed)	2.10.65
14.8.63	Wainsgrove, Ripley, Derbyshire (shot)	(18.5.65)
5.8.64	Edinburgh	Jan. 1965
10.8.64	Puerto de Santa Maria, Cadiz, Spain (killed)	(12.9.65)
11.8.64	Conceicão de Tavira, Algarve, Portugal (killed)	11.1.65
,,	Casablanca, Morocco (/?/)	early Feb. 1965
,,	Runswick Bay, Whitby	25.4.65
27.8.64	Nr. Moaña, Pontevedra, Spain (shot)	May 1965

Date ringed	*Place recovered*	*Date recovered*
LESSER BLACK-BACKED GULL—*continued*		
4.8.65	Tocha, Beira Litoral, Portugal (shot)	Nov. 1965
17.8.65	Oporto, Douro Litoral, Portugal (killed)	(29.10.65)
,,	Tocha (shot)	20.11.65
HERRING-GULL		
	(Total : 2 ; Farne Is. : 1 ; local : –)	
9.8.63	Blackhall Rocks, nr. Hartlepool	(17.4.65)
KITTIWAKE		
	(Total : 84 ; Farne Is. : 63 ; local : 5)	
25.7.55	S. Shields	19.8.65
23.6.58	*Egmond aan Zee, Noord Holland, Netherlands	(10.1.65)
9.7.60	Bridlington	16.7.65
14.7.60	Kingsdown, Deal, Kent	24.10.65
23.7.61	Blyth	(26.7.65)
7.7.62	Francois, Newfoundland (taken)	28.1.65
9.7.62	Sunderland	(16.6.65)
29.6.64	Setûbal, Estremadura, Portugal (taken)	16.1.65
,,	Goring, Worthing, Sussex (oiled)	(1.2.65)
,,	*Seaton Sluice	19.7.65
4.7.64	Bay of Biscay (44° 00′N. 2° 00′W—caught)	16.1.65
,,	Jakobshavn, W. Greenland (shot)	23.6.65
1.7.65	Newbiggin-by-the-Sea (found with broken wing)	(19.8.65)
6.7.65	Bermeo, Vizcaya, Spain (flew into fishing line, injured leg)	21.11.65
10.7.65	Druridge Bay	(29.7.65)
,,	Off Cape Bauld, Newfoundland (caught)	11.10.65
COMMON TERN		
	(Total : 1 ; Farne Is. : 1 ; local : –)	
ARCTIC TERN		
	(Total : 77 ; Farne Is. : 55 ; local : 7)	
7.7.60	Newbiggin-by-the-Sea (shot)	26.7.65
24.6.61	Offshore, between Southwold, Suffolk, and Shoeburyness, Essex	9-10.6.65
,,	Porto Alexandre, Angola	Oct. 1965
11.7.62	Newbiggin-by-the-Sea (found injured)	29.7.65
,,	Nr. Luanda, Angola	29.9.65
13.7.62	Hollen, nr. Bremerhaven, Niedersachsen, Germany	14.5.65
20.7.62	Nr. Berwick upon Tweed	(17.6.65)
7.6.63	*Lundin Links, Lower Largo, Fife	3.8.65
13.7.63	Nr. Kochevo, Perm, U.S.S.R. (**inland recovery**)	23.7.65
4.7.64	Ilha de Luanda, Angola (released)	20.10.65
21.7.64	Nr. Bissau, Portuguese Guinea	20.2.65

Date ringed	*Place recovered*	*Date recovered*
ARCTIC TERN—*continued*		
17.6.65	Red Row, Acklington, Northd.	16.7.65
19.6.65	Campbeltown, Kintyre, Argyllshire	14.7.65
,,	Seaburn, Sunderland	29.7.65
10.7.65	Ryhope, Sunderland	9.8.65
ROSEATE TERN		
	(Total : 2 ; Farne Is. : – ; local : –)	
21.7.64	Takoradi, Ghana	18.5.65
8.7.65	Port Bouet, nr. Abidjan, Ivory Coast (caught alive)	16.10.65
SANDWICH TERN		
	(Total : 42 ; Farne Is. : – ; local : 2)	
26.6.59	Green Island, Carlingford Lough, Co. Down, N. Ireland (controlled)	12.6.65
18.7.59	Green Island (controlled)	12.6.65
22.6.60	Nr. Carentan, Manche, France	Dec. 1965
25.6.60	Green Island (controlled)	12.6.65
9.7.60	St. Michel en l'Herm, l'Aiguillon, Vendée, France (controlled)	30.8.65
20.6.61	Green Island (controlled)	12.6.65
,,	Ile Dumet, Morbihan, France (drowned in sardine fishing net)	25.6.65
25.6.61	Langenwerder, off Poel Island, Mecklenburg, Germany (controlled)	29.6.65
1.7.61	Sands of Forvie, Newburgh, Aberdeenshire (controlled)	12.6.65
16.7.61	Sands of Forvie (controlled)	22.6.65
17.6.63	Wilsthorpe, Bridlington	30.6.65
22.6.63	Agadir, Morocco (/?/)	14.2.65
10.7.63	Dakar, Sénégal (caught in fishing net)	8.4.65
13.7.63	Lagos, Nigeria (/?/)	1.2.65
23.6.64	Accra, Ghana (killed by car)	9.3.65
,,	Keta Lagoon, Ghana (taken from boy, died later)	7.10.65
29.6.64	Dakar (caught in fishing net)	8.4.65
,,	Port Bouet, Ivory Coast (killed)	29.4.65
,,	Nr. Ada, Ghana (caught)	7.6.65
1.7.64	Abidjan, Ivory Coast (/?/)	2.5.65
,,	Dakar (found injured inside house)	24.7.65
,,	Keta Lagoon (caught in snare—died later)	12.8.65
4.7.64	Ste. Marie, Ile de Ré, Charente Maritime, France	(15.2.65)
13.7.64	Nr. Accra (apparently caught alive and released)	1.12.65
22.7.64	Nr. Freetown, Sierra Leone	27.11.65
19.6.65	Mennie Links, Belhevie, Aberdeenshire	28.8.65
,,	Caistor-on-Sea, Norfolk (? shot)	5.9.65
,,	R. Eden estuary, nr. St. Andrews, Fife	19.9.65
,,	Isla de Cortegada, off Carril, Pontevedra, Spain	20.9.65

Date ringed	*Place recovered*	*Date recovered*
SANDWICH TERN—*continued*		
19.6.65	Tentsmuir	25.9.65
,,	Accra—2 birds (caught alive)	*ca.* 2.12.65 ; 4.12.65
,,	Keta (died after being struck down by large wave)	25.12.65
,,	Kedzi, nr. Keta (caught alive)	27.12.65
29.6.65	Keta Lagoon—2 birds (1 released)	21.11.65 ; 22.11.65
,,	Fann, Dakar (released)	21.11.65
10.7.65	Blackhall Rocks	31.8.65
,,	Scolt Head, Norfolk	5.9.65
,,	Seafield, Kirkcaldy, Fife	10.10.65
GUILLEMOT		
	(Total : 29 ; Farne Is. : 17 ; local : 2)	
22.7.59	Kvitsøy, Boknfjord, Rogaland, Norway (shot)	12.10.65
20.6.60	*Hartlepool	1.2.65
16.6.62	*Off Mandal, Vest Agder, Norway (shot)	5.11.65
24.7.63	Burnmouth (killed by greater black-backed gull while trapped in salmon net)	10.6.65
29.6.64	Newbiggin-by-the-Sea (oiled)	18.7.65
17.7.64	Swanage, Dorset (oiled)	2.2.65
1.7.65	Off Egerøy, off Egersund, Rogaland, Norway (shot)	17.10.65
,,	Off Kvassheim Lighthouse, Ogna, Rogaland, Norway (shot)	19.10.65
10.7.65	Lunan Bay, nr. Montrose (released)	26.9.65
,,	Scheveningen, Den Haag, Zuid Holland, Netherlands	15.12.65
PUFFIN		
	(Total : 19 ; Farne Is. : 15 ; local : –)	
3.7.59	Cley, Holt, Norfolk	(25.2.65)
15.7.64(juv.)	Randesund, nr. Kristiansand, Vest Agder, Norway (shot)	2.1.65
,,	*Druridge Bay (oiled)	20.3.65
5.8.64	10m. S.W. of Kristiansand (shot)	17.1.65
REDWING		
	(Total : 1 ; Farne Is. : – ; local : –)	
10.4.63	*Nîmes, Gard, France (killed)	13.2.64

(b) Recovered on the Farne Islands, but ringed elsewhere

Date and place ringed	*Date and method of recovery*
SHAG	
21.7.61 Isle of May, Fife	June 1965 (controlled)
1.7.62 Bass Rock, E. Lothian	June 1965 (breeding)

Date and place ringed	*Date and method of recovery*
SHAG—*continued*	
28.7.62 Bass Rock	5.12.65
6.7.63 Isle of May	17.4.65 (controlled)
7.7.63 Isle of May—4 birds	1.6.65 (breeding) and 17.8.65 ; 6.7.65 (breeding) ; 8.7.65 (controlled) ; 5.12.65
9.8.63 Isle of May—2 birds	23.4.65 ; late Nov. 1965
2.8.64 Isle of May—4 birds	20.4.65 (controlled) ; late Nov. 1965—3 birds
22.6.65 Isle of May	late Nov. 1965
23.6.65 Isle of May—3 birds	late Nov. 1965
EIDER-DUCK	
5.6.58 *Coquet Island, Northd.	8.6.65 (controlled)
17.7.59 Budle Bay, Northd.—2 birds	31.5.65 (controlled)
12.9.61 *Seahouses, Northd.	31.5.65 (controlled)

NOTES : 1. * Indicates bird ringed as adult.
2. (juv.) Indicates bird ringed as juvenile.
3. Unless otherwise stated all birds have been found either dying or dead, or are presumed dead.
4. Where the date of recovery is unknown, the date of the reporting letter is given in brackets.
5. "Local" recoveries include all birds (other than those on the Farnes) recovered within 15 miles of the islands.
6. "Controlled" indicates that a bird ringed by one ringer has been trapped (and released) by another ringer.
7. /?/ Indicates that the manner of recovery is unknown.

REFERENCES

BOLAM, G. (1912). *The birds of Northumberland and the Eastern Borders.* Alnwick: H. H. Blair.

(1932). A catalogue of the birds of Northumberland. *Trans. nat. Hist. Soc. Northumb.* **8**, 1.

WADER MIGRATION IN NORTH-EAST ENGLAND

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SUMMARY

Recoveries of ringed birds, together with field observations, suggest that arrivals of waders in north-east England in August comprise chiefly birds from Iceland and Greenland, while those in September and October come from northern Europe via Scandinavia. Of the four species which arrive in large numbers from the north-west, two pass on to winter south of the British Isles, while the other two winter both in north-east England and elsewhere in Britain. Many birds of the eight wader species which arrive in large numbers from northern Europe winter in north-east England, but others pass overland to winter on the coasts of the Irish Sea and in Ireland. Dunlin arriving in August come chiefly via Iceland, and winter south of the Mediterranean ; those arriving in early September come chiefly via the southern Baltic and may continue migration to the Irish Sea coasts ; larger dunlin arriving in late September come via Norway and winter on the north-east coast. Most autumn immigration of all species is over by mid-November.

Spring emigration to northern Europe takes place chiefly in March and April, and passage through north-east England of waders returning to Iceland and Greenland chiefly in May.

Movements of each of the eleven species are discussed in detail in the text.

INTRODUCTION

Northumberland and Durham have long been famous for the large numbers of various wader species that may be seen on their coasts, especially at Fenham Flats and Teesmouth. Observations over many years, supplemented by details of shot birds, were incorporated in the systematic lists of Bolam (1912) for Northumberland, Watt (1951) for the Farne Islands, Temperley (1951) for Durham, and Stead (1964) for Teesmouth. In contrast, the accounts by Chapman (1907) and Perry (1946) of wader movements seen on Fenham Flats were based largely on personal records, but neither is as detailed as that by Brady (1949), who made many, usually fortnightly, counts there during the years 1945-47.

In the present review, I shall relate these published observations, together with records I made in north Northumberland in the autumns of 1960-65, to evidence obtained from recoveries of ringed birds, in an attempt to separate the movements of the different populations of the eleven wader species which are seen in the greatest numbers in north-east England. Such an analysis provides a useful background for

studies of wader migration as detected by radar in northern England (Evans, in prep.). The paper is also intended to examine which gaps in present knowledge might be filled by further field observations, and which by more extensive and selective ringing of waders in north-east England.

SOURCES OF INFORMATION

In addition to the publications listed earlier, I have consulted the annual Ornithological Reports for Northumberland and Durham for the years 1951-63 inclusive, for details of large flocks and of migration seen in progress. These reports also contain details of recoveries of ringed birds, relevant to the two counties, but since some ringers apparently do not submit their records each year, I also consulted the review of ringing prior to 1930, by Witherby and Leach (1931), and subsequent "Reports on bird-ringing" published in *British Birds*. In recent years, however, these have not always given the counties in which waders were ringed (for certain recoveries have been given in tabular form), so I have also extracted from the original records of the British Trust for Ornithology full details of all recoveries of waders ringed in Northumberland and Durham and reported between 1 January 1955 and 28 February 1966. All recoveries outside Great Britain, and most distant recoveries within the country, should thereby have been consulted in the preparation of this review. I have also obtained from the B.T.O. all known records of foreign-ringed birds recovered in Northumberland, Durham, and on the Yorkshire side of Teesmouth since ringing began, and up to 28 February 1966. The only recoveries which may have been omitted from this paper are any at short distances within Britain before 1955, and any birds retrapped alive and subsequently released by the original ringer.

Many recoveries of waders ringed in north-east England come from nestlings ringed by Dr. J. S. Ash and Viscount (then the Hon. M. W.) Ridley in the late 1940's and early 1950's. Indeed, until the opening in 1951 of Monks' House Bird Observatory (MHBO) at Seahouses, Northumberland, by Dr. E. A. R. Ennion, very few attempts had been made to trap migrant waders on the coasts of Britain. Static wire-netting traps, as used in Scandinavia, proved of little value in north-east England, as the tidal rise and fall is too great to allow such traps to be sited permanently in positions which would catch those waders, such as dunlin *Calidris alpina* (L.), which feed predominantly on the tide-edge. The development by Dr. Ennion of simple fast-operating clap-nets enabled considerable numbers of shore waders to be ringed in the 1950's, and the numbers caught each year rose still further in the late 1950's with the introduction of mist-nets. Ringing

organised by MHBO ended in 1964 ; details of long-distance recoveries of waders ringed by the observatory have normally been published elsewhere, but much information on birds retrapped there between 1951-64 is presented for the first time in this paper.

It may be thought that undue emphasis has been placed in this review on the interpretation of rather few ringing recoveries. For this I make no apology: it is a waste of time collecting information from ringed birds if no use is made of it ; and I believe it is necessary to speculate if future ringing is to be directed towards the solution of specific problems—even if this leads to contradiction rather than confirmation of the suggestions made here. Ringing has one major advantage over field observation : it enables the movement of individual birds to be followed, and in so far as these birds are typical of the populations from which they come, ringing recoveries provide information on the directions and timing of the movements of these populations, in a way which field observations cannot.

The present observational data almost all refer to unusually large counts of waders, or of movement in progress. It is rarely indicated whether any increases in numbers recorded reflect immigration from another country, or result merely from the concentration in one locality of birds which had hitherto been spread along several miles of nearby coast, or even inland. Similarly, decreases in numbers could reflect either emigration, local dispersal, or both. Furthermore, it is possible to have considerable **passage** of a species without any marked changes in numbers in a single area. Thus a series of counts in one area might well underestimate the size of the passage, and give false impressions of the duration and timing of movements in any one year.

It should be remembered that the timing of movements of certain wader species, as indicated by ringing recoveries, may be biased if the chance of recovery varies during the year. Six of the eleven species to be discussed in the systematic list may be shot between 1 September and 31 January ; these are golden plover *Charadrius apricarius* L., snipe *Capella gallinago* (L.), woodcock *Scolopax rusticola* L., curlew *Numenius arquata* (L.), bar-tailed godwit *Limosa lapponica* (L.) and redshank *Tringa totanus* (L.). (Snipe may, in fact, be shot from 12 August.)

In future work on wader migration in north-east England, it will be necessary to extend observations to include more than mere counts of the total numbers of each species present on each day : information on the age ratios in the flocks, and on wing-moult, is badly needed. While information from ringing recoveries is always valuable, it could be made more so if related to measurements of trapped birds, at least of certain species (Evans, 1964).

SYSTEMATIC LIST

For each wader species discussed below, I have outlined its breeding range (taken chiefly from Voous (1960)) and breeding status in north-east England. There follows an account of the movements detected in Northumberland and Durham throughout the year, starting at the end of the breeding season (usually in June or July) and proceeding through autumn, winter and spring to the next breeding season.

Most migrant waders stay on their breeding grounds no longer than necessary to breed and sometimes moult. In those species which moult after migration, the adults usually leave the breeding grounds before the juveniles, but in those which moult before migration, the juveniles may leave before the adults. Further complications are introduced by the effects of delayed maturity, for non-breeding birds often summer in areas where the species does not breed, and begin moult and/or autumn passage at the same time as, or slightly before, those adults which have attempted to breed but failed, and well before the adults which rear young successfully. One might also expect differences in the timing of migration of adult males and females in those species in which one sex has the chief, or even sole, care of the young. For example, Witherby *et al.* (1938) note that young woodcock are tended by the female alone, whereas young spotted redshank *Tringa erythropus* (Pall.) are cared for chiefly by the male. Finally, populations of a single species from different breeding areas migrate at different times of autumn.

A few species are partial migrants, i.e. some individuals of a population winter locally, while others move away to winter elsewhere. In the case of the woodcock, these movements probably take place before the winter becomes severe, whereas lapwings *Vanellus vanellus* (L.) seem to move only in response to cold weather. The latter are often termed "hard-weather" movements, and occur chiefly in those species which winter inland and rely on feeding grounds associated with static fresh water or soft soil, which easily freeze over. Because of these winter movements in response to cold weather, it is much more difficult to investigate whether such birds return to the same wintering area each year (where they can stay only if the weather is favourable), than it is to look for the same phenomenon in species which winter on the coast.

Spring movements are less complicated than those in autumn. In species which breed in their first year, differences in the timing of movements reflect chiefly the passage of different breeding populations. In species with delayed maturity, non-breeding birds usually pass later than breeding birds, and some may stay all summer in north-east England.

Lapwing *Vanellus vanellus*. The main breeding range of the lapwing covers the British Isles, southern Fenno-Scandinavia, and central Europe and Asia between the latitudes of approximately 40° and 60° N. The species breeds widely in north-east England.

Flocks of lapwing gather in lowland areas from mid-June. These are predominantly local birds, but there are a few records of arrivals across the sea into Northumberland at this time, and rather more into Durham. These arrivals are, however, on a much smaller scale than those into East Anglia in June (Lack, 1962). As the latter movements comprise chiefly adults (in wing-moult) from Holland, it is likely that the small arrivals in north-east England also contain adults, but from further north in Europe, probably from Scandinavia. The main immigration from Europe takes place in late October and early November, and contains chiefly Norwegian birds, as indicated by ringing recoveries.

Chicks ringed in Norway were found in Northumberland and Durham in October (1), December (2) and February (1) of their first winter, and November (2) and January (1) of their fourth winter. Although Danish and German birds have been recovered further south in Britain, none has yet been recovered in north-east England.

The local population of lapwing apparently do not move far until very late in the autumn and, even then, there is no evidence that they leave England **before** cold weather restricts their feeding areas. (There are very few records of birds wintering close to their birthplaces, but winter records elsewhere in England are also few.)

Chicks ringed in north-east England had moved 90 miles north-west by August and 80 miles south-west by December in their first year, and up to 80 miles from their birthplaces in later autumns. The first recovery overseas occurred in November, and others in December (2), January (7), February (8) and March (4). Of these recoveries abroad, only four came from Ireland, but eight from France and ten from northern Iberia ; all these are areas reached in cold weather by lapwing from other parts of Britain. All the recoveries in Iberia occurred in January and February, particularly in the cold weather of 1956 and 1963. The recoveries in March came only from France and may represent the return of birds which had reached Iberia earlier in the year.

The local birds usually return to their breeding grounds in late February or March, and the winter visitors from Scandinavia leave in March and early April. These departures, which have often been noted by field observers, are usually preceded by the gathering of large flocks in coastal and lowland fields. In this context, there is a recovery on the Northumberland coast on 5 April of a lapwing ringed as a chick in Sweden the previous summer.

Some lapwing breed in their first summer (Spencer, 1953) and local chicks have often returned close to their birthplaces to breed ; for example, there are recoveries at distances of no more than 6 miles of birds in their first, third, sixth and seventh summers. However, a group of recoveries of outstanding interest is provided by four chicks ringed in Northumberland and Durham and reported in their third (3) and fifth summers from Russia, Sweden, Norway and the Karelo-Finnish republic respectively. All four localities lie between 58° and 62°N, close to the northern limit of the species' breeding range. The Swedish recovery came from an area to which lapwing had spread as a breeding species only five years earlier, and as three recovery dates lay between 25 April and 6 May, and the fourth on 15 June, it is likely that the birds were breeding or about to do so.

As most lapwing that have bred in a locality return to the same place to breed in subsequent years (Spencer, 1953), it is possible that birds bred in northern Britain are in part responsible for the extension of range of the lapwing in northern Europe. In this connection, it is interesting to note that in spite of its extensive east-west breeding range, no sub-species of lapwing are recognised, which suggests that considerable mixing of breeding populations takes place. This certainly happens in winter, but lapwing do not pair until they reach their breeding areas, so it may be that British birds simply get caught up with returning flocks of the more migratory Scandinavian birds. It is perhaps also relevant that the number of breeding lapwing has declined in Northumberland in the last ten years (when the recoveries in northern Europe have taken place), partly as a result of destruction of breeding areas.

Clearly, intensive ringing in north-east England of lapwing chicks, and of the summer and autumn flocks (if methods can be devised for trapping these), should yield further interesting results.

Ringed plover *Charadrius hiaticula* L. This species breeds, both on the coast and inland, in Greenland, Iceland, south Sweden, Norway and Siberia, but chiefly on the coast in Denmark, north Germany, Holland and the British Isles. Pairs breed on the less frequented beaches of Northumberland and Durham, and a few inland.

The local population is augmented in late August and early September by passage birds, which appear in flocks composed largely of juveniles (Table 1). After these have moved through, a fairly steady winter population remains, though Brady (1949) recorded a second passage in October.

TABLE 1.

RINGED PLOVER TRAPPED IN NORTH NORTHUMBERLAND.

NO. RINGED AS:	DATE OF TRAPPING							
	July	Aug. 1-15	Aug. 16-31	Sept. 1-15	Sept. 16-30	Oct.	Nov.-Feb.	May
Adults	3	0	12	10	0	0	4	6
First year	2	6	53	65	14	1	2	0

Most local birds probably remain within a few miles of their nesting areas throughout the year, but a few migrate south for considerable distances in early autumn. The same is true of ringed plover breeding elsewhere in Britain, but it is not known whether the migratory individuals move each year or only irregularly.

There are eight recoveries referable to the local population. One chick had moved 20 miles south by mid-August, another had reached the Atlantic coast of France by mid-September, a third was found near its birthplace in February and a fourth only 4 miles away in late April ; the fifth chick was also found near its birthplace in September of its second autumn. Two juveniles ringed in autumn were retrapped close by in the following spring (late April and May), and an adult ringed in July was reported 4 miles away in June, three years later. Those birds which reach France in autumn overlap with the wintering birds from Denmark (Salamonsen, 1955).

There is no direct information on the origin of the birds seen on autumn passage in August and September, but it seems likely that they come from Iceland and Greenland, for the following reasons :

First, a chick ringed in Greenland has been recovered in west France in mid-September (Salamonsen, 1965) ; second, very few ringed plover ringed as chicks on the **continent** have been reported from northern England in autumn or winter, whereas more have been recovered in southern England and especially in France and Iberia ; and third, the autumn passage birds almost certainly form the spring flocks which pass through north-east England, *en route* probably to Iceland and Greenland (see below).

Besides the local population, a few immigrant ringed plover winter in north-east England, as indicated by the capture in Sweden in May

of a breeding bird, originally ringed in winter in Northumberland. It is not known when these immigrants arrive and depart.

The local birds take up territories in late March and April, but it is not until May that passage flocks appear. As ringed plover normally breed in their first summer (Laven, 1940), it is unlikely that the May flocks are merely non-breeding birds. The timing of passage through north-east England fits well with the dates of arrival of ringed plover in Iceland (Timmermann, 1949) and Greenland (Salamonsen, 1950), but not with arrivals in Finland, where ringed birds return in early May, or Scandinavia, where they are breeding by mid-May. Little is known of the movements of the Siberian race *tundra*, but it seems unlikely that they would move regularly so far west on their way to and from winter quarters in tropical Africa (Salamonsen, 1955). Recoveries of ringed birds are consistent with the hypothesis that the spring and autumn passages through north-east England contain the same breeding populations, probably from Iceland and Greenland.

Four birds ringed on autumn passage have been reported in spring. One ringed at Spurn, Yorkshire, in September was found in Northumberland in mid-May two years later ; another three ringed in Northumberland were shot in north and west France in late April and early May, one (2) and three years later. They would presumably have moved further north in mid-May. Further, a chick ringed in Iceland was shot in northern France in early May two years later (Gudmundsson, 1956).

Observations could profitably be made on the autumn flocks, to record the percentage of adults present, as it is uncertain whether these pass before, with, or after, the main passage of juveniles. Ringing could provide, not only confirmation of the identity of the passage populations, but also evidence of differences (if any) in migratory pattern between juveniles and adults. Ringers could also take wing measurements of trapped birds, as Salamonsen (1955) has shown measureable differences in wing-lengths of the different European breeding populations.

Golden Plover *Charadrius apricarius.* Golden plover breed in three main areas : Iceland, the British Isles, and Scandinavia with western Siberia. In Northumberland and Durham, they breed on the high moorlands, chiefly in the west of the counties.

From the accounts by Chapman (1907) and Brady (1949), supported by more recent observations, three periods of autumn movement in north-east England may be distinguished : first, in July and early August, the local breeding population flock and depart from the up-

land moors, and at least some move to the coast ; second, from mid-August to early October, flocks (including some adults of the "southern" form) arrive both at the coast and inland ; and third, from early October to early November, flocks (including adults of the "northern" form) appear at the coast and inland.

Local birds apparently do not move far to winter, and no British-bred golden plover has yet been recovered outside the country.

Of local birds ringed as chicks, there have been two recoveries in the first winter after ringing and two in the third winter. All four moved short distances (20-80 miles) southwards to lowland areas inland, three remaining to the east of the Pennines, but one moving south-south-west to Lancashire.

There are no recoveries in north-east England of golden plover ringed in Iceland ; these migrate in September, or later, to winter chiefly in Ireland, or on the west coast of Britain. Hence the arrivals in Northumberland and Durham in autumn must be chiefly from northern Europe, and probably direct from the Baltic.

A bird which wintered in Durham had been ringed on spring passage in Holland, but the information in Norrevang's (1959) paper indicates that, in fact, very few birds which reach Holland in autumn pass on to winter in the British Isles. Therefore, most birds presumably come direct from northern Europe.

In winter, "hard-weather" movements are noted and small parties appear on parts of the coast where they do not normally winter, presumably because birds can no longer obtain food inland when the ground freezes ; it is not known how far these movements extend.

From published observations, several periods of movement may again be distinguished in spring. In February, the coastal flocks are reduced in size and number, and passage is noted inland, particularly in lowland areas. Breeding birds return to the high moorlands in the first half of March, and a small passage, chiefly of pairs of birds of the "southern" form, is noted at the coast. Nearly all the coastal birds leave by the end of this month, but the flocks which have wintered or gathered on the lower moorlands, and which include mainly birds of the "northern" form, stay until late April or even early May. Thus the return passage to northern Europe probably takes place chiefly in March and April, after the local breeding birds have settled.

It is doubtful whether the migration pattern outlined above can be disentangled further by field observations, though to establish the timing of movement of the adults of the different populations, it would be useful to have counts of the percentages of birds in the flocks in breeding dress and wing moult. It should, however, be noted that the

separation of the northern and southern breeding birds by the extent of development of breeding plumage may not be entirely reliable (Tucker, 1949). The prime need is to find methods of trapping birds in the autumn and winter flocks, so that ringing recoveries can identify the countries of origin of the birds which reach north-east England at different times of autumn.

Turnstone *Arenaria interpres* (L.). The turnstone breeds in Greenland, and in Scandinavia with western Siberia. Many non-breeding birds summer to the south of the breeding range, and in north-east England a few may be found in most summers at Teesmouth and on the Farne Islands.

TABLE 2.

TURNSTONE TRAPPED IN NORTH NORTHUMBERLAND.

	July-Aug.	Aug.	Sept.		Oct.-Dec.	Jan.	Feb.	March	April-May
	1-15	16-31	1-15	16-30					
No. ringed	10	38	44	42	5	34	14	33	22

The main autumn arrival into Northumberland and Durham takes place in late August and early September (Table 2). It includes both birds which stay to winter, and which therefore presumably come from Greenland (Norrevang, 1959), and passage birds. No birds ringed on passage in Scandinavia have been recovered in north-east England, though several have been reported from southern England. Also, only one of one hundred and thirty-four turnstone ringed in autumn by MHBO has been recovered more than a few miles away ; this was an adult ringed on 30 August and recovered in late October in Gabon, West Africa, where chicks ringed in Scandinavia have also been recovered. Thus some, but probably rather few, Scandinavian birds pass through north-east England in autumn.

Adult turnstone which winter on the coast of Northumberland moult their flight feathers soon after they arrive in August. Some individuals have returned to the same wintering area in successive autumns (Table 3). The wintering flocks begin to disperse in late April, and northwards passage, chiefly of birds in breeding plumage, is recorded in May.

TABLE 3.

RETRAPS IN LATER WINTERS OF TURNSTONE RINGED AT SEAHOUSES, NORTHD.

	NO. OF WINTERS AFTER FIRST CAPTURE							
	1	2	3	4	5	6	7	8
No. retrapped	2	2	0	2	0	0	0	1

Observers could usefully count juveniles and adults separately in autumn, when they are readily distinguishable by plumage, to determine more precisely the timing of movements of the two age-groups. Ringing of wintering birds would be useful to confirm the absence of Scandinavian birds. This should not be too difficult, as turnstone are one of the few wader species which readily take household foods, and so can be caught at bait, especially in winter.

Snipe *Capella gallinago*. This species breeds in Iceland, the British Isles, and north and central Europe, east to eastern Siberia. In north-east England a few pairs breed on lowland marshes, but more on the moorlands.

Local birds have a protracted breeding season, with clutches of eggs hatching as late as August (Chapman, 1907). Adult snipe stay close to their breeding grounds to moult, but some young birds leave the moors and may form the influx in August to lowland feeding areas, noted particularly in Northumberland. (There are only a few sight records of immigration from the continent then, but birds might arrive at night.) It is not clear whether the movements of the local snipe parallel those of the local lapwing (in that long-distance movements occur only in cold winter weather), or whether a proportion of the population moves out to Ireland in early autumn each year.

Evidence for snipe remaining sedentary comes from a chick ringed in upper Teesdale and recovered there in early October seven years later, and from a full-grown bird ringed in early September and recovered only 4 miles away in the following January (though possibly this may not have been a British bird—see below). Evidence for movement in early autumn comes from a recovery in western Ireland in late October of a bird ringed in Northumberland in mid-July; there have also been October recoveries in Ireland of chicks ringed elsewhere in northern England. Two recoveries of birds ringed in Northumberland in August are consistent with the suggestion that they are local-bred snipe : one was found in western Ireland in January, in an area

where British chicks have been reported in winter, and the other was found in March near the Solway (95 miles west) when it may have been on return passage to north-east England.

Observations from Durham, and to a lesser extent from the rest of north-east England, suggest that an influx of birds, including some from northern Europe, may take place as early as September, though the main arrival occurs in October and November. Snipe breeding in Iceland winter in Ireland (Norrevang, 1959) and there is no evidence that they reach north-east England either on passage or to winter. On the other hand, snipe from Scandinavia and the Baltic countries, not only reach Northumberland and Durham in autumn, but may pass through on their way to winter quarters in Ireland.

One of four recoveries of snipe ringed between 10 and 17 September 1959 at Pity Me, Durham, came from Sweden on 5 September 1964, thereby confirming the presence of continental birds in the September gatherings. The other three recoveries came from western Ireland (2) and north-west France during the short cold spell in January 1962. Among the October immigrants, a bird ringed on the Northumberland coast late in the month was recovered in Denmark in early October four years later, probably on passage. Finally, a snipe trapped at Bamburgh in December had been ringed as a juvenile in Finland.

In addition to regular long-distance movements in autumn and spring, snipe may move extensively during periods of cold weather, when their feeding grounds become frozen. Three recoveries in hard weather have been quoted above, but do not indicate movement within a single winter. However, a few more relevant recoveries are available. Two snipe trapped in Northumberland in October and November 1962 were recovered in Devon and Morocco in January and March 1963, respectively. It is likely that they would have stayed in north-east England if their feeding grounds had remained unfrozen. Another two snipe, reported from Ireland at the start of the cold weather in January 1963, had been ringed in Durham in October 1959 and in Northumberland in December 1961 respectively.

Because movements take place in cold weather, it is difficult to establish whether snipe return to the same area in successive autumns, and there is limited evidence both for and against such behaviour. A bird trapped at Seahouses in December 1955 was retrapped in the same ditch in November 1959 and 1961. Further, a bird trapped in March 1962 was recovered in the same month in 1965, only 3 miles away ; and one ringed in September 1959 was recovered in December 1962 only 11 miles away. However, a presumed immigrant ringed in Essex in October 1958 was shot in Northumberland in October 1962.

The spring passage of birds returnnig to northern Europe is not well documented, but probably occurs in March and early April.

Future ringing of snipe might well be concentrated on the August and September gatherings, in the hope of establishing the pattern of movement of birds before they are forced to move by cold weather. Ringing of breeding birds and chicks would be valuable, but difficult.

Woodcock *Scolopax rusticola*. This species breeds in the British Isles, southern Scandinavia and Finland, and in central Europe and Asia. In Northumberland and Durham, woodcock breed in many woodland areas.

Some local-bred birds move to Ireland to winter (but rarely before November (Thomson, 1929)), while others remain close to their breeding areas throughout the year.

Recoveries up to 1929, including those of the chicks marked in the special scheme at Alnwick (the earliest known scheme for marking wild birds in Britain) were summarised by Thomson. Later results fall into the pattern he outlined, except that there have been no recoveries in France since the one he mentioned. Chicks ringed in north-east England since 1930 have been recovered in their first winter in Westmorland and locally (2) ; and in their second winter in Ireland (2), the Isle of Man, and locally (2).

Immigration from the continent is seen chiefly in late October and early November. Recent ringing recoveries indicate that many birds from Fenno-Scandinavia pass over northern Britain on their way to Ireland ; as yet there are no winter recoveries in north-east England. However, an immigrant ringed on the Northumberland coast in mid-November was found in winter two years later in Fife, Scotland, so birds may winter in different areas in different years.

The return passage to northern Europe is inconspicuous, but probably occurs in late March and early April.

Ringers could provide useful confirmation of the timing of movement of local-bred birds to Ireland by attempting to retrap these birds throughout the autumn. It would be interesting to know if the migrant individuals move before the arrival of cold weather, or in response to it.

Curlew *Numenius arquata*. The curlew breeds in the British Isles, in lowland Norway and Sweden, southern Finland, and north-central Europe and Asia. Birds breeding in north-east England were confined chiefly to the higher moorlands in the last century, but have gradually extended their range to include lower-lying land.

By July, adults which have bred in Northumberland and Durham collect in flocks to moult, often at the coast. There is little evidence to suggest that a south-west immigration of curlew from Scandinavia takes place in late June and July (as it certainly does in East Anglia (Lack, 1962)). Confusion is sometimes caused in north Northumberland by the large flock of curlew which gathers on the Farne Islands in July, for these birds frequently flight to the mainland for food, thereby giving the impression to coastal observers of immigration from across the North Sea. The local juveniles disperse from the breeding grounds in July and early August. Some move to the coast, while others may possibly move direct to Ireland, though as yet no chicks have been recovered there before 20 September. A proportion of both the juveniles and the adults move west to winter.

Birds ringed as chicks in Northumberland and Durham have been recovered in Ireland in the first (3), second (1), third (2) and tenth (1) winters after ringing ; also on the Lancashire and Cumberland coasts in the fourth winter after ringing. The earliest recovery was made on 14 September, in Lancashire. Another chick was reported from Fenham Flats (a movement of 12 miles north-east) in September of its second year, and a juvenile recovered there in winter had been ringed 30 miles south along the coast in late August, after it had dispersed from the breeding grounds.

The British Isles serves as a wintering ground for curlew from north-west Europe (Norrevang, 1959). Those which reach north-east England come from Fenno-Scandinavia, and begin to arrive in early September. Arrivals continue throughout September and October.

There are six recoveries of curlew ringed abroad ; four had been ringed as chicks in Finland, and two in Norway. These birds had reached Teesmouth by September, early October and mid-November in their first autumn, Holy Island and Teesmouth by 1 and 5 September respectively in their second autumn, and the sixth was found in February, presumably wintering, at Stockton, in its seventh winter of life.

The local curlew return to their breeding grounds in late February or March, but the large flocks of presumed continental birds stay at (for example) Fenham Flats until April, as first noted by Chapman (1907). Passage has been observed both in April and May. Some birds summer in areas where they do not breed, e.g. Teesmouth, but it is not known whether these curlew were bred in Britain, north-west Europe, or both.

Recoveries in April and May of birds ringed as chicks have come from localities only 3 and 7 miles from their birthplaces after two and seven years respectively. However, a chick ringed at Harrogate, west

Yorkshire, was found at Spennymoor in late March five years later, and so had moved nearly 60 miles north.

Field observers might profitably note the state of wing-moult in the immigrant flocks in autumn. One might suppose that the adults would have had time to moult on their breeding grounds in north-west Europe, but confirmation is needed. Just as for lapwing and golden plover, methods are needed for trapping and ringing the flocks of curlew which are present for so many months on the coast. At present it is impossible to estimate what percentage of the local breeding birds winter in north-east England, and what percentage move to Ireland, for ringing of chicks has given relatively few recoveries.

Bar-tailed Godwit *Limosa lapponica*. This species breeds from north Scandinavia eastwards between the latitudes of about 65° and 75° N.

There are few records of large arrivals in Northumberland before late August, and most of the observations earlier in the season refer to small parties of birds in summer plumage ; Chapman (1924, page 99) recorded that several of these had apparently migrated while in wing-moult. The main immigration comprises juveniles in late August, and then adults in winter plumage in late September and October (Chapman, 1907).

There have been recoveries in north Northumberland of birds ringed at Revtangen, Norway, in mid-September ; one had reached Alnmouth nine days later, the other was shot in January on Holy Island. One of forty-two birds ringed by MHBO, in late September, was recovered on passage in Denmark in early August, four years later.

Since bar-tailed godwit also winter on the west coast of Scotland and on the Irish Sea coasts, some numbers must cross northern Britain each autumn, but I have found no references to flocks flying inland from north-east England in autumn, other than records from Berwick in Bolam (1912).

Wintering birds leave the north-east coast in late March and April, while still in winter plumage. Some flocks of birds in breeding dress pass through rapidly in May.

Observations of departures and overland migration in autumn are needed. Ringing of this species in Britain has scarcely begun.

Redshank *Tringa totanus*. The redshank breeds in Iceland, the British Isles, Scandinavia, and central Europe and Asia. In north-east England it breeds in fairly small numbers, chiefly in damp lowland meadows and near the coast.

The local birds begin to leave the inland breeding areas for the coast in early July, and numbers at the coast build up steadily through July and August. Some birds winter locally, while others move south within England, or occasionally cross the Channel ; a similar pattern is followed by redshank breeding elsewhere in Britain (Ogilvie, 1963). Movement away from Northumberland may take place during July, as shown by ringing, but field observations have failed to detect a peak period of departures of the local population.

Chicks ringed in Northumberland have been reported from north France in late July, west France in mid-October, Lincolnshire and Kent in November, and the Isle of Wight and Holland in December. An adult which had reached the Dee estuary, Cheshire, by late September was found breeding in Northumberland in the next summer, and one caught in Kent in early March was found at Morpeth in late July three years later. Recoveries of three chicks have shown movement to the coast, but no southward migration thereafter : birds ringed in south-east Scotland and in a Cheviot valley were found in winter on the north Northumberland coast, at 35 and 20 miles respectively from their birth-places ; another moved 20 miles east along the Tyne valley to reach Gateshead by November.

Redshank breeding in Iceland, winter on both the east and west coasts of Britain (Ogilvie, 1963) ; there is one winter recovery in Northumberland. Some reach north-east England by September, for a bird ringed in Northumberland on 13 September was recovered in Iceland in summer. Also, redshank with wing-lengths of greater than 170 mm. have been trapped by MHBO in this month, and Harrison (1944) has shown that such long-winged birds are referable to the Icelandic race *robusta*. No redshank from the continent have been known to reach north-east England, either on passage or to winter (Salamonsen, 1954 and Ogilvie *loc. cit.*).

Some redshank are known to have remained in the same locality throughout the winter, but in exceptionally severe weather, atypical movements may take place. For example, two birds ringed in late August in Lincolnshire were recovered on the Northumberland coast, about 200 miles northwards, in the hard weather of January and March 1963. As yet, there is only one local record of a bird returning to the same wintering area in successive years.

The local breeding birds return to their nesting areas in March. There is no information on the constancy of nest site of adults, but a chick ringed in Cumberland moved 19 miles east to Haltwhistle by June of its first summer.

There is little information on the timing of the spring passage to Iceland, though late April and early May seems the most likely period. A wintering bird ringed by MHBO and found dead on an airfield in Fife (70 miles north-west) in early May, was probably on passage.

As both British and Icelandic birds are present on the coast in autumn, and as counts of redshank depend so much on the state of the tide (for many birds fly inland to roost at high tide), it is doubtful whether field observations will be able to define more closely the periods of movement of the different populations. However, ringers could provide much information on the composition of the autumn and winter flocks by measuring the birds they handle. More intensive ringing might also provide confirmation of the timing of spring passage to Iceland.

Knot *Calidris canutus* (L.). The breeding populations are separated into two main areas: Greenland and arctic Canada, and arctic Russia with Siberia. In north-east England, knot winter chiefly at Teesmouth, and on Fenham Flats and Budle Bay.

Apart from a few birds which may summer on the coast, the first flocks of knot usually arrive in Northumberland in late July. These are almost all adults (possibly failed or non-breeders) in summer plumage, but it is not known whether they have moulted their flight feathers before they arrive. Juveniles, and adults in winter plumage, arrive in late August and September, and numbers increase steadily throughout the autumn.

Migrants which pass through Iceland have been reported in winter chiefly on the Irish and Irish Sea coasts, but a few have reached the east coast of England, though as yet there have been no recoveries in Northumberland or Durham. On the other hand, birds ringed on passage in Scandinavia have been reported in winter chiefly on the east coast of Britain, though some have crossed to the Irish and Irish Sea coasts. Three knot recovered in north-east England between February and April had been ringed at Revtangen, Norway, between 20 August and 3 September.

According to Bolam (1912), the winter flocks reach full strength in Northumberland by November, but passage has been recorded at this time on the Durham coast, where the largest flocks are seen in January and February (Stead, 1964). It is not known whether this correctly implies that immigration from the continent continues during the winter, or merely that birds, which have hitherto been dispersed along the coasts of north-east England, concentrate at Teesmouth during periods of hard weather.

Numbers begin to fall in March and early April, when emigration presumably takes place. Most birds depart while still in winter plumage, but a few birds in breeding plumage pass through quickly in May.

Counts and observations of the winter movements of knot are needed, particularly in Northumberland, before the origin of the mid-winter influxes at Teesmouth can be ascertained. As yet, very few knot have been ringed in north-east England, so there is no information on the origin of the wintering birds; this is clearly needed, especially as Norrevang (1959) has suggested that some of the birds which pass through Norway, to winter in Britain, come from the Greenland population.

Dunlin *Calidris alpina*. The dunlin breeds in east Greenland, Iceland, the British Isles (mainly in the north), Scandinavia, Denmark and Finland to west Siberia. In north-east England, breeding pairs are restricted to the upland moors. Apart from a few non-breeding birds which may summer at Teesmouth and elsewhere, adult dunlin begin to appear on the coast in early July, with juveniles joining them from mid-July. These few early migrants may well be local or Scottish breeding birds. A single recovery of a bird caught in south Northumberland in mid-July does not conflict with this view, for it moved to the Lincolnshire side of the Wash in three weeks, thus showing a southward movement in Britain similar to that recorded for the rest of the British population (Ogilvie, 1963).

Brady (1949) recorded two peaks of dunlin passage in autumn on Fenham Flats—in late July and late September. My own observations further south on the north Northumberland coast suggest that there is an influx of juveniles which reaches a peak in mid-August, followed by further arrivals in September, in places where the late July arrivals are scarcely noticeable. As some of the July immigrants are also juveniles, they may possibly come from a different population from the mid-August juveniles. Indeed, like the July adults, they may be local or Scottish-bred birds.

There is now considerable evidence to show that the juvenile dunlin which pass through north-east England in August come chiefly from Iceland, and possibly also from Greenland. First, a bird ringed in Northumberland in mid-August has been recovered in Iceland in June. Second, as will be shown below, juveniles from Scandinavia rarely arrive before September, and then come chiefly to winter in north-east England, rather than on passage. Third, juveniles trapped from the August flocks have been reported from France and Iberia only in autumn and spring, but not in winter, whereas those ringed on autumn

passage in Norway and Sweden have been recovered in France, chiefly in winter. Fourth, the dunlin which pass through Northumberland and Durham in August form the flocks which pass north through France in April and May, after the majority of Scandinavian birds have departed (Ogilvie, 1963). Finally, wing-lengths and bill-lengths of juveniles caught from the August flocks are shorter than those from the September flocks, and are compatible with those to be expected from the Icelandic population, as I have discussed elsewhere (Evans, 1964).

Five dunlin ringed in Northumberland, and two ringed in Durham —all in August—have been recovered in north and west France between August and early October of the autumn of ringing, and between one and six weeks after being ringed. This indicates a leisurely southward movement from north-east England, as also do the four-week journeys of birds which reached Portugal in late August and southern Spain in late September, for all these birds were still on passage to winter quarters when recovered. (The only winter recovery, as yet, has come from Spanish West Africa in mid-February.)

TABLE 4.

RECOVERIES OF DUNLIN RINGED IN NORTH NORTHUMBERLAND.

	DATE OF RINGING							
	Oct.-May	July	Aug. 1-10	11-20	21-31	Sep. 1-10	11-20	21-30
No. ringed	74	75	97	57	370	403	133	92
RECOVERY DETAILS:								
N. Europe (spring and autumn)	0	0	0	0	1	2	1	0
Britain (winter)	0	0	0	0	0	2	1	0
France (autumn)	0	0	1	1	3*	0	0	0
France (spring)	0	0	1	1	3	2	0	0
Spain (autumn)	0	0	0	0	0	1	0	0
Spanish W. Africa (winter)	0	0	0	0	0	1	0	0
Iceland (summer)	0	0	0	1	0	0	0	0
TOTAL	0	0	2	3	7	8	2	0

* Includes one bird reported in December, but recovery date uncertain.

The arrivals of juvenile dunlin which I have noted in September come chiefly from Scandinavia, and two populations may be distinguished on the basis of wing- and bill-lengths and migratory habits. Those which arrive in the first half of the month are smaller than those which

arrive later, as I have discussed elsewhere (Evans, 1964). Also, some of the early September immigrants continue overland to the Irish Sea coasts to winter (two recovered in Ireland, one in Lancashire), whereas there is no evidence that the late immigrants do so. Finally, some of the early immigrants (but none of the later ones) have been retrapped subsequently on spring and autumn passage through the southern Baltic, but not in Norway.

A juvenile ringed in Northumberland on 6 September was recovered in north Germany in May, and three juveniles ringed on 28 August, 9 and 14 September were recovered in July and August in Finland, north Germany and Sweden respectively. None of the 225 dunlin ringed by MHBO between 10 and 30 September has been recovered in France or Iberia, where dunlin ringed in Norway and Sweden usually winter (Norrevang, 1955 and Ogilvie, 1963). Nor have there been recoveries in France in winter of dunlin ringed in north-east England at any time of year (see Table 4). Hence it is most unlikely that juvenile dunlin pass through north-east England on their way from Scandinavia to southern Europe.

TABLE 5.

RECOVERIES IN N.E. BRITAIN OF DUNLIN RINGED ON PASSAGE IN SCANDINAVIA.

	COUNTRY AND DATE OF RINGING						
Date and place of recovery	Aug. 10-20	Aug. 21-31	Sept. 1-10	Sept. 11-20	Sept. 21-30	Oct. 1-10	Oct. 11-20
Northumberland and Durham (Nov.-March)	—	S	DS	DSS	—	SN	N
Scotland (Nov.-March)	SN	—	N	NN	NNNN	—	—
Scotland, Northumberland and Durham (13 Sept.-18 Oct.)	—	NN	NN	N	N	—	—

NOTES:

D=Denmark, S=Sweden, N=Norway.

Dates of ringing give the earliest dates of departure from Scandinavia.

The recoveries of juvenile dunlin ringed in Northumberland in September, and discussed above, are consistent with the idea that those which arrive in early September come through the southern Baltic,

while those which arrive later in the month come from further north. This suggestion is supported by the timing of recoveries in northern Britain of dunlin ringed on passage in Scandinavia (Table 5). As may be seen, no dunlin ringed in Norway were reported from northern Britain before 13 September, and the dates of ringing of birds subsequently found in Britain in winter were earlier for those which passed through Sweden and Denmark than for those which passed through Norway. Finally, there is a clear tendency for those ringed in Norway to winter further north than those ringed in Denmark and Sweden.

Of the 1,301 dunlin ringed in north Northumberland by MHBO, only two were recaptured in the same area in later autumns. Both were ringed as juveniles, one in September, the other in October, and so were presumably winter-visitors rather than passage-migrants.

Brady (1949) recorded a marked increase in numbers of dunlin on Fenham Flats in late January and February, but a decline in March. Presumably this results from the departure in March of at least the southern element of the dunlin from northern Europe. The peak of spring passage in north-east England occurs in May, and represents the return of the Icelandic breeding population, as it fits well with the timing of the northward movement through France in April and May (which certainly includes Icelandic birds).

Three Icelandic breeding birds have been recovered in France in May (Ogilvie, 1963), and there have been seven recoveries in western France between mid-March and mid-May of birds ringed on autumn passage in Northumberland, and which, as argued above, belong to the Icelandic population. There was no indication that older birds returned through France earlier than younger birds. An adult ringed in Durham in early May was recovered in west France as early as 21 July of the same year. It may, of course, have failed or not attempted to breed.

Insufficient attention has been paid in the past to observations of the percentages of birds in breeding dress and wing-moult in the large autumn flocks. Field observations might resolve the timing of the movements of the adults of different populations, as there is little information on this at the moment. Just as with ringed plover and redshank, ringers could usefully take bill- and wing-lengths of all dunlin they handle, especially juveniles in autumn and winter, as these measurements may assist in the separation of different populations.

CONCLUSIONS

The movements of the eleven wader species which occur in the greatest numbers in Northumberland and Durham may be summarised according to their directions of immigration in autumn.

Four species come from the north-west (Iceland and Greenland): ringed plover, turnstone, redshank and dunlin. The dunlin pass through north-east England chiefly in mid-August, and the ringed plover in late August and early September. Both probably travel to the east of south when they leave north-east England, as also do those redshank and turnstone which winter in southern England, or western France. However, considerable numbers of the latter two species also winter in north-east England, which they reach in late August and September.

Eight species come from northern Europe, in directions from between east (i.e. from Denmark) and north-east (i.e. from Norway): lapwing, golden plover, snipe, woodcock, curlew, bar-tailed godwit, knot and dunlin. Many of the birds which reach north-east England stay to winter on the coasts, but others pass overland to the Irish Sea coasts and Ireland, particularly lapwing, snipe, curlew and woodcock. The breeding ranges of most of these species on the continent extend over considerable distances, especially in an east-west direction, and so arrivals in Northumberland and Durham are spread over several weeks or even months. The first arrivals, including golden plover of the "southern" form, curlew from southern Norway and Finland, juvenile bar-tailed godwits, and juvenile dunlin passing through Sweden and Denmark, reach north-east England in September or slightly earlier. In late September, adult bar-tailed godwits and juvenile dunlin passing through Norway form the chief immigrants. Curlew and godwits continue to arrive in October, as also do golden plover of the "northern" form, and snipe. In late October and early November, lapwing from Norway and woodcock from Fenno-Scandinavia reach north-east England, and immigration of snipe continues. The arrivals of knot are spread over the whole autumn, from late August until at least November. Those species which winter, not only in Northumberland and Durham, but also on the Irish Sea coasts and in Ireland, presumably pass over northern Britain in directions between south-west and west-south-west.

In spring, emigration to northern Europe begins in earnest in March, with the departures of the dunlin and "southern" golden plover which wintered in north-east England. In late March and early April, there are conspicuous departures of lapwing, but snipe and woodcock leave almost unnoticed, as also do bar-tailed godwit and knot, as judged solely by the decrease in the size of the wintering flocks. Curlew depart chiefly in late April, at the same time as the "northern" golden plover, though some flocks of both species delay departure until early May.

The return of waders to Iceland and Greenland takes place in late spring. Wintering turnstone and redshank depart chiefly in late April, but passage of the former species continues throughout May ; so also may redshank movements, but these are poorly documented. Both ringed plover and dunlin pass through Northumberland and Durham in large numbers in May.

In the preceding systematic list, I have suggested the aspects of the movements of each species which need further study by observation or ringing. If information can be collected systematically over several years, it should be possible to build up a detailed picture of the timing of migration of each species, both in relation to age and breeding status (i.e. successful, failed, or non-breeder), and to the timing and place of moult, and finally to the country of origin. North-east England is indeed well placed for a study of wader migration.

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APPENDIX

Several species of waders, other than the eleven discussed earlier, occur regularly in north-east England at certain times of year. Some points of interest on which information is available from Northumberland and Durham are mentioned briefly here.

Oystercatchers *Haemotopus ostralegus* L. breed in northern Britain, including north-east England, and some juveniles move south in autumn. Large winter concentrations occur chiefly on the west coast of Britain, and these contain birds from Iceland and the Faeroes (Buxton, 1957). (These immigrants probably do not pass through north-east England.) A few birds from Scandinavia reach the west coast of Britain, and thus presumably pass over Northumberland and Durham *en route*. Dusk departures of oystercatchers, flying high inland to the west of south, have been noted at Teesmouth and Budle Bay in late August. Further observations would be useful.

Jack snipe *Lymnocryptes minimus* (Brünn.) arrive in north-east England in autumn from breeding grounds in northern Norway and Sweden, and Siberia. One of seven birds ringed at Bamburgh by MHBO was re-trapped there two winters later. The green sandpiper *Tringa ochropus* L. is another species which may winter in Northumberland and Durham if the weather is not too severe, and some birds from the continent pass through the two counties in autumn. One such migrant, ringed at Bamburgh in September, was recovered in Portugal in the following February.

The common sandpiper *Tringa hypoleucos* L. breeds in northern Britain, arriving in north-east England in late April and departing in late July and August. Ringing recoveries have shown that some birds return to the same breeding areas in successive years. There is no evidence that Scandinavian birds pass through the area either in spring or autumn.

Small numbers of purple sandpipers *Calidris maritima* (Brünn.) winter on the north-east coast of England, especially near Bamburgh and Hartlepool. Sight records of two ringed birds at Bamburgh suggest that they had returned to the same winter quarters in successive years. It would be desirable to have confirmation of this by actual recoveries.

Sanderling *Crocethia alba* (Pall.) are regular migrants through Northumberland and Durham ; flocks are seen chiefly in late August and early September and again in May. Probably these birds arrive from the north-west (Greenland), as suggested by Ferdinand (1953), for one of fifty-three birds ringed by MHBO was recovered a month later on the Russian shore of the Black Sea, some 2000 miles south-east (assuming a direct flight overland). A few sanderling winter on the coast of the two counties ; one recovered in early October on the Durham coast had been ringed in Norway a fortnight earlier.

The arrivals of ruff *Philomachus pugnax* (L.) into Britain have been discussed by Nisbet and Vine (1956). Ruff appear in Northumberland and Durham most regularly in August and September, and three of twenty-four birds ringed by MHBO in these months have been recovered in later years. One was found in south-west France in

August and another in Hampshire in late November (both two years after ringing), while the third was recovered in Holland in May, almost five years later. A few ruff have overwintered in north-east England, but the only indication of the origin of the wintering birds comes from the recovery in late October on the Yorkshire side of Teesmouth of a bird ringed as a chick in Swedish Lapland.

REFERENCES

Bolam, G. (1912). *The birds of Northumberland and the Eastern Borders.* Alnwick: Hunter Blair.

Brady, F. (1949). The fluctuations of some common shore-birds on the north Northumberland coast. *Brit. Birds* **42**, 297.

Buxton, E. J. M. (1957). Migrations of the oystercatcher in the area of Britain : results of ringing. *Brit. Birds* **50**, 519.

Chapman, A. (1907). *Bird-life of the Borders.* London : Gurney & Jackson.
(1924). *The Borders and beyond.* London : Gurney & Jackson.

Evans, P. R. (1964). Wader measurements and wader migration. *Bird Study* **11**, 23.

Ferdinand, L. (1953). Sandloberens (*Crocethia alba* (Pall.)) traekforhold i Nordeuropa. *Dansk Ornith. For. Tidsskr.* **47**, 69.

Gudmundsson, F. (1956). Fuglamerkingar Natturugripasafnsins 1950-1952. *Natturufraedingurinn* **26**, 142.

Lack, D. (1962). Migration across the southern North Sea studied by radar. Part 3. Movements in June and July. *Ibis* **104**, 74.

Laven, H. (1940). Beiträge zur Biologie des sandregenpfeifers (*Charadrius hiaticula* L.). *J. fur Ornithologie* **88**, 183.

Nisbet, I. C. T. and Vine, A. E. (1956). Migration of little stints, curlew-sandpipers and ruffs through Great Britain in the autumn of 1953. *Brit. Birds* **49**, 121.

Norrevang, A. (1955). Rylens (*Calidris alpina* (L.)) traek i Nordeuropa. *Dansk Ornith. For. Tidsskr.* **49**, 18.
(1959). The migration patterns of some waders in Europe, based on the ringing results. *Vidensk. Medd. fra Dansk naturh. Foren.* **121**, 181.

Ogilvie, M. A. (1963). The migrations of European redshank and dunlin. *Wildfowl Trust 14th Ann. Rep.*, 141.

Perry, R. (1946). *A naturalist on Lindisfarne.* London : Lindsay Drummond.

Salamonsen, F. (1950). *Grønlands fugle.* Copenhagen : Munksgaard.
(1954). The migration of the European redshanks (*Tringa totanus* (L.)). *Dansk Ornith. For. Tidsskr.* **48**, 94.
(1955). The evolutionary significance of bird migration. *Dansk Biol. Medd.* **22** (6), 1.
(1965). Tiende forelöbige liste over genfundne grönlandske ringfugle. *Dansk Ornith. For. Tidsskr.* **59**, 92.

Spencer, K. G. (1953). *The lapwing in Britain.* London and Hull : Brown.

Stead, P. J. (1964). The birds of Tees-side. *Trans. nat. Hist. Soc. Northumb.* **15**, 1.

Temperley, G. W. (1951). A history of the birds of Durham. *Trans. nat. Hist. Soc. Northumb.* **9**, 1.

Thomson, A. L. (1929). The migrations of British and Irish woodcock : results of the marking method. *Brit. Birds* **23**, 74.

Timmermann, G. (1949). *Die Vogel Islands.* Reykjavik : Leiftur.

Tucker, B. W. (1949). A note on racial variation in golden plovers. *Brit. Birds* **42**, 383.

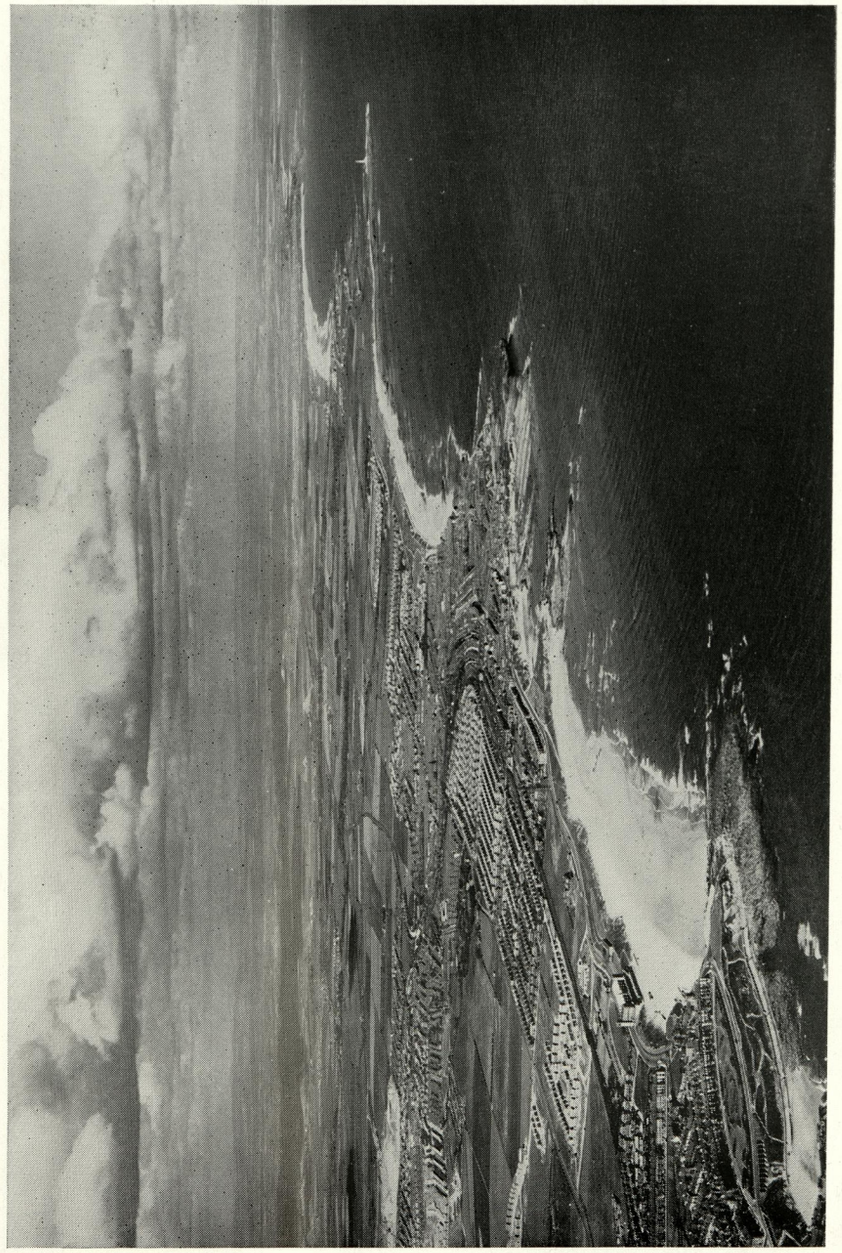
Voous, K. H. (1960). *Atlas of European birds.* London : Nelson.

Watt, G. (1951). *The Farne Islands.* London : Country Life.

Witherby, H. F., Jourdain, F. C. R., Ticehurst, N. F. and Tucker, B. W. (1938). *The handbook of British birds.* London : Witherby.

Witherby, H. F. and Leach, E. P. (1931). Movements of ringed birds from abroad to the British Islands and from the British Islands abroad. *Brit. Birds* **25**, 110, 174, 245.

PLATE 4



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TYNEMOUTH TO SEATON SLUICE

THE GEOLOGY OF THE COAST SECTION FROM TYNEMOUTH TO SEATON SLUICE

by

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SUMMARY

The coast section between Tynemouth and Seaton Sluice is one of the few surface exposures of Coal Measure strata in the country. As such, it attracts the attention of both professional and amateur geologists, and is much used for the teaching of elementary students. The paper is intended to serve as a field guide to the geology of this stretch of coast. The cliffs and foreshore have been described progressively from south to north and an attempt has been made to present the information in a form that will be acceptable to as large a number of people as possible.

The four miles of coast section between the mouth of the Tyne and the village of Seaton Sluice constitute one of the finest exposures of Coal Measure strata in Britain. It has long been a region of geological interest and, as a result of fundamental work by H. C. Sorby (1852), it may be regarded as the type area for certain forms of sedimentary structure. A full geological description of the region was not completed until 1913, when Woolacott led a Geologists' Association excursion over the area. Absalom and Hopkins (1926) published an account of the geological succession exposed in the coast section, in which they identified most of the coals and mussel bands exposed. Since that date no further comprehensive survey of the area has been produced.

At the present time large stretches of the section are being concealed by coast protection projects. This work has already been completed at the south end of Whitley Bay, at Cullercoats, and at Collywell Bay, so it is opportune that this description should be written before the section is completely concealed.

In view of the variations in facies that are present, it is perhaps simplest to describe this section geographically from south to north, and not stratigraphically; a stratigraphical succession (Fig. 1a) and series of maps have, however, been included to assist in the account.

The geological structure of the coastal section is illustrated in Fig. 1b. About two miles offshore, in the centre of the area, the rocks have been gently uplifted to form the Whitley Dome (Clark, etc., 1961). The strata comprising the westerly-dipping flank of this structure are exposed along the shore between Cullercoats and St. Mary's Island.

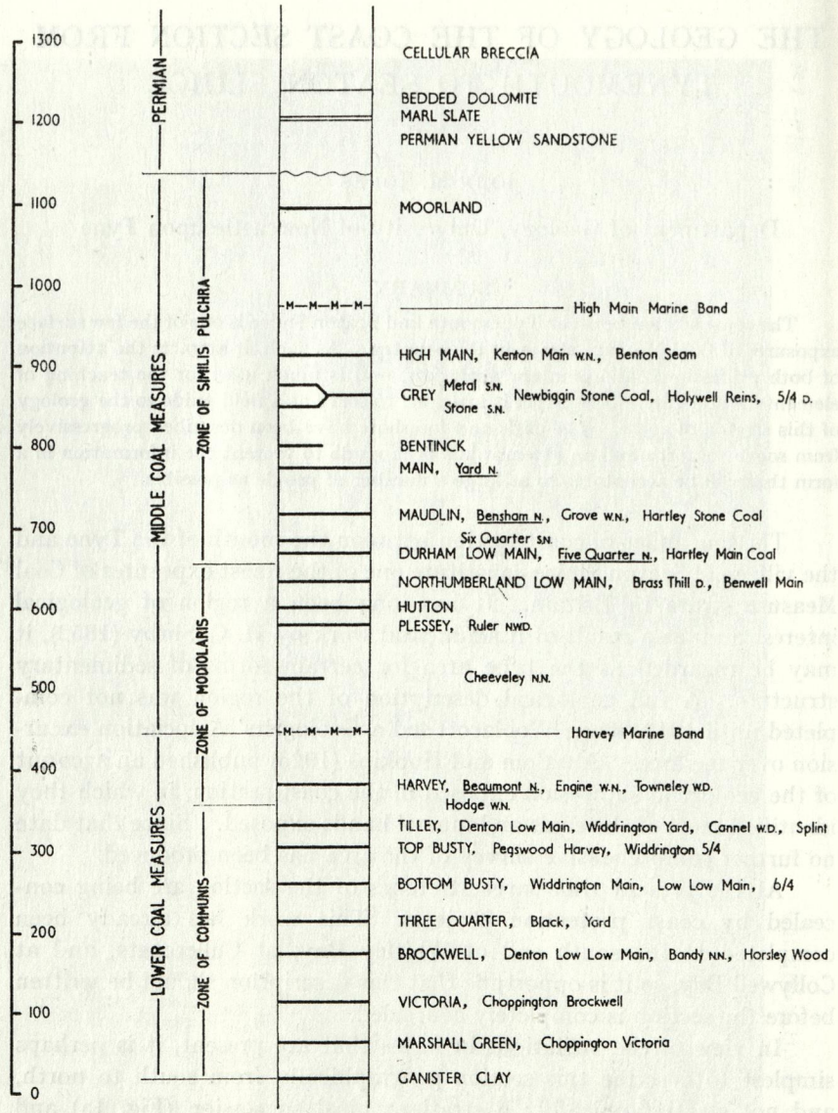


Fig. 1a. A stratigraphical column showing the principal coal seams and marine bands in the Northumberland and Durham coalfield. The seam names in capital letters are those standardised for the region by the N.C.B. and the Geological Survey in 1958. Names in lower case are old regional names with the initials following denoting the region where the name is most frequently encountered, e.g. S.N.—South Northumberland, W.D.—West Durham. Names underlined are those used in this paper which differ from the standard nomenclature.

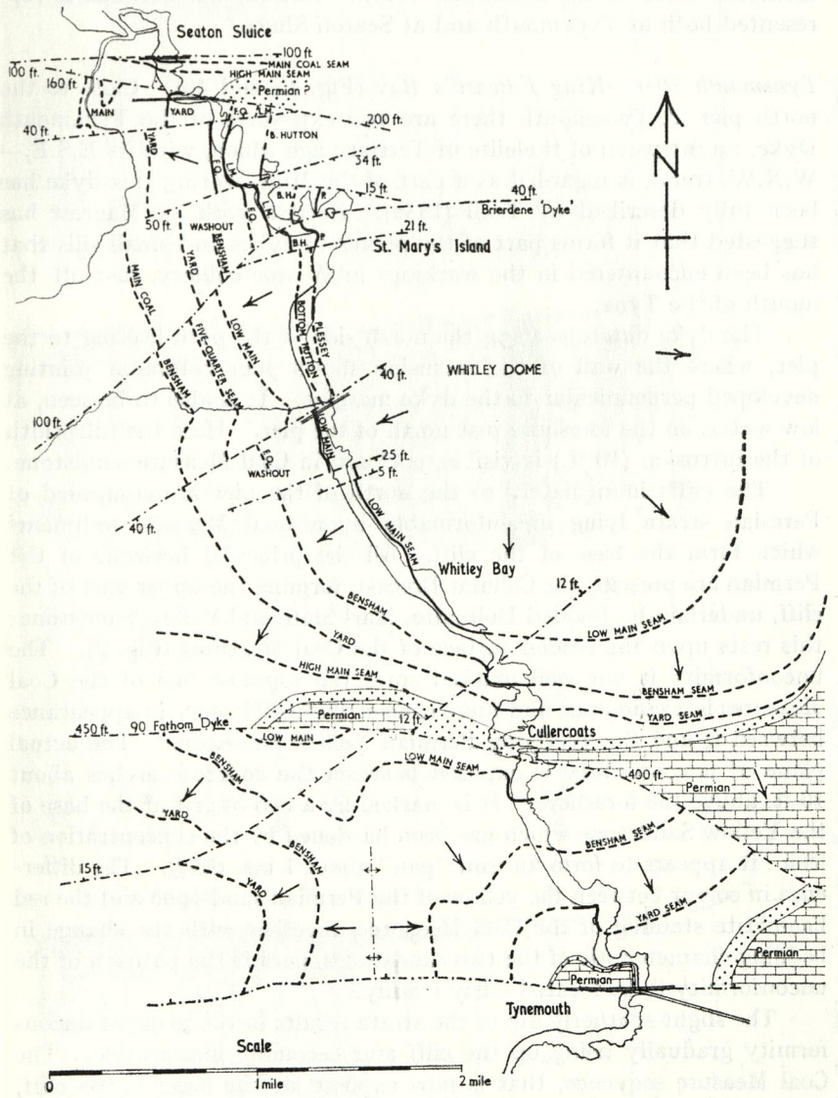


Fig. 1b. A geological sketch map of the coastal region of south-east Northumberland. Offshore data from (Clark, etc., 1961).

They constitute the oldest rocks of the coast section and include the Plessey Coal Seam, whilst progressively younger members of the Coal Measures occur to the north and south. Indeed, the Permian is represented both at Tynemouth and at Seaton Sluice.

Tynemouth Pier—King Edward's Bay (Fig. 4a and 4b). Close to the north pier at Tynemouth there are two exposures of the Tynemouth Dyke, an intrusion of tholeiite of Tertiary age which, with its E.S.E.—W.N.W. trend, is regarded as a part of the Mull swarm ; this dyke has been fully described by Teall (1889). Recent work by Magraw has suggested that it forms part of the plexus of dykes and small sills that has been encountered in the workings in Westoe colliery, just off the mouth of the Tyne.

The dyke outcrops along the north side of the path leading to the pier, where the wall of the intrusion shows poor columnar jointing developed perpendicular to the dyke margins. It is also to be seen, at low water, on the foreshore just north of the pier. Here the full width of the intrusion (10 ft.) is visible, enclosed in Coal Measure sandstone.

The cliffs immediately to the north of the pier are composed of Permian strata lying unconformably upon Coal Measure sediments which form the base of the cliff. All the principal horizons of the Permian are present, the Cellular Breccia, forming the upper part of the cliff, underlain by Bedded Dolomite, Marl Slate and Yellow Sandstone ; this rests upon the eroded surface of the Coal Measures (Fig. 2). The unconformity is not well marked since the topmost bed of the Coal Measures is a sandstone and there is no striking difference in appearance between it and the overlying Permian Yellow Sandstone. The actual plane of unconformity is exposed between the concrete arches about 10 ft. above the foreshore. It is marked by a bed of grit at the base of the Yellow Sandstone which has been hardened by the concentration of iron : it appears to form an iron "pan" about 1 ins. thick. The difference in colour between the yellow of the Permian sandstone and the red haematite staining of the Coal Measures, together with the change in bedding characteristic of the two sandstones, permit the position of the unconformity to be located fairly readily.

The slight southerly dip of the strata results in the plane of unconformity gradually rising up the cliff and becoming inaccessible. The Coal Measure sequence, that is now exposed at the base of the cliff, includes beds of conglomerate : this signifies erosion by strong water currents within the Coal Measure delta. The absence of coal scares at this particular horizon seems to indicate that the erosion did not cut down into any coal seams; the conglomerate is not associated with any known washout.

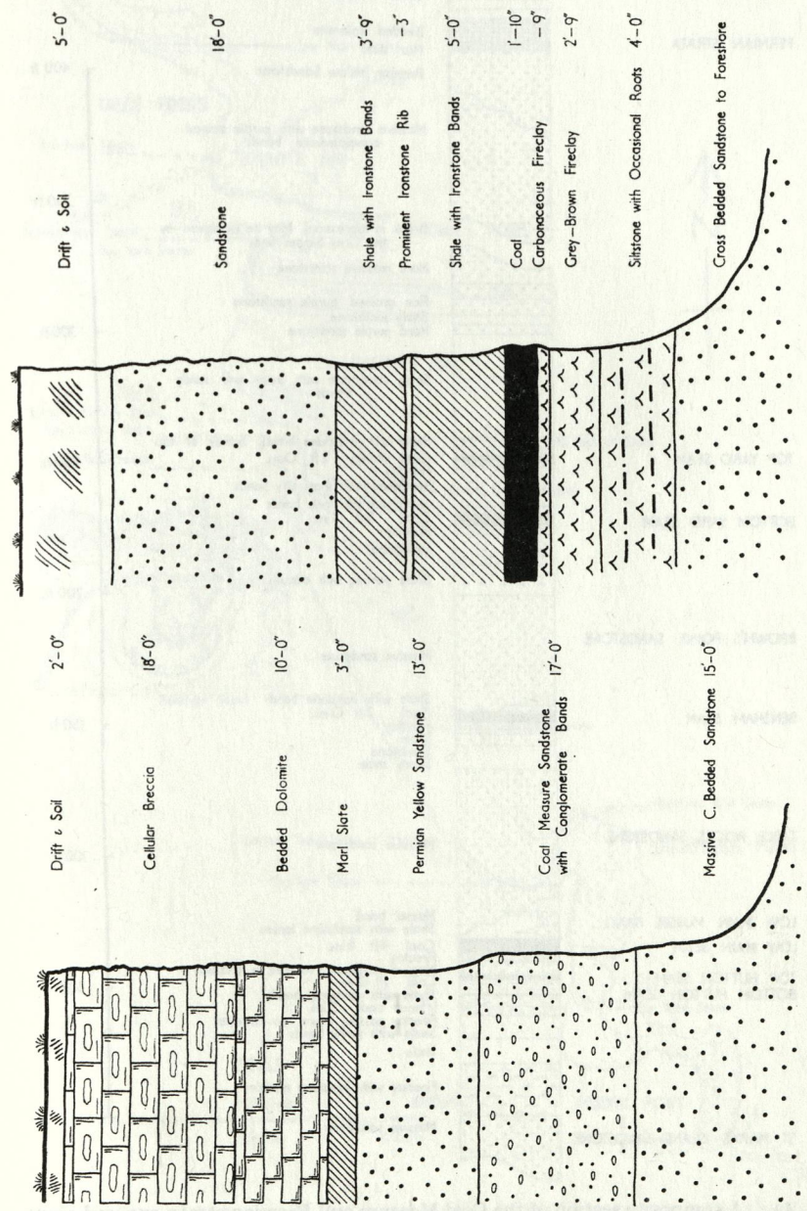


Fig. 3. Cliff section at Sharpness Point.

Fig. 2. Cliff section below Tynemouth Priory.

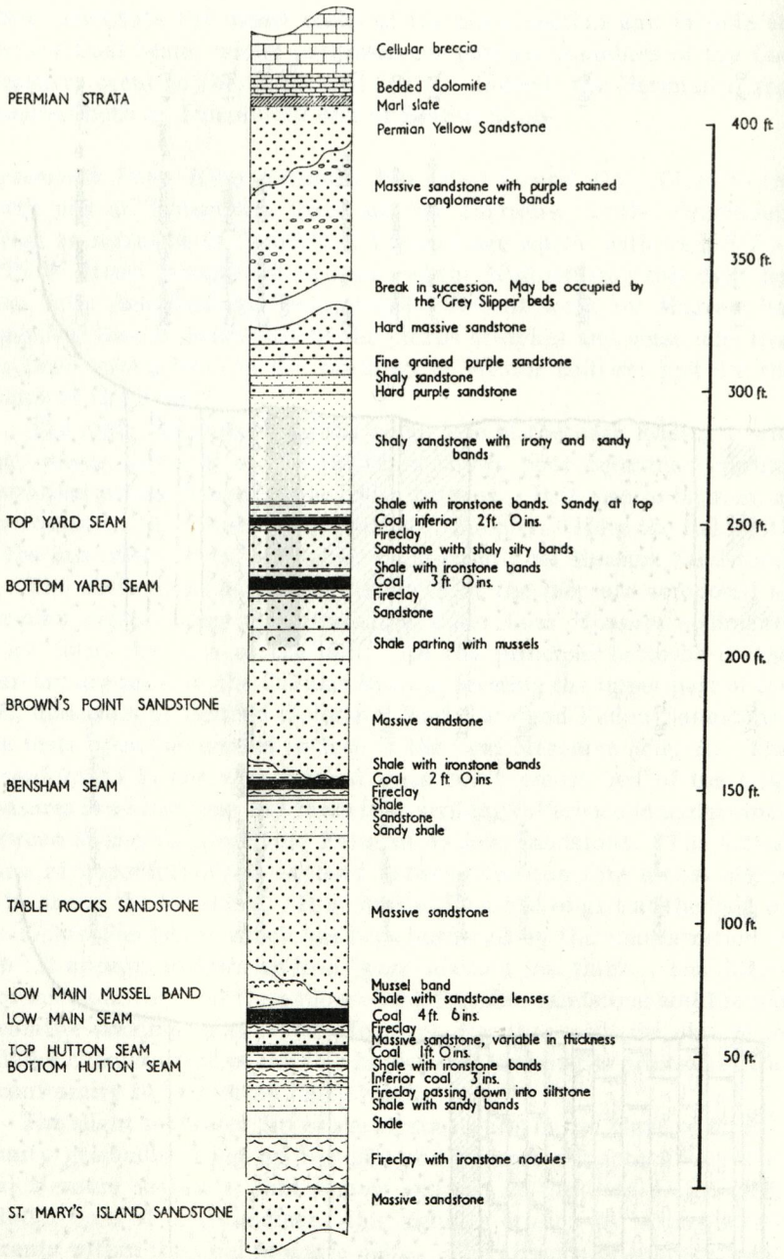


Fig. 4a. A composite section of the Coal Measure and Permian strata exposed along the coast section from Tynemouth pier to the Table Rocks, Whitley Bay.

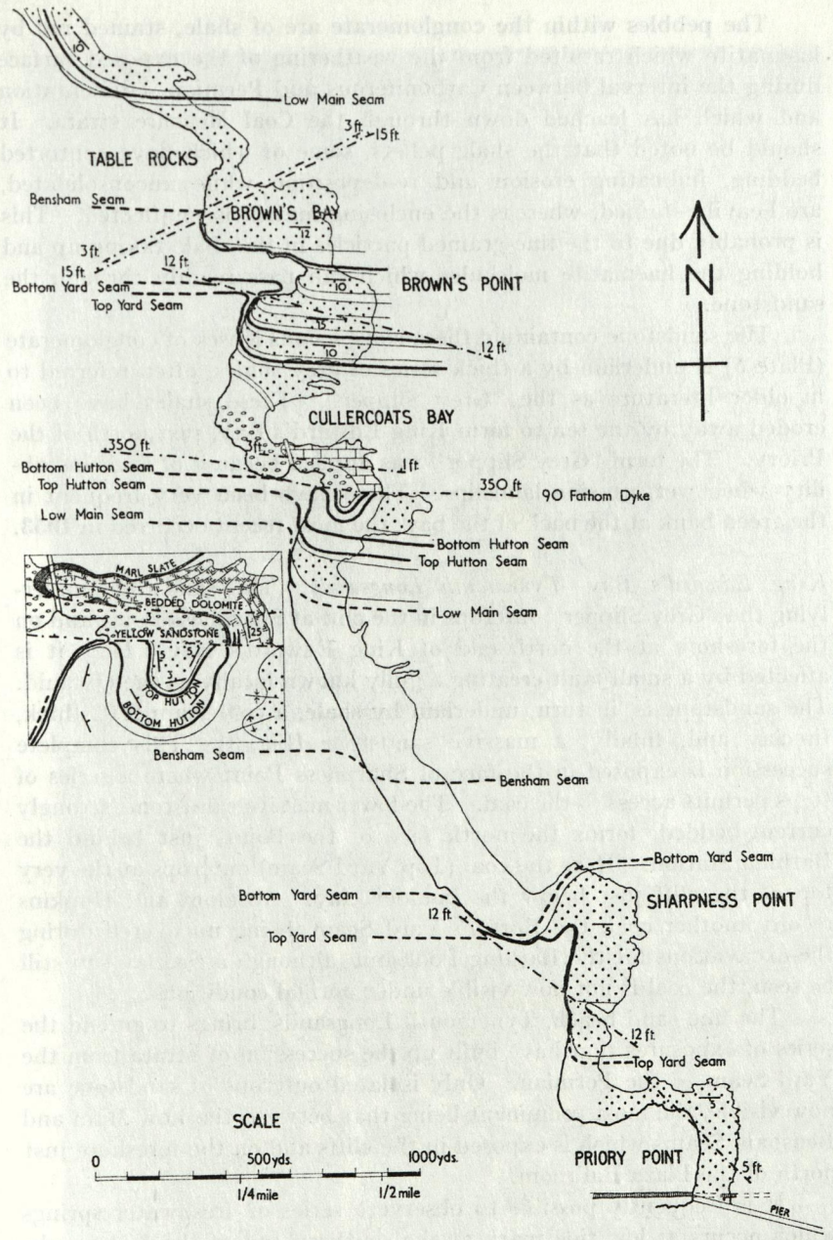


Fig. 4b. Geological map of the coast section from Tynemouth pier to the Table Rocks, Whitley Bay.

The pebbles within the conglomerate are of shale, stained red by haematite which resulted from the weathering of the exposed surface during the interval between Carboniferous and Permian sedimentation and which has leached down through the Coal Measure strata. It should be noted that the shale pellets, some of which have contorted bedding, indicating erosion and re-deposition while unconsolidated, are heavily stained, whereas the enclosing matrix is unaffected. This is probably due to the fine-grained particles in the shale taking up and holding the haematite molecules which can pass readily through the sandstone.

The sandstone containing these conspicuous lenses of conglomerate (Plate 5) is underlain by a thick series of grey shales, often referred to in older literature as the "Grey Slipper". These shales have been eroded away by the sea to form King Edward's Bay, just north of the Priory. The term "Grey Slipper" was applied because of their instability when wet, causing landslips. These have been very frequent in the green bank at the back of the bay; the most recent occurred in 1953.

King Edward's Bay—Tynemouth Longsands. The sandstone underlying the "Grey Slipper" outcrops in the cliff at Sharpness Point and on the foreshore at the north end of King Edward's Bay. Here it is affected by a small fault creating a gully known locally as the Oxfauld. The sandstone is, in turn, underlain by shale, a coal seam 2 ft. thick, fireclay and, finally, a massive sandstone (Fig. 3). This complete succession is exposed in the face of Sharpness Point where a series of steps permits access to the coal. The lower massive sandstone, strongly current-bedded, forms the north face of the Point, just behind the Bathing Station. Here the coal (Top Yard Seam) outcrops at the very top of the cliff just below the boulder clay. Absalom and Hopkins record another coal, the Bottom Yard Seam, being uncovered during the excavations for the Bathing Pool, but, although a fireclay can still be seen, the coal is not now visible under normal conditions.

The fine sand beach, Tynemouth Longsands, brings to an end the series of exposures that have built up the succession of strata from the Yard Seam to the Permian. Only isolated outcrops of sandstone are now visible, the most prominent being that between the Low Main and Bensham Seams which is exposed in the cliffs and on the foreshore just north of the Plaza Ballroom.

It is frequently possible to observe a series of freshwater springs which occurs at low tide mark at the southern end of the Longsands. Although these have the appearance of natural springs, it is suspected that they may result from a fractured sewer pipe.

PLATE 5



A portion of one of the lenses of conglomerate which occur in the Coal Measure Sandstone on the north side of Priory Point, Tynemouth. The pebbles are of siltstone and mudstone, heavily ironstained, which lie in an unstained sandy matrix.

Tynemouth Longsands—Cullercoats Bay. Recent coast protection works have obscured a good deal of the exposure at the north end of Tynemouth Longsands, although sufficient is still to be seen on the foreshore, providing the sand distribution and tide are suitable, to enable the succession to be worked out. Prior to the extension of the sea-wall, the Low Main Seam was exposed immediately under the boulder clay to the north of the ramp leading onto the beach. At the time of writing no Low Main coal can be seen, but the top leaf of the Hutton Seam, which underlies the Low Main, is still visible. It is a clean looking coal, 1 ft. 3 ins. thick, which may be identified by the thin band of sandstone that immediately overlies it. This seam is very different in character from the bottom leaf of the Hutton from which it is separated by 12 ft. of shale with ironstone bands. The lower coal is extremely dirty and is only worthy of note by virtue of the well-developed fireclay that underlies it. The "knobbly" appearance of this fireclay after weathering makes it particularly distinctive and this useful marker-band permits the relatively complex structure of this part of the section to be unravelled. The complexity has resulted from the presence of a large fault, the 90 Fathom Dyke, which crosses the section along the south side of the point that forms the northern limit of Tynemouth Longsands.

The 90 Fathom Dyke, one of the major structural features of the north of England, can be easily located since its downthrow north reintroduces the Permian Yellow Sandstone, bringing it into contact with the shales associated with the Hutton Seam. It is remarkable for its high angle of hade, the fault plane being at an angle of 35° to the horizontal. On the south side of the fault, which may be followed across the foreshore, there has been created a series of small folds which have their axes perpendicular to the fault plane. These "folds", together with the general northerly dip of the strata, have produced basin and dome structures which are well exposed on the foreshore.

The fireclay below the Bottom Hutton is of particular value in tracing the structures. It outcrops at the base of the cliff, and circles round the basin in the centre of which is the Top Hutton Seam and the sandstone that overlies it. At low tide a dome, the core of which is formed by the sandstone below the Bottom Hutton Seam, is to be seen; this is known locally as Crab Hill.

On the north side of the 90 Fathom Dyke the outcrops are similarly complicated by a syncline pitching seawards, the southern limb of which is faulted.

At Cullercoats South Point the cliff and most of the foreshore are composed of Permian Yellow Sandstone. The fine examples of dune-bedding should be noted, together with the fractured nature of the

sandstone, due probably to the shattering effect of the 90 Fathom Dyke. Close to the fault the cement of the sandstone is mainly barytes, as is that of the Coal Measure sandstone forming the Crab Hill Rocks. Since the content of barytes decreases away from the 90 Fathom Dyke, it seems probable that this concentration is due to the migration of barium solutions along the fault plane. Such solutions are encountered inland in collieries working near the fault; indeed, the barium is extracted from the pit-waters at both Backworth and Rising Sun collieries.

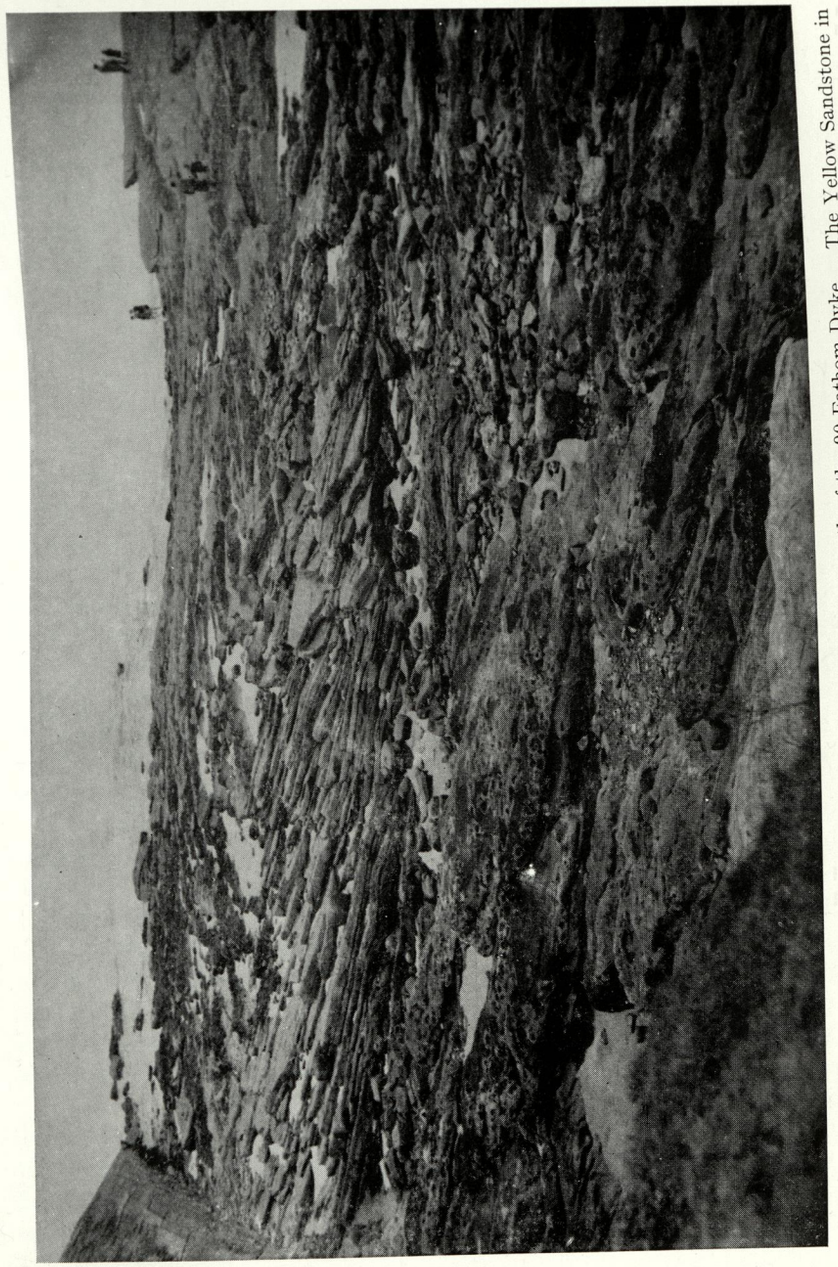
The Permian Yellow Sandstone is overlain by the Marl Slate, a bed of dark current-bedded siltstone about 3 ft. thick. The outcrop is rather sinuous, appearing first at the fault plane, low on the foreshore, where it is split into three sections by leaves of Yellow Sandstone. Fragments of the Marl Slate are to be found caught up in the minor fault plane along the southern limb of the syncline, and the outcrop then swings under the south pier where it is to be seen in the nose of the syncline, inshore of the pier (Plate 6). This area, accessible only at low tides, is one of the best localities for the recovery of the fossil fish for which the horizon is famous. The Marl Slate further outcrops along the northern limb of the syncline, passing beneath the pier and out to sea under a prominent ledge of the Bedded Dolomite which forms the centre of the syncline.

Although nothing is to be seen at the present day, due to the construction of a sea-wall, old photographs show the southern cliff of Cullercoats Bay to be composed of Coal Measure strata lying to the south side of the fault; this indicates that the plane of the 90 Fathom Dyke passes within the bay. Cullercoats Bay results from the erosion of the softer Permian Yellow Sandstone which forms the cliffs in the middle of the bay. The cliffs are riddled with caves that have developed along the joint planes of the sandstone.

Cullercoats—Brown's Bay. The unconformable base of the Permian on the Coal Measures is not seen at Cullercoats, probably being concealed behind the Lifeboat Station. This seems the most likely explanation, since there appears to be no sign of disturbance of the strata in the vicinity such as might be expected were the junction faulted. The Coal Measure strata, which are purple-stained massive sandstones, can be seen alongside the north pier dipping fairly steeply to the south (15°). This relatively high dip is most probably due to the presence of the 90 Fathom Dyke and it is interesting to note how well this accords with the old mining saying that strata "dip to a riser and rise to a dipper".

The Coal Measure strata immediately beneath the Permian unconformity lie between the Top Yard and Main coal seams : means that this

PLATE 6



Permian strata outcropping on the south side of Cullercoats Bay, just north of the 90 Fathom Dyke. The Yellow Sandstone in the foreground is separated by a small fault from the Bedded Dolomite which is folded into an easterly pitching syncline. Small patches of Marl Slate are present in the fault plane.

the 90 Fathom Dyke has a throw considerably less than its name would suggest, probably in the region of 400 ft. The strata are of comparable horizon with the sandstone exposed in King Edward's Bay.

Recent coast-defence works have, unfortunately, obscured what used to be an excellent succession of strata from the north pier at Cullercoats to Brown's Point. The foreshore in this area is without sand, but the coals and softer sediments have been deeply eroded and exposures are concealed in rubble-filled troughs between outstanding ridges of sandstone. The strike of the beds is here at right angles to the coast and the section provides an excellent stretch for elementary tuition. This was especially true in the past when there was a complete section in the cliff for comparison.

The sandstone which forms the foundation for the north pier at Cullercoats is underlain by a sequence of siltstones with occasional sandy bands. The base of the succession is marked by a six-inch bed of ironstone nodules in a sandy matrix and, since there is little sign of erosion, it is difficult to decide whether this is an intra-formational conglomerate, or whether, although it seems unlikely, the ironstone nodules have developed *in situ* in the sandy matrix.

Four feet below this horizon is the top leaf of the Yard Seam. This is a poor coal containing a good deal of shale, very different in character from the bottom leaf of the Yard from which it is separated by 12 ft. of strata which includes seggar, sandstone and shale. The bottom leaf is appropriately 3 ft. thick, but unfortunately it is very poorly exposed. In the past, it was a prominent feature in the cliff above the sewer at the north end of the bay. The upper leaf of the Yard was also exposed high up in the cliff, just below some iron shuttering.

Just south of Brown's Point, which is composed of the sandstone lying between the Yard and Bensham Seams, often referred to as the Brown's Point Sandstone, the strata are dislocated by a small strike fault having a downthrow north of 12 ft. The fault is rather difficult to locate, but it may best be found by tracing the outcrop of a small one-inch rib of sandstone, the topmost portion of the Brown's Point sandstone, where it crosses the foreshore. Some disturbed strata resulting from the fault movement may been seen along the line of the sewer pipe which runs out to sea at this point.

The Brown's Point Sandstone is divided into two portions by a shale parting 12 ft. thick. The erosion of the softer shale makes a pronounced indentation in the apex of the point and it is interesting to note the upturning of the shale outcrop at its northern end due to ice movement. The shale contains a few scattered mussels, mainly concentrated in the lower section.

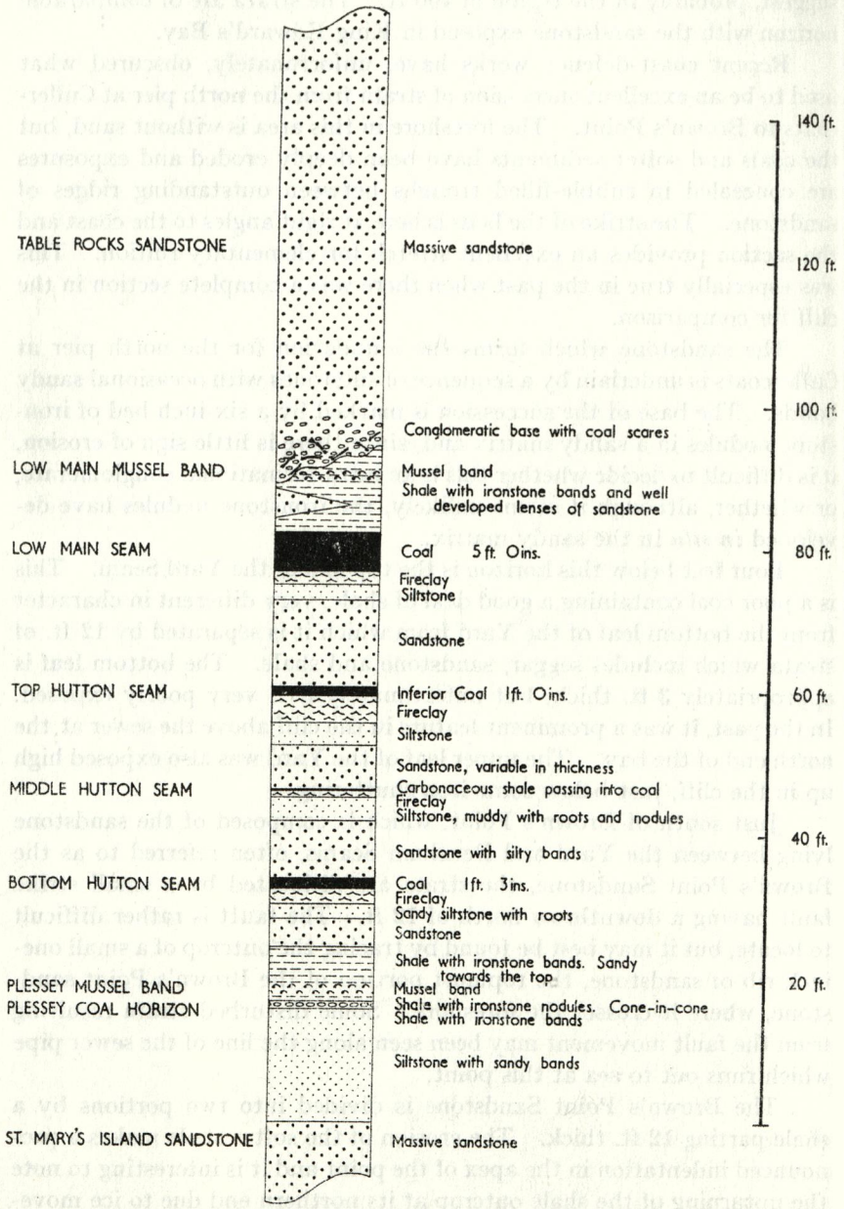


Fig. 5a. A composite section of the Coal Measure strata exposed along the coast from the Table Rocks, Whitley Bay, to St. Mary's Island.

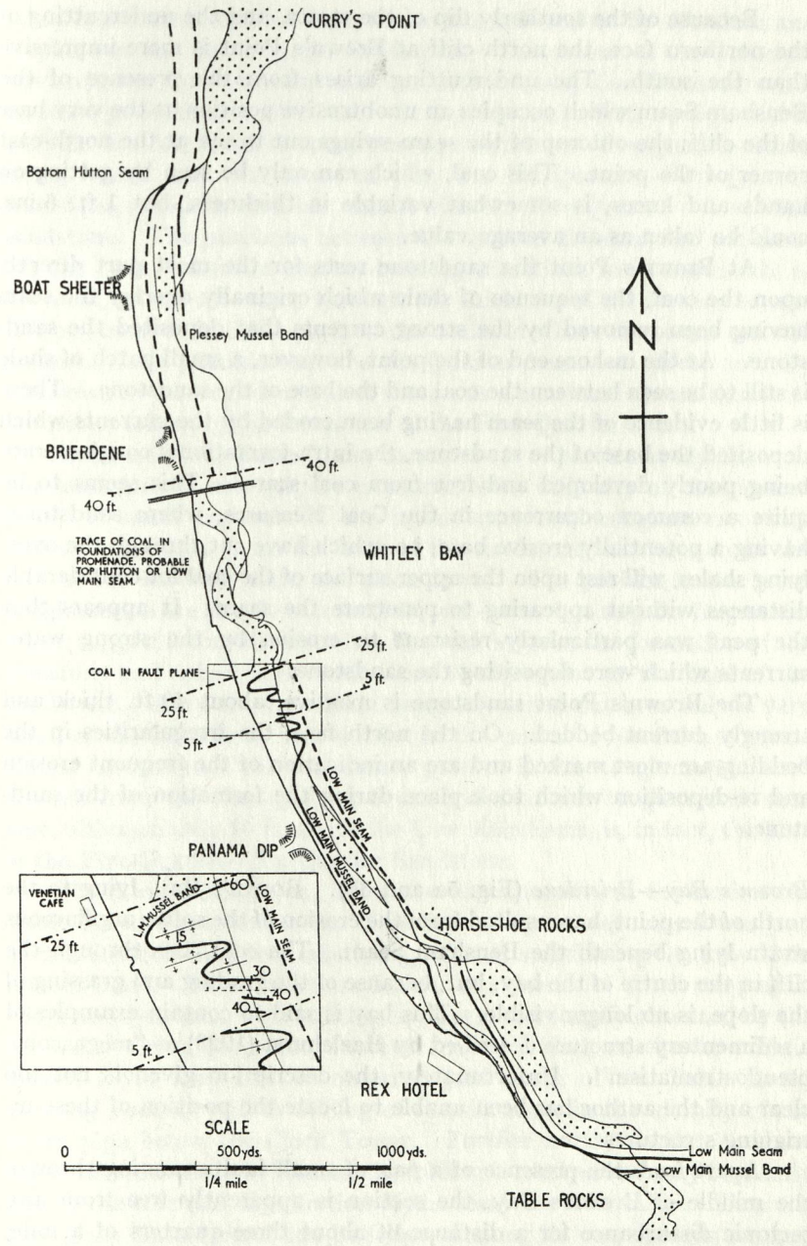


Fig. 5b. Geological map of the coast section from the Table Rocks, Whitley Bay to St. Mary's Island.

Because of the southerly dip of the strata, and the undercutting of the northern face, the north cliff at Brown's Point is more impressive than the south. The undercutting arises from the presence of the Bensham Seam which occupies an unobtrusive position at the very base of the cliff; the outcrop of the seam swings out to sea at the north-east corner of the point. This coal, which can only be seen by getting on hands and knees, is somewhat variable in thickness, but 1 ft. 6 ins. could be taken as an average value.

At Brown's Point the sandstone rests for the most part directly upon the coal, the sequence of shale which originally overlay the seam having been removed by the strong currents that deposited the sandstone. At the inshore end of the point, however, a small patch of shale is still to be seen between the coal and the base of the sandstone. There is little evidence of the seam having been eroded by the currents which deposited the base of the sandstone, the intra-formational conglomerate being poorly developed and free from coal scares. This seems to be quite a common occurrence in the Coal Measures, where sandstones having a potentially erosive base, i.e. which have cut through the overlying shales, will rest upon the upper surface of the coal for considerable distances without appearing to penetrate the seam. It appears that the peat was particularly resistant to erosion by the strong water currents which were depositing the sandstone.

The Brown's Point sandstone is massive, about 40 ft. thick and strongly current-bedded. On the north face, the irregularities in the bedding are most marked and are an indication of the frequent erosion and re-deposition which took place during the formation of the sandstone.

Brown's Bay—Brierdene (Fig. 5a and 5b). Brown's Bay, lying to the north of the point, has resulted from the erosion of the softer argillaceous strata lying beneath the Bensham Seam. The coal rises through the cliff in the centre of the bay, but, because of the grading and grassing of the slope, is no longer visible. This bay is said to contain examples of a sedimentary structure described by Hazlehurst (1923) as "megascopic pseudostromatism". Unfortunately, the description given is not too clear and the author has been unable to locate the position of these intriguing structures.

Apart from the presence of a pair of small faults running through the middle of Brown's Bay, the section is apparently free from any tectonic disturbance for a distance of about three-quarters of a mile, that is, until the centre of Whitley Sands is reached. From Table Rocks to the southern end of Whitley Sands, the cliffs are composed of massive

sandstone current-bedded from the south, referred to by Absalom and Hopkins as the Table Rocks Sandstone. This is one of the principal sandstones in the succession and has, like so many Coal Measure sandstones, a prominent erosive base. It should not, in fact, be regarded as a single horizon since it comprises the Bensham—Six-Quarter Sandstone, which has cut down to join the Six-Quarter—Five-Quarter Sandstone, which in turn has united with the Five-Quarter—Low Main Sandstone. The junctions between the various divisions are not clear, but the swing round in current-bedding directions from south-east to due west, as one moves up through the thickness of the sandstone, can also be observed in other parts of the coalfield where the seams are still present. It is possible that the Six-Quarter Seam was never actually laid down in this region and that there was a continual accumulation of sandstone following the formation of the Five-Quarter Seam.

The base of the Table Rocks Sandstone is of particular significance, but unhappily it can only be examined with difficulty at the present time. A small exposure of the intra-formational conglomerate with coal scares, which forms the base of the sandstone, can be seen at the foot of the sea-wall below the clock tower. The pebbles in the basal conglomerate are largely of ironstone, well-worn, but angular fragments, which suggest a considerable time interval between the formation of the ironstone and subsequent erosion and re-deposition at the base of the sandstone. Since the Low Main Seam is washed out over only a very small area, one mile by half a mile, in the centre of the field, it seems almost certain that the coal scares present in the conglomerate were derived from the Five-Quarter Seam and that the conglomerate seen here, although only 10 ft. above the Low Main Seam, is, in fact, the base of the Five-Quarter—Six-Quarter Sandstone.

The most striking thing about the disconformity at the base of the Table Rocks Sandstone is the disparity in dip between the lower part of the sandstone and the underlying sediments, including the Low Main Mussel Band. These latter are folded into a series of small steep anticlines and synclines, with faulting in places, now largely obscured by the sea-wall. On a good tide, however, steep folding of the Low Main Mussel Band may still be observed just north of the Table Rocks Bathing Pool, as well as folding of the siltstones in the vicinity of the sewer pipe below the Clock Tower. Further north, on the foreshore below the Convalescent Homes, the folding is marked and may be clearly seen if the tide and distribution of the sand are favourable. Here the Low Main Mussel Band can be followed along its very sinuous outcrop between high and low water marks. It is difficult, in the case of these latter examples on the foreshore, to be certain that one is dealing with folding at the base of the sandstone and not with ice drag.

The crescent form of the Horseshoe Rocks below Greggs Slope marks the outcrop of a lens of sandstone lying between the Low Main and the Low Main Mussel Band. The folding here is also probably penecontemporaneous folding at the base of the Table Rocks Sandstone. The disturbed strata attracted the attention of Lebour and Smythe (1906), who attributed the phenomenon to thrusting, but it now seems more probable that the disturbance is due either to earthquake shock similar to that described by Shirley (1955), or to movement under the load of deposition of the Table Rocks Sandstone (Plate 7).

The Low Main Mussel Band, one of the principal marker horizons in this part of the succession, is very prominent along this portion of the coast section. For a short distance the main sewer pipe below the Rex Hotel uses the mussel band as a foundation, after which the outcrop moves inland under the lower promenade and then out to sea again just north of the Table Rocks. At this latter point it is very difficult to locate, being partially washed out by the erosive base of the Table Rocks Sandstone.

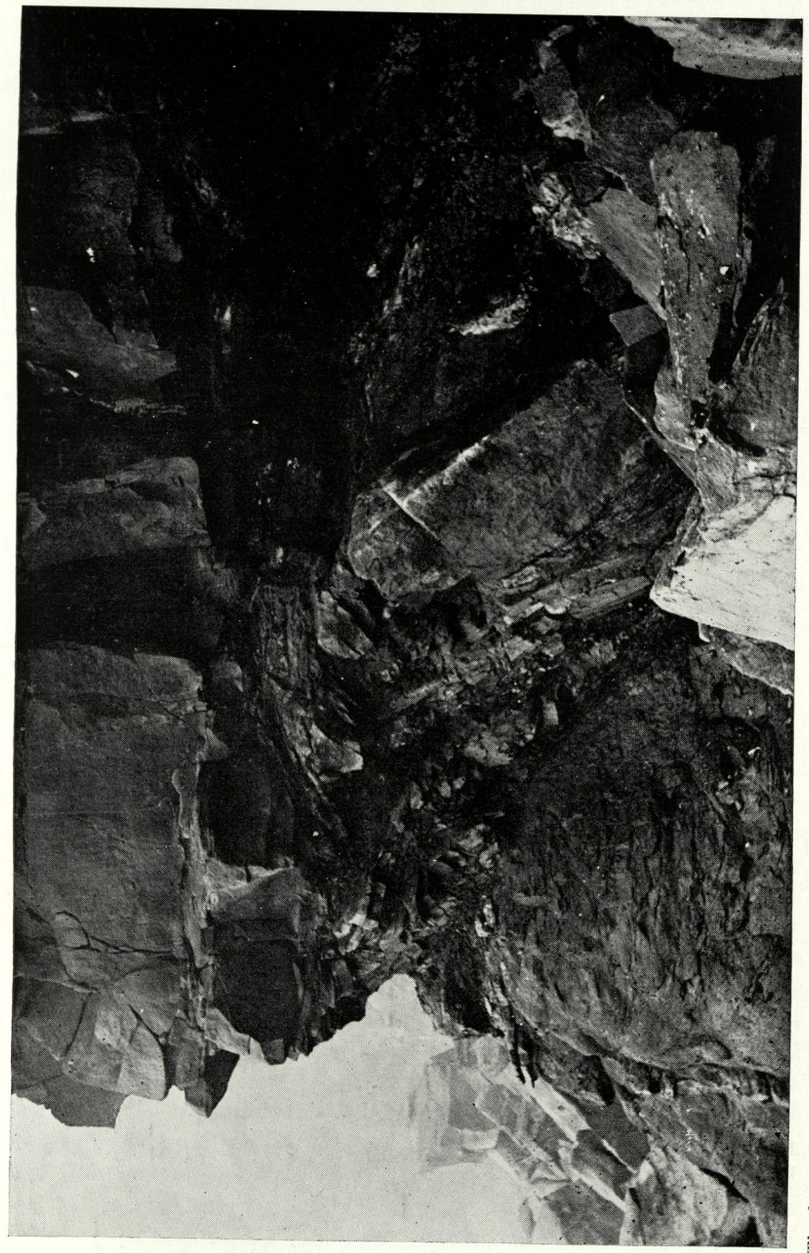
The change in the regional dip of the strata is most marked, swinging from due south at the Table Rocks to west below the Clock Tower; this swing may best be observed from the Lower Promenade. From here to St. Mary's Island the section is along the strike of the strata.

The Low Main Mussel Band consists of one foot of black, carbonaceous shale packed with the mussels *Anthracosia*, *Anthraconaia* and *Naiadites*. These gradually fall off in number above the main band, but the best uncompressed specimens are to be found in the ironstones that accompany the shale immediately overlying the band.

The Low Main Mussel Band is underlain by an earthy, micaceous shale, very much like a seggar in appearance. This passes downwards, after only a few inches, into a sandstone which is present in the form of a series of lenses. One such lens, forming a prominent little scarp on the foreshore below the Rex Hotel, can be seen to die out to the south as it passes under the lower promenade. As already remarked, another lens forms the Horseshoe Rocks, and further lenses outcrop at low water mark along the length of Whitley Sands as far north as the Panama Dip. These are easily distinguished by their clean iron-free appearance and strong current-bedding from the south east.

As with most coals on the foreshore, the Low Main Seam is very inconspicuous, but it can be found by digging in the rubble in the obvious depression on the foreshore below the Rex Hotel. The outcrop may be followed running south down the coast for a short distance before it swings out to sea parallel with the sewer pipe. To the north, the Low Main outcrops below the Horseshoe Rocks and at extreme low

PLATE 7



The base of the Table Rocks Sandstone, near the Table Rocks, Whitley Bay. The strong folding of the underlying strata, which includes the Low Main Mussel Band, is clearly shown. The photograph was taken by Dr. J. A. Smythe in connection with the Q.J.G.S. paper in 1906 although it was not published at that time.

spring tides the canneloid shale, which forms the roof of the seam, can be traced as far as the Panama Dip, lying below the outcrops of the sandstone lenses to which reference has already been made. It is then taken further out to sea by a small fault lying just below the Convalescent Homes.

The Low Main Seam is 4 ft. 6 ins. thick with a rather canneloid roof. It is underlain by a thin seggar and a massive current-bedded sandstone; the latter forms the scarp visible at low water below the Rex Hotel.

The Low Main Mussel Band is far better exposed than the coal, but, to follow its outcrop along the length of Whitley Sands, observations must be made over a protracted period and opportunity taken of temporary sand removal. Over the last ten years an almost complete outcrop of the horizon has been traced from below the Rex Hotel to the Venetian Café on the northern promenade. As the Mussel Band passes to the north, it swings first into the hollow inside the Horseshoe Rocks, then under the upper part of the beach until it is within ten yards of the promenade at Panama. At this point, the outcrop turns suddenly seawards and lies at low water mark by the old pipeline for the brine intake to the Convalescent Homes. For the next thirty yards the band is strongly crumpled, dips of 45° being recorded. Just below the Venetian Café the outcrop is influenced by a fault and swings round at right angles to the coast, passing from low water mark to the foot of the promenade before returning to low water mark again only ten yards further north; the dips in this region are in the order of 30°—40°. At this point the Low Main Mussel Band is underlain by an impure fireclay and the ironstone immediately above the band has developed a prominent cone-in-cone structure. It should perhaps be mentioned that the "hummocky" appearance of Whitley Links in this area is due to the remains of spoil tips from pits working, not coal, but the ironstone above the Low Main Mussel Band.

The fault plane referred to in the previous paragraph crosses the foreshore in an east-west direction, very close to the old sewer pipe below the Venetian Café; the outcrop of the Low Main Mussel Band lies only a few yards to the south of this fault. If sand conditions are favourable, fault-breccia may be seen close to the Low Main Mussel Band outcrop, together with a mixture of coal and seggar just a few feet further north. Absalom and Hopkins record five feet of coal uncovered during the excavations for the lower promenade north of the Convalescent Homes. Whilst they have identified this as the Five-Quarter Seam, it seems possible that it is, in fact, the Low Main Seam on the north side of the fault. This opinion is based upon the fact that the

Five-Quarter Seam was washed out at the Rex Hotel, and that in the nearest boreholes in which it has been encountered, it is consistently recorded as a split seam with an average total thickness of four feet. If it were the Five-Quarter on the north side of the fault, it would imply a considerable change in the character of the under-lying sandstone, exposed on the foreshore, which is here current-bedded from the north in contrast with the southerly direction which is usual for sandstones between the Low Main and Five-Quarter horizons.

It is difficult to be certain about the identification of the seam uncovered during the construction of the promenade since exposures in the area are very poor and the strata are contained in a wedge between two faults, the one already referred to and the other some one hundred yards further north at Brierdene. The only strata exposed are the sandstone, and a seggar which is to be seen in winter, when the sand has been removed, outcropping just under the north end of the promenade; this seggar presumably underlies the five feet of coal under discussion. Steeply dipping strata seen at low water mark on the north side of the fault seem to indicate that the downthrow is to the south. The throw is probably in the region of 25 ft., but it is difficult to be precise in view of doubts as to the identity of the seam and uncertainty regarding the true position of the strongly folded Low Main Mussel Band on the south side of the fault. This folding makes the map (Fig. 5b) appear rather peculiar since the underlying strata are undisturbed and have regular outcrops. In addition, dips are produced on the south side of the fault plane which would suggest a downthrow north, although more reliable indications, from strata not affected by penecontemporaneous movements, on the north side of the fault, suggest the contrary.

The sandstone, which forms a conspicuous outcrop at low water mark just to the north of the fault below the Venetian Café, swings inshore at the north end of the promenade and disappears under the boulder clay cliffs. The wall of the promenade is here built upon fireclay, in which is embedded a series of wooden posts apparently inserted as supports during the construction of the wall; this fireclay can be seen during most winters when the sand moves down to the lower part of the beach. This very plastic, light grey, muddy stratum is minutely examined by the small boys of the neighbourhood for coins, which, having fallen from the pockets of summer visitors, migrate downwards through the sand to become embedded in its upper surface. In the author's opinion it seems probable that this is the fireclay underlying the Low Main Seam.

A dyke of tholeiite, 1 ft. thick, crosses the foreshore some ten yards north of the end of the promenade, but is rather inconspicuous because

its hardness and colour are similar to that of the enclosing sandstone. It has a sinuous course, and this possibly accounts for its being recorded by the Geological Survey as two separate dykes.

Brierdene—Curry's Point. Just north of the Brierdene Burn the exposures are obscured by sand. From a geological viewpoint this is unfortunate since there is a possibility that this section of the coast contains a fault of appreciable throw. The presence of such a fault is suggested by the broken nature of the sandstone which outcrops for a distance of thirty yards to the north of the stream and well out onto the wave-cut platform. The strata appear to have little or no dip from this point to the end of the bay, a fact which makes the outcrops very difficult to follow.

During the winter of 1960 a mussel band with a characteristic layer of ironstone nodules containing cone-in-cone structure was exposed at low water mark on the foreshore, midway between Brierdene and the boat shelter. This band has since been traced round the coast to the north side of the causeway leading to St. Mary's Island, and has been identified as the mussel band overlying the Plessey Seam.

Projecting this outcrop some seventy yards south to the Brierdene would indicate the presence of a fault with a downthrow south of some 40 ft. It seems probable that this fault may be connected to another fault, the Brierdene Dyke, which crosses the coast section north of St. Mary's Island; the downthrow of this latter fault, however, is to the north, dying out eastwards.

Between the Brierdene Burn and the south side of Curry's Point (named after Michael Curry, who was hanged here in 1739 for the murder of the landlord of the "Three Horse Shoes" Inn at Hartley) there are few exposures save for the Plessey Mussel Band and associated nodules, overlain by sandstone.

The sand here is of interest since it possesses the property of singing. This was recorded by Tomlinson (1893), but at the present day the sands appear to be somewhat temperamental with regard to performance, although the author has been fortunate enough to hear the phenomenon on several occasions.

On the south side of Curry's Point a small exposure of coal, the Bottom Hutton Seam, used to be visible in the cliff, just at the base of the boulder clay, but this has now been concealed under Council refuse tipping. The coal was one foot in thickness and immediately overlain by a thin band of sandstone. The foreshore here is difficult to map since the strata are horizontal and the outcrops follow no set course. The lower part is made up of the siltstones and mudstones below the

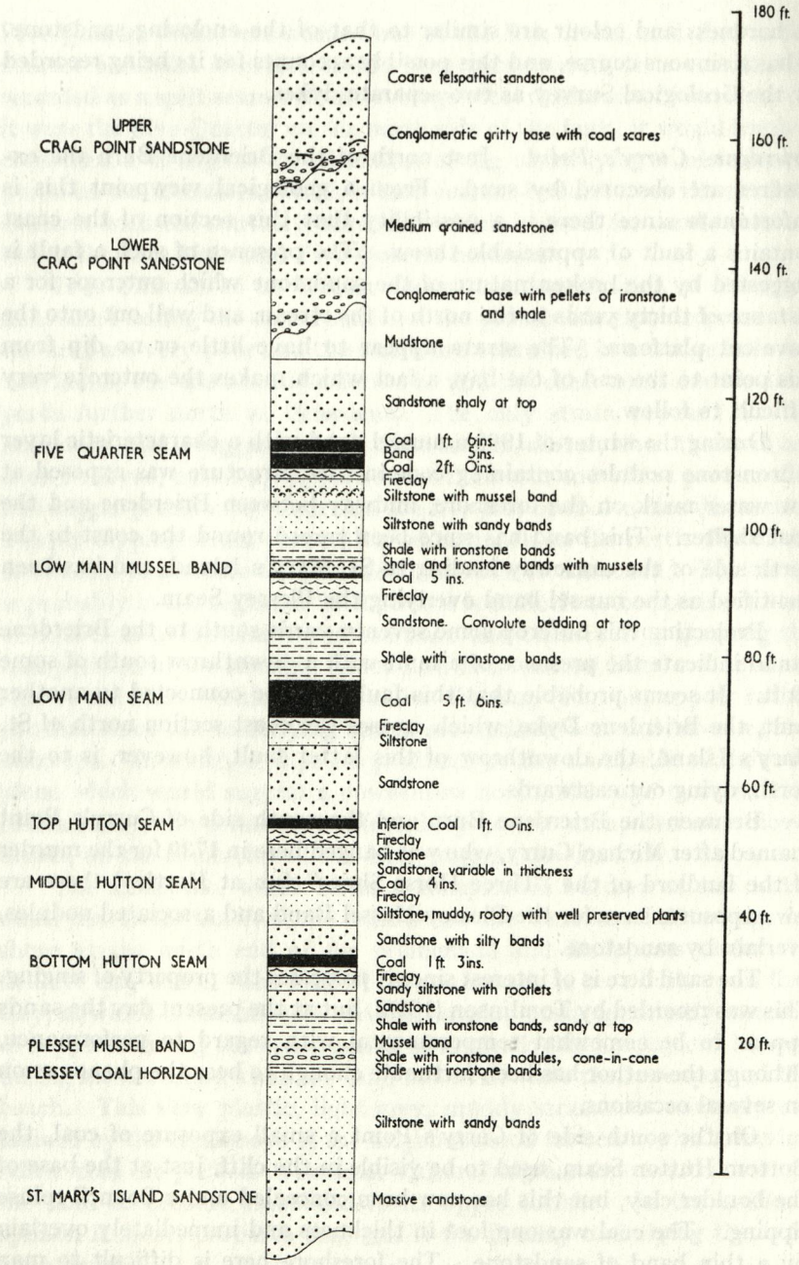


Fig. 6a. A composite section of the Coal Measure strata exposed along the coast from St. Mary's Island to Crag Point.

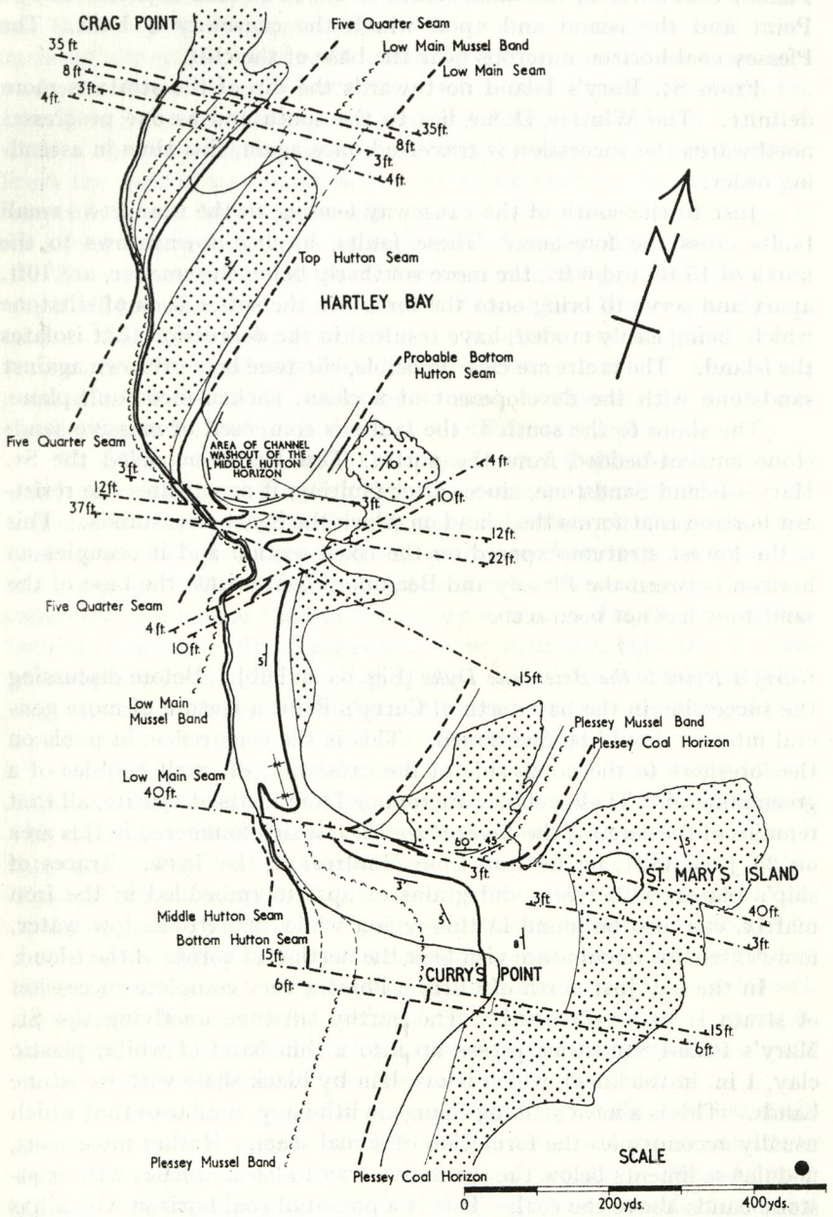


Fig. 6b. Geological map of the coast section from St. Mary's Island to Crag Point.

Plessey coal horizon, the same strata as are to be seen between Curry's Point and the island and upon which the causeway is built. The Plessey coal horizon outcrops near the base of the cliff.

From St. Mary's Island northwards the dip of the strata is more definite. The Whitley Dome lies to the south and as one progresses northwards the succession is traversed once again, this time in ascending order.

Just to the south of the causeway leading to the island two small faults cross the foreshore. These faults, having downthrows to the north of 15 ft. and 6 ft., the more southerly being the smaller, are 10ft. apart and serve to bring onto the foreshore the softer beds of siltstone which, being easily eroded, have resulted in the depression that isolates the island. The faults are clearly visible, siltstone being thrown against sandstone with the development of a clean, slickensided fault plane.

The shore to the south of the faults is composed of massive sandstone current-bedded from the north. This has been called the St. Mary's Island Sandstone, since, after faulting, it constitutes the resistant horizon that forms the island on which the lighthouse stands. This is the lowest stratum exposed on the coast section and it occupies an horizon between the Plessey and Beaumont coal seams; the base of the sandstone has not been seen.

Curry's Point to the Brierdene Dyke (Fig. 6a and 6b). Before discussing the succession in the bay north of Curry's Point a feature of more general interest should be mentioned. This is the occurrence, in pools on the foreshore to the north side of the causeway, of small pebbles of a green mineral. These pebbles are rounded fragments of apatite, all that remains of the cargo of the *Gothenburg City*, which foundered in this area on 26 June 1891, on its way from Montreal to the Tyne. Traces of ship's plates, with rivets and grains of apatite embedded in the iron matrix, can also be found in this region while, at extreme low water, more extensive remains are visible at the north-east corner of the island.

In the bay just north of Curry's Point a very complete succession of strata is to be observed. The earthy siltstone overlying the St. Mary's Island Sandstone passes up into a thin band of white, plastic clay, 1 in. in thickness, which is overlain by black shale with ironstone bands. This is a most striking change in lithology, similar to that which usually accompanies the formation of a coal seam. Rather micaceous, nodular sediments below the seam give way to 'clean' shales with ironstone bands above the coal. This is a potential coal horizon which has been identified by Absalom and Hopkins as the Low Main Seam on the basis of the fauna of the mussel band which lies some 8 ft. above it.

The author is not happy about this identification since it would necessitate the complete disappearance of 5 ft. of coal, recently worked in an opencast site within quarter of a mile of this point, without trace of a washout. In addition, recent revision of the correlations involving the Low Main Seam (Armstrong and Price, 1953-54) now makes it doubtful whether the fauna can be regarded as being appropriate to this horizon. From the general succession of the strata exposed in the area, and a comparison with borehole records, it seems more probable that this is the horizon occupied further north by the Plessey Seam.

The level at which this marked change in lithology takes place, and which will be referred to in future as the Plessey Coal Horizon, is of great value in this region as a marker band. Its outcrop may be traced round the margin of a gentle syncline down to low water mark, where it is isolated to form a small outlier by an east-west fault; this fault runs parallel to, and a few yards south of, the Brierdene Dyke.

The Plessey Coal Horizon is overlain by shales with ironstone bands which give way to a soft shale with conspicuous ironstone nodules. The soft shales having weathered away, these nodules remain as large isolated spherical or lenticular masses, up to three feet across, which litter the foreshore. The nodules are of particular interest since they are composed of a central band of ironstone containing mussels, sandwiched between two layers displaying cone-in-cone structure, both sets of cones pointing inwards and being radial in form. This distinctive horizon has been referred to (page 171) during the identification of the strata in the area between Curry's Point and the Brierdene Burn.

Immediately overlying the nodular horizon is the Plessey Mussel Band, very different in lithology from that above the Low Main Seam. The mussels are largely concentrated in one band of ironstone, although they are also to be found scattered throughout the adjacent shales. They are not so compressed as in the Low Main Mussel Band and many of them appear as "ghosts". This band of ironstone can be located on the foreshore by its habit of weathering to a deeper brown than most of the other ironstones in the succession. There is no sign of cone-in-cone structure, either in the mussel band, or in the ironstones overlying it. In addition to the mussels, fish scales and teeth have been found in the shales, together with some poorly-preserved plant material.

The shales overlying the mussel band gradually become more micaceous and sandy and, after about five feet, pass into a sandstone which forms a prominent ledge at the base of the cliff. The sandstone possesses three interesting features : it is very well jointed, it contains large nodules of sandy ironstone, and the bedding is disturbed by what appear to be large numbers of vertical worm tubes.

The upper part of the sandstone gradually becomes nodular and passes up, over the course of five feet of strata, into a fireclay. At this horizon some very fine stigmarian roots are present, together with a tree base with radial roots in position of growth. The fireclay is overlain by a coal 1 ft. 3 ins. thick, firm, bright and apparently of good quality; this, in the author's opinion, is the bottom leaf of the Hutton Seam. The coal is well exposed at the base of the cliff, which is here made up of a succession of sandstone with shaly partings, becoming more shaly just below the boulder clay. Recent erosion has exposed traces of coal above this shale, probably representing the position of the Middle Hutton Seam.

The Brierdene Dyke. A few yards north of the last locality the cliff has slumped down to shore level, concealing the Bottom Hutton Seam beneath boulder clay. This slumping marks the position of the Brierdene Dyke, the line of which can be traced from the cliff across the foreshore. The folding of the strata, exposed on the foreshore to the south side of the fault plane, suggests lateral movement since the axes of the folds are at right angles to the fault plane. The somewhat sinuous course of the fault across the foreshore may be indicative of a low angle of hade.

The fault plane marks the low water limit of the bay lying to the north of Curry's Point, and then cuts across the base of a long tongue of sandstone which projects to the north-east on the north side of St. Mary's Island. From here it forms the head of a gully on the north-west side of the island, and then passes under the lighthouse-keeper's house. On the inland side of the island, the fault plane forms quite a prominent scarp which used to be timber-boarded as an anchorage for small boats. On the east side, the position of the fault is marked by a deep cleft known locally as "The Gully".

On the north, the downthrow side of the fault, the strata dip steeply away from the fault plane, the dip reaching 70° in places between St. Mary's Island and the mainland.

Absalom and Hopkins recorded a downthrow south of only 6 ft. for this fault, but there can be little doubt that the throw is in the other direction and a good deal greater than 6 ft. They were possibly misled by the presence in the cliff, on the north side of the fault, of the top leaf of the Hutton Seam, which is brought to about the same level as the bottom leaf of the Hutton on the south side of the fault. At first glance this appears to be a continuation of the same seam, but closer examination will reveal that, not only the coal, but also the sediments both above and below the seam are completely different in character. In addition, the Low Main Seam, 5 ft. thick, is brought into the cliff on the north side of the fault just below the boulder clay.

If an exceptionally low tide is chosen it is fairly easy to determine the throw of the Brierdene Dyke. The characteristic band of ironstone nodules with cone-in-cone structure, and the Plessey Mussel Band which have already been noted on the south side of the fault, may be seen on the north side in the gully that lies to the north-west of the island. This means that the scar of sandstone on the north side of the fault may be correlated with the sandstone bench which occurs at the base of the cliff below the Bottom Hutton Seam on the south side. The bay, between the scar of sandstone and the mainland on the north side of the fault, is floored by strata associated with the Bottom Hutton Seam. Calculating from the displacement of the sandstone below the Bottom Hutton seam, the fault has a downthrow north of about 40 ft.

Before leaving the Brierdene Dyke it should be noted that there is an outcrop of coal caught up in the fault plane at the base of the sandstone scar; it is not however, certain which seam this is. The petrology of the coal rules out the Top Hutton, which is a dirty seam, and the Middle Hutton Seam, which is only a few inches thick. It seems probable, therefore, that this is a pocket of the Bottom Hutton Seam which has been dragged out of position.

Brierdene Dyke—Hartley Bay. The cliff on the north side of the Brierdene Dyke is composed of a fine-grained massive sandstone; this is in marked contrast with that on the south side of the fault, which is far more shaly in character. The sandstone is 18 ft. thick, thinning to the north, and is overlain by the Low Main Seam which can be clearly seen just below the boulder clay. At the base of the cliff, immediately below the sandstone, lies the Top Hutton Seam, a poor, shaly coal, underlain by a fireclay notable for containing well-preserved plant fragments.

To the north, the dip of the strata gradually brings the Low Main Seam down through the cliff until it becomes accessible from the foreshore at a position just south of the prominent point forming the southern boundary to Hartley Bay. Meanwhile, the Top Hutton has passed onto the foreshore where it becomes difficult to locate.

The foreshore just north of the Brierdene Dyke exhibits a series of small folds, the most conspicuous being a gently dipping syncline having its axis perpendicular to the fault plane. Included in the strata involved in the syncline are two horizons worthy of note, a band of black canneloid shale, the lateral equivalent of the Middle Hutton Seam, and an impure fireclay which contains well-developed ironstone nodules up to four feet across: these latter are oval with a marked central depression.

The cliff face just north of the fault exhibits a very fine example of ice drag. The strata in the upper part of the cliff have been moved

from north to south along the floor of the Low Main Seam. The coal, together with the shale and ironstone bands which overlie it, has been thrust into a series of sharp overfolds, indicating movement along the soft seggar at the base of the seam.

Just south of the promontory marking the southern limit of Hartley Bay the section is crossed by three small faults. These are well exposed in the cliff section, but are rather more difficult to trace across the foreshore. The first, or most southerly, has a downthrow south of 12 ft. and serves to lift the Low Main Seam from the base of the cliff, which here is composed mainly of slumped boulder clay, to a position well above shore level, just below the base of the drift. The middle fault is very small, having a downthrow north of only 3 ft. The northern fault is perhaps the most significant since it is responsible for the creation of the promontory, the fault plane forming the southern face. This fault plane is very clearly exposed, the soft shales below the Low Main being brought against the sandstone lying some 5 ft. lower in the succession on the north side. The shales have been eroded away to expose the fault plane, which appears extraordinarily fresh. It is smooth and slickensided, with pronounced horizontal striations and corrugations, indicating, as do the folds along the line of the Brierdene Dyke, a certain component of horizontal movement.

The outcrop of the Low Main Seam is accessible all round the promontory, but on the eastern face the coal has been burnt at some time, probably by human agency, and the overlying shale is reddened. This reddening should not be confused with the colouring of the large blocks of sandstone that litter the face of the cliff. This latter coloration, which occurs mainly along joint planes, is due to haematite staining arising probably from the former presence of a small outlier of Permian strata.

Hartley Bay. From the face of the promontory the fine cliffs at Crag Point become visible, forming the northern boundary to Hartley Bay. Even at this distance, the Crag Point Fault (Plate 8) is very conspicuous by reason of the sharp contrast between the shales on the south side of the fault and the massive sandstone on the north.

Between the south end of Hartley Bay and the steps leading down to the foreshore, the strata are troubled by a series of faults. This should be compared with the unbroken sequence of strata that stretches for about quarter of a mile between the steps and the Crag Point Fault.

The sequence of fault movement is very easy to follow in the cliffs as a result of the presence of the Low Main Mussel Band, which forms a distinctive marker horizon. Just round the promontory into Hartley

Bay the Low Main Seam passes from the middle of the cliff to a position at the base, where its outcrop is obscured by debris, and finally onto the foreshore. The overlying Low Main Mussel Band now comes into the section and dips down through the cliff to within 10 ft. of the foreshore at the first fault. The mussel band here differs somewhat in character from its appearance on the foreshore below the Venetian Café at Whitley Bay. The black shale containing compacted mussels has been replaced by a coal, which, in addition to this exposure, is recorded in many local boreholes and shaft sections. The area in which the coal is developed has been plotted and seems to represent the extent of a small island that existed during the time of formation of the mussel band.

The roof of the 5 ins. seam of coal contains a band of carbonate nodules which are soluble in hydrochloric acid, releasing perfect specimens of uncompressed megaspores and plant tissues in addition to ostracods and *Spirorbis*. The horizon approaches very closely the character of a coal ball formation, but with siderite as the main form of carbonate. This band is overlain by a series of shale and ironstone bands containing plentiful mussels; the lowest layer of ironstone has developed a double band of cone-in-cone structure.

There are three faults in this small section of the coast. All have downthrows to the south, the actual values being 15 ft., 22 ft. and 12 ft. respectively, moving from south to north. The first fault moves the Low Main Mussel Band from a position just above the foreshore to the centre of the cliff. The second re-exposes the Low Main Seam, bringing it from the foreshore to a platform about 5 ft. above the base of the cliff while the Low Main Mussel Band is taken just below the boulder clay. The third fault carries the Low Main Seam to a position about one-third of the way from the top of the cliff, while the Low Main Mussel Band passes out of the section, and the Top Hutton Seam is introduced at the base of the cliff. There is a further fault to the north of this series, but it has a movement of only a couple of feet.

Here, the Low Main is a fine sight, about 6 ft. in thickness and forming a surprisingly prominent band. Some years ago it actually stood out as a pinnacle of coal against the final fault plane, but this has now been eroded away. The Top Hutton, which is introduced into the section by the final fault, is still a dirty coal with a well developed fireclay.

Although the three fault planes are all well marked in the cliff, and show fine examples of slickensiding and fault brecciation, they are extremely difficult to follow on the foreshore. The most southerly of the faults is the easiest to trace, since it has a distinct southerly trend and passes just in front of the face of the south point, running in the direct-

ion of St. Mary's Island where it may well join the Brierdene Dyke. The remaining two faults cross the foreshore, but are partially concealed by patches of shingle. One fault plane is clearly visible forming the southern margin of a small rocky island, but it is difficult to say to which of the faults it belongs; the evidence suggests that the two faults may come together on the foreshore.

Among the strata exposed on the foreshore is the Top Hutton Seam and, some 15 ft. below this, a thin coal, 3 ins. thick, lying immediately below a prominent ridge of sandstone. This coal has not so far been encountered on the coast section, although it has been mentioned earlier in the description of the area alongside the Brierdene Dyke : it is the middle leaf of the Hutton Seam. The seam may be traced to the south and seen to pass laterally into the canneloid shale already noted at this horizon. Below the coal, the foreshore is made up of fireclay with bands of siltstone and ironstone nodules. This horizon is extremely rich in plant material, the following species having been recovered: *Pecopteris*, *Neuropteris*, *Alethopteris*, *Sphenopteris*, *Calamites*, *Annularia* and *Cyclopteris*. Recent work has also disclosed the presence of considerable numbers of arthropods of the genus *Pygocephalus*, ancestral to the present-day lobsters, and it is interesting to note that this genus is also recorded from alongside the 90 Fathom Dyke at Cullercoats and from the Phoenix Brickworks at Crawcrook. Both these occurrences are from the same horizon, the base of the Hutton Seam.

Below the steps leading into Hartley Bay a marked depositional disconformity is to be observed on the foreshore. The dip of the strata suddenly changes to a northerly direction along a small, but prominent ridge of siltstone and at extreme low tide the synclinal edge of the channel can be clearly seen. This channelling has resulted in the removal, or non-formation, of the middle leaf of the Hutton Seam in this area.

At low spring tides, the Bottom Hutton Seam is exposed underlying a ridge of rock just north of the small island to which reference has already been made.

North of Hartley steps, the succession both in the cliffs and on the foreshore is very straightforward. The main features of the bay are the well-developed sandstone scars running due north across the foreshore, the most prominent being that formed by the Top Hutton—Low Main sandstone, although the Bottom—Middle Hutton sandstone does form a scar that is visible at extreme low water.

Inshore of the Top Hutton—Low Main scar is a deep depression filled with boulders and rubble which serves to conceal most of the outcrop of the Low Main Seam. A small exposure of the seam may, however, be observed at the northern end of the depression alongside the Crag Point Fault.

The Low Main Seam, which outcrops in the cliff at Hartley steps, passes onto the foreshore near the small promontory in the centre of the bay. Unfortunately, over most of this distance the coal is concealed beneath rubble at the base of the cliff. Between the Low Main and the overlying Low Main Mussel Band the sandstone contains convolute structures. These appear to be persistent, since they are also present at the same horizon in the cliff section between the series of faults and the south end of Hartley Bay. There are two beds of contorted or convolute bedding, each one foot in thickness, the bands being three feet apart. It is suggested that these might represent a period of disturbance connected with movement along the line of the 90 Fathom Dyke. This movement may also have resulted in the strong folding already noted at this horizon below the Rex Hotel.

The Low Main Mussel Band passes from the cliff section to the foreshore at a point fifty yards south of the Crag Point Fault. Whilst in an accessible position at the foot of the cliff, the coal associated with the band may be examined in more detail. The base of the seam is made up of thick lenses of vitrinite showing augen (eyed) structure. They are up to 2½ ins. thick and seem to be the remnants of large logs of wood that formed the foundation for the seam.

The foreshore to the south of Crag Point consists of a prominent ledge of sandstone, that between the Low Main and the Low Main Mussel Band. It is very well jointed and in places the blocks of sandstone have been removed, leaving deep pools; these probably mark the site of former mining operations for the Low Main Seam. An old pit shaft is also to be seen up against the cliff. It is oval in section, about five feet across and there are signs of haulage marks up the face of the cliff.

The Low Main Mussel Band having descended to shore level, the cliff is here composed of the sandstone between it and the Five-Quarter Seam : the latter dips through the cliff after emerging from beneath the boulder clay at the mid-point of the bay. The Five-Quarter Seam, which also occurs in a small pocket in the faults south of Hartley Bay steps, is a split seam with two leaves of 1 ft. 6 ins. and 2 ft., separated by a five-inch band.

Thirty yards south of the Crag Point Fault the succession is disturbed by a series of much smaller faults, the first of which has a downthrow north of 3 ft. It is very well exposed in the cliff where it affects the position of a small mussel band which is conspicuous in the section 10 ft. below the Five-Quarter Seam. The mussel band consists of twin bands of ironstone, one inch apart, which occasionally thicken into lenses packed with mussels. The mussels appear to be entirely con-

fined to the bands of ironstone; none has been found in the enclosing shale.

The strata are disturbed by a further fault which lies about five yards south of the Crag Point Fault. This has a hade of 45° and a downthrow north of 8 ft., bringing the Five-Quarter Seam within reach of the shore.

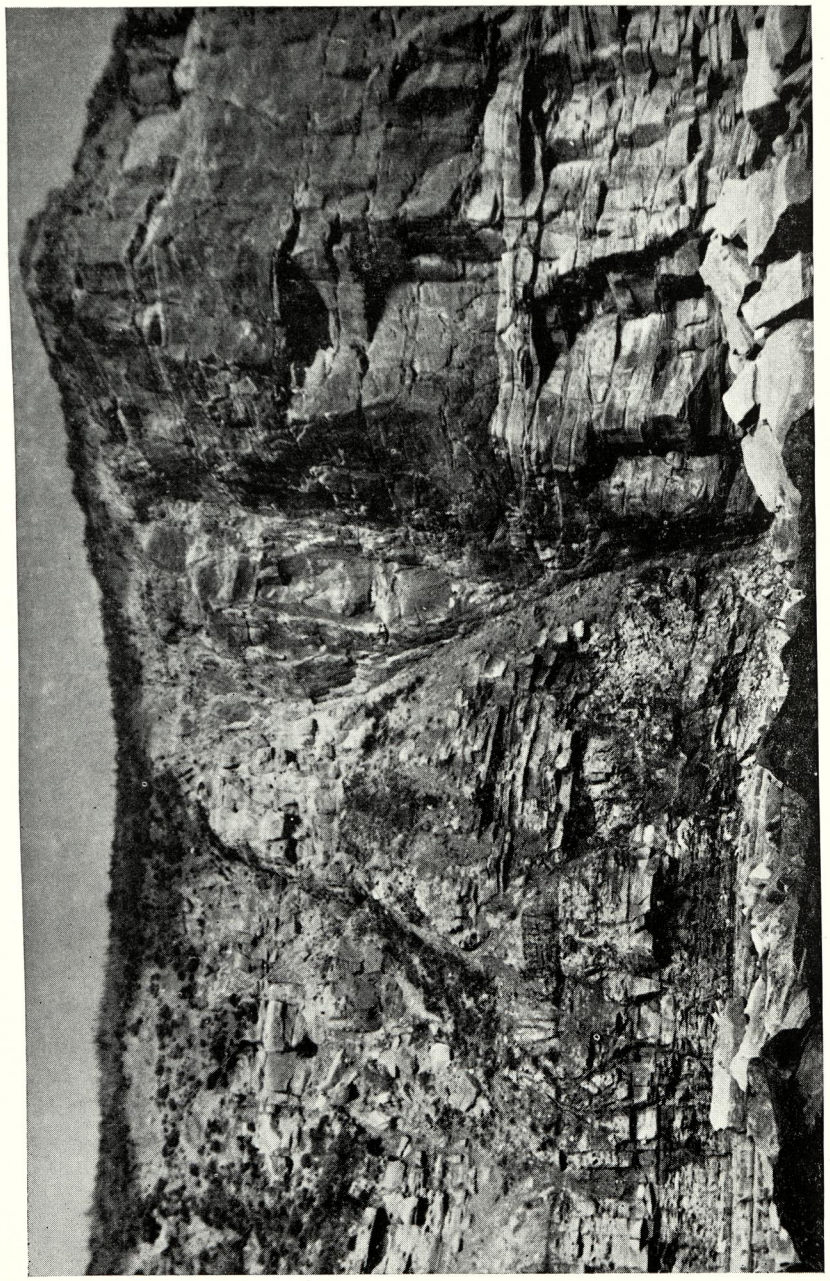
The cliff in this area is composed of the shale with sandy bands that overlies the Five-Quarter Seam. This passes up into a fireclay which is in turn overlain by massive sandstone. There are many signs of old mining operations, the most impressive being a small working cut into the floor of the Five-Quarter, probably to serve as a water-gate for the seam. It is still in excellent condition, with a roof of flagstones laid across the roadway; the entrance is 8 ft. above the foreshore. At the base of the cliff, below the Five-Quarter Seam and partially obscured by rubble, is a larger roadway probably connected with the workings for the Low Main, lower in the succession.

The Crag Point Fault is a magnificent example of a plane of movement (Plate 8). The exposure is usually clean and the pattern of diagonal striations which cover the fault plane can be clearly seen. Patches of fault breccia are also present. In addition to the tectonic interest of the area, there are some fine examples of intra-formational conglomerates; these will be described in the next section.

Crag Point. An examination of the cliff at Crag Point will reveal that it is made up of two sandstones, the lower fine-grained and the upper coarse-grained; the upper sandstone is current-bedded from due east and the lower from the north-west. Between the two sandstones is a conglomerate with well-developed coal scares. This conglomerate, however, is very different in character from those already examined at Priory Point and the Table Rocks; the matrix is coarse and the pebbles are of quartz and occasionally of felspar. This is obviously a surface that has been eroded by currents flowing strongly direct from the source and not resulting from acceleration within the area of the delta; the upper part of the Crag Point Sandstone may well be regarded as a main-channel sandstone.

The currents which deposited the upper portion of the Crag Point Sandstone, having cut through a coal seam that now remains only as coal scares, proceeded to erode the soft underlying sediments and join onto the sandstone of the cyclothem below. The few shale pellets that are present, are all that remain of the argillaceous sediments originally associated with the coal, and it seems likely that they were completely disintegrated by the strong currents. The coal washed out was prob-

PLATE 8



The Crag Point Fault. On the south side of the fault plane the Five-Quarter Seam may be seen affected by a small fault; downthrow north 8 ft. On the north side, the junction between the Upper and Lower Crag Point Sandstones is clearly visible.

ably the top leaf of the Bensham Seam, although it may have been a lower leaf of the Yard Seam; it is difficult to identify seams correctly even when they are present, and more so when they have been removed.

The sandstone that forms the lower part of Crag Point was also deposited by strong currents which eroded into the underlying sediments; this has already been suggested in the consideration of the south side of the fault. On the north side, the erosion surface is at the very base of the cliff and can only be seen by peering in among the large boulders. Its presence, however, enables the throw of the fault to be determined; this is about 45 ft., downthrow being to the north. The lower portion of this sandstone is composed of bands of black shaly siltstone, filled with fragmented plant material, which is underlain by an eight-inch band of conglomerate. This forms the actual base of the sandstone and rests upon a white seggary shale without rootlets. There are no coal scares present. Since this must be regarded as the washout of a potential coal horizon, it appears either that the coal was never developed, or that the erosion occurred so soon after plant growth that the peat stage was never reached.

The conglomerate is composed of small pellets of shale and ironstone in a fine muddy matrix. One can only regard this horizon as representing erosion contemporaneous with, or immediately following, the formation of a coal seam elsewhere in the area, the coal probably being the bottom leaf of the Bensham Seam.

At Crag Point the foreshore is composed of the shale with sandy bands, which at low tide stand out as prominent ridges, between the Five-Quarter Seam and the base of the Lower Crag Point Sandstone. The Five-Quarter Seam has not yet been located on the foreshore to the north of the fault and it seems unlikely that it will be present, since the strata swing round as they approach the fault, their strike in this region being parallel to the fault plane. From the foreshore a good view is obtained of the face of Crag Point. By following the line of the unconformity between the two sandstones, which lies in the centre of the cliff, a whole series of small faults can be seen; many of the fault planes have been eroded to form caves.

The lower unconformity at the base of the cliff passes onto the foreshore, the outcrop going below low water mark, just south of Collywell Bay. The upper part of the foreshore here consists of large blocks of sandstone which have become interlocked as a result of small movements between one another. The contrast in the nature of the current-bedding in the upper and lower portions of the Crag Point Sandstone should also be noted, the upper being in the form of flat sheets, while the lower is in trough lenses.

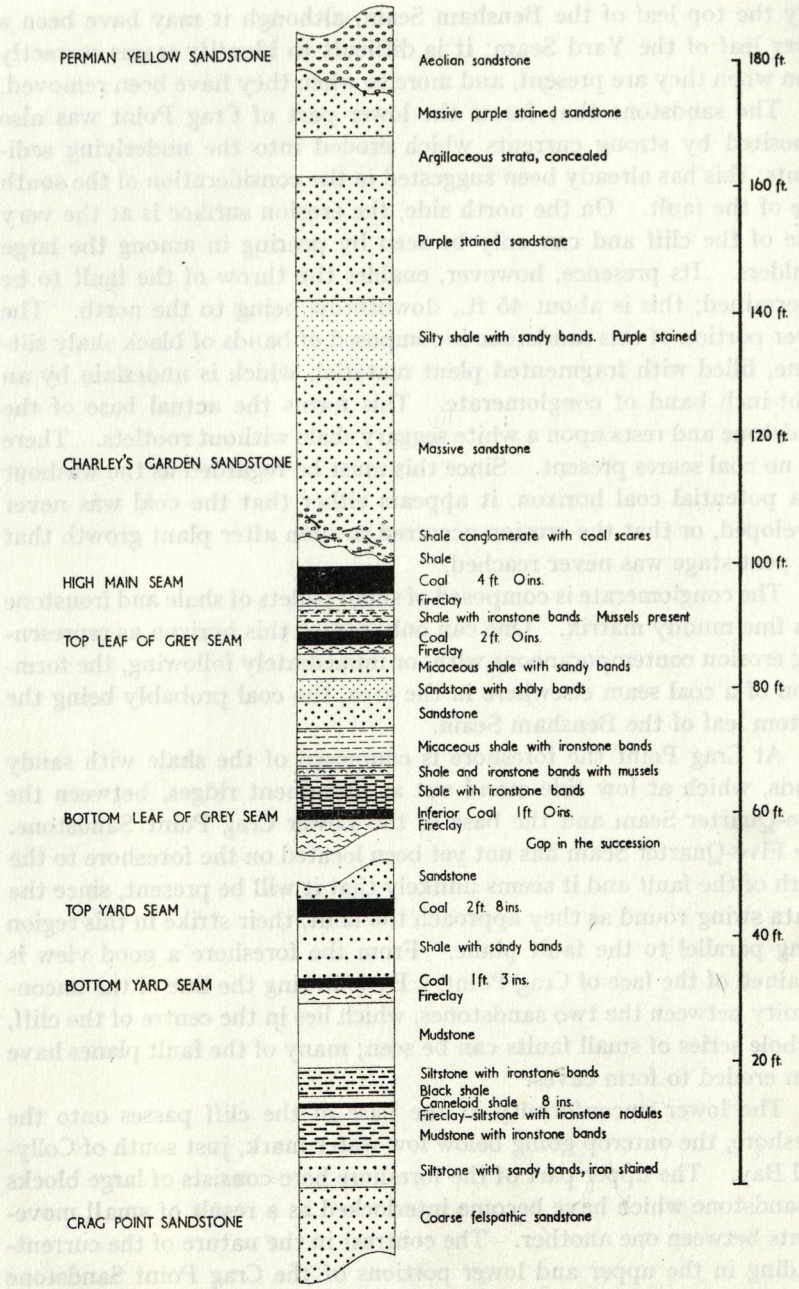


Fig. 7a. A composite section of the Coal Measure and Permian strata exposed in Collywell Bay, Seaton Sluice.

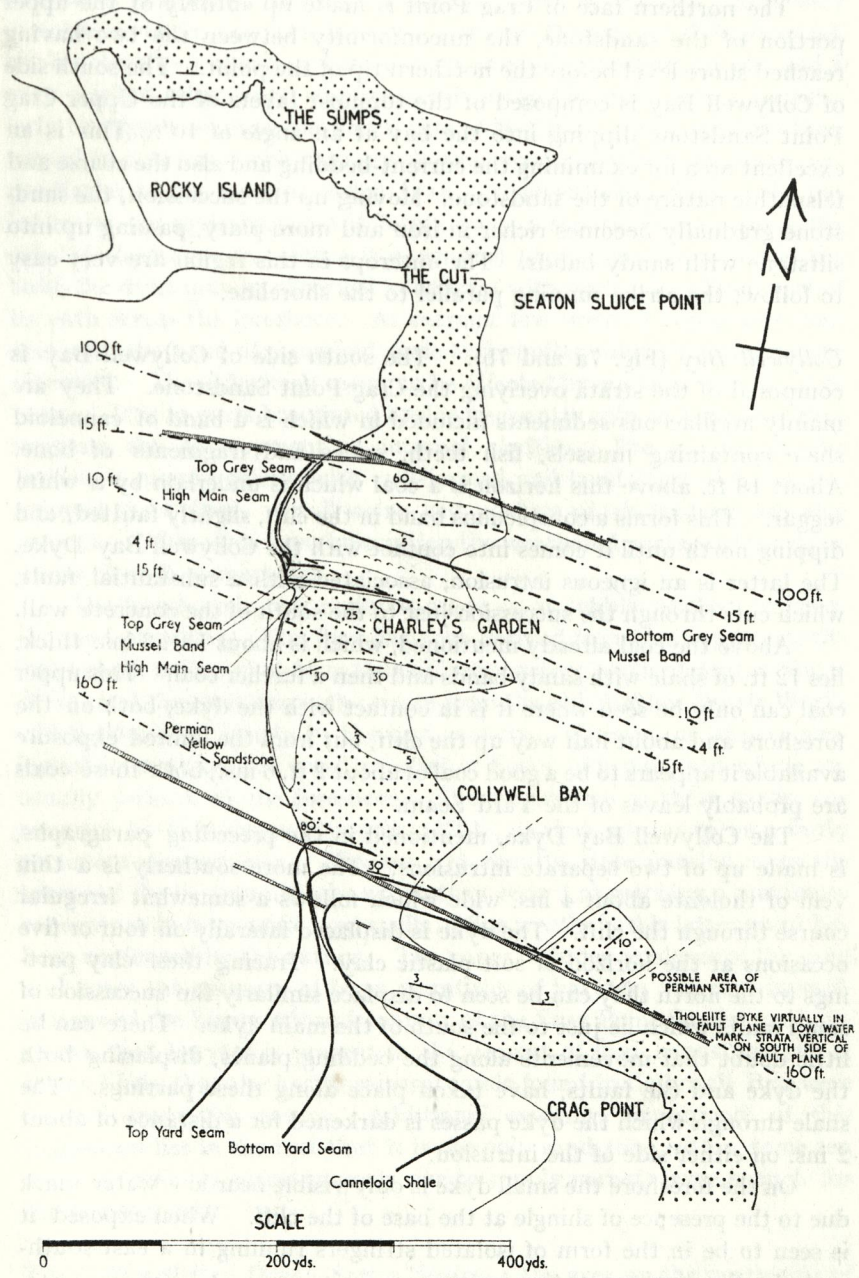


Fig. 7b. Geological map of Collywell Bay, Seaton Sluice.

The northern face of Crag Point is made up entirely of the upper portion of the sandstone, the unconformity between the two having reached shore level before the northern tip of the point. The south side of Collywell Bay is composed of the topmost layers of the Upper Crag Point Sandstone dipping into the bay at an angle of 10°. This is an excellent area for examining the current-bedding and also the coarse and felspathic nature of the sandstone. Moving up the succession, the sandstone gradually becomes richer in iron and more platy, passing up into siltstone with sandy bands. The outcrops in this region are very easy to follow, the strike running parallel to the shoreline.

Collywell Bay (Fig. 7a and 7b). The south side of Collywell Bay is composed of the strata overlying the Crag Point Sandstone. They are mainly argillaceous sediments included in which is a band of canneloid shale containing mussels, fish teeth, scales and fragments of bone. About 18 ft. above this horizon is a coal which is underlain by a white seggar. This forms a conspicuous band in the cliff, slightly faulted, and dipping north until it comes into contact with the Collywell Bay Dyke. The latter is an igneous intrusion, associated with a substantial fault, which cuts through the succession just to the south of the concrete wall.

Above the coal already mentioned, which is about 1 ft. 3 ins. thick, lies 12 ft. of shale with sandy bands and then a further coal. This upper coal can only be seen where it is in contact with the dyke, both on the foreshore and about half way up the cliff, but from the limited exposure available it appears to be a good coal of about 2 ft. 6 ins.; both these coals are probably leaves of the Yard Seam.

The Collywell Bay Dyke, mentioned in the preceding paragraphs, is made up of two separate intrusions. The more southerly is a thin vein of tholeiite about 4 ins. wide which follows a somewhat irregular course through the cliff. The dyke is displaced laterally on four or five occasions at the horizon of soft plastic clay. Tracing these clay partings to the north they can be seen to displace similarly the succession of small faults which lie just to the south of the main dyke. There can be little doubt that movements along the bedding planes, displacing both the dyke and the faults, have taken place along these partings. The shale through which the dyke passes is darkened for a distance of about 2 ins. on either side of the intrusion.

On the foreshore the small dyke is only visible near low water mark due to the presence of shingle at the base of the cliff. When exposed it is seen to be in the form of isolated stringers running in a east-south-easterly direction across the foreshore.

The larger of the two Collywell Bay Dykes is some 3 ft. thick. Like its smaller neighbour, it follows a sinuous course up the cliff and is very variable in thickness. It is intruded along the line of a small fault which has a downthrow north of 4 ft. and the heat of the intrusion has had a very marked effect upon the character of the two coal seams, particularly the upper seam on the north side of the dyke. The coal has been turned to a natural coke with a well-developed columnar structure perpendicular to the margins of the dyke. Mineralization of the coke has led to its strengthening and it forms quite a resistant layer along the sides of the intrusion. Since it is running parallel to the strike of the beds, the dyke may be observed in contact with coal over a large part of its path across the foreshore. At extreme low water it comes into contact with the band of canneloid shale and similar coking effects may be observed. The dyke itself seems to be affected by contact with the coal seams. It is in parts brecciated and is frequently split in a manner that suggests the development of internal cavities. The matrix of the breccia is mainly calcite with well-formed nail head crystals being developed in cavities. Small veins and pockets of chalcedony are also present. Where free from brecciation the weathered surface of the dyke shows clear flow markings.

The foreshore in this region is made up of pebbles of flint, chalcedony and glass slag. The flint has been derived from the large quantities of chalk ballast that form the cliff section just north of Seaton Sluice Point, and the glass slag is the waste from the old Hartley Bottle Works which flourished locally in the last century. Perhaps of greater geological interest are the small patches of heavy mineral sand which are usually present on the foreshore. The occurrence of these sands was recorded by Hawkes and Smythe (1931), so they appear to be a fairly persistent phenomenon. Hawkes and Smythe were puzzled as to the source of the heavy minerals, which they record as reaching a maximum concentration after prolonged spells of fine weather; this latter point has been confirmed by the author. The paper includes analyses of the sand and notes the presence of large quantities of barytes. Recent investigations of the heavy mineral content of the Crag Point Sandstone have shown that barytes is present in the cement of that sandstone and it seems likely that the heavy mineral sands found in Collywell Bay were derived from this source. Additional evidence in support of this suggestion lies in the fact that it is the only sandstone within some ten miles sufficiently coarse in grain size to supply garnets large enough for the beach sand.

The Collywell Bay Dyke—Seaton Sluice. The area on the north side of the Collywell Bay Dyke presents considerable difficulties of correlation.

This is because the strata have been dropped down between the large fault which runs close to the dyke and a second fault some seventy yards further north at Seaton Sluice Point. The only horizon in this region which can be identified with certainty is a small patch of Permian Yellow Sandstone that has been preserved from erosion as a result of this "graben" structure. The Permian lies at the top of the cliff above the concrete wall in the centre of the bay; it can be reached fairly easily from the road.

The sandstone is similar in texture to that seen at Cullercoats, although it does not appear to be so heavily fractured as when it is in close proximity to the 90 Fathom Dyke.

Between the Collywell Bay Dyke and the southern fault the strata dip steeply to the north; in places they are vertical. At high water mark the distance from dyke to fault is eight yards, but this gradually decreases across the foreshore, until, at extreme low tide mark, the dyke is very close to the fault plane.

In contrast with the area to the south of the fault, the strata immediately to the north, massive sandstone, show little or no change in dip. However, since the overall dip in the centre of Collywell Bay is to the south or south-east, it is perhaps better to start the description of this region from the northern end—at the Seaton Sluice Fault.

The lowest beds in the succession are not actually against the fault plane, because of the presence of a small fault, with downthrow of 15 ft. north, eighteen yards south of the Seaton Sluice Fault. They are a series of mudstones with rootlets underlying a one-foot band of inferior coal which outcrops on the floor of the bay just north of the sea-stack known as Charley's Garden. This horizon may also be seen under the base of the concrete sea-wall.

Fortunately, a small collapse of the sea-wall in this area permits easy access to the shale with ironstone bands which overlies the one foot of coal. The word "fortunately" is used since this is probably the best horizon on the coast section from which to obtain specimens of mussels, and the band is usually only poorly exposed on the foreshore. Although not so numerous as in the bands previously described, the mussels are better preserved, being replaced by pyrite, and only slightly compacted. At this point on the coast the succession of strata above the mussel band is well exposed in the cliff. There are a further six feet of siltstone and then a prominent band of sandstone which is brought onto the foreshore by the 15 ft. fault just to the south of the Seaton Sluice Point Fault. The strata between these two faults (this sandstone and the shales and siltstones which underlie it) are dipping north at up to 60° as a result of the faulting.

The cliff above the sandstone band contains two further coal seams. The lower is 2 ft. in thickness and is immediately overlain by a poorly developed mussel band. Five feet of strata separate this from the upper coal which is 4 ft. thick. These seams have been called the Upper Grey and the High Main respectively, but it must be stated that there is little evidence for this nomenclature.

From the directions of throw of the fault planes, the seams must lie above the Yard horizon. The Charley's Garden Sandstone, which overlies the 4 ft. of coal, can be traced upwards into a further sandstone and siltstone sequence of at least 60 ft. thickness without trace of additional coal seams. The High Main Seam is regarded as the uppermost major coal of the workable sequence, only thin impersistent seams such as the Moorland being developed above it. The average thickness of the High Main Seam in this area is from 4 - 5 ft., which is in fair agreement with the observed 4 ft. of the upper coal. Finally, the High Main Seam marks the beginning of a predominantly sandy sequence known in the coalfield as the 70 Fathom Post and the author agrees with the observations of Absalom and Hopkins that the Charley's Garden Sandstone is probably equivalent to this horizon.

In view of the presence of mussel fragments in the intervening strata, the seam which lies only 6 ft. below the proposed High Main Seam has been called the Upper Grey Seam and not classed as a lower leaf of the High Main. However, it has recently been observed that in the offshore area the Grey and High Main Seams appear to come together and so possibly no great significance should be placed upon this nomenclature. The 1 ft. band of interior coal already mentioned is regarded as a lower leaf of the Grey Seam.

The succession of coals described in the previous paragraphs may be examined at close quarters on the foreshore as a result of faulting which brings the strata down 10 ft. at the southern end of the succession. Although this fault is concealed by the high concrete sea-wall north of Charley's Garden, the fault plane can be traced across the foreshore and the distortion of the strata by the fault can be seen in the cliff alongside the concrete wall. The strata on the foreshore dip steeply to the south, at about 30°, and both the Upper Grey and High Main Seams are exposed on the upper part of the foreshore. Lower down the foreshore the seams are cut out of the succession by the fault that passes from the cliff across the north-east side of Charley's Garden, running almost parallel to the strike of the beds.

The base of the massive sandstone forming Charley's Garden may be seen lying a few inches above the roof of the High Main Seam. It is very conglomeratic with iron-stained shale pellets and large numbers of

coal scares. While there is no sign of erosion into the High Main Seam at this locality, washouts have been noted over a large area about a mile to the north-west; this, incidentally, is the direction from which the currents that deposited the sandstone were flowing.

It seems probable that Charley's Garden will not remain as a prominent feature of this part of the coast section for very much longer. Each year it decreases in size and it is feared that Charles Dockwray, after whom the sea-stack was named, and who is said to have grown cabbages and peas on its top, would now no longer find it a very fertile plot. The stack lies on a ridge of sandstone between two faults, the one just previously mentioned, and the other, actually a pair of faults, which together have a downthrow of 15 ft. to the north. Charley's Garden might, therefore, be regarded as a small graben in the middle of the larger graben of Collywell Bay.

The upper portion of the Charley's Garden Sandstone may be seen alongside the path leading out of Collywell Bay. It consists of a series of haematite stained siltstones with sandy micaceous bands which after about 12 ft. are overlain by a further sandstone. This topmost sandstone, which forms the foreshore in the centre of Collywell Bay, has already been mentioned in the beginning of this section as lying on the northern side of the large southern fault.

The sandstones and shales are stained purple as a result of the closeness of the overlying unconformity and, since the strata here are dipping in a south-easterly direction, it seems possible that the Permian outcrop in the cliff could be repeated on the foreshore at about extreme low water mark. This has not, so far, been located.

The Seaton Sluice Point Fault is, in appearance, very similar to the Crag Point Fault. Both fault planes are prominently exposed and are faced with the same sandstone, that between the Bensham and Yard Seams. In each case erosion of the softer sediments on the south side of the fault has resulted in the fault planes forming pronounced features. However, the Seaton Sluice Fault has provided a passage for an intrusion of tholeiite which is of particular interest since it occurs, not only in the Seaton Sluice Point Fault, but also in the plane of the smaller fault lying some eighteen yards further south. The dyke appears to leave this fault plane and move into the fault plane of the Seaton Sluice Point Fault. Since there is no sign of the dyke where the fault passes into the cliff, the exposure suggests that the dyke extends along the Seaton Sluice Point Fault from a point just below the cliff, mainly in an easterly direction. The dyke is about 3—4 ft. wide and although it seems to have a somewhat troubled course, brecciation and veining with calcite and chalcedony seem to be lacking; this is probably due to the absence of coal seams in its immediate vicinity.

Moving to the north side of the Seaton Sluice Point Fault, the cliff and foreshore are composed of the lower portion of the Bensham—Yard Sandstone, the same horizon as the lower portion of the Crag Point Sandstone. Just before the famous Cut at Seaton Sluice is reached the northerly dip of the strata results in the introduction of the upper portion of the sandstone to the section. This latter sandstone, although still possessing a marked basal conglomerate containing coal scares, is not so coarse as when it was examined at Crag Point. This is especially true a little further north on the other side of the Cut, where the sandstone is of normal grain size. It seems that this region is out of the central portion of the main east-west channel which was so marked at Crag Point.

Hopkins (1930) recorded that, as a result of rather exceptional weather conditions which removed the normal sand cover, a coal seam was exposed on the foreshore just north of Seaton Sluice Point. He identified it as the Yard Seam, 2 ft. 10 ins. thick, which has also been recorded in a series of boreholes in the Astley Arms area. If this identification is correct, which seems very probable, the seam is the same as that seen in the middle of the cliff alongside the Collywell Bay Dyke.

Finally, mention must be made of a rather fine example of a submerged forest on the foreshore below the Astley Arms Hotel. This appears to fill an east-west depression in the boulder clay and is exposed both at high and low water marks when sand conditions are suitable.

This account of the coast section between Tynemouth and Seaton Sluice is intended to serve as a guide for all those who may be interested in local geology. Like most coast sections, it has the added attraction that it is ever-changing in character. Exceptional weather conditions may affect the distribution of sand and make available new exposures which will permit a more accurate interpretation of the succession to be made.

ACKNOWLEDGEMENTS

The author wishes to thank Mr. J. Lee, Dr. D. A. Robson and Dr. W. R. Dearman of the Department of Geology, University of Newcastle upon Tyne, for their assistance and advice in the preparation of the text and figures of this paper.

REFERENCES

Absalom, R. G. and Hopkins, W. (1926). The geological relations of the coast section between Tynemouth and Seaton Sluice. *Proc. Univ. Durham phil. Soc.* **7**, 142.

Armstrong, G. and Price, R. H. (1953-54). The Coal Measures of north-east Durham. *Trans. Instn Min. Engrs, Lond.* **113**, 973.

CLARK, A. M., CHAMBERS, R. E., ALLONBY, R. H. and MAGRAW, D. (1961). A marine geophysical survey of the undersea coalfields of Northumberland, Durham and Cumberland. *Trans. Instn Min. Engrs, Lond.* **15**, 197.

HASLEHURST, S. R. (1923). A case of megascopic pseudostromatism in the Coal Measures of Northumberland. *Proc. Univ. Durham phil. Soc.* **4**, 162.

HAWKES, L. and SMYTHE, J. A. (1931). Garnet bearing sands of the Northumberland coast. *Geol. Mag.* **68**, 345.

HOPKINS, W. (1931). The identity and geological horizon of the coal seam exposed in the early autumn of 1930 on the foreshore at Seaton Sluice. *Proc. Univ. Durham phil. Soc.* **8**, 286.

LEBOUR, G. A. and SMYTHE, J. A. (1906). On a case of unconformity and thrust in the Coal Measures of Northumberland. *Quart. J. geol. Soc. Lond.* **62**, 530.

SHIRLEY, J. (1955). The disturbed strata of the Fox Earth Coal and its equivalents in the east Pennine coalfield. *Quart. J. geol. Soc. Lond.* **111**, 265.

SORBY, H. C. (1852). On the oscillations of the currents drifting the sandstone beds of south-east Northumberland and on their general directions in the neighbourhood of Edinburgh. *Proc. Yorks. geol. (polyt.) Soc.* **3**, 232.

TEALL, J. J. H. (1884). Petrological notes on some north of England dykes. *Quart. J. geol. Soc. Lond.* **40**, 209.

(1889). On the Amygdaloids of the Tynemouth Dyke. *Geol. Mag.* **26**, 481.

TOMLINSON, W. W. (1893). *Historical notes on Cullercoats, Whitley and Monkseaton.* London : Walter Scott.

WOOLACOTT, D. (1913). The geology of south-east Northumberland and north-east Durham. *Proc. Geol. Ass., Lond.* **24**, 88.

(1913). Report of an excursion to Sunderland and Tynemouth. *Proc. Geol. Ass., Lond.* **24**, 108.

MILLERITE FROM BOLDON COLLIERY, COUNTY DURHAM

by

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In June 1966 a sample of vein material brought out of the colliery at Boldon Colliery, County Durham, (Fig. 1) was found to contain the relatively rare nickel sulphide, millerite. Although the underground workers referred to other localities in the pit as alternative sources of the material, millerite was later found by the authors above the Hutton Seam, in the South-East district of the mine (G.R. NZ(45)3623460484) where this seam is worked 1650 ft. below sea level.

The walls of a roadway being driven in a S.22°E. direction provided exposures of a 1-2 ft. thick bed of hard, sandy siltstone some three feet above the roof of the Hutton Seam. This siltstone is crossed by vertical joints trending S.25°—30°E. which are occasionally infilled with ankerite and barytes. Such veins vary in thickness from a mere trace of mineralisation on the joint face to about one inch. In the thicker veins the central part is usually open, permitting the growth of well-formed crystals, and it was here that crystals of millerite were found.

The original specimen (B.M. 1966, 514), half an inch thick, is half of a vein, free from matrix, with the inner surface lined by crystals of barytes and ankerite. Also present is a small amount of pink calcite, sphenoids of chalcopyrite, and traces of galena. The millerite occurs as brass-yellow, longitudinally-striated, slender, acicular crystals, with a maximum length of 3 cm. and diameter of 0.2 mm. The needles are arranged either in characteristic radiating tufts, or as individuals on the surfaces of other crystals; they are also found within the barytes. The identity of the millerite has been confirmed by means of an X-ray powder photograph.

Accompanying the needles of millerite are hydrocarbons, present in the cavity in the centre of the vein. These take two forms: a thick brown grease present as a coating on crystals of barytes and ankerite and small reddish-brown spherical resinous masses within the plates of barytes. It is hoped to describe the nature of this hydrocarbon material more fully in a later communication. According to the miners working in the district, much more extensive developments of millerite needles than those collected by the authors have been encountered, but, unfortunately, none of this material is preserved.

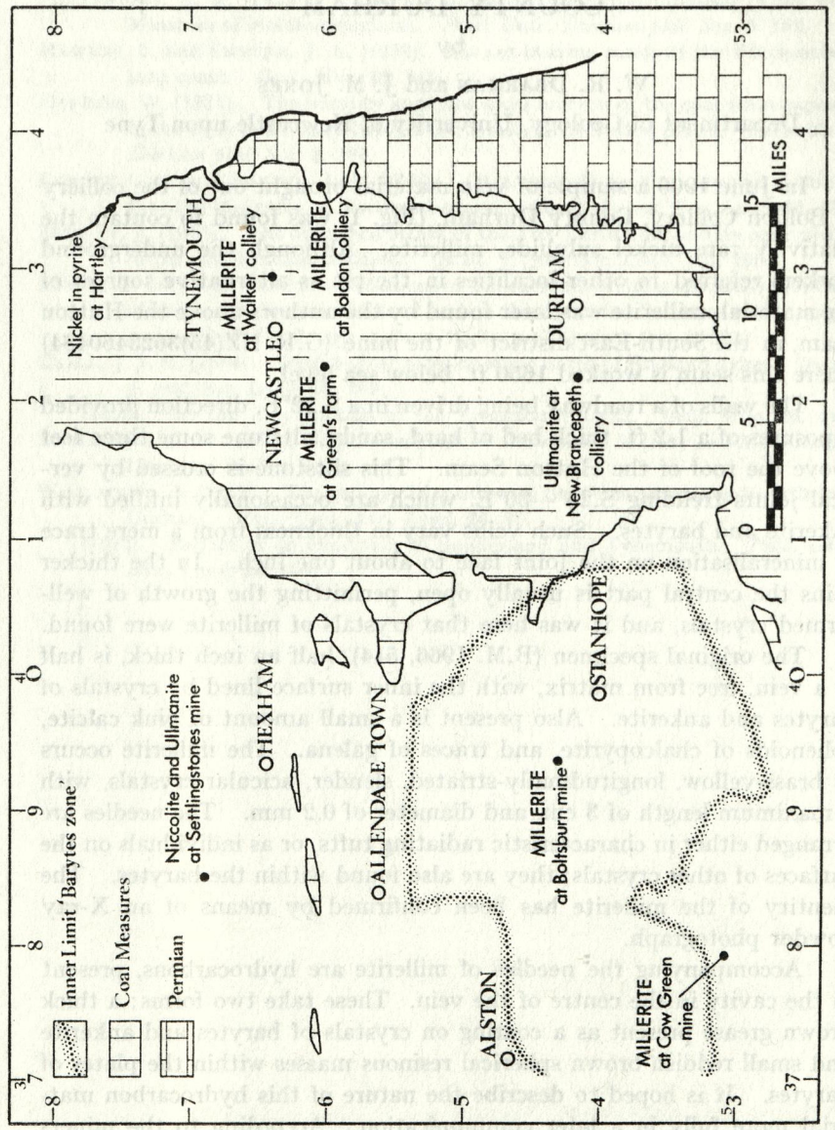

Fig.1. The distribution of millerite and other nickel-bearing minerals in Northumberland and Durham. Inner limit of barytes zone from Dunham (1948), plate II. Nickel in pyrite at Hartley is recorded by Hawkes and Smythe (1935).

Anderson and Smythe (1942) recorded another occurrence of millerite in the Durham coalfield, from a borehole put down west of Green's Farm (G.R. NZ228602). In a hard, compact, fine-grained greyish sandstone recovered from about one hundred feet below the Hutton Seam, millerite crystals, unaccompanied by any other mineral, were found on the face of an open vertical joint.

There are three other unpublished records of the occurrence of the mineral in the local Carboniferous rocks. In the collection of the Department of Geology, University of Newcastle upon Tyne, there is a single specimen of millerite on a matrix of ankerite, labelled "Walker colliery, G. A. Lebour, 1875". Walker colliery (G.R. NZ295640), long since disused, is on the Northumberland bank of the river Tyne. The mineral collections of the British Museum (Natural History) contain two examples of millerite from the northern Pennine orefield. Specimens (B.M. 1927, 4 and Russell 4083) from Boltsburn mine, Rookhope, Weardale, are both divergent bundles of bright, fairly stout, brassy needles. The label of the Russell specimen records that it was collected from a joint in the Quarry Hazel, in the cross-cut to the Fowlwood ("Fulwood" (Dunham, 1948, page 226)) or Lodgefield Vein in 1926. Another specimen (Russell 4084) is a typical divergent bundle of tarnished iridescent slender acicular crystals from the Cow Green barytes mine. It was collected in 1939 from the east wall of the Winterhush Vein, 500 ft. north of the Wrentnall shaft at the 106 ft. level where both walls of the vein are in the whin sill.

The Rookhope occurrence is at a recognised centre of mineralisation within the orefield (Dunham, 1948), but millerite and other nickel minerals have been recorded from veins at considerable distances from the centre. For example, ullmanite (NiSbS) has been found in the barytes-witherite vein at New Brancepeth colliery (Spencer, 1910), while ullmanite and niccolite (NiAs) have been recorded from the barytes-witherite vein at Settlingstones (Russell, 1927).

Barytes-witherite veins are generally accepted as being related to the hydrothermal mineralisation of the whole orefield. The authors feel that in the occurrence at Boldon Colliery, where millerite is accompanied by chalcopyrite and galena and is overgrown by barytes, there is sufficient indication of hydrothermal affinities to justify genetic relation to the main mineralisation in the orefield.

Anderson and Smythe (1942) surveyed the recorded British occurrences of millerite, where, as they state, it is present as a secondary mineral. They were impressed by its frequent presence in Coal Measure beds in South Wales, Ayrshire and elsewhere and show that cavities in ferriferous carbonate ore and ironstone nodules are favoured sites for

formation. In South Wales, millerite is sometimes accompanied by other sulphides such as sphalerite, galena, chalcopyrite and linnaeite, with barytes, kaolinite, calcite and occasionally hydrocarbons like hatchettine (North and Howarth, 1928).

Occasional occurrences from coalfields in this country are also marginal to known orefields for which hydrothermal origins are generally accepted.

ACKNOWLEDGEMENTS

We are especially indebted to Mr. C. Gambie and Mr. P. D. Lane who first brought the material to our attention, and to the National Coal Board, in particular to Mr. Snowdon, the manager of Boldon colliery, for permission to visit the locality. Dr. G. F. Claringbull, Keeper of Minerals, British Museum (Natural History) has kindly given permission for us to record the millerite occurrences represented by specimens in the collection.

Specimens (B.M. 1966, 514 and 515) have been presented to the Natural History Museum; other examples (70.3 and 70.4) have been placed in the Hancock Museum, Newcastle upon Tyne.

REFERENCES

Anderson, W. and Smythe, J. A. (1942). An occurrence of millerite in the Durham Coal Measures. *Geol. Mag.* **79**, 220.

Dunham, K. C. (1948). Geology of the northern Pennine orefield. *Mem. geol. Surv. U.K.*

Hawkes, L. and Smythe, J. A. (1935). Ankerites of the Northumberland Coalfield. *Miner. Mag.* **24**, 65.

North, F. J. and Howarth, W. E. (1928). On the occurrence of millerite and associated minerals in the Coal Measures of South Wales. *Proc. S. Wales Inst. Engrs.* **44**, 325.

Russell, A. (1927). Notice of an occurrence of niccolite and ullmanite at the Settlingstones mine, Fourstones, Northumberland; etc. *Miner. Mag.* **21**, 383.

Spencer, L. J. (1910). On the occurrence of alstonite and ullmanite (a species new to Britain) in a barytes-witherite vein in New Brancepeth colliery, near Durham. *Miner. Mag.* **15**, 302.

PLATE 9



Photograph by G. W. Chambers.

SHORT-EARED OWL at nest. Co. Durham, May 1965.

ORNITHOLOGICAL REPORT FOR NORTHUMBERLAND AND DURHAM FOR 1966

Compiled from the notes and records of members of the Natural History Society of Northumberland, Durham and Newcastle upon Tyne, the Teesmouth and Tynemouth Bird Clubs, and other observers

by

D. G. BELL

INTRODUCTION

Though the classified notes deal with the main items of interest under species headings, it is as well to mention here briefly the spring and autumn migrations as a whole.

With a few notable exceptions (e.g. yellow wagtail on 25 March) spring migrants arrived rather later than usual—though not as late as last year. There was a notable fall of robins, dunnocks and *Turdidae* along the coast, beginning on 9 April, increasing in the next few days and high numbers persisting until 17 April. Late spring brought its now not unexpected quota of rarer birds of prey—a pair of hobbies (which, remarkably, stayed to nest), an osprey and two marsh-harriers. At least four avocets and about six black redstarts also occurred at this time.

The autumn passerine migration was exceptionally good, with the annually expected influx of migrants from the continent lasting for most of August, throughout September, and well into October. The peak period was the last few days of August and the first few of September. The commoner drift-migrants, such as willow-warblers, garden-warblers, pied flycatchers, redstarts and whinchats, arrived in large numbers, while scarcer birds during the autumn included unprecedented numbers of icterine warblers (some sixteen), six barred warblers, four reed-warblers, one greenish warbler, two arctic warblers, three yellow-browed warblers, six wrynecks, one bluethroat, nine red-breasted flycatchers, at least twenty great grey shrikes, one woodchat-shrike, three red-backed shrikes, one red-headed bunting, one ortolan bunting and two rustic buntings. A further fall of robins occurred in mid-October, bringing thousands to our shores, and there was heavy immigration of *Turdidae* and bramblings. It was a good autumn, too, for skuas, both in numbers and variety (all four species occurred), but shearwater pas-

sage was again rather thin, and wader passage only moderate. The huge new reservoir on the River Derwent near Edmundbyers is already proving an attraction for water-birds.

Much more information is needed about the breeding birds of the two counties—especially the more locally distributed ones listed in last year's Report—and observers are again urged to send in all the details they have about them. Even general trends do not always emerge from the scattered breeding reports received, but it appears that the wet summer of 1966, and its attendant floods, adversely affected ground-nesting birds, and many game-bird and wader chicks were drowned.

Highlights of the year included the discovery of two more heronries in Northumberland at a time when the breeding population was thought to consist of only one pair, the huge brambling flocks at the end of the year after an unusually heavy immigration, the two white-billed divers (found dead, unfortunately) at Sweethope Lough and Budle Bay in April, the sooty tern at the Inner Farne in June (first Northumberland record), the pratincole at Holywell Ponds in July (first Northumberland record) and the four or more bearded tits at Teesmouth in December (first Durham record). Other interesting birds included a bittern, a rough-legged buzzard, two quail, a Temminck's stint, a grey phalarope, a long-tailed skua, two Sabine's gulls and a singing woodlark.

A number of other rare birds came to the notice of the compiler of this Report and the Joint Committee, but in the absence of satisfactory supporting evidence (in many cases, no evidence at all) it has, of course, been impossible to accept such records for inclusion. "Unusual Record" forms are always obtainable from the Society's office at the Hancock Museum.

CLASSIFIED NOTES

1. Black-throated Diver *Gavia arctica*

The only documented records of this species are: 1 (oiled) at Brasside Pond, Durham City, on 23 Feb. (JHL), 1 at Alnmouth on 27 Feb. (BM, BL), 2 at Cresswell on 5 Mar. (CW), 2 off Skate Road on 6 Mar. (DGB), 1 (in summer plumage) flying south at Hartlepool on 22 June (ECG) and 1 (in summer plumage) off Cresswell on 29 Oct.

2. Great Northern Diver *Gavia immer*

The only Durham records were 1 at Hartlepool on 17 and 2 on 19 Nov. 4 at Alnmouth on 27 Feb. (BL), but otherwise absent in Northumberland between 11 Apr.—2 at Holy Island (BG)—and 2 July—1 at Holy Island (CW). As usual, this was the main locality, up to 3 at a time being frequently recorded. Others occurred at St. Mary's Island, Hauxley, Cresswell, Alnmouth, Bamburgh and the Farne Islands.

3. White-billed Diver *Gavia adamsii*

1† in full summer plumage was found dead, oiled, on Sweethope Lough on 24 Apr., after being present for a day or two. The skin is now in the Hancock Museum.

This is about the twentieth British record of this rare arctic species, and yet the same day another (probably immature) oiled bird was found *ca.* 2 weeks dead at Budle Bay (CED).

4. Red-throated Diver *Gavia stellata*

Present every month along the coast. Up to *ca.* 100 again frequented Druridge Bay in Jan. (MN), but Alnmouth was the place which most consistently produced the highest numbers at both ends of the year: maximum *ca.* 95 in Feb. (BM). On 19 Jan. 67 divers sp. flew south in 30 minutes at Cresswell (TH). Inland, lone red-throats occurred at Hallington Reservoir on 13 Feb. (RG,WB), at Billingham Pond on 18 Feb. (DSS) and at Holywell Ponds on 6 Mar. (CED); the last 2 birds mentioned were both found oiled and dead.

5. Great Crested Grebe *Podiceps cristatus*

Of 2 pairs which are known to have nested in Northumberland, 1 reared 4 young; in Durham, only 1 young survived out of a brood of 4. The largest concentration outside the breeding season was 10 on the sea at Alnmouth on 27 Feb. (BL, BM).

6. Red-necked Grebe *Podiceps griseigena*

In Durham, 1 occurred on the sea at Hartlepool on 29 Oct. (RTM). In Northumberland, birds were seen in the first 4 months of the year, 3 still being present at Holy Island on 24 Apr. (CW, LGM, MN). Occurred again in the Holy Island area from 16 Oct.; max. 5 on 30 Dec. Inland, 1 swam on Grindon Lough 5-12 Mar. (MM, DGB, SAB, MGR, IR).

7. Slavonian Grebe *Podiceps auritus*

Skate Road, the favourite haunt of this species, had a maximum of *ca.* 40 on 6 Mar. (DGB), but the latest in the spring was 1 at Holy Island on 24 Apr.—in summer plumage (CW, MN). From Sept. until the end of the year birds were reported from Skate Road, Holy Island, Seahouses, Bamburgh and Cresswell, but no large concentrations were noted. Inland, 1 at Billingham Pond 11-17 Feb. (DIG, PJS, DGB *et al.*).

8. Black-necked Grebe *Podiceps nigricollis*

1 on Seal Sands on 24 Dec. (ECG). 7 at Holy Island (some in summer plumage) on 13 Mar. (JMB, MM).

9. Little Grebe *Podiceps ruficollis*

As always, by far the commonest grebe. The numerous reports include a pair with 2 young on Holy Island Lough on 24 June (IHA). Biggest concentrations were 10 at Gosforth Park in Apr. (LGM), and 12 at Hurworth Burn, 14 at Holywell Ponds and 15 at Capheaton Lake in Oct. (KR, CED, LGM).

16a. Manx Shearwater *Procellaria puffinus puffinus*

Apart from 1 at Hartlepool on 17 Apr. (EB, KR) and 6 at Cresswell on 28 May (MN), all records are for the period 25 June-28 Oct. Between these dates birds were noted along the entire coast, almost all flying north. However, totals were again small, the maximum being 42 in 2½ hours off Seaton Sluice on 29 June (CW, MN). At Hartlepool only 2 were seen in June, only 10 in July (during 22 hours sea-watching) and only 15 in Aug. (during 80 hours sea-watching). None was recorded there in Sept. or Oct. In view of this scarcity, it is interesting to note that a total of 20 flew north at Hauxley in the period 24-28 Oct.—late for this species.

21. Sooty Shearwater *Procellaria grisea*
Birds seen flying north as follows: 2 at Holy Island on 4 Sept. (LGM, RN), 9 at Hauxley on 25 Sept., 1 at Hauxley on 25 and 26 Oct., 1 at Hartlepool and at St. Mary's Island on 27 Oct. (ECG, JDP), 1 at Hartlepool and at Seaham on 6 Nov., 1 at Hartlepool on 17 and 18 Nov. and 1 at Cresswell on 19 Nov.

26. Fulmar *Fulmarus glacialis*
At Hartlepool on 2 May a dark bird flew south with 6 pale ones (EB, KW, KR, JD). Inland, fulmars occurred over Billingham—circling Kennedy Flats in fog—on 12 June (JV) and Cheviot on 19 June (BG), while ledges were occupied at Howick, Belford and Longhoughton (JA). Marked northerly movement recorded throughout Aug. in both counties; maximum 140 per hour at Hartlepool on 25 Aug. (RTM). This movement gradually tailed off in Sept.

27. Gannet *Sula bassana*
Recorded all months, but in Jan. and Dec. odd birds in north Northumberland only. Mainly northerly movement began in early Mar. and continued into Nov. An immature found at Long Newton, near Darlington, on 12 Sept. had struck overhead wires. It recovered and was released successfully at Seaton Carew on 3 Oct. (VFB).

28. Cormorant *Phalacrocorax carbo*
Inland records include 3 sitting on submerged fence-posts at Derwent Reservoir on 2 Sept. (GAC).

30. Heron *Ardea cinerea*
In addition to the traditional Northumberland and Durham heronries (again consisting of 1 and 6 nests respectively), it is gratifying to report the hitherto unsuspected presence of 2 more heronries in Northumberland. At one of these there were 2 nests in 1958, 4 in 1959, 6 in 1960, 7 in 1961, 8 in 1962, 10 in 1963, 11 in 1964, 14 in 1965 and 14 in 1966. At the other there are at least 8 pairs, but the previous history of it is not yet known. The largest concentrations outside the breeding season were at Derwent Reservoir, where up to 9 came to fish Nov.-Dec. (BL), and at Teesmouth, where 7 were in a tree at Greatham Creek on 19 Aug. (PJS). Odd birds occurred widely in both counties; 6 which flew in from the east, singly, at Hauxley in 80 minutes on 16 Sept. may have been immigrants.

38. Bittern *Botaurus stellaris*
1 at Holywell Ponds on 26 Nov., 11 and 31 Dec. (CED *et al.*).

45. Mallard *Anas platyrhynchos*
Abundant and widespread. The Tees estuary held maxima of 1,141 on 15 Jan. and 1,398 on 25 Dec. (ECG). Regular on the sea off Seaton Sluice in the winter 1965-66, with a peak of *ca.* 1,000 on 2 Jan. (CED). In the same month 500 were at Wingates, 650 at Capheaton and 700 at Hallington. The new Derwent Reservoir proved immediately attractive to this duck—380 on 11 Dec. (RN). Other places where numbers exceeded 300 were St. Mary's Island, Hauxley (flying north in Oct.), Blyth bay, Bamburgh, Holywell Ponds, Gosforth Park, Whittledene, Colt Crag, Sweethope Lough and Kimmer Lough.

46. Teal *Anas crecca*
Seal Sands held maxima of 191 on 13 Mar. (PJS) and 233 on 24 Dec. (ECG). Northumberland again had biggest numbers, the highest being 450 in Budle Bay on 24 Sept. (CW, MN) and a similar number at Holywell Ponds on 9 Nov. (HP). Numbers in excess of 100 occurred at Gosforth Park (350), Whittledene (200), Felton, Hallington, Blyth bay and St. Mary's Island.

47. Garganey *Anas querquedula*
First noted on 26 Mar.: a pair at Teesmouth (IL). Between Apr. and Sept. odd birds and pairs occurred at Hurworth Burn, Cresswell, Holywell Ponds, Druridge and Holy Island. A pair bred successfully on flooded meadows in south-west Durham in 1965 and 1966: 7 and 5 young reared respectively.

49. Gadwall *Anas strepera*
The only Durham records were at Teesmouth: 1 on 3 July and an injured bird (which later died) on 27 Sept. In Northumberland up to 4 were often seen at Cresswell and Holywell Ponds Mar.-Apr., and at Gosforth Park Aug.-Sept., while 1 passed Bamburgh on 29 Dec. (MM).

50. Wigeon *Anas penelope*
Present all months. The Durham peak was 320 on Seal Sands on 14 Feb. (PJS). On 14 Nov. Swinhoe Lakes held *ca.* 900 and Holborn Moss *ca.* 1,000 (CW).

52. Pintail *Anas acuta*
Apart from 1 at Teesmouth on 4 July, absent between 22 Apr. and 5 Aug. No party larger than 8 (at Holy Island on 6 Feb.) was recorded in Northumberland, although odd birds were fairly widespread. In Durham, Seal Sands held maxima of 29 in Jan. and 23 in Dec. A flock of 14 flew low over Brasside Ponds on 10 Sept. (JHL).

53. Shoveler *Spatula clypeata*
Records for all months except Jan. A duck with 6 young on Cresswell Pond on 20 July (ERM) and another with 11 young on Crookfoot Reservoir on 24 June (PJS). Numbers in both counties increased in late summer and autumn. At Teesmouth 19 on 30 July rose to 53 by 17 Aug. The largest flocks were 34 on Beal shore on 17 Aug. (with *ca.* 16 others in the area), 32 at Capheaton on 22 Oct. and up to 68 in Gosforth Park in Oct.

55. Scaup *Aythya marila*
No records between 24 Apr. and 23 June, and none in Dec. No inland records apart from odd birds on Cresswell Ponds Jan.-Apr. and June-Oct. No large parties were seen before late autumn; on 27 Oct. a movement took place in which 138 at Hartlepool and 90 at Hauxley all flew north.

56. Tufted Duck *Aythya fuligula*
Whittledene held 193 in Jan. and 165 in Dec., while Holywell Ponds had 160 in Feb. There were 83 at Capheaton Lake in Mar., but the biggest count for Durham waters was 55 at Hurworth Burn in the same month. During the scaup movement on 27 Oct., 123 flew north at Hartlepool (ECG). Tufted duck bred in both counties: at least 10 pairs in each.

57. Pochard *Aythya ferina*
Present all year, but no evidence of breeding. Much more numerous than last year. Holywell Ponds had a peak of *ca.* 190 on 20 Feb. (CED), while Whittledene had 123 in Nov. and Dec. In Durham, the biggest concentration was 89 on Hurworth Burn

on 13 Mar., but Derwent Reservoir had *ca.* 40 by 11 Dec. (ERM). During the duck movement of 27 Oct., 14 flew north at Hartlepool and 58 at Hauxley.

60. Goldeneye *Bucephala clangula*

No records between 7 May—a late bird at Cresswell—and 6 Aug.—1 in Greatham Creek. Strong northerly movement noted all along the coast from Hartlepool to Bamburgh on 27 Oct., 75 being recorded in 1 hour off Beadnell (DGB); this movement continued next day. Inland maxima were: 59 at Capheaton on 6 Mar. (MM), 40 on Derwent Reservoir on 11 Dec. (ERM), 23 at Colt Crag on 6 Mar. (MM) and 21 at Grindon on 12 Mar. (DGB).

61. Long-tailed Duck *Clangula hyemalis*

No records between 30 Apr. and 22 Oct., but outside this period present regularly off Skate Road (maxima 70 on 3 Apr. and 270 on 30 Dec. (BRS)) while there are scattered records for further south in Northumberland. In Durham, only reported from Hartlepool, where 8 flew north in the duck movement of 27-28 Oct. and seen regularly there between 12 and 20 Nov.; maximum 15 on 17 Nov.

62. Velvet Scoter *Melanitta fusca*

Records for all months, but as usual, rarely more than 2 or 3 together. However, in the duck movement of 27 Oct., 11 flew north at Hartlepool and 18 at Hauxley, while up to 12 occurred in the Bamburgh area.

64. Common Scoter *Melanitta nigra*

Apparently no May records. Northerly movement regular June-Nov., monthly maxima being 28 off Seaton Sluice on 25 June, 54 off Hartlepool on 17 July, 545 at Hartlepool on 14 Aug., 40 off St. Mary's Island on 19 Sept., 167 off Hartlepool on 27 Oct. and 152 off St. Mary's Island on 17 Nov. Elsewhere the largest concentrations were 200 off Skate Road in Mar. and Sept., and 350 off Warkworth on 30 Oct. The only inland occurrence was 1 on Holywell Ponds on 30 Oct. (CED).

67. Eider-Duck *Somateria mollissima*

Monthly Teesmouth maxima: 5 in Apr., 2 in May, 1 in Aug., 29 on 27 Oct. (flying north), 9 in Nov. and 4 in Dec. Now breeding more regularly on the Northumberland mainland.

69. Red-breasted Merganser *Mergus serrator*

No records between 15 May—1 at Cresswell—and 16 July—1 at Seaton Sluice. The biggest count was 90 in 2 parties on the sea off Skate Road on 16 Oct. (DGB). Maxima at other places where mergansers occurred fairly regularly were: Holy Island 28, Bamburgh 40, Budle Bay 15, Alnmouth 4, Warkworth 4, Hauxley 14, Cresswell 3, Newbiggin 20, Seaton Sluice 1, South Shields 1, Crimdon Dene 1 and Teesmouth 26 (flying north on 27 Oct.).

70. Goosander *Mergus merganser*

Broods of 13, 9 and 8 seen in Northumberland. As usual, rather scarce in Durham, 5 on Smiddyshaw Reservoir on 13 Nov. (ES) being the only party recorded. A drake flew north at Hartlepool on 5 Jan. and another swam in West Hartlepool docks on 4 Feb.; single "redheads" appeared in the Tees estuary on 27 Mar. and 18 Dec., and 1 flew north at Hartlepool on 17 Dec. In Northumberland, the biggest parties were *ca.* 35 on Greenlee Lough on 30 Jan. (BG) and 25 on Whittledene on 6 Feb. (IHA, JSB).

71. Smew *Mergus albellus*

Single redheads on Bolam Lake on 16 Jan. (LGM), in Hartlepool docks on 22 Feb. (JKW) and on Colt Crag on 5 and 6 Mar. (MM).

73. Sheld-Duck *Tadorna tadorna*

A good breeding season in the Tees estuary: at least 8 pairs nested, producing a total of 63 young, most of which were reared successfully (RTM). Monthly maxima here for the first 3 and last 3 months of the year were 1,759, 1,915, 521, 268, 603, and 1,456 respectively. In Northumberland, 141 in Budle Bay was the biggest count reported; 1 or 2 pairs reared young at Cresswell. Sheld-duck occurred inland as follows: 1 in Gosforth Park on 13 and 19 Feb., 1 on Broomlee Lough on 6 Mar., 5 on Derwent Reservoir on 11 Apr., 1 over Holywell Ponds on 29 Apr., 30 over Blaydon on 25 July (flying east), 3 at Witton-le-Wear on 3 Sept. and 1 in Gosforth Park on 2 Oct.

75. Grey Lag-Goose *Anser anser*

5 in Budle Bay on 1 Apr. (MM) and 2 on North Wamses on 21 June, 4 and 19 July; 5 in off the sea at Hauxley on 3 Sept. were the first of the autumn, and 1 flew north at Bamburgh next day. The largest of many skeins in Oct. was 90 which flew inland over Budle Bay on 30 Oct. (DGB, SAB), a day when 8 were also seen on Fenham Flats. The only grey lag identified in Durham was 1 flying over the Tees estuary on 5 Jan. (JCN). A dozen skeins of "grey" geese reported at both ends of the year probably included some of this species: the largest was *ca.* 200 flying west over Corbridge Fell on 7 Dec. (WB).

78b. Pink-footed Goose *Anser arvensis brachyrhynchus*

Scarce. From Northumberland comes 1 report in Apr., 2 in Oct., 1 in Nov. and 1 in Dec. In Durham, 1 was identified over Seal Sands on 6 Mar. and 2 on 12 Mar.

80. Brent Goose *Branta bernicla*

Fenham Flats held a maximum of 600 on 24 Jan. (BEY), reducing to 400 in Feb. and 8 by 19 Mar. None seen thereafter until 27 Oct., when 16 flew north at St. Mary's Island (JDP, HP) and 2 flew north at Hauxley. Fenham Flats had *ca.* 400 on 18 Dec. (ERM). In Durham, 15 appeared on Seal Sands on 13 Feb., increasing to 17 on 17 Feb. (PJS, ECG, ALC); 2 seen again there 3-13 Mar. and 1 on 27 Mar. (ECG, PJS, EB).

81. Barnacle-Goose *Branta leucopsis*

1 at Holy Island on 9 Jan. (LGM, RN, MN, CW); 16 (1 and 15) flew south, and 7 flew north, at Hauxley on 27 Sept. From 16 Oct. a lone bird accompanied the 21 Canada geese at Sweethope and Colt Crag until Mar. 1967. (RG, WB, EL). Col. Wood of Sweethope owns the Canadas, but knows nothing of the barnacle.

82. Canada Goose *Branta canadensis*

1, perhaps the same bird, frequented Swallow Ponds, Cresswell Ponds, Hartburn, Gosforth Park and Holywell Ponds in the first 4 months of the year. 21 at Sweethope and Colt Crag in the autumn are the remnants of a herd of 50 free-flying birds belonging to Col. Wood, who says that odd pairs bred at Sweethope this year. 12 at Burnhope Reservoir on 15 June were still present in Aug. A skein of 44 which flew south-west over West Hartlepool on 2 Sept. (JKW) is the second largest party ever recorded in either county.

85. Whooper-Swan *Cygnus cygnus*
An adult pair remained at Swallow Ponds from 4 May until 28 Aug. During this time they displayed to each other, and spent much time on an old mute swan's nest (AM, TG); the cob may have been injured. In both winters Fenham Flats held rather less than 200. Elsewhere the biggest herds were 35 at Prestwick Carr in early Jan. (ERM), 38 at Seaton Burn on 6 Feb. (BG), 32 at Cresswell on 13 Nov. and 32 at Ellington from 30 Nov. (TH). The Hartburn bird (Bell, 1966) still thrives.

86. Bewick's Swan *Cygnus columbianus*
Between 14 and 22 frequented Holy Island Lough Jan.-Mar.; 1 at Bothal and Ashington, and 6 at Seaton Burn, in Mar. The only records for the end of the year concern 1 at Shotton Colliery 31 Oct.-6 Nov. (DWS)—the sole Durham record, 1 at Broomlee Lough on 4 Nov. (BEY), 7 at Ellington in Dec. (MN) and 8 at Holy Island again, on 31 Dec. (MN). An injured bird remained all summer at Crag Lough, but died in late autumn (FS).

91. Buzzard *Buteo buteo*
Only 3 reports—from 3 Northumberland localities, including a summering bird.

92. Rough-legged Buzzard *Buteo lagopus*
1 at St. Mary's Island on 11 Oct. (HP). There was an unusually good immigration of this species into eastern England in autumn.

93. Sparrow-Hawk *Accipiter nisus*
5 breeding reports and birds seen in a dozen localities, involving *ca.* 14 individuals.

99. Marsh-Harrier *Circus aeruginosus*
1 quartered the reeds at Billingham Pond for a few minutes on 8 May, before flying off towards Billingham town-centre, where it circled for a few more minutes (EB, JD); 1 on Cowpen Marsh 21-25 May (ECG, PJS).

100. Hen-Harrier *Circus cyaneus*
A male in the Holy Island area Feb.-Mar. (CMA, JHL, TH); 1 at Heddon-on-the-Wall on 18 Sept. (IHA); 1 at Derwent Reservoir on 27 Nov. (BL).

103. Osprey *Pandion haliaetus*
1 caught a fish in Hartburn Lake, Northumberland, on 15 May (TL).

104. Hobby *Falco subbuteo*
A pair reared 2 young in Northumberland; a remarkable occurrence for a bird which in England is normally confined to the southern counties.

105. Peregrine *Falco peregrinus*
4 reports of single birds from Bamburgh on 10 Sept. and 29 Oct., Hauxley on 16 Oct. and Ross Links on 30 Oct. A pair attempted to breed in Northumberland.

107. Merlin *Falco columbarius*
4 young reared from a nest in south-west Durham; 7 nests in a Northumberland locality, including a brood of 5. Scattered reports of merlins seen in both counties throughout the year.

110. Kestrel *Falco tinnunculus*
Appears to be holding its own in both counties, and still by far the commonest bird of prey. In Kielder 15 nests found, but no brood exceeded 3. There were 6 on Cowpen Marsh on 27 Aug., and on 30 Oct. 5 flew north at Bamburgh.

113. Black Grouse *Lyrurus tetrix*
Reports from Hamsterley S.F. (usual numbers), Edmundbyers, Harbottle, Catcleugh and north Tyne area (6 cocks on 5 June). In Northumberland, many young were drowned in forestry drainage dykes during June, which was a very wet month: this appears to be a major hazard in wet summers.

115. Red-legged Partridge *Alectoris rufa*
2 flushed from a ploughed field just outside Morpeth on 29 Sept. (GB).

117. Quail *Coturnix coturnix*
Single birds seen and heard near Wynyard on 21 May (JM, RAS) and near Alnwick on 28 July and 7 Sept. (EW).

120. Water-Rail *Rallus aquaticus*
Reports from Gosforth Park (maximum *ca.* 15 in Dec.), Cresswell, Bamburgh (maximum 8 in Oct.), Howick, Hauxley, Hadstone, Darlington and Hurworth Burn, but only 1 bird was reported in summer.

125. Corncrake *Crex crex*
Heard at Alnwick Moor on 13 May (JA), Thrunton on 18 May (JA), Blagdon in late May-early June (R), Stanhope throughout June (JMC) and near Slaley on 17 and 20 July (*per* WB).

126. Moorhen *Gallinula chloropus*
72 at Swallow Ponds on 31 Dec. (AM) was the biggest concentration recorded.

127. Coot *Fulica atra*
Increasing. 380 on Capheaton Lake Nov.-Dec. is the highest count ever for this water—previous highest 338 in Dec. 1958 (AM). Other high counts were: 320 at Holywell Ponds in Oct., 300 at Seaton Burn in Oct.-Dec., 170 at Broomlee in Oct., and 133 at both Bolam and Swinhoe in Dec. The late autumn Northumberland population must have been well over 2,000. No large concentrations reported from Durham.

131. Oystercatcher *Haematopus ostralegus*
Bred inland in both counties, with some success in Northumberland—despite June floods. On 16 Oct. on Ross Point, Fenham Flats, 900 gathered at high tide (DGB)—the biggest concentration recorded.

133. Lapwing *Vanellus vanellus*
Biggest movements were 1,338 flying south at Teesmouth on 30 Jan. and 800 flying north at Bamburgh on 30 Oct. Much the largest flock was 1,801 counted near Teesside Airport on 19 Aug. (WR). Numbers of nesting pairs still below normal in south-west Durham (DNB, CG), but by mid-May 1 observer (AEH) had found 56 nests with eggs in Northumberland and Durham.

135. Little Ringed Plover *Charadrius dubius*
A brief history of nesting at a Durham gravel-works can now be published. In 1962 a nest was found with 4 eggs which certainly belonged to this species—though no birds were seen. In 1963 1 pair and an odd female were present, and 5 eggs laid in

1 nest; 4 of these eggs failed to hatch (owing either to heavy rain or infertility) but 1 chick did hatch and was probably reared successfully. In 1964 4 eggs were laid and hatched, but 26 days later there was no sign of any birds. In 1965 2 pairs were present: 1 with 2 eggs (which both hatched) and another seen later with 3 young. In 1966 2 pairs were again present: 1 had 3 eggs (from which the young hatched and were probably successfully reared) while the second laid 4 eggs, which were accidentally destroyed. Two months later a newly-hatched chick was found—probably from a replacement clutch. Away from this locality no nesting birds were recorded until 1967, despite the availability of apparently suitable sites. Odd birds occurred elsewhere in 1966 as follows: 1 at Teesmouth on 18 June and 1 immature there throughout July—perhaps the bird trapped there on 20 Aug.—and 1 near Hurworth Burn on 1 Sept. Little ringed plovers have yet to be recorded in Northumberland.

139. Grey Plover *Charadrius squatarola*
As usual, present all months in the Tees estuary, with 22 on 30 May and 8 on 5 June. Fed regularly on floodwater on pasture at Beal in Oct.

140. Golden Plover *Charadrius apricarius*
Usual numbers nesting in south-west and north Durham; *ca.* 40 young fledged on a small moor in Northumberland. Biggest concentrations were at Hauxley, where numbers increased to *ca.* 1,000 at the end of Aug., to *ca.* 1,500 in Sept. and to *ca.* 3,000 in Oct. Maxima elsewhere were *ca.* 900 at Jarrow Slake in Dec., *ca.* 800 at Prestwick Carr in Mar., *ca.* 750 at Cresswell in Jan. and *ca.* 600 at Brenkley in Apr Teesmouth numbers again low, 160 on Seal Sands in Dec. being the most recorded.

143. Turnstone *Arenaria interpres*
Biggest numbers again on Inner Farne in Aug.: 400 there in the first week (ERM); in the same month numbers at Hauxley reached 150.

145. Common Snipe *Capella gallinago*
Numbers in excess of 100 concentrated on flooded pasture at Beal in Oct. and in Gosforth Park in the same month. Over 70 rose from the islands in Witton-le-Wear reserve on 9 Oct., including a close flock of 40. Holywell Ponds had *ca.* 100 on 8 Oct. Smaller numbers occurred in most boggy areas in both counties.

147. Jack Snipe *Lymnocryptes minimus*
Absent May-Aug. inclusive. Widely scattered records for all other months.

150. Curlew *Numenius arquata*
Numbers in the Holy Island area far exceeded 300 at both ends of the year. At Teesmouth, 450 on 9 Jan. reached 501 by 12 Mar., a time when over 500 frequented the Longstone and 200 were seen at Grindon.

151. Whimbrel *Numenius phaeopus*
Only 3 spring records from Northumberland—all in the first week of May. At Teesmouth, first noted on 23 Apr. and there are 2 records for both May and June. The autumn passage started there on 14 July, with *ca.* 30 on 17 July. Aug. was the peak month in both counties, up to 20 a day occurring at Teesmouth, where a very late bird remained until 5 Nov. (ECG).

154. Black-tailed Godwit *Limosa limosa*
Rather scarce: 1 at Teesmouth 22-25 May, 1 on 14 and 24 July and 1 on 13 and 27

Sept.; 2 at Cresswell on 24 Aug.; 1-3 on Holy Island 29 Aug.-10 Sept. No others reported.

155. Bar-tailed Godwit *Limosa lapponica*
Maximum: 400 in the Holy Island area in early spring.

156. Green Sandpiper *Tringa ochropus*
1 at Witton-le-Wear Jan.-Feb., and 2 there in Mar. (remaining until 12 Mar.) (DNB, CG); 1 at Cresswell on 11 Apr. (TH); 1 at Teesmouth on 18 June and it (or another) at Witton-le-Wear next day. Steady autumn passage July-Sept., with the usual small numbers in the usual localities; maximum 11 on Cowpen Marsh on 14 Aug. A late bird at Hurworth Burn on 2 Oct. (RTM) and up to 6 at Witton-le-Wear into Nov. A wintering individual was again at Whittledene on 11 and 18 Dec. (IHA, JSB).

157. Wood-Sandpiper *Tringa glareola*
1 at Cresswell on 18 May (TH) and 1 at the Urpeth gravel works in the Team Valley on 19 June (GDS). Apart from 1 bird in July and 4 in Sept., autumn passage was confined to Aug., in which month birds occurred at a dozen or more localities; maximum 8 at Holywell Ponds on 19 Aug. (MN).

159. Common Sandpiper *Tringa hypoleucos*
Present on breeding grounds in good numbers and, despite June floods, many young reared in Northumberland. Strong autumn passage, Aug. being the peak month. A late individual at Crimdon Dene on 10 Oct. (BU).

162. Spotted Redshank *Tringa erythropus*
The wintering Teesmouth bird was seen irregularly until late Mar. In Apr. up to 4 occurred there, with the last on 1 May; another spring bird was at Beal 24-30 Apr. Autumn passage extended from 24 July until late Oct., maximum party being 6 at Cresswell on 11 Aug. (MN) and the last 1 at Teesmouth on 11 Nov. (KR).

165. Greenshank *Tringa nebularia*
8 or 9 passed through on spring passage between 23 Apr. and 4 June. Autumn passage began with 1 at Greatham Creek on 30 June and increased in intensity in July. Aug. was the peak month, with up to 11 a day present on the Tees marshes and at Hurworth Burn. Movement continued throughout Sept. into the first week of Oct. Late individuals at Beal on 29 Oct. (DGB, MGR) and Seal Sands on 9 Nov. (ALC).

169. Knot *Calidris canutus*
In Dec. Budle Bay had *ca.* 5,000 and Seaton Sluice *ca.* 800.

170. Purple Sandpiper *Calidris maritima*
Biggest counts were 200 on Inner Farne in early May and 80 at Bamburgh on 1 Apr. Up to 53 frequented Hartlepool Feb.-Mar., and up to 40, Seaton Sluice-St. Mary's Island in both winters. Smaller numbers on most rocky coasts in the two counties at all times except midsummer.

171. Little Stint *Calidris minuta*
1 at Teesmouth on the remarkable dates of 2 Jan. and 26 and 27 Feb. had a buff suffusion on the breast like an autumn immature (ECG); 1 there on 3 and 24 Apr., 31 May and 3-4 June. Autumn passage was slight, with minimum totals of 3 in July, 6 in Aug., 6 in Sept. and 7 in Oct.

173. Temminck's Stint *Calidris temminckii*
1 at Dorman's Pool, Teesmouth, on 9 July (ECG, IL, TF).

178. Dunlin *Calidris alpina*
Nested in its usual Northumberland and Durham haunts, and young seen in June.

179. Curlew-Sandpiper *Calidris testacea*
1 in summer plumage at Saltholme Pool 23-25 July (ECG, PJS). Strangely absent at Teesmouth in Aug., except for 1 on 14 Aug. Small numbers regular there in Sept.; maximum 14 on 13 Sept. and 1 lingered into Oct. In Northumberland, only 7 seen —at Budle Bay, Boulmer and Cresswell between 27 Aug. and 21 Sept.

184. Ruff *Philomachus pugnax*
Teesmouth: 2 in Mar., Apr. and May; up to 5 a day in July, reaching a peak of 18 at the height of the passage in Aug. (when 5 were also seen at Darlington Sewage Farm and 6 near Teesside Airport); up to 10 a day regularly throughout Sept., and of 4 still present on 23 Oct., 1 remained until 6 Nov. In Northumberland, 2-3 stayed at Cresswell 8 Mar.-25 Apr., while 1 occurred at Newton Bog on 11 Apr. Apart from 4 males in May, all other records concern the main passage July-Oct.; maximum party 40-50 on flooded pasture at Beal on 22 Aug. (MGR).

185. Avocet *Recurvirostra avosetta*
1 in Budle Bay on 31 Jan. (NR) and 13 Feb. (BW, GW, DNG, KJR); 2 on Greenabella Marsh, Teesmouth, 4-16 Apr. (IL, PJS, DSS); 2 at Newton Bog on 11 Apr. (DTP, EM) were probably the 2 at Cresswell 13-14 Apr. (EM, BH, TH) and 1 of these was probably the individual at Holy Island from 21 Apr. until the end of the month (BH, TH, HD).

187. Grey Phalarope *Phalaropus fulicarius*
1 at Hartlepool on 17 Nov. (ECG).

190. Pratincole *Glareola pratincola*
1† at Holywell Ponds 2-6 July (CED, JDP, IHA, JSB *et al.*) was watched hawking for flies. First record for Northumberland.

193. Arctic Skua *Stercorarius parasiticus*
Apart from 2 in June and 13 in Nov., all records concern the period July-Oct., during which the usual hundreds passed through; maximum 135 flying south in 3¾ hours at Hartlepool in a north-north-west wind on 15 Sept. (RTM, KR). All the Nov. birds flew north. It was a particularly good skua year at Hauxley.

194. Great Skua *Catharacta skua*
1 off Seaton Sluice on 29 June (CW, MN) was the first, followed by other single birds on 21, 23 and 30 July at Seaton Sluice, Hauxley and Cresswell respectively. Surprisingly, none seen in Durham before 6 Aug., after which 6 at Teesmouth and 15 in Northumberland brought the month's total to 21. Very scarce again at Teesmouth in Sept.—only 4 on 15 Sept.—but 23 passed along the Northumberland coast. Northerly movement took place in Oct.—a total of 32 in 3 days at Hartlepool (maximum 28 on 4 Oct.) and of 5 in 3 days at Hauxley. The last were 9 flying north at Hartlepool on 6 Nov. and 1 on 19 Nov.

195. Pomarine Skua *Stercorarius pomarinus*
Between 28 Aug. and 19 Nov. a total of *ca.* 76 was recorded. A typical late autumn movement was noted on 27 Oct. off Teesmouth, Hauxley and Beadnell, when dozens struggled north into a northerly gale.

196. Long-tailed Skua *Stercorarius longicaudus*
An immature at Hauxley on 24 Sept. (BL).

198. Great Black-backed Gull *Larus marinus*
Roosts estimated at *ca.* 1,000 at Chevington Burn on 2 Aug. (ERM) and at *ca.* 5,000 at Goswick on 25 Oct. (DGB).

199. Lesser Black-backed Gull *Larus fuscus*
A few winter records from Warkworth and Budle Bay. As usual, common in summer in Northumberland, but comparatively scarce in Durham and none there in winter.

202. Glaucous Gull *Larus hyperboreus*
About 12: at Hartlepool an adult or sub-adult flew north on 22 Jan. and a first-year bird was often seen there 30 Jan.-29 Apr.; another individual from 27 Aug. into Oct. In Northumberland, an immature was found dead at Ashington on 22 Jan., 1 first-year bird at Seahouses on 12 Mar., 1 adult at Wallsend Swallow on 22 Mar., 1 first-year bird near Holy Island on 1 Apr., 1 immature near Inner Farne on 11 May, 1 immature at Seahouses on 13 Sept., 1 immature off Staple Island on 29 Oct., 1 on Newcastle Quayside on 21 Dec. and 1 immature at Skate Road on 31 Dec.

205. Mediterranean Gull *Larus melanocephalus*
Between 11 Mar. and 24 Apr. an adult in summer plumage was seen on 4 occasions on Holy Island (ERM, DTP, MB *et al.*); it, or another, was recorded there on 14 Aug. (JHL *et al.*). After an apparent absence of 7 months, the Hartlepool bird was noted again from 19 July until 29 Sept.; it, or another adult, was found on Seaton Snook on 22 July (EB, RTM *et al.*).

207. Little Gull *Larus minutus*
Apart from 1 at Hartlepool fish-quay on 13 Feb. (JKW), none before 10 May, when an immature was found freshly killed at West Hartlepool (JKW); 1 appeared at Cresswell on 23 May, followed by another at Teesmouth on 18 June; 1 remained at Cresswell 1-12 Aug. and other single birds occurred at Hauxley and Holywell Ponds in the same month; 1 at Holy Island on 12 Sept., 2 at Seaton Sluice 10 Sept.-23 Oct. and 2 at St. Mary's Island on 5 Oct. complete the Northumberland total of 9. As usual, more numerous in Durham: regular at Teesmouth from 16 July, maximum in that month being 7 on 16 July (ECG), while a total of 16 (mostly second-year birds) were seen there 2-21 Aug.; maximum 9 together off Throston, Hartlepool, on 14 Aug. (EB). In Sept., 5 at Teesmouth, a party of 18 (4 adults and 14 immatures) at Hurworth Burn on 18 Sept. (KR, PJC), and 6 flying north off Seaham on 18 Nov. (ES), bring the Durham total to 50-60.

208. Black-headed Gull *Larus ridibundus*
The largest of several colonies reported was *ca.* 500 pairs at a mid-Northumberland site (ERM). A roost of over 5,000 gulls at Colt Crag in Oct. consisted mainly of black-headed, with a few common and greater black-backed (DGB).

209. Sabine's Gull *Xema sabini*
Single first-winter birds were seen at Seaton Sluice on 9 Oct. (CW) and flying north at Seaham on 2 Nov. (ES).

211. Kittiwake *Rissa tridactyla*
On the C.W.S. warehouse at Newcastle Quayside 14 eggs were laid in 8 nests; 11 of these hatched and all the young flew successfully (AM). In the 5 years (1962-66) that kittiwakes have nested at Newcastle/Gateshead 30 young have been reared (AM). Heavy northerly movement noted in Jan., June (maximum 2,300 in 10 minutes on 28 June: CW), July, Aug., Oct. and Nov. At Greatham Creek on 12 Apr. 12 were found freshly dead and unmarked (JM, RAS, DM).

212. Black Tern *Chlidonias niger*
2 spring records: 12 at Capheaton Lake on 29 May (HST) and 1 at Colt Crag on 31 May (FS). Between 30 July and 4 Oct. 19 occurred at Teesmouth: 1 in July, 14 in Aug. (including 13 flying south at Hartlepool on 28 Aug.), 3 in Sept. and 1 in Oct. Between 15 Aug. and 20 Sept. 6 occurred in Northumberland: 2 in Aug. and 4 in Sept.

219. Roseate Tern *Sterna dougallii*
Away from the Farnes, often noted at Bamburgh and Hauxley between 30 July and 18 Sept., and occasionally elsewhere in Northumberland. The only Durham record concerns 1 or 2 adults at Seaton Snook, Teesmouth, 21-25 July (RTM).

220. Sooty Tern *Sterna fuscata*
1† at Inner Farne on 20 June (IKM, JMS): first record for Northumberland.

222. Little Tern *Sterna albifrons*
Present between 21 Apr. and 19 Sept. and nested in Northumberland.

223. Sandwich Tern *Sterna sandvicensis*
Present from 3 Apr.—3 at Hauxley (BL)—until 3 Oct.—2 at Hartlepool (RTM). This summer juveniles have been colour-marked with rings and wing-tags at 3 colonies on the North Sea coast of Britain as follows: Sands of Forvie, Aberdeenshire(*ca.* 400: B.T.O. metal ring on left leg, yellow above red on right), Farne Islands (*ca.* 300: B.T.O. metal ring above green on left leg, none on right) and Scolt Head, Norfolk (B.T.O. metal ring on left leg, yellow above black on right). In addition, *ca.* ¼ of the Forvie juveniles had fluorescent green-yellow wing-tags. The table below shows the composition of post-breeding Sandwich tern flocks at Teesmouth 22 July-23 Aug.:

Date	*No. in flock*	*Total no. of juveniles*	*No. of juveniles from:* *Scolt*	*Farne Is.*	*Forvie*
22 July	100	15	1	—	1
24 July	350	100+	1	—	—
25 July	193	87	1	1	—
28 July	200	70	1	—	2
2 Aug.	50	25	1	1	1
4 Aug.	130	40	1	1	—
10 Aug.	450	200+	3	20–25	1
11 Aug.	500	250	present	present	present
17 Aug.	125	50	1	3	—
19 Aug.	280	70	—	*ca.* 3	—
23 Aug.	100	60	2	1 or 2	1

Thus, throughout the autumn *ca.* 1 in 10 of juveniles at Teesmouth bore colour-rings, while on 10 Aug. 1 in 8 of juveniles had Farne colour-rings. It is interesting that

their post-breeding dispersal should bring Norfolk terns up to Teesmouth. An adult at Teesmouth on 17 Aug. had been first ringed as pullus on the Farnes in July 1961 and colour-marked when nesting at Forvie in 1965 (RTM).

226. Little Auk *Plautus alle*
1 found exhausted at Rising Sun Farm, Wallsend, on 8 Jan. was later released on Swallow Ponds (FC); 1 found dead at Bamburgh on 20 Feb. and another at Holy Island on 24 Apr. (LGM, RN, CW, MN). In the autumn 2 at Bamburgh on 25 Oct., 6 at St. Mary's Island on 28 Oct., 6 at Cresswell and 5 at St. Mary's Island on 9 Nov., and 6 at Hartlepool on 17 Nov. and 1 on 19 Nov., all flew north. 1 off Inner Farne on 31 Dec.

229. Black Guillemot *Cepphus grylle*
The only records are from the Farnes—single birds in Apr., Oct. and Nov.

—. Collared Dove *Streptopelia decaocto*
Reports from Kielder, Whitley Bay (1 nest), Hartley, Holywell Dene (40; nest seen), Hauxley, Bamburgh, Inner Farne, Blyth, Tynemouth (2 young seen), Darras Hall, Howick Hall, Ellington, Pegswood, Earsdon, Gosforth area, Wolsingham (20), Hexham, Kenton (nesting), Hancock Museum grounds, Stocksfield, North Shields, South Shields, Durham, Darlington (young seen), Wynyard Park (20), Hurworth Burn, Graythorp and West Hartlepool. The largest population is still at West Hartlepool, where *ca.* 150 were seen on 21 Feb., including 56 together on a fence (EB, KR).

235. Turtle-Dove *Streptopelia turtur*
Reports from Corbridge, Heddon-on-the-Wall, Stocksfield (bred), Farne Islands, Cresswell, Seaton Delaval, Holywell Dene, Darlington, Wynyard Park (bred) and Teesmouth.

248. Long-eared Owl *Asio otus*
Continues to breed in small numbers in Northumberland; 2 nests found in the north-west.

249. Short-eared Owl *Asio flammeus*
Widespread, but only 2 pairs bred in north-west Northumberland—perhaps owing to the shortage of voles. This is in contrast to the usual population of *ca.* 20 pairs in that area.

252. Nightjar *Caprimulgus europaeus*
Apparently usual numbers in the Hamsterley S.F. area and 2 nests found in Wynyard Park. Other reports from Kielder, Plessey Woods, Dipton, Rothbury and Blagdon.

255. Swift *Apus apus*
First seen on 23 Apr.—1 at Witton-le-Wear (DNB, CG) and 1 at Cresswell (MN). Feeding flocks of *ca.* 100 birds were seen over the summits of Cheviot (2,676 feet) on 19 June (BG) and of Dunmore Hill (1,860 feet), near Ingram, on 3 July (LGM).

258. Kingfisher *Alcedo atthis*
2 reports: 1 at Witton-le-Wear several times Aug.-Sept. and 1 at Thropton.

262. Green Woodpecker *Picus viridis*
Scattered reports from both counties; rather scarce.

263. Great Spotted Woodpecker *Dendrocopos major*
Records include 1 on Holy Island 30-31 Aug. (MFMM) and 1 in Leazes Park (in the centre of Newcastle) on 14 Oct. (RMP).

264. Lesser Spotted Woodpecker *Dendrocopos minor*
1 at Hurworth Burn on 24 Dec. (PR); 1 pair at Bywell (BL).

265. Wryneck *Jynx torquilla*
1 at Cresswell on 14 Aug. (CW, MN). Between 29 Aug. and 3 Sept. 6 or 7 occurred along the coast.

271. Wood-Lark *Lullula arborea*
1 in song at east Wallsend 2-13 May (MB): a remarkable occurrence.

273. Shore-Lark *Eremophila alpestris*
Occurred in 4 localities: at Hartlepool—1 on 1 Oct. (KR); at North Gare—1 on 4 Oct. (RTM); at Newbiggin between 28 Oct. and 12 Nov.—maximum 16 on 28 Oct. (BM, TH, FGG, CMA *et al.*); near Bamburgh—7 on 18 Dec. (ERM).

274. Swallow *Hirundo rustica*
First noted on 8 Apr.—1 at Hauxley—but not generally distributed until the last week of the month. A reed-bed at Chevington Burn on 31 July held several thousand birds. Many reports until late Oct.

276. House-Martin *Delichon urbica*
Arrived on 22 Apr. and seen until late Oct.

277. Sand-Martin *Riparia riparia*
Noted from 8 Apr. until late Sept.

279. Raven *Corvus corax*
6 pairs are known to have bred in Northumberland.

281. Hooded Crow *Corvus corone cornix*
6 odd birds in Northumberland Jan.-Mar.; 2 at Bamburgh in May and Sept.-Dec.; up to 8 at Ross Nov.-Dec.; 1 near Wooler in Nov.; 1 on Seal Sands on 16 Oct. and 3 on 5 Nov. and 1 at Graythorp on 31 Dec.—the only Durham records for the year.

282. Rook *Corvus frugilegus*
The Haymarket (Newcastle) colony has increased further—to 23 occupied nests; this colony was formed in 1961 with only 2 nests (RMP).

283. Jackdaw *Corvus monedula*
Flocks of *ca.* 1,000 seen in Dec. at Prestwick Carr and Hurworth Burn.

286. Jay *Garrulus glandarius*
Several pairs are now established along the valley of the North Tyne, where jays were uncommon until *ca.* 2 years ago (BL, WLM). In the Hamsterley S.F. area, a pair regularly brought their 3 young to a bird-table only 4 yards from a kitchen window July-Sept. (DNB, CG).

293. Willow-Tit *Parus montanus*
Reported from South Shields, Durham City (bred), Seaham, Witton-le-Wear, Prestwick Carr (bred), Bolam, Seaton Delaval, Ellington, Kielder and Eshott.

295. Bearded Tit *Panurus biamarcus*
2 male birds in reeds near Dorman's Pool, Teesmouth, on 3 Dec. (ECG) and 4 (at least 1 male) there on 18 Dec. (KR, IL): the first Durham records.

296. Nuthatch *Sitta europaea*
Regularly seen at Hamsterley S.F., where 4 young were brought to a bird-table in June (DNB, CG); birds seen at Durham City (probably 2 pairs), Castle Eden Dene, Darlington, Bolam, Dipton (1 pair), Hamsterley (1 pair), Stocksfield (2 pairs), Alnwick (2 pairs) and Bamburgh—this last being a lone bird on 22 Oct.

302. Fieldfare *Turdus pilaris*
Regularly seen until late Apr.: on 25-26 Apr. there was still a roost of 400 at Stocksfield and another of 150 in Gosforth Park; 1 near Darlington on 13 May was the latest of 3 records in May. 2 at North Yardhope on 26 June (BGA) and a sub-adult found dead under the Longstone lighthouse on 9 Aug. Though odd birds and small parties were seen from 11 Sept., it was 9 Oct. that brought the first big influx—tens of thousands all along the coast.

303. Song-Thrush *Turdus philomelos*
2 flew in off the sea at Hauxley on 4 Aug., chased by arctic skuas—an early date for immigration. Huge numbers arrived in the following 2 months, especially on 6 Oct. when at least 2,000 came in off the sea at Hartlepool along with other *Turdidae* (RTM).

304. Redwing *Turdus iliacus*
A late lingerer on Inner Farne on 14-15 May (JMS); daily from 25 Sept., with massive influx in Oct., particularly 9 Oct. and 14 Oct.

311. Wheatear *Oenanthe oenanthe*
The first was a male near Stocksfield on 23 Mar. (BL) and the last 1 at Greatham Creek on 22 Oct. (ECG).

317. Stonechat *Saxicola torquata*
The usual scattering of coastal records, from Holy Island down to Teesmouth, in the first 4 and last 4 months of the year. In addition, single juveniles were trapped at Hauxley and Druridge where pairs were present in the summer. No inland reports.

318. Whinchat *Saxicola rubetra*
First noted on 23 Apr.—1 near Seaton Delaval (MH). Several hundred occurred in the drift movement 28 Aug.-3 Sept., while late individuals stayed into the third week of Oct.

320. Redstart *Phoenicurus phoenicurus*
First noted on 11 Apr.—1 at Preston (MN). Last noted on 10 Nov.—1 at Blyth which had been present from 5 Nov. (RC). A good breeding year for this species at Kielder.

321. Black Redstart *Phoenicurus ochruros*
Half a dozen occurred 2-21 Apr. along the coast between Holy Island and Teesmouth, and *ca.* 16 6-30 Oct.; also 1 at Bamburgh on 19 Nov.

324. Bluethroat *Cyanosylvia svecica*
1 at Hartlepool on 29 Aug. (RT).

325. Robin *Erithacus rubecula*
A very large spring fall all along the coast, beginning with 30 at Hauxley on 9 Apr. and increasing on 10-11 Apr.: 300 on Holy Island, 300 at Hauxley, 30 in Whitley Bay cemetery, 20 at Hartley, 45 at Hartlepool, etc. These robins were accompanied by blackbirds, song-thrushes and dunnocks; high numbers persisted for a week, though steadily decreasing; several hundred were still present at Dunstanburgh 16-17 Apr. Autumn brought more, especially 14-15 Oct., when there were *ca.* 600 at Hauxley, 100 at Whitley Bay cemetery and dozens at Hartlepool.

327. Grasshopper-Warbler *Locustella naevia*
Regular between 21 Apr. (1 at Teesmouth, reeling on passage) and 3 Sept. (1 on Holy Island). Bred in both counties.

333. Reed-Warbler *Acrocephalus scirpaceus*
2 pairs again bred in Northumberland. Single passage birds recorded as follows: 1 trapped at Hauxley on 28 Aug., and still present on 31 Aug.; 1 trapped at Hauxley on 14 Oct., when 1 was also seen near St. Mary's Island (CTB); 1 trapped at Hartlepool on 15 Oct.

337. Sedge-Warbler *Acrocephalus schoenobaenus*
Spring arrivals first noted on 26 Apr.; 2 pairs nested deep inside Kielder Forest among small conifers (BL); *ca.* 25-30 singing males in the Beal Station-Haggerston-Goswick triangle in early June (MGR).

340. Icterine Warbler *Hippolais icterina*
An unprecedented influx involving *ca.* 16 individuals:
15 Aug.: 1 trapped at Hauxley.
21 Aug.: 1 on the Longstone (DC).
25 Aug.: 1 in Blyth cemetery (JKJ).
28 Aug.: 1 trapped at Hauxley (BGa., BL, ERM).
29 Aug.: 1 trapped at Marsden (MLC, FGG), still present next day (first record for Durham); 1 trapped at Hauxley (BL, JDP, JPD); 1 at Bamburgh.
30 Aug.: 1 at St. Mary's Island car-park (JDP, MB); 1 on Holy Island; 1 at Hartlepool (PJS).
1 Sept.: 2 at Druridge (IHA, JDP).
3 Sept.: 1 at Hauxley.
5 Sept.: 1 at Bamburgh (MN).
29 Sept.: 1 in Prior's Park, Tynemouth (HP).
30 Sept.: 1 trapped at Graythorp (PR).

343. Blackcap *Sylvia atricapilla*
Winter records (all males): 1 in Stockton on 16 Jan.; 1 trapped at Eshott on 17 Dec. (NH); 1 at Rowlands Gill 24-27 Dec. (RP). 2 trapped at Graythorp on 5 Nov., and 1 seen there on 6 Nov., were probably late migrants—birds were seen in coastal areas in both counties throughout Oct.

344. Barred Warbler *Sylvia nisoria*
1 on Holy Island on 28 Aug. (MFMM), 3 at St. Mary's Island (MN) and 1 at Cresswell on 29 Aug. (TH) and 1 at Bondicarr on 31 Aug.

348. Lesser Whitethroat *Sylvia curruca*
A pair with 4 young seen at Beal on 12 June (BL, TG); 2 broods reared in Holywell Dene (JDP); a male sang at Blaydon May-June (BL). In autumn, migrants occurred along the coast between 20 Aug. (1 at Hauxley) and 29 Oct. (1 at Hartlepool).

355. Greenish Warbler *Phylloscopus trochiloides*
1† trapped at Bamburgh on 30 Aug. (MB, MM, JDP): second record for Northumberland.

356. Chiffchaff *Phylloscopus collybita*
First noted on 25 Mar.—2 singing near Darlington (WR). Autumn migration lasted throughout Oct., with late individuals at Bamburgh on 13 Nov. (a re-trap of 1 ringed there on 26 Oct. 1966) and in Holywell Dene on 19 Nov. (MN). Even later individuals near Wooler (trapped) on 28 Nov. (JKJ), at Bamburgh (trapped) on 4 Dec., at Graythorp (trapped) on 5 Dec. (PR) and at Killingworth on 26 Dec. (GB).

359. Arctic Warbler *Phylloscopus borealis*
1† at Hauxley 28-29 Aug. (BL, BGa., GM) and 1† at Druridge on 29 Aug. (IHA, TH, JDP).

360. Yellow-browed Warbler *Phylloscopus inornatus*
1 (trapped) at Hauxley 1-8 Oct. (BL); 1 at Cresswell on 8 Oct. (CW, MN); 1 at Hartlepool on 2 Nov. (JKS, KR).

364. Goldcrest *Regulus regulus*
Spring and autumn influxes. In Seaton Delaval Avenue, where only 1 was noted on 3 Apr., there were hundreds on 9 Apr.; over 100 at Hauxley the previous day, with movement until 17 Apr., when 20 were still present. Autumn influxes were even larger, especially 13-15 Oct., when thousands arrived all along the coast. Southerly movements apparent inland at Bolam, Black Heddon, Rothbury and Hallington on 22 and 30 Oct.

368. Pied Flycatcher *Muscicapa hypoleuca*
Early individuals at Hauxley on 8 Apr. (CW, MN) and in Seaton Delaval Avenue on 9 Apr. Good nesting season in the usual localities. Autumn migrants occurred along the coast from early Aug., maximum several hundred 28-31 Aug.; over 150 in the area of Holy Island village alone on 28 Aug. (MFMM). The last were on 16 Oct. —4 at Bamburgh, 1 on Holy Island, 3 at Tynemouth and 1 at St. Mary's Island.

370. Red-breasted Flycatcher *Muscicapa parva*
2 on Holy Island on 29 Aug. (RH *per* MFMM) and 1 on 30 Aug. (MFMM); 1 in Whitley Bay cemetery on 5 Oct. (JDP), 1 at St. Mary's Island on 8 Oct. (PJ, MB, JDP), 1 at Holy Island 10-14 Oct. (BH, TH), 3 at Hauxley 13-16 Oct. and 1 at Craster on 16 Oct. (WSC *per* BL).

371. Dunnock *Prunella modularis*
Coastal influxes: up to 50 at Hauxley on 9 Apr. and in Whitley Bay cemetery on 4 Oct.

381. Grey Wagtail *Motacilla cinerea*
Though still scarce in some localities, there are more records this year; now completely recovered in the Kielder area from the 1962-63 winter (BL).

382. Yellow Wagtail *Motacilla flava*
A male at Greatham Creek on 25 Mar. (PR) was very early.

383. Waxwing *Bombycilla garrulus*
Single individuals and small flocks in Northumberland Jan.-Mar. (plus 1 in Darlington on 27 Feb.), with late lingerers in Newcastle on 6 Apr. (RMP) and Ponteland on 7 Apr. (ERM). Apart from 1 (singing) at Bamburgh on 14 May (MB), no others before 10 Oct., when 1 appeared at Hartlepool. On 22 Oct. 2 fed at Haltwhistle, and thereafter waxwings were widespread in very small and scattered numbers; maximum 20 at Rowlands Gill 12-14 Dec.

384. Great Grey Shrike *Lanius excubitor*
1 at Cresswell on 14 Jan.; 2 at Kielder 30 Mar.-Apr.; 1 on Holy Island 9-16 Apr.—perhaps the bird at Bamburgh 16-20 Apr.; 1 in Prior's Park, Tynemouth, on 11 Apr. Between 11 Oct. and 30 Oct. 3 on Holy Island, 2 at Bamburgh, 1 at Cresswell, 5 at Hauxley, 1 at Boulmer, 2 at Hadstone, 1 at Rothbury, 2 at Hartley, 1 at Whitley Bay cemetery, 1 in Holywell Dene and 1 at Graythorp bring that month's total to at least 20. The 2 at Hartley were seen again 8-9 Nov. and single birds appeared at Kielder and Graythorp later the same month. Winter records: 1 on Holy Island on 3 Dec., 1 near Ravensworth on 6 and 11 Dec. and 1 in Holywell Dene from 31 Dec.

386. Woodchat-Shrike *Lanius senator*
1† immature at Druridge 31 Aug.-1 Sept. (IHA, TH, JDP): eighth record for Northumberland.

388. Red-backed Shrike *Lanius cristatus*
1 on Staple Island 12-13 June; 1 trapped at Hauxley on 28 Aug.; 2 at Druridge on 30 Aug., 1 remaining until 10 Sept.

389. Starling *Sturnus vulgaris*
In Catcote Road, West Hartlepool, on 21 Feb., 3,195 were counted in a roost shared by *ca.* 160 song-thrushes, *ca.* 260 blackbirds and *ca.* 400 house-sparrows; in Dec., the same roost contained over 250,000 starlings (RTM, EB, PR). A roost at Broad Wood, near Warenford, contained *ca.* 50,000 (CW).

391. Hawfinch *Coccothraustes coccothraustes*
1 on Holy Island on 10 Apr. (JKJ), 2 Oct. (PJB, KH) and 14 Oct. (BH, TH); 1 in Prior's Park, Tynemouth, on 16 Oct. (CW, MN); 1 at Tritlington, south Northumberland, on 2 Nov. (RMP).

393. Goldfinch *Carduelis carduelis*
Present in good numbers; maximum flock 50-60 in trees round a car-park at Billingham I.C.I. on 21 Feb. (DIG).

394. Siskin *Carduelis spinus*
15 at Bolam (BL) and up to *ca.* 50 at Stocksfield in Feb. (JSB, IHA); a similar big flock frequented conifers near Riding Mill 6 Mar.-27 Apr. (JDE, MFHM). Small numbers again bred in Northumberland. Some 40 fed on weed seed-heads at Tarset, north Tyne, on 17 Sept. (PATC). Immigrants arrived along the coast in Oct.

396. Twite *Carduelis flavirostris*
1 in Howick bay on 3 Dec. (AJR) is the only record for the year.

397. Mealy Redpoll *Carduelis flammea flammea*
4 with 1 lesser redpoll in Gosforth Park on 2 Jan. (LGM, RN); 1 trapped at Bamburgh on 19 Feb.

404. Crossbill *Loxia curvirostra*
12 at Kielder on 29 May and 3 smaller parties on 9 July; a pair with 4 young at Budle Bay for 2 hours on 29 June. Influx in late Aug.: at Hauxley 1 on 26 Aug., 2 on 27 Aug., 30 on 28 Aug. and 2 on 31 Aug.; during this period there also arrived at least 30 on Holy Island (on 27 Aug.), 5 at Marsden (on 29 Aug.) and a few at Hartlepool. A few more arrived later: 1 at Bamburgh on 6 Sept. and 2 on 10 Sept., 9 at West Hartlepool on 28 Sept. and 4 at Hauxley on 4 Oct.

408. Brambling *Fringilla montifringilla*
In the early part of the year, biggest numbers were flocks of over 200 at Holywell Dene, Alnwick and Graythorp. Absent between 21 Apr.—2 on Holy Island—and 12 Sept.—1 at Lewisburn (CED). Heavy autumn immigration, particularly in Oct., produced some large concentrations later on, of which the largest were 400 at Prestwick Carr on 27 Nov. (CW) and 1,400 at Hurworth Burn in late Dec. (RTM, EB, PR).

410. Corn-Bunting *Emberiza calandra*
The biggest concentration was *ca.* 130 at Graythorp on 10 Dec. (EB, PR).

413. Red-headed Bunting *Emberiza bruniceps*
Single males on Holy Island on 1 June (JST) and 1-2 Sept. (MFMM, LJR). This species is imported in large numbers as a cage-bird, and the date of the first observation suggests an escape—though the bird was not very tame and occurred after a period of easterly winds. The second individual, however, occurred during a marked immigration of continental passerines, including ortolan and rustic buntings (see below) and it is of interest to note that another male arrived on the Isle of May on 30 Aug. and stayed 2 days.

416. Ortolan Bunting *Emberiza hortulana*
1 on Holy Island on 2 Sept. (MFMM, LJR).

419. Rustic Bunting *Emberiza rustica*
A male† and female† on Holy Island on 1 Sept. (LJR, MFMM).

421. Reed-Bunting *Emberiza schoeniclus*
A roost at Alnmouth consisted of 200-500 birds in Mar. (BM) and of over 100 again in Sept. (ERM).

422. Lapland Bunting *Calcarius lapponicus*
1 at Chevington Burn on 3 Jan (BGa.), 1 on St. Mary's Island on 1 Oct. (MN), 1 at Hauxley on 16 Oct., 9 at Seaton Carew on 23 Oct. (PJS), 3 on Holy Island on 25 Oct. (DGB, MGR), 2 at Beal on 30 Oct, (DGB, SAB), 1 at Seaton Carew on 3 Nov. (KR), 2 on Brownsman on 9 Nov. (PME), 5 on Holy Island on 3 Dec. (AJR), 1 at Hauxley on 4 Dec., 2 at Seaton Carew on 24 Dec. (RTM) and 1 at Chevington Burn on 30 Dec. (ERM).

423. Snow-Bunting *Plectrophenax nivalis*

Rather scarce Jan.-Mar., 35 on a school-field in Newcastle on 28 Feb. and 1 Mar. (LGM) being the largest party; 4 on moorland near Edmundbyers on 2 Jan. (AEH) is also noteworthy. From late Sept. until the end of the year, snow-buntings were widespread in the usual localities, the largest parties in Durham being *ca.* 300 in stubble-fields near Horden on 28-30 Nov. (BU) and *ca.* 120 at Seaton Carew in Dec. (RTM). Some 140 at Wallsend in Dec. was the largest Northumberland concentration, and 25 were again noted on the Newcastle school-field on 6 Dec.

† signifies a record accepted by the *British Birds* Rarities Committee

OTHER SPECIES

The following species have occurred, but are not included in the above list:

Shag, flamingo (escape), mute swan, red grouse, partridge, pheasant, ringed plover, woodcock, redshank, sanderling, herring-gull, common gull, common tern, arctic tern, razorbill, guillemot, puffin, stock-dove, wood-pigeon, cuckoo, barn owl, little owl, tawny owl, skylark, carrion-crow, magpie, great tit, blue tit, coal tit, marsh-tit, long-tailed tit, tree-creeper, wren, dipper, mistle-thrush, ring-ouzel, blackbird, garden-warbler, whitethroat, willow-warbler, wood-warbler, spotted flycatcher, meadow-pipit, tree-pipit, rock-pipit, pied wagtail, greenfinch, linnet, lesser redpoll, bullfinch, chaffinch, yellowhammer, house-sparrow, tree-sparrow.

WEATHER SUMMARY

January. Changeable cyclonic weather early and late, but predominantly anti-cyclonic with cold easterly winds in mid-month. Very cold spell in mid-month followed by above average temperatures in last few days. Precipitation amounts below average, but number of days with precipitation above average, with resultant sunshine well below average. Falls of snow prevalent mid-month with some heavy falls locally.

February. Dull and wet with very mild and very cold spells. Mild and often rainy weather (heavy on 7 Feb.) in first week gave way to wintry weather with strong easterly winds and snow by 8 Feb. with some snowfall (at times heavy) daily until 19 Feb. By 14 Feb., undrifted snow 6-12 ins. deep in many places. Milder weather followed, with heavy rain on 19 Feb.; rain at times and intermittent sunshine in last week. Rainfall twice monthly average with sunshine a little over half average.

March. Markedly dry with rainfall well below average and good sunny spells. Temperatures generally above average, especially in first 10 days; last week coldest with persistent north to north-west winds and showery conditions—at times, of snow.

April. First 3 weeks generally cold and wet with persistent easterly winds. Mid-month was coldest, with some snow showers. Rainfall about twice average. Some improvement during last week, with drier and sunnier weather and rising temperatures.

May. Generally very changeable, but with warm dry spells at beginning, middle and towards end, giving above average sunshine. Rainfall about average, with heaviest falls on 11 May, and further stormy period 19-25 May with strong winds at times. Last few days dry and sunny.

June. After 3 fine days weather turned unsettled and changeable with some sunny days inland, but persistent cloud and fog on coast in second week. Thundery rain and thunderstorms prevalent after mid-month with week of very unsettled weather after 19 June; last 2 days fine. Rainfall above average and sunshine well below.

July. First 2 days warm and sunny, but weather changeable after 4 July with occasional rain or showers interspersed with some fine days. Week of sunny dry weather followed after 16 July, but with cool north-east winds. Further outbreaks of rain occurred after 23 July, particularly towards end of month, with cold northerly winds. Rainfall generally below average (particularly to north and west) except some places in Durham. Temperatures generally below average.

August. First fortnight unsettled with good deal of rain and only brief sunny spells. 10-13 Aug. particularly wet; thunderstorms on 13 Aug. with very heavy rain in some places. After 14 Aug., dry sunny weather predominant for most of month until 29 Aug., although rather cool and south-east or east winds predominated; these winds, combined with anticyclonic conditions at end of month, provided ideal "drift" conditions.

September. First half unsettled and very changeable, with stormy period 4-5 Sept. and more persistent rain on 11 and 12 Sept. Period of quiet, dry weather persisted after 16 Sept. almost to end of month, sunny at first, but turning dull in last week. Rainfall well below average with temperatures about average, although nights mild in first week.

October. Generally very changeable and disturbed weather persisted most of month with cold northerly winds at beginning of month and in last week. Rainfall a little above average, but prolonged on 3 Oct. and heavy in places on 26 Oct.

November. Cold, with frequent and often strong or gale force north or north-east winds, especially later in month. Weather generally unsettled, though with a few more settled days which at times gave overnight fog (mainly in Co. Durham). A clear night on 11 Nov. produced very low temperatures, but was followed by short, mild spell 12-15 Nov. Weather again colder and disturbed after 15 Nov., with some wintry showers.

December. Beginning of month stormy, with gales, heavy rain in places and snow over Pennines. Cold winds and wintry showers persisted for first few days. Remaining days changeable; milder rainy spells fluctuating with colder showery spells with sunny periods, though often with strong winds. Snow showers on 24 Dec., then 2 clear, cold days and a return to milder, rainy weather at the end.

RINGING

The following authorised ringers have contributed information to this section of the report: Bamburgh Ringing Group, A. Belshaw, F. Colley and P. Hawkey, P. R. Evans, Natural History Society of Northumberland, Durham and Newcastle upon Tyne, Northumbria Ringing Group, J. Richardson, Teesmouth Bird Club, Tyne/Tweed Ringing Group and P. Yeoman.

As in previous years, a selection of the most interesting recoveries (including some made in 1965, but not previously reported) is given below, the letter **A** again being used to indicate that a bird has been found alive (in the majority of cases controlled by another ringer).

1966 was the last year for the Sand Martin Enquiry and there have been further recoveries. Nine of these—all controlled—are listed (page 221) and, in addition, ten sand-martins (four from Crawcrook, three from Branch End, two from Prudhoe and one from Howtel) were retrapped at a large roost at March, Cambridgeshire, in August. Seven birds ringed at the large Wiggenhall roost, near King's Lynn, in 1964 and 1965 were recovered (controlled) in the two counties; they included one trapped at Bamburgh in May while on migration, the remainder being at the colonies at Branch End (one), Prudhoe (three) and Crawcrook (two). A bird from South Acre, Swaffham, Norfolk, was controlled at Prudhoe and one from Fairburn, Castleford, Yorks., and another from Chichester, Sussex, at Crawcrook.

RECOVERIES OF RINGED BIRDS

(a) Ringed in Northumberland and Durham

Date and place ringed		*Place recovered*	*Date recovered*
Mute Swan			
4.4.63(1y)	Newcastle upon Tyne, Northd.	(1) S. Shields, Co. Durham **A**	15.11.64
		(2) Blaydon-on-Tyne, Co. Durham	18.1.66
12.5.63	*Haggerston, nr. Beal, Northd.	Loch Leven, Kinross-shire **A**	3.8.66
Kestrel			
22.6.63	Tranwell, nr. Morpeth, Northd.	Nr. Dreux, France	27.6.66
9.6.64	Durham City, Co. Durham	Road A689, Co. Durham	(13.10.66)
24.6.64	Kielder, Northd.	Kain, Hainaut, Belgium	1.4.66
29.6.66	Kielder	Boulmer, Northd.	(31.8.66)
Common Snipe			
2.1.62	*Bamburgh, Northd.	Narva, Estonian S.S.R.	22.8.66
Woodcock			
17.11.63	*Low Hauxley, Northd.	Tayport, Fife	8.1.66
Common Sandpiper			
21.5.59	*Langleeford, Wooler, Northd.	Langleeford **A**	19.6.66

Date and place ringed		*Place recovered*	*Date recovered*
Dunlin			
5.9.60	*Budle Bay, Northd.	River Gremyakha, Severodvinsk, Archangel, U.S.S.R.	20.8.66
Black-headed Gull			
13.6.62	Nr. Belford, Northd.	Alnmouth, Northd.	19.8.66
4.6.63	Nr. Belford	Carsethorn, Kircudbrightshire	2.12.66
15.12.64	*Wallsend-on-Tyne, Northd.	Nr. Workington, Cumberland	1.1.66
3.3.65	*Wallsend-on-Tyne	Lunda, Västerås, Sweden	15.6.66
11.7.65	Westgate, St. John's Chapel, Co. Durham	Rostherne, Knutsford, Cheshire	(23.2.66)
22.6.66	Linnheads Lake, Northd. —3 birds	Houghton-le-Spring, Co. Durham	30.7.66
		Brampton, Cumberland	(17.8.66)
		Mohammedia, Morocco	(8.12.66)
9.7.66	Linnheads Lake	E. Morriston, Earlston, Berwickshire	(13.10.66)
Swallow			
9.8.63	Fenwick, nr. Beal, Northd.	Mordiford, Herefordshire	*ca.*30.5.66
24.7.66	Stocksfield, Northd.	Brough, Yorks. **A**	9.9.66
27.8.66	Stocksfield	Whisby Gravel Pit, Lincs. **A**	20.9.66
11.9.66(juv.)	Stocksfield	Brough **A**	22.9.66
Sand-Martin			
9.7.63(juv.)	Branch End, Northd.	Kinfauns, Perthshire **A**	30.5.66
3.7.64(juv.)	Shincliffe, Co. Durham	Masham, Yorks. **A**	14.5.66
27.6.65(juv.)	Slaley, Northd.	(1) Wiggenhall, King's Lynn, Norfolk **A**	26.8.65
		(2) Crawcrook, Co. Durham **A**	15.7.66
26.7.65(juv.)	Prudhoe, Northd.	Nr. St. Pryve, Loiret, France **A**	13.9.65
26.6.66(juv.)	Crawcrook	Ancaster, Lincs. **A**	7.7.66
23.7.66(juv.)	Prudhoe	Sittingbourne, Kent **A**	11.9.66
26.7.66(juv.)	Crawcrook—2 birds	Brough **A**	6.8.66
		Boston, Lincs. **A**	12.8.66
30.7.66(juv.)	Crawcrook	Ploegsteert, W. Flanders, Belgium **A**	6.9.66
Great Tit			
2.10.65	*Bamburgh	Coldingham, Berwickshire	1.4.66
Blue Tit			
13.6.65	Gosforth, Northd.	Hart, Co. Durham	29.1.66
Song-Thrush			
3.9.63	*Whitley Bay, Northd.	Grangemouth, Stirlingshire	20.7.66
8.2.64	*Holywell, Northd.	Kinellar, Aberdeenshire	7.7.66
14.8.64	*Low Hauxley	Blyth, Northd.	16.2.66

Date and place ringed		*Place recovered*	*Date recovered*
SONG-THRUSH—*continued*			
2.10.65	*Whitley Bay	Blackpool, Lancs.	Mar. 1966
9.10.65	*Bamburgh	Bilboa, Vizcaya, Spain	6.11.66
14.10.65	*Low Hauxley	Ambès, Gironde, France	23.10.66
REDWING			
2.3.65	*Whitley Bay	Jarrow, Co. Durham	18.2.66
24.10.65	*Graythorp, Co. Durham	Póvoa de Lanhoso, Minho, Portugal	3.3.66
RING-OUZEL			
2.10.65	*Graythorp	Parentis-en-Born, Landes, France	24.10.65
BLACKBIRD			
9.12.62(1y)	Holywell	Hokksund, Norway	16.3.66
14.12.63(1y)	Tynemouth, Northd.	Västalanda, Sweden	10.4.66
29.10.64	*Low Hauxley	Fryele, Jönköping, Sweden **A**	19.3.66
21.11.64	*Gosforth	Eidane, Lysefjord, Rogaland, Norway	21.7.66
19.3.65	*Hartley, Northd.	Matrand, Hedmark, Norway	Oct. 1966
28.3.65	*Bamburgh—2 birds	Landirus, Gironde, France	10.2.66
		Sandeid, Rogaland, Norway	30.3.66
17.10.65	*Graythorp	Pyla-sur-mer, Gironde, France	20.11.65
22.10.65	*Bamburgh	Stranda, Mores Romsdal, Norway	15.7.66
29.10.65(1y)	Cresswell, Northd.	Lit-et-Mixe, Landes, France	15.1.66
28.11.65	*W. Hartlepool, Co. Durham	Nord King Vo, Masfjorden, Norway	6.10.66
5.12.65(1y)	Alnwick, Northd.	Valassaaret, Vaasa, Finland **A**	15.6.66
20.2.66(1y)	Hartley	Evje, Aust Agder, Norway	27.4.66
27.2.66	*Hartley	Sokndal, Rogaland, Norway	17.10.66
WHEATEAR			
4.9.65(1y)	Whitley Bay	Spurn Point, Yorks. **A**	26.4.66
REDSTART			
10.6.66	Hamsterley S.F., Co. Durham	St. Andrew, Guernsey, Channel Islands	*ca.* 18.9.66
ROBIN			
2.10.65	*Bamburgh	Blackpool	17.1.66
WHITETHROAT			
30.5.64	*Felton, Northd.	Oporto, Portugal	25.9.65
21.7.66	*Seaton Burn, Northd.	Gouvea, Beira Alta, Portugal	10.10.66

Date and place ringed		*Place recovered*	*Date recovered*
WILLOW-WARBLER			
13.7.63(juv.)	Gosforth	Sidi Bettache, Casablanca, Morocco	(23.10.66)
10.8.64(1y)	Gosforth	Newport, Shropshire **A**	15.4.66
30.6.66(juv.)	Arcot Hall, Northd.	Spurn Point **A**	15.8.66
GOLDCREST			
3.10.65	*Craster, Northd.	Walton-on-Naze, Essex	22.3.66
1.5.66	*Bamburgh	Glåvands Huk, Jutland, Denmark	10.5.66
PIED FLYCATCHER			
16.6.66	Hamsterley S.F.	Between Astudillo and Fromista, Palencia, Spain	23.8.66
19.8.66	*Low Hauxley—2 birds	Lit-et-Mixe, Landes, France	2.9.66
		Ile d'Ouessant, Finistère, France **A**	8.9.66
PIED WAGTAIL			
5.7.66	*E. Woodburn, Northd.	Salé, Rabat, Morocco	18.11.66
STARLING			
3.9.61	*Wallsend	Stockton-on-Tees, Co. Durham	2.5.66
19.1.64(1y)	Hartburn, Northd. —2 birds	Ulefos, Telemark, Norway	15.3.66
		Nes Verk, Aust Agder, Norway	17.5.66
GREENFINCH			
23.9.60(1y)	Craster	Isle of May, Fife **A**	23.4.66
22.3.61(1y)	Gosforth	Seaton Delaval, Northd. **A**	24.4.66
18.2.66	*Gosforth	Shincliffe	(4.7.66)
SISKIN			
29.9.65(1y)	Bamburgh	Wiers, Hainaut, Belgium	25.1.66
LINNET			
6.9.63	*Gosforth	Soustons, Landes, France	20.11.65
1.6.64	Holywell	Baracaldo, Vizcaya, Spain	27.2.66
8.8.64(juv.)	Arcot Hall	San Sêbastian, Guipozcoa, Spain	3.1.66
23.5.56	*Cresswell	San Miguel de Basaurier, Bilbao, Spain	2.3.66
9.8.65(1y)	Seaton Burn	Nr. Woverhampton, Staffs.	26.4.66
18.9.65	Graythorp	St. Médard-en-Jalles, Gironde, France	15.11.65
31.7.66(juv.)	Low Hauxley	St. Médard-en-Jalles	23.10.66
REDPOLL			
29.8.62(juv.)	Craster	(1) Rumes, Hainaut, Belgium **A**	12.11.63
		(2) Rumes **A**	4.10.66

Date and place ringed	*Place recovered*	*Date recovered*
REDPOLL—*continued*		
16.5.64 *Low Hauxley	Arcot Hall **A**	29.4.65
6.9.64(juv.)Howick, Northd.	Ambly, Namur, Belgium	22.10.66
4.7.65(juv.)Fenwick	Pâturages, Hainaut, Belgium **A**	1.10.66
30.8.65 *Arcot Hall	Vizy, Namur, Belgium **A**	6.10.65
11.9.65(1y)Gosforth	Scunthorpe, Lincs. **A**	4.5.66
22.9.65(1y)Craster—2 birds	Ober Ursel, Frankfurt-am-Main, Hesse, Germany	2.2.66
	Roeselare, W. Flanders, Belgium	10.10.66
23.9.65(1y)Craster—2 birds	Halesowen, Worcestershire	20.3.66
	Hollebeke, W. Flanders, Belgium	22.10.66
,, (1y)Ford, Northd.	Roubaix, Nord, France	14.11.66
29.8.66(juv.)Craster	Proven, W. Flanders, Belgium	14.11.66

(b) Interesting local recoveries of birds ringed outside the two counties

Date and place ringed	*Place recovered*	*Date recovered*
COMMON SNIPE		
9.8.65 *Noorden, Netherlands	Broomley, Northd.	23.8.65
BLACK-HEADED GULL		
10.6.55 Hognestad, nr. Stavanger, Norway	Gateshead, Co. Durham	Jan. 1966
SWIFT		
3.7.65 *Marston, Grantham, Lincs.	Fordley, nr. Dudley, Northd. **A**	3.8.66
RAVEN		
29.4.64 Peebleshire	Nr. Rothbury, Northd.	3.10.65

NOTES:
1. * Indicates bird ringed as adult or full grown
2. (1y) Indicates bird ringed as 1st year
3. (juv.) Indicates bird ringed as juvenile
4. All other birds have been ringed as pullus
5. Where the date of recovery is unknown, the date of the reporting letter is given in brackets

ACKNOWLEDGEMENTS

My thanks are due to the Joint Records Committee (Messrs. J. C. Coulson, P. Evans, B. Little, J. D. Parrack, P. J. Stead, and P. Yeoman) who checked the manuscript of this Report and gave helpful advice, to Mrs. Grace Hickling who edited it, to Mrs. E. M. Lamb who helps so much with the cards at the museum, to B. Coldbeck and W. Richardson who helped in sorting, numbering and arranging the enormous number of records, and to the following contributors (with apologies for omissions):

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ERRATA — VOL. XVI. No. 4

Page 225. Tynemouth Bird Club, should read, Tyneside Bird Club.

REFERENCE

BELL, D. G. (1966). Ornithological report for Northumberland and Durham for 1965. *Trans. nat. Hist. Soc. Northumb.* **16**, 79.

Date and place ringed		*Place recovered*	*Date recovered*
REDPOLL—*continued*			
16.5.64	*Low Hauxley	Arcot Hall **A**	29.4.65
6.9.64(juv.)	Howick, Northd.	Ambly, Namur, Belgium	22.10.66
4.7.65(juv.)	Fenwick	Pâturages, Hainaut, Belgium **A**	1.10.66
30.8.65	*Arcot Hall	Vizy, Namur, Belgium **A**	6.10.65
11.9.65(1y)	Gosforth	Scunthorpe, Lincs. **A**	4.5.66
22.9.65(1y)	Craster—2 birds	Ober Ursel, Frankfurt-am-Main, Hesse, Germany	2.2.66
		Roeselare, W. Flanders, Belgium	10.10.66
23.9.65(1y)	Craster—2 birds	Halesowen, Worcestershire	20.3.66
		Hollebeke, W. Flanders, Belgium	22.10.66
,,	(1y)Ford, Northd.	Roubaix, Nord, France	14.11.66
29.8.66(juv.)	Craster	Proven, W. Flanders, Belgium	14.11.66

(b) Interesting local recoveries of birds ringed outside the two counties

Date and place ringed		*Place recovered*	*Date recovered*
COMMON SNIPE			
9.8.65	*Noorden, Netherlands		
BLACK-H			
10.6.6			
SWIFT			
3.7.65	*Marston, Grantham, Lincs.	Fordley, nr. Dudley, Northd. **A**	3.8.66
RAVEN			
29.4.64	Peebleshire	Nr. Rothbury, Northd.	3.10.65

NOTES: 1. * Indicates bird ringed as adult or full grown
2. (1y) Indicates bird ringed as 1st year
3. (juv.) Indicates bird ringed as juvenile
4. All other birds have been ringed as pullus
5. Where the date of recovery is unknown, the date of the reporting letter is given in brackets

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REFERENCE

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ORNITHOLOGICAL REPORT FOR THE FARNE ISLANDS FOR 1966

Compiled by

GRACE HICKLING

INTRODUCTION

Principal contributors to this report are C. M. Adamson, F. Y. Bodger, J. C. Coulson, I. K. Marshall, E. Meek, G. R. Potts, W. Shiel, Miss J. M. Spriggs and the compiler. Others who have helped with the ringing, or have provided records, include G. Brazendale, C. Brown, B. Campbell, P. M. Elliott, P. R. Evans, N. P. E. Langham, J. H. Lawton, J. Richardson, K. G. Spencer, visitors to the Study Centre, students from the University of Durham and members of the Natural History Society, including C. J. Almond, Mrs. H. E. Almond, Miss S. Appleby, W. H. Barnett, M. and T. H. Bell, W. Carr, Mr. and Mrs. S. Dale and M. Dale, C. L. Davidson, Mrs. J. S. Davidson, A. E. Hingston, B. Mortimer and J. D. Tully. As in previous years, the initials of an observer are given only when a species is either difficult to identify or occurs infrequently or at an unusual time.

In this report, as in the county ornithological report, the classified notes, and ringing recoveries, are arranged in the order given in the *Check-List of the birds of Great Britain and Ireland* (1952), published by the British Ornithologists' Union.

GENERAL

The oil slick which travelled down the east coast of England in mid-January had a disastrous effect on the off-shore sea-bird population, many hundreds (including large numbers of guillemots) being found dead, or, if alive, suffering from the effects of oiling, on local beaches. Only a few Farne-ringed birds were seen—an eider-duck at Bamburgh on 23 January, a kittiwake, shag and eider on Holy Island and a shag at Dunstanburgh Castle (all in February) and a guillemot at Seahouses in early March—but there is no doubt that many other birds, whose breeding headquarters were on the Farnes, were affected. Eider-ducks certainly suffered: on 24 January several badly oiled birds were on the islands and during the next few weeks at least eighteen drakes and eleven ducks were found dead on Brownsman and Inner Farne and it is probable that there were others, undiscovered, on islands such as Wideopens (where five oiled drakes were seen on 24 January).

By 4 and 9 March there were definite signs of spring for the Pinnacles were thickly covered with guillemots and many kittiwakes were on their nesting sites. Unfortunately, this mild spell was followed by frosts, gales and, in mid-April, snow and, as a result, it was not until 21 April that students were able to take up residence on the islands. Accordingly, there is no information about the early spring passage. Small numbers of migrants were seen in late April and early May, but field-fares were the only species that occurred in appreciable numbers, at least eight being on Brownsman and Staple Island, and twenty-two on Inner Farne, on 24 April.

There was no apparent shortage of food during the nesting season, but two periods of heavy rain—on 23-24 June and 4-5 August—caused considerable damage to some of the young birds. Puffins suffered on both occasions; following the June storm burrows on the tops of islands such as Brownsman, Staple Island and Wideopens were flooded and many young birds were drowned while others, which managed to scramble clear, were killed by gulls. Fortunately, by August most of the young puffins had fledged although a few late-hatched chicks perished—on Brownsman, for example, there were eight to nine inches of water in the burrows. As usual, some of the arctic terns nesting on the flat below the Brownsman cottage lost their eggs in the early June spring tides, but, fortunately, although quite a number of young terns died in the heavy June rains, the casualties were fewer than had been expected. The main sufferers during the August rainstorms were shags and cormorants although some lesser black-backed and herring-gull chicks were found drowned in their nests on North Wamses. During heavy rain, tiny shags and cormorants are brooded by their parents, so escaping harm, while well-feathered youngsters are able to withstand the wet. The "in-betweens", however, suffer, for although still in the down, they are too big to be sheltered by the adults, but, at the same time, are unable to stand continuous wet and cold. Thirty of these young shags died on Brownsman and eleven on Staple Island, the nests facing north-north-west (the direction of the gale that accompanied the rain) suffering severely. Luckily no Inner Farne nests were affected. On North Wamses eleven young cormorants died from a similar cause.

Particularly welcome was the return of the summering grey lag-geese. Only two were seen, but in view of last year's absence it is good to know that at least some of the party still survive.

The last visitor left the Study Centre on 27 August (the watchers had come off both Inner Farne and Brownsman some days earlier) and bad weather prevented Dr. P. R. Evans from paying his usual autumn visits to the islands. The compiler, too, was unable to get out and, ac-

cordingly, there is no information about conditions in September and early October. On 12 October, however, when the Earl of Antrim, Chairman of the National Trust, visited the Inner Farne, large numbers of fieldfares were seen and it seems probable that these were part of a movement of many thousands of fieldfares and redwings which had been noted on the north Northumberland coast on 9 October.

As mentioned in the last report, local fishermen are no longer allowed to collect gulls' eggs on the islands. Nevertheless, the Farne Islands Local Committee felt that an attempt must be made to control the ever-increasing numbers of lesser black-backed and herring-gulls and, on the advice of the Nature Conservancy, that this could best be done by a drastic reduction in the numbers of fledged young. Accordingly, a licence was issued to the official boatman, Mr. W. Shiel, authorising him to collect both lesser black-backed and herring-gulls' eggs and, at the same time, stipulating that this collection must be carried on until there was no chance that young gulls would be reared. It was impossible to achieve one hundred per cent success, but the great reduction in the numbers ringed (see page 233) shows that comparatively few youngsters survived. Unfortunately, certain fishermen decided to assert what they considered their traditional "right" to collect gulls' eggs and there is no doubt that the eggs of other species (including, according to reports, fulmar, eider-duck and guillemot) were also taken. An additional control measure was the shooting of some one hundred and sixty adult gulls on the south end of Brownsman; it was also hoped that, by relieving some of the pressure on the campion, this might do something to arrest the continuing erosion of this area.

One addition, the sooty tern, was made to the systematic list; this is one of the rarest birds ever recorded on the Farnes for its normal habitat is the Caribbean region, islands of tropical Atlantic, Pacific and Indian Oceans, and Australia, and it is merely a straggler to Great Britain.

An unusual and popular (although not ornithological) visitor was a dolphin (probably the bottle-nosed dolphin *Tursiops truncatus* Mont.). It (or a similar creature) was first recorded in early January 1965, but it was not until March 1966 that its appearances became increasingly frequent. Throughout the summer it played round the fishing boats, diving only a few feet away, and sometimes following them almost into harbour. It was last seen by the compiler on 29 October.

CLASSIFIED NOTES

2. Great Northern Diver *Gavia immer*
2 records, both of single birds—off North Wamses on 26 June (BC) and in Staple Sound on 31 Oct. (CMA).

26. Fulmar Petrel *Fulmarus glacialis*
At least 46 pairs nested (some 30 on Inner Farne, 7 on Staple Island, 8 on Brownsman and 1 on South Wamses), but only 6 young are known to have fledged. On South Wamses, a bird again nested near the wreck of S. S. *Spica*, but the egg was, unfortunately, mistaken for a gull's egg and was accordingly collected. Gulls caused considerable loss and all Brownsman eggs disappeared while only 1 chick was reared successfully on Staple Island.

27. Gannet *Sula bassana*
Many records, with large numbers seen in late July—during 1 hour on 25 July C. M. Adamson counted 400 travelling north off Brownsman, the biggest party numbering 50.

28. Cormorant *Phalacrocorax carbo*
At the beginning of July 101 nests were counted on Megstone and 99 on North Wamses. Laying started about 27 Apr. (some 19 days later than in 1965) and on Megstone the first young hatched on 30 May. Many birds on North Wamses lost their early eggs and on 6 Aug. there were still a few tiny young and unhatched eggs. A bird found nesting on North Wamses on 19 July had been ringed as young on Megstone in 1952.

29. Shag *Phalacrocorax aristotelis*
G. R. Potts reports as follows:—
Following the eruptive movements and subsequent wreck in Nov. and Dec. 1965, the Farne Islands shag population was highly dispersed at the beginning of the year. The wreck continued throughout Jan., but still mainly concerned the immatures. In Feb., however, even the oldest adults became involved and the vast majority left the Farnes altogether. In early Mar., only 300 shags (most of Scottish origin) were in the vicinity of the islands. During the next few weeks the breeding birds slowly returned—for example, a female seen on the Lamb (an island near the Bass Rock) on 8 May, nested on Brownsman in early June. The first clutch was started late (on 19 April); clutch size was low and the peak of laying was delayed until mid-May. The association of adult dispersal, late season and low clutch size was very similar to that in 1958. Unlike 1958, however, the mortality was high enough (a quarter of the breeding birds died in the winter 1965-66) to reverse the population trend. For the first time since 1931, when shags began to nest regularly on the Farnes, a decrease was recorded. The number of nests was 346, or 21 (6%) down on 1965.
The autumn immigration was somewhat irregular and the end of 1966 was marked by a small eruptive dispersal of the first year birds.

53. Shoveler *Spatula clypeata*
Inner Farne: 6 on 7 June and 10 July; 9 flying north on 2 July; a duck on the Churn pond 26-27 July. Last recorded in 1962.

56. Tufted Duck *Aythya fuligula*
5 near Knoxes Reef on 6 July.

67. Eider-Duck *Somateria mollissima*
At least 1,076 ducks nested—825 on Inner Farne, 12 on the Wideopens, 9 on Knoxes Reef, 220-230 on Brownsman and *ca.* 10 on Staple Island. 2 nests were on Brownsman on 27 Apr. while the first egg was laid on Inner Farne on 29 Apr.
2 nesting ducks had been ringed as adults in 1953.

69. Red-breasted Merganser *Mergus serrator*
A pair off Inner Farne on 21 Apr.

73. Sheld-Duck *Tadorna tadorna*
6-7 pairs frequented Brownsman in early May and a pair are known to have nested here. On 22 June, 2 adults and 17 ducklings were seen in the Fairway.

75. Grey Lag-Goose *Anser anser*
2 on North Wamses on 21 June, 4 and 19 July.

110. Kestrel *Falco tinnunculus*
Only record: 1 on Inner Farne on 10 Aug.

126. Moorhen *Gallinula chloropus*
Brownsman: 1 on 8 Nov. (GRP). Last recorded in 1958.

131. Oystercatcher *Haematopus ostralegus*
At least 20 pairs known to have nested—12 on Brownsman, 4 on Staple Island, 3-4 on Inner Farne and 1 on West Wideopens. A flock, varying in number from 40-110, roosted on Inner Farne in late Apr. and July while *ca.* 50 were on West Wideopens on 29 Oct. A partial albino bird was seen on Inner Farne on 19 Sept.; it had normal coloured bill and legs and there were scattered flecks of black on its pure white body (JHL).

134. Ringed Plover *Charadrius hiaticula*
Some 12 pairs nested on Inner Farne, Brownsman and Staple Island, but few young were reared on the Outer Group.

143. Turnstone *Arenaria interpres*
Numbers on Inner Farne built up from 3 on 29 June to a maximum of *ca.* 400 on 7-8 Aug.

150. Curlew *Numenius arquata*
As usual, the largest numbers were seen on Longstone, the biggest flock (estimated at 500-1,000) being recorded on 9 Mar.

155. Bar-tailed Godwit *Limosa lapponica*
Brownsman: 1 on 30 July.

156. Green Sandpiper *Tringa ochropus*
Brownsman: 1 on 5-12 Aug.

159. Common Sandpiper *Tringa hypoleucos*
Inner Farne: 1 on 11-12 Aug.

169. Knot *Calidris canutus*
Inner Farne: 150 on 7 May and 2 on 28 June. West Wideopens: *ca.* 600 (largest flock ever recorded on the Farnes) on 29 Oct. (MB).

170. Purple Sandpiper *Calidris maritima*
Largest numbers present in early May when 200 were on Inner Farne. Autumn maximum: *ca.* 55 in late July.

184. Ruff *Philomachus pugnax*
Brownsman: 1 ruff and 2 reeves on 5 Aug. (CMA). Fifth occurrence for the Farnes and last recorded in 1964.

198. Greater Black-backed Gull *Larus marinus*
Seen occasionally, in small numbers, throughout the year, but over 1,000 were counted during a tour of the islands on 18 Aug. (GRP).

202. Glaucous Gull *Larus hyperboreus*
An immature near Inner Farne on 11 May (GRP) and another off Staple Island on 29 Oct. (MB).

211. Kittiwake *Rissa tridactyla*
2 pairs again nested in the Staple Island "gut" while the colony at the north end had increased to 11. Birds are also spreading on Skeney Scar and 5 pairs colonised a new site—the gut running down into the centre of the island. A count of nests on Inner Farne on 5 June showed that the total differed by only 3 from the 1963 figure of 525. The first egg was laid on 10 May and by 14 July most young were flying although there was a newly-hatched chick on Inner Farne.
2 nesting birds had been ringed as adults in 1954.

217. Common Tern *Sterna hirundo*
Small numbers nested on both Brownsman and Inner Farne.

218. Arctic Tern *Sterna macrura*
The recent decrease in Brownsman numbers was again apparent, but some 100 pairs were on Northern Hares and a further 20 pairs on Longstone main rock; there were *ca.* 30 pairs on Staple Island. Eggs were laid on Brownsman on 24 May and on Inner Farne on 26 May.

219. Roseate Tern *Sterna dougallii*
A marked decrease on Brownsman with only 22-24 nests compared with 37 nests in 1965. This is probably due to the disappearance of the campion from parts of the north end and the consequent lack of shelter for the main colony which fell from 24 pairs to only 5-6 pairs. 14 pairs were near the windlass and 3-4 beside the upper garden. There are again no precise figures for Inner Farne, but several pairs nested in dense vegetation in the centre of the island and on 26 July a nest (with 1 egg) was found on the north rocks—a new site. 15 young were ringed here and 20 on Brownsman.

223. Sandwich Tern *Sterna sandvicensis*
The whole colony (probably 1,500-2,000 pairs) was at the north end of Brownsman. The first birds settled about 16 May, but lost their eggs; laying started in earnest on 21 May. Hatching commenced on 13 June and several eggs were still being incubated on 2 Aug.; 4 days later 2 remained unhatched. There was again a marked preponderance of single eggs—for example, a random count showed that 33 out of 35 clutches in a small area contained only 1 egg. Fewer infertile eggs were found than in 1965 and the heavy rain on 23 and 24 June fortunately caused less mortality than

expected. Nevertheless, despite this, there was a definite reduction in the numbers of young and the ringing total was only 1,388 (1,726 in 1965).

220. Sooty Tern *Sterna fuscata*
Inner Farne: 1 on 21 June (IKM, JMS, CB). First record for the Farnes.

224. Razorbill *Alca torda*
Although some 60 frequented the Outer Group during June only 1 pair nested (on Staple Island) and the egg later disappeared. At least 6 pairs were on Inner Farne and 5 young fledged.

226. Little Auk *Plautus alle*
1 in the Fairway on 31 Dec. (WS).

227. Guillemot *Uria aalge*
The first eggs were laid on 23 Apr. and by 26 July the Pinnacles were practically deserted; despite this, there were still 8 young on Brownsman on 6 Aug. On 4 July a guillemot with all-white plumage (except for black tips to the secondaries) was on the Scarcars.

229. Black Guillemot *Cepphus grylle*
Single birds seen on 23 Apr., 22 Oct. and 8 Nov.

230. Puffin *Fratercula arctica*
2 puffins, ringed as young on the Farnes in 1960 and 1961, were found on the Isle of May in May (see page 239). This is a recently established colony and the fact that 2 of the comparatively small number of puffins ringed on the Farnes were recovered here suggests that many of the birds probably came originally from the Farnes.

232. Stock-Dove *Columba oenas*
Brownsman: 2 on 25 Apr.

—. Collared Dove *Streptopelia decaocto*
Inner Farne: 1 on 16 June.

235. Turtle-Dove *Streptopelia turtur*
Brownsman: 1 on 1 and 3 May (FYB).

237. Cuckoo *Cuculus canorus*
Inner Farne: 1 on 12 May.

302. Fieldfare *Turdus pilaris*
A sub-adult (probably killed against the light 4 days before) was found under the Longstone lighthouse on the unusually early date of 9 Aug. (KGS).

308. Blackbird *Turdus merula*
A pair again nested on Inner Farne. 3 young were seen on 14 May and a newly-hatched juvenile was trapped on 25 July.

321. Black Redstart *Phoenicurus ochruros*
Staple Island: 2 on 1 May. Inner Farne: 1 on 9 and 11 May.

337. Sedge-Warbler *Acrocephalus schoenobaenus*
Inner Farne: 1 on 7 June.

340. Icterine Warbler *Hippolais icterina*
Longstone: 1 on 21 Aug. (see page 214). Second record for the Farnes.

343. Blackcap *Sylvia atricapilla*
Single females on Brownsman on 23 Apr. and on Inner Farne on 3 May.

347. Whitethroat *Sylvia communis*
Single birds on Inner Farne on 9, 10 and 13 May and 8 Aug.

348. Lesser Whitethroat *Sylvia curruca*
Single birds on Inner Farne on 29 Apr. and 6 May and on Staple Island on 12 May.

354/356. Willow-Warbler/Chiffchaff *Phylloscopus trochilus/P. collybita*
A bird, which was either a willow-warbler or chiffchaff, was on Brownsman on 8 Nov., the latest date either of these species has been recorded on the Farnes (GRP).

357. Wood-Warbler *Phylloscopus sibilatrix*
Brownsman: 1 on 5 Aug. (CMA).

376. Tree-Pipit *Anthus trivialis*
Inner Farne: 1 on 13 May.

388. Red-backed Shrike *Lanius cristatus*
A male on Staple Island on 12-13 June (FYB, GRP). An infrequent visitor and last recorded in 1956.

392. Greenfinch *Chloris chloris*
Inner Farne: 5 on 27 June and 1 on 28 June.

422. Lapland Bunting *Calcarius lapponicus*
Brownsman: 2 on 9 Nov. (PME). Fourth record for the Farnes and last seen in 1961.

OTHER SPECIES

The following species, although not dealt with in detail, were recorded: diver sp. Manx shearwater, heron, mallard, teal, wigeon, common scoter, lapwing, golden plover, common snipe, woodcock, whimbrel, redshank, dunlin, arctic skua, great skua, lesser black-backed gull (breeding), herring-gull (breeding), black-headed gull, wood-pigeon, swift, skylark, swallow, house-martin, sand-martin, carrion-crow, jackdaw, (breeding) wren, song-thrush, redwing, ring-ouzel, wheatear, whinchat, redstart, robin, goldcrest, spotted flycatcher, dunnock, meadow-pipit, rock-pipit (breeding), pied wagtail, starling (breeding), linnet, chaffinch, brambling.

RINGING

During the year 5,466 young, 7 juveniles and 468 adults were ringed: this is 1,136 fewer than in 1965. The numbers of individual species were as follows, the 1965 figures being given, for comparison, in brackets:—fulmar 12 (3); cormorant 138 (143); shag 419 (509); eider-duck 572 (652); oystercatcher 1 (—); lesser black-backed gull 9 (487); herring-gull 5 (81); kittiwake 1,273 (1,234); common tern 136

(118); arctic tern 1,789 (1,751); roseate tern 37 (70); Sandwich tern 1,388 (1,726); guillemot 103 (118); puffin 55 (128); blackbird 4 (8). In addition, 48 adults (63 in 1965) were re-ringed.

The lists that follow show that 1,363 Farne-ringed birds were recovered in 1966. Mr. I. K. Marshall's work on eider-ducks resulted in 306 controlled recoveries, Miss J. M. Spriggs retrapped 138 arctic terns on Inner Farne, while the total includes 554 shags seen alive on the islands by Dr. G. R. Potts.

During the year three veteran shags (one ringed as young in 1951 and two ringed as adults in 1953) are known to have died and the oldest shag seen on the islands was a 1954-ringed adult; there were also two 1955 birds, one ringed as young and the other as adult. Several of the January and February shag recoveries (especially those to the south of the Farnes) were obviously the aftermath of the 1965 "wreck", but at least eight breeding birds died in a minor "wreck" on the east coast of Scotland.

In 1947 the late T. R. Goddard ringed what seems, by present day standards, to be the minute total of 99 arctic tern pulli (52 on Inner Farne, 31 on Brownsman and 16 on Longstone). None of these has been recovered away from the Farnes, but between 1954 and 1966 eight have been found nesting on Inner Farne (the only island on which systematic retrapping has been carried out). Details are given below and it will be seen that this represents a recovery rate that is considerably higher than the average for the species:—

Date and place of ringing		*Recovery date*
29.6.47	Inner Farne	18.5.54
,,	,,	1.6.55
,,	,,	4.6.55
,,	,,	(1) 9.6.55
		(2) 9.6.66
30.6.47	Brownsman	22.6.61
,,	,,	24.7.62
,,	,,	14.6.66
14.7.47	,,	9.6.55

Only one Farne-ringed Sandwich tern was found in an "alien" colony—at Newburgh, Aberdeenshire—but, for the first time, a Sandwich tern ringed on Coquet Island was recovered on the Farnes. Unfortunately, it is impossible to say if it had nested here. The recoveries from Cape Province and Zululand bring the total of Farne Sandwich terns from South Africa to seven.

RECOVERIES OF RINGED BIRDS

(a) Ringed on the Farne Islands

Date ringed	*Place recovered*	*Date recovered*
CORMORANT		
	(Total : 22 ; Farne Is. : 1 ; local : –)	
22.6.63	Low Hauxley, Northd.	(8.10.66)
16.6.64	Robin Hood's Bay, Yorks.	22.12.66
,,	Inch Garvie, Firth of Forth	(28.12.66)
13.7.64	S. Shields, Co. Durham (oiled)	20.2.66
,,	Ynys Moelfre, Anglesey	20.6.66
16.7.64	St. Andrews, Fife (drowned in fishing net)	17.1.66
,,	Avoch, Fortrose, Ross-shire	Apr. 1966
,,	Spittal, Tweedmouth, Northd. (oiled)	Apr.-May 1966
25.7.64	Dublin, Eire (found exhausted)	(2.5.66)
8.6.65	Stevenston, Ayrshire	9.1.66
,,	R. Coquet, nr. Warkworth, Northd.	(17.1.66)
,,	R. Arun, nr. Arundel, Sussex	22.1.66
9.6.65	Bramhill, Broughty Ferry, Angus	14.1.66
,,	Druridge Bay, Northd.	29.6.66
29.6.65	R. Bure, nr. Horning, Norfolk (killed flying into tree in darkness)	25.4.66
,,	S. Shields (oiled)	19.6.66
4.8.65	R. Stour estuary, Essex	(18.2.66)
21.6.66	Amble, Northd. (shot)	(31.12.66)
6.8.66	Ramp Holme, Lake Windermere, Westmorland (drowned in pike net)	(15.11.66)
,,	Alnmouth, Northd.	20.11.66
,,	Queen Mary Reservoir, nr. Staines, Middlesex	6.12.66
SHAG		
	(Total : 637 ; Farne Is. : 563 ; local : 14)	
16.7.53	*Elie, Fife	27.2.66
19.7.53	*Nr. Crail, Fife	(28.2.66)
12.8.55	Cresswell, Northd.	(10.2.66)
1.6.56	*Balcomie, Fife Ness, Fife	22.2.66
8.6.59	*Cellardyke, Anstruther, Fife	27.2.66
19.6.59	*Elie	21.4.66
22.7.59	*Nr. Edinburgh, Midlothian	(20.6.66)
15.5.61	*Reighton, Filey, Yorks.	11.1.66
5.6.61	Balmerino, Firth of Tay, Fife	13.2.66
23.6.62	Crail	28.2.66
,,	Granton, Edinburgh	26.4.66
28.6.62	Flamborough Head, Yorks. (oiled)	26.9.66
5.7.63	*Grangetown, Sunderland, Co. Durham (slightly oiled)	18.11.66
25.5.64	*Burnmouth, Berwickshire	24.3.66
30.6.64	Holme-next-the-Sea, Hunstanton, Norfolk	10.3.66

Date ringed	*Place recovered*	*Date recovered*
SHAG—*continued*		
1.7.64	Scarborough, Yorks.	8.4.66
2.7.64	Altens, Kincardineshire (drowned in salmon net)	17.3.66
16.7.64	Marsworth, Bucks. (**inland recovery**)	10.1.66
,,	Portlethen, Kincardineshire	2.3.66
,,	Hunstanton	*ca.* 15.3.66
,,	Walthamstow Reservoirs, Essex (**inland recovery**)	7.5.66
,,	New Aberdour, Aberdeenshire	29.5.66
23.7.64	Nr. N. Berwick, E. Lothian (ring only found)	Dec. 1966
11.8.64	Bridlington, Yorks.	16.1.66
8.6.65	*Leven, Fife	(26.4.66)
14.6.65	N. Coates, Saltfleet, Lincs.	2.1.66
,,	Huttoft Bank, nr. Alford, Lincs.	(14.1.66)
,,	Spurn Point, Yorks.	20.2.66
,,	N. Shields, Northd. (strangled in fishing line)	5.3.66
,,	Cove Bay, nr. Aberdeen	(25.4.66)
,,	Inchkeith Island, Firth of Forth	30.4.66
,,	Rattray Head, Aberdeenshire (oiled)	(28.12.66)
16.6.65	Rushenden, Queenborough, Kent (oiled and choked on flat fish)	(21.1.66)
,,	Ingleby Cross, nr. Northallerton, Yorks. (**inland recovery**)	late Jan. 1966
,,	Sandford Bay, Peterhead, Aberdeenshire (oiled)	(10.2.66)
,,	Portsoy, Banff (drowned in salmon net)	13.3.66
,,	St. Andrews	(17.4.66)
,,	(1) Whickham Bishops, Witham, Essex (released)	1.12.65
,,	(2) Poole Harbour, Dorset (shot)	(26.8.66)
29.6.65	Between Crail and Anstruther	6.1.66
,,	Bridlington	10.1.66
,,	Lowestoft, Suffolk (oiled)	(10.1.66)
,,	Mablethorpe, Lincs.	11.1.66
,,	Whitby, Yorks.	23.1.66
,,	S. End, Eday, Orkney	(27.2.66)
,,	Between Largs and Fairlie, Ayrshire	15.3.66
,,	Stonehaven, Kincardineshire	14.5.66
,,	Gullane, E. Lothian	8.7.66
16.7.65	Methwold Fen, Norfolk (**inland recovery**)	(27.2.66)
,,	Trimley, Felixstowe, Suffolk	21.3.66
22.7.65	Cairnbulg, Fraserburgh, Aberdeenshire	8.1.66
,,	Helford River, Cornwall	(9.1.66)
,,	Ouddorp, Overflakkee, Zuid Holland, Netherlands	(18.1.66)
1.8.65	Druridge Bay	(15.2.66)
,,	Scurdie Ness, Montrose, Angus	26.2.66
9.8.65	Musselburgh, Midlothian (shot)	3.1.66
5.7.66	Ramsgate, Kent	28.12.66
16.7.66	Teesmouth, nr. Redcar, Yorks.	5.9.66
6.8.66	Tynninghame Bay, E. Lothian	10.12.66
,,	Holme Fen, Ramsey, Huntingdonshire (**inland recovery**)	(19.12.66)

Date ringed	*Place recovered*	*Date recovered*
SHAG—*continued*		
11.8.66	Scarborough	26.12.66
EIDER-DUCK		
(Total : 328 ; Farne Is. : 308 ; local : 16)		
2.6.58	*Cockenzie, E. Lothian	24.4.66
12.7.64	*(1) Newport-on-Tay, Fife (released)	12.2.66
	(2) Buddon Ness, Angus (? shot)	20.3.66
3.6.65	*Berwick upon Tweed	*ca.* 13.3.66
27.5.66	*Cresswell (oiled)	24.7.66
LESSER BLACK-BACKED GULL		
(Total : 14 ; Farne Is. : – ; local : 1)		
13.8.62	Middlestone, Spennymoor, Co. Durham	July 1966
12.8.63	Pollington, Goole, Yorks. (released)	29.9.66
11.8.64	Condeixa-a-Nova, Beira Litoral, Portugal (killed)	(3.3.66)
,,	Thropton, Rothbury, Northd.	(10.6.66)
27.8.64	Alloa, Clackmannanshire (found injured)	24.5.66
16.7.65	Between Lifford and Porthall, Donegal, Eire	17.5.66
4.8.65	Ovar, Beira Litoral, Portugal (/?/)	early Feb. 1966
,,	Aston upon Trent, Derbyshire	18.5.66
,,	Nr. Stockton-on-Tees, Co. Durham	28.6.66
,,	Vila Real de Santo António, Algarve, Portugal (taken)	17.9.66
9.8.65	Northallerton (apparently shot)	(16.5.66)
,,	Essaouira, Morocco (released)	*ca.* 23.11.66
17.8.65	Nr. Agadir, Morocco	15.3.66
KITTIWAKE		
(Total : 106 ; Farne Is. : 83 ; local : 4)		
29.6.57	Sletten, Julianehåb, Greenland (shot—probably in 1959 or 1960)	"before 1966"
30.6.58	*Kwade Hoek, Goedereede, Zuid Holland, Netherlands (oiled)	24.4.66
10.7.58	Baie du Mont St. Michel, Manche, France	18.3.66
19.7.58	Cramond, Edinburgh	28.4.66
,,	Blyth, Northd.	(5.5.66)
,,	Baltrum, E. Frisian Islands, Germany (leg bone only found)	17.6.66
6.7.60	Wolsingham, Co. Durham (**inland recovery**)	11.4.66
7.7.62	Thropton (**inland recovery**)	(14.4.66)
16.7.63	Wyk, Insel Föhr, N. Frisian Islands, Germany	1.1.66
19.7.63	Marsden, S. Shields	6.8.66
23.6.65	Nr. Kangeq, Godthåb, Greenland (presumed killed)	9.8.66
6.7.65	Placentia Bay, Newfoundland (killed)	(3.11.66)
10.7.65	S. of Myggenaes, Faeroe Islands (caught)	11.2.66
,,	Port Talbot, Glamorgan	5.6.66

Date ringed	*Place recovered*	*Date recovered*
KITTIWAKE—*continued*		
14.7.66	Newbiggin-by-the-Sea, Northd.	(9.8.66)
,,	Winterton-on-Sea, Norfolk (released)	27.8.66
,,	Kungmiut, Angmagssalik, E. Greenland (shot)	6.9.66
,,	Horden, Co. Durham	(26.9.66)
16.7.66	Newbiggin-by-the-Sea	(30.8.66)
COMMON TERN		
(Total : 5 ; Farne Is. : 2 ; local : 2)		
16.7.65	St. Louis, Sénégal (found alive)	9.6.66
ARCTIC TERN		
(Total : 167 ; Farne Is. : 148 ; local : 13)		
27.6.66	Whitley Bay, Northd.	7.8.66
1.7.66	Whitby	(17.8.66)
6.7.66	Seaton Sluice, Northd.	2.8.66
,,	Southampton Water, Hampshire (caught on fishing line; released)	7.9.66
16.7.66	Bad-Oldesloe, Schleswig-Holstein, Germany (**inland recovery**)	(12.8.66)
,,	Redcar, Yorks.	15.8.66
ROSEATE TERN		
(Total : 2 ; Farne Is. : – ; local : –)		
30.6.65	Dakar, Sénégal (found exhausted)	10.5.66
14.7.66	N. Queensferry, Fife (found alive)	26.8.66
SANDWICH TERN		
(Total : 53 ; Farne Is. : – ; local : 15)		
4.7.59	Druridge Bay	3.9.66
11.7.59	Tentsmuir, Fife	5.6.66
22.7.59	Dakar (/?/)	2.4.60
25.6.60	Sands of Forvie, Newburgh, Aberdeenshire (controlled)	17.6.66
22.6.61	Orford, Suffolk	11.5.66
1.7.61	Teesmouth, Co. Durham (seen)	17.8.66
22.7.61	Aveiro, Beira Litoral, Portugal (shot)	18.8.66
17.6.63	Weybourne, Norfolk	11.6.66
1.7.64	Freetown, Sierra Leone	20.1.66
19.6.65	Agadir (found exhausted)	8.1.66
,,	Keta, Ghana—2 birds (/?/ and caught)	24.1.66; (17.3.66)
,,	St. Louis (found exhausted)	26.1.66
,,	Baie d'Arcachon, Gironde, France (oiled—released)	30.1.66
,,	Freetown (released)	13.2.66
,,	Vridi, nr. Abidjan, Ivory Coast (found exhausted)	12.3.66
,,	Kedzi, nr. Keta (caught)	14.5.66

Date ringed	*Place recovered*	*Date recovered*
SANDWICH TERN—*continued*		
29.6.65	Cap Vert, Dakar	(30.1.66)
,,	Nr. Freetown (caught)	1.3.66
,,	M'Bour, Sénégal (taken)	7.8.66
1.7.65	Keta (released)	(16.1.66)
6.7.65	Nr. Pecaltsdorp, George, Cape Province, S. Africa	8.1.66
,,	St. Lucia estuary, Zululand, S. Africa (released)	11.2.66
10.7.65	Dakar (released)	(19.1.66)
,,	Accra, Ghana (caught alive)	30.1.66
,,	Nr. Keta (caught)	20.3.66
,,	Nr. Freetown (trapped; died later)	4.5.66
1.7.66	Dakar (oiled—released)	7.12.66
,,	Adina, nr. Keta (caught)	(20.12.66)
2.7.66	Lomé, Togo	9.11.66
14.7.66	Newbiggin-by-the-Sea	(20.8.66)
,,	Cruden Bay, Aberdeenshire	22.8.66
,,	Freetown—2 birds (alive)	25.10.66; 12.12.66
,,	Dakar (found exhausted)	30.11.66
16.7.66	Foz do Douro, Douro Litoral, Portugal (released)	26.9.66
19.7.66	18m. from Freetown (shot)	20.11.66
2.8.66	Freetown (alive)	(28.10.66)
GUILLEMOT		
(Total : 17 ; Farne Is. : 5 ; local : 1)		
11.7.59	10m. off Hartlepool, Co. Durham (drowned in fishing net)	12.8.66
20.6.60	*Redcar, Yorks.	20.7.66
16.2.62	*Staithes, nr. Whitby, Yorks. (oiled)	23.12.66
22.6.63	Off Cabourg, Calvados, France (killed)	11.1.66
1.7.65	Bigbury-on-Sea, nr. Plymouth, Devon (oiled)	22.2.66
,,	Par, St. Austell, Cornwall (oiled)	28.2.66
,,	Tynemouth, Northd.	(28.8.66)
10.7.65	Baie de Somme, Somme, France (killed)	(13.2.66)
,,	*Redcar (found alive—oiled)	4.4.66
29.6.66	The Midrips, nr. Rye, Sussex (oiled)	5.3.66
2.7.66	Skudeneshavn, Karmøy, Rogaland, Norway (shot)	25.9.66
PUFFIN		
(Total : 12 ; Farne Is. : 3 ; local : 1)		
19.4.54	*Staithes	(10.2.66)
17.4.59	*S. Ness, Lerwick, Shetland	22.11.66
9.7.59	*Easington Colliery, Peterlee, Co. Durham (released)	13.12.66
11.7.59	Scremerston, Northd.	(9.4.66)
2.8.60	Isle of May, Fife	10.5.66
24.6.61	Johnshaven, Kincardineshire	9.1.66
,,	Isle of May (controlled)	31.5.66
16.5.64	Nr. E. Haven, Angus	30.8.66

(b) Recovered on the Farne Islands, but ringed elsewhere

Date and place ringed		*Date and method of recovery*
SHAG		
14.7.62	Isle of May—2 birds	4.5.66; 5.7.66 (controlled)
28.7.62	Bass Rock, E. Lothian	7.5.66 (controlled)
17.7.65	Isle of May	Apr. 1966
EIDER-DUCK		
17.7.59	Budle Bay, Northd.—5 birds	6.5.66; 16.5.66; 1.6.66; 5.6.66; 16.6.66 (all controlled)
12.9.61	*Seahouses, Northd.	3.5.66 (controlled)
23.5.63	*Coquet Island, Northd.	4.3.66 (oiled)
24.7.63	Seahouses	6.6.66 (controlled)
27.8.64(juv.)	Seahouses	27.5.66 (controlled)
SANDWICH TERN		
1.7.63	Coquet Island	19.7.66

NOTES : 1. * Indicates bird ringed as adult.
2. (juv.) Indicates bird ringed as juvenile.
3. Unless otherwise stated all birds have been found either dying or dead, or are presumed dead.
4. Where the date of recovery is unknown, the date of the reporting letter is given in brackets.
5. "Local" recoveries include all birds (other than those on the Farnes) recovered within 15 miles of the islands.
6. "Controlled" indicates that a bird ringed by one ringer has been trapped (and released) by another ringer.
7. /?/ Indicates that the manner of recovery is unknown.



WHITETHROAT with young. *Photograph by James Alder.*

PLATE 10

ORNITHOLOGICAL REPORT FOR NORTHUMBERLAND AND DURHAM FOR 1967

Compiled from the notes and records of members of the Natural History Society of Northumberland, Durham and Newcastle upon Tyne, the Teesmouth and Tyneside Bird Clubs, and other observers

by

D. G. BELL (Durham) and J. D. PARRACK (Northumberland)

Owing to the increasing difficulty of dealing with the combined areas of Northumberland and Durham, it has been decided to split the two counties. J. D. Parrack has compiled the Northumberland section and D. G. Bell the Durham one. Although compiled quite independently, with the records adjudicated by separate committees (see page 274), every effort has been made to correlate the two sections, which appear consecutively under the headings **N** for Northumberland and **D** for Durham. P. Yeoman has prepared the ringing summary.

INTRODUCTION

A fairly mild start to the year resulted in little of note being recorded and passerine flocks were generally small and widespread, but there were huge flocks of duck and bramblings in south-east Durham. Colder, blustery weather in late March delayed the arrival of spring migrants, and strong, generally northerly winds and low temperatures continued until 14 April. Then high pressure began to build up over the country, bringing a warmer period with light, variable breezes which lasted until 19 April. This period saw the arrival of the first main influx of spring migrants, together with continental robins, goldcrests and a firecrest. Northerly weather again intervened until 22 April, when rising pressure produced more stable conditions lasting to the end of the month and bringing further small falls on 23 and 29 April. South-easterly winds 3-6 May saw the arrival of warblers, in particular grasshopper, sedge and whitethroat, and of black terns. Further easterly spells on 14, 21 and 27 May coincided with an influx of ring-ouzels (late), Greenland wheatears, a trip of dotterel, osprey, marsh-harrier (now almost annual), two bluethroats and as many as four golden orioles.

During the breeding season weather was generally quite good. Warblers in particular were very successful, many large broods being reared. Worthy of special note has been the breeding in Durham of garganey, goosander and common gull.

As regards quantity, autumn passage was rather poor, no doubt owing to the prevalence of westerly weather, while the foot-and-mouth restrictions curtailed ornithological activities in both counties. A light fall of warblers occurred on 19 and 26 August, while south-easterly breezes 16-19, 24-25 and 26-29 September brought a dotterel, a sprinkling of yellow-browed and barred warblers, a greenish warbler, red-breasted flycatcher, a citrine wagtail, a red-backed shrike, a scarlet grosbeak and an ortolan bunting.

At sea, shearwater and skua passage was well below normal, while some of the usual passage waders were scarce. Throughout October the winds were westerly on all but three days—no doubt facilitating the arrival of a Baird's sandpiper in Northumberland and a pectoral sandpiper in Durham. The *Turdidae* immigration was not notable, and even a spell of stormy south-easterly winds at the beginning of November produced little of interest apart from a Bonelli's warbler. From then onwards, winds continued predominantly westerly until the end of the year. In the main, variety not quantity was the keynote of the autumn passage.

Taking the year as a whole, it can be stated that species which have been unusually scarce include Manx shearwater, common scoter, all the skuas, wood-sandpiper, spotted redshank, hooded crow and black redstart. In contrast, numbers of pochard, sheld-duck, water-rail, whimbrel, little stint and ruff have been unusually high—the sheld-duck and whimbrel reaching record figures in the Tees estuary. Of particular interest among species not already mentioned in the Introduction has been the occurrence of spoonbill, golden eagle, white-winged black tern and chough, together with an inland summer record of Slavonian grebe and a passage of glaucous gulls.

CLASSIFIED NOTES

1. Black-throated Diver *Gavia arctica*

N 2 off Cresswell on 7 Jan. (MN) and 2 off Stag Rocks on 25 Feb. (DGB), with up to 4 in the Bamburgh-Ross area during Mar. Only 1 in autumn—flying south off Bamburgh on 26 Oct. (BRS)—and 1 at Longhoughton on 28 Dec. (AJR).

2. Great Northern Diver *Gavia immer*

N The only spring records were off Holy Island (1 on 19 Mar.: RA, DB) and off Budle Bay (1 on 27 Mar. and 2 on 28 Mar.: MM, EB, KR). In autumn, single birds flew south off St. Mary's Island on 22 Oct. (JDP), off Bamburgh on 28 Oct.

(BRS) and at Fenham Slake on 29 Oct. (FGG, CMA). A maximum of 3 frequented the Bamburgh-Holy Island area in Dec.

4. Red-throated Diver *Gavia stellata*

N Recorded every month except Aug. Of up to 100 divers off Alnmouth on 8 Jan., the majority were of this species (BG); a bird there on 22 Jan. was already in breeding plumage (BM). Other large concentrations included 70 at Alnmouth on 4 Mar. and 40 off Budle Bay on 28 Mar. Unusually scarce at the end of the year. Inland: 1 on Catcleugh Reservoir on 9 Apr. (BL *et al.*).

D At Hartlepool, occurred with regularity until 2 May (maximum 9 on 2 Jan.). Thereafter, only 1 (in Aug.) seen before 13 Sept., after which the species was recorded fairly regularly in small numbers for the rest of the year (maximum 13 on 31 Oct.).

5. Great Crested Grebe *Podiceps cristatus*

N 4 pairs bred, rearing a total of 13 young (TyBC, CMA), and at least 3 non-breeding pairs summered. Occasional birds offshore early and late in the year, with a maximum of 4 off Warkworth and 1 at Cresswell on 4 Mar.

D A pair again nested, 1 of the 2 young being reared successfully. A non-breeding pair occurred at Witton-le-Wear Nature Reserve in June (1 remained until Sept.) while, throughout summer and autumn, 3 pairs were present at 2 other waters.

6. Red-necked Grebe *Podiceps griseigena*

N 6 in the Holy Island area during Feb. and again on 28 Mar. (DGB, BM, MN). Also present from 14 Oct. (1 off Dunstanburgh) to the end of the year, with a maximum of 6 off Bamburgh on 24 Dec. (BRS).

D 1 at Hurworth Burn on 1 Oct. (JHL).

7. Slavonian Grebe *Podiceps auritus*

N Present in the Holy Island area during Feb., Mar. and Dec., with up to 35 off Stag Rocks on 25 Feb. (MN). 1 on a pond at Low Hauxley on 19 Nov. (HRS). Several observers reported a bird in full breeding plumage at Hartburn from mid-June to mid-July.

8. Black-necked Grebe *Podiceps nigricollis*

N Up to 4 recorded from the Holy Island area during Mar. (BRS).

9. Little Grebe *Podiceps ruficollis*

N Following wintering records from a number of inland waters, a good breeding season was recorded. Single birds on a pond at Low Hauxley (where they do not otherwise occur) on 8 Sept. and 12 Nov. were evidently on passage, and 1 was on the sea off Seaton Sluice on 22 Sept. (RN).

D Maximum concentration: 26 at Hurworth Burn 8-9 Sept.

16a. Manx Shearwater *Procellaria puffinus puffinus*

N Away from the Farnes, the relatively few records concern small parties noted between 27 May (6 flying south off Seaton Sluice) and 5 Oct. (10 flying north there).

D Scarce. At Hartlepool, 3 on 28 May, 1 on 31 May, 1 on 1 June and a party of 9 on 30 June. In July, totals of 74 flew north and 84 south (maximum 46 north and 23 south on 15 July); in Aug., only 10 seen and in Sept., only 12.

20b. Cory's Shearwater *Calonectris diomedea*

N 1† flying south off Hauxley on 31 July (GR) is the first accepted record for the

county, although a number of birds thought to be of this species have been described in recent years (Parrack, 1966).

21. Sooty Shearwater *Procellaria grisea*

N Only confirmed records: 1 off St. Mary's Island on 5 Jan. and 5 off Seaton Sluice on 5 Oct., all flying north.

D 2 flying north at Hartlepool on 14 Oct. (ECG, KR, GRE, TCP).

26. Fulmar *Fulmarus glacialis*

N Bred in at least 3 inland quarries; coastal breeding reported from Dunstanburgh, but only 1 pair was successful at Cullernose, while 2 regular sites on Holy Island were untenanted (CMA). Northerly passage of up to 40 per hour occurred off Hauxley 5-9 Aug. The first birds had returned to the Dunstanburgh cliffs by 18 Nov. (WSC).

D No big movements, the largest recorded being at Hartlepool where 38 flew south in 110 minutes on 15 Feb. and 76 flew north on 13 May. On 22 May, in the late afternoon, 2 were watched circling Durham cathedral tower for a few minutes before flying away northwards (JHL).

27. *Gannet *Sula bassana*

N Recorded in every month, but sparsely in spring. Birds were moving north off Hauxley during 6-9 Aug., reaching 150 per hour on the latter date, but on 24 Sept. a southerly passage of 100 per hour occurred off Holy Island. Some 150 feeding off Bamburgh on 26 Oct. (BRS).

28. Cormorant *Phalacrocorax carbo*

N Records include birds in the estuaries of the Aln and Coquet in Jan. (JA), and on the Tyne at Lemington during Feb., Mar. and Apr. with a maximum of 4 in the latter month.

D Inland, 1 flew up river over Newport Bridge, Middlesbrough, on 21 Apr., 1 swam on Hurworth Burn on 7 May and another on Derwent Reservoir on 9 Nov.

30. Heron *Ardea cinerea*

N Breeding status continued to improve. The 2 main heronries had 15 and 18 pairs; at least 6 isolated pairs bred and *ca.* 60 pairs were located during the breeding season. 6 coming in from the sea at Chevington on 6 Aug. were presumably immigrants, as were 2 at Hauxley on 20 Aug. 9 herons flew up the Rowley Burn, Hexham, on 28 Aug. (LPH).

D At least 4 nests in use at the traditional south Durham heronry, with *ca.* 6 nests at another site further north. Outside the breeding season, widespread in small numbers in suitable localities. At Hartlepool, a party of 9 flew in off the sea on 28 Aug. and then turned north (PJS), while on 10 Sept. 1 flying in alighted on the sea about a mile offshore (VFB).

38. Bittern *Botaurus stellaris*

N The bird at Holywell Ponds (Bell, 1967) was last seen on 22 Jan. (CED, MN). Only other record: 1 at Seaton Burn on 12 Nov. (BG).

42. Spoonbill *Platalea leucorodia*

D 1 flew up river at the mouth of the Wear on 20 June (PH *per* SNHS).

[**Chilean Flamingo** *Phoenicopterus ruber chilensis*
A bird of this race, commonly kept in captivity, was at Teesmouth 9-19 Aug.]

45. Mallard *Anas platyrhynchos*

N Notable concentration in Jan. included 220 at Capheaton, 275 at Whittle Dene, 485 at Gosforth Park, 500 at Colt Crag and 700 at Hallington, with 500 on the sea off Hartley and 300 in Druridge Bay; thereafter, numbers declined rapidly. The only large flocks at the end of the year were 500 in Budle Bay on 24 Dec. and 300 at Whittle Dene for most of that month.

D The biggest counts in the Tees estuary were 800 in Jan., 900 in Feb., 385 in Sept., 680 on 29 Oct., 795 in Nov. and 690 in Dec. (PJS, ECG). Elsewhere, the largest numbers were up to 326 on Hurworth Burn in Jan. (EB, KR) and 120 at Witton-le-Wear Nature Reserve in Nov. (VFB).

46. Teal *Anas crecca*

N Inland concentrations of at least 100 occurred at Gosforth Park (Jan. and late Oct.), Hallington (Jan.), Capheaton (Feb.) and Holywell Ponds (Sept., rising to over 300 in Oct.). Maximum count for Budle Bay was 600 on 30 Sept. (DGB). Numbers continue to show a slight decline and breeding records are very few.

D 130 in the Tees estuary on 15 Jan. had increased to a new record peak of 406 by 12 Feb. (PJS) and 159 were still on the local marshes on 1 Apr. Fewer were recorded there at the end of the year (maximum: 134 on 12 Nov.). Darlington Sewage Farm had 52 in Sept. and there were 120 at Washington on 1 Nov. (ES). 3 broods were found at Middleton-in-Teesdale in June (WR, RWK).

47. Garganey *Anas querquedula*

N A pair on Holy Island lough during June (GR) and 1-2 at Bothal in late July (CW, BM). A brood, probably of 4 young, was successfully reared near Druridge.

D The pair which bred in south-west Durham in 1965 and 1966 (Bell, 1967) returned in the last week of Mar. 1967 and again bred; the duck was seen with 4 young on 8-9 July. At Teesmouth, up to 8 occurred in Aug.

49. Gadwall *Anas strepera*

N Pairs at Hadstone on 13-14 May (HRS) and at Holburn Moss on 21 July (CMA). Other records: 1 at Holy Island on 16 July (LGM), up to 3 at Holywell Ponds in early Aug. (CED) and, at Gosforth Park, 2 in mid-Sept. rising to 4 by late Oct. (ABl, LGM). No proof of breeding.

50. Wigeon *Anas penelope*

N Present every month. Totals for the Budle Bay area fell from 2,700 on 22 Jan. to 700 by mid-Feb. and 400 in early Mar. Following northerly coastal passage in Sept., 400 were again present during Oct., reaching 860 by the end of the month and 4,000 on 18 Nov., before dropping to 1,000 by the end of the year, when several thousands were also at Holy Island (AJR).

D Teesmouth figures low—maximum 101 on Seal Sands on 12 Mar. Absent from the coast 23 Apr.-25 July.

52. Pintail *Anas acuta*

N Recorded in all months except May, the largest party being 30 in Budle Bay on 15 Oct. (BL). A female on Holy Island lough on 26 June gave a distraction display (IHA), but there was no other indication of breeding.

D The Tees estuary held a peak of 34 in Feb., reducing to 13 in Mar., and to 1 on 26 Apr.; 2 were present in Aug., 5 in Sept., 3 in Oct., 9 in Nov. and 17 in Dec. A few also occurred at Hartlepool, Hurworth Burn and Washington.

53. Shoveler *Spatula clypeata*

N Relatively few in spring. At least 8 pairs bred and numbers rose markedly in mid-July with 12 at Holywell Ponds, 12 at Holy Island and 32 at Longhirst (rising to 52 by 9 Aug. when other increases occurred). Subsequent decline on many waters, combined with a peak of 65-70 at Gosforth Park on 18 Nov. (ABl), suggests flocking before departure.

D Present all months at Teesmouth, including 2 pairs in summer; 16 on 23 July increased to a peak of 33 on 18 Aug. (ECG). Thereafter, numbers decreased, but there were still 15 on 5 Sept. and up to 3 occurred irregularly until the end of the year (when shoveler are unusual at Teesmouth). Also seen at Witton-le-Wear Nature Reserve, Hurworth Burn, Fishburn lake, Hartlepool and Washington (up to 7 regularly).

55. Scaup *Aythya marila*

N Unusually scarce. Apart from a pair on Holy Island lough on 21 May (MFMM), not recorded between 30 Apr. and 15 July, nor, apparently, later than 25 Oct.

D None before 8 July, when 4 flew north at Seaham (ES), and 15 July, when 3 flew north at Souter Point (FGG). 3 on pools at Greatham Creek 22-23 July, later reducing to 1, and 1 there again in Sept., when another flew north at Hartlepool. Northerly passage noted Oct.-Nov. (maximum 27 on 19 Oct.). A marked northerly passage on 5 Nov., in a force 10 north-east gale, included 22 scaup—the same number being recorded at Marsden. Up to 4 occurred at Hartlepool in Dec. Only inland record: a duck at Hurworth Burn 1-15 Oct. (JHL, DGB, PJS).

56. Tufted Duck *Aythya fuligula*

N The largest concentrations at Gosforth Park (83), Capheaton (45), Whittle Dene (295), Holywell Ponds (75), Grindon (70) and Newton (over 40) occurred during Jan.-Feb. and again in Dec. (195 at Whittle Dene). 6 broods were successfully reared at Holywell Ponds—the result of effective protective measures.

D Maxima: 65 at Brasside Ponds on 12 Mar. and 56 at Hurworth Burn on 7 May.

57. Pochard *Aythya ferina*

N Spring maxima included 140 at Gosforth Park on 28 Jan. and, during the last week in Feb., 52 at Whittle Dene, 90 at Lilburn pond and 100 at Bolam. 2 pairs bred successfully at Gosforth Park, the first confirmed record for many years, and the largest autumn flock occurred there—88 on 18 Nov. (ABl, BL *et al.*).

D Another good year. Hurworth Burn held up to 53 in the first quarter, while 98 on 8 Oct. reached 128 by 29 Oct. (PJS) and this flock did not diminish until late Nov. 11 on Seal Sands on 17 Sept. (PJS) was a high number for the Tees estuary, while 64, which flew north at Hartlepool in the duck movement of 5 Nov., was also unusual. No evidence of breeding.

60. Goldeneye *Bucephala clangula*

N Present every month (1 summered off Hauxley, 1 remained at Gosforth Park until 4 June and 2 were at Longhirst on 9 Aug.). Otherwise average numbers, with maxima at Hallington (41), Colt Crag (18) and Capheaton (29) on 12 Feb. Northerly coastal movement was recorded on 28 Oct. (42 at St. Mary's Island: JDP) and 9 Dec. (55 off Cresswell: CW, LGM, ERM).

D Numbers low in the first half of the year—up to 6 in the Tees estuary and on inland waters, with late individuals at Hartlepool. Thereafter, widespread, but no parties larger than 8 inland. Coastal movements include 20 flying north at Hartlepool on 31 Oct., 23 going north and 26 south there on 5 Nov. and as many as 102 travelling north on 9 Dec. (KR, IL, GRE).

61. Long-tailed Duck *Clangula hyemalis*

N 37 off Stag Rocks on 22 Jan. (FGG) had increased to 140 by 25 Feb. (MN), but numbers then fell rapidly, though a further peak of 80 was recorded on 27-28 Mar. An influx occurred during 28-29 Oct., with 5 at Cresswell Ponds, 6 flying north off Seaton Sluice and 16 off Bamburgh (TH, BG, BRS). Nov. produced 4 inland records (1 at Gosforth Park, 1 at Broomlee and 2 at Hallington) and numbers off Bamburgh rose to 150, declining again to 50 by the end of the year.

D A good autumn for this species at Teesmouth (though none recorded before Oct.). 3 arrived on the Reclamation Pond on 8 Oct., 1 remaining in the area until 16 Nov. At Hartlepool, 7 flew north on 17 and 29 Oct., while on 21 and 22 Oct. adult drakes appeared in the harbour. Others were seen from the observatory in late Oct. and early Nov., and a party of up to 11 gathered in the harbour from 18 Nov. until well into the new year, with a peak of 17 on 16 Dec.

62. Velvet Scoter *Melanitta fusca*

N Only 4 records for the first half of the year. 9 flew north, and 4 south, off Cresswell on 15 July (CW, MN), but very few thereafter (maximum: 4 off Bamburgh in Nov.).

D No record until the summer: a party of 9 flew north at Whitburn on 24 June (FGG) as did 7 more at Hartlepool on 15 July (1 at Whitburn the same day) and 2 on 30 July. 1 or 2 seen regularly at Hartlepool from 23 Oct. until the end of the year.

64. Common Scoter *Melanitta nigra*

N Very few spring records apart from 27 and 10 flying north off Hauxley on 7 and 22 Apr. respectively (HRS). Autumn passage (prominent during the first fortnight of July) was also slight, although the wintering flock off Bamburgh built up to 550 by 24 Dec. The species is declining on the breeding grounds, and observers should check the effects of this on Northumbrian passage and wintering records.

D Recorded all months, but only very small numbers until July, when they increased slightly. Biggest counts were 115 flying north, and 62 south, at Hartlepool on 15 July, and 132 moving north there on 21 Nov. (KR).

67. Eider-Duck *Somateria mollissma*

N Fewer wintered in the Seaton Sluice area, and a large decrease in numbers nesting on Inner Farne (see page 276) although eiders again bred satisfactorily at a number of mainland sites. The wintering flock off Holy Island numbered 800 on 10 Dec.

D 3 or 4 observed regularly in the Tees bay from Jan. until 2 June, after which they disappeared; 3 returned on 8 Sept. and up to 6 more were often seen until the end of the year. 5 were at Whitburn on 30 May.

69. Red-breasted Merganser *Mergus serrator*

N 34 between Holy Island causeway and Bamburgh on 19 Mar. (RA, DB), and 12

at Alnmouth on 24 Mar., were the largest spring totals. In autumn, 20 seen off Holy Island on 1 Oct. and 19 off Bamburgh on 15 Oct., with a northerly passage of 25 at Bamburgh on 6 Nov. (CMA, BRS). A party of 7, all drakes, off Alnmouth on 3 Dec. (FGG).

D Up to 6 at Hartlepool, and 14 at Crimdon Dene, Jan.-Mar.; 2 at Hartlepool on 4 May, 24 June, 15 July and 21-22 Sept.; 1 at Whitburn on 31 Mar. and 3 on 15 July. More often seen Oct.-Dec.: maximum 19 which flew north on 6 Nov. at Hartlepool, where a party of 8 assembled in the harbour in late Nov. and Dec.

70. Goosander *Mergus merganser*

N The largest parties were 20 at Colt Crag on 16 Jan. and 20 at Greenlee on 5 Feb. Flocks of up to 14 seen regularly on the North Tyne during Mar. and Apr. and at least 5 pairs bred (BL). A drake on the sea off Alnmouth on 28 Dec. (BG).

D In June 1965 a duck goosander with *ca.* 8 ducklings was watched for 15 minutes on the Tees; during the last few days of June 1967 "a large grey duck with a brown head and long thin beak, accompanied by a brood of 13 big brown and white striped ducklings" was seen on the Tees by a farmer. These observations appear to be the first evidence of goosander breeding in this county, although it has often been suspected in recent years. Winter records: 1 near Greatham Creek on 11 Feb. (RWK, WR), 1 in Hartlepool harbour on 18 Nov. (TCP), 1 flew north at Hartlepool on 9 Dec. (KR, ECG) and 1 at Shotton Colliery on 18 Dec. (DWS). Up to 3 occurred at the Derwent Reservoir Mar.-Apr. and in Dec. (AHB).

71. Smew *Mergus albellus*

N A drake at Gosforth Park during 10-14 May (FC, KH *et al.*) and a "redhead" on Havannah Pond on 25 Dec. (ERM).

D A drake in Greatham Creek on 19 Feb. (ECG).

73. Sheld-Duck *Tadorna tadorna*

N 177 in Budle Bay on 18 Jan. decreased to 130 by late Mar., and to 60 by the end of Apr., remaining at that total throughout May. A Nov. maximum rose to 140 on 3 Dec. with 430 in Lindisfarne National Nature Reserve on 17 Dec. Breeding occurred in several coastal areas, and was suspected near a stretch of water a few miles inland—about 70 young were reared. Inland, 1 on Grindon Lough on 18 Feb. (DGB).

D 2,711 in the Tees estuary in Jan.—a new record—constituted one twelfth of the total number of sheld-duck counted in Great Britain during the International Wildfowl Census. Later monthly maxima were 1,400 in Feb., 350 in Mar., 380 in Apr., 172 in May, 266 in Sept., 430 in Oct., 1,342 in Nov. and 2,300 in Dec. Inland records: 1 on the new floating island on Billingham Pond throughout Apr., a pair at Derwent Reservoir on 9 Apr. and 1 at Washington 1-12 Sept.

[South African or Cape Sheld-Duck *Tadorna cana*

A drake in the Tees estuary 1 Sept.-1 Nov. Clearly an escape, it was probably the bird seen near York in Aug.]

75-78. Grey Geese *Anser* sp.

N Rather fewer than usual. The first autumn record (16 flying south over Cresswell on 14 Sept.: TH) was followed by sightings of small parties in coastal areas during Oct., but the only large flock (250-300 birds) occurred inland on 12 Nov. (RG, WB). A skein of 34 heading east over Newbiggin on 9 Dec. (EL).

D 3 on Saltholme Pool, Teesmouth, on 3 Jan.; 8 over Hartlepool on 5 Jan.; 20 on 7 Jan. and 6 on 30 Jan.; 20 over Cowpen Marsh on 16 Oct. and 40 over Hartlepool on 18 Nov.

75. Grey Lag-Goose *Anser anser*

N 12 flew north-west over Cresswell on 4 Jan. (TH); 12 at Kimmer Lough on 13 Jan. (JA); 14 in the Budle Bay area throughout Mar. (BRS); 2 on North Wamses on 19 and 27 June and 6 on 1 July (*per* GH); 40-50 remained in the Ross-Budle Bay area during Sept. (HD); 25 at Wingates Moor on 23 Oct. (CMA); 5 returned to Budle Bay on 27 Oct.; 27 at Hartburn on 6 Dec. (TH).

D Rather more records than usual: 1 near Greatham Creek on 8 July could fly, but had many wing-feathers missing (DM, KLP); 17 on Wynyard Park lake on 20 July (PJS); 1 over Dorman's Pool on 17 Oct. (JKW, PJS) and 9 over Hurworth Burn next day (KCB, JKW); a small party over Billingham on 20 Oct. (PR) and 9 over Port Clarence on 25 Nov. (IL, IJ).

76. White-fronted Goose *Anser albifrons*

N An adult spent some time flying around Holy Island castle on the afternoon of 2 Jan. (BG) and 2 first-year birds were on the lough there 24-25 Mar. (CW).

78a. Bean Goose *Anser arvensis arvensis*

N 4 at Grindon Lough throughout Feb. and again during the latter half of Nov. (DGB, MGR *et al.*).

78b. Pink-footed Goose *Anser arvensis brachyrhynchus*

N 12 over Holywell Dene on 15 Jan. (CED, MN), and 3 at Bamburgh on 12 Feb. (BM, BG), are the only substantiated records for the early months. On 29 Sept. 200 seen flighting off Lindisfarne National Nature Reserve (HD) and on 12 Nov., skeins of 150 and 40 flew south over Bolam (WGJ).

D 11 in a field near Seaton Carew on 13 Mar. (KR); 2 skeins flew south over Durham City at 2000 on 4 Oct. (JHL); 11 over Port Clarence on 25 Nov. (IL, IJ).

80. Brent Goose *Branta bernicla*

N The Holy Island flock numbered 150 at the beginning of the year and 60 throughout Feb., the last seen being 2 on 25 Mar. 180 in late Nov. had increased to 300 by 28 Dec. (AJR). A party of 12 flew north off Dunstanburgh on 9 Dec. (WSC).

D 3 flew south at Hartlepool on 8 Apr. (IL, IJ).

81. Barnacle-Goose *Branta leucopsis*

N The Colt Crag bird (Bell, 1967) remained until Mar. and 1 was at Grindon from early Oct. Elsewhere, 5 at Cresswell on 4 Mar. (MN) and single birds on Holy Island on 28 Feb. (BEY), and at Gosforth Park on 29 Oct. (CW). M. Philipson, who has recorded this species flying west through the Tyne Gap in small numbers every year since 1957, saw a massive flock of *ca.* 2,000 birds flying in that direction over Haltwhistle on 10 Jan. 40-50 seen in Lindisfarne National Nature Reserve in late Sept. and again on 4 Oct. (HD). 12 flew into Budle Bay on 26 Oct., settled, and eventually flew off westwards (DGB, MGR).

D 1 over Seal Sands on 30 Sept. (ECG, RWK, WR) and 1 on the Reclamation Pond 18-19 Oct. (KCB, JWK).

82. Canada Goose *Branta canadensis*

N The party frequenting the Sweethope-Colt Crag area (Bell, 1967) numbered 19

in Jan. Some 10 young were reared on Sweethope Lough, and in autumn the flock totalled 27. 17 flying north-west over Killingworth at dusk on 1 July (BG) may have been the flock of 17 unidentified geese travelling north over Ashington on 3 June. 6 at Beal on 23 Sept.

D 14 on Wynyard Park lake in Apr.; 5 flew north-east over Hartlepool on 12 May; 2 at Blaydon on 16 May; 17 flew north over South Shields on 1 July; 1 on Seal Sands on 28 Aug.; 19 flew south-east over Billingham on 19 Oct.

84. Mute Swan *Cygnus olor*

N The maximum for the Holy Island-Budle Bay area was only 87 (on 18 Jan.)—a marked decrease. During May, 30 non-breeding birds present, but numbers again low throughout the autumn.

D Largest concentration reported: 20 on Saltholme Pool, Teesmouth, on 29 Jan. (ECG).

85. Whooper Swan *Cygnus cygnus*

N A pair again summered at Wallsend Swallow Ponds. Up to 210 in the Holy Island area in Jan. had dropped to 25 by late Feb., but, following evidence of coastal passage, rose to 77 on 24 Mar. Not recorded between 28 Apr. (4 at Grindon) and 8 Oct. (2 at Whittle Dene). Birds were on passage in coastal areas during the third week in Oct. and the wintering flock at Holy Island had built up to 200 by 12 Nov. (HD).

D 3 at Teesmouth 12-13 Nov. (KR, IL)—the only "wild" swans of the year.

86. Bewick's Swan *Cygnus columbianus*

N Several small parties, noted in coastal areas up to mid-Mar., probably amounted to the unusually large total of 45-50 birds. Only 3 records for the second half of the year—2 at Longhirst on 21 Oct., 2 at Holy Island lough on 10 Dec. (CW, RN) and 10 (newly arrived) on 28 Dec. (AJR).

89. Golden Eagle *Aquila chrysaëtos*

D An immature was watched flying north over the Wellhope Burn, upper Weardale, on 29 Apr. (GWC).

91. Buzzard *Buteo buteo*

N 1 seen in the Cheviots on 16 Apr. (MN, CW, LGM) and 1 in the Kielder area on 20 Aug. (CJG). At least 1 pair bred in the north of the county.

D 1 reported near Langdon Beck on 15 Sept.

93. *Sparrowhawk *Accipiter nisus*

N Up to 5 recorded in most months, and birds reported holding territory, or breeding, near Bolam, Corbridge, Haltwhistle, Kielder (at least 3 pairs), Newcastle, Ponteland Rothbury and Stocksfield (BL, TyBC). Single birds seen at Craster on 23 Aug. and Druridge on 26 Aug. (TH, WSC).

99-102. *Harrier *Circus* sp.

N 1 flying south over Cresswell Ponds on 10 May (TH) and 1 in the Earsdon area on 23 June (CMA).

99. Marsh-Harrier *Circus aeruginosus*

N An immature at Holywell Ponds on 20 May (CED) and a female, or immature, hunting over the Snook, Holy Island, on 6 May (BL).

D An immature on Cowpen Marsh on 6 May (ECG).

100. Hen-Harrier *Circus cyaneus*

N 1 at Sweethope Lough on 2 Dec. (JSB).

103. Osprey *Pandion haliaëtus*

N 1 fishing just offshore in Blyth bay on 16 May (JDP) was probably the bird seen at Blagdon on the same day (R) and, on several occassions, in the vicinity of Holywell Ponds during June and early July. 1 in the Kielder area in early June (BL).

D 1 at Hartlepool on 7 May (PR); 1 in Hamsterley S.F. 11-13 June (CG, DNB); 1 at the Reclamation Pond, Teesmouth, on 19 Aug. (IL, IJ, GRE).

105. Peregrine *Falco peregrinus*

N 3 reported inland during Apr. and 2 pairs summered, but breeding was not established. The only autumn records were single birds at Beal on 7 Oct. (CW *et al.*), at Bamburgh on 15 Oct. (BRS) and in the North Tyne area on 30 Oct. (BL).

D 1 at Teesmouth on 21 Sept. (DR) and 1 on 26 Dec. (RTM, KR).

107. Merlin *Falco columbarius*

N Single merlins at Radcliffe on 9 Apr., and at Bondicarr on 8 Aug. and 24 Sept. (HRS), were probably migrants; others were seen in coastal areas later in the autumn. At least 15 pairs attempted to breed; in 2 nests the eggs did not hatch, 4 pairs each reared 3 young and 1 pair reared 4 young. The results of the other clutches are unknown (BL).

D 5 nests reported, including 2 from which 4 and 3 young flew respectively.

108. Red-footed Falcon *Falco vespertinus*

N 1† seen at very close range at Tynemouth Priory on 28 June (TG). This appears to be only the sixth record of this very rare falcon in Northumberland.

110. Kestrel *Falco tinnunculus*

N Among other coastal records, 1 which came in from the sea at Low Hauxley on 20 Aug. was mobbed by terns (HRS).

D Records include 6 seen simultaneously hovering over Cowpen Marsh at dusk on 21 Aug. and 1 coming in off the sea at Hartlepool on 26 Aug. (GRE, TCP).

113. *Black Grouse *Lyrurus tetrix*

D Records include up to 20 seen regularly near Langdon Beck; generally plentiful in Weardale.

116. *Partridge *Perdix perdix*

N Now very scarce in the south-west of the county, although increasing in the south-east and among coastal sand-dunes (TyBC).

117. Quail *Coturnix coturnix*

N 1 flushed from a young plantation at Hedley on 19 May (GAC) and 1 seen on 2 occasions in June at Blagdon (R). A pair spent most of July in the Bamburgh area (BRS).

D 1 heard near Fishburn on 3 June (TAB).

[Demoiselle-Crane *Anthropoides virgo*

D 4 rather tame birds, which had doubtless escaped from captivity, were seen on Cowpen Marsh 6-21 July, 2 remaining until 17 Sept. (MKS, AV, PJS, DGB, TCP).]

120. Water-Rail *Rallus aquaticus*

N Apparently not recorded between 1 Apr. and 28 Aug. (1 at Bondicarr). Otherwise well represented in coastal areas with a distinct influx on 18-19 Nov. when 3 arrived at Bamburgh and 4 at Hauxley (BRS, HRS).

D A good immigration from early Nov. 1 found with broken legs in South Shields on 2 Nov. died later (FGG).

121-124. Crake *Porzana* sp.

D 2 very small crakes seen (at 3 feet range) at dusk on 17 Nov. at Shotton Colliery. "They were definitely crakes and not water-rails" (DWS).

121. Spotted Crake *Porzana porzana*

N 1 near Alnmouth, apparently first heard on 19 July, was successfully recorded on tape during the night of 24-25 July (GR), but was not seen or heard subsequently.

125. Corncrake *Crex crex*

N 1 calling during May at Blagdon (R), 1 on Brownsman 13-17 May (FYB) and 1 heard near Greenhead on 7 July (RC). As usual, a pair bred near Haggerston (BL).

D 1 at Hartlepool Bird Observatory on 14 May (DM, TF) and another heard near the Portrack roundabout, Stockton-on-Tees, on 5 June (PE).

126. *Moorhen *Gallinula chloropus*

N Out of a total of 103 eggs laid in 20 nests near Gosforth Park, only 44 hatched (TCS). Flooding may have been to blame for the poor breeding season which this, and other records, suggest.

127. *Coot *Fulica atra*

N A continued increase in most areas. Maxima include over 450 at Capheaton, 190 at Broomlee, 227 at Bolam, 275 at Holywell Ponds and 322 at Seaton Burn: in most cases peak numbers occurred in Nov. Some observers recorded recolonisation of former sites, probably as a result of increased depth of water. Only 20 eggs hatched out of 52 laid in 10 nests near Gosforth Park (TCS).

131. *Oystercatcher *Haematopus ostralegus*

N Numbers lower than in recent years, with maxima of 200 in Budle Bay on 29 Oct. (CMA) and 59 in the Whitley Bay area. First seen inland near Hexham on 25 Feb.; at least 9 pairs bred in upper Coquetdale (CMA), with smaller numbers in other river valleys.

133. *Lapwing *Vanellus vanellus*

N The only large concentrations occurred early in the year: 1,500 at Cresswell on 28 Jan. and 1,000 at Whittle Dene on 29 Jan. and 25 Feb. Numbers in upland areas well back to normal, and a good breeding season reported, but lowland birds again suffered.

134. Ringed Plover *Charadrius hiaticula*

N Bred at several coastal sites (maximum: 5 pairs near Beadnell) and occasionally in river valleys. Large counts in coastal areas included 64 at Boulmer on 11 Aug. and 60 in Budle Bay on 2-3 Sept.

D Peak passage at Teesmouth was *ca.* 460 on 24 May (RTM).

135. Little Ringed Plover *Charadrius dubius*

D 3 at the usual Durham site on 30 Apr.; later, 3 nests found there, with a fourth a few hundred yards away. 1 on Cowpen Marsh on 6 May (ECG).

139. *Grey Plover *Charadrius squatarola*

N Absent from 21 Apr. (1 on Holy Island: RA) until mid-July. A total of 21 in Budle Bay had risen to 80 on 3 Sept. (BRS), but fell again to 40 by 29 Oct. (CMA).

140. Golden Plover *Charadrius apricarius*

N Largest flocks were 2,000 at Cresswell on 27-28 Jan. (CW, TH), 1,500 at Bondicarr on 19-20 Nov. and 1,800 at Druridge on 23 Dec. (TH), while parties of 700 at Whittle Dene on 23 Apr. (IHA, JSB), and 1,400 at Beadnell on 26 Aug. (CW), were unusually large for the time of year. 10 were still present on the moors at Minsteracres on 16 Dec. (EMD).

D Away from the nesting grounds the biggest concentration was 800 at Teesmouth on 28 Jan. (ECG); 198 there on 15 Apr. were mostly of the northern race (ECG).

142. Dotterel *Charadrius morinellus*

N 1 heard flying south over Holy Island on 29 Sept. (MFMM *et al.*) is the first recorded since 1952.

D 5 passage birds on a fell near Ravensworth on 20 May (BJ).

143. Turnstone *Arenaria interpres*

N Largest spring concentrations were over 300 on Holy Island on 11 Mar. (RGW) and 90 at Boulmer on 17 Mar. (JA). The first autumn influx (25 at Bamburgh and over 20 at Holy Island) occurred on 29 July, while southerly passage involved *ca.* 250 at Low Hauxley on 4 Oct. (HRS).

D Records include 2 feeding in a field (1 digging in a mole-hill) near Seaton Carew with 8 oystercatchers on 1 Jan. (PJS, MAS) and 1 at Hischope Reservoir on 30 July (AHB).

145. Common Snipe *Capella gallinago*

N Fewer than usual, the largest total being 100 at Seaton Burn on 12 Nov. (BG). Small influxes at the end of July and during 3-5 Sept.

D Biggest concentration was again at Witton-le-Wear Nature Reserve—over 90 in Nov. (VFB). Up to 50 (on 10 Sept.) at a reed-bed near Durham City in the autumn (DLS).

147. Jack Snipe *Lymnocryptes minimus*

N Only 5 birds recorded Jan.-Mar. while autumn records were concentrated in Oct. 1 seen in display flight in the Kielder area on 16 Apr. (BL, ERM).

D Scattered records of individuals at Teesmouth, Stanley and near Durham City.

148. *Woodcock *Scolopax rusticola*

N Only 5 recorded from coastal areas during autumn; breeding records are increasing, being now not confined to the heavily wooded areas (TyBC).

150. *Curlew *Numenius arquata*

D Maximum: 200 at Teesmouth on 1 Dec. (ALC).

151. Whimbrel *Numenius phaeopus*

N 9-10 noted in coastal areas during 5-13 May (CMA *et al.*) and 3 at Boulmer on 9

June (GR). Marked southerly movement on 30 July, and during 6-12 Aug., while on 15 July 1 flew north-west up the valley at Falstone (ERM). Last record: 1 at Holy Island on 24 Sept. (CW).

D Seen regularly at Teesmouth throughout May (maximum 12 on 6 May: ECG); some over Durham City at 2345 on 10 May called for about 5 minutes, indicating a big flock (JHL); 6 at Teesmouth on 17 June was the last spring record. On autumn passage, a party of 76 in the south-west corner of Seal Sands at high tide on 30 July (ECG) is the largest ever recorded at Teesmouth. Much smaller numbers occurred regularly in the area Aug.-Sept.

154. Black-tailed Godwit *Limosa limosa*

N Single birds at Cresswell (14 May), Wallsend Swallow Ponds (17 May), Holywell Ponds (17 May and 12 July), Fenham-le-Moor (13 and 25 July), Brownsman (9 Aug.), Longhirst (9-12 Aug.), Bamburgh (12 Aug.) and Budle Bay (9 Sept.).

D At Teesmouth, 1 on 12 Mar., 6 on 24 Mar., 1 on 15 and 22 Apr., 2 on 29 Apr., 1 on 8 and 14 May, 9 on 15 July, 5 on 15 Aug., and 2 for the rest of Aug. and Sept., with the last on 1 Oct.

155. Bar-tailed Godwit *Limosa lapponica*

N Very few during the early months, but prominent on autumn passage, with over 100 at Fenham-le-Moor on 13 July, 18 flying south off Hauxley on 23 July and 400 at Beal on 25 July (GR). An estimated wintering (1967-68) population of 3,000 on Lindisfarne National Nature Reserve (HD). Elsewhere, numbers were again low at the end of the year.

D Maxima: 59 at Greatham Creek on 26 May and 160 on Seal Sands on 29 Oct.

156. *Green Sandpiper *Tringa ochropus*

D Spring records: 2 at Summerhouse Beck, near Darlington, 28 Mar.-4 Apr. (VFB) and 1 at Teesmouth on 16 Apr. (ECG). Autumn passage 2 July-22 Sept. in the usual localities (maximum 5 at Houghton on 14 Aug.: FGG). Seen at Witton-le-Wear Nature Reserve in most months (CG, DNB).

157. Wood-Sandpiper *Tringa glareola*

N Rather scarce: 1 at Holywell Ponds on 9 May, 1 on 4 July and 3 on 24 Aug.: 1 at Holy Island on 5 June; 1 at Longhirst on 9 Sept.; 1 at Low Hauxley on 13 Sept.

D Surprisingly scarce: 1 at Teesmouth on 7 May, 1 on 9 July and 2 on 9 Aug.; 1 at Washington on 28 June and 1 on 24 Aug.-1 Sept.; 1 at Darlington Sewage Farm on 9 Aug.; 1 at Stanley on 13 Aug.

159. Common Sandpiper *Tringa hypoleucos*

N A marked influx 22-23 Apr. (3 on River Alwin, 2 at Langleeford, 8 at Whittle Dene, 5 near Harbottle and 1 near Redesmouth). Autumn passage was concentrated during 6-8 Aug., with 9 at Holywell Ponds, 10 at Chevington, 8 at South Lynton and 15 at Wallsend Swallow Ponds.

D Seen regularly from 22 Apr.

162. Spotted Redshank *Tringa erythropus*

N Only spring record: 1 (in summer plumage) at Beal on 18 Apr. (MGR). Autumn passage from 12 Aug. to 23 Sept. involved *ca.* 33 birds, almost entirely in coastal areas. In addition, 1 at Boulmer on 22 Oct. (JA) and 2 at Bothal on 28 Oct. (MN, CW).

D Reports from Teesmouth 4 Mar.-8 May may concern the same individual. Autumn passage there was slight, but 1-2 were fairly frequent from 13 Aug., with 1 remaining until at least 26 Dec. (RTM, KR, TJF). Elsewhere, odd birds occurred at Houghton and Hurworth Burn, and several were at Washington in Sept. (ES).

164. Lesser Yellowlegs *Tringa flavipes*

D 1† at Washington on 10 May (ES). First record for Durham.

165. Greenshank *Tringa nebularia*

N Records of spring passage involved 7-8 birds during 6-19 May and 1 at Cresswell on 18 June (CW). In autumn, at least 50 birds recorded between 12 July and the end of Sept., when 7 were still at Budle Bay (DGB).

D 1-2 at Teesmouth 16-23 Apr. Average autumn passage July-Sept., with parties of up to 4 at Teesmouth, Darlington Sewage Farm and Washington. 16 were believed to be present at Teesmouth 19-20 Sept. Last record: 2 at Teesmouth on 1 Oct.

170. *Purple Sandpiper *Calidris maritima*

N Among large concentrations early in the year were 110 at St. Mary's Island on 5 Jan. (ERM) and 100 at Stag Rocks on 12 Feb. (BG). Autumn passage was prominent 28-29 Oct., with 42 at St. Mary's Island and 65 at Bamburgh.

171. Little Stint *Calidris minuta*

N Spring record: 1 (in full breeding plumage) in Budle Bay on 7 June (GR). Prominent in coastal areas during 8-17 Sept., when *ca.* 22 were recorded, with 8 at Budle Bay and 5 at Alnmouth on 17 Sept.

D Spring record: 1 near Greatham Creek on 24 May (RTM). Good autumn passage at Teesmouth, starting with an adult (in breeding plumage) on Dorman's Pool on 29 July (ECG); up to 3 a day occurred on the marshes in Aug., but Sept. was the peak month, with 43 on Dorman's Pool and 7 on Saltholme Pool on 19 Sept. (ECG). In the same month up to 12 (on 18 Sept.) occurred at Washington. 4 were on Saltholme Pool on 8 Oct. and 1 was still in the area on 22 Oct. (VFB).

173. Temminck's Stint *Calidris temminckii*

D 1 at Washington 22-23 May (ES); 1 on Dorman's Pool, Teesmouth, on 22 July (ECG).

174. Baird's Sandpiper *Calidris bairdii*

N 1† seen (at close range) in Druridge Bay on 17-19 Oct. in company with sanderling and dunlin (AA, JDP). First record for Northumberland.

176. Pectoral Sandpiper *Calidris melanotos*

D 1 on pools at Seaton Carew tip on 15 Oct. (PJS, VFB, ECG).

178. *Dunlin *Calidris alpina*

N Two distinct passage movements occurred in autumn, the first in late July (16 at St. Mary's Island, 100 at Hauxley and 270 on Holy Island) and the second 16-17 Sept. (200 at Boulmer, 200 at Alnmouth and 1,000 in Budle Bay). Some 6,000 wintered (1967-68) on Lindisfarne National Nature Reserve (HD).

179. Curlew Sandpiper *Calidris testacea*

N First noted at Hauxley on 29 July (HRS) and last seen in Budle Bay on 29 Oct. (FGG). An influx on 10-17 Sept.: Hauxley (up to 6), Boulmer (1) and Budle Bay (3).

D Spring passage: 1 at Teesmouth on 20 May (ECG). Autumn passage began with an adult (in breeding plumage) on the Reclamation Pond on 15 and 25 July (ECG), while up to 6 occurred on Dorman's Pool in Aug. No steady passage before Sept., when numbers increased on 9 Sept. and reached a peak of 26 on 19 Sept. (ECG). 3 at Washington on 15 Sept. and still odd birds at the end of the month. Last records: 1 on the Reclamation Pond on 1 Oct. and 1 on Dorman's Pool on 8 Oct.

181. Sanderling *Crocethia alba*

N Present every month, the main autumn arrival occurring during the third week in July.

D Maximum concentrations occurred near Seaton Carew: *ca.* 145 on 25 May and *ca.* 155 on 25 Dec. (RMT).

184. Ruff *Philomachus pugnax*

N Spring passage from 1 Apr. to 7 May involved *ca.* 7 birds. The return passage began 23-25 July (5 at Hauxley, 8 at Longhirst and 3 on Holy Island) and continued intermittently until 8 Oct., with 2 late birds at Longhirst on 28 Oct. (MN, CW).

D At Teesmouth, up to 5 from 31 Jan. to late Mar., with 8 on 26 Mar.; up to 6 in Apr. and up to 8 in May, with 1 on 24 June. A good autumn passage, with daily totals of up to 11 in July, 15 in Aug. and 25 in Sept.; 12 stayed until 8 Oct., but had fallen to 3 by 17 Oct., with a late bird on 7 Nov. The other main locality for this species was Washington, where birds were recorded June-Oct., with up to 10 in July and Aug., and a peak of 35 on 8 Sept. (ES).

187. Grey Phalarope *Phalaropus fulicarius*

N Single birds at Seaton Sluice on 9 Oct. (DGB *et al.*) and on 19 Nov. (ABl).

193. Arctic Skua *Stercorarius parasiticus*

N Several off Brownsman in late Apr. (GRP) and 4 on spring passage 10-15 June (DLS, HRS, GR). Very few in autumn (9 July-2 Nov.) with a maximum of 20 at Cresswell on 5 Sept. (TH) when several were also off Seaton Sluice (ABl). An unusual inland record—on 22 Oct. 1 arrived from the north-west at Colt Crag: it harried a common gull before departing (FGG, CMA).

D Though passage extended from 8 July until early Nov., and some were seen on most sea-watches, totals were far smaller than usual. Daily counts exceeded a dozen on only 4 occasions; 63, which flew south at Hartlepool on 21 Sept. (RTM, KR), was easily the largest party for that month. Regular, but still rather scarce in Oct., although a big southerly movement (involving 337 birds) was recorded at the Yorkshire side of Teesmouth on 4 Oct. On 5 Nov., 77 flew south (and only 4 north) at Hartlepool in a northerly gale; they included a party of 38 (RTM). Very few after this date, but odd birds were still present in Dec.

194. Great Skua *Stercorarius skua*

N Unusually scarce. Only 12 reported between 26 July and 23 Sept.

D 1 flew north at Hartlepool on 3 Jan. Unusually scarce and irregular at Teesmouth on autumn passage: 3 (plus 1 at Souter Point) on 15 July and 2 more on 13 Aug.; only 1 in Sept., 11 in Oct., 15 in Nov. (including a party of 7 on 5 Nov.) and 2 on 29 Dec.

195. Pomarine Skua *Stercorarius pomarinus*

N Single birds flying north off Seaton Sluice on 22 Sept. (RN) and 5 Oct. (MN), and off St. Mary's Island on 27 Oct. (JDP).

D Only record: 11 flew north at Hartlepool on 16 Nov.

198. *Great Black-backed Gull *Larus marinus*

N Northerly movement of great and lesser black-backed gulls, and herring-gulls, involving 100 per hour, occurred on 9 Apr. off Hauxley, where southerly passage (at 200 per hour) was also recorded on 6 May. During 9-10 Dec., these larger gulls were moving north along the whole coastline at 400-600 per hour.

199. Lesser Black-backed Gull *Larus fuscus*

N Increased slightly in coastal areas late Mar. to mid-April and again at the end of Oct. On 5 May, *ca.* 10 were at Gosforth Park, and single birds were noted inland on the River Coquet (FGG) and on the Whitfield moors (JDP) in June.

D Remains a rather scarce and irregular bird, most being seen in early spring and in summer.

200. *Herring-Gull *Larus argentatus*

N A single pair bred at a site 30 miles inland; 2 quarries near the coast had a total of 12 pairs; 4 pairs were successful at Dunstanburgh and several bred on chimney stacks in North Shields.

During 1966 and 1967, 9,677 herring-gulls were ringed on the Isle of May by J. Parsons of the Zoology Department, University of Durham. All were colour-ringed, red being used in 1966 and yellow in 1967 and considerable numbers have been seen along the coast. In addition, up to 31 Dec., about 13% of 1966 pulli recoveries, and 16% of 1967 pulli recoveries, were from Northumberland and Durham.

201. Common Gull *Larus canus*

N Increased in coastal areas during mid-Aug. when a few flocks of up to 100 also appeared inland.

D 2 pairs bred in an area of moorland where breeding was possible in 1965, and probable in 1966: 1 successfully reared 3 young and the other 2 young (AEH, AHB). First breeding record for Durham.

202. Glaucous Gull *Larus hyperboreus*

N Single birds at Holy Island in Jan. and Feb., at Ashington in Mar., and off Chevington Burn on 6 May. In autumn, a sub-adult was at Boulmer on 16 Sept. (WSC) and 1 flew north off Dunstanburgh on 8 Oct. (FGG). Plentiful at the end of the year: during 8-10 Dec., 1 in Seaton Sluice area and 4 immatures flying north off Dunstanburgh (WSC) and on 19 Dec., records of single birds at Cresswell, Hauxley and Warkworth possibly all referred to the same individual (TH). In addition, 4 "white" gulls (2 in July, 1 in Oct. and 1 in Dec.) were not specifically identified.

D Records from Hartlepool for the first 4 months concern 2 different immatures; 1 of these was also seen at North Gare and Seaton Snook, while another individual was observed at North Shields fish-quay and South Shields harbour in Feb.; a late bird was at South Shields on 16 May. A sub-adult was frequently recorded at Hartlepool from 26 Aug. A remarkable total of 16 flew north (and 2 south) at Hartlepool on 9 Dec.; nearly all were immature, but there were 3 adults (GRE, IL, IJ). It is very many years since such a number was recorded. The next day 4 passed Hartlepool—indicating that the exceptional movement was not over.

203. Iceland Gull *Larus glaucoides*

N Only 3 substantiated records: 1 at Cresswell on 14 Aug. (GR), 1 at Seahouses on 9 Sept. (TW) and 1 at Warkworth on 24 Sept. (BH, TH).

D 1 at South Shields on 26 Feb. (FGG); 1 sat on a buoy at the Transporter Bridge, Port Clarence, on 12 Mar. (PJS).

205. Mediterranean Gull *Larus melanocephalus*

D The Hartlepool bird was not recorded after 1 Jan. (PJS, MAS), but returned for its eleventh consecutive autumn's residence there on 14 July (JKW) and thereafter was seen intermittently into 1968.

207. Little Gull *Larus minutus*

N An immature at Cresswell on 18 June (CW). Thereafter, 3 records in July, 4 in Aug. and the last at Holywell Ponds on 17 Sept. (CW).

D An adult fed at Hartlepool on 5 Jan. (DGB). An immature on Cowpen on 14 and 20 May, and on 17 and 24 June (ECG). On 5 Aug., a party of 13 at Hurworth Burn consisted of 2 adults (still in breeding plumage), 10 sub-adults and 1 juvenile (PJS); on 1 Sept. there were 2 adults and 4 juveniles (TCP, GRE), with 1 adult on 8 Sept. (RTM). Also 1 adult at Seaton Snook on 6 Aug., 1 at Washington on 24 Aug. and 1 at Graythorp on 9 Sept. (ECG, RTM, FGG); 4 flew north at Hartlepool on 5 Nov. (RTM) and 1 on 16 Nov. (KR).

208. *Black-headed Gull *Larus ridibundus*

N The colony reported as having 500 pairs in 1966 (Bell, 1967) has increased to 800-1,000 pairs (ERM). Some 200 pairs at Holburn Moss reared *ca.* 200 young (CMA).

211. *Kittiwake *Rissa tridactyla*

N The largest movements occurred off Hauxley, involving up to 300 per hour during 5-8 Aug. and 1,000 per hour on 5 Oct. On 9 Dec., kittiwakes were moving north with the larger gulls at 250 per hour. The breeding site at Smith's Docks was reoccupied by 24 Jan., a very early date (ABl), and the Newcastle colony (Bell, 1967) held 16 occupied nests (RMP).

212. Black Tern *Chlidonias niger*

N More than usual on spring passage, 5-13 May: 3 at Cresswell, 2 at Hadstone (FGG), 1 at Holywell Ponds, 1 at Wallsend Swallow Ponds, 1 at Newton Bog, 1 at Gosforth Park and 1 at Whittle Dene. Autumn passage began with 1 at Cresswell on 31 July (GR); only 2-3 occurred during Aug., but at least 10 were off Seaton Sluice on 5 Sept. (ABl).

D 3 at Teesmouth on 6 May, 1 on 7-8 May, 2 on 9 May, 1 on 14 May and 1 on 17-25 June. Between 13 Aug. and 20 Sept. single birds and small parties were often seen here, particularly in the Reclamation Pond.

213. White-winged Black Tern *Chlidonias leucopterus*

D 1† (in nearly full breeding plumage) at the Reclamation Pond, Teesmouth, was seen daily 13-18 Aug. (JGC, PJS, ECG, GRE *et al.*): the second Durham record, and the first this century.

217/218. Common Tern/Arctic Tern *Sterna hirundo/S. macrura*

N On autumn passage, many moved south up to 2 miles inland from the coast (CED, JDP). Inland (at Hallington): 1 on 22 July (CW) and 2 on 28 Aug. (LGM, CW).

D 6 pairs of *S. hirundo* nested at Teesmouth, where a few do nest most years. There are several inland records. At Brasside Ponds, Durham City, 1 was seen on 10 June; on 1 Aug. 9 appeared there and next day, between 1000 and 1405, a total of 39 (in parties of 2, 4, 8, 9 and 16) passed south over the ponds. All were adults and they included *hirundo* and a few *macrura*; the impression was of a big southerly movement high up, with only a few birds dropping down to the pools for a while before passing on (JHL). Clearly relevant to these observations are records of 1 which stayed only a few moments at Hisehope Reservoir on 30 July before flying south (AHB), *ca.* 300 *hirundo* at a pond at Washington on 4 Aug. (FGG) and 1 at Hurworth Burn on 5 Aug. (PJS); *hirundo* were seen or heard flying south or south-west over South Shields almost daily throughout Aug. Other inland records include 1 which flew up the Wear at Durham City on 6 Sept. (JHL, DLS), 1 at Brasside Ponds on 8 Sept. (JHL) and 1 at Shotton Colliery 10-21 Oct. (DWS); 3 flocks (totalling 127) flew inland from the Tees estuary in a south-westerly direction on 20 Sept. (RTM).

219. Roseate Tern *Sterna dougallii*

N Several moving south off Seaton Sluice on 17 Sept. (ABl, CMA) were rather late.

D At Teesmouth, 6 rested on Seaton Snook on 25 May; thereafter scattered records until 12 Sept., including an adult with 2 juveniles on Greenabella Marsh, near Greatham Creek, on 29 July (ECG) and at Hartlepool on 10 Sept.; 2 flew south at Souter Point on 10 Aug. (FGG).

222. Little Tern *Sterna albifrons*

N First record: 1 in Budle Bay on 29 Apr. (PJMW). At a mainland site 1 of 4 pairs bred successfully, but at another 2-3 pairs were unsuccessful.

D Again no nesting. 1 or 2 seen occasionally from 6 May (1 fishing at Cowpen Marsh) until the autumn.

223. *Sandwich Tern *Sterna sandvicensis*

N Present from 25 Mar. (1 off Bamburgh) to 8 Oct. (2-3 off Dunstanburgh).

226. Little Auk *Plautus alle*

N A dead bird (oiled) was found at Ross on 12 Feb. (BG) and 2 more at Alnmouth on 14 Mar. (JA). 2 flying north off Hauxley on 31 Oct. (TH), 1 off Cresswell on 9 Dec. (CW) and 1 near Brownsman on 14 Dec. (GH) are the only other records.

D 1 flew north at Hartlepool on 9 Dec. (GRE, IL, IJ) and another on 29 Dec. (RTM, CSA, KR).

235. Turtle Dove *Streptopelia turtur*

N Only spring records: 3 on Farne Islands on 5-7 May; 2 at Bamburgh (BRS) and 1 at Craster (WSC) on 21 May.

D First recorded on 9 May—1 in Hartlepool. Present in summer at Wynyard Park and Hurworth Burn, but although 2 birds sang at Shotton Colliery none bred there (DWS); 2 near Darlington on 23 Sept. (WR, RWK) were late.

—. Collared Dove *Streptopelia decaocto*

N Continues to spread, and now found increasingly further north—usually in the Alnwick area. 2 flying north off Bamburgh on 29 Apr. (BRS) were probably migrants.

D Seen for the first time from Hartlepool Bird Observatory—once in May and several times in Nov.

237. Cuckoo *Cuculus canorus*

N Infrequently recorded in lowland areas: becoming much more typically a bird of the moorland valleys. A small tributary of the South Tyne held 7 breeding pairs.

D First heard on 23 Apr.: 2 near Hurworth Burn (RTM).

241. Barn Owl *Tyto alba*

N A number of breeding records suggests that the species, though nowhere common, is quite widespread in suitable lowland areas.

D Records include apparently successful nesting in Durham Cathedral (JHL).

247. *Tawny Owl *Strix aluco*

N A pair successfully reared 2 young in a nest-box (also used in 1966) at Embleton (AEH).

248. Long-eared Owl *Asio otus*

N At least 2 pairs bred in the centre of the county, rearing 2 and 4 young respectively (ERM).

D Still occurs in the Crookfoot Reservoir area.

249. Short-eared Owl *Asio flammeus*

N At least 6 pairs bred successfully in coastal areas (TyBC) and 4 pairs inland (JA, BL). Maximum of 3 at Bamburgh in Nov.

D Well above average numbers on the north-west Durham moors, Aug.-Sept.—up to 6 in the air at a time—coinciding with a huge local increase in the bank vole (GAC). As usual, up to 4 a day seen regularly (except June-July) over the Teesmouth marshes.

252. Nightjar *Caprimulgus europaeus*

N Reported from Felton Park (bred), Kielder (bred), elsewhere in the North Tyne valley and in Hulne Park.

D Apparently usual numbers at Hamsterley S.F. and Wynyard Park.

255. Swift *Apus apus*

N First recorded on 29 Apr. (2 at Gosforth Park: LGM and 1 at Bamburgh: BRS), but the main influx occurred 6-7 and 11-14 May. Several late records, 1 at Craster on 15 Oct. (WSC) being the last. Again noted feeding over the summit of Cheviot (on 11 June: ERM).

D First seen on 25 Apr.—1 over Darlington (VFB)—and recorded daily from 1 May. A late bird at Hurworth Burn on 1 Oct. (JHL) and, exceptionally late, 1 over Darlington 3-4 Nov. (CB, VFB).

258. Kingfisher *Alcedo atthis*

N 2 pairs in the Morpeth area, at least 1 of which bred (TyBC), and another pair near Rothbury which probably bred (BL).

D Only 2 reports: 1 at Witton-le-Wear Nature Reserve on 2 Apr. (VFB) and 1 at Norton-on-Tees on 12 Dec. (IJ, RL).

261. Hoopoe *Upupa epops*

N 1 seen at close quarters on the road between Weldon Bridge and Rothbury on 4 Aug. (ETS).

262. Green Woodpecker *Picus viridis*

N Now more typically a breeding species of the north-east of the county (TyBC).

D Still scarce; records include 1 on Durham City banks in Feb. (HMJ).

263. Great Spotted Woodpecker *Dendrocopos major*

N Fairly widespread, but has its strongholds in stands of mature mixed woodland in southern and central areas (TyBC).

D Still the commonest woodpecker, but appears to be decreasing. Records include birds feeding on food suspended in gardens—1 (on fat) in Durham City (HMJ) and another—accompanied by 2 young—on nuts in Bedburn, Weardale (CG, DNB).

265. Wryneck *Jynx torquilla*

N Only 2 records: 1 at Boulmer on 16 Sept. (LGM) and, next day, 1 at Colt Crag (RG, WB, EL).

272. *Skylark *Alauda arvensis*

N Autumn passage noted on 24 Sept., with 230 at Holy Island (CW), and again during the last week in Oct.

273. Shore-Lark *Eremophila alpestris*

N 12 at Newbiggin on 12 Mar. (BM), 1 on Brownsman on 6 May (GRP, FYB) and 1 at Alnmouth on 28 Oct. (BL).

D At Hartlepool, 1 flew south on 14 Oct. and 2 came in off the sea on 19 Oct. (KR, JKW).

274. Swallow *Hirundo rustica*

N First seen—2 at Alnwick on 8 Apr. (JA) and, next day, 1 at Colwell (TL)—with the main arrival on 23 Apr. Heavy southerly movement at Hauxley on 6 and 20 Aug. and elsewhere on 8-9 and 23-24 Sept. Last records: 3 at Bamburgh on 12 Nov. (BRS) and 1 at Broomhill on 13 Nov. (TH).

D First records: 1 at Witton-le-Wear Nature Reserve and 3 at Horden on 15 Apr. As usual, a few stayed into Oct. with a late adult flying north at Hartlepool on 11 Nov. (TJF) and, next day, another at Witton-le-Wear.

276. *House-Martin *Delichon urbica*

N 1 at Morpeth on 15 Apr. (BG) followed by an influx on 22-23 Apr. An unusually large concentration (*ca.* 250) was in lower Holywell Dene on 30 Sept. (ABel). Late records: 1 near Seaton Delaval on 11 Nov. (ABel) and 1 flying north at Bamburgh on 18 Nov. (BRS).

277. Sand-Martin *Riparia riparia*

N Present from 30 Mar. (1 at Hexham) until 8 Oct. (6 at Cresswell).

D First record: 1 at Durham City on 2 Apr. (DLS).

278. Golden Oriole *Oriolus oriolus*

N 3 "green" birds at Bamburgh 20-21 May, and an adult male on 28 May (BRS) —the largest number recorded for many years.

279. *Raven *Corvus corax*

N Of some 25 pairs present in the north and north-west of the county, 11-13 pairs bred successfully, a pleasing increase (TyBC, BI.).

281. Hooded Crow *Corvus corone cornix*

N Several spring records, including a maximum of 19 at Ross Links on 28 Feb. and

16 on Holy Island as late as 7 May (LGM *et al.*). Only 1 record at the end of the year —a single bird at Gosforth Park on 29 Dec. (CED).
D Only reports: 1 at Seaton Carew tip in Jan. and 3 at Hartlepool on 19 Apr.

282. *Rook *Corvus frugilegus*
N The Haymarket (Newcastle) colony now numbers 28 pairs (RMP)—a further steady increase.

284. Magpie *Pica pica*
N In Jan. some 20 pairs in the Rugley-Alnwick area; this locality, in common with other districts, has shown a marked increase during the past 2-3 years.
D 5 feeding on a dead black-headed gull at Dorman's Pool, Teesmouth, on 23 July were harried by common terns until all 5 fled into the shelter of a tiny bush, in which they had great difficulty in escaping the attentions of their attackers (VFB).

286. Jay *Garrulus glandarius*
N Largest concentration: 7 at Bolam on 28 Dec. (TH).
D A pair with young visited a bird-table at Bedburn, Weardale (CG, DNB).

287. Chough *Pyrrhocorax pyrrhocorax*
D 1 at Seaburn on 24 Oct. (AR). It is 40 years since a chough was recorded in Durham, but there is always the possibility that it had escaped from captivity.

288-289. Great Tit/Blue Tit *Parus major*/*P. caeruleus*
N A pair of each species bred in the same nest-box at Dipton. *P. major* reared 5 young from 5 eggs; *P. caeruleus* reared 2 young from 4 eggs. Adults of both species fed the young (BL).
D A great tit (with a yellow and a metal ring) in Darlington on 30 Dec. had a downcurved bill *ca.* 1¼" long (VFB).

293. *Willow-Tit *Parus atricapillus*
D Present throughout the year in the Hamsterley S.F. and Hurworth Burn areas. Also 1 in a Hartlepool starling roost on 18 Mar. (KR, PR).

296. Nuthatch *Sitta europaea*
N Recorded at Dilston (a pair: RG) and elsewhere in the Tyne valley (probably 2 more pairs: IHA), Hulne Park, Gosforth Park and Warenford during the breeding season.
D Nested at Croxdale Hall, Durham City and in Hamsterley S.F.—the latter pair again being regular visitors to a bird table at Bedburn.

298. *Tree-Creeper *Certhia familiaris*
N Bred successfully in nest-boxes in the Thrunton (AEH) and Kielder (ERM) areas.

299. *Wren *Troglodytes troglodytes*
N Continues to increase, as typified by an improvement from 6 to 9 breeding pairs in the Gosforth census area. 2 instances of birds modifying old swallow's nests for breeding purposes have been recorded. A marked arrival occurred, at Holy Island, Hauxley and Cresswell, 21-22 Oct. during a period of predominantly westerly weather.

302. Fieldfare *Turdus pilaris*
N Many remained late into spring—500 were still on Holy Island on 7 May (MN, CW)—and the last left on 24 May (MFMM). Autumn passage commenced on 15 Sept. (1 on Holy Island, and next day birds at Bamburgh and Beadnell), but no large numbers recorded until 28 Oct. when "several hundred" arrived at Hauxley. *Ca.* 1,000 at Sweethope on 2 Dec. (JSB).
D First autumn record: 1 at Hartlepool 12-13 Sept. (RTM).

303. *Song-Thrush *Turdus ericetorum*
N An increase in breeding pairs from 9 to 15 in the Gosforth census area (TCS). Slight influxes in coastal areas mid and late Sept.

304. Redwing *Turdus musicus*
N Redwings left early in spring, there being only 1 record in Apr. Return passage commenced on 22 Sept., but involved unusually few birds.
D First autumn record: 1 at Hartlepool on 13 Sept.

307. Ring-Ouzel *Turdus torquatus*
N First records: 2 at Linshiels and 1 at Shillmoor on 27 Mar. (MN, LGM). Small "falls" in coastal areas 6-14 May included 4 at Beal, 6 at Dunstanburgh and at least 10 at Boulmer (MN, CW, FGG, JHL).
D Although they arrived early and had a good early nesting season, there were also some late migrants: 1 at Teesmouth on 7 May and several more 14-16 May, and 6 or 7 at Marsden on 17 May.

308. *Blackbird *Turdus merula*
N Bad weather in late Mar. produced "falls" at hill farms from Gilsland to Coquetdale—evidently passage birds. Otherwise relatively scarce both in spring and autumn.

311. Wheatear *Oenanthe oenanthe*
N First reported on 25 Mar. at Alwinton, Bamburgh and Rothbury. During 11-14 May, many were recorded in coastal areas, the majority being identified as belonging to the Greenland race *O. o. leucorrhoea*: 30 in upper Holywell Dene, 12 at Holywell Ponds, 60 at Cresswell, 20 at Hauxley and over 60 at Bamburgh.
D 1 at Hartlepool on 12 Mar. (GRE) was the first; it was followed (on 25 Mar.) by single males in the nearby area.

317. Stonechat *Saxicola torquata*
N 6 in the Warkworth area on 29 Feb. (JA) and 6 at Foxton, Alnmouth, in Oct. (BG). Now fairly generally distributed along the northern part of the coastline, with at least 10 breeding pairs, while a few pairs also bred inland near Wooler (TyBC).
D A wintering male at Teesmouth Jan.-Feb. and a pair Nov.-Dec.; 1 near Thornley on 18 Oct.; a male defended territory in the north of the county in May.

318. Whinchat *Saxicola rubetra*
N Present from 28 Apr. (1 at Housesteads) to 2 Oct. (1 in Whitley Bay cemetery).
D Records include 1 at Shotton Colliery on 31 Oct. (DWS)—a very late bird.

320. Redstart *Phoenicurus phoenicurus*
N First seen at Redesmouth on 23 Apr. (BG), followed by considerable numbers during 13-15 May and on 20 May. A very late bird at Cullernose on 11 Nov. (FGG).

In Hulne Park, a pair bred in peat on a completely bare stretch of burnt ground (CMA).
D Records span the period 16 May-5 Nov.

321. Black Redstart *Phoenicurus ochruros*
N Only records: a female near Wooler on 26 Mar. (JKJ) and another on Holy Island on 20 May (MFMM).
D Unusually scarce: 2 at Hartlepool on 27 Apr. and 1 next day.

324. Bluethroat *Cyanosylvia svecica*
N A male (trapped and ringed) in Whitley Bay cemetery 14-16 May (CED, JDP); a female on Brownsman on 30 May (FYB).
D 1 at Hartlepool 13-16 Sept. (KR, RTM, PJS).

325. *Robin *Erithacus rubecula*
N A marked "fall" occurred in coastal areas during 13-16 Apr., when several birds trapped showed characteristics of the continental race, *E. r. rubecula*.

327. Grasshopper-Warbler *Locustella naevia*
N First noted on 29 Apr. when 6 were at Bamburgh (BRS), and another influx occurred 6-7 May. Many breeding records.
D Present from 23 Apr. until autumn.

333. Reed-Warbler *Acrocephalus scirpaceus*
N Only record: 1 at Gosforth Park on 18 July (MN).

337. *Sedge-Warbler *Acrocephalus schoenobaenus*
N First noted in Gosforth Park on 29 Apr. (LGM) with the main arrival during the second week in May.

340. Icterine Warbler *Hippolais icterina*
N Single birds trapped at Hauxley on 19 Aug. and 10 Sept. (HRS).
D 1 at Hartlepool on 4 Sept. (KR, EB)—only the fourth Durham record, the others being seen in 1966.

343. Blackcap *Sylvia atricapilla*
N First record: a male at Howick Haven on 15 Apr. (RN, MH). Many were late on passage in autumn—at least 7 were seen in Nov. and a male was still at Matfen on 16 Dec. (*per* CED).
D 1 in Hartlepool on 9 Nov. (AFD) and another in Castle Eden Dene next day (BU) were probably late migrants, but a female seen in a Hartlepool starling roost on 31 Dec. (KR) was obviously a wintering bird.

344. Barred Warbler *Sylvia nisoria*
N Single first year birds trapped at Hauxley 17 Sept. and 8 Oct. (HRS).
D 1 at Hartlepool on 13 Sept. (RTM, KR) and 1 trapped at Graythorp on 17 Sept. (PR *per* RTM).

347. Whitethroat *Sylvia communis*
N First arrivals noted during the small "fall" on 6 May: 5 near Stocksfield 1 near St. Mary's Island and 5 at Holy Island. Scarce on autumn passage.
D First seen on 6 May: 3 at Graythorp.

348. Lesser Whitethroat *Sylvia curruca*
N 6 recorded on spring passage from 7 May and 10-12 on autumn passage in Sept. Again bred in the county.
D A few migrants at Hartlepool 27 Apr.-14 May and 13-20 Sept.

355. Greenish Warbler *Phylloscopus trochiloides*
D 1† at Hartlepool 16-17 Sept. (ECG, RTM, JVH). First record for Durham.

356. Chiffchaff *Phylloscopus collybita*
N 1 at Dilston on 11 Apr. (RG, WB) and widespread by 15 Apr. Autumn passage (mid-Sept. to mid-Nov.) involved few birds.
D 1 at Hartlepool on 8 Jan. (PS). No spring arrivals reported before 15 Apr.

357. *Wood-Warbler *Phylloscopus sibilatrix*
N First seen: 4 at Allenbanks on 30 Apr. A total of 48 singing males was present in this area during the breeding season (LGM)—a much larger concentration than hitherto suspected. The strongholds of the species are in the South Tyne valley and in scattered areas of deciduous woodland in the centre of the county (TyBC).

358. Bonelli's Warbler *Phylloscopus bonelli*
N 1† trapped at Hauxley on 4 Nov. (HRS). This is the first confirmed record for Northumberland although the species now appears annually in the British Isles as a consequence of its northerly spread in Europe.

360. Yellow-browed Warbler *Phylloscopus inornatus*
N 1 in Blyth cemetery on 23 Sept. (BG, JKJ, RN), 1 on Holy Island 24-26 Sept. (TH, CW, LGM, RN), 1 at Hauxley on 24 Sept. and 2 on 30 Sept. (HRS), 1 on Holy Island on 1 Oct. (FGG), 1 at Bamburgh 14-15 Oct. (BRS) and 1 at Druridge on 22 Oct. (BG).
D At Hartlepool, 3 on 16 and 17 Sept., 1 on 18 and 19 Sept., 1 on 21 Sept., 2 on 22 Sept., 3 on 23 Sept. and 1 on 24 Sept. It is considered that at least 4 or 5 individuals were involved (RTM, PJS, KR, VFB *et al.*).

364. *Goldcrest *Regulus regulus*
N A marked passage 13-15 Apr., with 30 at Hauxley and 26 at Bamburgh, and 1 was still on Holy Island on 7 May (LGM). Moderate numbers on autumn passage 14 Sept. to 25 Nov.

365. Firecrest *Regulus ignicapillus*
N A female trapped at Bamburgh on 16 Apr. (BRS).

366. Spotted Flycatcher *Muscicapa striata*
N First noted on 6 May, and over 30 arrived at Bamburgh on 15 May—an influx not reflected in other coastal areas.
D First record: 1 at Hartlepool on 27 Apr.

368. *Pied Flycatcher *Muscicapa hypoleuca*
N A male at Redesmouth on 30 Apr. (BM, BG), but few recorded before mid-May. Steadily increasing as a breeding species, 120 (adults and pulli) being ringed in the Dilston-Hexham area in June (BL, ERM). A pair that bred successfully at Kielder consisted of 2 "brown" birds (ERM). Following an early party of 8 at Druridge on 8 Aug. (TH), relatively few on autumn passage.

370. Red-breasted Flycatcher *Muscicapa parva*

N 1 at Holy Island 23-24 Sept. (TH, JKJ) and 1 trapped in Prior's Park, Tynemouth on the latter date (MH).

D 1 at Hartlepool 17-18 Sept. (RTM, VFB).

373. Meadow-Pipit *Anthus pratensis*

N Large-scale southerly coasting movements at Hauxley on 10, 24 and 30 Sept. involved thousands of birds (HRS).

D Movements include *ca.* 100 which flew south-east at Hartlepool in 2 hours on 19 Sept. (RTM).

376. *Tree-Pipit *Anthus trivialis*

N 4 at Redesmouth on 23 Apr. (GB, BM) and plentiful by the end of the month.

380a. *Pied Wagtail *Motacilla alba yarrelli*

N A roost near Ryal still held 150 as late as 30 Apr. (WGJ) and 40 were roosting on the roof of Parsons' factory in Newcastle in late Oct. (ABel).

380b. White Wagtail *Motacilla alba alba*

N 19 recorded on passage between 22 Apr. and the end of May, and 1 at Howick on 23 Nov. A bird carrying nesting material in the Kielder area during May.

D The usual spring dozen or so were recorded 16 Apr.-7 May, with a late bird at Teesmouth on 17 June.

381. Grey Wagtail *Motacilla cinerea*

N Widespread, and apparently completely recovered from the 1962-63 winter; particularly plentiful in the South Tyne valley. Small numbers passed through Bamburgh on several occasions in Sept. and 1 flew inland at Craster on 3 Dec. (WSC).

D Once again occurs regularly in Teesdale (young seen), Weardale, and in the Team and Derwent valleys. Also recorded at Hartlepool, Darlington and Witton-le-Wear Nature Reserve.

382. Yellow Wagtail *Motacilla flava*

N First record: 1 at Holywell Ponds on 22 Apr. More plentiful in the North Tyne valley than in recent years (BL). Birds with the characters of the blue-headed race *M. f. flava* were seen at Cresswell on 10 May (TH), Wallsend Swallow Ponds on 12 May (FC) and on Holy Island 21-23 May (FGG, MFMM). A male at Holywell Ponds on 13 May (MN) showed no trace of a white superciliary, and had the ear-coverts distinctly darker than the crown. These features are associated with the ashy-headed race, *M. f. cinereocapilla.*

D First recorded on 18 Apr. Individuals showing the characters of *M. f. flava* were seen at Billingham Pond on 22 Apr. (*per* ALC) and at Hartlepool on 12 May (KR).

—. Citrine Wagtail *Motacilla citroela*

N 1† at Holy Island lough 28-30 Sept. (MFMM, BH, TH). First record for Northumberland.

383. Waxwing *Bombycilla garrulus*

N Few records for the early months, 1 on Holy Island with other migrants on 14 May (AJR) being very late. 4 at Lemington on 9 Oct. (BG), but no more recorded until 6 Nov., from which date small parties were widespread until the end of the year.

D 1 at Rowlands Gill 1-2 Jan., and 1 in Darlington on 21 Jan. and 30 Mar., were the only reports for the first part of the year. From late Oct., up to 15 at Shotton Colliery, and from early Nov. until the end of the year, very small numbers occurred widely in places as far apart as Darlington, Hartlepool, Durham City and South Shields (38 in Darlington was by far the largest party reported).

384. Great Grey Shrike *Lanius excubitor*

N Single birds in Holywell Dene, at Corbridge and at Simonburn in Jan., and at Haydon Bridge, near Alwinton and on the Allerhope Burn near Clennel in late Mar. During 9-15 Apr., 2 near Hauxley, 2 near Alnwick and 1 at Haggerston (on 15 Apr.). In contrast, only 5 autumn records: 1 at Beal on 7 Sept., 1 on Holy Island 23-27 Sept., 1 at Newsham on 18 Oct., 1 at Brock Mill on 7 Nov. and 1 at Whitley Bay on 16 Nov.

D 1 at Graythorp on 9 Apr. (*per* PJS); 1 near Frosterley on 15 Apr. (JR); 1 at Witton-le-Wear Nature Reserve 11-12 Nov. (VFB).

388. Red-backed Shrike *Lanius collurio*

D A female or immature at North Gare 21-24 Sept. (RTM, KR, GRE).

391. Hawfinch *Coccothraustes coccothraustes*

N Recorded at Plessey, Hexham, Haydon Bridge and Scremerston during the breeding season. 1 on Holy Island on 21 May (MFMM).

393. Goldfinch *Carduelis carduelis*

N The largest parties were 15-20 near Wooler on 17 Sept. (JKJ) and 15 at Howick shore on 3 Dec. (JEO). Now a widespread breeding species, although usually in isolated pairs (TyBC).

D Biggest concentration was on Greenabella Marsh, Teesmouth—up to 60 in Dec. (RAS, GRE, TCP, TJF).

395. *Linnet *Carduelis cannabina*

N Apparently decreasing, despite a flock of *ca.* 1,000 at Warkworth on 15 Jan. (BG). This decrease is typified by a drop from 14 to 9 pairs in the Gosforth census area (TCS).

396. Twite *Carduelis flavirostris*

N Only record: party of 15 on Holy Island on 23 Dec. (AJR).

397. *Lesser Redpoll *Carduelis flammea*

N Coastal passage noted at Bamburgh on 30 Apr. (61 flying north) and 14 May, and at Hauxley on 13 and 30 Sept. (BRS, HRS).

401. *Bullfinch *Pyrrhula pyrrhula*

N Now a widespread breeding species and continuing to increase. 2 in Druridge wood on 21 Oct. (EGG) may have been on passage.

402. Scarlet Grosbeak *Carpodacus erythrinus*

N 1† trapped near Seaton Delaval on 16 Sept. (ABel, FC, MH).

404. Crossbill *Loxia curvirostra*

N A female at Bamburgh on 2 Apr., and a pair on 13 May (BRS), but no coastal records at the end of the year. An adult and 3 young near Redesmouth on 8 July and small numbers again bred in Kielder Forest (BL).

408. Brambling *Fringilla montifringilla*

N Between 2 and 12 Mar., 800 at Heddon (IHA, JSB), 300 near Alnwick (JA) and 150 at Newsham (JKJ), with a very late female at Newton Links on 3 June (DGB, IR, MGR). Very few at coastal stations in autumn, but the wintering flock at Bolam numbered 600 by 2 Dec.

D The large flock at Hurworth Burn in Dec. 1966 diminished in the new year, but there were *ca.* 800 on 3 Jan. (DGB, SAB), still *ca.* 260 on 3 Apr. (KR, EB) and over 50 on 12 Apr.; a flock of *ca.* 300 at Neville's Cross, Durham City, on 29 Jan. (PJS), and another of *ca.* 200 at Brancepeth Park on 22 Feb. (JHL), are also noteworthy. By comparison, autumn records were few and scattered.

410. Corn-Bunting *Emberiza calandra*

N Increasing in eastern and central areas (several pairs bred near Ponteland, and 2 pairs near Stocksfield, where the species has not nested for many years). Over 100 roosting at Chevington Burn on 15 Jan. (BG).

D Largest concentration: 62 on Cowpen Marsh on 9 Feb. (ALC).

[**413. Red-headed Bunting** *Emberiza bruniceps*

N 1 seen at Craster on 16 May, and again on 15 July (WSC), may have been an escape.]

416. Ortolan Bunting *Emberiza hortulana*

N A male at Foxton on 9 Sept. (LGM, BW).

422. Lapland Bunting *Calcarius lapponicus*

N 1 on Holy Island 28-29 Sept. (MFMM, TH, BH) and at least 2 (FGG), and probably 4 (CW, MN), 1-2 Oct.

D Single birds at Teesmouth on 1 Apr., 15 Nov., 2 Dec. and 7 Dec. (RTM, KR, PJS).

423. Snow-Bunting *Plectrophenax nivalis*

N Not recorded between 28 Mar. (minimum of 12 near Bamburgh) and 8 Oct. (1 at Bamburgh). Flocks of at least 150 at Wallsend on 1 Jan. (TG) and near Longbenton on 8 Jan. (JB) and, in autumn, at Craster on 11 Nov. (WSC). The largest party was 700 at Newbiggin Hall on 21 Dec. (BG).

D Fewer than usual at Teesmouth in the early part of the year (maximum 97 on 4 Jan.); last seen there on 28 Mar. (9: RTM) and at Crimdon Dene on 30 Mar. (2: BU). First reported in the autumn on 2 Oct.: 2 at North Gare (KR). Thereafter, scattered records until the end of the year: maximum 125 at Seaton Carew on 30 Dec., when a flock of 50 flew in onto the cliffs at Crimdon Dene. Far inland, a solitary male was seen on Newbiggin Common, upper Teesdale, on 12 Nov. and 35-40 often fed on a tip at Shotton Colliery at the end of the year. (DWS).

425. *Tree-Sparrow *Passer montanus*

N A pair bred in the underside of a rotten railway sleeper forming part of a bridge over a stream at Beal—an unusual site (IR, MGR).

† signifies a record accepted by the *British Birds* Rarities Committee

OTHER SPECIES

In the classified notes an * indicates that a species, although dealt with in detail for only one county, has also occurred in the other county during 1967. In addition, the following species have been recorded in both counties: shag, red grouse, pheasant, redshank, knot, razorbill, guillemot, puffin, stock-dove, wood-pigeon, little owl, carrion-crow, jackdaw, coal-tit, marsh-tit, long-tailed tit, dipper, mistle-thrush, garden-warbler, willow-warbler, dunnock, rock-pipit, starling, greenfinch, chaffinch, yellow-hammer, house-sparrow.

RINGING

The following authorised ringers have contributed information to this section of the report: Bamburgh Ringing Group, A. Belshaw, F. Colley and P. Hawkey, T. A. Bowbeer, P. R. Evans (Monk's House Bird Observatory), Natural History Society of Northumberland, Durham and Newcastle upon Tyne, Northumbria Ringing Group, P. Reid, J. Richardson, Tyne/Tweed Ringing Group and P. Yeoman.

Once again it has only been possible to select the most interesting of the many recoveries received; the majority of these occurred in 1967, although a few made in earlier years, and not previously reported, have been included.

Two swallows seen in South Africa in December and January are of special interest. South African ringers are now concentrating their attention upon the large reed-bed roosts of swallows and one bird, ringed (as young) at Wallsend in July 1965 was controlled near Johannesburg in December 1966. The second, which was found dead at Riding Mill in July 1967, had been ringed (as an adult) at Kimberley in the previous January. The redwing recovered in Russia should encourage the ringing of both redwings and fieldfares and the additional recoveries which would probably result would provide useful information about these winter-visitors. Three summer-visitors—a whitethroat, a pied flycatcher and a spotted flycatcher—have been recovered outside the British Isles, the spotted flycatcher (found in Corfu) being the most easterly recovery of a British-ringed bird of this species. (It may perhaps have been a bird from eastern Scandinavia which had been caught "off course" while on passage to its wintering area in Africa and which then re-orientated itself to the easterly migration route through the Balkans.) Finally, the reed-bunting, ringed at Low Hauxley in January 1966 and recovered in Norway in September 1967, adds weight to the theory (based on autumn influxes of this species at places such as Fair Isle) that there is a passage of Scandinavian reed-buntings through this country.

RECOVERIES OF RINGED BIRDS

(a) Ringed in Northumberland and Durham

Date and place ringed		*Place recovered*	*Date recovered*
GOOSANDER			
2.7.67	Holystone, Northd.	Solway Firth	2.9.67
MUTE SWAN			
29.10.61 (w)	Hartlepool, Co. Durham	(1) Cresswell, Northd. **A**	9.3.63
		(2) Cresswell **A**	9.4.67
9.9.62(juv.)	Hartlepool	Loch Leven, Kinross-shire **A**	9.8.67
KESTREL			
27.4.64	Kielder, Northd.	Clowne, Derbyshire	Mar. 1967
17.6.67	Rock, Northd.	Kirknewton, Midlothian	Aug. 1967
24.6.67	Stocksfield, Northd.	Nr. Boulogne, France	17.9.67
SNIPE			
12.9.64	*Bamburgh, Northd.	Bangor, Caernarvonshire	7.1.67
DUNLIN			
5.8.67	*Dorman's Pool, Tees-mouth, Co. Durham	Snettisham, Norfolk **A**	21.8.67
SWIFT			
29.5.65	*Holywell Ponds, Northd.	Nr. Leeds, Yorks.	17.5.67
SWALLOW			
14.7.65	Wallsend, Northd.	Nr. Johannesburg, S. Africa **A**	18.12.66
10.8.67	*Stocksfield	Nr. Hull, Yorks. **A**	18.9.67
19.8.67	Stocksfield	Hornsea Mere, Yorks. **A**	4.10.67
HOUSE-MARTIN			
17.5.67	*Holywell Ponds	More og Romsdal, Norway	30.5.67
SAND-MARTIN			
2.6.65	*Corbridge, Northd.	Blaye, Gironde, France	8.4.67
SONG-THRUSH			
12.3.66	*Hartley, Northd.	Hordaland, Norway	9.10.67
9.10.66	*Low Hauxley, Northd.	St. Morillon, Gironde, France	2.1.67
REDWING			
22.10.65	*Low Hauxley	Batumi, Georgia, U.S.S.R.	24.1.67
BLACKBIRD			
4.11.61 (w)	Fenwick, Northd.	Fagerhult, Kalmar, Sweden **A**	19.4.66

Date and place ringed		*Place recovered*	*Date recovered*
BLACKBIRD—*continued*			
18.10.64 (w)	Low Hauxley	(1) Heligoland, Germany **A**	21.4.66
		(2) Drangedal, Telemark, Norway	5.8.67
18.10.64	*Low Hauxley	Sokndal, Rogaland, Norway	3.10.67
19.10.64 (w)	S. Shields, Co. Durham	Cleethorpes, Lincs. **A**	31.12.67
31.10.64	*Low Hauxley	Nibe, Jutland, Denmark	Apr. 1966
31.10.64	*Hartley	Texel Island, Netherlands	1.1.67
27.3.65	*Bamburgh	Malsjven Fla, Norway	20.4.67
24.10.65 (w)	Bamburgh	Falköping, Skaraborg, Sweden	29.7.67
30.12.65	*Gosforth, Northd.	Santander, Spain	18.12.66
14.10.66	*Whitley Bay, Northd.	Krolestrand, Goteburg, Sweden	14.4.67
22.10.66	*Cresswell	Landildut, Finistère, France	8.12.66
28.10.66 (w)	Low Hauxley	Nordfjord, Sogn og Fjordane, Norway	May 1967
24.12.66 (w)	S. Shields	Hirtshals, Jutland, Denmark	15.3.67
4.1.67 (w)	S. Shields	Fedje, Hordaland, Norway	11.4.67
14.1.67	*Whitley Bay	Mareham le Fen, Lincs.	7.11.67
15.4.67 (w)	Low Hauxley	Mjosa, Hedmark, Norway	18.10.67
ROBIN			
14.10.66 (w)	Low Hauxley	El Helechar, Badajoz, Spain **A**	21.1.67
16.10.66	*Tynemouth, Northd.	Le Marias, Guernsey, Channel Islands **A**	5.2.67
19.10.66	*Newton-by-the-Sea, Northd.	Talairan, Aude, France	28.12.66
WHITETHROAT			
11.6.66	Low Hauxley	Oujda, Morocco	May 1967
WILLOW-WARBLER			
6.5.67	*Low Hauxley	Whitley Bay	19.6.67
CHIFFCHAFF			
28.5.67	Bamburgh	Spurn Point, Yorks. **A**	23.6.67
SPOTTED FLYCATCHER			
28.8.66	*Low Hauxley	Corfu Island, Greece	15.9.67
PIED FLYCATCHER			
26.6.67	Dipton Wood, Northd.	Langoiran, Gironde, France	13.10.67
STARLING			
11.1.59	*Fenwick	Ös, Hordaland, Norway	30.8.67
8.3.65	*Low Hauxley	Oldenburg in Niedersachsen, Germany	21.9.67
13.2.66	*Bamburgh	Burea, Vasterbotten, Sweden	31.7.67

Date and place ringed		*Place recovered*	*Date recovered*
STARLING—*continued*			
29.1.67	*Hartlepool	Vadde Island, Stockholm, Sweden	15.6.67
GREENFINCH			
29.2.64	*Gosforth	Croxby, Lincs. **A**	6.5.67
10.9.67	*Seaton Delaval, Northd.	Spurn Point **A**	10.10.67
LINNET			
10.8.64	*Low Hauxley	Ares, Gironde, France	5.11.67
26.9.65(juv.)	Bamburgh	Capbreton, Landes, France **A**	17.11.67
LESSER REDPOLL			
27.7.63	*Arcot Hall, Northd.	Liége, Belgium	28.11.66
30.7.63(juv.)	Arcot Hall	Lommel, Limburg, Belgium	12.10.67
1.8.64	*Gosforth	Liége	9.11.66
11.7.65(juv.)	Low Hauxley	Bredene, Belgium **A**	22.10.65
16.8.65(juv.)	Seaton Burn, Northd.	Lichtaart, Belgium **A**	3.10.66
22.8.65	*Arcot Hall	Limburg, Belgium	17.10.66
30.8.65	*Arcot Hall	W. Flanders, Belgium	22.10.66
23.9.65 (w)	Craster, Northd.	Rebain les Ath, Hainaut, Belgium	25.11.67
15.5.66	*Holywell Dene	Drongen, Belgium **A**	18.10.66
28.5.66	*Seaton Delaval	Haut Fays, Luxemburg **A**	30.10.66
18.6.66	*Arcot Hall	W. Flanders	16.10.66
27.8.66	*Arcot Hall	Brabent, Belgium	29.1.67
7.9.66	*Sheepwash, Northd.	Poperinghe, W. Flanders, Belgium	23.10.67
23.8.67(juv.)	Craster	Ferrieres, Liége, Belgium	8.11.67
BRAMBLING			
14.4.66	*Seaton Delaval	Nr. Leigh, Lancs. **A**	15.1.67
REED-BUNTING			
9.1.66 (w)	Low Hauxley	Namdalen, Nord Trondelag, Norway	5.9.67
HOUSE SPARROW			
21.1.61	*Billingham, Co. Durham	Billingham **A**	4.2.67

(b) Interesting local recoveries of birds ringed outside the two counties

Date and place ringed		*Place recovered*	*Date recovered*
FULMAR			
10.6.65	*Newburgh, Aberdeenshire	Polish trawler 25 m. E. of Boulmer, Northd.	28.8.67
MALLARD			
8.2.66	*Akerselva, Oslo, Norway	Simonburn, Northd.	21.1.67

Date and place ringed		*Place recovered*	*Date recovered*
TEAL			
11.9.67	*Sonderho Decoy, Fano, Denmark	Lindisfarne N.N.R.	19.9.67
GREAT BLACK-BACKED GULL			
July 1965	Great Ainov Island, Murmansk, U.S.S.R.	Beamish, Co. Durham	24.5.67
BLACK-HEADED GULL			
11.6.67	Sunbiggin Tarn, Orton, Westmorland	Whitley Bay	27.7.67
SWALLOW			
29.8.66(juv.)	Nr. Macclesfield, Cheshire	Haltwhistle, Northd.	3.8.67
23.1.67	*Kimberley, N. Cape, S. Africa	Riding Mill, Northd.	1.7.67
SAND-MARTIN			
2.8.66(juv.)	Nr. Boston, Lincs.	Greenhead, Northd.	31.7.67
BLACKBIRD			
17.4.66	*Storrkarr, Vastergotland, Sweden	Bamburgh **A**	11.3.67

NOTES: 1. * Indicates bird ringed as adult or full grown
2. (w) Indicates bird ringed as 1st winter
3. (juv.) Indicates bird ringed as juvenile
4. All other birds ringed as pullus
5. **A** indicates bird was found alive (in some cases controlled by another ringer)

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REFERENCES

BELL, D. G. (1967). Ornithological report for Northumberland and Durham for 1966. *Trans. nat. Hist. Soc. Northumb.* **16,** 197.

PARRACK, J. D. (1966). Sea-watching in Northumberland. *Seabird bulletin* **2,** 32.

ORNITHOLOGICAL REPORT FOR THE FARNE ISLANDS FOR 1967

Compiled by

GRACE HICKLING

INTRODUCTION

Principal contributors to this report are C. M. Adamson, F. Y. Bodger, J. C. Coulson, M. F. Gill, I. K. Marshall, G. R. Potts, Miss J. M. Spriggs (now Mrs. Horobin) and the compiler. Others who have helped with the ringing, or have provided records, include C. Brown, W. P. Laidler, N. P. E. Langham, W. Shiel, visitors to the Study Centre, students from the University of Durham and members of the Natural History Society, including C. J. Almond, Mrs. H. E. Almond, Miss S. Appleby, M. and T. H. Bell, E. Cook, C. L. Davidson, A. E. and A. M. Hingston, F. G. Grey, B. Little, R. Lowes, B. Mortimer, M. Riley and J. D. Tully. As in previous years, the initials of an observer are given only when a species is either difficult to identify or occurs infrequently or at an unusual time.

In this report, as in the county ornithological report, the classified notes, and ringing recoveries, are arranged in the order given in the *Check-List of the birds of Great Britain and Ireland* (1952), published by the British Ornithologists' Union.

GENERAL

Although there was comparatively little snow and frost during the early months of the year gales were practically continuous and, accordingly, there are no observations between 14 January (when C. M. Adamson and the compiler visited the islands) and 22 April (the date on which F. Y. Bodger and G. R. Potts arrived on Brownsman). The Study Centre on Inner Farne was manned from 3 May until mid-August.

By 23 April, some seventy shags had laid on Staple Island with a further forty on Brownsman and two days later (on the unusually early date of 25 April) the first kittiwake eggs were found. 25 April also produced a small fall of migrants, fieldfares, blackbirds, wheatears, robins, garden and willow-warblers being seen on Brownsman while a flock of some fifty fieldfares was noted flying towards the mainland.

The main passage was in early May when, following a period of south-east winds (which at times reached gale force 8), many migrants arrived on the islands. Peak numbers occurred on 6 May, a day which G. R. Potts later described as the "best" in the five years during which he has stayed on Brownsman in spring. Observers on Inner Farne and Brownsman recorded a total of six skylarks, one shorelark, nine swallows, one house-martin, some one hundred and fifty fieldfares, one song-thrush, five redwings, one ring-ouzel, two blackbirds, more than thirty wheatears, five whinchats, four redstarts, one robin, two sedge-warblers, three blackcaps, one common and two lesser whitethroats, nine willow-warbler/chiffchaffs, one wood-warbler, one goldcrest, two pied fly-catchers, at least four tree-pipits, six wagtails, four linnets and two bramblings. In addition, a jack snipe and a green sandpiper were seen on Inner Farne and two turtle doves on the Outer Group. Accompanying the south-east winds was a very heavy south-east swell; on 4 May waves were breaking right over the top of Skeney Scar and conditions were still bad on 6 May with the result that nearly two hundred shags' nests were washed away.

Puffins suffered considerably as the result of weather. Many early eggs were lost when burrows were flooded at the beginning of May and, although the birds relaid, there was further heavy rain in June and July and the nesting success, particularly at the south end of Brownsman, must have been small. On 28 June burrows in this area were half-full of mud while on 18 July, following very heavy and prolonged thunderstorms on 14 and 17 July, not only were the surface ponds on Brownsman and Inner Farne filled to capacity, but pools of standing water were widespread on the islands—the water was several inches deep in the Brownsman burrows. These July storms, and an accompanying heavy swell, also caused the death of considerable numbers of young terns and kittiwakes.

The most disturbing feature of the breeding season was, however, the absence of nesting eiders, particularly on Inner Farne. Here there were not more than 300 ducks, compared with 667 in 1965 and 825 in 1966, while only half the usual number were on Brownsman. According to I. K. Marshall, who has made a special study of this species, a similar situation prevailed along much of the east coast of Great Britain, a possible explanation being that the cold, wet, windy weather in May had upset the nesting pattern. He added that there appeared to have been no undue mortality among eiders, but, despite a careful search of the adjoining mainland, he had been unable to trace the whereabouts of most of the missing Inner Farne birds.

In pursuit of its efforts to control the numbers of nesting lesser black-backed and herring-gulls the Farne Islands Local Committee issued licences to three Seahouses fishermen to collect gulls' eggs on the Wideopens, Wamses and Harcars. As in 1966, licences stipulated that collection must be carried out until there was no chance that young birds would be reared, but, unfortunately, this stipulation was not fulfilled. On 23 June, some 500 eggs (the majority on the south island) were destroyed during a brief visit to the Wamses; these included, in addition to single eggs, many clutches of two and three. Despite this, by 11 August there were large numbers of young of varying ages on these islands although there were definitely fewer on the South than on the North Wamses. Similar large numbers of young fledged on the Harcars and Wideopens.

Once again, comparatively few visits were made during the last four months of the year and there is therefore no information about the autumn passage.

One addition, the partridge, was made to the systematic list. The bird was seen on Inner Farne on 6 May, a day of persistent rain, with force 5-6 south-east winds, when, as already reported, considerable numbers of migrants were on the islands, but was probably merely a casual visitor from the mainland.

CLASSIFIED NOTES

4. Red-throated Diver *Gavia stellata*

1 in flight in the Fairway on 14 Dec. (JCC).

16. Manx Shearwater *Procellaria puffinus*

A shearwater, thought to be of this species, seen flying in the Fairway on 14 Jan. (CMA, WS). Several off Brownsman 22-26 Apr. and small numbers recorded in late June, July and early Aug.

26. Fulmar Petrel *Fulmarus glacialis*

No egg was found on South Wamses, but some 7 pairs nested on both Brownsman and Staple Island and at least 23 pairs on Inner Farne. No young were reared on the Outer Group, but 5 chicks were ringed on Inner Farne on 1 Sept. and 3 others probably fledged earlier.

28. Cormorant *Phalacrocorax carbo*

The old-established site on North Wamses was deserted and the colony (which split into several small groups) moved north, and also east towards the sea. On 23 June there were 120 occupied nests while a further 40 were either empty, or incomplete. 95 young, representing some 38-39 broods, were ringed on 11 Aug.; they varied in age from a few days to about 5 weeks and at least 1 nest still contained an egg. A nest of tiny young was seen on 1 Sept. A count made on Megstone on 13 June showed a total of 62 occupied and 7 empty nests; unfortunately, there is no later information about breeding numbers.

29. Shag *Phalacrocorax aristotelis*

G. R. Potts reports as follows:—

The adult survival rate was above average throughout the year, reflecting the absence of prolonged winter storms. In fact, it was a storm during the breeding season which dominated the year's activities. Approximately 200 nests were destroyed in the south-easterly swell of 5 and 6 May. Eggs had been laid in 160 of the nests and in the majority of cases they contained complete clutches; some had been incubated for more than 3 weeks. On the other hand, 90% of the birds which lost eggs laid a repeat clutch.

The maximum number of nests, reached on 1 June, was 360 (or 4% up on 1966). This increase was about half that in the colonies in south-east Scotland which were not so exposed to the May storm. On the Farnes, the most significant change in distribution was that 6 pairs nested on East Wideopens and 5 pairs attempted to nest on interior ledges of Skeney Scar. As shags increase, albeit at a lower rate than formerly, they spread into areas that are more exposed to the rapidly increasing herring-gull population. Only 3 eggs were taken by herring-gulls in 1963, but by 1967 the numbers had risen to 40. Such increased predation, combined with the increasing proportion of nests that are exposed to heavy seas, probably account for some of the decreased rate of increase of the shag on the Farnes.

During 1964-1967 a study of the possible adverse effects of the organo-chlorine insecticide, dieldrin, on the shag population has been carried out. An account of the distribution of dieldrin in the marine life in the Farne area has been published (Robinson *et al.*, 1967). A higher concentration of dieldrin was found in the shag than in any other species although there is considerable evidence that the level is not lethal (Potts, 1968a); it appears, however, that the dieldrin may be the cause of disturbed incubation in a small proportion (<6%) of the breeding population (Potts, 1968b). Fortunately, recent evidence indicates a decrease in the level of dieldrin in the marine fauna following the 1966 restrictions on the use of insecticides.

53. Shoveler *Spatula clypeata*

Brownsman: a pair on 6 May and 1 on 8-9 Aug.

61. Long-tailed Duck *Clangula hyemalis*

1 in the Kettle on 17 Nov.

67. Eider-Duck *Somateria mollissima*

Some 360-410 ducks are known to have nested—250-300 on Inner Farne, 102 on Brownsman, 6 on Staple Island, 1 on North Wamses and 1 on Longstone. 2 nests (containing respectively 1 and 3 eggs) were on Inner Farne on 25 Apr. and 2 days later nesting started on Brownsman. The season was unusually protracted; on Inner Farne, the last duck hatched on 2 Aug. and on 12 Aug., when the watchers came ashore, a duck was still sitting on Staple Island.

A duck nesting on Inner Farne had been ringed there, as an adult, in 1953.

73. Sheld-Duck *Tadorna tadorna*

No evidence of nesting, but pairs seen on Brownsman on 26 Apr., on Staple Island on 19 June and on Inner Farne on several days in May.

75. Grey Lag-Goose *Anser anser*

North Wamses: 2 on 19 and 27 June; 6 on 1 July.

82. Canada Goose *Branta canadensis*

2 on Scarcars on 2 Sept. (WPL).

93. Sparrow-Hawk *Accipiter nisus*

Inner Farne: 1 on 29-31 July. Last recorded in 1964.

110. Kestrel *Falco tinnunculus*

Brownsman: a male killed a young arctic tern on 3 Aug.

116. Partridge *Perdix perdix*

Inner Farne: 1 on 6 May (NPEL, IKM). First record for the Farnes.

125. Corncrake *Crex crex*

A male on Brownsman 13-17 May (FYB). An infrequent visitor and last recorded in 1964.

126. Moorhen *Gallinula chloropus*

Remains of a dead bird found on Brownsman on 25 Apr. (GRP).

131. Oystercatcher *Haematopus ostralegus*

At least 17 pairs known to have nested—9 on Brownsman, 4 on Staple Island and 4 on Inner Farne. The usual flock of non-breeding birds was seen on the Inner Group in May and June (maximum 100 on 10 June).

134. Ringed Plover *Charadrius hiaticula*

A total of 13-15 pairs nested on Brownsman, Staple Island and Inner Farne.

143. Turnstone *Arenaria interpres*

As in 1966, numbers on Inner Farne reached a maximum (*ca.* 200 compared with *ca.* 400) on 7-8 Aug.

147. Jack Snipe *Lymnocryptes minimus*

Inner Farne: 1 on 6 May (NPEL, IKM). Fifth record since 1922 and last seen in 1959.

150. Curlew *Numenius arquata*

300-400 on Longstone on 19 July was the largest flock recorded.

151. Whimbrel *Numenius phaeopus*

Brownsman: 1 on 29 Apr. and 6 May. Staple Island: *ca.* 5 on 1 Sept.

154. Black-tailed Godwit *Limosa limosa*

Brownsman: 1 seen several times on 9 Aug. (CMA). Third record for the Farnes.

156. Green Sandpiper *Tringa ochropus*

Inner Farne: 1 on 6 May (NPEL, IKM).

159. Common Sandpiper *Tringa hypoleucos*

Inner Farne: 1 on 7-8 May.

165. Greenshank *Tringa nebularia*

Inner Farne: 1 on 9 Aug.

169. Knot *Calidris canutus*
No large flocks seen, but small parties (numbering 2-6) recorded in Jan., July, Aug. and Sept.

170. Purple Sandpiper *Calidris maritima*
Largest numbers again recorded in early May when over 100 were on Inner Farne. Autumn maximum: *ca.* 50 on Brownsman on 10 Aug.

181. Sanderling *Crocethia alba*
Brownsman: 1 on 9-10 Aug. (CMA, FYB).

184. Ruff *Philomachus pugnax*
Brownsman: a reeve seen from late July to 10 Aug. (CMA).

193. Arctic Skua *Stercorarius parasiticus*
Several seen near Brownsman in late Apr. and other records in July and Aug.

194. Great Skua *Stercorarius skua*
A bird, which had died some 4-5 weeks earlier, was found on East Wideopens on 1 June; it had been ringed on Foula on 19 July 1965 (see page 289), a movement of 310 miles south. 1 flew south off Brownsman on 22 June.

200. Herring-Gull *Larus argentatus*
2 herring-gulls, ringed by J. Parsons on the Isle of May, were found dead on the Farnes in autumn (see page 288).

211. Kittiwake *Rissa tridactyla*
Nests at some recently established sites had increased as follows—Megstone: 2 occupied and 4 empty (2, both empty, in 1964); Staple Island, gut: 4 (2 in 1966); Staple Island, north end: 20-30 (11 in 1966); Skeney Scar, gut: 14 (5 in 1966); Brownsman, centre (new colony overlooking Brownsman's Gut): 13. No counts were made at the main Brownsman and Staple Island colonies, but 556 nests were recorded on Inner Farne on 18 May.
A nesting bird had been ringed as an adult in 1954.

217. Common Tern *Sterna hirundo*
Although common terns were still much less numerous than arctic terns, ringing figures bear out the impression that nesting pairs had increased on both Brownsman and Inner Farne.

218. Arctic Tern *Sterna macrura*
A rough estimate by Mrs. Horobin indicated that more than 2,000 pairs nested on Inner Farne—virtually the same as in 1966. 30-40 pairs were on Staple Island while on Brownsman the main concentrations were in Pinnacles Haven, the North Cove and on the flat below the cottage and adjacent areas. On 22 June *ca.* 50 were reported on Northern Hares, but on 19 July, although about 100 terns (mostly common) were flying overhead, no eggs or young birds were found on this island and only 2 clutches on Longstone End. Eggs were laid on Brownsman on 20 May (a day earlier than on Inner Farne) and young were flying by 10 July; despite this, 2 clutches did not hatch until 3 and 5 Aug. A few nests were decorated with the red cords used to identify dead seal calves.

219. Roseate Tern *Sterna dougallii*
Some 24-25 pairs nested on Brownsman, a figure still considerably below the 1965 total of 37 nests. No count was made on Inner Farne, but it was thought (JMH) that numbers had increased; 30 young were ringed here and 25 on Brownsman. On Brownsman, the breeding season extended over a considerable period: 4 tiny young were found on 30 June; on 2 Aug. there were still 4 unhatched eggs, while as late as 9 Sept. an adult, carrying food, was flying over the colonial area.

223. Sandwich Tern *Sterna sandvicensis*
The whole colony (some 1,500-2,000 pairs) was again at the north end of Brownsman. Birds arrived in 2 main groups, the first eggs being laid on 18 May, but smaller parties continued to arrive and on 2 Aug. a few eggs were still being incubated. Unlike 1966, most clutches contained 2 eggs while at least 12 had 3 and, probably as a result of this, the numbers of young ringed had increased from 1,388 to 1,689. On 10 July, several colour-ringed birds were seen (NPEL). The majority (maximum 14) had been ringed in 1965, but 1 bird, ringed on 1 July 1961, had been controlled at the Sands of Forvie in June 1965 and seen at Teesmouth on 17 Aug. 1966 (Bell, 1967). 2 more Farne birds were found nesting in the Sands of Forvie colony while, for the first time, an Irish-ringed Sandwich tern was recovered (found dead) on the Farnes (see page 289).

224. Razorbill *Alca torda*
As in 1966, some 50-60 razorbills frequented the Outer Group in June. 2 young fledged from nests on the Inner Farne stack while the only 2 nesting pairs on Staple Island lost their eggs.

226. Little Auk *Plautus alle*
1 in Pinnacles Haven on 14 Dec.

227. Guillemot *Uria aalge*
An all-white guillemot, which may have been the bird observed on the Scarcars in 1966 (Hickling, 1967), was seen off Staple Island on several occasions throughout the summer. Although the Pinnacles were practically deserted by 31 July, an adult and chick were still on Skeney Scar on 18 Aug.

230. Puffin *Fratercula arctica*
A bird found dead on Brownsman in early summer had been ringed here as an adult on 11 Apr. 1955. This is the oldest Farne-ringed puffin yet recovered.

232. Stock-Dove *Columba oenas*
A pair remained on Brownsman-Staple Island from 22 Apr. to 1 May.

234. Wood-Pigeon *Columba palumbus*
Brownsman: 1 on 6 May.

235. Turtle-Dove *Streptopelia turtur*
Single birds on Inner Farne on 5 May, on Brownsman on 6 May and on Staple Island 5-7 May.

237. Cuckoo *Cuculus canorus*
Inner Farne: an immature mobbed by terns on 2 Aug.

248/249. Owl sp. *Asio otus/A. flammeus*
An owl, probably short-eared, but possibly long-eared, got up from Staple Island as the helicopter came down on 8 Nov.

273. Shore-Lark *Eremophila alpestris*
Brownsman: 1 (in full breeding plumage) on 6 May (GRP, FYB). Third record since 1886 and last seen in 1961.

308. Blackbird *Turdus merula*
No nest was found on either Inner Farne or Brownsman, but on 20 May 2 juveniles were in the "Fishe House" while between 17 and 28 May a female was seen carrying food near the Brownsman beacon lighthouse.

324. Bluethroat *Cyanosylvia svecica*
Brownsman: a female on 30 May (FYB). Eighth record for the Farnes and last seen in 1963.

337. Sedge-Warbler *Acrocephalus schoenobaenus*
Inner Farne: 1 on 6 May. Brownsman: 1 on 6 May and 2 on 7 May.

343. Blackcap *Sylvia atricapilla*
Inner Farne: a female on 6 May and a pair on 7 May. Brownsman: a pair on 6 May.

346. Garden-Warbler *Sylvia borin*
Inner Farne: 1 on 4, 7 and 11 May; 1 found dead on 16 May. Brownsman: included in movement of 25 Apr.; 5 found dead on 14 May; 1 on 9 Sept.

347. Whitethroat *Sylvia communis*
Inner Farne: 1 on 7 May; 2 on 11 May. Brownsman: 1 on 6 May.

348. Lesser Whitethroat *Sylvia curruca*
Brownsman: 2 on 6 May.

354/356 Willow-Warbler/Chiffchaff *Phylloscopus trochilus/P. collybita*
A *Phylloscopus* warbler (not definitely identified, but probably *P. c. tristis*) was on Brownsman on 10 Nov. This is 2 days after the previous latest recorded date (Hickling, 1967).

357. Wood-Warbler *Phylloscopus sibilatrix*
Brownsman: 1 on 6 May.

368. Pied Flycatcher *Muscicapa hypoleuca*
Brownsman: a pair seen 6-8 May were found dead on 10 May, probably due to cold, stormy weather and the accompanying shortage of insect food.

373. Meadow-Pipit *Anthus pratensis*
A pair nested on Brownsman and reared 2 broods. This species breeds occasionally on the Farnes, the last record being on Inner Farne in 1962.

376. Tree-Pipit *Anthus trivialis*
Brownsman: at least 4 on 6 May; 1 on 12 and 15 May. Inner Farne: 1 on 21-22 May.

380. Pied Wagtail/White Wagtail *Motacilla alba yarrelli/M. a. alba*
On 6 May, 2 white wagtails on Inner Farne and at least 3 (with a pied wagtail) on Brownsman.

382. Yellow Wagtail *Motacilla flava*
Inner Farne: 1 on 7-8 May.

393. Goldfinch *Carduelis carduelis*
Inner Farne: 2 on 4 May. An infrequent visitor, last recorded in 1963.

394. Siskin *Carduelis spinus*
A male on Inner Farne on 16-19 May. An infrequent visitor, last recorded in 1965.

397. Redpoll *Carduelis flammea*
1 lesser redpoll on Brownsman on 25 Apr. An infrequent visitor, last recorded in 1965.

425. Tree-Sparrow *Passer montanus*
Brownsman: 1 on 8 May. An infrequent visitor, last recorded in 1963.

OTHER SPECIES

The following species, although not dealt with in detail, were recorded: gannet, heron, mallard, wigeon, common scoter, lapwing, golden plover, redshank, dunlin, great black-backed gull, lesser black-backed gull (breeding), black-headed gull, swift, skylark, swallow, house-martin, carrion-crow, jackdaw, wren, fieldfare, song-thrush, redwing, ring-ouzel, wheatear, whinchat, redstart, robin, goldcrest, rock-pipit (breeding), starling (breeding), linnet, chaffinch, brambling, snow-bunting.

RINGING

During the year 6,130 young and 241 adults were ringed: this is 340 more than in 1966. The numbers of individual species were as follows, the 1966 figures being given, for comparison, in brackets:— fulmar 5 (12); cormorant 160 (138); shag 414 (419); eider-duck 7 (572); ringed plover 1 (—); lesser black-backed gull 2 (9); herring-gull 1 (5); kittiwake 1,206 (1,273); common tern 322 (136); arctic tern 2,333 (1,789); roseate tern 55 (37); Sandwich tern 1,689 (1,388); guillemot 148 (103); puffin 28 (55). In addition, 31 adults (48 in 1966) were re-ringed.

The lists which follow show that 752 Farne-ringed birds were recovered in 1967. In addition, many nesting shags were either controlled, or identified from their colour-rings: the exact numbers are, however, not yet available. The reduction in nesting eider-ducks was accompanied by a fall in the numbers of ducklings and very few eiders were ringed; nevertheless, there were 238 recoveries on the islands, the majority sight records of colour-ringed birds. Mrs. J. M. Horobin continued her work on arctic terns on Inner Farne and among the birds controlled were three of the 99 pulli ringed by T. R. Goddard in 1947 (Hickling, 1967, page 234). Details are as follows:—

Date and place of ringing		*Recovery date (nesting)*
29.6.47	Inner Farne	(1)18.5.54
		(2) 8.7.67
,,	,,	(1) 1.6.55
		(2) 3.7.67
30.6.47	Brownsman	(1)14.6.66
		(2)25.5.67

This means that out of eight birds recovered, four are known to have still been nesting in 1966 and 1967.

In contrast with 1965 and 1966, there has been no "wreck" of shags and this is reflected in the fact that only 24 shags (ten of them local) have been recovered away from the islands. One of these (101.6908) is of particular interest. It was ringed as a breeding adult in 1963; on 22 May 1965 G. R. Potts found it breeding on the Isle of May (see Hickling, 1966, page 119) and on 15 July 1967 it was controlled by P. Yeoman in the colony on the Bass Rock, 8 miles to the south-south-west. Kittiwake recoveries have been widespread, localities including Newfoundland, Greenland, Eire, Norway, Germany (both inland), Holland, France (one inland), Spain, Portugal and Italy.

RECOVERIES OF RINGED BIRDS

Date ringed	*Place recovered*	*Date recovered*

(a) Ringed on the Farne Islands

CORMORANT

(Total: 25; Farne Is.: 3; local: 1)

15.8.53	La Grande Briére, Loire Atlantique, France (killed)	probably before 1956
9.6.61	Île de Ré, Charente Maritime, France	12.2.67
20.6.61	Sacriston, Co. Durham	*ca.* Nov. 1965
21.6.63	Tynemouth, Northd. (oiled; released 8.8.67)	17.4.67
13.7.64	Broughty Ferry, Angus	2.1.67
,,	Blyth, Northd.	(15.1.67)
25.7.64	Blyth	(6.1.67)
21.6.66	Berwick upon Tweed, Northd.	(24.2.67)
3.7.66	Grimsby/Cleethorpes boundary, Lincs. (drowned)	(19.1.67)
,,	Amble, Northd.	25.6.67
19.7.66	Bridlington, Yorks. (oiled)	11.6.67
6.8.66	Robin Hoods Bay, nr. Whitby, Yorks.	4.1.67
,,	Runham, R. Bure, Norfolk (**inland recovery**)	5.1.67
,,	Montrose Basin, Angus (shot)	*ca.* 1.3.67
,,	R. Coquet, Northd. (shot)	19.3.67

Date ringed	*Place recovered*	*Date recovered*

CORMORANT—*continued*

6.8.66	Highmead, R. Teifi, nr. Lampeter, Cardiganshire (**inland recovery**)	8.4.67
19.6.67	Between Mersea Island and Tollesbury, Essex (oiled)	Sept.-Dec. 1967
12.7.67	Blithfield Reservoir, Rugeley, Staffs. (shot)	autumn 1967
11.8.67	Blithfield Reservoir (shot)	autumn 1967
,,	Old Hunstanton, Norfolk	4.12.67
1.9.67	Nr. Woodhall Spa, Lincs. (shot)	(7.11.67)

SHAG

(Total: 36; Farne Is.: 12; local: 10)

20.6.61	Spittal, Tweedmouth, Northd.	19.2.67
16.6.62	Cresswell, Northd.	(8.4.67)
,,	St. Abbs, Berwickshire	26.5.67
23.6.62	Whitley Bay, Northd.	18-19.2.67
22.7.63	*Bass Rock, E. Lothian (controlled)	15.7.67
22.7.64	Warkworth, Northd.	5.2.67
1.7.66	Portgower, Helmsdale, Sutherland	11.6.67
8.7.66	Leith, Edinburgh, Midlothian (1) (seen alive)	1.2.67
	(2)	*ca.* 7.2.67
16.7.66	Whitley Bay	14.1.67
,,	Nr. Brora, Sutherland	(24.2.67)
,,	Flamborough Head, Yorks.	27.3.67
19.7.66	Portobello, Edinburgh (oiled)	(13.4.67)
19.6.67	Newbiggin-by-the-Sea, Northd.	29.12.67
25.7.67	Flamborough Head (oiled)	(5.12.67)

EIDER-DUCK

(Total: 250; Farne Is.: 238; local: 9)

2.6.58	*St. Monance, Fife	15.2.67
16.5.59	*St. Andrews, Fife	*ca.* 15.12.67
5.6.66	Berwick upon Tweed	20.3.67

LESSER BLACK-BACKED GULL

(Total: 17; Farne Is.: 3; local: 3)

22.8.61	Skhirra, nr. Gabes, Tunisia	June 1967
14.8.63	Albufera Lake, Valencia, Spain (taken)	28.9.66
11.8.64	Claouey, Arès, Gironde, France	3.1.67
,,	Strachen, Banchory, Kincardineshire (injured wing; flew off later)	12.5.67
,,	Stenhousemuir, Larbert, Stirlingshire	14.6.67
,,	Morton-on-Swale, Northallerton, Yorks.	(11.8.67)
27.8.64	Ednam, Kelso, Roxburghshire (found unable to fly)	21.5.67
17.8.65	Mira, Beira Litoral, Portugal (killed)	Jan. 1967
,,	Ellastone, Staffs. (found with broken wing)	(3.6.67)
,,	Wetherby, Yorks. (shot)	10.8.67
,,	Baie de Somme, Somme, France (released)	28.8.67

Date ringed	*Place recovered*	*Date recovered*
Herring-Gull		
	(Total: 1; Farne Is.: 1; local: –)	
Kittiwake		
	(Total: 58; Farne Is.: 35; local: 1)	
1.6.56	*Newbiggin-by-the-Sea	(8.6.67)
3.7.56	*Cayton Bay, Scarborough, Yorks.	Apr. 1967
23.6.58	*5 naut. m. N.E. of Flamborough Head (came down on ship oiled; destroyed)	18.4.67
22.7.59	Great Yarmouth, Norfolk	23.6.67
14.7.60	Baie d'Authie, Somme, France	12.11.67
29.6.61	Great Saltee, Co. Wexford, Eire	9.7.67
7.7.61	Nr. Noordwijk-aan-Zee, Zuid Holland, Netherlands	11.4.67
16.7.61	Einfeld, Neumünster, Schleswig-Holstein, Germany (oiled—**inland recovery**)	25.3.67
7.7.62	N. Sea, 25 m. E.S.E. of Farnes (taken on boat)	14.4.67
6.7.65	Manitsoq, Agto, Egedesminde, Greenland (shot)	20.8.67
10.7.65	Nr. Nairn	27.6.67
,,	Nr. Colmar, Haut Rhin, France (**inland recovery**)	Sept. 1967
2.7.66	*Knüppeldamm, nr. Wredenhagen, Röbel/Müritz, Mecklenburg, Germany (found exhausted—**inland recovery**)	24.2.67
14.7.66	Off Skipness Point, Kintyre, Argyllshire (released)	5.6.67
,,	Bonavista, Newfoundland (shot)	(31.10.67)
,,	Espinho, Douro Litoral, Portugal	18.12.67
16.7.66	5 m. S. of Rothesay, Bute	26.1.67
,,	Julianehâb, Greenland (shot)	28.8.67
1.7.67	Rattray Head Lighthouse, Aberdeenshire	29.8.67
,,	Between Guetaria and Zarauz, Guipuzcoa, Spain	2.11.67
,,	Hvittingfoss, Buskerud, Norway (injured against wire when chased by crows; destroyed)	7.11.67
19.7.67	15 m. S. of Capo dell Armi, Calabria, Italy (caught by fisherman; died)	5.11.67
Common Tern		
	(Total: 7; Farne Is.: –; local: 2)	
30.7.64	Bedlington, Northd. (?shot)	23.7.67
17.7.66	Accra, Ghana (trapped alive)	21.12.67
6.7.67	At sea, 40-50 kms. off Conakry, French Guinea (/?/)	10-12.11.67
19.7.67	Agadir, Morocco (washed up alive; flew off later)	7.10.67
28.7.67	Reighton Gap, Filey, Yorks.	14.9.67
Arctic Tern		
	(Total: 258; Farne Is.: 243; local: 4)	
5.7.51	St Cyrus, Kincardineshire	July 1967
9.7.57	Chesil Bank, nr. Weymouth, Dorset	12.9.67

Date ringed	*Place recovered*	*Date recovered*
Arctic Tern—*continued*		
15.7.62	Newbiggin-by-the-Sea	22.8.67
20.6.64	Steinsfjorden, Tyrifjorden, Buskerud, Norway (**inland recovery**)	30.5.67
4.7.64	Nr. Newbiggin-by-the-Sea	June 1967
24.6.67	Victoria, W. Cameroons	7.10.67
4.7.67	12 m. N.E. of Scarborough (landed on fishing boat; died later)	10.8.67
5.7.67	Port Elizabeth, Cape Province, S. Africa	24.12.67
7.7.67	Genouillé, nr. Muron, Charente Maritime, France (killed)	early Oct. 1967
28.7.67	Eden Estuary, St. Andrews	6.8.67
,,	Between Cley and Blakeney, Norfolk	2.9.67
Roseate Tern		
	(Total: 2; Farne Is.: –; local: 1)	
21.7.67	Freetown, Sierra Leone (found alive)	7.12.67
Sandwich Tern		
	(Total: 51; Farne Is.: 2; local: 9)	
22.6.60	Sands of Forvie, Newburgh, Aberdeenshire (sight record in colony)	1.6.67
,,	S. Gare, Teesmouth, Yorks.	8.6.67
21.7.60	Amble	11.7.67
20.6.61	Sands of Forvie (controlled)	10.6.67
22.7.61	St. Louis, Sénégal (caught; died later)	Feb. 1967
,,	Ferrybridge, Knottingley, Yorks. (**inland recovery**)	19.6.67
10.7.63	Crimdon, Hartlepool, Co. Durham	25.7.67
14.7.63	Old Hunstanton, Norfolk	13.5.67
16.7.63	Vila Real de Santo António, Algarve, Portugal (killed)	Jan. 1967
29.6.64	Po di Valano, Codigoro, Ferrara, Italy (killed)	13.5.67
14.6.65	Off Luanda, Angola (released)	(14.4.67)
19.6.65	Sagunto, Valencia, Spain	(19.4.67)
29.6.65	Between E. London and Hamburg, Cape Province, S. Africa	4.5.67
,,	Minsmere, Suffolk	6.9.67
1.7.65	Rufisque, Sénégal—2 birds (taken)	8.1.67
,,	Kedzie, nr. Keta, Ghana (caught; died later)	29.5.67
,,	Joal, Sénégal (taken)	27.9.67
14.7.66	M'Bao, nr. Rufisque (released)	8.9.67
16.7.66	Dangane, nr. Joal	12.3.67
27.7.66	Freetown (swallowed fish hook and line)	16.1.67
30.6.67	Amble	19.8.67
,,	L'Aiguillon-sur-Mer, Vendée, France (controlled)	4.9.67
,,	Joal (taken)	23.9.67
,,	Azemmour, Casablanca, Morocco	Oct. 1967
,,	At sea, off Mauritania (landed on ship)	7.10.67

Date ringed	*Place recovered*	*Date recovered*
SANDWICH TERN—*continued*		
30.6.67	Nr. Monrovia, Liberia (released)	11.11.67
,,	Afiadenyigba, nr. Keta	9.12.67
1.7.67	Nr. Dakar, Sénégal (killed by children)	29.9.67
,,	Off Monrovia (released)	10.11.67
,,	Rufisque (caught by children with baited fishing line)	13.11.67
,,	Anyako, nr. Keta (trapped)	21.12.67
5.7.67	Dakar (caught; died later)	12.10.67
7.7.67	Freetown (caught)	16.11.67
10.7.67	Nianing, nr. M'Bour, Sénégal (taken)	26.11.67
,,	Thiaroye-sur-Mer, nr. Dakar (trapped; died later)	2.12.67
19.7.67	Kayar, Sénégal (took baited fishing line; died next day)	1.10.67
,,	Afiadenyigba (trapped)	(27.11.67)
,,	Tema, Ghana (/?/)	11.12.67
,,	Murray Town, Freetown (released)	17.12.67
GUILLEMOT		
	(Total: 40; Farne Is.: 35; local: –)	
29.6.64	Schoorl, Noord Holland, Netherlands (oiled)	7.2.67
1.7.65	Nr. Castricum, Noord Holland	5.1.67
2.7.66	Sea Palling, Stalham, Norfolk	27.1.67
30.6.67	Waxham, nr. Stalham	9.9.67
3.7.67	Berck-Plage, Pas-de-Calais, France (oiled)	10.12.67
PUFFIN		
	(Total: 7; Farne Is.: 5; local: 1)	
14.7.62	*St Mary's Island, Whitley Bay	16.4.67

(b) Recovered on the Farne Islands, but ringed elsewhere

Date and place ringed		*Date and method of recovery*
SHAG		
2.8.64	Isle of May, Fife	30.4.67
25.7.65	Bass Rock	1967 (breeding)
EIDER-DUCK		
17.7.59	Budle Bay, Northd.—2 birds	1967 (controlled)
HERRING-GULL		
17.6.66	Isle of May	21.10.67 (died of peritonitis after swallowing 1¾″ hypodermic needle)
3.7.67	Isle of May	21.11.67

Date and place ringed		*Date and method of recovery*
SANDWICH TERN		
27.6.64	Burial Is., Ballyhalbert, Co. Down, Eire	30.6.67
GREAT SKUA		
19.7.65	Foula, Shetland	1.6.67

NOTES:
1. * Indicates bird ringed as adult.
2. (juv.) Indicates bird ringed as juvenile.
3. Unless otherwise stated all birds have been found either dying or dead, or are presumed dead.
4. Where the date of recovery is unknown, the date of the reporting letter is given in brackets.
5. "Local" recoveries include all birds (other than those on the Farnes) recovered within 15 miles of the islands.
6. "Controlled" indicates that a bird ringed by one ringer has been trapped (and released) by another ringer.
7. /?/ Indicates that the manner of recovery is unknown.

REFERENCES

BELL, D. G. (1967). Ornithological report for Northumberland and Durham for 1966. *Trans. nat. Hist. Soc. Northumb.* **16**, 197.

HICKLING, G. (1966). Ornithological report for the Farne Islands for 1965. *Trans. nat. Hist. Soc. Northumb.* **16**, 108.

(1967). Ornithological report for the Farne Islands for 1966. *Trans. nat. Hist. Soc. Northumb.* **16**, 226.

POTTS, G. R. (1968a). Success of eggs of the shag on the Farne Islands, Northumberland, in relation to their content of dieldrin and pp'DDE. *Nature, Lond.* **217**, 1,282.

(1968b). The influence of eruptive movements, age, population size and other factors on the survival of the shag. *J. Anim. Ecol.* (in the press).

ROBINSON, J., RICHARDSON, A., CRABTREE, A. N., COULSON, J. C. and POTTS, G. R. (1967). Organochlorine residues in marine organisms. *Nature, Lond.* **214**, 1,307.