

SCOTTISH BIRDS



THE JOURNAL OF THE
SCOTTISH ORNITHOLOGISTS' CLUB

Volume 8 No. 1

SPRING 1974

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THE JOURNAL OF THE SCOTTISH ORNITHOLOGISTS' CLUB
21 Regent Terrace, Edinburgh EH7 5BT

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SCOTTISH BIRDS

THE JOURNAL OF THE SCOTTISH ORNITHOLOGISTS' CLUB



Vol. 8 No. 1

Spring 1974

Edited by Squadron Leader Harry Greig

Editorial

Readers will now be well aware of the changes that have recently taken place in the Club Headquarters at Regent Terrace but, as a new name now appears at the top of the Editorial page, it would be inappropriate to let the occasion pass without further comment. Tom Delaney has for the past three years maintained the high standard set by his predecessor and it is encouraging to know that both are to be members of the Editorial Committee and will be available to give advice and assistance to your new editor. We would like to express our appreciation of the help and encouragement given by Tom during the transition period and for the gentle manner in which he has eased us into the editorial chair.

We will continue to welcome contributions on all matters of ornithological interest and importance in Scotland and hope that, with the help of contributors, we can continue to produce an interesting and informative journal.

Publication dates. Because of the delay experienced with the publication of the 1972 Scottish Bird Report the journal is now some weeks behind the scheduled dates. With the co-operation of Mr Walter Thomson, our printer, a programme has been planned for the publication of issues at approximately ten-week intervals for the remainder of 1974 and, if successful, this should result in the publication of the winter number during December.

This can only be accomplished, however, with the co-operation of contributors and we would ask them all to assist us to achieve this aim by checking and returning proofs with the minimum of delay.

Loch of Strathbeg. Professor Dunnet's paper on the impact of the oil industry on Scottish coasts which appears in this issue includes a short case history of the recent attempt to build a North Sea gas reception and transmission plant at Crimond airfield; this would have involved the laying of pipelines across the Loch of Strathbeg and nearby sand dunes. Fortunately for the future of this internationally important area attempts to divert this installation elsewhere were suc-

cessful and, since that time, the RSPB has established a Reserve at the Loch of Strathbeg and has appointed Mr Jim Dunbar, a native of Aberdeenshire, as warden.

The factors that combine to make this one of the greatest centres for wildfowl in Britain are its location within half-a-mile of the coast in the easternmost corner of Scotland and its area of 550 acres, which is large enough to provide a secure roost and yet shallow enough to afford rich feeding grounds. The ornithological importance of the loch has been recognised for at least 150 years and the first full account of its bird life by Thomas Edward, published in 1854, lists most of the breeding species. (Edward T., *Naturalist*, 1854, 239 (1854)). Wildfowl visiting the loch have now been counted once a month in winter for the past 19 years and some of the figures obtained appear in the paper by Professor Dunnet.

Shetland Bird Club. An increasing interest in ornithology in Shetland and concern over problems associated with oil development in the area have led to the formation of the Shetland Bird Club. When the idea was first publicised the response was immediate, and some 40 members had been enrolled by the time the inaugural meeting was held on 26th January 1974. Bobby Tulloch is the Club's first Honorary President, and many other well-known names already appear on the membership list.

In addition to promoting an increased interest in ornithology the Club aims to support conservation and to study and record all aspects of bird life in Shetland. It will also take over responsibility for the compilation of the Shetland Bird Report and it is hoped that the 1973 Report will be on sale by the time this appears in print.

Membership is open to anyone with an interest in Shetland birds and the subscription rates are £1.00 for adults and 50p for members under 16. Further details of the Shetland Bird Club can be obtained by writing to the Secretary, Iain Robertson, West Isle, Skerries, Shetland.

Change of local recorder. Bob McMillan has now taken over as local recorder for Perthshire in place of Valerie Thom. We take this opportunity to thank Valerie for the excellent work she has carried out in the past and feel sure that Bob will keep up the high standard set for the area. Bob's address is 29 Lewis Place, North Muirton, Perth.

Current literature. Recent material of Scottish interest includes:

Interactions between Gulls and Eiders in St Andrews Bay, Fife. O. E. Prys-Jones. *Bird Study* 20: 311-313.

Gannet nest with two chicks. P. Rowe. *British Birds* 67: 25.

Impact of the oil industry on Scotland's coasts and birds

G. M. DUNNET

Introduction

The exploration for oil and gas in the North Sea began to be considered in the late 1950's, and in 1958 agreement was reached in Geneva for the division of the continental shelf areas of the North Sea among the countries with North Sea coastline, for the exploration of mineral resources. The first discovery was gas at Schlochteren in the Groningen province of Holland in 1959. In 1962 preliminary survey work was carried out in the U.K. sector on behalf of the British Government. In 1964 the U.K. ratified the Geneva Convention and licences were awarded in September and December of that year for exploration.

The first off-shore gas field, West Sole, was discovered in 1965, and in 1966 further gas fields were discovered. In September 1966 the first oil discovery was made in Danish waters and in 1968 the first discovery of gas condensate was made in the central North Sea. The huge Ekofisk oil field was discovered by Philips in Norwegian waters of the central North Sea in December of 1969, but in 1970 attention switched from the southern North Sea and important oil and gas condensate discoveries were made at West Ekofisk, Eldfisk and Torfeld close to Ekofisk in Norwegian waters, and Josephine and Forties fields in the British sector. Since then there has been a continuous series of discoveries in the northern North Sea to the east of Shetland with the Auk and Frigg fields, the huge Brent field in 1971, and recently the Ninian and other fields. In fact so many reports are coming in each week that it is quite impossible to keep up-to-date.

In September 1972 known reserves already totalled over 700 million tons. This has since been increased to 800-1300 million tons and even this figure is expected to be increased substantially as other discoveries are confirmed as commercial fields. Discoveries known in September 1972 would support a daily production equivalent to the total currently supplied by the whole of Canada, and by 1980 the North Sea should supply two-thirds of Britain's oil requirements. We have for a long time associated oil fields with places like the deserts of the Middle East, Texas and the Gulf of Mexico and it still requires a considerable effort for us to realise that there is one of the largest oil fields in the world 12000 feet below the grey and

stormy North Sea and to the west of Shetland. It is important to realise that North Sea oil and gas are, relatively speaking, very close to one of the most densely populated industrial regions in the world.

Problems and technology

Most of the problems associated with finding and extracting oil and gas from the North Sea relate to the physical problems of the sea itself. The North Sea is one of the world's most difficult areas in which off-shore drilling takes place, with wave heights in winter over 15 feet for 20% of the time, and the severe storms that sweep the region regularly bring waves ranging up to 65 feet. In addition to this the work has to be carried out in high winds and low temperatures, far from land, and often in fog. Rigs operating there have experienced about 15% shut-down time, and supply and support operations to the exploration rigs, as well as to the production platforms, have been curtailed for almost 25% of the time.

This problem has been solved to some extent with the development of semi-submersible rigs which should lead to a substantial reduction in the cost due to delays when fixed rigs cannot operate.

North Sea weather imposes high costs on much of the operations in the oil industry. For example, when a ship's anchor damaged a gas pipeline from the Leman field, repairs had to be delayed because of bad weather, and the resulting loss was estimated at more than six million dollars.

In the face of the challenge of the serious environmental conditions which the North Sea offers many new ideas and concepts have been developed. Many of these are experimental, and it is important for us to realise that technology is being pushed to the very limit in much of these operations. Ideas for replacing production platforms with sea-floor completion systems are well under way and have been tried out in the Gulf of Mexico already; submarine service vessels are being considered, and many types of undersea storage are being developed from which oil will be pumped to tankers on the surface. These could present serious problems of control in case of accidents. Also being pioneered for the North Sea, especially by Norway, is the technology of concrete platforms incorporating within their structure huge storage facilities, usually on the sea bed, enabling production to continue even when it is impossible for tankers to come alongside to take away the oil; the million-barrel storage tank built of concrete at Stavanger and towed out to the Ekofisk field is a well known example.

Birds at risk

Clearly seabirds are vulnerable to damage resulting from the oil industry's activities and the greatest single source of danger is from oil pollution resulting from accidental spillage and leaks and from discharge of oil by ships at sea. Beach Survey results organised by the RSPB and the Seabird Group indicate the seriousness of this: up to 90% of dead birds on beaches are oiled. Birds are especially vulnerable (a) when concentrated at and around their breeding stations, (b) when concentrated in sheltered inshore areas for moulting (when many species are flightless) or for overwintering, and (c) when dispersed over their feeding grounds at sea. We now have data on these aspects of bird distribution, but much more are needed.

A preliminary map on distribution of breeding auks and wildfowl was prepared by the Nature Conservancy in 1971; this is now out of date. The results of the Seabird Group's "Operation Seafarer" (Cramp, Bourne and Saunders 1974) provides details of the distribution of all seabird colonies around the United Kingdom and Ireland, together with estimates of approximate breeding numbers in 1969. It is an invaluable aid to assessing risks. A plot of the major Scottish colonies shows how many are concentrated in areas likely to become involved in the oil industry (fig. 1). A minor oil incident involving residual fuel discharged from a ship in the central North Sea off Shetland in June 1971 killed considerable numbers of Guillemots, Puffins and Razorbills, and also some Gannets, Kittiwakes and Fulmars. About 1000 bodies were recovered, probably equivalent to 10000 killed. Large incidents of the *Torrey Canyon* type could be catastrophic in such areas when tides, currents and winds would quickly disperse floating oil around the islands. Data are available for Scaup, Scoter, Long-tailed Duck, Goldeneye and Eider which show marked concentrations in certain estuaries and bays. Such concentrations are highly vulnerable, especially when the birds are flightless. The incident on the Tay estuary involving a spillage from the tanker *Tank Duchess*, which caused massive mortality of Eiders in February 1968, is well documented (Greenwood and Keddie, 1968).

The attendance of auks and other seabirds at or near the colonies outside the breeding season is not fully understood, and work is still in progress. In favourable conditions some species such as Guillemots and Fulmars come to their colonies, or near to them, from mid October onwards, so that their vulnerability to oil pollution is not confined to the breeding season.

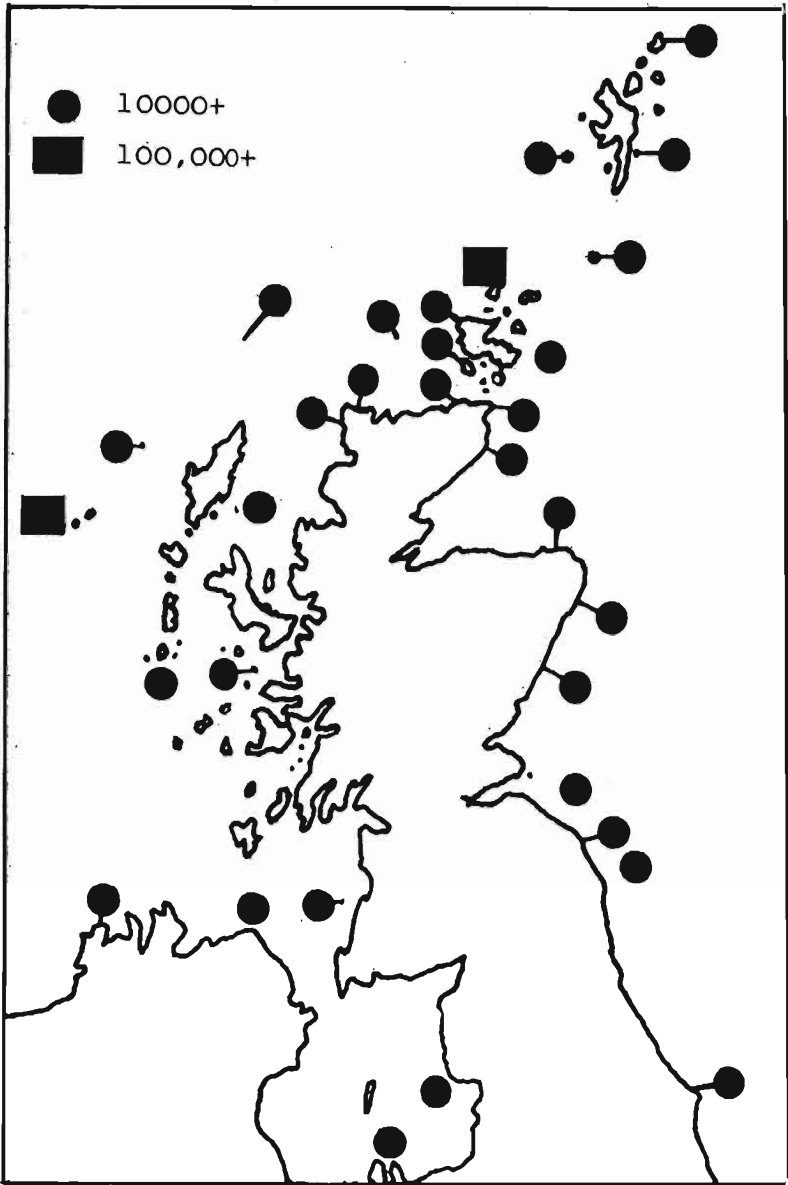


FIG. 1. Scottish seabird colonies reported to hold more than 10,000 pairs during the Seabird Group's survey "Operation Seafarer" in 1969.

Much less is known about the distribution of seabirds at sea. Dr Bourne is obtaining useful data on numbers and patterns of distribution of seabirds in the northern North Sea and off the west coast of Scotland. These data will provide a valuable base line for comparison with future surveys and will indicate areas and times when birds will be specially at risk.

Other likely problems arise from shore-based installations, and have affected or are likely to affect sand-dune habitats (Strathbeg-St Fergus and Ardersier), intertidal flats (Cromarty Firth), and moorland of various kinds (especially Shetland). These are important habitats for some relatively rare breeding birds such as Whimbrel and Sandwich Tern, and for wintering waders and waterfowl. Research is now going on to determine the patterns of movement of migratory waders and their feeding ecology, to provide a better understanding of their dependence on British estuaries.

In addition, the roads that may have to be built in hitherto remote areas will open up to tourists and others large tracts of land that have been almost inaccessible: land birds far from the sites of coastal development may thus be affected as an indirect consequence of the oil industry.

Impact on the environment

There are four kinds of installation at sea with which we have to be concerned: (i) the mainly steel, fixed or semi-submersible exploration rigs; (ii) the production platforms, much larger structures, more permanent, and built of steel or concrete; (iii) storage facilities at sea, and buoyed terminals for tanker loading; and (iv) pipelines. Although these structures are carefully designed to withstand the environmental conditions in which they will be installed, there are several sources of danger to birds. First of all there is the question of leakage and spillage of oil from any of these sources. Spillage is something that is bound to happen from time to time, and the oil companies have joined together to form a service to mop up spillages whenever they are found and as quickly as they can. However these precautions are not enough, as indicated by the spill of 400 tons of oil from the *Conoco Britannia*, which oiled Yorkshire's beaches in June 1973. The tanker went aground on a sunny afternoon, not far from the new pollution centre at Immingham on the Humber, yet the spill was not contained and floated out to sea on the ebb tide and was blown north to Flamborough. This demonstrates clearly that the time required to assemble and use the right equipment is so great that enormous damage can occur. If spillages occur at the oil fields in the North Sea they will often be over 100 miles from the nearest shore. Such slicks may well break up before reaching coasts.

We have a different problem when it comes to leakages. These are most likely from well heads and from pipelines. Delicate instrumentation will detect any major drop in pressure in any of these systems, and automatic devices will operate to close them down. We may assume that leakage at this level will be infrequent and should be fairly quickly detected and dealt with, though in bad weather this will be difficult. Slow seepages may happen from time to time in some of these installations. On overland pipelines in North America, seepages have been known to continue for a long time at a slow rate which could not be detected by the instruments installed for the purpose. This is potentially quite a serious hazard, and I understand that BP intend to patrol the length of their under-sea pipeline regularly by helicopter to detect any substantial leak of this type.

There are numerous types of on-shore installations that are important to us : (i) terminals for gas and for oil; (ii) refineries and petrochemical plants; (iii) rig-building sites—steel or concrete; (iv) service bases; and (v) pipelines.

The landfall of a pipeline has to be a gently shelving beach, with deep sand in which the pipe can be buried and within which it is safe from the effects of wave action and also from the activities of trawling and other fishing and shipping. There is always great concern that landfalls should be the shortest possible distance from the fields, and with pipelines costing £300000 or more per mile under sea, clearly a deviation of the line from the optimum site is undesirable from the developer's point of view.

Once the pipelines arrive on shore they are buried, and indeed one can see little sign of them, so that the impact there is minimal provided adequate care is taken for the rehabilitation of dunes and the prevention of blow outs, especially during winter. Gas, when brought ashore, has to be processed immediately at a terminal before being pumped into pipelines for the national grid. These terminals take up considerable amounts of land and have a big impact on the amenity of our coastline.

Oil pipelines by contrast can come ashore and pass, as the BP pipeline at Cruden Bay does, straight from its landfall through a small pumping station and overland to a refinery, in this case at Grangemouth and to a tanker terminal in the Forth.

There is only one refinery at the present time in Scotland, at Grangemouth, but there are suggestions for others to be built, at Sullom Voe, in the Cromarty Firth area, at Hunterston, at Campbeltown and at Loch Eriboll. Refineries are huge, unsightly installations and often attract to the area subsidiary

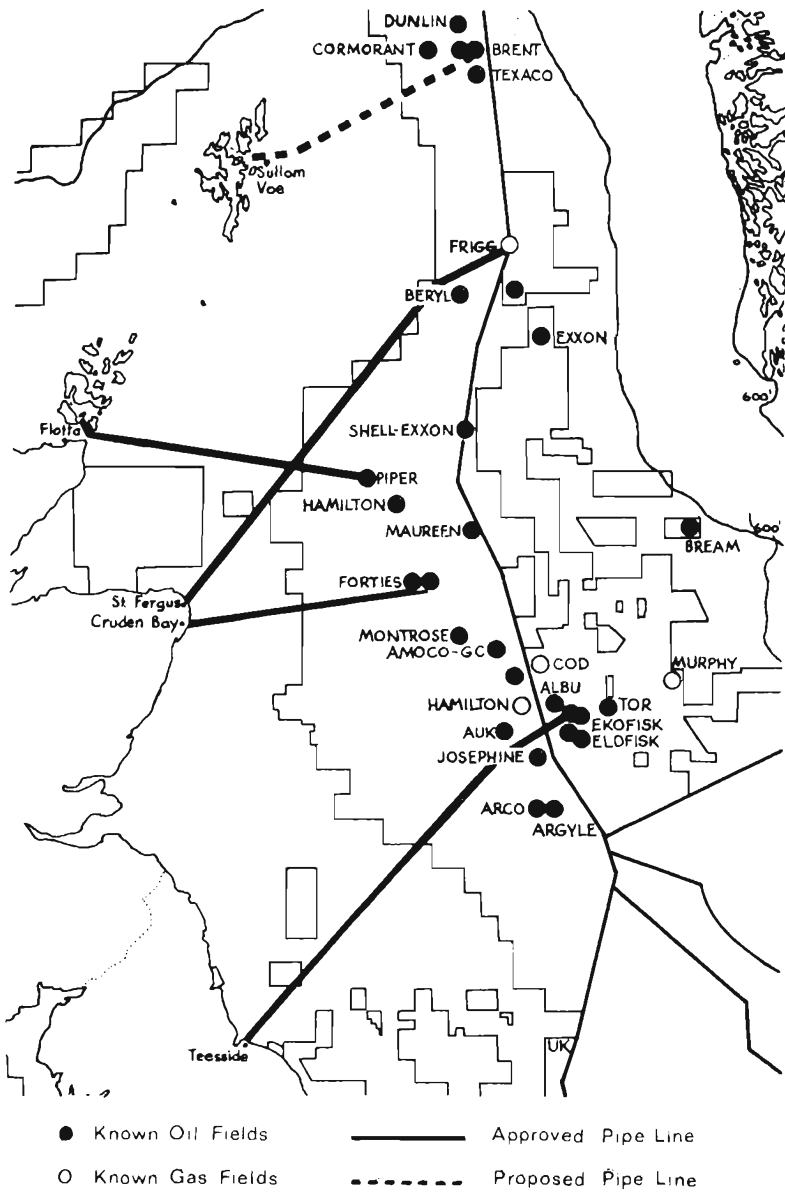


FIG. 2. Known oil and gas fields with approved and proposed pipelines—August 1973.

petrochemical industries. They also inevitably involve substantial tanker traffic. There has been such an outcry by environmentalists against the establishment of oil refineries in the United States and in Canada that it now looks as if American oil companies may try to establish refineries in Western Europe, including Scotland. This is a point we ought to have very much in mind and we should be quite clear about the advantages and disadvantages of having refineries in Scotland.

It is perhaps about rig-building sites that we have heard most in the Scottish situation. Production platforms sit on the bottom of the sea and extend above the surface. Those used in the North Sea at depths between 400 and 1000 feet must therefore be huge structures.

A steel platform made for Shell-Esso's Brent field and constructed at Methil in Fife has six legs and will rise 750 feet above the sea bed. It contains 40000 tons of steel. Structures of this kind will be towed out to the sites in a horizontal position, up-ended, and driven into the sea bed using jackets around the legs or piles inside the legs.

Thus steel-platform building sites require areas in which the platforms can be built on their side and floated out into relatively deep water fairly quickly. Such rigs are at present being built at Nigg Bay, at Ardersier, at Methil and also on the Clyde, and a number of applications are lodged with planning authorities for such sites round Scotland.

Concrete production platforms are still untested. One type has a cellular base for storing oil, 368 feet square and 131 feet high; its total height is 650 feet (the London GPO tower is 620 feet). Such platforms are built in an upright position and towed out to sea complete with their superstructure, facilities, and equipment. They are ballasted to settle on the sea bed. The requirements for building sites for concrete platforms are rather more stringent than for steel, and very deep water must be available close by. There are proposals at present for this type of site at Loch Carron (Drumbuie), Ardyne, Loch Eriboll, and elsewhere.

There is a great need for strategic planning to prevent the haphazard selection of too many sites along our coasts. The Scottish Development Department has gone some way towards defining Preferred Development Zones and Preferred Conservation Zones, but there is, in addition, great need to make effective the legislation on site rehabilitation when the building of production platforms comes to an end. The need for production platforms is variously estimated at 50 to 80 platforms in the North Sea over the next 30 years.

The proliferation of exploration rigs and production platforms has created a great demand for servicing facilities. There are now many oil-rig service bases scattered around our coast. This has often brought about the development of port facilities at places like Dundee, Montrose, Aberdeen, Peterhead, Stromness, Kirkwall, Scalloway, Lerwick and Balta Sound to mention a few. Many of these developments seem to be less damaging than many of the other types of on-shore installation. Increased port facilities may very well lead in the future, after the oil industry has come to an end, to their effective use by other industries.

There is no reason why on-shore pipelines should present a serious environmental hazard either to our coastline or to our birds. Pipeline technology is now far advanced, and much better than it was before the 1939-45 war when many American and European pipelines were built. There is little doubt that if we keep sufficient pressure on the developers, most environmental hazards from this source can be prevented. But this requires great effort and vigilance.

One of the major developments that will inevitably occur in association with this industry is an increase in tanker traffic. Unless crude oil is taken by pipeline from the well head all the way to the refinery, as BP does from the Forties field, it will at one stage or another be moved by tanker. Indeed since the Forties field will produce much more crude oil than the refinery at Grangemouth can process, it has been necessary to build a tanker terminal at Cramond in the Forth to enable tankers to come to a buoy well out in the river to carry away excess crude oil to refineries elsewhere. This increased tanker traffic causes great concern—especially in an area like the Forth, with its major concentrations of birds. The Piper field pipeline is now to come in at the island of Flotta in Scapa Flow where the incoming oil will be stored if necessary, and then passed to tankers. The proposals for the Brent field are that oil will be taken from the well head by pipeline or tanker to Sullom Voe in Shetland, where it will be transferred to large tankers, or it will possibly be refined in that area, and the products taken away presumably by smaller tankers. In these two examples in Orkney and Shetland tanker traffic could be of great significance in areas where the seabird populations are concentrated throughout the year, but especially in the breeding season, and where, for example in Scapa Flow, concentrations of sea-ducks (notably Long-tailed Ducks) gather in winter. Navigation is not easy in these areas, and there are many hazards such as tide races, shoals and fog among the islands. Inevitably sooner or later there must be an accident which may have very serious consequences. One

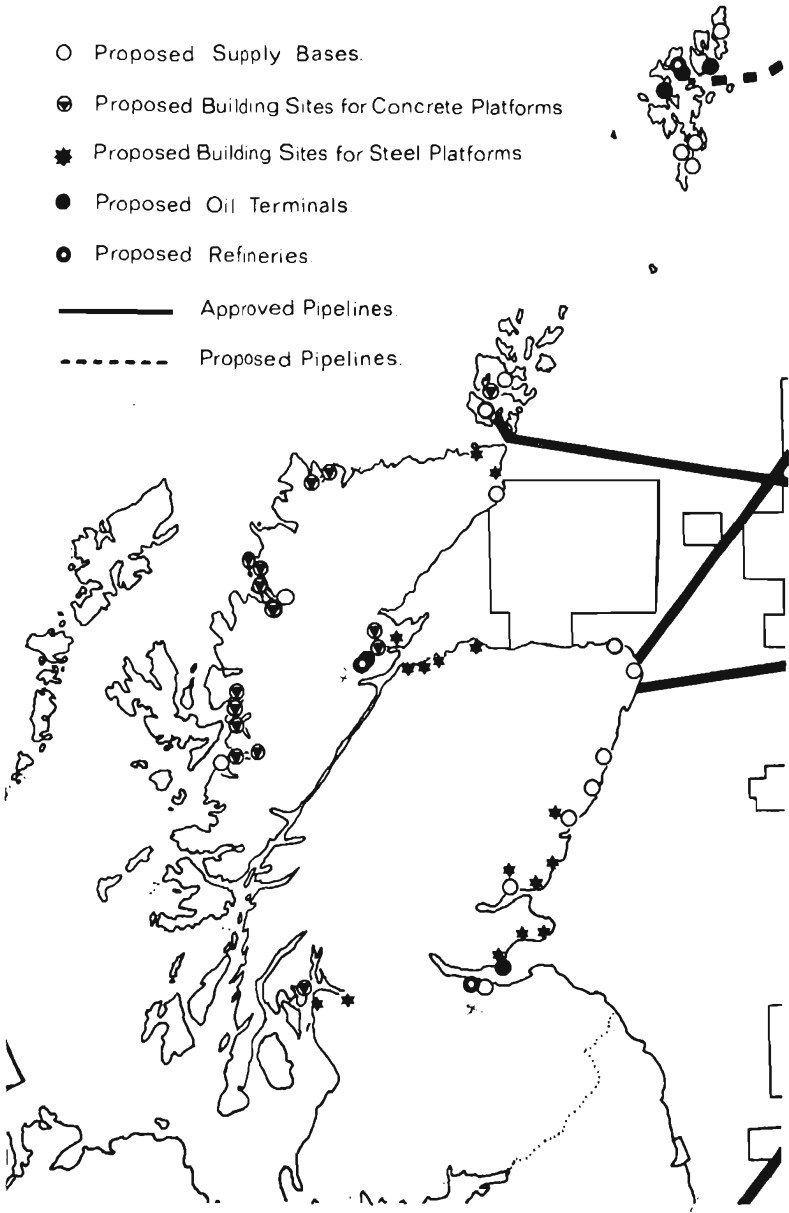


FIG. 3. Some of the proposed onshore installations.

hates to think of the Gannets from Hermaness, or seabirds sitting at sea off their colonies, becoming trapped in oil slicks from a spillage of the *Torrey Canyon* type. We must do all we can to ensure the greatest possible provision of navigational aids in order to reduce risks of this kind to an absolute minimum.

It is impossible to consider the impact of the oil industry on the Scottish coastline, and indeed on Scottish birds, without considering people. The oil industry brings with it a great influx of people, some of them temporary labourers working on building sites, others are oil executives with a way of life and a standard of living quite different from that of local people. There must be an increase in the infrastructure of roads, drains, sewage and housing, and the impact of all this on the countryside, usually but not always in coastal areas, is very great indeed. People bring with them new recreations such as power boating, water skiing and other sophisticated activities. Many of them will come from other countries and will be only temporarily in the area and may have rather little serious concern for the environments in which they find themselves. It is not difficult to understand that their attitude may be exploitive rather than conservationist.

The rapidly advancing technology and the several choices open to oil companies for transporting oil from the well head to distribution centres or refineries make it difficult to foresee the likely effect on adjacent coasts until the company plans are finally decided and made public. It is therefore extremely difficult to be prepared in advance with a clear assessment of the ecological value and vulnerability of places likely to be affected. With our present planning system this inevitably results in hurried and sometimes scrappy surveys, though one must welcome the growing tendency for consultants to be employed to prepare surveys and to predict the likely impact of specific proposals. However, as an ecologist, I feel that consultants, though competent in considering the economics and social impact of such schemes, are often inadequate in their assessment of the ecological aspects. An important lesson from all this is that we should move fast NOW to set up reserves wherever these are merited. The Nature Conservancy's Prospectus for Nature Conservation within the Moray Firth is a good example of what can be done.

Loch of Strathbeg—a case history

There are now many case histories of negotiations between oil-based industries and conservationists in Scotland—in the Moray Firth, in Shetland, at Dunnet Bay, at Drumbuie and so on. The Loch of Strathbeg is a site of international ecological

importance on four different counts—geomorphology, limnology, botany and wildfowl. Observers have recorded the following maximum numbers of wildfowl species: Whooper Swan 822; Mute Swan, 354; Greylag Goose, 4500; Pink-footed Goose, 4600; Mallard, 8000; Wigeon, 2500; Pochard, 2764; Tufted Duck, 1060; Goldeneye, 518. These are maxima, but it is clearly an exceptional site.

It was proposed that gas from the Frigg field should be piped to a landfall on the seaward side of the dunes which separate the loch from the sea. Pipes would then be brought through the dunes and dragged through the loch, which is only about four feet deep, and on to a disused airfield at Crimond. Outline planning permission was sought on the sketchiest of information, with four days' notice, and the subsequent discussions revealed that four pipelines could ultimately come into this site, and that a very large gas terminal would be built on the airfield. Clearly the bringing of pipes through the dune systems and across a very shallow loch was bound to have a major effect on the plant communities and the natural environmental processes in both the dunes and the water mass of the loch, and we had misgivings about the risk of pollution of the water. Further, Total Oil Marine, the French company responsible for bringing the gas ashore in Aberdeenshire, had not made it clear that they had carefully examined other potential landfalls involving little variation in the length of their pipeline. They were clearly attracted by the derelict airfield site.

However, this proposal was opposed on ecological grounds by a large number of organisations, including the Nature Conservancy, the Countryside Commission, the RSPB, the Scottish Wildlife Trust, the Wildfowl Trust, and by many private individuals. Conservationists in Aberdeen were deeply alarmed at the speed of developments and mounted a massive campaign. An Environmental Liaison Group was set up largely within the University, but including members from the Nature Conservancy, RSPB and SWT; it actively opposed the development at Crimond, and got a considerable amount of publicity.

Discussions took place between the developers and several organisations, but perhaps the most detailed and critical discussions took place in private under the chairmanship of Aberdeenshire's county clerk between the Environmental Liaison Group and the two developers, Total Oil Marine and the British Gas Corporation. These discussions enabled ecologists from different disciplines to discuss critically with the developers the likely impact of their plans. We were unyielding on the principle that this highly important ecological site should not be put at risk until everybody was satisfied that

suitable alternative sites could not be found. Such a site was eventually found at St Fergus, a few miles further south. The Environmental Liaison Group considered this alternative carefully and offered no objections to it but recommended to the County Council that the rehabilitation of the dunes and the creation of a reserve should be carried out in collaboration with the Scottish Wildlife Trust, and that the recreational facilities at the beach and sand dune areas could be improved.

Crimond airfield at the Loch of Strathbeg had already been the subject of a proposal for development by the Ministry of Defence who planned to erect an aerial farm there. That proposal had been in abeyance for some time and the reason given by the gas terminal developers for moving from Crimond to St Fergus was that the Ministry of Defence had made it clear that they were going to proceed and that it was impossible for the two developments to co-exist there. At no time did the developers admit that the ecological and conservation arguments put forcibly to them had had any effect on their final decision.

Now the RSPB has established a reserve at the Loch of Strathbeg, and we hope that the scientific value of the site will be safeguarded.

There are several lessons to be learned from this. I believe that some developers will, if they think the situation is right, make serious efforts to get planning permission rapidly so that development can proceed. Also, they will apply for outline planning permission without tabling the details of their plans and proposals. Further, they may not always have made exhaustive searches for alternative sites and may in some situations propose elaborate schemes for environmental defence to satisfy local councils, when really these may be quite inappropriate. It is very important that opportunities be given by local authorities for these plans and proposals to be examined critically by experts in the relevant fields, and this can be done via Countryside Committees.

More alarming was the fact that during these negotiations there was a serious lack of detailed communication between the various conservation groups who were having discussions with the developers. There was a serious risk that the developers could have separate meetings with, for example, the Nature Conservancy in Edinburgh and with the Environmental Liaison Group in Aberdeen and that neither of the two groups knew exactly what the other was saying and so they ran the risk of being played off against each other. It is essential that conservation groups do not become divided in any way in negotiations of this kind and that national organisations should

involve their local membership, especially those members who are professionally qualified to combat the high degree of professionalism employed by the developers.

Acknowledgments

I wish to thank Dr W. R. P. Bourne for useful discussions and, as Secretary of the Seabird Group, for permission to publish the map of major Scottish Seabird Colonies, and also Mrs J. C. Ollason for preparing the other maps.

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Birds of the northwest Highland birchwoods

W. B. YAPP

Introduction

The birchwoods of the northwest Highlands are probably unique in the United Kingdom in having been little, if at all, exploited by man (Yapp 1972) and deserve much more attention than they have received. They have scarcely been studied by botanists, and it is not even certain to what species or subspecies the trees should be assigned. Whatever the species, however, these woods have birch as the dominant tree, and in many of the woods there are few other trees. Rowan is the only one that is at all common, and there are a few willows, aspens and hollies. There are no shrubs except in a few valley woods, where there are also a few hazels. The field layer is generally fairly rich, with leafy species and grasses, and in a few woods there are heathy patches.

The birch produces abundant wind-borne seeds, and seedlings a few inches high can sometimes be found in the woods and more commonly outside them. At this height they are grazed off by deer and sheep, so that there is no effective regeneration. My visits were made in 1951-52 and 1970-71. Of the 25 woods that I saw in both pairs of years one had been completely and two almost completely obliterated by coniferous planting. Most of the rest did not appear to have changed much in the interval of 18-20 years, but one was so much more open on my second visit that it could hardly have been classed as a wood, while some others had developed many gaps which

were not recorded on my earlier visit. Some of the most striking of these were on the National Nature Reserve at Inverpolly, Wester Ross, and I have photographs of one wood (Doire-na-h-Airbhe) as proof. These woods are doomed unless they are soon protected from all grazing.



FIG. 1. Birchwoods visited during 1951-52 and 1970-71.

Methods

The most extensive account of the birds of these woods is that which I gave in 1962, based on counts in 26 woods in 1951 and 1952. In 1970 and 1971 I counted in 36 woods, 24 of which were in the earlier list. Thus the present paper is based on data from 38 woods out of a total of about 200 in the area. In the first pair of years only one of the woods was visited in both years, but in the second pair 21 woods were visited each year. The dates of my visits were 5-9th June 1951, 28th May-5th June 1952, 8-19th June 1970, and 29th May-5th June 1971. With the exception of the 1970 visit, which was unavoidably rather late, these are about the best times to visit these woods.

Counts were made by the method of the line-transect (Yapp 1956 and 1962). It has not been much used in Britain, for reasons that are not clear to me; it is one of the few practicable means by which a large number of samples can be accumulated in a short time. A party from the BTO, consisting of 19 or more supporters (Williamson 1969) was able to score territories in

eight plots in about twice the period of time in which by myself I made line transects in 25 woods. Even if the latter method were less accurate than the former, this would be outweighed by the advantage of having more samples. Having used both methods, I am by no means sure that there is much difference in reliability between the two, and recent American and European papers support this view (Emlen 1971 and Haukioja 1968). It is certainly unwise to generalize about the birds of birchwoods from one or two examples, since it is possible for a bird to be present in one wood and absent from a similar one over the hill, or to be present one year and not the next. This rule is especially important in marginal habitats such as the woods of the northwest, where by no means all the suitable territories are necessarily filled. Still less should one make statements about bird densities based on a few samples.

All methods of counting birds overestimate conspicuous species and underestimate quiet ones. For comparative purposes this does not greatly matter, provided that the distortion so introduced is more or less constant in different conditions, as it probably is.

Another quick method, which has been used even less than the line transect, is the time-quadrat (Yapp 1962). For this, one scores merely the occurrence of every species that is met in each unit of time that one spends in the habitat, without regard to the numbers of individuals. My counts in 1951-52 could be used only approximately for this method, based on 20-minute periods, but in 1970-71 I used it systematically, with periods of 10 minutes.

Results

Table 1 is a summary of the contacts for both pairs of years, with the relative abundance for all species where it is 1.0 or more. Relative abundance (R.A.) is the percentage, calculated to one decimal place, of the total number of contacts given by a species. In general the R.A.'s for the two sets of years are very similar.

Table 2 gives the species that in either pair of years had an R.A. of 2.0 or more; they are ranged in the rank order of 1970-71 (the larger sample). The percentage frequency of occurrence (P.F.) is given also, based on the number of woods in which the species was recorded and on the number of time-quadrats, e.g. if a species was recorded in every wood, its P.F. in the "woods" column would be 100; if it was recorded during, say, half the time quadrats, its P.F. in the "quadrats" column would be 50.

The table emphasises the similarity of the two periods and



PLATE 1 (a). Oil-rig fabrication yard at Nigg Bay, Easter Ross, August 1973. The production platform for BP's Forties Field is being constructed in the graving dock (page 10). (b) The first North Sea oil pipeline coming ashore at Cruden Bay, Aberdeenshire from BP's Forties Field, May 1973 (page 8).

Photographs by G. M. Dunnet





PLATE 2. Birds at risk (page 5). (a) Puffins, Clett Stack, Fetlar, 1971. (b) Puffins, Clett Stack, Fetlar, 1971.

Photographs by R. J. Tulloch

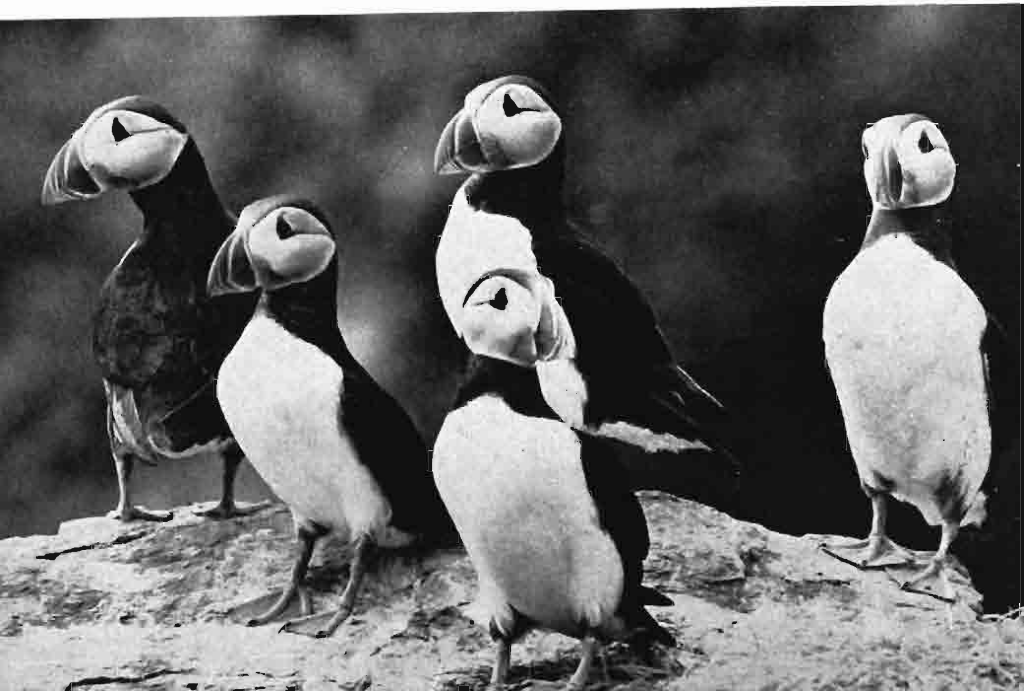
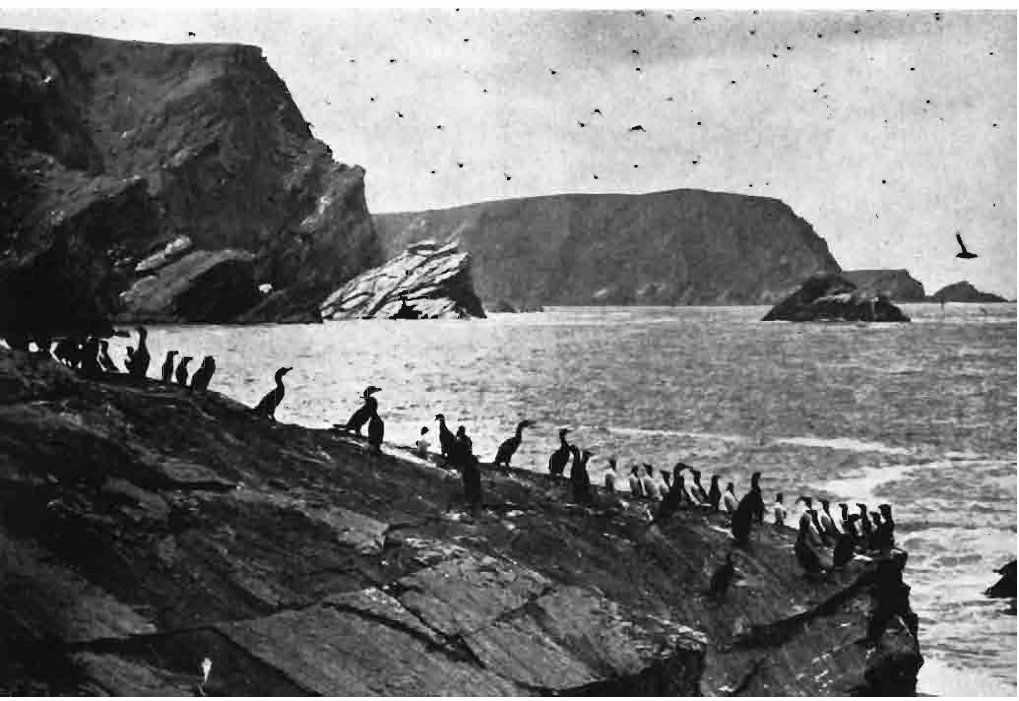




PLATE 5. Birds at risk (page 5). (a) Gannet colony, Hermaness, Shetland, 1972.
(b) Shags and Razorbills, Hermaness, Shetland, 1972.

Photographs by R. J. Tulloch



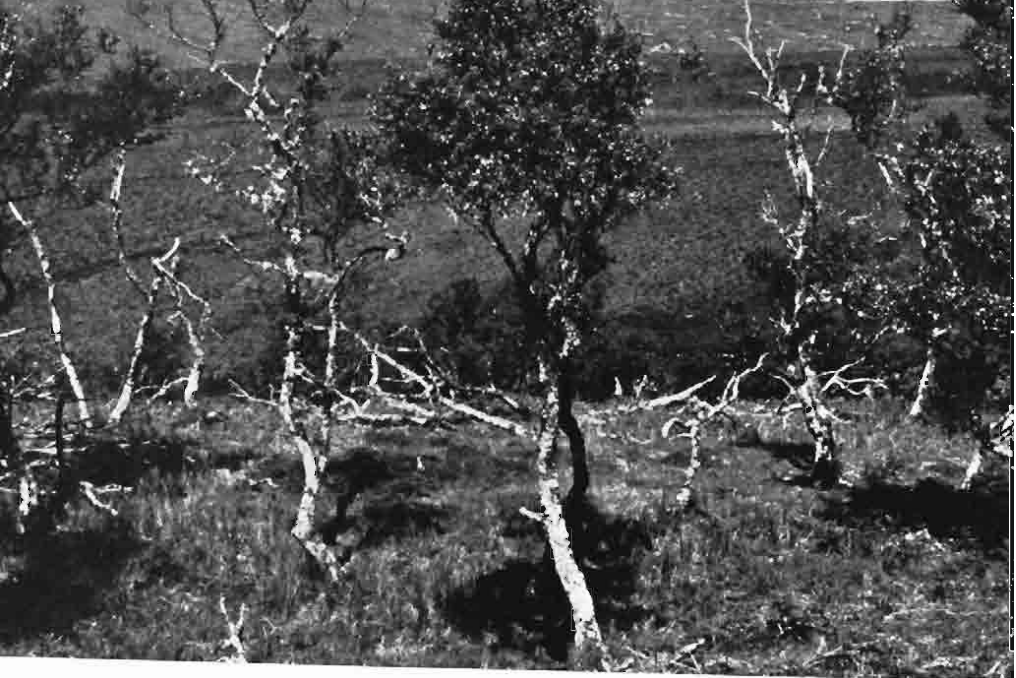


PLATE 4 (a). Birchwood, Wester Ross, June 1971 (page 16). (b) Birchwood, Doire-na-h-Airbhe on the Inverpolly National Nature Reserve, July 1950 (page 16).

Photographs by W. B. Yapp



shows that more than two-thirds of the total contacts are given by the top four species, and 90% by the top ten or 12. The P.F. based on 10-minute quadrats obviously gives almost as good a representation of the avifauna as the R.A., the two inversions of order (Tree Pipit/Robin and Redpoll/Blue Tit) being trivial. The P.F.'s scored on 20-minute quadrats and on woods are, as would be expected, not so good, but they are useful approximations. The time-quadrat method, which needs nothing but a watch, a pencil and a notebook (or preferably a pre-printed card) is a good and quick method for checking bird populations.

No attempt was made to find nests, but species for which I obtained evidence, in one or more years, that would have justified category 3 in the BTO Atlas project are marked N in table 1. There can be no doubt that the other common species do breed in these woods, and one might confidently add Chaffinch, Spotted Flycatcher, Wood Warbler, Redwing, Mistle Thrush, Cuckoo and Tawny Owl, making 27 species probably breeding with some regularity.

The line-transect counts do not easily convert to densities, but they can be used for comparison. In 1951-52 the number of contacts per (moving) hour was 42, while in 1970-71 it was 61. If there had been any change in my accuracy of counting I should expect that it would have been such as to decrease the number of contacts; being 19 years older I might have walked more slowly and would certainly have heard less. Thus it seems clear that there has been an increase in the density of population of these woods, and I have evidence, for roughly the same period, of a similar increase in woodlands in other parts of the country as well.

The number of species recorded increased from 29 (of which two were not in the timed counts) to 45. Dunnock and Buzzard were the only species recorded in 1951-52 that were not found in the later years. There is no reason to think that the increase is an expression of anything but the greater number of woods visited and the greater time spent in them.

Counts of this sort provide information on the diversity of the fauna, which cannot be measured adequately simply by counting the species present. Various formulae have been devised for the purpose, one of the simplest and best being Yule's Index of Diversity as modified by Williams (1946 and 1971). It is a measure of the chance that any two individuals taken at random will not be of the same species. A high index therefore means great diversity. For the birchwoods in 1951-52 Yule's Index is 5.5, for 1970-71 5.8, and for all years combined 5.8. These are very consistent results and suggest both that the method is reliable and that the avifauna has not changed.

Table 1. Species recorded, numbers of contacts and relative abundances, northwest Highland birchwoods, 1951-52 and 1970-71

	1951-52		1970-71	
	Contacts	R.A.	Contacts	R.A.
Passerines				
Raven <i>Corvus corax</i>			1	
N Carrion/ Hooded Crow <i>Corvus corone</i>	5		18	1.2
Jay <i>Garrulus glandarius</i>			1	
N Great Tit <i>Parus major</i>	16	2.4	15	
N Blue Tit <i>Parus caeruleus</i>	12	1.8	32	2.0
N Coal Tit <i>Parus ater</i>	22	3.2	48	3.1
N Long-tailed Tit <i>Aegithalos caudatus</i>			1	
N Tree Creeper <i>Certhia familiaris</i>	2		8	
N Wren <i>Troglodytes troglodytes</i>	35	5.1	140	9.0
Dipper <i>Cinclus cinclus</i>			3	
Mistle Thrush <i>Turdus viscivorus</i>			15	
N Song Thrush <i>Turdus philomelos</i>	25	3.7	31	2.1
Redwing <i>Turdus iliacus</i>			2	
Ring Ouzel <i>Turdus torquatus</i>	3		13	
N Blackbird <i>Turdus merula</i>	1		5	
Wheatear <i>Oenanthe oenanthe</i>	4		1	
N Stonechat <i>Saxicola torquata</i>			4	
Whinchat <i>Saxicola rubetra</i>	2		6	
N Redstart <i>Phoenicurus phoenicurus</i>	18	2.6	68	4.4
N Robin <i>Erithacus rubecula</i>	46	6.7	81	5.2
N Willow Warbler <i>Phylloscopus trochilus</i>	262	38.4	538	35.4
Chiffchaff <i>Phylloscopus collybita</i>			1	
Wood Warbler <i>Phylloscopus sibilatrix</i>	10	1.4	12	
Goldcrest <i>Regulus regulus</i>			1	
Spotted Flycatcher <i>Muscicapa striata</i>	11	1.6	9	
Dunnoek <i>Prunella modularis</i>	(2)			

	1951-52		1970-71	
	Contacts	R.A.	Contacts	R.A.
Passerines				
N Meadow Pipit <i>Anthus pratensis</i>	3		13	
N Tree Pipit <i>Anthus trivialis</i>	65	9.6	108	6.9
Pied Wagtail <i>Motacilla alba</i>			1	
Starling <i>Sturnus vulgaris</i>			3	
N Redpoll <i>Acanthis flammea</i>	20	2.9	38	2.4
Bullfinch <i>Pyrrhula pyrrhula</i>			3	
Chaffinch <i>Fringilla coelebs</i>	85	12.4	288	18.4
Reed Bunting <i>Emberiza schoeniclus</i>	1		4	
Total contacts (passerines)	650		1512	
Non-passerines				
Grey Heron <i>Ardea cinerea</i>			1	
Buzzard <i>Buteo buteo</i>	2			
N Red Grouse <i>Lagopus lagopus</i>			5	
Black Grouse <i>Lyrurus tetrix</i>	1			
N Woodcock <i>Scolopax rusticola</i>	7		9	
Curlew <i>Numenius arquata</i>	4		4	
Common Sandpiper <i>Tringa hypoleucos</i>	1		3	
N Woodpigeon <i>Columba palumbus</i>			5	
Collared Dove <i>Streptopelia decaocto</i>			1	
Cuckoo <i>Cuculus canorus</i>	17	2.4	28	1.8
Tawny Owl <i>Strix aluco</i>	(1)		2	
Total contacts (non-passerines)	33		58	
Total contacts (passerines and non-passerines)	683		1570	
Species totals	29		42	
Grand total of species		45		

Figures in brackets refer to contacts made outside timed counts
R.A.=relative abundance (given only where it is 1.0 or greater)
N=evidence of nesting

It is a low index, less than half that for most deciduous woods in England, little more than half that for young coniferous plantations and only a little higher than that for older ones. It is probably a result of the vegetational uniformity of the woods, the absence of a shrub layer and the harshness of the climate. It is an expression of the high proportion of individuals formed by a small number of species.

Table 2. The twelve most abundant species, northwest Highland birchwoods

	1951-52				1970-71			
	P.F.		R.A.		P.F.		R.A.	
	in 26 Woods	in 54× 20 min Quadrats	in 682 Contacts	Cum.	in 36 Woods	in 159× 10 min Quadrats	in 1564 Contacts	Cum.
Willow Warbler	100	100	38.4		97	85	34.3	
Chaffinch	88	89	12.4	50.8	89	75	18.4	52.7
Wren	62	59	5.1	55.9	86	49	9.0	61.7
Tree Pipit	81	61	9.6	65.5	53	30	6.9	68.6
Robin	65	56	6.7	72.2	66	36	5.2	73.8
Redstart	42	30	2.6	74.8	70	28	4.4	78.2
Coal Tit	42	39	3.2	78.0	47	19	3.1	81.3
Redpoll	19	13	2.9	80.9	31	11	2.4	83.7
Blue Tit	19	24	(1.8)		39	15	2.0	85.7
Song Thrush	46	35	3.7	84.6	28	9	2.0	87.7
Cuckoo	15	18	2.4	87.0	8	8	(1.8)	
Great Tit	38	28	2.4	89.4	22	8	(1.0)	

Species are arranged in order of relative abundance in 1970-71
P.F.=percentage frequency R.A.=relative abundance
Cum.=cumulative abundance

Changes

In addition to the degeneration mentioned earlier of some of the woods there are two other sources of possible general change. There has been a great increase in tourist traffic, and there may have been a change in climate. If there is any increase in human pressure, it does not appear to be very important. In 1951-52 I met no one at all; in 1970-71, except in two areas, the only people I saw in the woods were two members of the SOC in a roadside wood doing a square for the Atlas. The exceptions are, however, of some importance; in 1970-71 in woods in the two National Nature Reserves (Coille-na-Glas-leitire in Ben Eighe and some of the woods of Inverpoll) there were numbers of people, some with dogs, where 19 years before there had been none. I do not think that in

Inverpollly the open-door policy of the Nature Conservancy has yet had much effect—the woods are too far from the road—but in Coille-na-Glas-leitire I think it has, both by trampling of the undergrowth and by the scattering of crumbs, as well as by the mere presence of crowds. From the point of view of conservation, it seems that the worst thing that can happen to these woods may be that they should become nature reserves.

There is abundant evidence that throughout the 19th century and the first half of the 20th the climate of northern Europe was on the whole becoming better, and, as I pointed out in 1962, the well documented inflow of species into the northwest Highlands indicates this, just as does the northward spread of birds in Finland during the same period. There is some meteorological evidence that about 1950 this trend was checked or even reversed. The observations discussed here confirm this up to a point, since the avifauna seems to have stabilized and not to have changed since 1951, but they give no evidence for any worsening of the climate.

The commoner species find the birchwoods a suitable habitat irrespective of the variations in the environment; it is possible that the presence of the others might be in part determined by such variable factors as the degree of openness of the woods; the ground surface, whether damp or rocky; the amount of heathy vegetation (heather and bilberry) in the field layer; and the aspect. The geology is fairly uniform, all the woods being on siliceous rocks of one sort or another, except for one which is partly on Durness limestone. There is a variable amount of peat (probably adequately indicated by the dampness of the surface), and the woods in the eastern part are on land more or less covered by boulder clay of the Moine Drift. Geological mapping of the area is however incomplete. I have considered several species in relation to all these points, without being able to show any clear correlation.

With all methods of assessment the fact that a species is not recorded does not necessarily mean that it is not present, but the longer one spends in a wood the more likely it is that any species that is present will show up. I have therefore assumed that all woods in which a species was found in any one of the four years are equally suitable, although in some woods the species was found in more than one year. Of the 38 woods, 20 were recorded as being rocky, eight as being wet, 13 as having heather or bilberry or both, and 20 as facing north, northeast or northwest.

Pipits

Moorland woods with open patches may contain both common species of pipit, as may young coniferous plantations and the birchwoods of Fin-

land as well as those of Scotland. I did not find any Meadow Pipits' nests, but birds were carrying food for young within the woods.

If a pipit is silent and one cannot get a good view, it is not always possible to say which species it is; in 1970-71 there were 33 such doubtful contacts. In table 1 I have assigned all these to Tree Pipit, since this is the most likely identification; a statistically better procedure would have been to distribute them in the proportion of certain identifications, i.e. 13:75, which would have given five Meadow Pipits and 28 Tree Pipits. This would not alter the r.a. of Tree Pipit, calculated to one decimal place.

The R.A. of Tree Pipit is lower in 1970-71 than in 1951-52, and the difference seems real; the density, however, is still about the same—4.3 contacts per hour instead of 4.0, a difference that is probably not significant. Most people would have expected the opening-up of the woods to have encouraged the Tree Pipit, but this does not seem to have happened to any great extent. While keeping up its numbers, it has been depressed in relative abundance by increases of Chaffinch and Wren. My counts in Wyre Forest (Yapp 1969) over roughly the same period show fluctuations in the density of Tree Pipits, but there were as many at the end as at the beginning.

Tree Creeper

Tree Creepers were recorded in seven woods, all in the west; although all of these were visited more than once, and five of them three or four times, there were no repeats, but this may be no more than an expression of the low conspicuousness of the species.

Only one of the woods is possibly partly on boulder clay, but other factors, such as the more oceanic climate of the west, may be more important in determining distribution. The species is present in woods on boulder clay in England, but its distribution, and especially its density, in relation to this would be worth investigation.

Six of the woods are rocky, and only one is wet. If the bird's distribution had been truly random, one would have expected it to occur in four rocky woods and three wet. Thus, although the connection with rocks may be significant, the negative connection with wetness is probably not.

Flycatchers

Spotted Flycatchers were found in 12 woods, again with no repeats. They were widely distributed, both north to south and east to west, and showed no correlation with any of the factors assessed. These birchwoods are clearly suitable for the species, therefore, but do not support high numbers. This agrees with the bird's general distribution; the numbers in gardens, for example, are much smaller than what the available nesting sites and, one would have thought, the available food would support.

It is perhaps surprising that Pied Flycatchers are not found in the birchwoods. The species occurs much further north on the Continent, but its limit on the west side of Scotland appears to be the south side of Loch Broom, which it has reached only recently; only three of my woods are south of this. The species occurs in birchwoods in England, but sparingly.

Leaf warblers

Willow Warbler is easily the dominant species (so much so that Birch Warbler should be its name).

A Wood Warbler was recorded in 1929 by Baxter and Rintoul (1953) in a wood beside Loch Shin (which could have been one that I visited),

and they say a bird was heard in 1913 at Loch Hope (where I found it in 1952). But the species apparently did not become at all widespread until the late 1940's, and has never been common. In 1951-52 I recorded it in four woods, in 1970-71 in three, with one repeat (1951 and 1970), the total of six being well distributed. In some likely woods in 1970-71 I tried to call the bird with tape, with no success. There has, if anything, been a decrease in the numbers of Wood Warblers, which would agree with the supposed deterioration in temperature.

I recorded only one Chiffchaff, in a wood near Little Loch Broom in 1970, which was not visited in 1971; it had also both Wood Warbler and Willow Warbler; another Chiffchaff was singing in a nearby larch plantation. A few years ago the species was only just penetrating the Highlands, but in 1971 one was heard at Scourie, Sutherland (I. D. Pennie in Dennis 1972).

Thrushes

The commonest thrush is the Song Thrush, which was recorded in 16 woods, in eight of them in more than one year. This is surprising, for otherwise its commonest natural habitat in Britain is the pedunculate oakwood of southern England. The birchwoods containing it are well distributed and cover all the main features referred to above. By contrast Blackbirds are rare.

Ring Ouzels were recorded in seven woods, all in the west, five of them on the Inverpollly Reserve. Six were rocky, as against four expected; none was wet, as against two expected; and five had a northern aspect, as against two expected.

Redwings nest in similar birchwoods in Scandinavia, and I had long expected that if it ever became a Scottish breeding bird it would be in these woods. In fact most of the records are from policies, farmland and other man-made areas. I recorded only two birds in 1970 and none in 1971, so that, although it probably nests in the birchwoods, it does so only sparingly.

In 1951-52 I recorded no Mistle Thrushes, but in 1970 they were in four woods, and R. V. Collier found them in another wood at Inverpollly which I did not visit. In 1971, although I visited three of the woods where I had found Mistle Thrushes the year before, I found them in one wood only where I had not seen them in 1970. It looks as if the small population fluctuates considerably.

In 1970 one open wood of about 16 hectares (40 acres) contained Song Thrush, Mistle Thrush and Ring Ouzel, of which the first was certainly breeding.

Summary

The birchwoods of the northwest Highlands are probably the most natural woods in Great Britain. Thirty-eight woods were visited in 1951-52 and 1970-71, 24 of them in both pairs of years, and their birds were recorded by the methods of line-transect and time-quadrat. They have a characteristic avifauna, in which Willow Warbler and Chaffinch make up half the total number of contacts and ten or 12 species make up 90 per cent of the total. There was little change between the two pairs of years, but the density increased. The total number of species recorded was 45. The species diversity is less than half that of most English deciduous woods, and less than that of young conifer plantations.

Acknowledgments

In accordance with the customary freedom of the Scottish hills I went into most of these woods without permission.

Nevertheless I am grateful to all the landowners, known and unknown, who made my visits possible. Those of 1951-52 and 1970 were made during term time, but at my own expense, while I was a lecturer in the Zoology Department of the University of Birmingham.

I acknowledge the permission of the Nature Conservancy to work in the Ben Eidge and Inverpolly Reserves in 1970 and in Inverpolly in 1971, and especially thank R. V. Collier, then the Warden at Inverpolly, and Mrs Collier, for their help and hospitality.

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Appendix I

Species of trees

If we follow Clapham, Tutin and Warburg 1952 the trees of the north-west Highland birchwoods would appear to be *Betula pubescens* Ehrh. ssp *odorata* (Bechst.) E.F. Warb., but more recent work indicates that this subspecies may be synonymous with the central European *B. carpatica* (Walst. et Kit.) (Gardiner 1972). It seems, however, that this conclusion comes from a study of birches much further south than those we are concerned with, and clearly no firm conclusions about the Scottish birches can be drawn so long as the northwestern woods are ignored. I have not seen *B. carpatica*, but it is said to be very similar to *B. tortuosa* (Ledeb), which forms woods in northern Scandinavia that I have seen and that are very similar in general appearance to some of those of the northwest Highlands. Clapham *et al* indeed, in their second edition (1962) include *tortuosa* with *B. pubescens odorata*, and on general geographical grounds this seems a more likely identification.

Seven of the woods, including some that I visited, are treated in McVean and Ratcliffe (1962), but the lists of species given there are incomplete. They say (p. 23) that areas of pure rowan wood are not uncommon in the birchwoods of the west Highlands, but there are none in those that I visited. Their statement that there are several acres of rowan on Isle Mor in Loch Scionascaig (one of the woods included in my list) is a mistake. (Anyone using their very useful book should note that the map references are given in an unusual form, with the northings above the eastings; thus 9159 2090 (Inverpolly Forest) is what is better known as 29/090159 or NC/090159.)

The birchwoods round Loch Maree (one of which is included in my lists) may be second-growth regeneration following the clearance of firs, but since Pennant (1774-76) in the 18th century described birches where there are now firs it is possible that these trees as they now exist in Coille na Glas-leitire are mainly planted and that birch was a more natural dominant. (For the early history of this wood see Steven and Carlisle 1959). However that may be, I know of no evidence that north of Loch Broom birchwood is anything but a natural climax, just as it is north of the conifers in Scandinavia.

Short Notes

Great Snipe in Shetland

At about 10 a.m. on 20th September 1973 I flushed a bird from a patch of dead mayweed in Out Skerries. Its large size (larger than a Snipe but not as big as a Woodcock), slow flight, white corners to the tail and its distinctive call immediately made me think of Great Snipe. When first flushed, the bird was only a few feet from me and it went down in the mayweed patch again, this time about 50 yards away. During the next two days the bird was flushed about 15 times, and good views were obtained.

Description Upperparts much as Snipe, but pale stripes appeared more prominent, probably due to darker background colour; underparts much as in Snipe, but flanks appeared much more heavily marked; wings broader and less sharply pointed than in Snipe and seemed darker, but at close range the white trailing edge could be seen; some white markings could also be seen on the wing coverts; tail paler than body, with conspicuous barred white outer feathers forming white corners to tail; at close range these corners looked off-white due to cross barring; bill noticeably shorter than Snipe's, with deeper base, which was paler than the rest of the bill; call a very low, guttural *crruck* heard several times when the bird was flushed but not uttered in normal flight.

In flight the bird differed from Snipe in outline, having a deeper chest and steeper forehead and holding the bill in a more horizontal position similar to Woodcock. The wings looked broad and were held in a bowed position on the down-beat. The flight was slower than that of Snipe, with no zig-zags, and the bird rarely flew higher than 30 feet. It dropped

into cover in the manner of a Jack Snipe and could be flushed from the same spot with ease. It frequented several patches of mayweed between crops of potatoes and oats but did not land in the wetter areas frequented by Snipe and Jack Snipe.

I. S. ROBERTSON.

(There are few records of this species in recent years in Scotland; the last one was at Fair Isle on 23rd September 1969.—Ed.)

White-winged Black Tern in Aberdeenshire

At about 1800 hrs on 26th September 1973 we noticed two marsh terns feeding over the River Ythan close to the road. One was an immature White-winged Black Tern and the other was a Black Tern in non-breeding plumage. Several points of difference between the two birds were noted.

The bill of the White-winged Black Tern was noticeably shorter than that of the other bird. The White-winged Black Tern lacked any trace of shoulder mark, the whole of the underparts being an unmarked white. The Black Tern had a definite, though not a particularly large, shoulder mark, i.e. a mark at the side of the chest at the base of the leading edge of the wing. The mantle of the White-winged Black Tern was dark grey and contrasted with the much lighter grey of the wings, the white of the collar and the white of the rump. The mantle of the Black Tern did not show this contrast with the wings and lacked the appearance of a clear-cut rectangle so distinctive in the White-winged Black Tern. The wings of the White-winged Black Tern were a noticeably paler grey than those of the Black Tern, and its tail became greyish towards the tip.

A. PARKER, M. J. GRIGSON.

Pair of Kingfishers rears three broods

On 20th April 1973 I discovered a pair of Kingfishers excavating a nest hole in the banks of a river in Lanarkshire. Several days later when this hole was near completion, the female appeared disinterested and on 28th April was seen cleaning a hole that had possibly been excavated the previous year.

There was little sign of the birds until 26th May when feeding of the young commenced. In the latter stages of feeding the young the adults showed interest in the other nest hole and, as they were seen only infrequently from 22nd June, I assumed that incubation of a second clutch had commenced

in that hole. On 21st July this proved to be correct when feeding of the second brood was observed. This continued until 12th August, but on 13th August the nest hole was found to be empty. No young birds were seen in the vicinity, but as the area is heavily wooded this is not surprising and I have no reason to believe that this brood was unsuccessful.

During the latter stages of rearing the second brood the female disappeared, and, on inspecting the hole from which the first brood had fledged, I discovered her incubating a third clutch. Feeding of the third brood began on 29th August and continued until 11th September. On 12th September the parent birds were not seen and the nest hole was found to be empty. Immediately above the hole a tree root projected on which three small scores were seen. These were consistent with the claw marks of a small predator and were the only visible signs of disturbance.

Between 20th April and 11th September approximately 30 hours were spent in observation. Minnows were the main food source but stickleback, stone loach and small trout were also taken. The young were fed mainly by the male, at intervals ranging from 20 minutes to one hour 30 minutes, and the second brood in particular were very audible when clamouring for food. The first brood were in the nest hole for 27 days and the second for 24 days. Estimates of duration of incubation were not made for fear of disturbance at the critical periods. The lengths of the nest holes were 19 inches and 22 inches.

R. M. LAMBIE.

(P. A. Clancey, in his study of the habits of Kingfishers carried out on the River White Cart in Renfrewshire during 1934 recorded one triple brood in 33 breeding pairs (*Brit. Birds* 28: 295-301).—ED.)

White's Thrush at Fair Isle

In the late afternoon of 24th September 1973 R. Dewey and T. Loseby saw a White's Thrush at the Lower Station, Ward Hill. I arrived at about 1750 hrs and, at that time, the bird had not been seen for about 15 minutes so we walked slowly through the old wartime huts where it was last seen. As we entered the last hut it flew out at about 5 feet range and landed on the hillside. The bird was immediately identifiable as a White's Thrush, the size, colouration and prominent underwing pattern ruling out anything else. Other observers on the island were notified and we all watched the bird from about 100 yards range. It stayed in the same general area although on one occasion it flew several hundred yards before returning

gradually to the original area. While we watched it field notes were taken and, when all the observers present had had good views and the light was fading, a mist nest was put up between the huts and the bird was caught. It was taken back to the Observatory where it was ringed and measured, and a detailed plumage description was taken. The bird was roosted overnight and in the early hours of the following morning, after photographs had been taken in very poor light, it was released. It was seen later the same day but was not seen again after that.

Description Large thrush, maybe even slightly larger than Mistle Thrush; upperparts mottled golden, black and white; wings as upperparts but a small clear patch was noticeable on the secondaries; underwing pattern very prominent, broad black stripe running the whole length of the underwing and contrasting strongly with clear white area on either side of it; tail long with small white tips; underparts generally white, heavily overlain with golden and black crescentic markings, more numerous on the upper breast where they seemed to form a gorget; legs pale, fairly long, giving it a stance similar to a Mistle Thrush; in flight, which undulated quite noticeably, the body appeared to be curiously long and thin; the underwing pattern was very prominent and could be seen at long range, giving the bird a characteristic quite distinct from any other species I have seen.

R. A. BROAD.

Lanceolated Warblers at Fair Isle

On 19th September 1972 VM flushed a small bird near the Hegri Burn. It flew onto a grassy bank some 50 to 60 feet away where it remained for 20 minutes during which time RJR, BSB and JDC had ample opportunity to view it and take the following notes:

Description Crown heavily streaked, with dark brown centre; back and scapulars streaked dark brown; chin and throat whitish, with dark streaks which ended abruptly on the upper breast forming a gorget; lower breast and belly creamy white; under tail-coverts orange-buff; tail feathers dark brown and noticeably pointed; bill dark brown but yellowish at base; legs flesh pink.

About an hour later the bird was caught in a mist net put up near the spot by RAB. The first impression was of a very small *Locustella*, and when extracted from the net, the bird was positively identified as a Lanceolated Warbler. It was then taken to the Observatory where it was examined and a full description taken; later it was released near the spot where it had been caught.

V. MCFARLAND, R. J. RAINES, J. D. CRAGGS,
B. S. BARNACAL, R. A. BROAD.

On 22nd September 1973 we saw a warbler in the vegetation in one of the Sukka Mire ditches. We had good views of the bird and thought it was a Lanceolated Warbler but were not

sure. The bird was later caught in a mist net by RAB and taken to the Observatory, where it was ringed, measured and photographed. The original identification was confirmed as a Lanceolated Warbler. It was seen both in the field and in the hand by several observers who had seen the one trapped at Fair Isle the previous year and all agreed that it was similar in every respect to last year's bird except that the gorget on the upper breast was not so extensive. The warbler was released at the spot where it had been caught and it was seen there again during the same afternoon but was not seen after that.

Description taken in the hand Forehead, crown and nape, feathers dark brown with olive-buff fringes giving streaked appearance; back and rump as crown; tail, olive-brown feathers with darker centres; wings, scapulars and coverts as nape; primaries and secondaries grey-brown with broad brown-buff edgings; indistinct eyestripe mottled greyish-buff just anterior to the eye; a very faint pale buff moustachial streak; chin white with a few faint fleckings; upper breast feathers with dark shaft streaks forming a distinct gorget of close streaks across the lower neck and upper breast; belly creamy white, olive-buff wash on flanks; under tail-coverts with dark central streak; underwing greyish with buff wash; iris deep olive-brown; bill dark with lower mandible dull pink towards the gape; gape pale yellow; legs pinkish grey.

N. V. ALLEN, I. BURROWS, P. COE, R. A. BROAD.

Reviews

Breeding Birds of Britain and Ireland: a historical survey. By John Parslow. Berkhamsted, T. & A. D. Poyser Ltd., 1973. Pp. 272; 225 distribution maps and other text illustrations. 24 x 16 cm. £3.60.

In 1964 the Records Committee of the British Ornithologists' Union organised a nation-wide survey in order to provide up-to-date information on distribution for its projected new checklist (later published as *The Status of Birds in Britain and Ireland*, 1971). In the end of the day John Parslow was to be largely responsible for the writing of the BOU publication, but in the meantime he had already analysed the results of the survey and had largely used it as the basis for an extensive paper entitled "Changes in status among breeding birds in Britain and Ireland" which was published in *British Birds* in 1967 and 1968.

Four-fifths of the present book represents an almost direct reprint of the *British Birds* paper, and so the greater part of the material cannot be said to be original. But the quality of the original paper thoroughly warrants its separate publication and this is greatly enhanced by the attractive presentation. The book deals with the status of every wild bird that has bred in the British Isles since 1800 (no place therefore being found for such earlier records as the White Storks that nested on St Giles' Cathedral in 1416) and describes in particular the changes that have taken place since the results of the last similar survey by W. B. Alexander and David Lack were published in 1944. This accent on the historical perspective has the happy result that the book is as fascinating to read as it is valuable as a record of our knowledge and understanding of present distribution.

The text of the original paper in *British Birds* brought the position up to date to 1966/67. In this book a ten-page postscript has been added summarising the most important developments that have taken place during the period 1967/72. The events of the past six years certainly lend themselves well to a separate general summary of this kind, but on the whole one regrets that the main text was not made complete by being brought up to date. Occasionally it suffers noticeably from an incomplete tie-up with the postscript. For instance, in the case of the birds of prey there is in the main text a marked diffidence about blaming toxic chemicals for the big decrease in many species that was noted in the late 1950's, and although the post-1967 chapter places the blame for many decreases fairly and squarely on the organochlorine insecticides, there is nothing to suggest that this might be the cause of the decline in the Merlin population.

The most valuable new feature of the book is the Appendix, which contains 225 maps showing the breeding distribution of all the species that have bred in the British Isles during the past 30 years. John Parslow has tried his hand at this sort of thing before—in *The Reader's Digest Book of British Birds*, 1969, and in *The Birds of Britain and Europe*, 1972—but these latest versions are on a larger scale and gain enormously from the fact that they deal exclusively with breeding distribution. Looking through these maps one notices the very occasional oversight (Hen Harrier totally absent from the Outer Hebrides; Black-throated Diver from the Uists; Great Black-backed Gull from the Forth estuary) and the more frequent occasions when the inevitable limitations of any such system produce surprising results (Great Crested Grebes must surely be much more widely and securely established as breeding birds in Ayrshire than either Black-throated or Red-throated Diver, and Little Grebes surely breed as commonly in the Uists as anywhere else in Scotland), but there can be no doubt that these maps provide far and away the best available pictorial representation of bird distribution in the British Isles, and the book will prove as valuable to the birdwatchers of today as it will, in retrospect, to those of the future.

DOUGAL G. ANDREW

Azraq, Desert Oasis. By Bryan Nelson. London, Allen Lane, 1973. Pp. xix + 436; 90 black-and-white plates; 41 text illustrations. 23 x 15½ cm. £6.00.

The Azraq National Park covers an area of over 2000 square miles in the desert of eastern Jordan; it is an oasis surrounded by permanent marsh, which gets its water supply underground from the Syrian mountains to the north. The area was designated the first National Park Area in the Middle East in 1965, but because of the tendency of Middle East populations to look upon all forms of wildlife as a food source, and the need to utilise all available water supplies for human use, little has been done to develop the area as a wildlife habitat and National Park since that time. Bryan Nelson went there in 1968 to establish a biological research station and, though this book is a result of that visit, it is not merely an account of the visit but is a remarkably detailed description of the entire Azraq area, its geological origins, vegetation and wildlife.

The book contains a wealth of detailed information and statistical data, but the author has wisely concentrated most of this in the 13 appendices; this has made the main text much more readable than it would otherwise have been, and the result is a book which is both interesting to read and a useful text book for future reference.

Almost half of the book is devoted to the bird life of the area, and an idea of the importance of Azraq to the millions of migrating birds that pass through there can be gained from the fact that the chapter on bird

migration occupies one quarter of the book. In this chapter are listed the 224 species seen by Bryan Nelson during his stay there; their Azraq status is given and, for comparison, their status in Israel. This chapter also includes a study of bird migration through the Middle East generally, and contains a great deal of useful information on the subject, much of it gleaned from sources other than the author's own experience. The 44 recorded breeding species are covered in a comprehensive chapter, and it is surprising to find such unlikely breeding neighbours as Desert Lark and Water Rail, Sand Partridge and Mallard. There is also a chapter on the wildfowl of Azraq, and an eight-page appendix contains some interesting statistics on weights, wing lengths, etc. taken from birds shot by local hunters. Birds ringed at Azraq and ringing recoveries are also listed.

It is a pity that it was thought necessary to reduce some of the photographs to almost postage-stamp dimensions in order to crowd as many as eight onto one page. There are also some textual errors and misprints which should not have reached the final printing stage in a book of this quality; the worst of these being the reference to *Sturnus vulgaris* as the Startling and the author's reference to the Sahara as being "well to the east of Jordan". These are minor criticisms, however, and it would be unfair to allow them to detract from the value of this book as the most comprehensive work so far produced on this ornithologically important area.

In Bryan Nelson's own words this is a straightforward attempt to put Azraq on some maps as one of the world's outdoor laboratories and his suggestions for its development, research projects, and animals to be introduced or re-introduced into the area deserve serious consideration. It is doubtful if this aim will be achieved so long as the present state of tension persists in the Middle East but, if this book achieves the wide readership the author obviously hopes for, it should certainly cause most societies concerned with wildlife conservation to give serious thought to future development of the area along the lines suggested.

HARRY GREIG.

The Natural History of Cape Clear Island. Edited by J. T. R. Sharrock, illustrated by R. Gillmor. Berkhamsted, T. & A. D. Poyser, 1973. Pp. 197; 16 black-and-white plates and numerous line drawings. 22½ x 14 cm. £3.00.

Small islands and birds are a magic mixture, and Tim Sharrock has brought together accounts of all aspects of life on Cape Clear Island to produce a most attractive and readable book. Not only that, but it is a volume I will return to frequently for reference; it can be compared with earlier works on Fair Isle and the Isle of May and is a must for bird-watchers interested in islands and migration. The island is situated at the southwest corner of Ireland and is the country's most southerly point, except for the tiny Fastnet Rock four miles further out.

The real meat of the text is given in the accounts of the 244 species of birds recorded at Cape Clear. Eighty-six pages are devoted to the status of all these species, and a special feature of the book is the extremely interesting histograms, prepared from the Observatory's detailed records, showing monthly abundance of migrant birds. Maps of breeding distribution and numbers are also given for some species. Cape Clear is the bird observatory *par excellence* for observing seabird migration, and one cannot fail to be impressed by some of the big movements, such as migrations of Manx Shearwaters peaking at 30000 birds per hour and the amazing total of 5118 Great Shearwaters in four hours on 15th September 1965. One is also struck by the list of very rare vagrants observed at the island, its location making it a better venue for American

strays than Fair Isle. Also remarkable is the scarcity of some species, notably wildfowl; for example there is only one record of Eider and none of Barnacle Goose.

The bias of the book is naturally ornithological, but the 20 chapters give a most interesting account of the rest of the island's natural history, its people and the Bird Observatory. The book is profusely and delightfully interspersed with vignettes by Robert Gillmor but I found the poor reproduction of the black-and-white photographs disappointing. About a dozen authors have contributed to the text; all of them obviously have a great love of the island and Dr Sharrock, as senior author, has marshalled their work into a most valuable book. I thoroughly recommend it (and a visit to Cape Clear) to all readers.

R.H.D.

Alaska and its Wildlife. By Bryan L. Sage. London, Hamlyn, 1973. Pp. 128; 44 colour and 20 black-and-white photographs; end-paper maps; 29 x 22 cm. £2.50.

This is a splendid, moderately-priced book with a description and beautiful colour photographs of the scenery and wildlife of the largest and most remote wilderness area in the U.S.A.

Employed as an ecologist by British Petroleum to advise on environmental and conservation aspects of the company's activities, the author spent most of 1969 and 1970 in Alaska assessing the ecological implications of oil exploitation in the Arctic and in particular those relating to the trans-Alaska pipeline. Bryan Sage is a first-class photographer and has lectured on Alaska to several branches of the SOC.

The vastness, remoteness and staggering beauty of this 'last great wilderness' has been captured in print in this fine book. In the introduction, the author traces the chequered history of the State from the days when, as part of the Russian Empire, it was ruthlessly exploited for its wealth of fur-bearing animals. Today, with the world-wide problems of oil shortage, the rich oil fields on the Arctic Slope and at Prudhoe Bay are about to be exploited. Since the book was written, the scheme for the Alaskan pipeline, held up for many years because of ecological problems, has been given the go-ahead.

As an ecologist, the author is rightly concerned with the impact of development on this hitherto unspoilt environment and its wildlife, and this he deals with in the chapter—Conservation and Development: the challenge is to develop the resources and at the same time to preserve in perpetuity the greatest combination of wilderness scenery and wildlife in the world.

It is the High Arctic regions that have the greatest attraction for the author, with their wealth of wildlife—moose, bears, caribou, musk oxen, wildfowl and other arctic-breeding species. There is a fascination for naturalists in studying the adaptation of the fauna and flora to the harsh environment. The glory of the perpetual daylight throughout the short summer, the stupendous and dramatic scenery and the beauty of the animals and flowers are depicted in a series of fine colour photographs taken mostly by the author.

What a glorious place—and how important that Man should preserve its vast wilderness tracts. As Peter Weedon has written 'Man needs a place where wolves stalk the strand-lines in the dark, because a land that can produce a wolf is a healthy, robust and perfect land'. Anyone who has seen a polar wolf in its wild state in the Arctic would certainly agree.

GEORGE WATERSTON.

Requests for Information

Possil Marsh. Desmond Norden is carrying out a survey of birds in the Possil Marsh area, on the outskirts of Glasgow and will welcome any unpublished information or notes on the locality for the period from 1950 to date. All contributions will be acknowledged and should be addressed to D. J. Norden, 1240 Argyle Street, Glasgow, G3 8TJ.

Kestrels. An attempt is being made to assess the extent to which Kestrels nest in urban sites in Scotland. Anyone with information about sites or breeding records is requested to contact Gordon Riddle, Depute Principal, Culzean Country Park, Maybole, Ayrshire.

The Scottish Ornithologists' Club

SPECIAL GENERAL MEETING OF THE CLUB

A Special General Meeting of the Club was held in the Education Centre, Royal Zoological Society of Scotland, Edinburgh, at 7.30 p.m. on Tuesday 9th April 1974. Mr George Waterston, President of the Club, presided over an attendance of about 100 members.

Apologies Apologies for absence were received from Miss M. H. E. Cuninghame, Lt Col J. P. Grant, Sqn Ldr H. Greig, B. G. Grattage, F. D. Hamilton, M. K. Hamilton, Dr M. A. Keith, Miss M. P. Macmillan, H. Robb, R. T. Smith and Mrs George Waterston.

Constitution The Chairman reminded members that full details of the Council's proposals for raising subscriptions had been circulated to all members in February this year. He said that, following representation from a number of members, Council had considered a special subscription rate for those entitled to draw the State Old Age Pension—it being agreed that, on application to the Club Secretary, such members may pay a reduced subscription of £2.00 (single) or £3.00 (family). This information will be included in Club subscription notices.

The Meeting approved the recommendation of Council that Membership rates should be increased immediately and that the definition of Joint and Junior Membership be altered; it also approved the proposed amendment to the Constitution that paragraph 3 MEMBERSHIP (e) should now read as follows :

"There shall be no entry fee. The Annual Subscription shall be £3.00; or £1.00 for members under 21 years of age at the time at which their subscription falls due in any year, and for students under 25 years of age who satisfy Council of their status. The Life Subscription shall be £75.00. Married couples shall be eligible for Family Membership at an Annual Subscription of £4.50, which shall also include any of their nominated children under 18 years of age, and for Family Life Membership at a Subscription of £112.50, and shall enjoy all the usual privileges of Membership but be entitled to only one copy of *Scottish Birds* (Club Journal) and any other literature circulated by the Club."

There being no further business, the Meeting closed at 7.45 p.m.

BANKER'S ORDERS AND DEEDS OF COVENANT

Following the increase in subscription rates agreed at the Special General Meeting of the Club on 9th April 1974, the Secretary has written

to all members who pay their subscription by Banker's Order and who have signed a Deed of Covenant in favour of the Club.

Members who do not pay by Banker's Order are asked to consider this method of payment when renewing their subscriptions, since this helps to reduce our administrative and postage costs : a form will be sent at the end of the session or on application.

Without the tax recovered from Deeds of Covenant, the Club's Revenue Account for both 1972 and 1973 would have shown a deficit. Members who do not covenant their subscription are therefore urged to do so, as the tax which we can recover is of very great help to the Club. Those who pay income tax are requested to write to the Club Secretary for a Deed of Covenant form.

CLUB ENQUIRIES

It is intended to publish progress reports on the enquiries which have been adopted by Council as official Club enquiries, and on the completion of each enquiry a report will be published in *Scottish Birds*. The following progress reports concern the current enquiries which were notified in the Report of Council for 1972/73 (*Scot. Birds* 7: 424).

Effluent Enquiry organised by Mr B. Pounder.

All the major outfalls of domestic and industrial wastes into Scottish coastal waters have been located, as well as those serving medium and small sized towns. Wildfowl counts were carried out at all the sites during mid-November 1973 and mid-February 1974 and the results are being analysed. The final report will include a survey of the factors which may have beneficial or detrimental effects on the bird flocks which feed in the vicinities of these outfalls.

Redwing Breeding Survey organised by Mr R. H. Dennis and Mr M. I. Harvey.

Published information is now being collated and the organisers would welcome any unpublished information about Redwing breeding. Details should be sent to R. H. Dennis, Landberg, North Kessock, Inverness, IV1 1XD or to M. I. Harvey, Clach Bhan, Loaneckheim, Kiltarlity, Inverness-shire.

Great Crested Grebe Breeding Survey organised by Mr R. W. J. Smith.

The report on this enquiry is now being written and will be published in a future number of the journal.

Carrion/Hooded Crow hybrid-zone Enquiry organised by Mr A. Cook.

A progress report on this enquiry was given in *Scot. Birds* 7: 417.

SCOTTISH BIRDS — BINDING AND BACK NUMBERS

Details of binding Volume 7 are given in the Index to that Volume issued with this number; earlier Volumes can be bound at the same price provided they are sent for binding at the same time.

Back numbers of the journal can be obtained post free from the Club Secretary at the following prices, cash with order :

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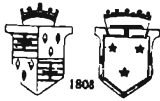
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