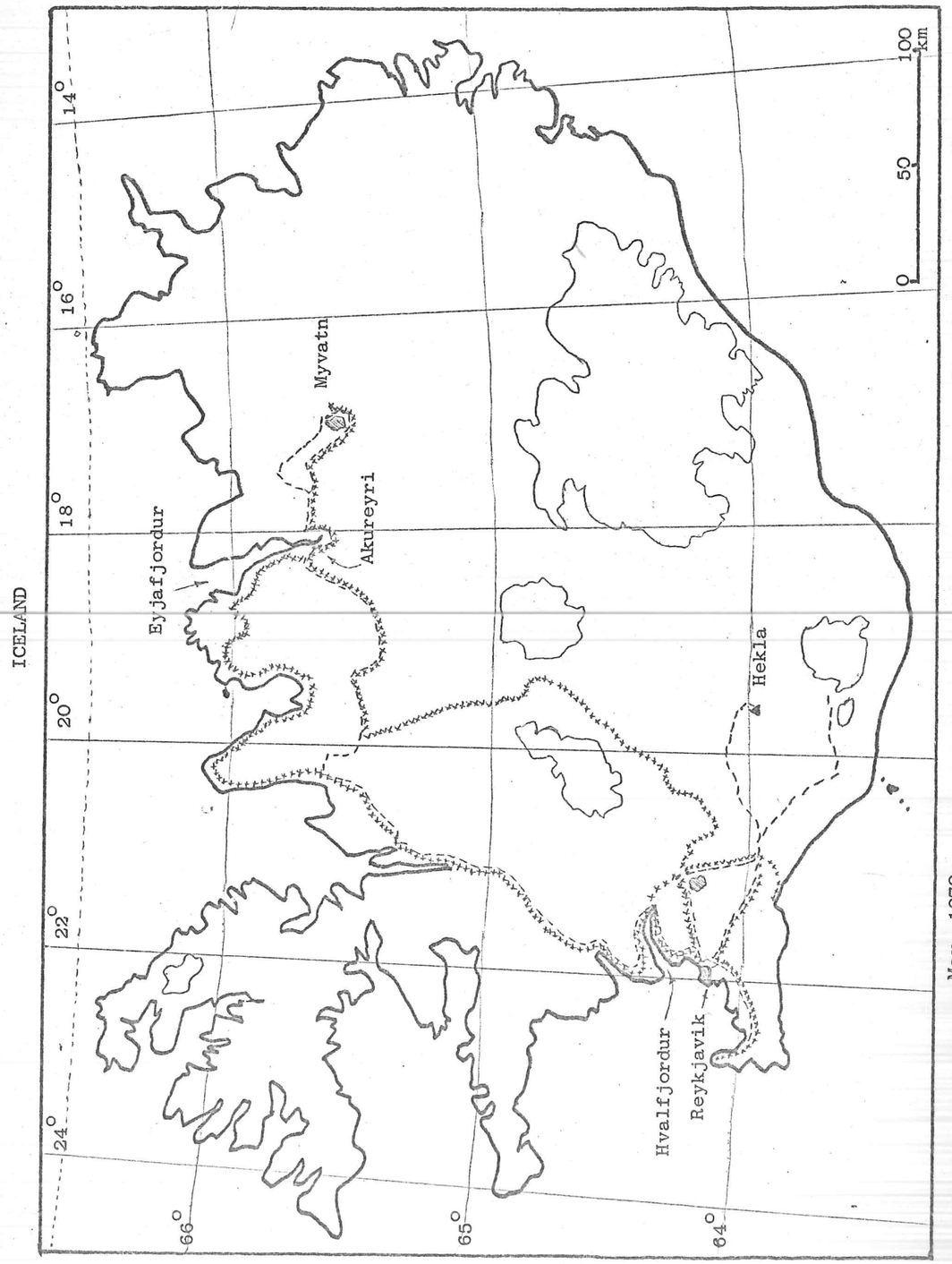
CAMBRIDGE — LONDON

ICELAND EXPEDITION

1970



July/August, 1970

May, 1970

CAMBRIDGE/LONDON ICELAND EXPEDITION 1970

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CONTENTS

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Cover: Knot flock at Thornham, Norfolk. Drawing by R.I.G.M. from a photograph (film courtesy of Ilford Ltd.).

ACKNOWLEDGEMENTS

We wish to extend our sincere thanks to the following organisations and individuals for their support, without which the expedition could not have been undertaken.

In particular, to the following for financial assistance:

University College, London
The Merchant Taylors' Company
NATO Research Grants Programme
University of London Convocation
King's College, London
Chelsea College, London
Derbyshire Education Committee
Newbury Ornithological Society
Analytical Supplies Ltd. (Derby)
Camp Hopson & Co. Ltd. (Newbury)
Deb Chemical Proprieties Ltd. (Derby)
Hamp & Sons Ltd. (Northampton)
Marks & Spencer Ltd. (Newbury)

We also wish to thank the following firms for donations of their products:

Beecham Foods, British Sugar Corporation Ltd., Cerebos Foods Ltd., John Dewar & Sons Ltd., Fowler Ltd., William Grant & Sons Ltd., John Haig & Co. Ltd., H.J. Heinz Co. Ltd., Ilford Ltd., John Mackintosh & Sons Ltd., Reckitt & Sons Ltd., Saward Baker & Co. Ltd.(on behalf of A. Wander Ltd.), C. Shippam Ltd., Supreme Salt Co. Ltd., Whitworths Holdings Ltd., W.D.&H.O. Wills,

and the following firms for offering us their products at reduced rates:

Batchelors Foods Ltd., Bovril Group Marketing Ltd., Brown & Polson Ltd., Dornay Foods, F.M.S.(Farm Products) Ltd., G.A.F.(Great Britain) Ltd., Kavli Ltd., Kodak Ltd., Libby, McNeill & Libby Ltd., Smiths Food Group Ltd., Joseph Terry & Sons Ltd., Unigate Ltd., Unilever Export Ltd., United Biscuits Ltd.,

and to all firms contributing to the Cambridge Block Order Scheme, whose products we used on the expedition.

We thank the following individuals and organisations for their generous assistance:

In Great Britain:

For their expert advice and assistance on the ornithological work undertaken:
Dr.P.J.K. Burton, The Bird Room, The British Museum
Dr.C.D.T. Minton, Organiser of the Wash Wader Ringing Group
The British Trust for Ornithology

For the loan of cannon netting equipment:
The Wash Wader Ringing Group

For the loan of a tent:
M.R. Plant

For assistance:
Cambridge University Explorers' and Travellers' Club
University of East Anglia Exploration Society

For cooperation regarding finances:
The National Westminster Bank Ltd. (Derby)

For help with the analysis of data and translating illegible scribble into typescript:
Ann Joyes
Susan Danswan

For help in the production of a leaflet:
Allan Hubbard

For considerable help in the organisation of the medical supplies:
Dr. L. Hawtrey May, Fenner's, Cambridge

and for scientific advice and collaboration on the parasite study:
Dr. A.E. Williams, University of Birmingham

In Iceland:

For his most helpful advice on the ornithological work, and for supplying the rings:
Dr. Finnur Gudmundsson, Director of the Museum of Natural History, Reykjavik

For permission to work in Iceland:
The National Research Council (Rannsoknarad Rikisins)

For their very kind hospitality in allowing us the use of their premises whilst in Reykjavik, and storage of our equipment at other times:
The Youth Council of Reykjavik (Aeskulydskrad Reykjavikur)

For permission to work and camp on their land:
The farmers and people of Iceland

For advice:
Sigurdur Blondal

and for advice, discrete help and also entertainment:
Mr. Brian D. Holt, Consul, British Embassy, Reykjavik, and also to the staff of the embassy.

INTRODUCTION

THE AIMS AND ACHIEVEMENTS OF THE CAMBRIDGE/LONDON ICELAND EXPEDITION 1970

(An account of the expedition published in The Times, Wednesday, 3rd February, 1971, under the title "Mass Ringing Helps to Map Haunts of Wading Birds".)

The tremendous encroachments that Man is making on the natural habitats of wildlife is at last being recognised. 1970 has been declared European Conservation Year, and this has stimulated many operations involving international cooperation aimed at the conservation of balanced populations of wildlife. One of the most outstanding changes that has occurred in Western Europe in recent years has been the loss of vast areas of "wetland habitats" caused by the expansion of agriculture, industrial and domestic interests, the creation of leisure areas, and general environmental pollution. The relative mildness of the British Isles and their position on the European seaboard make them the visiting ground of immense flocks of wildfowl and waders that breed in Greenland, Iceland, Spitzbergen, Siberia and Northern Europe. In particular, drainage schemes in Ireland, barrage schemes for many of the British estuaries, including Morecambe Bay, the Wash and the Solway Firth, and land reclamation in Western Europe, threaten the feeding grounds of the wintering populations of wading birds, including the knot, oystercatcher, redshank and dunlin.

The estuaries of Britain, in particular the Wash and Morecambe Bay, have long been recognised as critically important wintering areas for waders. However, a comprehensive study by the Wash Wader Ringing Group has emphasised that these areas are important for, and absolutely essential to, birds that migrate further south to wintering areas in North and West Africa. The Wash Wader Ringing Group, established in 1959, has developed sophisticated catching equipment that has enabled about 60,000 birds to be ringed on the Wash to date. Subsequent recoveries of ringed birds has enabled a picture of the migration routes of many species to be built up, and allowed identification of their wintering and breeding grounds. However, for some species, such as the knot, the picture is not clear. Populations of birds of the same species breeding in different areas often differ slightly in size. By measuring, for instance, the wing length of trapped birds, it may be possible to discover whether birds from two different breeding grounds are using a common wintering area. In the case of the knot, two such groups occur on the Wash in winter, and it is suspected that these may originate from Greenland and Siberia. Although 15,000 knot have been ringed by the Wash Wader Ringing Group, it has still not been possible to decide the origin of either of the two populations because of the very low recovery of ringed birds in

their sparsely populated breeding grounds. To resolve this problem it was necessary to catch a sample of knot known to come from one of the breeding grounds; it was not possible, however, to do this by going to the breeding grounds, since the birds would be too widely dispersed to allow an adequate number to be caught. A different tactic was therefore adopted: large flocks of knot are observed migrating through Iceland in the spring, and owing to the geographical position of the country it is possible to identify these birds as belonging to the population that breeds in Greenland. On the advice of Dr. Finnur Gudmundsson of the Icelandic Museum of Natural History, it was considered feasible to organise an expedition to visit Iceland to catch this species.

The personnel of the expedition came from the Universities of Cambridge, London and East Anglia, the necessary equipment was supplied by the Wash Wader Ringing Group, and the project received financial support from the University of London, the Merchant Taylors' Company and the NATO Scientific Research Programme.

The expedition took place in two phases. The first, in May, was present during the spring migration of the birds northwards towards their breeding grounds, and the second, in July and August, during the return migration.

In May, despite adverse weather conditions, the first party was successful in catching 885 knot, and the second party, in addition to catching a further 204 knot, ringed valuable samples of redshank, dunlin and oystercatchers. The success of the expeditions lay in the fact that 52 of the knot were already carrying rings, including 45 British, 1 French and 1 German ring. These recoveries emphasised the importance of the Wash and Morecambe Bay to the Greenland knot population. The measurements of the birds caught in Iceland were in agreement with those caught on the Wash in early autumn, and on Morecambe Bay later in the winter. These data suggested that the Greenland population is found moulting on the Wash in early autumn, and around November moves to Morecambe Bay, where it spends the winter.

None of the birds caught while migrating north through Iceland to Greenland to breed were less than two years old, indicating that the birds do not breed or migrate to the breeding grounds during their first year. In this connection, it is interesting to note that juvenile birds ringed on the Wash have been recovered during their first winter in West Africa, whilst no adults appear to go this far south. One juvenile ringed on the Wash in September was recovered in Senegal only five days later, showing the speed at which this species can cover great distances.

The successful conclusion of this year's expedition has raised hope that the expedition to Morocco planned for next summer by the University of East Anglia will lead to a more complete picture of the migration pattern of these birds.

The population of waders on the Wash in early autumn may approach 100,000 and they naturally require a substantial supply of food. The Wash is the only area on the east coast of Britain capable of supporting such a population, and thus the apparent abandonment of the

scheme to barrage the entire Wash is welcomed by many conservationists. Destruction of the wetland habitats in Britain could have disastrous consequences for wader populations, not only in Britain, but in the entire northern hemisphere.

Mass ringing helps to map haunts of wading birds

By a Special Correspondent

The mildness of the British climate and its position on the European seaboard make it the visiting ground for flocks of wildfowl and waders which breed in Greenland, Iceland, Spitzbergen, Siberia and northern Europe. Drainage systems in Ireland, barrage schemes for many of the British estuaries, and land reclamation in western Europe, threaten the feeding grounds of the wintering populations of wading birds, including the knot, oystercatcher, redshank and dunlin.

The estuaries of Britain, particularly the Wash and Morecambe Bay, have long been recognized as critically important wintering areas for waders. But a study by the Wash Wader Ringing Group has pointed out that these areas are absolutely essential to birds which migrate farther south to wintering areas in north and west Africa. The group has developed up-to-date catching equipment so that about 60,000 birds have been ringed on the Wash in the past 10 years. The recovery of ringed birds has enabled a picture of the migration routes of many species to be built up. It has led to the identification of their wintering and breeding grounds.

However, for some species, such as the knot, the picture is not clear. Birds of the same species breeding in different areas often differ slightly in size. By measuring, for instance, the wing length of trapped birds, it may be possible to discover whether birds from two different breeding grounds are using a common wintering area. In the case of the knot, two such groups occur on the Wash in winter, and it is suspected that these may originate from Greenland and Siberia. Although 15,000 knot have been ringed the origin of either of the two populations has not been pinpointed because of the very low recovery of ringed birds in their sparsely populated breeding grounds. To overcome this problem it was necessary to catch a sample of knot known to come from one of the breeding grounds. It was not possible to do this by going to the breeding grounds, since the birds would be too dispersed for an adequate number to be caught.

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None of the birds caught was less than two years old, indicating that they do not breed or migrate to the breeding grounds during their first year. It is interesting to note that juvenile birds ringed on the Wash have been recovered during their first winter in west Africa, while no adults appear to go as far south, and one juvenile ringed on the Wash in September was recovered in Senegal only five days later. The success of the expedition has raised hope that an expedition to Morocco next summer by the University of East Anglia will lead to a more complete picture of the migration pattern of these birds. The population of waders on the Wash in early autumn may approach 100,000 and they naturally require a substantial supply of food. The Wash is the only area on the east coast of Britain capable of supporting such a population, and the apparent end of the scheme to barrage the entire Wash is welcomed by many conservationists. Destruction of the wetland habitats in Britain could have disastrous consequences for the wader, not only in Britain, but in the entire northern hemisphere.

ITINERARY

Phase I, May 1970 (R.I.G.M.)

The evening of the 6th May saw the supplies finally crated in Cambridge, and that night they were taken to Leith by Peter, Les and Gwyn, who returned the next day, thus somewhat inadvertently setting a pace of travelling which lasted throughout the expedition. Guy and Les watched the supplies go on board the m/s Gullfoss on the morning of 11th May, and later in the day the party flew from Glasgow airport to Iceland. In Reykjavik we were very kindly given accomodation at the headquarters of the Reykjavik Youth Council, and this provided us with an ideal base from which to organise our activities.

The 12th May was spent in making ornithological contacts and arranging customs clearance for our equipment, all of which took a considerable time, and it was evening before we were able to pick up the Land Rover which we had arranged to hire. We were pleased to find that it was a new Land Rover, fresh from the factory, and with the worried exhortation of the agent to look after the new vehicle, we left Reykjavik to visit the volcanic eruptions that had begun on 5th May on Hekla.

We had heard rumours that the roads to the south of the volcano were impassable, that the farmers were out barring the way with shotguns and that disease was spreading amongst the sheep. Approach from the north therefore seemed the more attractive proposition, and passing through Thjorsardalur we had fine views of black tailed godwits and grey lag geese. Soon our attention was gripped by a small tongue of flame on the flank of the mountains ahead, and as we neared the newly constructed power station on the river, we found that the ground was completely covered by a layer of volcanic ash from six to nine inches in depth. It was dark when we crossed the raging glacial river at the new dam, and we wondered about the sanity of our driving blithely towards an active volcano which we could now see rather more clearly ahead, lighting up the sky with a spectacular red glow. The track soon disintegrated into a series of deep muddy ruts, and we were forced to wait for the light to improve before we could continue. We climbed to a nearby ridge, and as we watched the red glow fade in the increasing daylight, we had fine views across to the vent. On the mountainside behind it the snow line had risen by several hundred feet where the heat from the volcanic activity had caused the snow to melt; below us lay a circular lake, half covered with ice which was filthy from the ashfall.

We continued at dawn, leaving the track and heading across country towards the vent, skirting around the long tongues of lava which had flowed down the mountain, and from which smoke was still streaming. Eventually our path was barred by a lava flow twenty feet high and we got out to explore the area. The crater was now less than a mile away and we could see the lava being thrown to heights of several hundred feet in the air; the noise of the explosions was now very loud. The lava was mostly cool to the touch, but there were many "hot spots" which were still smoking and giving off a most unpleasant sulphurous smell. The going over the lava was most tricky as it was like climbing across loosely packed, razor-sharp pieces of clinker. On much of the ground that had not been covered by the flows we found little craters where pieces of lava had landed during an earlier, more violent phase of the

eruption. Sometimes the piece would be nearby, where it had bounced, sometimes there would be a little pile of rubble where it had shattered on hitting the ground. The lava itself was surprisingly light, owing to its high porosity.

After a rather long scramble over the treacherous ground, we found the lava flow itself. Huge slabs toppled over one another as the lava oozed slowly over the hillside, making an eerie creaking noise as the partially cooled surface ground and scraped over itself. Underneath we could see the red hot magma moving slowly along at a speed of about eight feet per minute,, giving off a tremendous heat which prevented us getting any closer, a thing which we were not, in any case, particularly anxious to do. Through the shimmering heat haze we had magnificent views of the crater itself, feeding the river of lava just in front of us. Occasionally there would be a particularly loud bang, and we would look up anxiously to see a large pall of smoke rising menacingly near the active crater and a shower of rocks falling to the ground: it appeared that another vent was probably warming up.

Although it was a fascinating experience watching what appeared to be solid ground creeping over the mountainside, the nose from the crater, which was now less than half a mile directly uphill from where we stood, suggested that it would not be particularly prudent to prolong our stay too long, and so, having expended a suitable quantity of film, and as we could progress no further, we set off on the arduous journey back to the Land Rover.

At the vehicle, we paused for a somewhat belated breakfast, and cleaned up our various scrapes from the lava. It was now mid morning and the sun was shining brightly. Around us the treeless brown, black and occasional green of the desert stretched away to the frozen interior; to the south we could see black mountain masses streaked with white rising above the wasteland floor, and towering above the raging vent was the main massif of Hekla itself, gleaming majestically white whenever the cloud which hung to its peak dispersed for a while. Though we had been up all night we were much too stimulated by our surroundings to feel very tired.

After a very rough journey back down the mountain, tiredness did catch up with us on the return journey to Reykjavik, which we made via Thingvellir. At Ulfjotsvatn we enjoyed views of Great Northern Divers.

After a welcome night's rest, we spent the 14th May in the complicated business of completing customs arrangements, talking our way out of a parking fine and sorting out our equipment and supplies which had arrived on the Gullfoss that morning. After dinner we were on the road again, the Land Rover visibly sagging under the weight of its load, to search for waders in the western fjords. As we passed a lagoon area at Hvaleyri in Hvalfjordur we saw a large flock of knot feeding on a mussel bed. We quickly checked at the local farm whether we could operate on the lagoon area, and soon had the Land Rover bogged down in the soft ground beside the track leading from the main road. We established our camp at the head of some small cliffs to the west of and commanding a fine view of the lagoon area.

In the morning Peter made a thorough recce of the area and the Land Rover was extricated from the bog. In the afternoon we could see the knot roosting on the sand in the lagoon area, and while Pete and Les set the nets on the mussel bed, Gwyn and Guy went to Keflavik to pick

up Angela who had flown out from Ehgland that day. After a meal that evening, a check at the firing position revealed a large flock of knot feeding on the mussel bed, and we quickly redeployed to fire the nets. In the dim light we saw a huge flock of birds rise from the mussel beds as the cannons fired, but many were in the net and the result was a catch of 885 knot of which we were able to process 148, including all 37 controls. At about six o'clock in the morning, a vast number of knot began arriving in the fjord, probably having just made the flight from Britain. There were so many (we estimated 14,000) that it was possible to hear the whirring of their wings, and many landed and began feeding on the lagoon not far from the nets. By the time we had completed the last processing and packed away the nets it was after noon, and not even a violent storm could wrest us from sleep during the next twenty hours.

Subsequent recconaissance of the fjord indicated that Eyri was the most important area to the knot, and this is where we spent until 20th May attempting further catches on each high tide. After our last attempt to catch on 19th May, we retired to Reykjavik to reorganise our equipment, and the next day set out for Akureyri by the main coast road. It was a long and uncomfortable journey, the passengers in the back literally being bounced between seat and ceiling on occasions. As we drove across the moors between Stadur and Blonduos we had a spectacular view of two skuas hunting a snipe. The skuas wheeled over the snipe, and as it swept over the road only about 70 yards in front of us, one of the skuas struck it hard onto the ground. We jumped out of the vehicle and chased the skuas off, but the snipe was very badly injured internally, and we had to kill it. As we left, we saw its mate fly up, searching for its partner.

After spending the night in a small hut high in the snow-bound pass at the head of Oxnadalur, we drove into Akureyri on 21st May. Here we learned that the roads to Myvatn were nearly impassable, but we set out the same afternoon, ready to put our Land Rover to the test. Our first attempt at the journey ended after we had spent most of the afternoon digging it out of the mud on one of the two roads leading out of the fjord.

We returned to Akureyri and decided to attempt to catch the waders which we had observed flying around over the mud between the southern end of the town and the airstrip at the head of the fjord. The tide was at about 2 a.m., but we had no luck in trying to twinkle small flocks of purple sandpipers and dunlin towards the nets on the shoreline. The tide slowly receded, and by 4 a.m. we had moved the nets out onto the mudflats which now extended almost across the entire width of the fjord. It became rather misty and began to snow, and it was with some amusement that we watched a police van appear on the scene and slowly approach the Land Rover in which Angela had remained. There followed a rather abortive attempt to establish a common language, and after retiring to confer with his companions, one policeman returned to the Land Rover to enquire whether we were all English. This having been established, all seemed to have been satisfactorily explained, and the van drove off.

The next day, the 22nd May we resumed our journey to Myvatn, and this time succeeded in making the ascent out of the fjord, though the track was more often like a sea of mud than a road. At Godafoss we saw our first harlequin, not far from the falls, bobbing on the turbulent glacial river. The road became bad again, and we had to contend with snow, mud and collapsed culverts before eventually reaching Myvatn. A stop for a splendid view of a party of Whooper Swans on a frozen lake was the only brief rest from the constant

jolting. The 120 kilometre journey took about seven hours.

On 23rd May we visited the hot springs at Namaskard, and then split up to climb the volcanic explosion crater Hverfjall and to investigate the bird life on the lake; the latter included a flock of about 1500 red-necked phalaropes and numerous waterfowl. A well shaken bottle of champagne was then opened to celebrate our furthest point from Reykjavik, and we set off back to Akureyri on the new road which had been built to serve the kieselguhr factory near the lake; the return journey took only three hours.

The tide conditions on the 24th May turned out to be rather unsuitable for attempting a catch, and a series of recces failed to establish where the waders were roosting. We decided therefore to return south, and arrived in Reykjavik early the next morning after a somewhat exhausting twelve hour journey through the night. The next few days were spent in winding up our business, and Peter, Les and Gwyn left for England by air on 27th May. Angela and Guy spent a few more days in Iceland, visiting the Rangavellir area in southern Iceland and returning to the eruptions at Hekla: these were still very active and it seemed that much of the area we had previously visited was now under lava! Despite a general strike threatening the international air flights, all members of the expedition were back in Britain by 3rd June.

Phase II, July/August 1970 (M.W.P., K.R.A.)

The five members of the expedition second phase flew to Keflavik on Icelandair's night flight, arriving at Reykjavik at 4.30 a.m. on Tuesday 21st July, a small amount of additional equipment having been shipped to Reykjavik from Felixstowe on the M.V. "Reykjafoss". Tuesday was spent finding the equipment left by the first party, establishing ourselves at the Youth Council Headquarters, which kindly provided us with accommodation while we were in Reykjavik, and meeting our Icelandic contacts. However, our attempts to hire a vehicle proved even more difficult than anticipated, as, unfortunately, earlier uncertainties in our finances had prevented the booking of a Land-Rover in advance. For the next three days the lack of a vehicle kept us in Reykjavik but our impatience was moderated by the co-operation we received from the Icelanders with whom we had to deal, and by continual sunshine and exceptionally hot weather, making bird watching by the city's lake or harbour a very pleasant occupation. On Friday 24th our spirits were raised when John found a flock of at least 300 Knot off Reykjavik Harbour, and by the news that we could hire a Land-Rover the following day for the whole of our stay. For help in obtaining this we are greatly indebted to the staff of the British Embassy in Reykjavik.

By the afternoon of the 25th we were camped above Eyri in Hvalfjordur where the first party had made their catch, but although 200-300 waders of various species were present, the neap tide was insufficient to cause them to flock. It also seemed likely that birds were not being pushed off other feeding areas in the fjord. With only four hours twilight (in which it was quite possible to read or write) and no darkness, mist-netting was impractical. We decided to move towards

the North, taking the opportunity of bird watching on the way, and to return along the coast looking for suitable sites, aiming to return to Hvalfjordur, which we anticipated would be the most rewarding area, by the spring tides a week later.

On 26th we drove eastwards leaving a cloud of dust over the sun-baked road (and in the back of the vehicle) to visit Thingvellir, the site of the ancient parliament. As we drove on over the hot lava plain, we had our first mishap as the top water hose burst. A rather gentle 130 kilometre detour through Sunday traffic followed before we found a suitable substitute hose and effected a repair. Camp was eventually pitched 6 km. from, and within sight of the hot springs at Geysir, and Peter's birthday was celebrated with an excellent meal of tinned steak and kidney pudding, baked beans and instant potato.

In the morning, after visiting the hot springs, we continued northwards and beyond the magnificent sight of the waterfall Gullfoss, the road soon degenerated into a very rough track with occasional deep fords. The desolate lava plain across which we drove was bounded by mountain ranges 10 to 30 km. away, and beyond them the icecaps of Langjokull to the west, and Hofsjokull to the east. We refuelled at the weather station at Hveravellir after about 100 km. without a sight of any habitation at all and started across the next 80 km. before reaching that valley of Blondudalur. Shortly after leaving the weather station our brakes failed completely as the fluid burst out of a front brake pipe. The remainder of the journey across the lava plain and the descent into the valley proceeded very gingerly before we camped beside the main Reykjavik-Akureyri road near the junction. We did, however, manage to stop in order to catch and ring our first bird, a pullus Redshank in Blondudalur.

With a very temporary repair improvised with the help of the local telegraph operator we travelled the 100 km. to Akureyri, Iceland's second largest town, where we obtained and fitted a new pipe. Myvatn, the lake famous for its large numbers of breeding wildfowl, was reached late on the 28th, Harlequin and Barrow's Goldeneye having been seen at the classic site on the rapids of the River Laxa en route. After catching and ringing 3 pulli Golden Plovers, camp was pitched near the shore of the lake. The next day was spent travelling slowly around Myvatn before returning westward, stopping on the way to ring 2 Rednecked Phalarope pulli in Adadalur.

At Gaseyri, a spit north of Akureyri, seen from across the fjord when we left Akureyri the previous day, 200 Dunlin and smaller numbers of other waders were present. While driving to talk to the farmer, two of the team contemplated what would next go wrong with the vehicle but both were proved wrong when the dynamo fell off. With permission obtained we set our nets and retired to bed. The morning tide was considerably lower than expected but a flock of 150 Dunlin soon landed and started feeding well above the water and a party of them very obligingly walked straight in front of one of the nets. The catch of 47 was ringed and fully processed. Four hours work on the part of two of the team and a mechanic in Akureyri repaired the Land-Rover and after a higher tide than expected had foiled an evening catch we set off northwards along the side of Eyjafjordur on the morning of the 31st. Our furthest north, Aedarsker, was celebrated

with photographs of Grimsey, the island on the Arctic Circle. Travelling westwards along the North Coast, through magnificent scenery, we obtained excellent views of a Gyr Falcon and a family party of Slavonian Grebes at Hegranes, and Iceland Gulls on the refuse heap at Saudarkrokur.

The pink sky of the previous night belied the downpour of the morning of the 1st August when we drove round the headland of Skagaheidi, the direct road to Blonduos having been washed away. Snow Buntings were abundant around the northern tip of the peninsula and a family party of Ptarmigan was very obliging to the photographers. Our detour took us 3 km. north of the previous day's point, and, lacking champagne, we celebrated with Kendal mint-cake. After a break the downpour continued, turning the main road to mud with an interesting skid-pan effect. After a long drive passing numerous road accidents, we arrived back at Hvaleyri in the evening.

The early morning reconnaissance on 2nd succeeded in bogging the Land-Rover to its axles at 5 a.m. and, the snow chains and jack being in a state of disrepair, the vehicle was finally freed at 10 a.m. The recce was very disappointing in other respects, with very few waders about. The evening tide produced 200 Redshank and 60 Knot but Mike established that the site was rather impracticable as the fjord water reached 2" further up his legs than did his waders in his attempts to reach the islet. Meanwhile, Peter and Keith found 150 Oystercatchers at the head of the fjord and flocks of 100 Oystercatchers, 300 Knot, and 70 Turnstone at Brekka, the latter 2 species moving to a rocky island in the fjord to roost at the height of the tide. Camp was moved to Brekka the next day and nets set (1) for the evening tide, but after the Knot landed in the wrong place (2), the tide dropped too rapidly for a catch of Oystercatchers or Turnstone to be substituted. One of the nets was moved to alternative site (2) but on the morning of the 5th no flocks of birds appeared. A visit was made to Reykjavik to collect stores and mail before attempting another catch. In the evening the Knot flew across the fjord from the roost without landing and again an Oystercatcher catch was prevented by the running out of the tide. The nets were moved a few hundred yards (3) for an attempt on Oystercatchers and a recce around the fjord failed to reveal the Knot.

On the morning of the 5th we were again fooled by the tide which was much lower than expected, but our luck turned as Peter was able to see the Knot flock leave the islet roost and land at Hvammur across the fjord. After a quick breakfast we joined the Knot which were feeding on the seaweed between the high-tide island of Hvammshofdi and the mainland. Unfortunately viewing difficulties prevented our setting on the site (4) seen by Peter from across the fjord and we had to make do with a site on the island (1) and hope that John on the mainland would be able to push the birds across. This failed on the evening tide as the birds showed no interest in our site. As the tide dropped we moved our nets to positions round a small pool (2) on the island where we had seen 60 Redshank while waiting for the Knot. However the next morning the wind dropped removing the advantage of shelter afforded by the island pool and the Redshank did not return in numbers. We moved the net across to the mainland (3) as near as viewing considerations allowed to the favoured site (4) but the birds still did not co-operate.

The situation called for unusual methods and on the 2nd we moved the second net across to the site of our original choice (4) and installed Mike and the firing box under net covering material 7 yds. behind this net, from where there was an excellent view of the catching area. The net set round the corner (3) could not be seen from the firing position and the other members of the team were a little frustrated to see 30 Knot land in the catching area. However a catch of 31 Oystercatchers including one British control was made, and a similar arrangement the following morning resulted in 13 Dunlin and a Purple Sandpiper. Attempts on the evening of the 8th and the morning of the 9th met with no success, but mist-netting in a nearby bay on the night of the 9th-10th caught 13 birds.

On the 10th we broke camp to return to Reykjavik to fly one of our nets back to England where it was required, and to collect mail. The visit also afforded the opportunity of a chat with members of the Brathay Expedition who had been ringing Great Skuas in the S.E. of the country and who were now returning to Britain. We continued west to the light-house of Gardskagi on Midnes where some years earlier H. Williamson had caught waders with beach-traps, but the site was not suitable for cannon-netting although, if we had had more time at our disposal, single panel mist-netting would probably have had rewards. On the 11th we returned to Hvammur on the mainland, and mist-netted during the night. Early on the 12th we set a cannon-net on the seaweed on the shore of Hvammshofdi (5). Keith walked over to the mainland site to move the Knot flock which flew around for a short time and then landed beautifully in the catching area. 204 fully processed Knot later, we decided that perhaps we could afford to give mist-netting a miss that night.

The 13th was largely a day of preparing equipment for the return voyage and after a night's mist-netting, a party took the crates to Reykjavik and despatched them to Felixstowe on the M.V. "Reykjafoss". After another night at Hvammur we rose to a bitterly cold day with snow on the mountains across the fjord and we moved back into Reykjavik where we shared accommodation with a football team from Isafjordur in N. Iceland. The team made us very welcome and in return Alan and Peter entertained on the piano. The remaining two days of our stay were slightly more restful than the preceeding three weeks as we cleared our business and again looked around Reykjavik. We landed at Glasgow in the early hours of the 18th, and by the 19th were either recovering or else had joined our colleagues catching waders on the Wash.

(Numbers in the text refer to netting sites, see pages 22-24).

SPECIES LIST

The following list of birds seen on the expedition is based on detailed records kept by P.I.S. and P.J.K. for Phase I and Phase II, (a) and (b), respectively.

Great Northern Diver (Gavia immer)

(a) 5 Thorsardalur, 12th May; 1 Ulfjotsvatn, 13th May; 1 about 100 yards from shore at Eyri, 17th May; 2 on small lake inland from Eyri, 18th May.

(b) Single pairs at Medalfellsvatn (Kjalarnes) 26th July and at Myvatn, 29th July. Two winter phase birds off Gaseyri (Eyjafjordur) 29th and 31st July. Single birds 1st August at Keldvik (Skagaheidi) and Kroksbjorg (Skagest road). At Hvammur (Hvalfjordur) two on 6th August and one on 14th August.

Red-throated Diver (Gavia stellata)

(a) 3 single birds at Eyri 15th-18th May; 14 individuals Myvatn on 23rd May.

(b) Young birds seen at Myvatn and Vestmannsvatn (Fljotsheidi). Also seen at Hvaleyri, Hegranes (Saudarkrokur), Hraunsvik (Skagaheidi), Krokssel (Skagastrand) and Botnsvogur (Hvalfjordur).

Slavonian Grebe (Podiceps auritus)

(a) 2 at Eyri, 17th May.

(b) A pair with 3 young and another adult bird seen at Hegranes (Saudarkrokur) on 31st July.

Fulmar (Fulmarus glacialis)

(a) Wide distribution with pairs common on West and North coasts. 27 pairs in residence at Eyri, 17th May, and small sea passage of 150 off Eyri on 18th May.

(b) Generally distributed around the coasts, about 150 seen flying out to sea past Gardskagi (Midnes) on 11th August, and a concentration of about 300 at Orfirisey, Reykjavik on August 16th. Only one blue phase bird was seen at Brekka (Hvalfjordur) on 4th August.

Gannet (Sula bassana)

(a) Small passage at Eyri on 17th May after a storm on 16th May.

(b) About 50 passing Gardskagi (Midnes) on 11th August were mostly adults.

Little Auk (Plautus alle)

(a) 3 at Eyri on 17th May.

Cormorant (Phalacrocorax carbo)

(b) 1 juvenile at Gardskagi (Midnes) on 11th August.

Mallard (Anas platyrhynchos)

(a) Common in S.E. Iceland with concentration around Reykjavik. Present at Eyri, 17th May.

(b) About 500 with at least 10 downy young on Reykjavik Lake on 23rd July, about 60 at Myvatn on 29th July; otherwise very few seen.

Teal (Anas crecca)

(a) Considerable numbers (parties of up to 28) seen inland on the smaller rivers but most dense in Oxnadalur Valley where about 100 on half a mile of river.

(b) Single birds seen at Olafsfjordarvatn on 31st July and Hegranes on same date.

Gadwall (Anas streptera)

(a) Numerous at Vogar, Myvatn on 23rd May, presumed breeding.

(b) 30+ at Myvatn on 29th July.

Wigeon (Anas penelope)

(a) 20+ on Reykjavik Lake on 12th May; 15 in Oxnadalur on 21st May, and 2 on Myvatn on 23rd May.

(b) About 15 were at Reykjavik Lake for the whole of our stay. At Myvatn about 150 were seen on 29th July and about up to six were present at Hvammshofdi 5th-7th August.

Pintail (Anas acuta)

(a) 4 at Myvatn, 23rd May.

(b) One or two on Reykjavik Lake throughout our stay. One seen at Myvatn on 29th July and 7 at Gaseyri (Eyjafjordur) on 30th July were the only other birds seen.

Shoveler (Anas clypeata)

(a) 2 on Reykjavik Lake on 12th May.

(b) 1 on Reykjavik Lake on 17th August.

Scaup (Aythya marila)

(a) Very large numbers on Myvatn on 23rd May.

(b) On Reykjavik Lake up to about 50 with about 50 young on 22nd July. 3500 estimated at Myvatn on 29th July; 2 at Olafsfjordarvatn on 31st July and 1 pair with 6 young at Keldvik (Skagaheidi) on 1st August.

Tufted Duck (Aythya fuligula)

(a) Numerous on Reykjavik Lake, 20+ 12th May, large numbers at Myvatn 23rd May, presumed breeding.

(b) Up to about 40 on Reykjavik Lake in July and about 700 at Myvatn on 29th July.

Tufted Duck x Scaup Hybrids (?)

(b) At least 2 individuals on Reykjavik Lake showing characteristics of both species.

Pochard (Aythya ferina)

(a) 4 at Eyri on 17th May; many at Myvatn on 23rd May.

(b) 2 at Myvatn on 29th July.

Barrow's Goldeneye (Bucephala islandica)

(a) 6 on Reykjavik Lake on 12th May. 170 at Vogar on 23rd May, breeding.

(b) 1 male on Reykjavik Lake in July and about 200 present on River Laxa at Arnavatn (Myvatn) on 28th and 29th July.

Long-tailed Duck (Clangula hyemalis)

(a) Many breeding pairs on Myvatn on 23rd May. 20+ breeding on tip of airstrip at Akureyri on 22nd May - one nest with eggs.

(b) 4 at Mosvatn (Myvatn) on 28th July; 11 at Myvatn on 29th July and families totalling 10 adults and 9 young at Vestmannsvatn (Fljotsheidi) on 29th July. 11 at Hvammsvik (Skagaheidi) on 1st August.

Harlequin (Histrionicus histrionicus)

(a) 22 on River Laxa on 22nd May. Widely distributed on Myvatn but low density on 22nd May; 2 near Godafoss. 1 on Markarfljot, 30th May.

(b) 6 on River Laxa at Arnarvatn (Myvatn) on 28th July.

Eider (Somateria mollissima)

(a) Wide distribution all around coast; high tide roosts of 200+ at Eyri during May.

(b) The most widely distributed duck with flocks present in sheltered parts of the coast everywhere. Downy young were seen on Reykjavik Lake. The largest flocks were about 500 at Grunnafjordur (Akranes) on 2nd August and an estimated 700 in Hvalfjordur on the same day. One bird at Hvammur was unusually pale with fawn wings and whitish tail.

Red-breasted Merganser (Mergus serrator)

(a) 6 pairs at Vogar on 23rd May.

(b) 7 with 5 young at Myvatn on 29th July, one female at Hopsvatn (Fljotavik) on 31st July. 1 at Bjorg (Skagaheidi) on 1st August, 1 at Medalfellsvatn (Kjalarnes) on 9th August.

Goosander (Mergus merganser)

(b) 1 on small pond at Reykjavik Lake on 23rd July, probably captive.

Grey Lag Goose (Anser anser)

(a) Widespread in river valleys, e.g. Thjorsardalur, and at least 3 pairs nesting at Eyri.

(b) One or two on Reykjavik Lake throughout our stay, about 300 at Gaseyri 29th-31st July, about 100 at Hvaleyri on 25th July decreased to about 20 by 11th August, but about 50 were still present at nearby Laxarnes on 14th August.

Pink-footed Goose (Anser brachyrhynchus)

(a) Small numbers in Thjorsardalur on 12th May.

Whooper Swan (Cygnus cygnus)

(a) Widespread. 17 at Eyri, 17th May; 160 near Myvatn, 22nd May; 43 Myvatn, 23rd May.

(b) Seen at a total of 17 localities with young birds at five of these. Single birds or pairs were most often seen; about 200 at Myvatn on 29th July and up to 23 in the Hvaleyri-Laxarnes on 9th August.

Gyr Falcon (Falco rusticolus)

(b) Single birds at Gaseyri on 29th July and Hagranes (Saudarkrokur) on 31st July. Two, one of which was probably a juvenile were seen at Hvaleyri on 9th August.

Merlin (Falco columbarius)

(b) A male was seen near Gaseyri on 27th July and another, probably a juvenile, caught a meadow pipit near Ljosavatn (Akureyri) on 29th July; single birds were seen on several dates in August at Hvammur.

Ptarmigan (Lagopus mutus)

(a) Small numbers at Vadlaheidi on 22nd May and 4 at Godafoss on 22nd May.

(b) 1 at Geysir on 27th July; a female with 10 juveniles at Keta (Skagaheidi) on 1st August, and 6 at Keldvik (Skagaheidi) on 1st August.

Oystercatcher (Haenatopus ostralegus)

(a) 14 breeding pairs on flats at Hvaleyri, but up to 250 birds roosting in the lagoon at high tide. Very widespread and observed feeding in fields inland at Keflavik and in small flocks on West coast. Breeding near Markarfljot (Flotshlid), pairs chasing skuas from nests, 30th May, 1970.

(b) Seen at all localities visited in August; a flock of about 200 in Hvalfjordur fed at Hvammsvik and roosted at various sites, notably Brekka and Botnsvogur.

Ringed Plover (Charadrius hiaticula)

(a) Widespread, up to 70 at Eyri, and seen all along the West coast.

(b) Small numbers seen at 10 sites all around the coast and inland at Reykjavik and Kjalur. Largest numbers about 90 at Hvaleyri and about 30 at Blonduos.

Golden Plover (Pluvialis apricaria)

(a) Common on West and North coasts and in the larger river valleys; large numbers in Oxnadalur, 21st May, Thjorsardalur 12th May and Myvatn on 23rd May.

(b) In July many were seen in areas suitable for breeding and pulli were seen at Myvatn and Keldvik (Skagaheidi). In August several flocks were seen in Hvalfjordur, numbering up to 130. These flocks fed on hay fields at high tide, often moving down to the seashore to feed on the exposed mud at low tide.

Turnstone (Arenaria interpres)

(a) Small flocks of about 10 were seen along the South East and West coasts, with small concentrations of up to 25 on suitable beaches. 24 at Eyri on 17th May and small flocks at Botnsvogur. Very scarce on the North coast, especially at Akureyri.

(b) Orferisey, Reykjavik, 8 on 29th July and about 10 on 16th August. About 50 were feeding on the tide wrack at Midnes on 11th August and two were at Gaseyri (Eyjafjordur) on 31st July. Up to 70 were present in Hvalfjordur in August and these birds tended to keep as a flock, feeding on the shore at Brekka, Mulafell or chiefly at Hvammshöfdi, and roosting at high tide on a small island at Brekka.

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Snipe (Gallinago gallinago)

(a) Large numbers seen at all localities with up to 30 'in the air' at once in the Thjorsardalur on 13th May. South of Blonduos, two dark phase arctic skuas were observed to knock and adult male snipe out of the air; the snipe was picked up and dispatched because of its severe injuries. Drumming over campsite in Akureyri, 24th May.

(b) Widely distributed, drumming or calling birds being encountered at most campsites. Largest number seen was 4 at Hvammur (Hvalfjordur) in August.

Jack Snipe (Lymnocryptes minima)

(b) 1 flushed at Myvatn on 29th July.

Whimbrel (Numenius phaeopus)

(a) Small numbers on West coast, but pairs already holding territory so that distribution observed probably reflected the breeding distribution. 7 breeding pairs around the Hvaleyri spit. Nesting near Markarfljot (Fljotshlid), 30th May.

(b) Pairs or single birds were frequently seen by the roadside during our travels in July. At Gaseyri (Eyjafjordur) a flock of about 40 was seen on 30th and 31st July, and in Hvalfjordur small numbers were present up to 14th August, frequently feeding on exposed mud at low tide.

Black-tailed Godwit (Limosa limosa)

(a) Small numbers of breeding pairs in Thjorsardalur on 12th May, Thingvellir on 13th May and in Hvalfjordur.

(b) " at Medalfellsvatn (Kjalarnes) on 26th July, 3 at Gaseyri (Eyjafjordur) on 31st July and 2 at Hagranes (Saudarkrokur) on the same day. A juvenile at Hvammshofdi (Hvalfjordur) on 5th August, and 2 there the following day.

Redshank (Tringa totanus)

(a) Very wide distribution. 40 at Hvaleyri, with many breeding pairs 16th May, and 400 at the whaling station (Midsandur, Hvalfjordur) on 17th May. 70 at Akureyri on 21st May, and nest with eggs at Myvatn on 23rd May.

(b) Commonly seen during our travels and pulli were seen at Blondudalur and Hofsos. 60+ were present at Hvaleyri on 25th July, with about 200 here on 2nd August and elsewhere in Hvalfjordur smaller flocks were seen with up to 80 feeding on the mud at Hvammur and 30 at Brekka.

Knot (Calidris canutus)

(a) Up to 5,000 regularly roosting at Hvaleyri during the high tide period from 14th-17th May, but very few were seen elsewhere. On the morning of 16th May at least 14,000 passed over Eyri in 4 hours and many hundreds passed low over the keeping cages holding the knot caught by the expedition. The knot at Hvaleyri were only observed to feed during the two hours immediately after high tide on the 'wrack' zone to the west of the spit.

(b) About 300 were seen at the spit at Orferisey, Reykjavik, and 4 were at Hvaleyri on 25th July. On the 28th July, 6 were seen near the airstrip at Akureyri. 1 flew over Gaseyri (Eyjafjordur) on 30th July. About 100 were seen briefly at Hvaleyri on 2nd August and about 300 were roosting on a small island off Brekka (Hvalfjordur) on the same date. This flock was later found to be feeding at Hvammshofdi at low tide and it was here that the birds were caught on 12th August. 5 were seen at Midnes on 11th August.

Purple Sandpiper (Calidris maritima)

(a) Present in all mixed wader flocks seen often with dunlin and redshank. Up to 200 at Botnsvogur (Hvalfjordur) on 17th May, and 70 at Akureyri on 21st May. 1 nest at Myvatn on 23rd May.

(b) 7 were seen at Orferisey, Reykjavik, on 24th July, and about 25 on 16th August. At Hvammshofdi 1 was seen on 5th and 6th August and 4 on the 8th August.

Dunlin (Calidris alpina)

(a) 150+ observed at Hvaleyri on 14th May and later a flock of 400+ on mudflats just up the fjord from this area. 200+ on the mudflats at Botnsvogur (Hvalfjordur) on 17th May and up to 1,000 at Akureyri on 21st May. Very few observed inland during May.

(b) Small numbers were seen at 11 localities. 100+ were at Hvaleyri on 25th July. About 200 at Gaseyri (Eyjafjordur) on 29th July dwindled rapidly to about 100 on 31st July. On 2nd August only about 20 were at Hvaleyri and only small numbers were seen subsequently around Hvammshofdi.

Sanderling (Calidris alba)

(b) At Hvammshofdi 8 were seen on 5th August and 3 on 7th August.

Red-necked Phalarope (Phalaropus lobatus)

(a) One of the spectacular ornithological sights of the May expedition was a flock of 2200 ± 200 red-necked phalaropes sheltering in a small bay of Myvatn, on 23rd May. This flock was watched for about one hour and behaved very much like a flock of seabirds, not coming on land but remaining in the centre of the bay. Only two other individuals observed, both at Myvatn.

(b) A male in summer plumage on Reykjavik Lake on 23rd and 24th July. 6 near Geysir on 26th July. On 29th July 55+ were seen on Myvatn; 4 adults and 2 juveniles North of Einarsstadir and 1 near Akureyri. Up to 3 were seen at Gaseyri on 30th and 31st July, and on the latter date, 1 was seen at Hopsvatn (Fljotavik) and 3 at Hegranes (Saudarkrokur). 1 was at Tjörn (Skagaheidi) on 1st August, 3 were on the sea at Hvammshofdi on 8th August and 6 near Orferisey, Reykjavik on 16th August.

Arctic Skua (Stercorarius parasiticus)

(a) Regular distribution with 5 pairs breeding at Hvaleyri: observed hounding whimbrel and oystercatchers feeding on the lagoon at Hvaleyri, and nesting near the Markarfljot (Fljotshlid) on 30th May, and to chase terns off the spit at Hvaleyri during the stay there. Breeding pairs seemed to be restricted to the coast and very few were seen inland. Two dark phase birds seen hunting a snipe (see above).

(b) Small numbers were seen on every day of our stay. No pulli were found, though several displaying pairs were seen and a juvenile was encountered at Hvammur (Hvalfjordur). Over 20 were seen off Gardskagi (Midnes) on 11th August, and about 30 were around the puffin colony on Akureyri on 16th August.

Great Skua (Stercoarius skua)

(a) 1 pair at Hvaleyri on 15th May (only record).

(b) 3 at Hvaleyri on 26th July, 1 at Gaseyri (Eyjafjordur). 1 at Gardskagi (Midnes) on 11th August.

Great Black-backed Gull (Larus marinus)

(a) Very numerous in all coastal areas: flocks of over 500 in Reykjavik harbour on 12th May and large numbers in Hvalfjordur, 15th May.

(b) The most widely distributed gull, recorded every day. Largest numbers were about 150 at Hvaleyri, about 50 at Gaseyri (Eyjafjordur) and about 30 at Saudarkrokur rubbish tip.

Lesser Black-backed Gull (Larus fuscus)

(a) Small flocks of about 20 in Reykjavik harbour, but this gull appears to be of very local distribution and only common in the South West.

(b) Seen in most of the Western parts of Iceland, but not seen along the coastline between Akureyri and Hofsos.

Herring Gull (Larus argentatus)

(a) Several in Reykjavik harbour on 12th May. 2 at Hvaleyri on 15th May, but no others recorded.

(b) 4 adults were seen at Gaseyri on 30th July. On 31st July two pairs with 3 young noted on cliff tops ot Aedarsker (Olafsfjordur) and about 50 were at Saudarkrokur rubbish tip on the same day.

Common Gull (Larus canus)

(b) One at Akureyri on 28th July, 1 at Dalvik on 31st July, 1 at Midsandur (Hvalfjordur) on 3rd August.

Glaucous Gull (Larus hyperboreus)

(a) Just individuals observed in Reykjavik harbour, but singles recorded in all Western fjords, with a maximum of 8 in Hvalfjordur on 15th May.

(b) Commonest on West coast where constantly present during out stay. 2 were seen in Akureyri on 28th July and 2+ were at Saudarkrokur rubbish tip on 31st; not elsewhere in the North. 60+ at Brekka (Hvalfjordur) on 4th August was the highest record with about 40 at Hvaleyri and about 30 at Orferisey, Reykjavik on the 2nd and 16th August respectively.

Iceland Gull (Larus glaucoides)

(a) 2 in Reykjavik harbour on 12th May.

(b) About 5 on Saudarkrokur rubbish tip on 31st July.

Black-headed Gull (Larus ridibundus)

(a) Common around Keflavik on 12th May, and small numbers in South West Iceland and in all fjords on West coast.

(b) Widely distributed with small flocks in fjords all round the coast from Akureyri to Midnes. About 250 at Midsandur whaling station (Hvalfjordur) on 4th August was the largest flock recorded.

Kittiwake (Rissa tridactyla)

(a) Large passage past Hvaleyri on 17th May, probably associated with the previous day's storm, up to 500 passing in about 30 minutes. Other small flocks in the Western fjords.

(b) No large colonies were seen, the only breeding site seen being Geirsholmi (Hvalfjordur), where 100 pairs were estimated from a distance to be breeding on 4th August. In Eyjafjordur, at least 1,000 were seen around Dalvik on 31st July and 1st August. About 75 at Krokssel (Skagestrand) and about 50 were at Mulay (Skagaheidi) on 1st August. On 11th August about 50 passed east at Gardskegi (Midnes) with arctic terns.

Arctic Tern (Sterna paradisea)

(a) Large numbers observed all around coast, but detailed records were not kept. Roosts of 450 at Hvaleyri on 15th May and 230 at Akureyri by the airstrip on 21st May.

(b) Widely distributed with numbers around 100 birds in several localities. Reykjavik Lake 170; Akureyri, Gaseyri (Eyjafjordur), Keta (Skagaheidi) and Imrikrokur (Akranes), 200. Numbers in most areas decreased rapidly around 6th August, but 300+ flew east at Gardskagi (Midnes) on 11th August.

Black Guillemot (Cepphus grylle)

(a) 7 pairs around Hvaleyri on 15th May and odd birds recorded in Northern fjords and at Akureyri.

(b) In Hvalfjordur, up to 12 were at Hvaleyri in July, about 5 with 1 juvenile were at Brekka on 4th August, and up to 10+ were around Hvammshofdi in early August. One was at Fljotavik (Skagafjordur) on 31st July and 3 were seen on 1st August at Mulaey (Skagaheidi).

Puffin (Fratercula arctica)

(a) Very few seen, with move of 3 in Hvalfjordur on 17th May.

(b) About 1,000 were estimated from a distance at a colony on Akurey (Reykjavik) on 29th July, and a colony on Geirsholmi (Hvalfjordur) which was estimated roughly at 1500 birds on 4th August was responsible for records of birds seen flying up and down the fjord elsewhere e.g. at Hvammshofdi, where in a 'half hour' watch 583 were counted leaving seawards and 233 returning.

Raven (Corvus corax)

(a) Wide distribution with pairs holding territory when we arrived. Nest with 4 young on hill above Svalbard (Eyjafjordur) on 21st May; nest with 3 young at Godafoss on 22nd May. Pair nesting on Stora-Dimon (Fljotshlid) on 30th May.

(b) Widely distributed, but no more than 10 were seen at any one locality.

Redwing (Turdus iliacus)

(a) Wherever small 'woods', redwing were observed, with local concentrations in Akureyri, Myvatn and Reykjavik.

(b) Up to 10 seen in Reykjavik, where several juveniles were seen. Also seen in small numbers at Gersir, Myvatn, Akureyri, Olafsfjordur and Grabrokarhraun.

Wheatear (Oenanthe oenanthe)

(a) Wide distribution with 12 pairs at Hvaleyri on 15th May.

(b) Widely but patchily distributed, with most birds seen in the North.

Meadow Pipit (Anthus pratensis)

(a) Wide distribution in all areas; detailed records not kept.

(b) Generally distributed and common, flocks up to 20 forming in mid August.

White Wagtail (Motacilla alba)

(a) Individuals in Reykjavik on 12th May, Hvaleyri on 17th May and Akureyri on 21st May.

(b) Seen almost every day, chiefly near streams. Several juveniles were seen.

Starling (Sturnus vulgaris)

(a) Individuals in Reykjavik on 12th May.

(b) 1 in Reykjavik on 22nd July and about 5 were in the same area on the next day, one bird carrying food. This species is a comparative newcomer to Iceland.

Redpoll (Acanthis flammea)

(b) Seen only in Reykjavik where it was most common around the Lake: about 150 around this locality on 16th August.

Snow Bunting (Plectrophenax nivalis)

(a) Only record was 9 at Godafoss on 22nd May.

(b) Up to 3 seen at the following localities in July: Medalfellsvatn (Kjalarnes), Blafell, Hvitavatn, Audkuluheidi, Bolstadarhlid, Myvatn, Vadlaheidi (Akureyri) and Olafsfjordur. Over 250 were seen along the roadside as we followed the coast around the northern end of Skagaheidi.

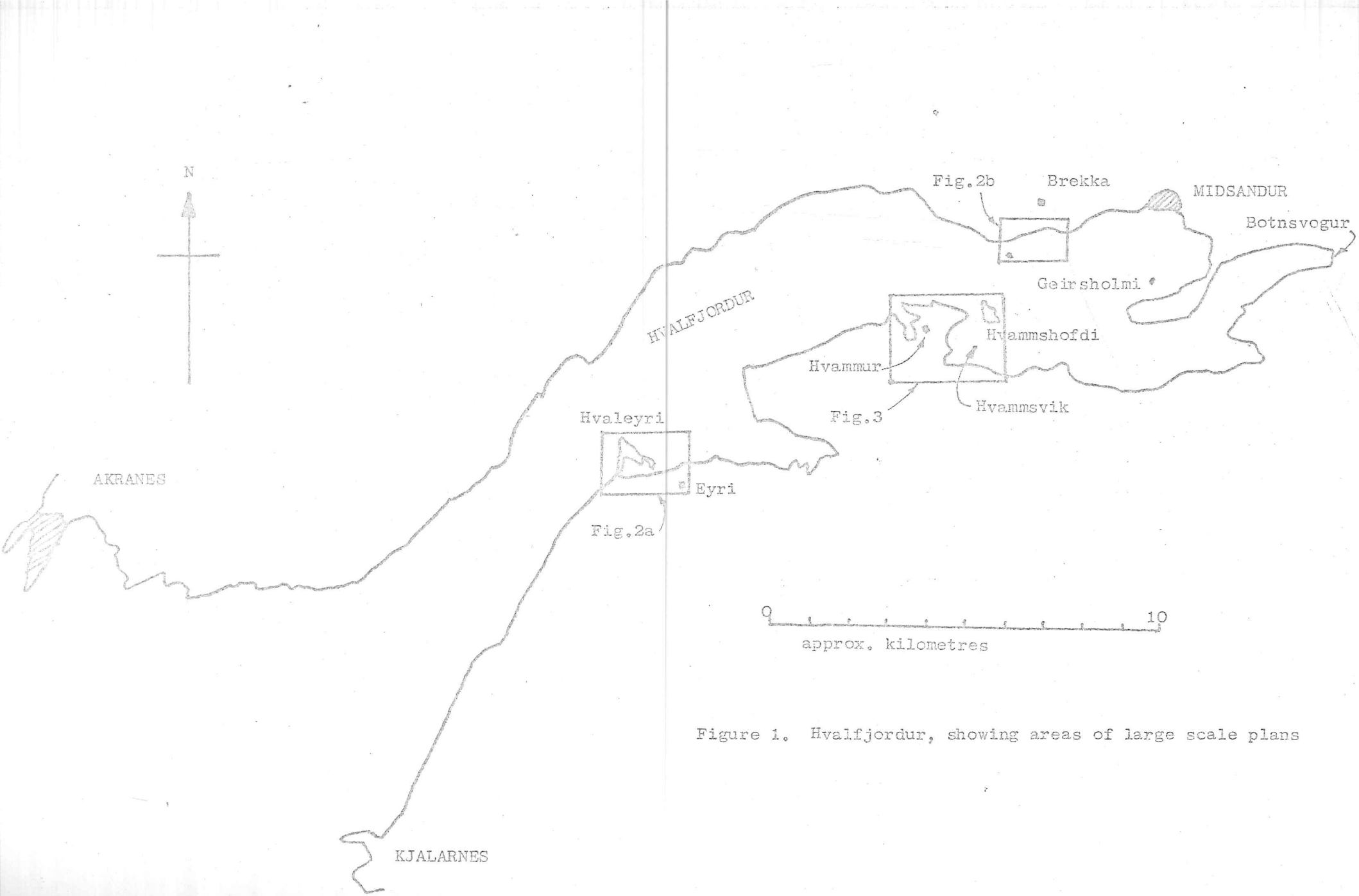


Figure 1. Hvalfjordur, showing areas of large scale plans

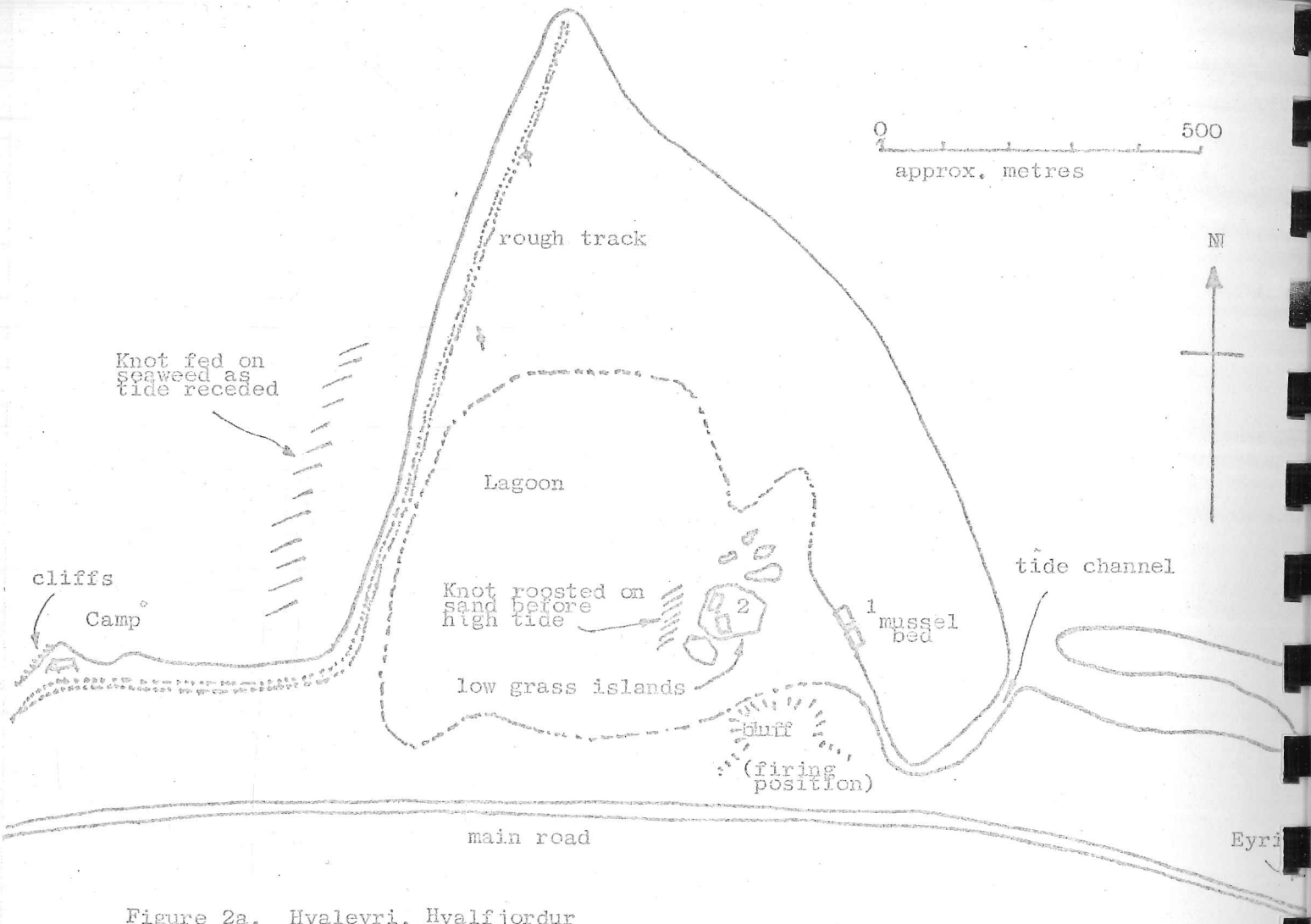
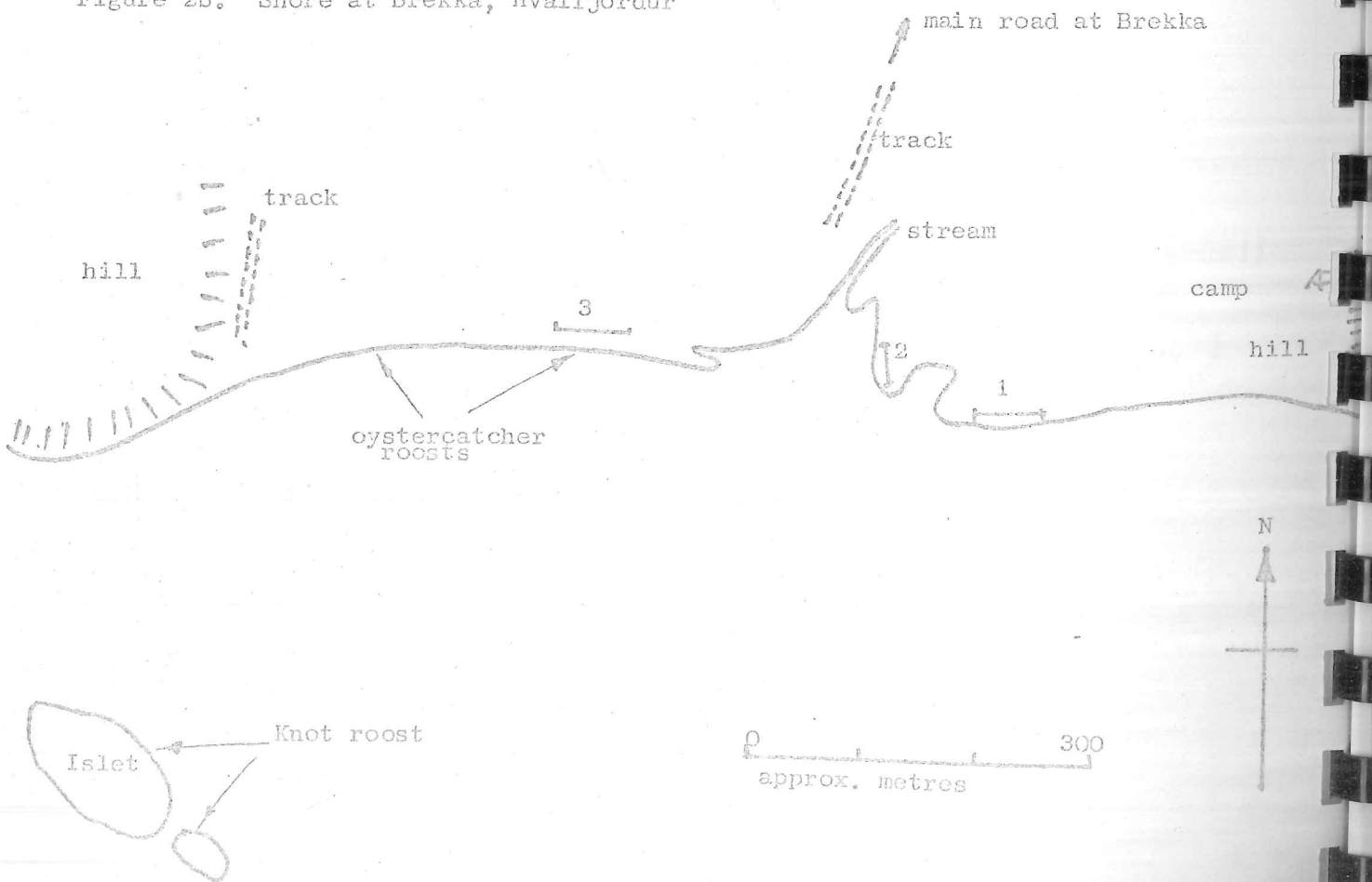


Figure 2a. Hvaleyri, Hvalfjordur

Figure 2b. Shore at Brekka, Hvalfjordur



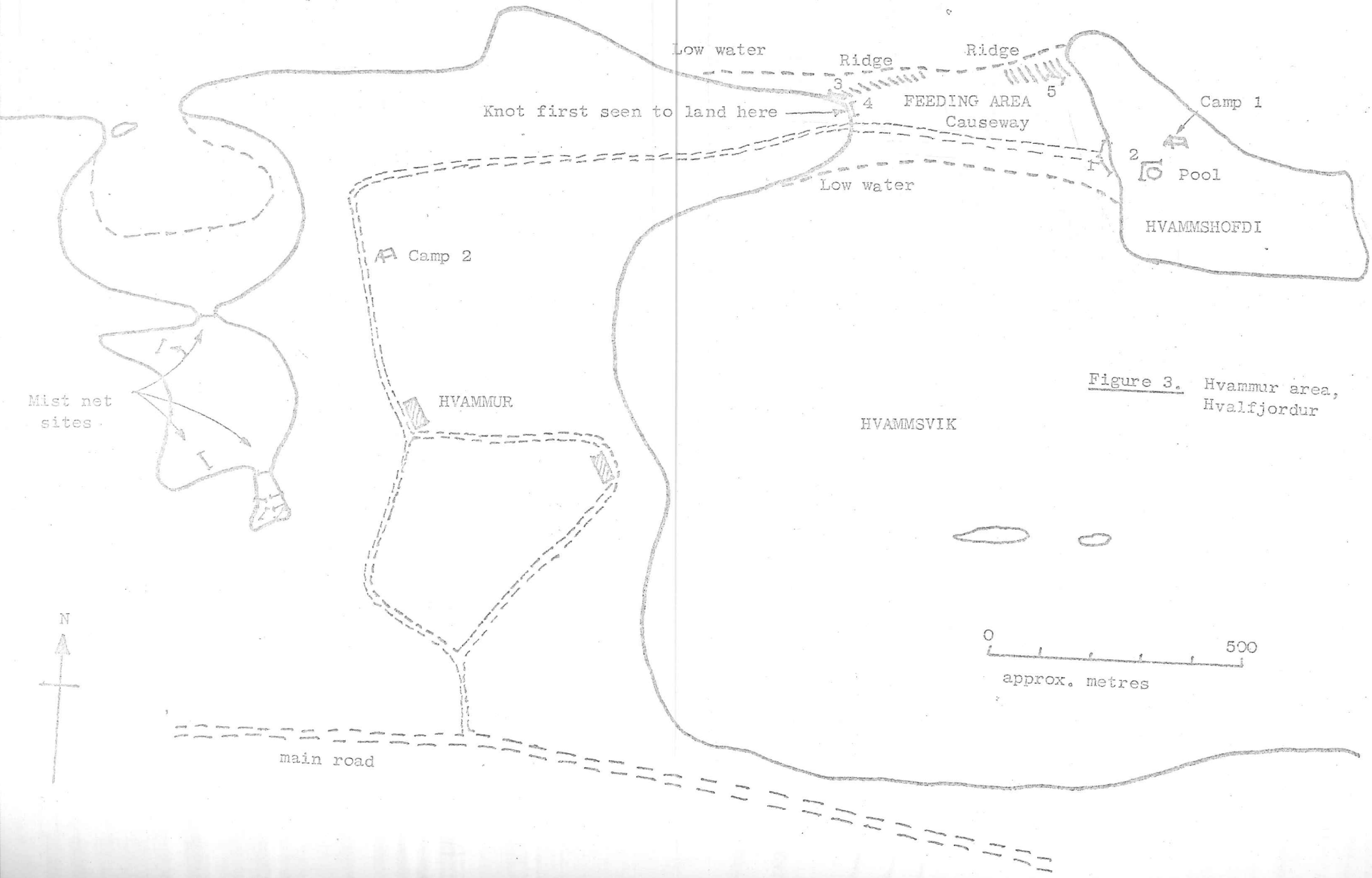


Figure 3. Hvammur area, Hvalfjordur

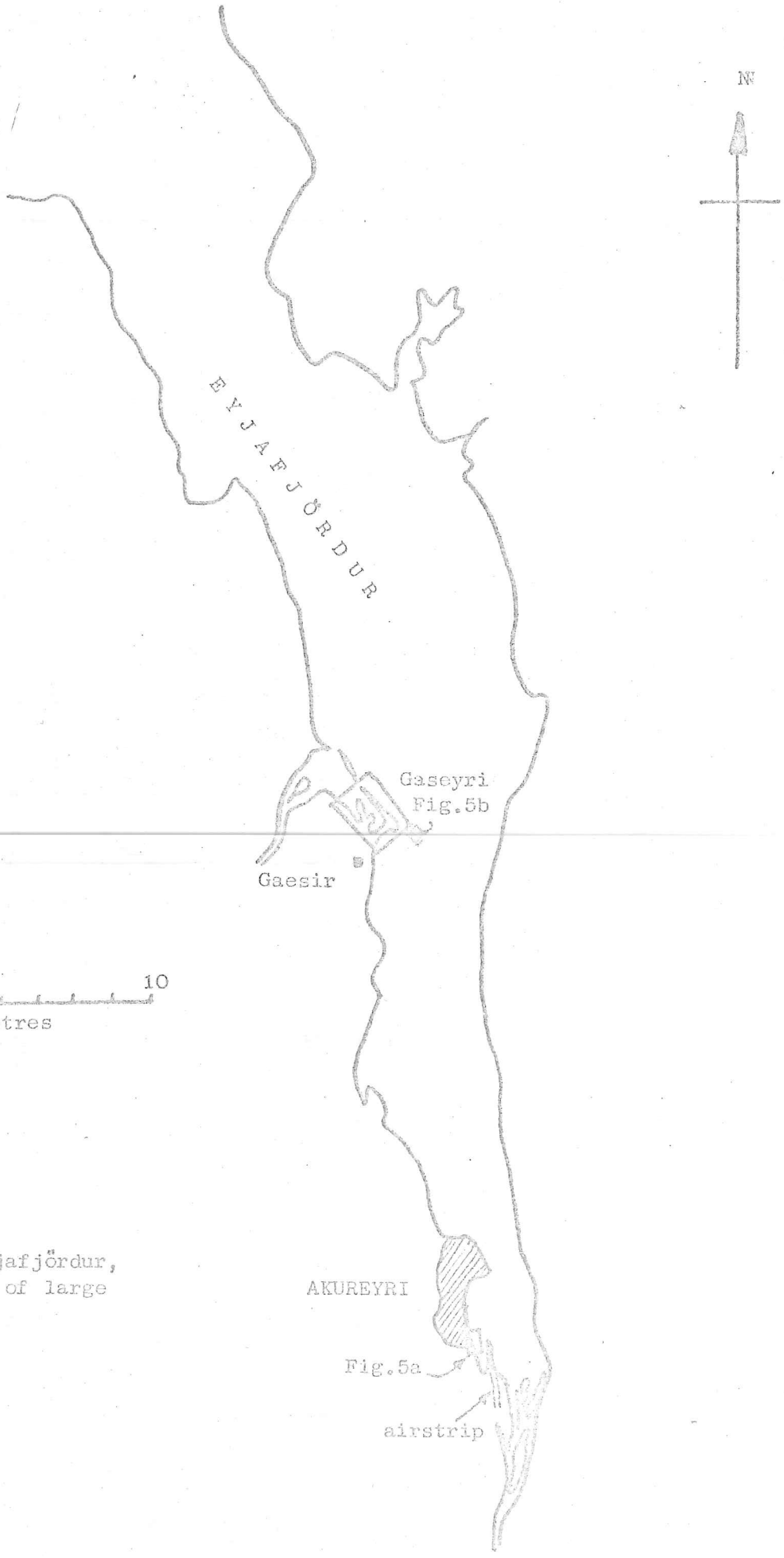


Figure 4. Eyjafjördur, showing areas of large scale plans

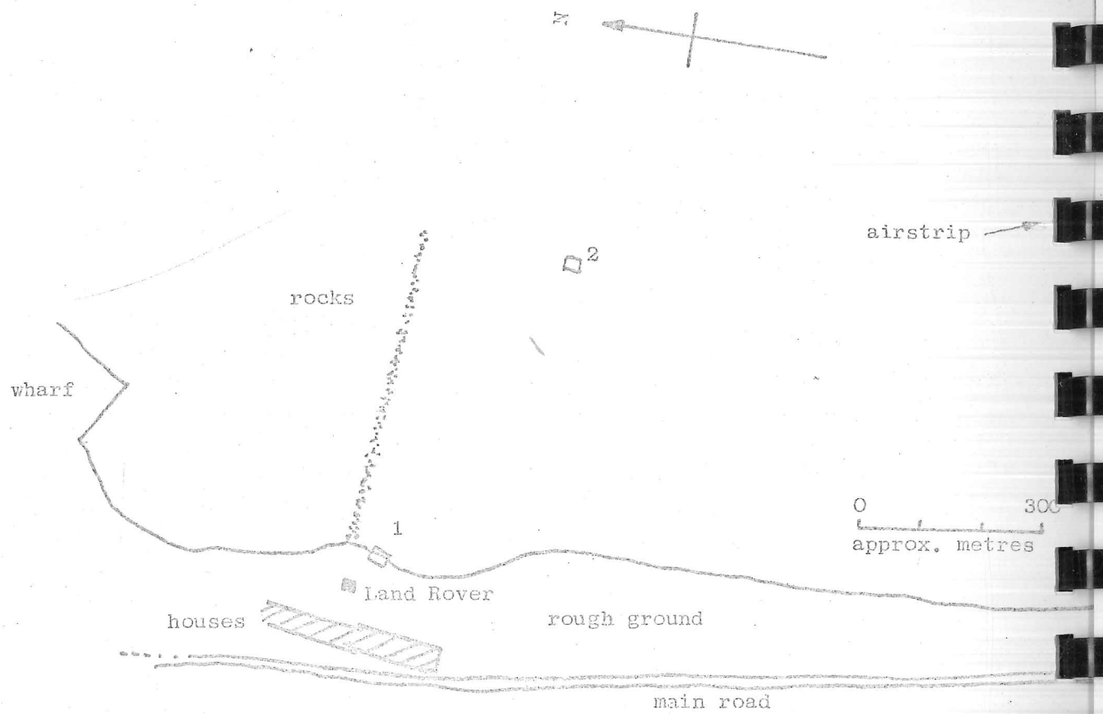


Figure 5a. Akureyri, Eyjafjordur

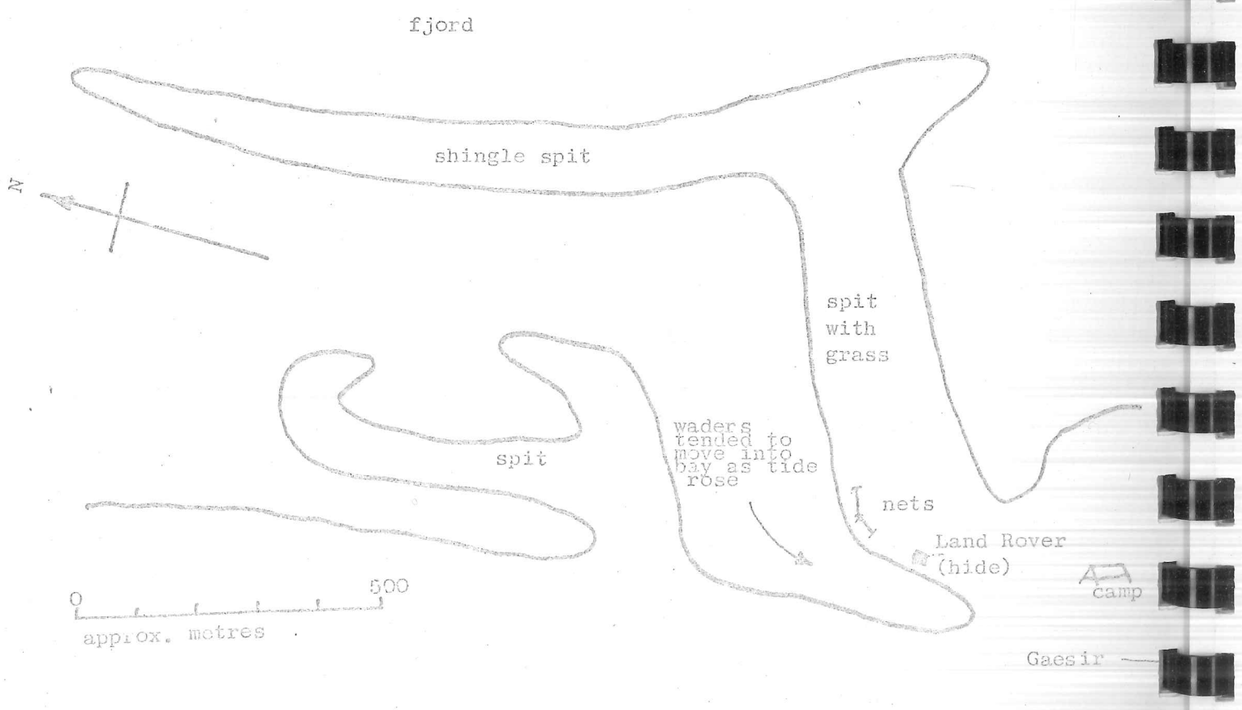


Figure 5b. Gaseyri, Eyjafjordur

NETTING SITES

May, 1970 (R.I.G.M.)

The main sphere of operation of the first phase of the expedition was at Hvaleyri in Hvalfjordur, where we first saw a flock of knot feeding on a mussel bed on the evening of 14th May, 1970. Hvaleyri, which was about an hour's drive from Reykjavik, consisted of a large, approximately triangular area projecting into the fjord. The western, or seaward, side of the triangle was a shingle spit running about one kilometre out into the fjord, the eastern side being formed by a series of sandy beaches running back from the point so that the triangle had a base about one kilometre in length. The tip of the triangle consisted of an area of sand and pebbles covered with a considerable amount of tide wrack, whereas the lower part of the triangle was an area of mud and sand which became covered with water to form a shallow lagoon on spring high tides (Fig. 2a).

We first found the knot flock feeding on a mussel bed near the channel entering the lagoon (site 1, Fig. 2a), and two nets were set here on 15th May. The flock returned to feed before the high tide during the "night" of the 15/16th May, and the result was a catch of 885 knot in one net, this only being a fraction of the birds present. The site thereafter became unusable as it was rapidly covered on subsequent high tides, and we did not again observe the flock of knot feeding on it.

The knot habitually came to roost on the sandy area of the lagoon neat a series of low grass islands several hours before high tide, and as the water entered the lagoon the sand became covered and the birds would fly onto the grass islands. It seemed a relatively simple matter, therefore, to set our nets on the islands and wait for the tide to move the birds in front of the nets (site 2, Fig. 2a). As there were 4-5,000 knot in the area this seemed destined to lead to further success, but the plan failed to materialise for a number of reasons. One was that the birds were very wary of the nets, and the low, flat nature of the islands made camouflage very difficult beyond concealing the most obvious hardware with tide wrack. We were also considerably hampered by lack of knowledge of the local tide conditions, partly because the only available tide tables gave the times and not the heights of the tides, and because the weather conditions in the fjord were constantly changing. The tide was lower than we expected on several occasions and it was necessary to twinkle the birds. The state of the tide could be told with some accuracy from the firing position, which was situated on a small bluff commanding a superb view of the whole catching area, since the water flowed very rapidly through the channel just below the bluff and the direction of the current could easily be ascertained. A small amount of twinkling, however, would lead to the knot leaving Eyri and heading a short distance up the fjord to a small island about 200 yards offshore: this island could be reached at low tide and might prove a useful catching area in the future.

A further potential catching area might be on the beds of seaweed just to the west of the shingle spit: these became uncovered as the tide went down, and the knot would come to feed there about two hours after high tide.

Another area of potential interest was at Botnsvogur at the head of Hvalfjordur, which we drove past at low tide on 20th May. We observed about about 700 waders on the muddy area which was uncovered, including 400 redshank, 200 purple sandpipers and smaller numbers of dunlin and ringed plover.

In Akureyri we attempted a catch near a line of rocks extending from the shore between the southern end of the town and the airstrip at the head of the fjord (Fig. 5a). Efforts at twinkling small flocks of purple sandpipers and dunlin towards the nets at high tide (site 1, Fig. 5a) met with no success, and the tide receded, eventually uncovering almost the entire southern end of the fjord. We moved the nets out onto the mudflats (site 2, Fig. 5a), though the only interest this aroused was from a police van (see Itinerary). Further observations indicated that the waders mostly left the vicinity of Akureyri at high tide, possibly to roost in the area of Gaseyri which was discovered by the second phase of the expedition in July/August (see below).

Notes

The farmhouse at Eyri was also the nearest post office and it was possible to obtain a local weather forecast in English on the telephone. These were not generally of great value as the weather was constantly changing.

The lagoon and spit area was owned by the farmer at Eyri although we camped just over the boundary of his land at the head of some small cliffs to the west of the catching area. This land was owned by the next farmer down the fjord.

Most areas of the lagoon could be reached in a pair of waders at high tide.

July/August, 1970 (M.W.P.)

Gaseyri, a complex spit projecting about a kilometre into Eyjafjordur 10 km. north of Akureyri, presented an obvious site for investigation when first seen from high on the opposite side of the fjord. We were not disappointed and found 200 dunlin and smaller numbers of redshank, ringed plover and oystercatcher. These tended to flock in the sheltered lagoon by the base of the spit at high tide, when there was still some possibility of feeding. As on all our sites, tides presented a problem as we were unable to obtain predictions of tide heights, and in any case the wind tended to change very rapidly in both strength and direction. Our catch there was fortunate as the tide was lower than expected but the birds fed in a loose flock well above the water. However, our second attempt was foiled by a much higher tide than expected. The site was certainly well worth working and, if the wader passage on the north coast in spring is also concentrated, this area may well be very rewarding at that time.

Our main area of activity was Hvalfjordur on the west coast in the bay of Faxafloi. This fjord had reasonably accessible sites as well as workable flocks of waders. Although Eyri held up to 50 oystercatchers, 50 ringed plover, 200 redshank, 200 dunlin and 50 knot, it did not appear to be as important to the waders as it had been in the spring and the centre of activity was further into the

fjord. By the end of our stay it was apparent that knot were feeding in a flock on the seaweed between Hvammur and Hvammshofdi and rising with the tide usually to the top of the beach on the Hvammur side before moving off to roost on the rocky islet off Brekka. This roost was shared by a flock of about 50 turnstone which, inlike the knot, were dispersed into singles and small parties for the remainder of the tide. Oystercatchers roosted on the beaches at Brekka, at various sites along the south side of the fjord between Hvammur and Botnsvogur, and at Eyri. Redshank flocked around the time of the high tide and usually found sites high on the beach or on small areas of mud where it was possible to continue leisurely feeding.

The knot tended to become restless just before leaving the roost and sometimes the flock flew "sorties" before finally leaving. They would sometimes land at Brekka and the sight of this is what caused our move from Eyri to set on this site (not having found the Hvammshofdi site at that time). On arrival, we found a small party feeding on a patch of weed on the beach and set there (site 1, Fig. 2b) in preference to the site by the stream (site 2, Fig. 2b) where they had been seen to land on the previous day. The flock landed very briefly by the stream that evening but we never again saw them land at Brekka so that our attempts with one net on each site (1 and 2, Fig. 2b) on both tides of the 4th August also failed. Attempts to catch oystercatchers after it was apparent that there would be no chance of a catch of knot and again when we specifically set for oystercatchers at site 3 (Fig. 2b) failed because of the rapid fall of the tide in the first cases and unexpectedly low tide in the last.

On moving to Hvammur, as previously described, lack of viewing position prevented us setting on the Hvammur site 4 (Fig. 3) and attempts to move the birds over to the Hvammshofdi site with the nets set at site 1 (Fig. 3) failed, as did the attempt to catch redshank around the island pool (site 2, Fig. 3) described in the Itinerary. The nearest site to the preferred one where viewing was possible (site 3, Fig. 3) also proved unsuccessful and it was not until a net was set at the site of the first choice (site 4, Fig. 3) with a firing position 7 yards directly behind the net that a catch of roosting oystercatchers and another small one of dunlin were made. The knot, however, still did not oblige until a net was set on one of their favoured feeding sites in the littoral zone (site 5, Fig. 3) and the birds landed here after being moved off a similar site on the Hvammur side of the feeding area.

As the nights became darker towards the middle of August, mist-netting was attempted on several nights in the bay to the west of Hvammur. Here nets were positioned at the narrow entrances to the inner bays and on the mud around the favoured feeding areas of redshank, our particular target. However, these proved particularly wary and alert, and even on one very dark night (10-11th August) were agile enough to avoid the net. Even single panel nets were avoided but the use of these on dead weed on the shore (particularly at Midnes) might prove worthwhile. Small numbers of dunlin, redshank, oystercatcher and a ringed plover (mainly juveniles) were caught by this method, but it seems that, even as late as mid-August, mist-netting for waders is a severely limited technique.

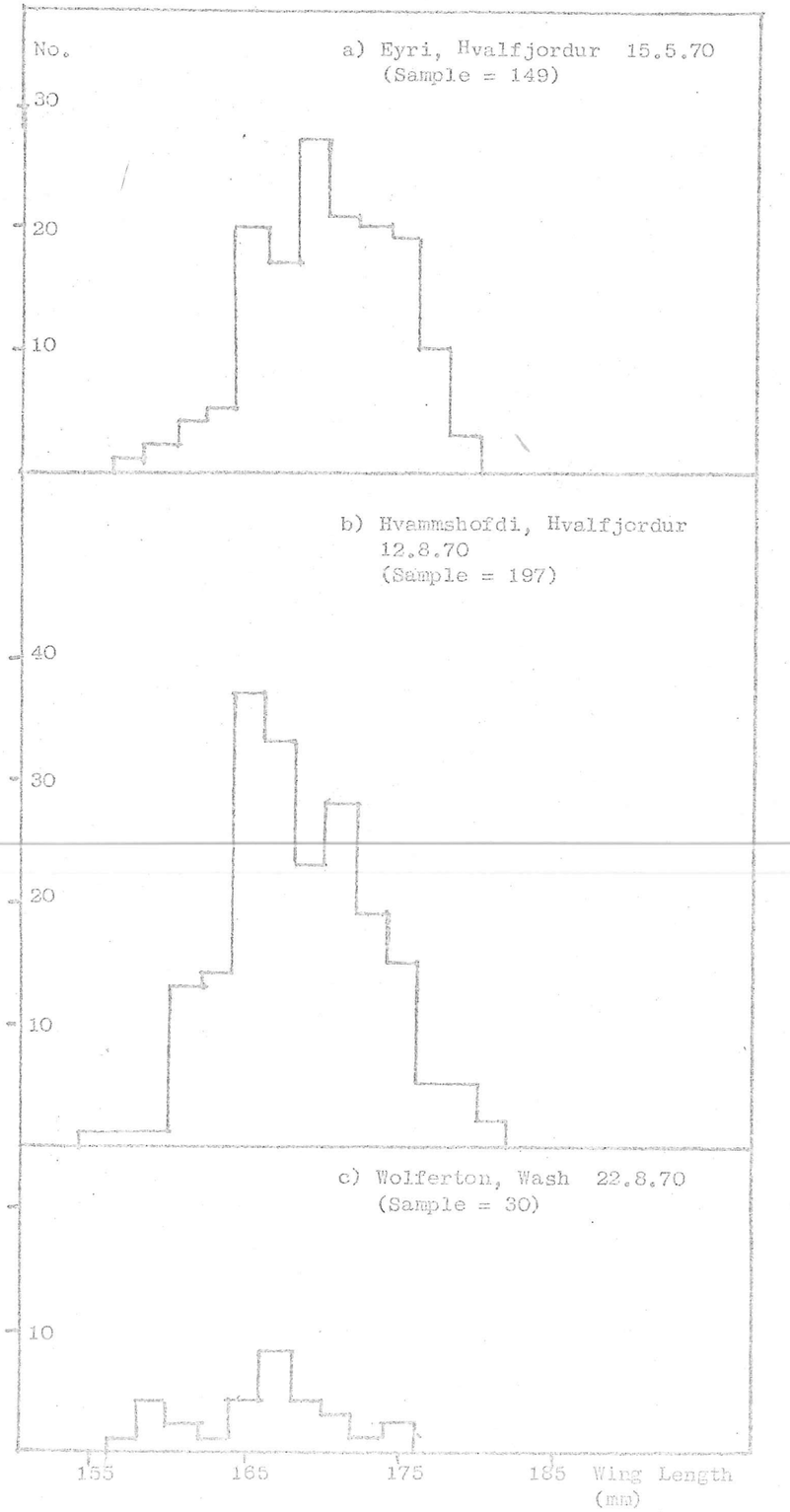


Figure 6. Histograms of Wing Lengths of Adult Knot (Calidris canutus).

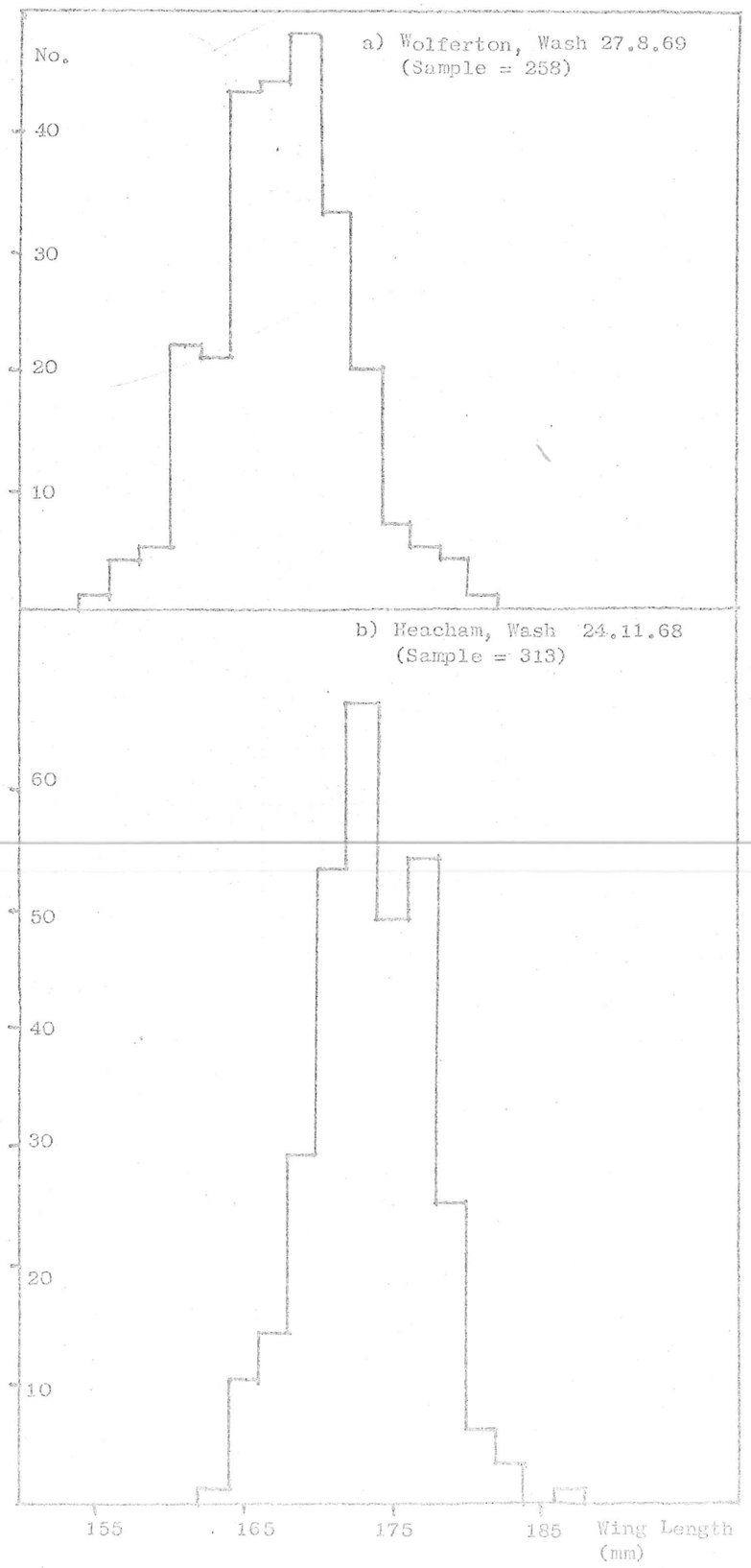


Figure 7. Histograms of Wing Lengths of Adult Knot (Calidris canutus)

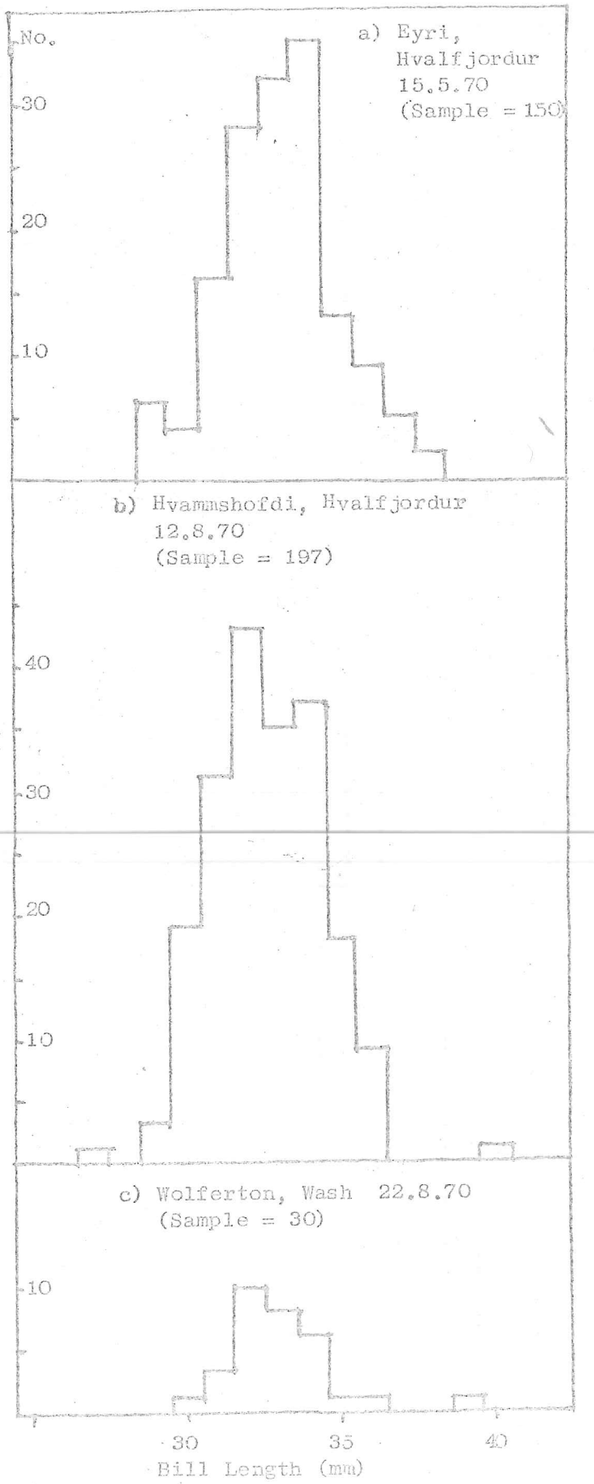


Figure 8. Histograms of Bill Lengths of Adult Knot (Calidris canutus).

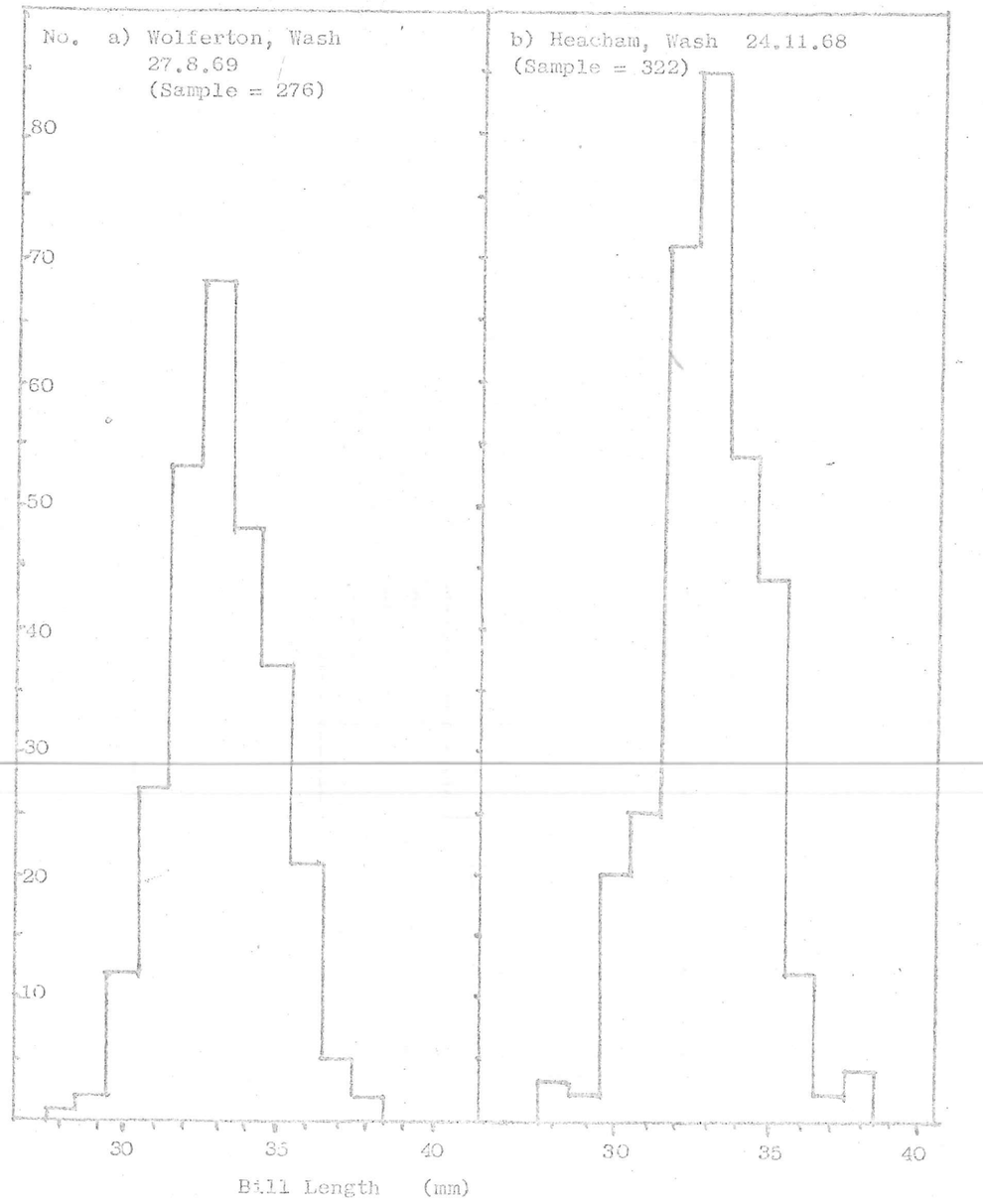


Figure 9. Histograms of Bill Lengths of Adult Knot (Calidris canutus).

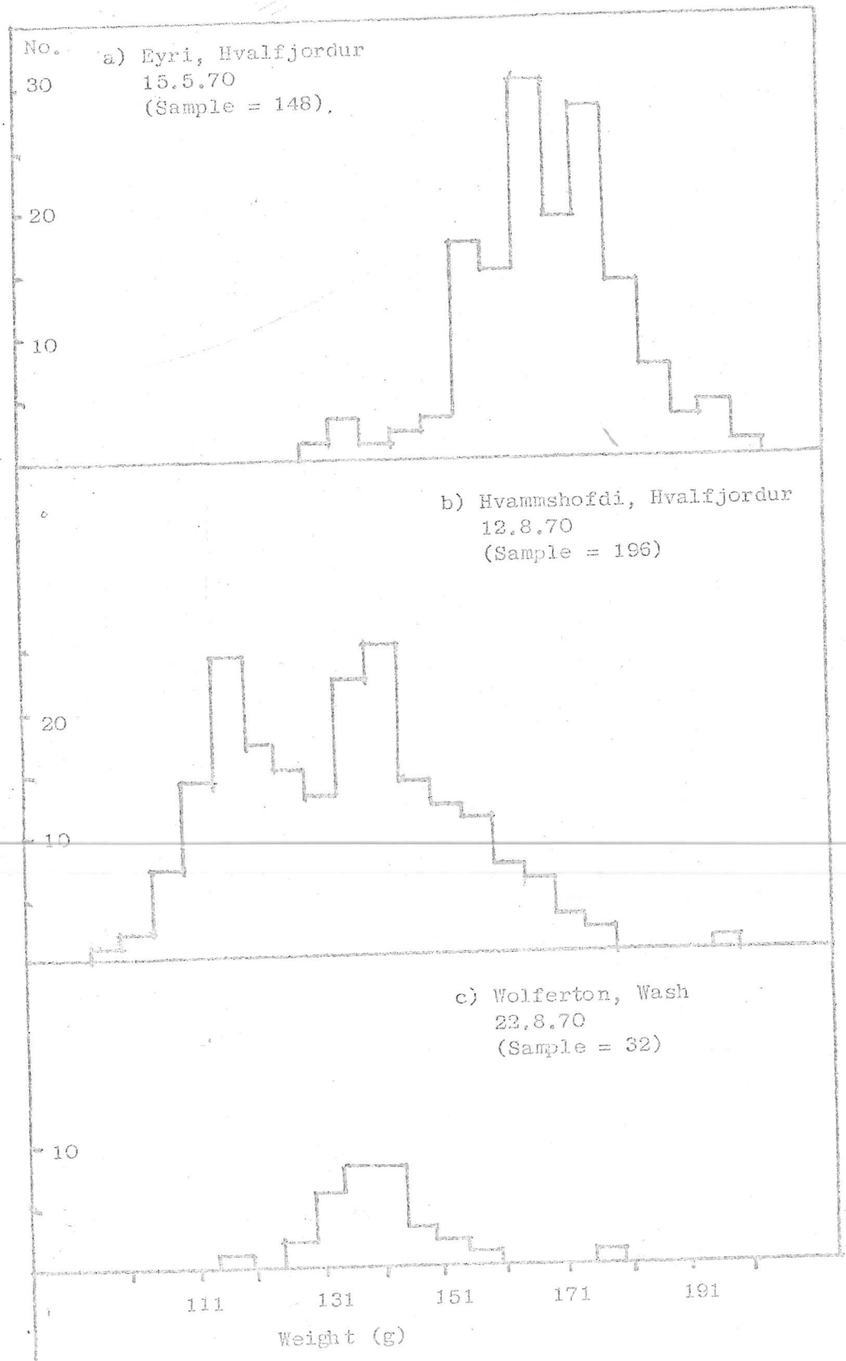


Figure 10. Weight Distribution of Adult Knot (Calidris canutus)

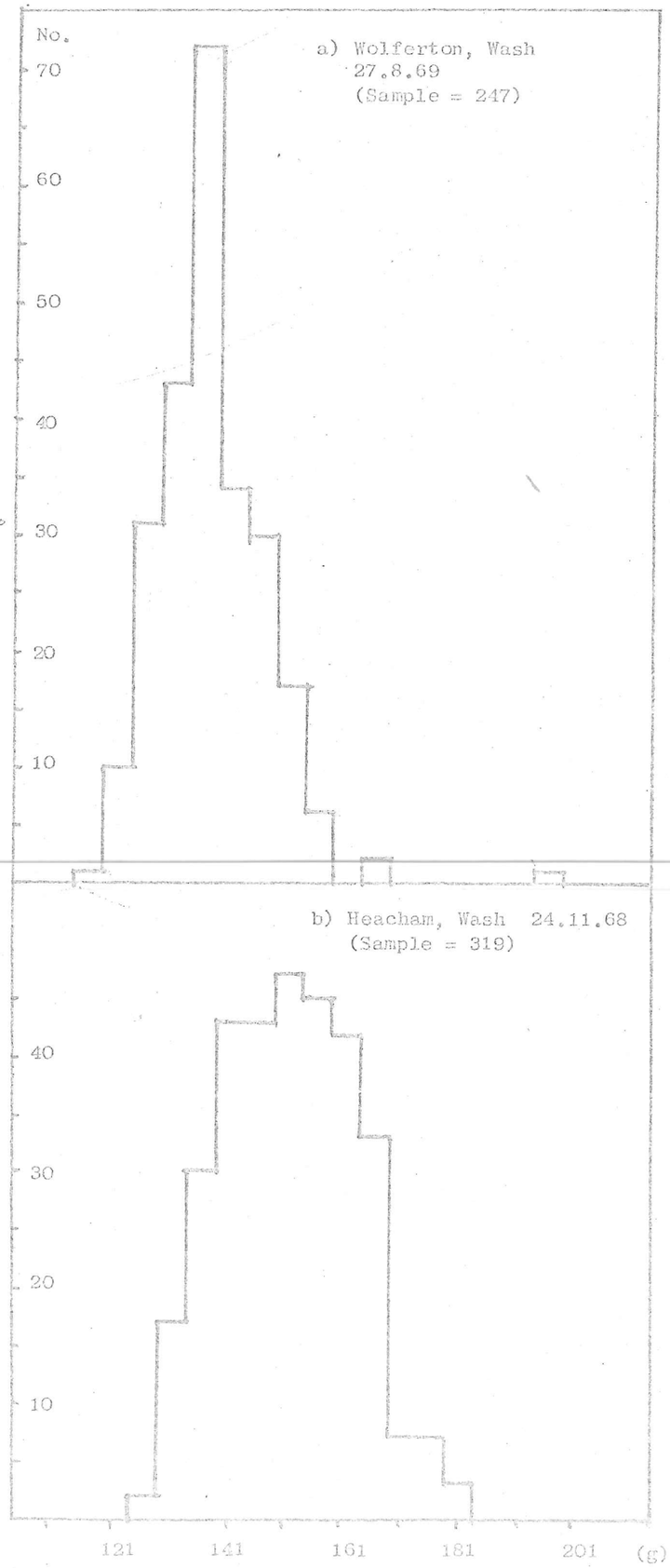


Figure 11. Weight Distributions of Adult Knot (C. canutus)

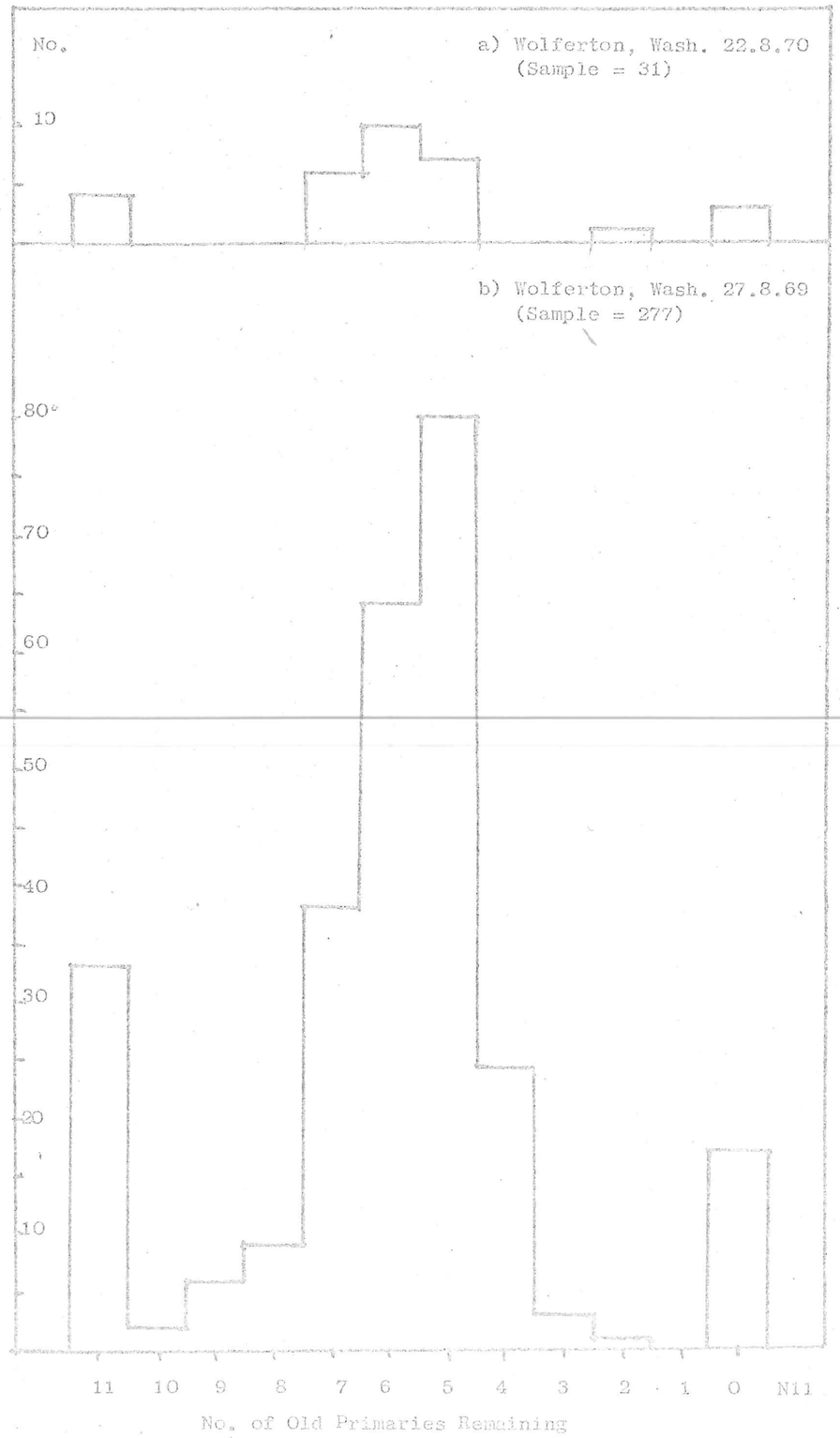


Figure 12. Moult of Knot (Calidris canutus) on the Wash.

TABLE 1

TOTALS OF BIRDS CAUGHT ON THE EXPEDITION

	Juv		PJ	Adult		Total
	Pull.	Flying		New	Controls	
MAY						
Knot (Calidris canutus)	-	-	-	848	37	885
JULY/AUGUST						
Oystercatcher (Haematopus ostralegus)	-	14	3	28	1	46
Ringed Plover (Pluvialis apricaria)	4	-	-	-	-	4
Redshank (Tringa totanus)	2	11	-	2	-	15
Knot (Calidris canutus)	-	7	-	182	15	204
Purple Sandpiper (Calidris maritima)	-	1	-	-	-	1
Dunlin (Calidris alpina)	-	39	-	28	-	67
Red-necked Phalarope (Phalaropus lobatus)	2	-	-	-	-	2
	8	73	3	240	16	
	81		3	256		340
			324		16	
TOTAL	1172 New and 53 Controls					1225

TABLE 2

PLACE AND YEAR OF RINGING OF BIRDS CONTROLLED IN ICELAND

	1970	69	68	67	66	65	64	63	62	61	1960	
W.W.R.G.	3	2	11	-	-	-	-	2	-	-	1	19
M.B.R.G.	8	2	8	-	-	-	-	-	-	-	-	18
M.R.G.	3	-	1	-	2	2	-	-	-	-	-	8
L.R.G.	-	-	1	-	-	-	-	-	-	-	-	1
C./L.I.E. May	5	-	-	-	-	-	-	-	-	-	-	5
France	-	-	-	-	-	-	1	-	-	-	-	1
Heligoland	Details not yet available											1
												53

W.W.R.G. = Wash Wader Ringing Group
M.B.R.G. = Morecambe Bay Ringing Group
M.R.G. = Merseyside Ringing Group
L.R.G. = Leigh Ringing Group

TABLE 3

LOCATIONS AND MONTHS OF RINGING OF "BRITISH" KNOT CONTROLLED IN ICELAND BY THE EXPEDITION

	Wash	West Coast	Total
August	7	1	8
September	3	3	6
October	3 (13)	1 (5)	4
November	1	1	2
December	-	6	6
January	1	-	1
February	-	12	12
March	3	2	5
April	-	1	1
May	1 (6)	- (22)	1
	19	27	46

TABLE 4. COMPARISON OF NUMBER OF CONTROLS IN ICELAND OF BIRDS RINGED ON THE WASH AND MORECAMBE BAY RELATED TO THE ESTIMATED NUMBERS OF SURVIVING RINGED BIRDS FROM THESE LOCALITIES

	Total ringed up to May 1970		Estimated no. of ringed birds still alive at May 1970		No. of controls in Iceland from:-		No. of controls as % estimated still alive	
	Wash	Morecambe Bay	Wash	Morecambe Bay	Wash	Morecambe Bay	Wash	Morecambe Bay
Ringed Aug.-Oct. .-	4606	295	3368	202	13	2	0.39	0.99
Ringed Nov.-May .-	6026	6434	5305	4501	6	16	0.11	0.36
Total ringed .-	10632	6729	8673	4703	19	18	0.22	0.38

Overall: 37 in 13376 = 0.28%

TABLE 5

BIRDS CONTROLLED IN ICELAND IN MAY

Knot (Calidris canutus)

Eyri, Hvalfjordur 15.V.70 64°20'N, 21°41'W

Wash Wader Ringing Group

CK 73344	FG	26.8.60	Holbeach, Lincs. (Controlled 8.2.70, Middleton, Morecambe Bay, reringed CK 91007, see below)
CX 25063	Juv	3.9.63	Holbeach, Lincs.
CX 26640	Juv	6.9.63	Dawsmere, Lincs.
CK 68321	Ad	27.8.68	North Wooton, Norfolk
CK 59547	Ad	27.8.68	"
CK 74434	Ad	27.8.68	"
CK 68087	Ad	27.8.68	"
CK 68902	Ad	27.8.68	"
CK 74031	Ad	27.8.68	"
CK 75025	Ad	26.10.68	Heacham, Norfolk
CK 74867	Ad	26.10.68	"
CR 90789	Ad	24.11.68	"
CR 92077	Ad	5.5.69	Wolferton, Norfolk
CV 97475	Ad	7.3.70	Heacham, Norfolk
CK 96003	Ad	7.3.70	"
CK 96829	Ad	7.3.70	"

Morecambe Bay Ringing Group

CR 22479	PJ	23.8.68	Hest Bank, Morecambe Bay
CP 22807	Ad	22.12.68	Piel Island, Walney, Lancs.
CP 23848	Ad	22.12.68	"
CP 22937	Ad	22.12.68	"
CP 23751	Ad	22.12.68	"
CK 90119	Ad	9.10.69	Pilling, Lancs.
CK 90352	Ad	13.11.69	Middleton, Morecambe Bay
CK 91069	Ad	8.2.70	"
CK 91118	Ad	8.2.70	"
CK 91007	Ad	8.2.70	" (see CK 73344 above)
CK 90751	Ad	8.2.70	"
CK 91097	Ad	21.2.70	Bardsea, Ulverston, Lancs.
CR 91431	Ad	10.4.70	Hest Bank, Morecambe Bay (Blue plastic ring, right leg)

Merseyside Ringing Group

CX 61557	FG	6.2.65	West Kirby, Wirral, Cheshire
CV 48540	Ad	16.9.66	Point of Ayr, Flintshire
CV 48542	Ad	16.9.66	"
CX 98391	Ad	24.9.68	"
CK 97208	PJ	5.2.70	Hoylake, Wirral, Cheshire
CK 97218	PJ	5.2.70	"
CC 51552	Ad	11.2.70	"

Leigh Ringing Group

CR 36402	PJ	31.3.68	West Kirby, Wirral, Cheshire
PARIS GZ 1850	FG	31.12.64	Vendee, FRANCE

TABLE 6

BIRDS CONTROLLED IN ICELAND IN AUGUST

Knot (Calidris canutus)

Hvammshofdi, Hvalfjordur 12.VIII.70 64°23'N, 21°33'W

Wash Wader Ringing Group

CV 97445	Ad	28.1.68	Wolferton, Norfolk (C.D.T.Minton)
CK 75682	Ad	26.10.68	Heacham, Norfolk
CK 95360	Ad	13.9.69	"

Morecambe Bay Ringing Group

CR 22176	PJ	1.3.68	Hest Bank, Morecambe Bay
CP 22902	Ad	22.12.68	Piel Island, Walney, Lancs.
CP 23568	Ad	22.12.68	"
CK 90864	Ad	8.2.70	Middleton, Morecambe Bay
CK 91851	Ad	8.2.70	"

Merseyside Ringing Group

CX 61584	FG	6.2.65	West Kirby, Wirral, Cheshire

Cambridge/London Iceland Expedition, May 1970

Reykjavik

721201	Ad	15.5.70	Eyri, Hvalfjordur, Iceland
721379	Ad	15.5.70	"
721446	Ad	15.5.70	"
721506	Ad	15.5.70	"
721735	Ad	15.5.70	"

Heligoland

7362162	Details not yet available

Oystercatcher (Haematopus ostralegus)

Hvammur, Hvalfjordur 8.VIII.70 64°23'N, 21°34'W

Morecambe Bay Ringing Group

SS 89078	Ad(mo)	3.11.68	Piel Island, Walney, Lancs.

TABLE 7

DETAILS OF CONTROLS OF BIRDS RINGED BY THE EXPEDITION

Ringing Details							Control Details							
Ring No.	Date	Place	Age	Wing mm	Bill mm	Weight g	Added Ring No.	Date	Place	Age	Wing mm	Bill mm	Weight g	Fr Ca
721201	15.5.70	Hvaleyri	Ad	-	-	-	-	12.8.70	Hvammshofdi	Ad	172	32	111	
721379	15.5.70	"	Ad	-	-	-	-	12.8.70	"	Ad	170	31	137	
721446	15.5.70	"	Ad	-	-	-	-	12.8.70	"	Ad	168	35	120	
721506	15.5.70	"	Ad	-	-	-	-	12.8.70	"	Ad	175	34	163	
721735	15.5.70	"	Ad	176	34	192	-	12.8.70	"	Ad	176	33	135	
721114	15.5.70	Hvaleyri	Ad	-	-	-	CN 64301	22.8.70	Wolferton, Nor. England	Ad	167 (O^{5})	33	134	1/30
721036	15.5.70	Hvaleyri	Ad	-	-	-	CN 57699	15.11.70	Thornham, Nor. England	Ad	174	34	156	1/45
721033	15.5.70	Hvaleyri	Ad	-	-	-	CC 52045	2.1.71	Dee Estuary, Flints. Wales	Ad	178	-	154	
720661	12.8.70	Hvammshofdi	Ad	169	30	129	CC 52306	2.1.71	Dee Estuary, Flints. Wales	Ad	173	31	136	
720526	12.8.70	Hvammshofdi	Ad	172	34	115	CP 66151	3.1.71	Thurstaston, Wirral, Ches.	Ad	175	-	-	3/89

TABLE 8

DISTRIBUTIONS OF WING AND BILL LENGTHS OF ADULT KNOT (CALIDRIS CANUTUS) IN ICELAND IN MAY AND AUGUST 1970

MAY

	29	30	31	32	33	34	35	36	37	38	Totals
157-159				2							2
160-162		1	1	1	3						6
163-165	2	1	3	6	1	2					15
166-168			4	10	4	3	2	2			25
169-171		1	4	4	14	6	5	2	1		37
172-174	3		2	3	4	10	3	3	1	1	30
175-177	1	1	2	2	4	13	1		2	1	27
178-180					2		2	1	1		6
Totals	6	4	16	28	32	34	13	8	5	2	148

AUGUST

	27	28	29	30	31	32	33	34	35	36	Totals
154-156				1							1
157-159					1	1					2
160-162				1	5	6		1			13
163-165	1		1	6	4	7	4	4	3		30
166-168			1	7	8	11	11	7	8	2	55
169-171			1	3	7	10	9	4		3	37
172-174				1	4	6	5	9	6	3	34
175-177					2	2	3	10	1	1	19
178-180							1	2			3
181-183							2				2
Totals	1		3	19	31	43	35	37	18	9	196

TABLE 9

PROBABILITY P OF SAMPLES OF WINGLENGTHS IN FIGS. 6 & 7 BEING THE SAME POPULATION. EACH SAMPLE COMPARED WITH ALL OTHERS BY d-TESTS

Iceland 12.VIII.70	P>0.1			
Wash 22.VIII.70	0.02>P>0.01	0.05>P>0.02		
Wash 27.VIII.69	0.1>P>0.05	P>0.1	P>0.1	
Wash 24.XI.68	0.01>P>0.002	0.001>P	0.001>P	0.001>P
	Iceland 15.V.70	Iceland 12.VIII.70	Wash * 22.VIII.70	Wash 27.VIII.69

* Small sample of 30

RESULTS

MIGRATION

Ringing and Measurement Studies

Methods

Cannon netting was the main technique used to catch roosting flocks of waders, and was found to be very suitable for use on the coastal sites discovered on the expedition. Mist netting was also used on the second phase of the expedition, but was of less value because of the limited amount of darkness during the summer in Iceland.

Wing measurements were taken by the maximum chord method; bills were measured with a vernier rule from the tip to the start of the feathers on the upper mandible. Weights were recorded using a Pesola spring balance.

Results

The total catches of the two phases of the expedition are given in Table 1: 1225 birds were caught, including 1172 newly ringed and 53 controls. Details of the controls are shown in Tables 5 and 6. Details of birds ringed in Iceland which have been subsequently controlled in Britain are shown in Table 7. Details of all birds processed on the expedition are shown in Tables 10 and 11. The data is discussed by species below.

KNOT (Calidris canutus)

148 adult knot (of 885 caught) were processed on 15.V.70, and 197 adults and 7 juveniles on 12.VIII.70. The processing details of these catches are shown in Tables 10 and 11 respectively (at end of Results), and the resulting data regarding wing and bill length and weight are plotted in Figures 6-11. Also shown in these Figures are the data for the small mist-netted catch at Wolferton on the Wash on 22.VIII.70, which included a bird ringed on the May expedition, and catches on the Wash on 27.VIII.69 and 24.XI.68 which are representative of the autumn (August-October) and winter (November onwards) Wash populations repectively.

It is apparent from Figures 6 and 7 that the knot in the two Iceland catches have the same distribution of wing lengths as the two autumn Wash samples (mean approximately 169mm) while the winter Wash sample has a distinctly longer wing (mean approximately 174mm). The probabilities (p) of the samples of wing lengths shown in Figures 6 and 7 being the same population are shown in Table 9. The results tend to indicate that the populations present in both May and August in Iceland and those in autumn on the Wash are the same, while all these are significantly different from the population on the Wash in the winter. The difference in wing lengths could be at least partly accounted for by a change in feather length of individual birds moulting from old to new plumage. It seems possible that a change in feather length might also occur for a number of other

reasons, either 'biological' (e.g. change in structure of feather - ageing ?) or 'mechanical' (e.g. abrasion). These points will be investigated further. However, the apparent differences between autumn and winter birds on the Wash are also supported by weight data (see below) and retrap rates (unpublished WWRG data, MWP).

The state of moult for the autumn Wash catches is shown in Figure 12. No birds caught in Iceland were in moult. This suggests that the Greenland population flies to the Wash to moult, and that when this is complete around the end of October, tends to move to a different wintering site and is partly replaced by a longer winged population. It may be mentioned that there has only been one recovery of a knot ringed on the Wash towards the Siberian breeding grounds, and it is not at the moment clear what the origin of the longer winged population may be if it is not purely a moult difference.

It may be possible to distinguish between the Greenland and Siberian breeding populations on the basis of plumage differences. Examination (by MWP) of the skin collections of the British Museum (Natural History) showed that Siberian knot in breeding plumage were very dark with very little rufous plumage on the back, whereas the Greenland birds were much lighter with much more rufous colouration. The differences were most marked in the males. All birds observed in Iceland were of the rufous type, supporting the validity of this plumage difference.

Table 2 shows the place and year of ringing of knot controlled in Iceland. 85% of these birds were ringed since and including 1968, reflecting the important contribution to wader studies made by the cannon netting technique. This data is summarised in Table 3, which separates controls from the Wash and west coast (Morecambe Bay, Merseyside, Dee). There are large differences in the amount of ringing done at these sites during the year, and Table 4 relates the ringing totals up to May 1970 on the Wash and on Morecambe Bay, mortality being allowed for (Boyd, 1962), to the number of controls from each of these places. The resulting ratios should give a measure of relative densities of the Greenland population at these localities. The results indicate that the frequency of Greenland birds is greater on the Wash in autumn (up to October) than in winter (November onwards), while the Morecambe Bay figure is similar to that of the Wash in autumn, confirming the impression given by examination of the figures in Table 3. It thus appears that there is a tendency for birds moulting on the Wash to winter on the Irish sea area. In this connection it is worthy of note that of 30 knot caught on 22.VIII.70 on the Wash, one was an Iceland control while only one control was found in a nearby catch of 450 on 15.XI.70 and none in a catch of 170 on the Wash on 31.I.71. Three knot ringed in Iceland were caught in a total of 892 on the Dee Estuary (Flintshire/Cheshire) on 2-3.I.71 (see Table 7).

It should be noted that all birds in May and all non-juveniles in Iceland were in summer plumage. It is uncertain at what time it becomes impossible to distinguish one year old birds from adults, but there were no doubtful cases in either May or August, from which it would appear that non-breeding immature birds do not generally migrate to summer on the breeding grounds. It appears that such birds may spend the winter in Africa, a hypothesis suggested by the recovery of 5 juvenile knot in West Africa soon after ringing the birds on the Wash in September, 1963 (Spencer, 1964). The University of East Anglia Expedition to Morocco 1971 will investigate this problem.

In general, there was little difference in the distribution of bill lengths in the birds caught in May and August in Iceland, and on the Wash in the winter or autumn (see Figures 8 and 9).

Figures 10 and 11 show the weight distribution of knot in Iceland and in representative samples from the Wash. The May birds were at high weight levels in preparation for further migration, possibly over the Greenland icecap (Salomonsen, 1950), and for the breeding season. The August Iceland and autumn Wash samples are at rather lower weights (means about 40g less). This is well illustrated for a bird caught in both May and August in Iceland: the weight had dropped from 192g to 135g (i.e. 57g) between the two passages (see Table 7). The August Iceland sample is bimodal, possibly indicative of either a sex difference or different arrival dates of two groups of birds prior to putting on fat for onward migration. Also, the upper end of the distribution is skewed, which may point ot birds putting on weight for further southward migration. At Hvanmshofdi birds were feeding continually and groups were frequently seen to fly high and leave the fjord southward.

There is an increase in the mean weight distributions observed between the autumn and winter Wash populations (Figure 11), possibly complementing the data on wing length and indicating the presence of a second population. However, it is not known whether the weight of the bird may vary according to its different 'metabolic state' at different times of the year. Thus, the question may be asked whether an intervening moult and a change in the metabolic status of the birds might account for the observed differences in the wing length and weight distributions of the populations of knot present on the Wash in the autumn and winter. Analysis of birds controlled at different times of the year will help to answer this problem.

Table 8 shows the distributions of wing and bill lengths of the two catches of knot. An attempt has been made, using this data, to analyse the samples by the method of Fournier and Spitz (1970). This involved estimating the component means of bill lengths for each group of wing lengths and vice versa by the method of Bhattacharya (1967); mean wing and bill lengths of possible component populations in the sample may then be derived. However, with small sample sizes the method is rather difficult to apply and the results cannot be considered meaningful; they are therefore not reproduced here.

The Iceland knot data are at present being analysed further in conjunction with the data from the Wash.

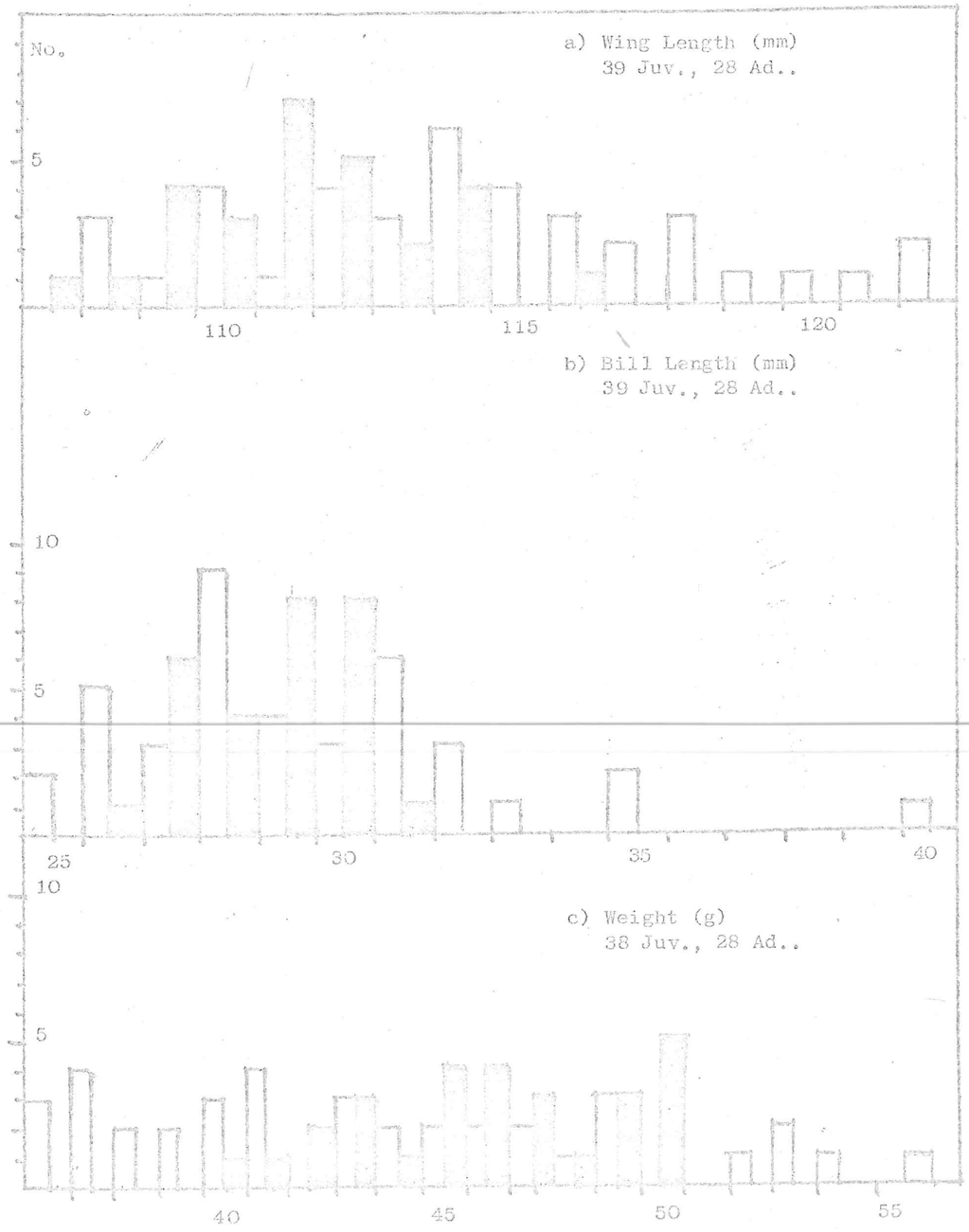


Figure 13. Histograms of Wing and Bill Lengths and Weights of Dunlin (Calidris ~~canutus~~ alpina) in Iceland, July/August, 1970.

Adults ■ Juveniles □

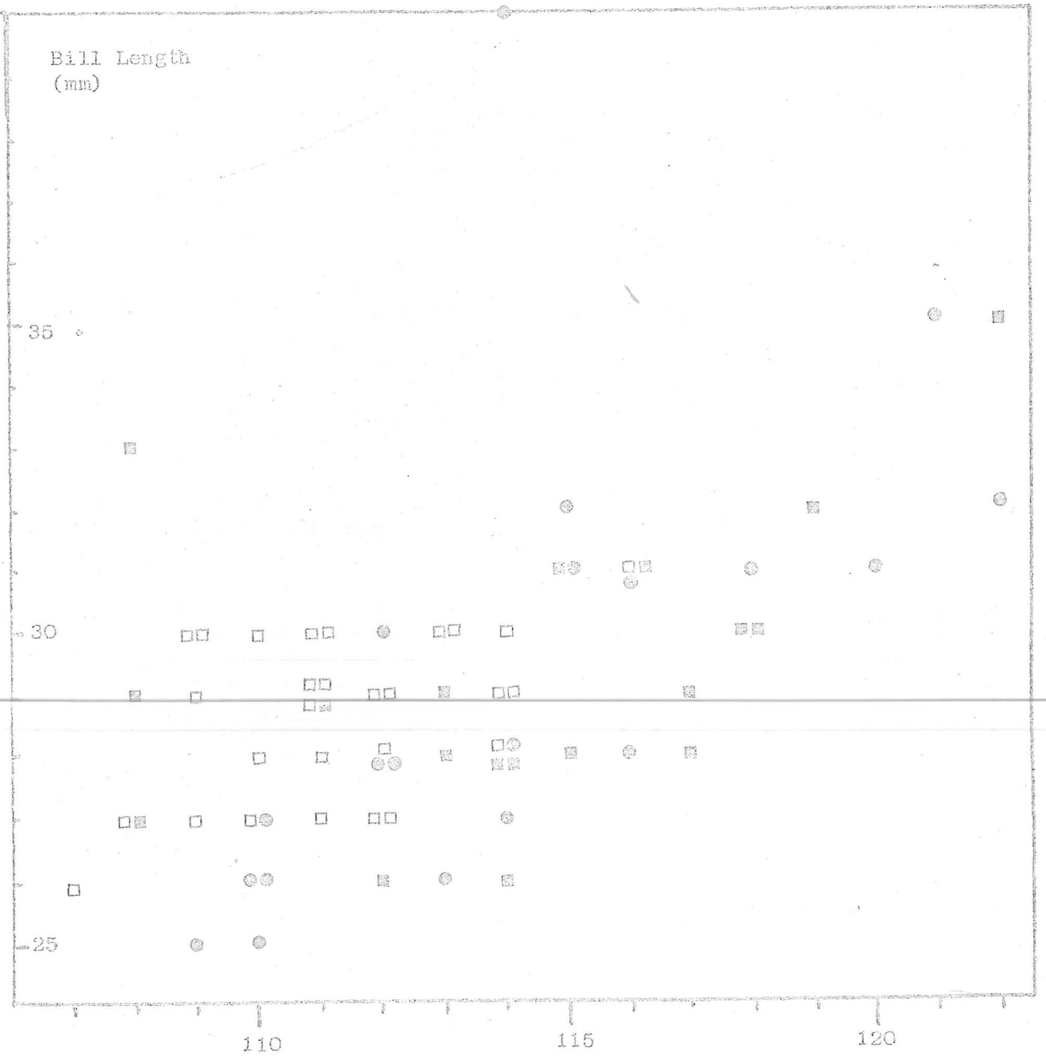


Figure 14. Wing Length vs Bill Length for Dunlin (Calidris alpina) in Iceland, July/August, 1970.

□ Adults: Gaseyri (28)
▣ Juveniles: Gaseyri (19)
◎ Juveniles: Hvammur (20)

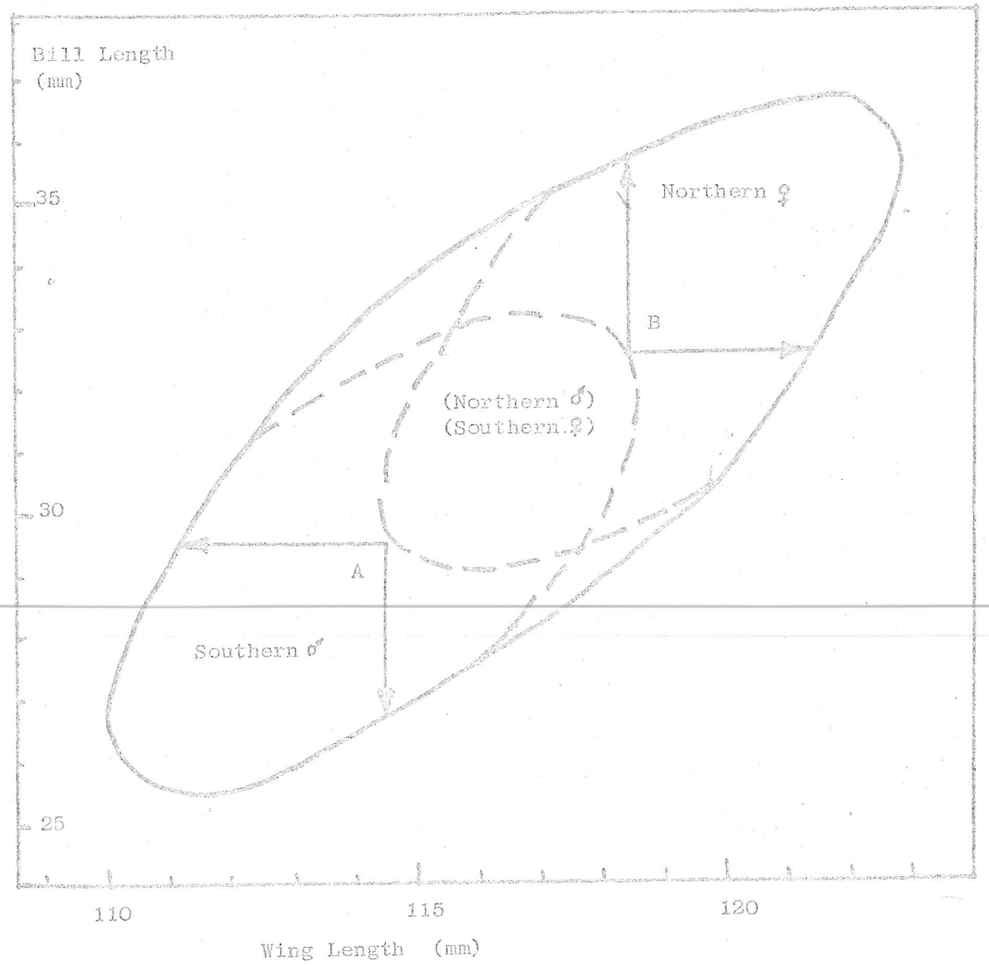


Figure 15. Diagram of Wing Length vs Bill Length of Dunlin (Calidris alpina) to Illustrate Range of Northern and Southern Races (Minton, 1969).

$$\text{Ratio } \frac{\text{Southern}}{\text{Northern}} = \frac{\text{No. birds below A}}{\text{No. birds above B}}$$

DUNLIN (Calidris alpina)

Histograms of wing and bill lengths and weights of both adults and juveniles are given in Figure 13, and a plot of wing length against bill length in Figure 14. Birds were caught at Gaseyri on 30.VII.70 (47), and Hvammur on 8.VIII.70 (13) by cannon netting, and at Hvammur from 9.VIII.70 to 13.VIII.70 (7) by mist netting. No birds were in wing moult. Figure 14 shows that the adults caught had bill lengths not exceeding 30mm and wing lengths not exceeding 114mm (with one exception), whereas the juveniles spread over this range and further up to 35mm and 122mm respectively (plus one exception at 40mm and 114mm). This suggests that two populations were present, the adults belonging to a short bill and short wing group while the juveniles represented both this and a larger sized population. The juveniles would only have been a few weeks old at most, and, allowing for an increase in the wing and bill lengths of these birds (Williamson, 1960; Evans, 1964), it appears that they could possibly all be representatives of the larger sized population. It seems most unlikely that the difference between the adult and juveniles caught could have been explained by a reduction in both wing and bill lengths of the adults by any of the mechanisms discussed above in relation to knot feathers.

The results may be compared with Figure 15, showing the separation of Northern (C. a. alpina) and Southern (C. a. schinzii) races in Britain (Minton, 1969; see below). Icelandic birds form part of the Southern race but are probably larger than typical Southern birds (Witherby et al, 1938). It is extremely unlikely that birds of the Northern race would have been present in Iceland as their breeding distribution is given as northern Scandinavia, Spitzbergen and northern Russia eastward by Vaurie (1965).

However, two races are known to occur in Iceland (Salomonsen, 1950): the Southern dunlin and Schioler's dunlin (C. a. arctica). The former breeds in Iceland and in the Angmagssalik district of East Greenland, while the latter breeds in the area from Scoresby Sound to North Germania Land in N. E. Greenland. Salomonsen (1950) states that wing lengths of arctica and schinzii are similar, but that arctica has a shorter bill; his data, however, are based on samples of less than twenty. Vaurie (1965) gives similar results, but again with small samples consisting in this case of only males. Methods of wing measurement are not given by either source. Salomonsen (1950) also states that the birds of the Iceland population of schinzii are slightly larger than the European birds of this race and have in the past been separated as C. a. islandica by some authors.

With this background, it is impractical to suggest with any certainty that the two possible populations in Figure 14 are arctica and schinzii. However, if, as is the case with many species of waders, adults leave the breeding grounds earlier than juveniles, it might be expected that the latter in Iceland in August would be birds of the year. Salomonsen (1950) states that adult dunlin leave the Greenland breeding grounds very early in the last week of July and in early August. Therefore, birds on the north coast of Iceland, which is due south of arctica's breeding grounds north of Scoresby Sound, might be expected to be arctica adults and Iceland schinzii juveniles.

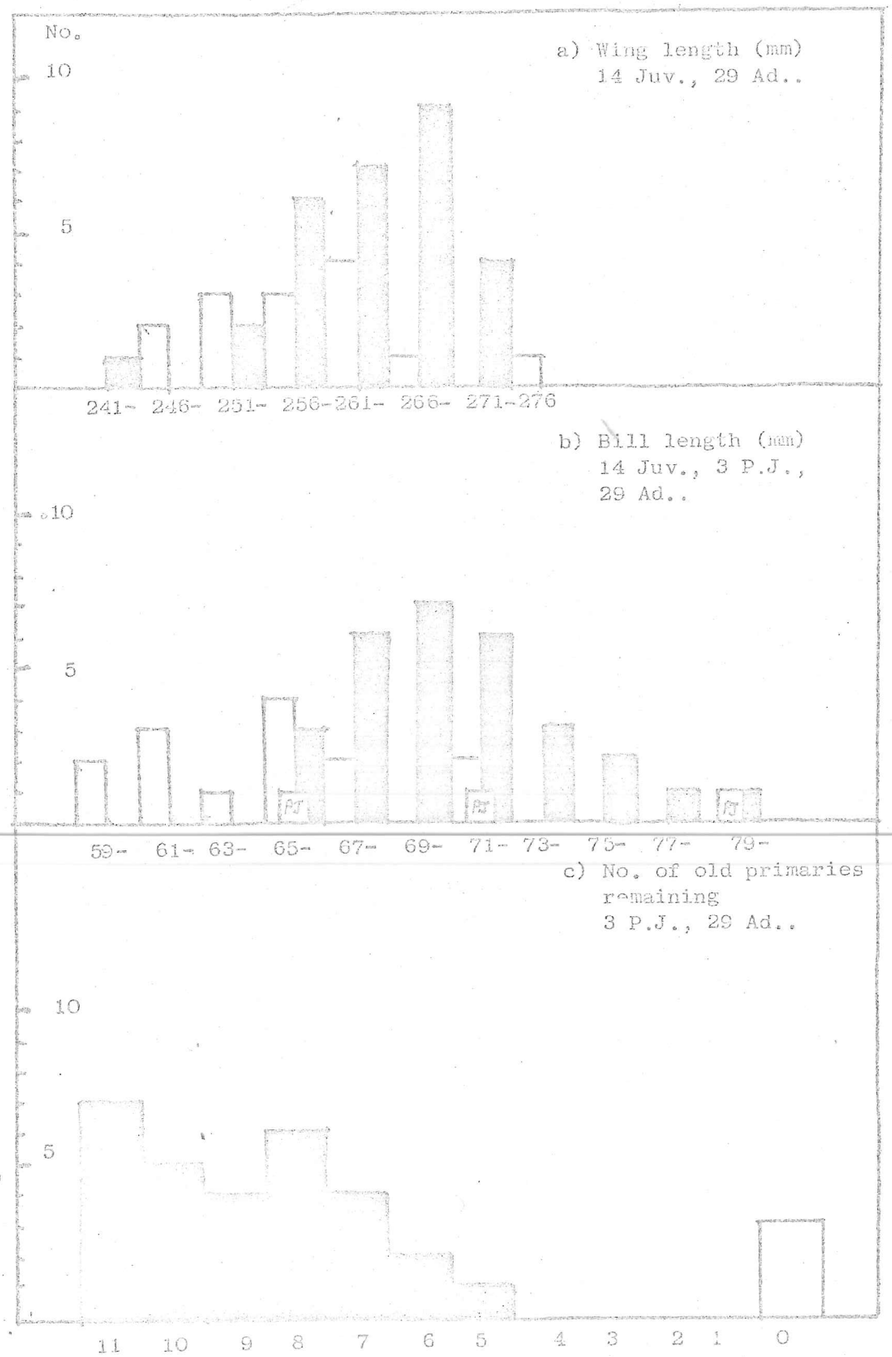


Figure 16. Histograms of Wing and Bill Lengths, and Number of Old Primaries Remaining for Oystercatchers (Haematopus ostralegus) in Iceland, July/August, 1970. Adults ☒ Post-juveniles ▨ Juveniles ☐

If one assumes that some of the juveniles are still growing, this gives figures for the juvenile Iceland population of about 117mm wing and 30mm bill. As the adults of the Greenland population will have old plumage, their wing lengths may be up to several mm longer in fresh plumage. This could give a similar wing length to that of the Iceland population, but a shorter bill, as suggested by earlier authors. The first set of figures are slightly larger than, but correspond reasonably with, those suggested by Evans (1964) for juveniles of the Iceland population (27-30mm bill, 114-117mm wing).

These conclusions are clearly of a tentative nature, and further work to investigate the dunlin in Iceland is called for.

OYSTERCATCHER (Haematopus ostralegus)

The data for wing and bill lengths and moult are presented as histograms in Figure 16. Birds were caught at Hvammur on 7.VIII.70 (31) and Hvammshofdi on 12.VIII.70 (1) by cannon nets, and at Hvammur from 9.VIII.70 to 13.VIII.70 (14) by mist nets.

The majority of birds were either recently fledged juveniles or adults (i.e. probably at least 3 years old), and only 3 were recorded at post-juveniles (i.e. probably 1 or 2 years old). Whilst bearing in mind the small sample caught, the situation seems basically similar to that of knot in that the majority of the non-breeding immature birds do not migrate to the northern breeding grounds, instead summering further south.

However, it is notable that both adults and the post-juveniles which do summer on the breeding grounds also moult there, the post-juveniles being further distinguished by their earlier moult. The control ringed in Morecambe Bay (see Table 6) is also worthy of note in that it was moulting when ringed as an adult on 3.XI.68. Does the oystercatcher suspend its moult to migrate, or do individual birds change their moult and migration behaviour from year to year, or are both of these the case ? Again, further work is called for.

REDSHANK (Tringa totanus)

Although the attempts at mist netting in August were aimed largely at redshank, the nights were still too light and the birds too agile for the technique to be successful, with the result that only 2 adults and 8 juveniles were caught from 9.VIII.70 to 11.VIII.70 at Hvammur, together with a further 3 juveniles in the cannon net catch at Hvammshofdi on 12.VIII.70. Measurements obtained for the juveniles were wings 164-173mm (mean 167.6), bills 36-44mm (mean 40.1), weights 111-180g (mean 131.6), and for the adults were wings 169 and 170mm, bills 45 and 42mm and weights 143 and 146g (see Table 11).

As with the oystercatchers, the state of moult is noteworthy, as one adult had all its old primaries while the other had only four old primaries remaining.

BLOOD PARASITE STUDY

Smears were taken for a study of blood parasites by Dr. A.E. Williams (University of Birmingham) from the catches of dunlin (Calidris alpina) at Gaseyri (10), Hvammur (10); oystercatchers (Haematopus ostralegus) at Hvammur (10); knot (Calidris canutus) at Hvammshofdi, and from a purple sandpiper at Hvammur. Smears were obtained by taking a small sample of blood from near the ankle joint by approved technique, and smearing the blood on a microscope slide. The smear was fixed with methanol.

Dr. Williams has examined approximately 50% of the samples to date, and the results have so far all been negative. The full results will be published elsewhere.

NOTES ON FEEDING AREA OF KNOT (CALIDRIS CANUTUS) AT HVAMMSHOFDI, HVALFJORDUR

The following note by J.P.H. describes the area at Hvammshofdi in Hvalfjordur on which the knot flock fed at low tide when the second phase of the expedition was in the area in August, 1970 (see Figs. 1 & 3).

1. Position

The feeding area studied is located along the south shore of Hvalfjordur at Hvammshofdi, some 35 km north from Reykjavik, at a point where a small island lies immediately offshore at high tide. A shingle spit, exposed approximately 1½ hours after high tide, connects the island to the mainland at low tide, and on the seaward side of this, the north west facing shore, the receding tide exposes a large area of mudflat and rocky shore. This attracts numerous waders off the nearby small islands and off the mainland shore to feed on the life there.

2. Description

The shore forms a shallow bay, protected from the larger waves by rocks that form a line almost across the opening to open water. It is covered in a layer of mud of varying thickness, 7-10 cm., beneath which is a layer of hard shingle. The slope of the beach is gradual, a gradient of about 1 in 10. The area contains numerous small rocks (up to 15cm. high) under which some of the more mobile littoral species spend the immersion period.

The whole region is exposed for about 5 hours at low tide.

3. Notes on the Flora

(a) on the rocks:
- Ascophyllum nodosum
- Fucus vesiculosus
- Enteromorpha compressa
- Pelvetia canaliculata
- Laminaria digitata

(sequence from top to bottom)

(b) on the mud surface: a fine covering of brown and green species of filamentous algae, both unidentified.

4. Notes on the Marine Fauna

(a) on the rocks:
- Mussels (Modiolus ?) up to 1 cm. in length
- Barnacles
- Littorina littoralis
- Asterias sp.

(in order of abundance, most to least)

(b) in mud: Three species of polychaetes, all unidentified
(i) white worm, up to 2½ cm. in length. Apparently gregarious. Errant type; moves by peristalsis.
(ii) small species of nereid polychaete up to 4 cm. in length.
(iii) black, red or green worms up to 4 cm. in length, locomotion smooth, but some peristalsis

one small crustacean (like Gammarus sp.) approximately 1 mm. in length.

Visual estimates of numbers (made through lack of apparatus and time, therefore only a rough indication):

under rocks: small white polyshaete approx. 500/100 sq. cm.
mereid polychaete: approx. 5-10/100 sq. cm.
variable colour polychaete approx. 9-12

small mussels on weed approx. 150-200/100 sq. cm.
larger mussels in mud approx. 15-20 (size: large, over 3 cm. in length)

A Ryvita tin lid was used to mark out a tandomly selected area for counting; the approximate area of the lid is 100 sq. cm.

Also present were numbers of Nucella sp. but not in significant quantity.

5. Estimated percentage cover

Based on the same quadrat size as before, a series of visual estimates gave the following averages:

area no. 1:	brown filamentous algae	approx. 3%
	green " "	" 28%
	Fucus vesiculosus	" 3%
	bare mud	" 66%
area no. 2:	brown filamentous algae	approx. zero
	green " "	" 70%
	Fucus vesiculosus	" 15%
	Porphyra sp.	" 10%
	bare mud	" 5%

6. Conclusions

One therefore has the impression of a fairly stable mudflat with only a thin layer of mud populated by numerous mussels, which were consumed in large numbers by the local oystercatchers, and very numerous polychaete worms, which may be preyed on by almost all the other waders present (knot, turnstone, dunlin, redshank etc.). The rocks form refuges for animals stranded by the tide and ensure safety from predation for perhaps a large enough proportion of the remaining fauna to maintain those more exposed in the face of predation. They also act as substrate for larger seaweeds and for planktonic larvae of the resident molluscs and crustaceans, including barnacles.

The results described in the study indicate that the density of small mussels in the area should be well sufficient to support the observed knot population (A.J. Prater, personal communication to M.W.P, 1970).

CONCLUSIONS

The expedition was highly successful in its main objective of catching and ringing knot (Calidris canutus). A total of 1089 knot was caught, including 52 controls. Wing measurements indicated that the Greenland population correlated well with that found moulting on the Wash in early autumn, and the ringing data and subsequent controls of birds ringed on the expedition lead us to propose the hypothesis that part of this population subsequently moves to the west coast of Britain around November, where it spends the rest of the winter. The results are discussed in detail above. Further catching of knot in Iceland would be of value in consolidating and extending the present results, also allowing a fuller statistical analysis.

The data from the 67 dunlin (Calidris alpina) caught indicated that two populations of this species may be present in Iceland, and that further work would be of value in clarifying the present data.

The data from the catches of oystercatcher (Haematopus ostralegus) and redshank (Tringa totanus) were particularly interesting in that each species was found to be in moult in Iceland in August, a fact not previously known. The control oystercatcher was also in moult when ringed on Morecambe Bay in November, 1968, and further work would be of great value in determining the moult pattern (and whether there is a consistent pattern) of each of these species.

A full species list of the birds seen on both phases of the expedition was compiled.

The feeding areas observed appeared well capable of maintaining the flocks of waders observed to be using them.

Results to date indicate that blood parasites were absent from the species examined.

To allow adequate conservation measures to be formulated in Western Europe, detailed knowledge of the migration ecology of the species concerned must be accumulated. Birds such as waders spend much of their lives in remote and unpopulated areas, including the Arctic and West Africa, but rely heavily on British estuaries for their survival. Expeditions aimed at catching large samples of these birds in such remote areas are essentialto complete the picture of migration of these birds, for which much data has already been gathered in Europe.

The classic Wildfowl Trust expeditions to Iceland in the 1950's were highly successful in solving many of the questions regarding the breeding and migration of geese. We hope that the present series of expeditions will do the same for waders, and consider that the Cambridge/London Iceland Expedition 1970 has laid a solid foundation for further work, as well as showing that such expeditions are technically feasible. The University of East Anglia Expedition to Morocco 1971 and the Cambridge Iceland Expedition 1971 are at present being organised in order to continue these studies.

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TABLE 10

PROCESSING DATA

MAY 1970

KNOT (Calidris canutus)

Ring No. (Controls)	New Ring Added	Age (if not adult)	Wing Length mm. P.I.S.	Bill Length mm. R.I.G.M.	Weight g.L.V.T.
Hvaleyri, Hvalfjordur.	15.V.70	(Cannon net)			
"	721769	"	166	32	160
CK 90119	70	"	170	35	176
CR 22479	71	"	175	32	172
"	72	"	169	33	180
"	73	"	166	32	166
"	74	"	177	34	182
CK 91118	75	"	167	32	173
"	76	"	172	38	182
CK 96003	77	"	169	32	164
CK 90352	78	"	175	34	176
"	79	"	168	32	164
"	80	"	165	32	184
CP 22807	81	"	176	30	167
"	82	"	179	33	174
"	83	"	168	32	157
CK 97208	84	"	171	33	167
CK 91097	85	"	173	32	173
"	86	"	169	34	160
CK 90789	87	"	173	34	177
"	88	"	168	36	149
"	89	"	175	34	195
"	90	"	173	31	171
"	91	"	175	31	180
CX 26640	92	"	175	37	192
"	93	"	170	36	182
CV 48540	94	"	176	38	187
"	95	"	173	33	174
CR 91431	96	(Blue plastic ring) right leg	170	35	160
"	97	"	175	35	166
CK 68321	98	"	173	34	185
"	99	"	170	33	182
PARIS GZ1850	721800	"	165	30	158
"	01	"	165	29	179
"	02	"	166	32	180
CK 59547	03	"	175	32	180
"	04	"	167	36	167
"	05	"	173	33	174
"	06	"	162	32	138
CK 74434	07	"	170	35	170
"	08	"	172	34	160
CK 91007	09	"	168	32	178
"	10	"	171	33	194
"	11	"	169	33	178

Control Ring No.	New Ring Added	Age (if not adult)	Wing Length mm. P.I.S.	Bill Length mm.R.I.G.M.	Weight L.V.T.
"	721812	"	171	30	175
"	13	"	176	33	178
"	14	"	174	34	158
"	15	"	172	33	153
"	16	"	178	33	166
"	17	"	172	32	168
"	18	"	171	35	180
"	19	"	171	34	178
"	20	"	175	34	183
"	21	"	169	37	163
"	22	"	172	34	186
CK 75025	23	"	170	34	182
"	24	"	174	36	185
"	25	"	172	36	183
"	26	"	172	29	168
"	27	"	178	37	170
"	28	"	173	34	182
"	29	"	175	34	172
"	30	"	169	31	167
"	31	"	160	33	165
"	32	"	167	33	169
CV 97475	33	"	168	32	188
"	34	"	166	34	164
"	35	"	169	34	178
"	36	"	173	34	180
"	37	"	169	35	177
CK 68087	38	"	177	34	162
CP 23848	39	"	167	31	172
"	40	"	173	32	170
CX 98391	41	"	173	34	174
"	42	"	175	34	172
"	43	"	162	31	135
"	44	"	179	36	182
"	45	"	158	32	162
"	46	"	177	33	180
"	47	"	169	33	151
"	48	"	176	33	183
"	49	"	164	32	163
"	50	"	179	35	177
"	51	"	175	33	171
"	52	"	165	35	163
CR 36402	53	"	167	34	161
CK 74031	54	(hole through tarsus at knee)	166	32	175
"	55	"	176	34	163
CK 90751	56	"	175	37	185
"	57	"	172	34	160
"	58	"	176	29	147
"	59	"	171	31	165
"	60	"	166	--	--
"	61	"	170	31	166
"	62	"	162	33	160
"	63	"	169	34	190
"	721735	"	176	34	192
"	36	"	170	33	174
"	34	"	177	34	188
"	11	"	168	31	170
"	37	"	165	34	164

Control Ring No.	New Ring Added	Age (if not adult)	Wing Length mm. P.I.S.	Bill Length mm.E.I.G.M.	Weight g.L.V.T.
"	721748	"	165	29	156
"	31	"	170	33	166
CV 48542	864	"	166	32	167
"	710	"	170	33	164
CX 25063	865	"	163	33	159
"	743	"	172	36	200
"	45	"	173	35	167
"	49	"	167	33	172
"	42	"	"	34	176
"	40	"	165	32	168
"	52	"	173	34	196
"	50	"	170	33	177
"	27	"	170	32	168
"	46	"	"	36	200
"	33	"	173	31	162
"	44	"	163	34	156
"	12	"	169	35	180
"	28	"	175	34	175
"	866	"	173	29	176
"	717	"	163	31	156
"	25	"	161	30	145
"	39	"	167	33	140
"	26	"	171	33	179
CR 92077	867	"	165	32	168
"	718	"	171	32	166
"	41	"	170	32	168
"	15	"	167	32	178
"	16	"	177	34	170
"	21	"	171	33	166
"	51	"	171	33	184
"	23	"	168	34	176
"	33	"	159	32	157
"	20	"	162	33	"
"	32	"	165	32	170
"	03	"	178	35	201
"	29	"	174	35	170
"	04	"	167	31	174
"	14	"	173	33	178
"	22	"	174	37	"
"	30	"	172	29	151
"	05	"	170	34	176
"	08	"	177	34	171
"	13	"	166	31	164
"	07	"	173	35	186
"	01	"	169	31	158
"	06	"	177	31	158
"	09	"	166	33	140
CK 97218	868	"	165	31	168
"	702	"	168	35	186
"	24	"	170	33	170
CK 96829	878	"	164	31	155

Coordinates of Hvaleyri, Hvalfjordur: 64°20'N, 21°44'W

TABLE 1[illegible]

PROCESSING DATA

JULY/AUGUST 1970

OYSTERCATCHER (Haematopus ostralegus)

Ring No.	Age (if not adult)	Moult	Wing Length mm. M.W.P.	Bill Length mm. P.J.K.
Hvammur, Hvalfjordur 7.VIII.70 (Cannon net)				
SS 89678	-	O 11	264	67
413251	-	O 8	262	72
52	Juv	-	248	59
53	Juv	-	255	67
54	-	O 9	260	66
55	-	O 11	256	67
56	Juv	-	261	65
57	Juv	-	261	62
58	-	O 11	269	71
59	-	O 11	256	74
60	-	O 8	268	68
61	-	O 10	260	70
62	-	O 10	272	68
63	Juv	-	249	68
64	-	O 7	260	65
65	-	O 7	252	76
66	-	O 9	262	67
67	-	O 8	256	66
68	-	O 9	266	70
69	-	O 5	262	71
70	-	O 6	270	70
71	-	O 10	268	70
72	Juv	-	276	71
73	-	O 11	267	75
74	-	O 9	263	67
75	Juv	-	260	65
76	Juv	-	255	62
77	Juv	-	265	64
78	-	O 8	268	71
79	-	O 7	275	70
80	-	O 6	255	79
Hvammur, Hvalfjordur 9.VIII.70 (Mist net)				
413281	Juv	-	260	62
82	PJ	N 8	-	66
83	PJ	N 7	-	71
84	-	O 11	274	74
85	Juv	-	270	66

Ring No.	Age (if not adult)	Moult	Wing Length mm. M.W.P.	Bill Length mm. P.J.K.
Hvammur, Hvalfjordur 11.VIII.70 (Mist net)				
413286	Juv	-	257	72
87	-	O 8	241(abd.)	69
88	Juv	-	262	65
89	-	O 10	272	71
90	-	O 10	261	78
Hvammshofdi, Hvalfjordur 12.VIII.70 (Cannon net)				
413291	Juv	-	255	60
Hvammur, Hvalfjordur 13.VIII.70 (Mist net)				
413292	-	O 11	269	71
93	PJ	N 8	-	80
94	-	O 8	265	69
95	-	O 7	267	74

RINGED PLOVER (Charadrius hiaticula)

Ring No.	Age (if not adult)	Moult (if not O 11)	Wing Length mm. M.W.P.	Bill Length mm. P.J.K.	Weight g.K.R.A.
Hvammur, Hvalfjordur 13.VIII.70 (Mist net)					
919269	Juv	-	128	14	52

REDSHANK (Tringa totanus)

Ring No.	Age (if not adult)	Moult (if not O 11)	Wing Length mm. M.W.P.	Bill Length mm. P.J.K.	Weight g.K.R.A.
Hvammur, Hvalfjordur 9.VIII.70 (Mist net)					
618607	Juv	-	169	41	120
08	Juv	-	165	39	150
09	Juv	-	173	39	143
10	Juv	-	167	36	126
Hvammur, Hvalfjordur 11.VIII.70 (Mist net)					
618611	Juv	-	169	39	129
12	Juv	-	164	39	128
13	Juv	-	166	40	158
14	-	O 11	170	42	146
15	-	O 4	169	45	143
16	Juv	-	169	44	174

Ring No.	Age (if not adult)	Moult (if not O 11)	Wing Length mm. M.W.P.	Bill Length mm. P.J.K.	Weight g.K.R.A.
Hvammshofdi, Hvalfjordur		12.VIII.70	(Cannon net)		
618617	Juv		169	41	150
18	Juv		165	41	124
19	Juv		168	41	156

KNOT (Calidris canutus)

Ring No.	Age (if not adult)	Moult (if not O 11)	Wing Length mm. M.W.P.	Bill Length mm. P.J.K.	Weight g.K.R.A.
Hvammshofdi, Hvalfjordur		12.VIII.70	(Cannon net)		
British Museum					
CK 75682			162	32	138
CK 90864			173	35	121
CK 91851			182	33	150
CK 95360			171	34	130
CP 22902			173	36	175
CP 23568			174	35	118
CR 22176			162	32	135
CV 97445			174	35	198
CX 61584			171	32	119
Heligoland					
7362162			168	34	119
Reykjavik					
721201			172	32	111
721379			170	31	137
721446			168	35	120
721506			175	34	163
721735			176	33	135
720501			179	40	172
02			169	32	131
03			163	30	120
04			168	34	123
05			172	31	162
06			166	31	161
07			162	32	156
08			170	33	112
09			170	31	150
10			166	32	137
11			177	34	149
12			175	34	158
13			167	33	154
14			173	33	132
15			165	33	159
16			174	31	178
17			167	30	120
18			173	34	146
19			167	33	127
20			166	35	120
21			172	33	129

Ring No.	Age (if not adult)	Moult (if not O 11)	Wing Length mm. M.W.P.	Bill Length mm. P.J.K.	Weight g.K.R.A.
720522			167	34	176
23			166	33	148
24			162	31	146
25			171	32	136
26			172	34	115
27			174	34	157
28			177	34	149
29			169	32	116
30			169	33	138
31			168	34	152
32			165	33	145
33			177	32	115
34			167	32	155
35			168	32	111
36			171	36	167
37			159	31	135
38			155	30	130
39			165	31	141
40			166	33	151
41			169	33	123
42			174	32	168
43			179	33	153
44			166	30	123
45			164	35	155
46			173	33	147
47			172	30	154
48			169	33	168
49			171	31	132
50			172	33	134
51			165	29	133
52			172	35	145
53			168	31	131
54			168	35	164
55			169	36	144
56			166	33	133
57			168	31	143
58			174	31	158
59			165	30	125
60			170	33	151
61			173	34	158
62			166	30	129
63			176	34	169
64			165	31	115
65			163	35	139
66			179	34	168
67			162	31	136
68			175	34	147
69			168	35	138
70			165	35	142
71			181	33	136
72			179	34	160
73			175	34	159
74			177	35	143
75			163	30	121
76			167	31	120
77			165	33	126
78			157	32	142

Ring No.	Age (if not adult)	Moult (if not O 11)	Wing Length mm. M.W.P.	Bill Length mm. P.J.K.	Weight g.K.R.A.
720579	"	"	171	34	143
80		Added to Heligoland 7362162			
81	"	"	173	36	164
82	"	"	172	32	153
83	"	"	173	32	130
84	"	"	164	33	147
85	"	"	173	34	139
86	"	"	172	33	143
87	"	"	165	30	116
88	"	"	166	32	143
89	"	"	168	36	145
90	Juv	"	159	30	124
91	"	"	164	31	118
92	"	"	167	31	110
93	"	"	168	32	133
94	"	"	167	33	128
95	"	"	171	36	143
96	"	"	167	31	124
97	"	"	164	32	131
98	"	"	165	32	123
99	"	"	169	33	118
720600	"	"	169	30	"
01	"	"	172	34	137
02	"	"	170	31	104
03	"	"	170	32	153
04	"	"	174	34	174
05	"	"	164	32	139
06	"	"	176	36	138
07	"	"	165	34	140
08	"	"	170	34	145
09	"	"	174	36	138
10	Juv	"	166	35	135
11	"	"	168	35	124
12	"	"	162	32	157
13	"	"	164	32	139
14	"	"	176	33	120
15	Juv	"	170	36	151
16	"	"	175	34	149
17	"	"	171	32	114
18	"	"	161	31	142
19	"	"	165	31	110
20	"	"	168	32	143
21	"	"	176	34	119
22	"	"	164	32	132
23	"	"	166	32	144
24	"	"	175	34	120
25	"	"	162	30	118
26	"	"	167	34	126
27	"	"	165	34	151
28	"	"	171	29	125
29	"	"	166	33	136
30	"	"	169	31	136
31	"	"	168	33	124
32	"	"	168	29	119
33	"	"	161	32	108
34	"	"	162	34	120
35	"	"	166	32	114
36	"	"	165	34	118

Ring No.	Age (if not adult)	Moult (if not O 11)	Wing Length mm. M.W.P.	Bill Length mm. P.J.K.	Weight g.K.R.A.
720637	Juv	-	162	32	116
38	-	-	175	32	127
39	-	-	162	31	114
40	-	-	169	32	145
41	-	-	172	32	153
42	-	-	167	30	118
43	-	-	174	35	142
44	-	-	167	32	106
45	-	-	175	31	144
46	-	-	168	31	126
47	-	-	170	30	120
48	-	-	168	34	156
49	-	-	175	33	129
50	-	-	166	33	122
51	-	-	169	31	110
52	-	-	162	31	100
53	-	-	164	30	113
54	-	-	169	32	119
55	-	-	169	33	144
56	Juv	-	165	34	123
57	-	-	166	30	111
58	-	-	166	36	125
59	-	-	171	33	122
60	-	-	166	33	150
61	-	-	169	30	129
62	-	-	170	34	120
63	-	-	171	31	107
64	-	-	166	35	163
65	-	-	172	34	141
66	-	-	172	34	140
67	-	-	176	31	143
68	-	-	172	32	139
69	Juv	-	154	31	108
70	-	-	168	31	114
71	-	-	171	33	166
72	Juv	-	166	31	138
73	-	-	167	32	104
74	-	-	171	32	121
75	-	-	165	32	113
76	-	-	166	35	124
77	-	-	166	30	129
78	-	-	163	32	153
79	-	-	166	32	123
80	-	-	167	34	133
81	-	-	167	34	136
82	-	-	165	30	137
83	-	-	162	32	144
84	-	-	168	30	128
85	-	-	170	32	147
86	-	-	172	31	108
87	-	-	173	35	146
88	-	-	166	33	120
89	-	-	167	35	119
90	-	-	164	27	143

PURPLE SANDPIPER (Calidris maritima)

Hvammur, Hvalfjordur 8.VIII.70 (Cannon net)

Ring No.	Age (if not adult)	Moult (if not O 11)	Wing Length mm. M.W.P.	Bill Length mm. P.J.K.	Weight g.K.R.A.
835701	Juv	-	134	28	66

DUNLIN (Calidris alpina)

Gaseyri, Eyjafjordur 30.VII.70 (Cannon net)

Ring No.	Age (if not adult)	Moult (if not O 11)	Wing Length mm. M.W.P.	Bill Length mm. P.J.K.	Weight g.K.R.A.
919203	Juv	-	115	28	43
04	Juv	-	114	28	48
05	-	-	112	27	45
06	-	-	114	28	44
07	-	-	109	27	43
08	-	-	111	27	45
09	-	-	114	29	48
10	Juv	-	118	30	52
11	-	-	112	29	42
12	-	-	111	29	50
13	Juv	-	108	29	43
14	Juv	-	108	27	39
15	-	-	110	28	49
16	-	-	111	29	46
17	Juv	-	119	32	43
18	-	-	110	27	47
19	-	-	111	30	47
20	-	-	109	30	49
21	Juv	-	122	35	49
22	Juv	-	112	26	40
23	-	-	112	27	49
24	-	-	112	29	50
25	Juv	-	115	31	41
26	-	-	109	30	40
27	-	-	111	28	43
28	-	-	113	30	45
29	-	-	116	31	47
30	Juv	-	108	33	54
31	-	-	114	29	46
32	-	-	111	30	46
33	-	-	109	29	47
34	-	-	108	27	43
35	-	-	112	28	45
36	Juv	-	118	30	46
37	-	-	107	26	41
38	Juv	-	117	29	41
39	-	-	111	29	45
40	Juv	-	114	26	38
41	Juv	-	113	28	36
42	-	-	110	30	50
43	Juv	-	117	28	40
44	Juv	-	114	28	37

Ring No.	Age (if not adult)	Moult (if not O 11)	Wing Length mm. M.W.P.	Bill Length mm. P.J.K.	Weight g.K.R.A.
919245	-	-	113	30	50
46	-	-	114	30	50
47	Juv	-	111	29	45
49	Juv	-	116	31	45
50	Juv	-	113	29	47
Hvammur, Hvalfjordur	8.VIII.70	(Cannon net)			
919248	Juv	-	120	31	40
51	Juv	-	110	25	37
52	Juv	-	112	28	43
53	Juv	-	110	26	35
54	Juv	-	110	27	49
55	Juv	-	116	31	41
56	Juv	-	115	31	44
57	Juv	-	118	31	44
58	Juv	-	115	32	53
59	Juv	-	113	26	39
60	Juv	-	121	35	53
61	Juv	-	109	25	38
62	Juv	-	122	32	49
Hvammur, Hvalfjordur	9.VIII.70	(Mist net)			
919263	Juv	-	117	30	56
64	Juv	-	112	28	47
65	Juv	-	114	28	-
66	Juv	-	114	27	37
Hvammur, Hvalfjordur	11.VIII.70	(Mist net)			
919267	Juv	-	116	28	37
Hvammur, Hvalfjordur	13.VIII.70	(Mist net)			
919268	Juv	-	110	26	36
70	Juv	-	114	40	41

CO-ORDINATES OF CATCHING SITES

Gaseyri, Eyjafjordur	65°47'N	18°10'W
Hvammur, Hvalfjordur	64°23'N	21°34'W
Hvammshofdi, Hvalfjordur	64°23'N	21°33'W

PULLI RINGED

618601 Redshank (Tringa totanus) Hollustadir, Blondudalur 65°28'N, 19°50'W
02)
03) Golden Plover (Pluvialis apricaria) Myvatn 65°36'N, 17°07'W
04)
05 Redshank (Tringa totanus) Brekka, Hofsos, Skagafjordur 65°55'N, 19°25'W
06 Golden Plover (Pluvialis apricaria) Kelduvik, Keta, Skagaheidi 66°06'N, 20°06'W

919201) Red-necked Phalarope (Phalaropus lobatus) Helgastadir, Einarsstadir,
02) Adaldalur 65°46'N, 17°25'W

FINANCES

Phase I. May 1970

Income

	£ s d
University College, London	275- 0- 0
Merchant Taylors' Company	50- 0- 0
Personal contributions	225- 0- 0
	550- 0- 0

Expenditure

Travel (air fares)	232- 0- 0
Shipping	28- 0- 0
Vehicle hire	120- 0- 0
Insurance	20- 0- 0
Maintenance of equipment etc, netting expenses	30- 0- 0
Correspondence, postage, stationary, report etc	50- 0- 0
Food	35- 0- 0
Miscellaneous	35- 0- 0
	550- 0- 0

Phase II. July/August 1970

Income

NATO Research Grant	170- 5- 8
University of London Convocation	90- 0- 0
Chelsea College, London	50- 0- 0
King's College, London	50- 0- 0
Derbyshire Education Committee	30- 0- 0
Newbury Ornithological Society	5- 0- 0
Analytical Supplies Ltd. (Derby)	2- 2- 0
Camp Hopson & Co. Ltd., (Newbury)	3- 3- 0
Deb Chemical Proprietaries Ltd. (Derby)	5- 5- 0
Hamp & Sons (Northampton)	10- 6
Marks & Spencer Ltd. (Newbury)	1- 1- 0
Personal Contributions	249-10-10
	656-18- 0

Expenditure

Air fares (personal)	196- 8- 0
Shipping (equipment)	67-12- 0
Vehicle hire	221-15- 0
Food	17-18- 0
Maintenance of equipment, cartirdges, spares etc.	41- 3- 0
Photography	51- 0- 9
Insurance	30- 8- 9
Stationary, postage etc.	24- 5- 6
Bank charges & loss in exchange	2- 4- 0
Miscellaneous	4- 3- 0
	656-18- 0

PUBLICATIONS

A general account of the work and results of the expedition has appeared in The Times (see above).

A report of the result of the expedition has appeared in the British Trust for Ornithology Wader Study Group Bulletin (see Summary).

Apart from appearing in this report in full, the results are being prepared for publication in scientific journals.

Several lectures have been given on the work of the expedition (see below).

PUBLICITY

The following articles connected with the expedition have appeared in the press:

1. The Times; Wednesday, 3rd February, 1971.
2. The Cambridge Evening News; Wednesday, 11th March, 1970.
3. The Cambridge Evening News; Tuesday, 7th April, 1970.

LECTURES

The following lectures have been given on the expedition:

1. Cambridge Bird Club; Friday 16th October, 1970.
   R.I.G. Morrison.
   "Migration of the Knot: a Ringing Expedition to Iceland".

2. University of East Anglia; Wednesday, 2nd December, 1970.
   R.I.G. Morrison and M.W. Pienkowski.
   "Iceland 1970".

3. British Trust for Ornithology Ringing and Migration Conference, Swanick, Derbyshire; Saturday, 9th January, 1971.
   P.I. Stanley.
   "The Migration of the Knot: Ringing in Britain and Iceland".

The following lectures are planned:

1. Stephen Hales Society, Corpus Christi College, Cambridge; Tuesday, 27th April, 1971.
   R.I.G. Morrison.

2. Merchant Taylors' School, Northwood, Middlesex; Friday, 30th April, 1971.
   R.I.G. Morrison.

PHOTOGRAPHY

In addition to a full photographic record of the expedition on still film, an 8mm cine film of the expedition, lasting about 35 minutes, was completed.