the WARRAH

JOURNAL OF THE FALKLAND ISLANDS TRUST

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Warrah by S. Paul

W A R R A H

JOURNAL

OF

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THE WARRAH OR FALKLAND FOX (Canis antarcticus). This bold, inquisitive fox was described by the early settlers and from records was probably never very numerous. It was larger than its European and South American relatives. On the introduction of sheep it was said to have hunted in small groups and to have hunted for fun. With a Government bounty to back them, the farmers persecuted the Warrah to extinction by 1876.

The Warrah was the only endemic species of mammal on the Falklands. We hope the Journal will play a small part in preventing any other part of the Falkland heritage following the same path to extinction.

INTRODUCTION

In writing this introduction to what I hope will be the first of many Falkland Islands Trust Journals, I thought that it might be as well to give a brief outline of our aims. Our object is a far reaching one, namely the preservation of, and promotion of interest in, all aspects of Flora and Fauna; plus the preservation of all that can be considered as Industrial Archaeology, that is Wrecks, Buildings and such within the Colony.

Currently, many of these interests are actively pursued by people locally, and it is in an endeavour to unite these interests and activities that the Trust has been formed. This is where we look to people involved in these fields to assist us. This, of course, can best be done by becoming a Member of the Trust, or alternatively by passing to the Trust any information that you can.

At this point I would stress that although we intend having contact with learned bodies throughout the world, the Falkland Islands Trust is primarily for people locally and is not in itself a scientific or other such group, although we are fortunate in having a number of gifted persons either as members or associated with us.

So we have a very broad spectrum of interest and an ambitious one, but one we consider we can cover with the assistance of all who are interested in preserving the valuable heritage that we have here in the Falklands.

In closing I would request of all who read this Journal to give us, The Falkland Islands Trust, your active support.

Ian Stewart

F A L K L A N D I S L A N D S T R U S T

RULES

1 The Trust shall be called The Falkland Islands Trust.

2 The object of the Trust shall be to preserve and to promote the study of wild animals, birds and plants and their habitats, the study and preservation of wrecks, buildings and sites of archaeological interest, by:

(a) interesting the public and decision makers in the safeguarding and conservation of wild animals, birds, plants, and their habitats, wrecks, buildings and sites of historic, archaeological or scientific interest;

(b) promoting the establishment and proper management of Nature reserves and sanctuaries and the enforcement of laws for the protection and conservation of wild animals, birds and plants and their habitats, wrecks, buildings and sites of historic, archaeological or scientific interest;

(c) establishing relations with societies throughout the world having similar interests;

(d) for the purposes of (a) to (c) above, promoting or undertaking publications, meetings, exhibitions, symposia and other informative activities; and

(e) developing, in conjunction with the Department of Education, an educational programme to develop an awareness of, and appreciation for, the heritage of the Falkland Islands.

3 Membership

All persons interested in the objectives of the Trust are eligible as members.

The subscription rate shall be (per annum) £

Members	5.00
Family Membership (1 Journal per family)	7.50
Associate Membership (up to 15 years of age) ..	1.00

Annual subscriptions shall become due on 1 July each year. Members whose applications to join the Trust are received during April, May and June of any year shall not be required to pay a subscription for that financial year.

Honorary members may be elected at the discretion of the Council.

Kindred societies or other bodies may be members of the Trust on payment of the annual subscription of a single member. Any such society or body shall receive all publications which any Ordinary member receives, but its individual members shall not ipso facto become members of the Falkland Islands Trust.

The name of any member whose subscription is one year in arrears shall be removed from the list of members and any member whose subscription is six months in arrears shall not be entitled to receive the Journal of the Trust.

Members of the Trust have the right to be present and to vote at all General meetings of the Trust and to receive free the Journal of the Trust.

EDITORIAL

The purposes of the Trust, as can be seen from page 2 of the Journal and the chairman's introduction, are very far reaching and concern the study and conservation of all things within the Islands, past and present. Much of the scope of the Trust is shown in the articles in this Journal.
Conservation is a word that can raise the hackles of the most placid citizen and it would be as well to state here, not what conservation is, but what it will not be as far as the Trust is concerned.
The Trust will not be urging changes in any of the laws concerning egg taking, shooting, fishing etc, nor is it intended that members will become unofficial policemen and pop from behind a tussac bog to catch someone in the act of breaking the law.
Changes in the law will only be advocated if it can be proved beyond doubt that the preservation of something can be achieved by no other means.
It is hoped that when people realise the scope of the Trust and its intentions they will become members - as everyone, young and old, from all walks of life, can, we hope, contribute and gain something from it.
These British Islands in the South Atlantic are unique. Let us try to preserve the many aspects that make them so.

CONSERVATION ON CARCASS ISLAND

by

K Bertrand

Carcass Island was first leased to Captain Charles Hansen on 11 September 1872. It has always been privately owned and since Jason Hansen became manager in 1903 successive owners have managed to conserve the wild life. Jason Hansen fenced nearly all the wasteland and planted it with tussac and sand grass in the early 1930's. He created sufficient tussac paddocks to winter all the sheep except the old wethers. At the same time he also created habitat for all manner of birds. What had been a wilderness of black tussac soil, clay and sand became a wildlife paradise with lush tussac and sand grass. All this work was done without the aid of machines. The tussac was planted by hand, thousands of roots every winter. It was transported mainly by pack-horse, with a little help where possible by cart and horse.

When my husband and I bought Carcass Island in 1953 we continued Mr Hansen's policy regarding fencing and conservation of wildlife. Our aim was to show that it was possible to run a successful sheep farm and save the wildlife. I think we succeeded as our wool fetched a good price because, as well as being fine, it was clean. In addition Cecil planted a lot of trees including a small plantation of Radiata and Austrian Pine on the side of a hill about 250' above sea level. This became the home of a number of small birds, mainly thrushes, but a pair of owls also nested there. These were our short-eared owls but on several occasions we saw another type which we are sure was from South America. It was larger than our little short-eared owl, darker in colour and had distinct 'ears'.

Night Herons or Quarks, as we call them, started to live in the trees round the house in 1961 and have steadily increased in numbers to such an extent that I could not

say how many nests there are there now.

We sold Carcass to Robin McGill in 1974 who also believes in conserving the wildlife. It was encouraging to hear what Sir Peter Scott had to say. He first visited Carcass Island in February 1968 and he made a return visit in January 1979. He said he was delighted to see that there were even more birds than when he was there eleven years ago and that they were tamer than ever.

BIRDS AND SEA-MAMMALS REPORT

Edited by

John Peatfield

Introduction

Originally it was intended that this report would cover the 1980 period. However, once memories were stirred, notes and sightings for other periods came to light. It seemed a valid exercise to try and include as much as possible, especially as so little information has been documented over the past years. Hopefully this first report will stimulate an increasing response in the future.
All dates refer to 1980 unless specifically indicated.

I wish to gratefully acknowledge the many people who have gone to the trouble to provide reports of sightings. Throughout the report I have referred to contributors by their initials.

Contributions came directly or indirectly from the following:

Tony Chater TC
Stuart Booth SB
Nick Keenlyside NK
John and Anne Peatfield JP AP
Alan Watson AW
Don Davidson DD
Steve Whitley SW
Neil Watson NW
Lord Buxton LB (per R and L McGill)

Other observers mentioned:

Richard Gosney RG
Alain Gilmour AG
Jean-Pierre Voisin JPV

Stephen Hunter very kindly contributed the paper on Giant Petrels which was a special bonus for the first report.

B I R D S

KING PENGUIN (Aptenodytes patagonicus)

An early March count at Volunteer revealed:

Shanty Green area - 76 adults, 35 downy young;
Lagoon bar - 9 adults, 3 downy young.
3 adults present in same vicinity.
During period up to 5 adults present at Port Stephen. NK

CHINSTRAP PENGUIN (Pygoscelis antarctica)

A single bird was present at Long Island on 5 December 1980. NW

WANDERING ALBATROSS (Diomedes exulans)

30 plus were observed in the Calm Head, Bird Island area during period 19 - 26 May. Infrequent, but regular, off Cape Pembroke in winter. JP AP
2 observed 14 December in Port William during strong easterly gale. TC

ROYAL ALBATROSS (Diomedea epomophora)

One found dead on Volunteer Beach 11 March 1981. This was identified from its ring (Dominion Museum, New Zealand). The bird had been banded as a chick on Campbell Island in September 1980. NK

GREY-HEADED ALBATROSS (Diomedea chrysostoma)

Immature flying north off Cape Pembroke 20 April.
A 'very common albatross in offshore waters' according to Jerome and Sally Poncet off Damien II 1979/80. pers com JP

LIGHT-MANTLED SOOTY ALBATROSS (Phoebetria palpebrata)

During an easterly gale a single bird seen in the company of two Wandering Albatrosses in Port William - 18 December. TC

SOUTHERN GIANT PETREL (Macronectes giganteus)

A pure white example of this species was seen off Wood Cove, Port Stephens on three occasions between 19 - 26 May. JP AP

NORTHERN GIANT PETREL (Macronectes halli)

The first documented sighting of this relatively recently determined species for Falkland water was on 14 November, half a mile off Manguerra Point. See identification paper on Giant Petrels - Appendix 1. J-PV AG, TC

ANTARCTIC OR SILVER-GREY FULMAR (Fulmarus glacialoides)

Large numbers, 400 plus, sheltering in the lee off Cape Pembroke on 19 April. Regular in winter off Cape, often in high numbers and observed as the most common species following trawlers entering Port William. JP AP

CAPE PETREL (Daption capense)

Regularly observed during sea-watches off Cape Pembroke - much smaller numbers than the former species. Quite common off Calm Head 19 - 26 May, including one feeding flock of 20. JP AP

SNOW PETREL (Pagodroma nivea)

Single bird observed during storm off Eliza Cove, 24 July 1979. About two months later Dr H King found two long dead specimens in the Cape Pembroke area. JP RG

KERGUELEN PETREL (Pterodroma brevirostris)

Single bird observed flying parellel to the shore adjacent to Ross Road West on 2 October. A typical gadfly petrel with very erratic flight and dark appearance. Is it possible that the increased trawler movements are bringing about changes in the occurrence of pelagic sea birds? JP AP

GREATER SHEARWATER (Puffinus gravis)

A positive increase in sightings during 1980 sea-watches off Cape Pembroke during April, and May passage counts reached a peak of 30 - 40 an hour. JP AP

SOOTY SHEARWATER (Puffinus griseus)

A late sighting - 26 May off Calm Head. JP AP

WILSON'S PETREL (Oceanites oceanicus)

Regularly seen off the Copious during the summer. TC

CATTLE EGRET (Bubulucus ibis)

Reduced numbers, apparently, during annual influx, which is part of the normal post breeding dispersal of this species. A retrospective account of the arrival and annual occurrence of this species deserves attention. The Trust would welcome information and thanks Dennis Middleton for the information already received of Goose Green sightings.

COSCOROBA SWAN (Cygnus coscoroba)

14 sighted on Carcass Island, Northwest Point area, on 15 February 1981. LB

BLACK-NECKED SWAN (Cygnus melancoryphus)

An extremely interesting observation of this species concerns the predation of one of a flock of six by a sea lion. This was near Felton Stream on 15 April 1981. NK

FLYING STEAMER DUCK (Tachyeres patachonicus)

It is possible that this species may be the subject of a special investigation in 1982. Any information regarding this species would be welcomed by the Trust.

SILVER TEAL (Anas versicolor)

Family party consisting of 2 adults and 3 juveniles observed on Stanley Common during late summer - breeding suspected.
Up to 9 present near Eliza Cove in May. JP AP

CINNAMON TEAL (Anas cyanoptera)

A pair present on Stanley Common 10 November 1979 - and another June 1981. JP AP

CINEREOUS HARRIER (Circus cinereus)

A number of scattered reports.

AMERICAN KESTREL (Falco sparverius)

2 birds present in Stanley area from March onwards until after mid-winter. Presumed to have succumbed to harsh weather. JP AP SB

BAIRD'S SANDPIPER (Calidris bairdii)

On 14 October 1979 4 birds were seen in the Eliza Cove, Goose Green area. They differ from the more

common regular wintering 'peep' (WHITE-RUMPED SANDPIPER Calidris fuscicollus) in the following main features: generally buff appearance; 'divided' rump; legs often look noticeably flexed; and the bird is more likely to be found away from the shore. JP AP

WHITE-RUMPED SANDPIPER (Calidris fuscicollus)

Regular winter visitor with up to 120 plus present on Surf Bay in the summer months. First sighted 19 April, last 9 September. JP AP

SANDERLING (Calidris alba)

Regular winter visitor but a noticeable increase in numbers present on Surf Bay in March, April and May. The numbers seem to be steadily increasing in recent years. pers com SB

The former three species are the subject of a long term study by the International Shorebirds Survey based at Manomet Bird Observatory, Massachusetts, USA.

WHIMBREL (Numenius phaeopus)

During 1980 information came to hand of a bird shot in recent time on Pebble Island. However the most significant set of observations concerns a possible wintering population at Ronda Salvador: 6 on 1 November 1980; 5 on 23 February 1981; 12 on 24 February 1981; and about 30 seen on a date about a week prior to the latter date. NK AW

WILSON'S PHALAROPE (Phalaropus tricolor)

A winter-plumaged individual was located on a reedy pond near Eliza Cove. The bird was very tame and was photographed on 6 November. NK

STERNA TERNS (Sterna spp)

See note in appendix.

EARED DOVE (Zenaida auriculata)

One present on West Point in April 1981. DD

CHILEAN SWALLOW (Tachycineta leucopyga)

1, York Bay, 27 October; 1, Ronda Salvador, 5 November; and 3, Cow Bay, 13 February 1981. JP NK - latter two sightings

ROUGH-WINGED SWALLOW (Stelgidopteryx rufficollis)

Observed on 15 October 1979 at Eliza Cove. Similar in general appearance to a Bank Swallow (Riparia riparia), but lacks white throat and pectoral band. Vagrancy pattern associated with arrival of 4 Baird's Sandpipers (Calidris bairdii) in same area. JP AP

ADDITIONAL REPORTS

GIANT PETREL (Macronectes giganteus)

A specimen found by K Berntsen on Pebble Island 19 September. This had been banded as an unfledged chick on Anvers Island 7 March 1979. (Museum of Natural History, Minneapolis) SW

SHARP-SHINNED HAWK (Accipiter striatus)

An immature was seen on a number of occasions by various observers for about 3 weeks in 1981. It was first seen on or about the 15 June. On 29 June detailed notes were taken, including a field sketch, and its identification confirmed. The hawk was also seen pursuing and killing a sparrow (Passer domesticus) in the centre of Stanley. JP AP TC SB

TAWNY-THROATED DOTTEREL (Oreopholus ruficollis)

An adult was present near Cape Pembroke lighthouse on 3 and 4 September 1979. JP AP

S E A - M A M M A L S

MINKE WHALE (Balaenoptera acutorostratus)

A young male of this species was found stranded in the vicinity of Stanley. Unfortunately, it was so badly stranded, that to attempt to save it would have caused unnecessary suffering and it was therefore destroyed. The finders hope that the skeleton can be retained for the museum.
The whale was found on 28 May 1981. SW AW

CRUCIGER DOLPHIN (Lagenorhynchus cruciger)

A newly dead adult male was found on 25 January 1981 near the settlement at New Island. The skeleton is being preserved and retained. This find is of tremendous importance as it is only the third complete specimen known to science, and the sixth specimen ever. Information per SW from Natalie Goodall.

PILOT WHALE OR BLACKFISH (Globicephala melaena)

During 1980 approximately 70 were stranded on Weddell Island and 100 were seen 'playing' in the vicinity about one week later. 20 carcasses were observed nearby on 23 April. All were '6 - 7 yards long except for one which was about 1½ yards long'. SW

Steve Whitley would like to be informed of any strandings or sightings. He is especially eager to hear about the presence and absence of Commerson's and Peale's dolphins.

SPERM WHALE (Physeter catadon)

Several Sperm whales were stranded on Port King near North Arm in November. NK

An interesting report was of a sea lion killing and eating a Black-necked Swan (Cygnus melanocoryphus) at Felton stream on 15 April 1981. NK

APPENDIX ONE

IDENTIFICATION OF GIANT PETRELS

Adapted from a longer paper by Stephen Hunter who has been working on Bird Island, South Georgia.

There are two species of Giant Petrel, both of which occur on South Georgia. The Northern species, Macronectes halli, is only known to breed on Bird Island at Fleshul and Dartmouth Point, but has probably been overlooked elsewhere. The Southern species, Macronectes giganteus, occurs throughout the island.

BREEDING

There is a considerable difference in the timing of the breeding cycle of the two species.

Macronectes halli lays from about mid September. Hatching occurs during late November and early December. The chicks fly during March.

Macronectes giganteus lays in the last week of October and the first half of November. Hatching takes place in late December and early January. The chicks fly during late April and May.

IDENTIFICATION

Adults Both species have similar iris and body colours. The iris starts as a dark chocolate brown and turns progressively whiter as the bird matures. The body plumage is predominantly grey in both species, becoming paler as the bird gets older. In particular the head, neck and upper breast become almost white in older birds. Although there is some evidence that the paling process is different in the two species, one can not however safely identify the species from the plumage.

The one exception to this is the white phase of Macronectes giganteus.

The main method of differentiating between the species is on bill colour. Macronectes halli has a pinkish-horn coloured bill with a distinctive reddish-pink colouring to the hook part of the upper mandible which is noticeably darker than the rest of the bill. In Macronectes giganteus this hook is a pale green colour - being slightly paler than the rest of the bill. Dark marks can occur on the bill of both species but are commoner on Macronectes halli.

Chicks The plumage of a fully grown chick of either species is of a charcoal grey colour. This becomes more mottled and paler as the bird matures. White phase birds are that colour from birth. The bill of a chick of Macronectes halli is a yellowish-horn colour throughout. The tip starts becoming reddish in some birds before they fly. In Macronectes giganteus the bill colour is as in the adult, though slightly paler - the pale green hook is obvious.

DISTRIBUTION

Southern Giant Petrel (Macronectes giganteus) - South Shetlands, South Orkneys, South Sandwich Island, South Georgia, Falkland Islands, Bouvet Island, Heard Island and Macquarie Island.

Northern Giant Petrel (Macronectes halli) - Gough, Marion and Crozet Islands, Kerguelen Island, Chatham, Stewart, Snares, Auckland, Campbell and Macquarie Islands.

TUCK G S (1978) Seabirds of Britain and the World

In view of the records of Macronectes halli on South Georgia and the sight record for the Falklands, a close examination of our breeding birds would be of interest.

Editors

APPENDIX TWO

'STERNA' TERNS IN THE FALKLANDS

by

John Peatfield

According to Woods (1975) the Sterna terns recorded in the Falklands are the South American Tern (Sterna hirundinacea) as a breeding migrant and the Common Tern (Sterna hirundo) as an accidental, based on a specimen at Cape Pembroke on 15 September 1945. In reporting the latter record Woods suggests that the Common Tern 'may occur regularly in Falkland seas during the southern summer'.

In this paper I suggest that there may be more than two species of Sterna tern present in the Falkland seas in the summer and that the Common Tern is not the most obvious candidate for regular occurrence in the Falkland summer.

OBSERVATIONS

The South American Tern (Sterna hirundinacea) is quite a common bird in the breeding season and large groups gather where there is a concentration of food. This is quite noticeable off Cape Pembroke, where these observations were made. All observations were carried out during sea watches using 10 x 50, 10 x 40 binoculars and 20-40 x 60 telescope.

On watching these feeding groups it soon became apparent that there was more than one species of Tern present, especially as comparison was possible with the breeding plumaged South American Tern. Summarising observations there appear to be 3 'types' of Terns present and that this feature is most noticeable at the beginning and end of the summer.

Type 1

Medium sized breeding plumaged terns, with pale pearl-grey mantles and wings, long tail streamers and a relatively strong red, dark tipped bill. These terns are paler than the other terns present and appear very slightly larger and more robust. These are the breeding South American Terns (Sterna hirundinacea).

Type 2

Medium-small terns in breeding plumage. These terns have obviously darker mantles and wings than the preceding species

and following types, long tail streamers and a red bill. The body is also not as pale as the South American Terns. These terns have only been observed in September and October (1979, 1980) by myself, but have been seen regularly by other observers (pers com S Booth).

Type 3

Medium-small terns in non-breeding plumage. Their foreheads are white or mottled and tail streamers often short in a number of individuals. The mantle and wings appeared to be light pearl-grey but not as light as the South American Terns. The bill colour has not been accurately determined but on closely observed birds was dark. On 15 April 1979 a number of these birds were observed with feeding South American Terns off Cape Pembroke by Dr R Summers, the late Mrs J Summers, Mrs A Peatfield and myself. It was felt that these terns had the 'jizz' of winter plumaged 'Commic' Terns (euphemism for Common Terns - Sterna hirundo - and Arctic Terns - Sterna paradisea). Although very similar these two species can be separated by careful observation of the primaries, the Common Tern having translucent inner primaries, which are also white tipped, creating a wedge-shaped effect. This effect is intensified towards the months of September and October. (Hume R 1979,1980) One of these terns, flying close inshore, was closely scrutinised in good light and this feature could not be seen. In fact the bird had the appearance of an Arctic Tern (Sterna paradisea).

DISCUSSION

The terns in Type 1 are obviously the commonest tern in these observations, being the breeding South American Terns (Sterna hirundinacea).

The terns of Type 2 correspond in features and are identified as Antarctic Terns (Sterna vittata), almost certainly on passage to the southerly breeding grounds, the nearest being South Georgia. It is believed that they spend the winter off South Africa, southern South America and the central South Atlantic Ocean. (Watson G 1975)

It is the terns in Type 3 that present the difficulties for identification. I am confident that at least one individual was a winter plumaged Arctic Tern (Sterna paradisea), a species which I have seen a great deal of in the northern hemisphere. Besides the obvious difficulty in separating these species (Common and Arctic) without a good view in strong lighting conditions, there is also the possibility of confusion with juvenile and winter plumaged Antarctic Terns at certain times of the year. However none of the

terns in Type 3 were observed to be as dark as the Antarctic Tern, which supports their identification as a separate species. According to Watson (1975): 'All Antarctic tern populations, however, are lighter than the Kerguelen Tern and darker than the Arctic Tern'.

Indirect evidence in support of the Arctic Tern being the most likely winter plumaged tern to be seen in the austral summer comes from the literature and comments by other observers. Blake (1977) gives the distribution ofthe Common Tern as extending only as far south as Santa Cruz, Argentina, whereas indicating a more southerly wintering area for the Arctic Tern. This is reinforced in de Schauensee (1971) and Watson (1975), the latter author not mentioning Common Tern at all. The distribution maps in Tuck (1978) show the wintering range of the Common Tern as being much more northerly, closer to the tropical and temperate regions. He in fact even shows a conjectural migration route for the Arctic Tern passing in the vicinity of the Falklands. Terns seen by BAS ornithologists are generally regarded as being Arctics if in winter plumage in the austral summer (pers com S Hunter).

CONCLUSION

I suggest that the status of Sterna terns in Falkland waters is as follows:

South American Tern as per Woods (1975);
Antarctic Tern as a passage migrant;
Common Tern as per Woods (1975) an accidental visitor, probably at the extreme end of the species wintering range;
Arctic Tern as a regular (?) passage and wintering species offshore during the Falkland summer - the birds appearing inshore if and when food is available.

I hope that other observers will give any winter plumaged terns a close and careful scrutiny so as to assist in clarifying this situation.

REFERENCES

BLAKE E R	Manual of Neo-tropical Birds (Chicago 1977)
DE SCHAUENSEE R M	The Birds of South America (Oliver and Boyd 1971)
HUME R A	Mystery photographs Common Tern (British Birds 72 4 1979) (British Birds 73 4 1980)
TUCK G	Seabirds of the World (Collins 1978)
WATSON G E	Birds of the Antarctic and the sub-Antarctic (American Geophysical Union 1975)
WOODS R	The Birds of the Falklands (Nelson 1975)

PLANT CONSERVATION IN THE FALKLANDS

by

D and M C Davidson

In 1978 the IUCN (International Union for Conservation of Nature and Natural Resources) published the IUCN Plant Red Data Book. On page 447 is recorded the status and other data relating to the Felton's flower (Calandrinia feltonii), the one endemic plant of the Islands which is extinct in a wild state and only exists in a relatively few gardens within the Islands, at Kew Gardens and possibly some other botanical gardens to which Kew have sent seed. In this connection the authors would be interested to hear of all Felton's flowers growing in the Islands and perhaps elsewhere should anyone know about them.

In 1979 we sent a quantity of Falkland Island flower seeds to Kew Gardens and on 27 May 1981 we were sent a very interesting letter from the assistant curator, an extract from which is included here:

> "In April 1981 there was an International Rock Garden Conference held at Nottingham in England. For Kew I staged an exhibit of plants from the southern hemisphere that would be suitable for growing on a rock garden. Included in the exhibit were a number of plants which had been raised from your seed: Azorella filamentosa; Nassauvia gaudichaudii; Azorella (Bolax) gummifera; Acaena lucida; Acaena ovalifolia; Sisyrhinchium filifolium.
>
> "We have recently opened a new Alpine House and quite a number of plants raised from your seed are to be seen here. At the moment in flower are Armeria macloviana, Sisyrhinchium filifolium, Anagallis alternifolia, Ranunculus sericocephalus, Ranunculus biternatus. Chilotrichum diffusum, Senecio candicans, Cotula scariosa have been planted elsewhere in the Gardens and seem to be thriving. The remainder are to be seen in the peat banks outside the Alpine House.
>
> "One of the features within the Alpine House is a bench to which are attached refrigerated coils on top of which is 12" of sand. Potted plants are plunged into this and the temperature controlled at 9 - 21 °C. Under these conditions many of your plants are thriving.
>
> "Your gift of seed has been put to good use and we were particularly pleased to have it. It has produced many plants not previously grown at Kew."

We hope to be sending more seed to Kew in the future where it will provide an interesting pool of Falkland Island study material, and, as is already the case with the Felton's flower, a safety supply of plants and seed should any become endangered.

We will be interested in any plant information and will do our best to identify any material sent to us. We would particularly like information about some of the rarer endemic plants (plants only found in the Islands). Here is a list of the 14 endemics, the more uncommon ones being marked with an asterisk.

Arabis macloviana* (Falkland Rock cress)
Calandrinia feltonii* (Felton's flower)
Chevreulia lycopodioides
Erigeron incertus*
Graphalium affine
Hamadryas argentea*
Leuceria suaveolens (Vanilla daisy)
Lilaeopsis macloviana
Nassauvia gaudichaudii
Nassauvia serpens*
Nasthanthus falklandius*
Senecio littoralis
Senecio vaginatus
Sisyrinchium filifolium (Pale maiden)

REPORT ON HOOKERS POINT

by

P Gilding

In December 1980 Stanley Senior School adopted Hookers Point. This was done principally as a means of involving Falkland Island children in a land improvement project leading hopefully to a greater awareness of the importance of taking care of the land, which always will be the most valuable resource of these islands.

On adoption, the point was in a state of advanced neglect, with fencing partially removed in one place and collapsed in others, allowing livestock unlimited access. This had resulted in severe overgrazing and subsequent near destruction of the tussac grass, which in turn had led to rapidly worsening erosion. In short the point was a disgraceful mess and this in full view of tourists arriving at Stanley Airport.

Obviously our first priority was to repair the fence in order to make it stockproof and this was done, using existing fencing materials, by Mr Tony Jaffray the Education Department handyman, enthusiastically assisted by a group of fourth year boys. Having refenced the point, all remaining wire was cleared away from the site by a party of children from Stanley House. Since it has never been our intention to prevent access to the point by the public a stile was then erected.

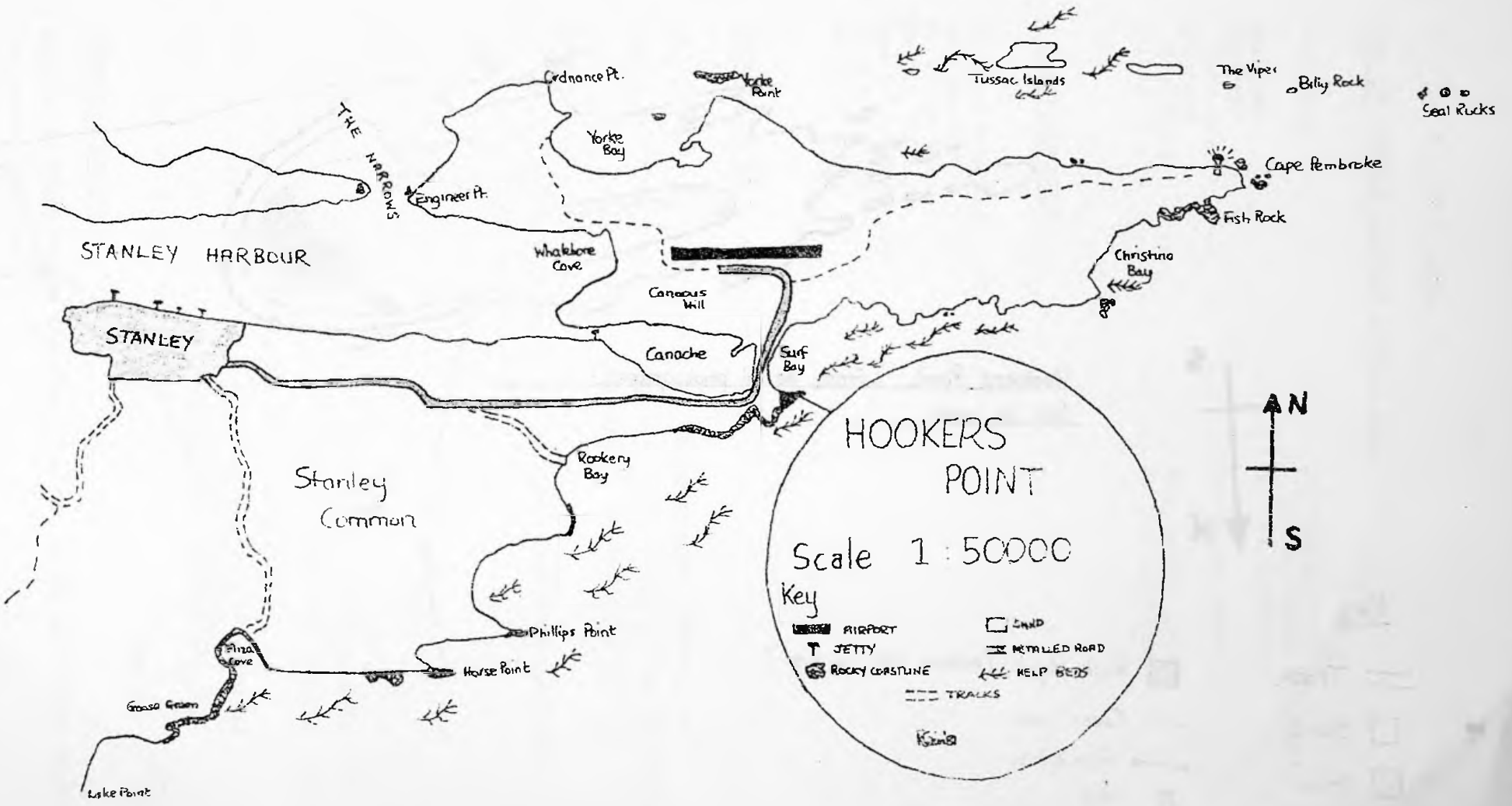
Our second priority was to try and control the erosion and work on this has now been started by Mr Stan Angel, our Rural Science teacher, and a party of pupils. A weekend has been spent transplanting sand grass on the sandy slopes in order to try and arrest the serious loss of sand and soil. It is hoped that the long roots of the sand grass when they develop will eventually stabilise these slopes.

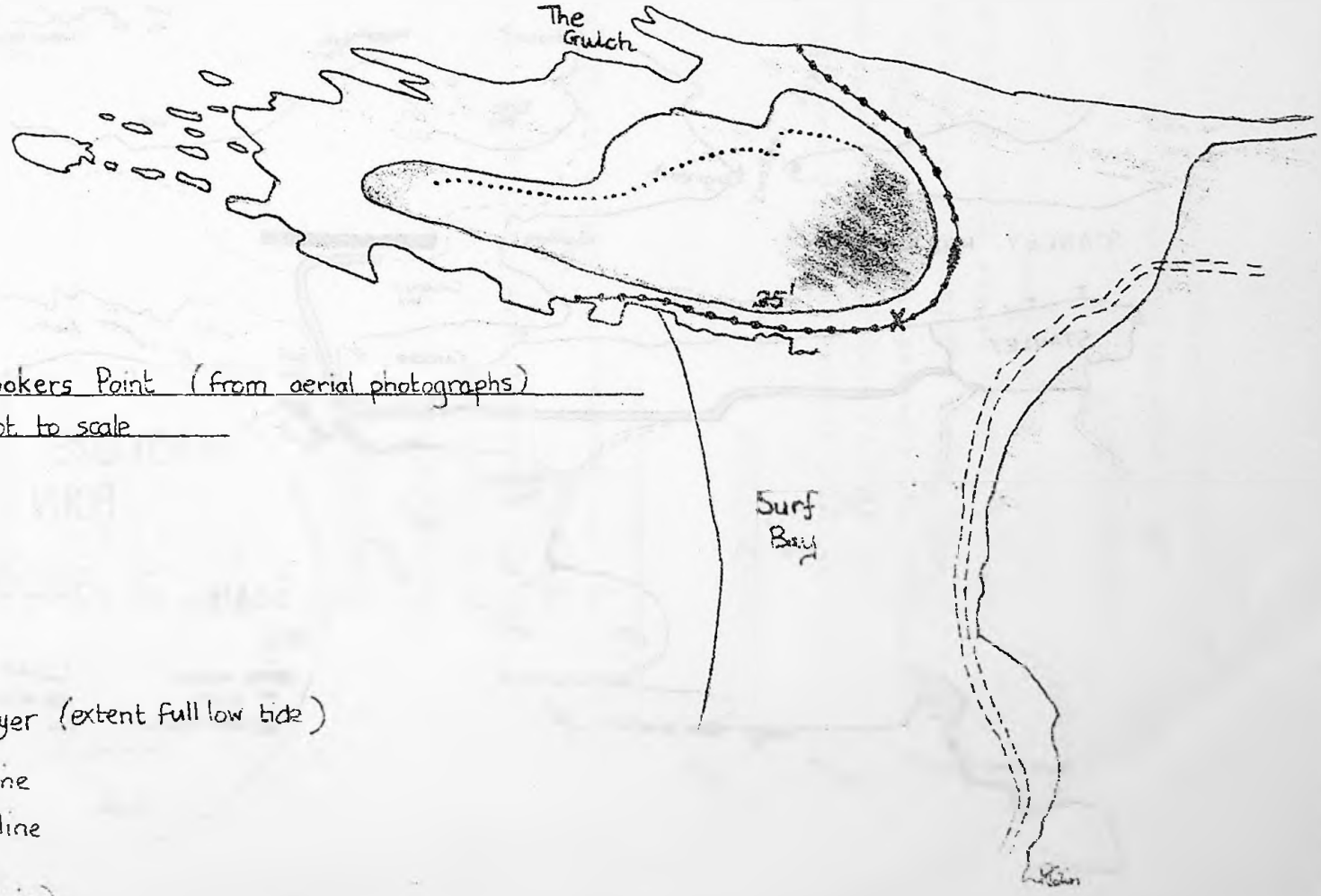
As the flora and fauna of the point re-establish themselves it is intended that the point be regularly visited by parties of pupils to observe and record the wildlife as part of their Rural Science course.

A booklet which will help children to identify the plant life is now close to completion. This has been written by Mrs Margaret Davidson with illustrations by Margaret Smith a fourth year girl. This booklet, which also includes some historical and geographical details, will be used by the pupils as they follow the nature trail which will be ultimately established. The excellent maps which accompany this report were produced by Mr Richard Cain and are also to be reproduced in this booklet.

Photographs have been taken by members of the school Photography Club illustrating the condition of the point before adoption and an exhibition of prints has been on display in the West Store.

Everything that has been done so far on this project has been achieved using our own limited resources, but it became increasingly obvious that, if the project was to continue, the fencing would need replacing in the near future. With this in mind, we applied to the Falkland Islands Foundation for financial help. All involved with this project were extremely gratified to hear that £100 had been donated by the Foundation towards the cost of the fencing. This interest from the outside world will surely help to emphasize in the minds of the children the importance of such projects for the future of the Falkland Islands.


Ordnance Pt.
Yorke Point
Tussac Islands
The Viper
Billy Rock
Seal Rocks
THE NARROWS
Yorke Bay
Engineer Pt.
Cape Pembroke
Fish Rock
STANLEY HARBOUR
Whalebone Cove
Christine Bay
Canopus Hill
STANLEY
Canache
Surf Bay
HOOKERS POINT
Scale 1 : 50000
N
S
Rookery Bay
Stanley Common
Key
AIRPORT
JETTY
ROCKY COASTLINE
SAND
METALLED ROAD
KELP BEDS
TRACKS
Phillips Point
Elma Cove
Horse Point
Goose Green
Lake Point



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Hookers Point (from aerial photographs)

Not to scale

Key

- Track
- Sand
- Grass
- Peat
- Rock layer (extent full low tide)
- Crest line
- Fence line
- Stile
- Gate (wire)

LIST OF OFFICE BEARERS 1981 - 1982

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Mr Rob McGill
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CONTRIBUTIONS

The editors welcome articles, observations, notes, etc about anything that can come under the scope of the Society. We are not fussy about the length, the subject, your spelling!
We won't guarantee to publish but all contributions will be acknowledged.

DISTRIBUTION

This first Journal is being issued free to all members and circulated to camp stations, Stanley shops and public buildings, and selected overseas societies.
Further copies and future Journals can be obtained by becoming members of the Trust or on a payment of 50p locally or 80p overseas.

ACKNOWLEDGEMENTS

We wish to thank Mrs J. Blackburn for the typing and Mrs M. Bryson for secretarial assistance.

WARRAH

Annual Report

1985

FALKLAND ISLANDS TRUST

WARRAH

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FALKLAND ISLANDS TRUST

COMPILED AND EDITED BY SHANE WOLSEY, ENDURANCE AVENUE, STANLEY

CONTENTS

EDITORS NOTE

This is the first annual report of the Falkland Islands Trust since that produced in 1981. The gap has been too long, and it is hoped that the production of the Warrah will become an annual event from now on. In future years it should be distributed earlier in the year than the August distribution that this edition is seeing.

The content of the Warrah is reliant upon its readers and contributors. A considerable number of articles are included in this report and range in form from being quite scientific to being very informal and having a considerable folklore content. This mixture is the right one for a body like the Trust.

I would like to thank all the authors of the articles and I hope that their contributions will prove both interesting and a stimulus for future study and writing. I must also thank all the contributors to the Falkland Bird Report and hope that next year there will be many more details of birds seen around the islands. Perhaps we will also be able to have a land and sea mammal report?

My thanks also go to Tony Chater for designing the cover of the report and last, but certainly not least, to Natalie McPhee for her tremendous assistance in typing and retyping this report and helping me bring the report into existance.

SHANE WOLSEY

FALKLAND ISLANDS TRUST

OFFICE BEARERS

	up to 31.3.86	from 31.3.86
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WARRAH OR ANTARCTIC WOLF

by David Day

In 1833 Charles Darwin, on his famous voyage in the Beagle, passed through the Falkland Islands off the southern tip of South America and noted the presence of the only predator on the islands, the so-called Antarctic Wolf (Dusicyon australis). While on the islands he collected three skin specimens, two of which were later presented to the London Zoological Society.

The creature was 125 to 160 cm (4-5 ft) in length and had a large wolfish head, but its legs were shorter than a true wolf's and it measured only 60 cm (2 ft) at the shoulder. Its body coat was a mixture of brown, yellow and black. Its ears were black, its belly white, and its tail was white-tipped like a fox's. Although wolf-like, it was not a wolf at all, nor was it a large fox as others believed. The Antarctic Wolf, or the Warrah as the islanders called it, was something of an enigma. Not only was this unique species the only predator on the Falkland Islands it was (apart from a small mouse) the only land beasts on the island. How this could have occurred is a mystery that will probably never be resolved. How could the Warrah have evolved on these isolated islands independent of any related species? Indeed that it was able to survive by feeding on birds' eggs and hunting birds and sea mammals is, in itself, surprising. One theory proposes that its forbears had drifted over on the ice from Patagonia; while a second suggests that the pre-glacial forests on the Falklands once harboured many species, and that only the Warrah survived.

The first description of the Warrah was recorded by Richard Simson who sailed on the Welfare in 1689-90 against the French: 'We saw foxes twice as big as in England, we caught a young one alive, which we kept on board for some months.' However, when the British ship engaged itself in a battle with the French, the Warrah decided a ship was no fit place for a beast and leapt overboard.

As Richard Simson's account was not published, Darwin did not know of it, but he had read and noted the adventures of midshipman John Byron of The Wager which was wrecked in the Straits of Magellan in 1741. Byron and the crew took refuge on the Falkland Islands. Byron said the Warrahs were as big as middle-sized mastiffs. His men were much alarmed as 'four creatures of great fierceness resembling wolves, ran up to their bellies in the water to attack the people in the boat' so that they put off to sea again. Later they were frightened again, and they seem to have over-reacted by setting fire 'to the tussock to get rid of them'. The result was: 'the country was ablaze as far as the eye could reach for several days, and we could see them running in great numbers.'

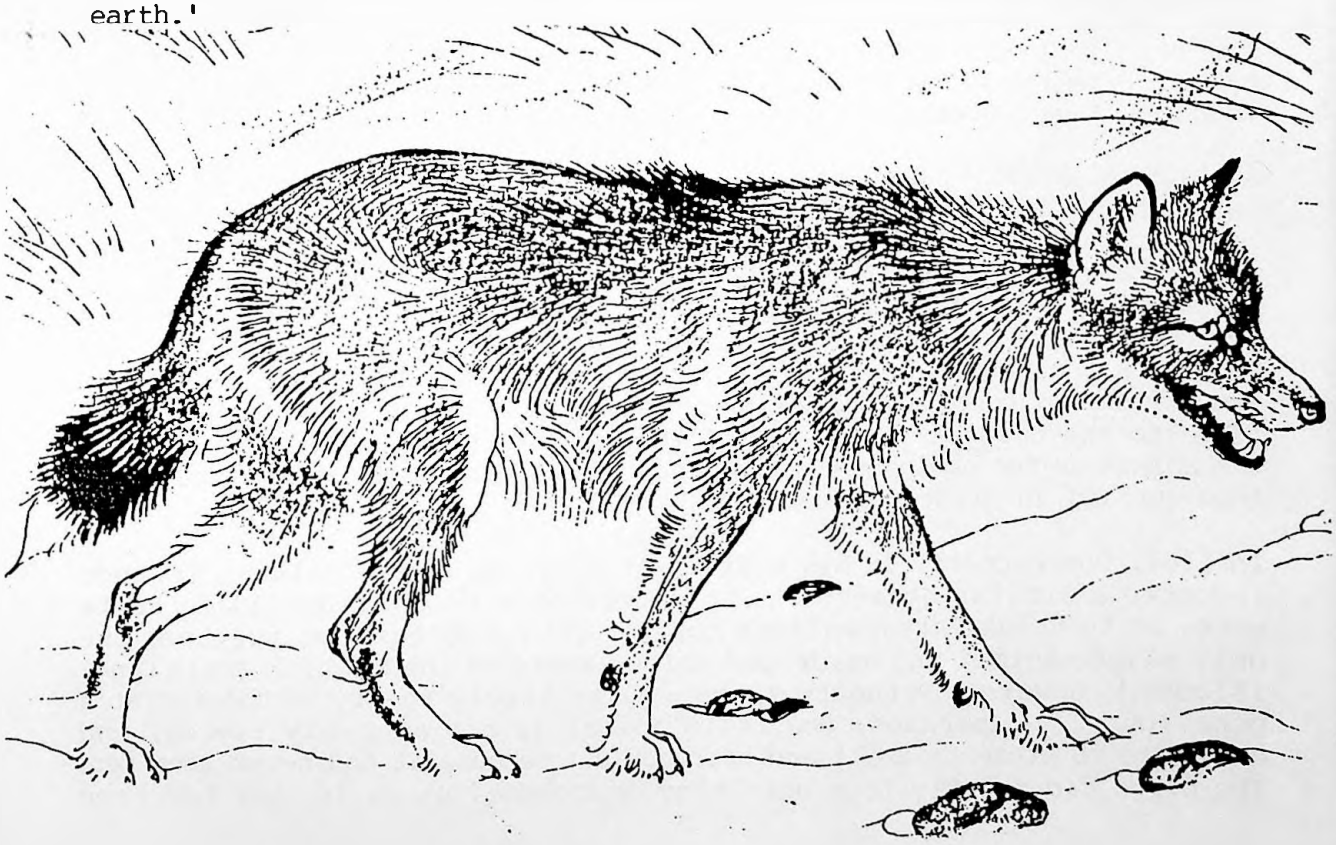
In 1764, Dom Pernetty in his History of a Voyage to the Malouin Islands reported a similar attack: '.....officers of M de Bougainville's suite were, so to speak, attacked by a sort of wild dog; this is, perhaps, the only savage animal and quadruped which exists on the Malouin (Falkland) Islands.' However, Pernetty gives a quite likely theory of the Warrah's behaviour: '.....perhaps, too, this animal is not actually fierce, and only came to present itself and approach us, because it had never seen men. The birds did not fly from us: they approached us as if they had been

tame.' This tameness, whether motivated by hunger or by curiosity, is well documented by later observers, and contributed greatly to the Warrah's extinction.

De Bougainville himself wrote a considerable account of the Warrah in his Voyage Round the World: 'The wolf-fox, so called because it digs itself an earth and because its tail is longer and more fully furnished with hair than that of a wolf, lives in the dunes of the sea-shore. It follows the game and plans its trails intelligently, always by the shortest route from one bay to another; on our first landing we quite believed that they were the paths of human inhabitants. It would appear that this animal starves for part of the year, so meagre and thin is it. It is the size of a dog, and also barks like one, but weakly.'

Darwin in his Zoology of the Voyage of the Beagle quotes these other visitors to the Falklands and then goes on to make his own laconic observations and astute prediction: 'Their habits remain nearly the same to the present day, although their numbers have been greatly decreased by the singular facility with which they are destroyed. I was assured by several of the Spanish countrymen, who are employed in hunting the cattle which they run wild on these islands, that they have repeatedly killed them by means of a knife held in one hand and a piece of meat to tempt them to approach in the other .....

'The number of these animals during the past fifty years must have been greatly reduced; already they are entirely banished from that half of East Falkland which lies east of the head of San Salvador Bay and Berkeley Sound; and it cannot, I think, be doubted, that as these islands are now being colonized, before the paper is decayed on which this animal has been figured, it will be ranked among those species which have perished from the earth.'



Soon after Darwin left the Falklands, the colonial government set a bounty on the animals. Bounty and pelt hunters moved in on the already greatly reduced Warrahs. In 1839 Colonel Hamilton-Smith in his The Dog Tribe (in The Naturalist's Library) was referring to the 'Falkland Island Aquara Dog' when he saw, in: 'the fur stores of Mr G Astor in New York, a large collection of peltry which came from the Falkland Islands, where, according to reports that gentleman had received, his hunters had nearly extirpated the species'.

Rather miraculously one specimen reached England in 1868 and was kept for several years in the London Zoo. It had been a survivor, along with three small birds, of a huge collection of animals sent on the packet Fawn, joining the mail steamer at Montevideo. The shipment included sea lions, foxes, penguins, geese, wolves, starlings and finches. Typically bad and careless shipping resulted in all these creatures perishing. The man responsible for this collection was named Lecomte. He was the same man who used to send the Zoological Society King Penguins whenever he could get them, which, in its turn, was largely the cause of the disappearance of King Penguins from the Falkland Islands. (Although a shepherd near Dunrose House was responsible for the destruction of the last rookery, which he boiled down to waterproof his roof with their oil.)

As the numbers and threat of the Warrah as a predator decreased, tales of its destructive powers seem to have increased. The old vampire superstition surfaced again, and shepherds made unlikely claims of high sheep killings. They insisted absurdly (as men had before with many other 'wolves') that the Warrah killed only to suck blood from the sheep; falling back on flesh only at times of need. The bounty was raised and hunting intensified once again.

The last known Warrah was killed at Shallow Bay, in the Hill Cove Canyon, 1876. Darwin's prediction came true faster than he foresaw: the Warrah or Antarctic Wolf was exterminated within his own lifetime.

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HOW MANY ISLANDS ARE THERE IN THE FALKLAND ISLANDS ARCHIPELAGO?

by Robin Woods

"On these islands and islets, which are said to number above three hundred....."
E Fanning, 1833

"The remaining islands, about 200 in number....."
R C Moody, 1842

"East Falkland.....West Falkland..... and about 100 small islands...."
W Dallimore, 1919

"There are about two hundred much smaller islands....."
R W Woods, 1975

".....archipelago made up of 340 islands....."
I J Strange, 1976

These quotations are a sample from 30 references to the number of islands around East and West Falkland, collected from published literature. They show yet another aspect of Falkland geography where knowledge is lacking. An examination of these 30 estimates shows that "about 200" has been the most frequently quoted total. The earliest reference found to this number is that of Moody (1842) in his long despatch to Lord Stanley, describing the Falklands and his suggested plans for selling land in order to develop farming activities.

Moody's despatches were influential, not only in causing a relocation of the seat of government to Stanley but also in his estimate of the total number of islands. An authorative publication, the Colonial Office Biennial Report for 1956/57, stated that there were "about 200 small islands"; in the 1968/69 Report it was repeated that the Falkland Islands comprise "two large islands and some 200 smaller islands." This statement is somewhat surprising, considering that it was made ten years after the first comprehensive survey and mapping of the Falklands had been completed.

In 1956, Hunting Aerosurveys were contracted by the Directorate of Overseas Surveys to provide complete aerial photographic cover of the Falkland Islands for the purpose of producing the first accurate maps. Ground work was completed by 1959 and maps on a scale of 1:50,000 were published in 1961 and 1962, with 29 sheets covering the whole archipelago.

My interest in the Falkland Islands started in the same year as the aerial survey. In 1961 and 1962 I was one of the Stanley residents who bought copies of several map sheets and, like Moody in 1842, was impressed to see that the Falkland Islands were ".....so singularly irregular in.....coastline, and so full of harbours and creeks.....". In common with many other writers however, I perpetuated the myth that the Falkland Islands consist of two large islands and "about 200 much smaller islands".

In 1984, the Falkland Islands Foundation was becoming more interested in protecting smaller offshore islands that retained mature, ungrazed tussac grass, Poa flabellata. At the same time, 'Operation Raleigh' were expressing interest in surveying some small islands in the Falklands for the Falkland Islands Trust (Stanley) and the F I Foundation.

I began to exmaine the 1:50,000 maps and to compile lists of the named and unnamed islands marked on each map. After working on a few sheets it became apparent that the total number of offshore islands was going to be considerably more than 200. The remaining 1:50,000 sheets were obtained from the Ordnance Survey and by October 1985 the analysis was complete. Included on the lists were all those islands where a high water mark was indicated; all rocks shown as covered by high tides were excluded. The final total of islands lying apart from East and West Falkland was 778. Table 1 shows the total number and proportion of islands in each size class. Apart from 32 islands in freshwater lakes or ponds, there are 746 offshore islands. Of the 778 islands, 403 are named on the maps, 3 have local names known to me and 372 islands are not named.

Part of the analysis was an estimate of the flat area of each island. This was measured using a transparent grid overlay marked in 10 hectare squares, each subdivided by diagonals.

Table 1 - Analysis of islands lying apart from East and West Falkland

Area Classes			
Hectares	Acres	Number	%
<1	<2.5	276	35
1-5	2.5-12	232	30
5-20	12-50	100	13
20-70	50-170	75	10
70-250	170-620	55	7
>250	>620	40	5
TOTALS		778	100

The Table shows that 276 (35%) of the islands are less than 1 hectare (2.5 acres) in area; another 232 (30%) cover between 1 and 5 hectares (2.5-12 acres). These islands may appear too small and insignificant to be economically useful for farming. However, an island of only 5 hectares can have 1000 metres (1100 yards) of coast which may include boulder beaches with dead kelp accumulations. If mature, ungrazed tussac grass is also present and the island is free of rats, mice or cats, it is likely that bird populations will be high. This is only speculation, based on published information and my own field work in 1983. I am confident, nevertheless, that significant breeding populations of birds, particularly burrowing petrels, are waiting to be discovered on several uninhabited offshore islands.

Major reasons for the lack of knowledge about these many islands are difficulties in landing by small boat and the unpredictability of the weather. Another important factor is the low human population, which has never exceeded 2,500 permanent residents in a land of 4,700 square miles. Although the difficulties outlined above still remain, there is some hope now that we shall gradually uncover the secrets of these 780 islands, through several recent developments.

My analysis has shown the size of the task in numbers of islands to be investigated. The subdivision of large farms has led to the establishment of additional smaller settlements, which means that there are more embryonic centres of human population. Newly established independent farmers have new ideas, including the use of small islands offshore. The Falkland Islands Government has become aware of the demand for grazing on such islands and has communicated its wish to know more about previously ungrazed islands to the Falkland Islands Trust in Stanley and the Falkland Islands Foundation. Discussions are now taking place into the feasibility of a comprehensive study of small islands, so that decisions can be taken on the conservation of the natural vegetation, particularly tussac grass, and the protection of habitats essential for the native birds and seals.

Through this generally increased interest in conservation of the Falkland habitats, some information on the smaller islands is already being collected. The F I Foundation has supported a Tussac Islands Survey by printing a report form, along the lines of the current Breeding Birds Survey form. The F I Trust is co-ordinating publicity for this survey, which will depend on interested people making observations on the presence and state of tussac, the presence or absence of introduced mammals and the extent of grazing.

1986/87 will see the full-scale introduction of this survey. In the meantime, data is being collected by Shane Wolsey, a recently arrived amateur ornithologist who works for the Falkland Islands Development Corporation. He is making use of his journeys by air to various settlements, to record as much as possible about the presence of tussac and grazing animals as he flies over the islands. This individual initiative is entirely in keeping with the pioneering spirit that developed the Falklands last century. Enthusiasm of this kind will encourage others to participate and will, eventually, establish basic knowledge on the 780 islands that we now know are included in the Falkland archipelago.

ICE AGE FALKLANDS

by David Roberts

It is widely recognised that the last 'Ice Age' (the Pleistocene geological era) lasted for about 2 million years, ending at some time around 10,000 years ago. It would be incorrect to assume that this was a single uninterrupted period of global cold conditions, however, for evidence from many parts of the world suggests that the climate fluctuated a great deal during the Pleistocene. Colder 'glacial' periods of perhaps 60,000 to 80,000 years duration were punctuated by milder 'interglacials', probably lasting for about 10,000 years, when conditions were as warm as, or even warmer than, those of the present time.

There are no glaciers in the Falkland Islands today - in fact even on the highest mountains patches of snow and ice rarely survive much beyond midsummer; there is, however, abundant evidence to indicate that the islands were indeed glaciated during Pleistocene times. This evidence takes two forms. Firstly there are erosional landforms such as 'cirques', which are deep, semi-circular rock basins cut by glaciers on the higher hillslopes. Secondly there are depositional features such as 'moraines' (bouldery ridges) and 'till' deposits (a distinctive mixture of clay, sand and boulders), both of which are derived from material carried away by the moving ice and dumped at its sides and base. When these abandoned features have been identified and accurately mapped, it is possible to estimate the dimensions of the glaciers which created them, and to draw inferences about the climate of the Falklands when those glaciers last existed.

Analysis of the Falklands evidence indicates that glaciers became established in the highest areas on at least two separate occasions. The most recent glaciation took place at some time between 26,000 and 10,000 years ago, when about seventy snowpatches and glaciers developed in the hills around Mt Adam, Mt Maria and Mt Usborne. These were not large snow and ice bodies, however - the longest glacier stretched only about 500 metres downvalley - and conditions for glaciation seem to have been very marginal. This may be explained by the fact that the climate of the Falklands was even drier than it is today, so that although conditions were obviously cold enough, there was simply insufficient snow to nourish large glaciers. Snow accumulation depended on intense snowdrifting by the strong westerly winds across bare plateau surfaces, and thus occurred preferentially on east-facing slopes beneath the plateau-edges. Perhaps surprisingly, the mean annual temperature in the islands may have been only 3 degrees centigrade cooler than at present.

Beyond the limits of the glaciers, the cold climate destroyed most of the vegetation, and any exposed rock outcrops were shattered and broken by frost action to produce abundant volumes of boulders. When incorporated into the soil material on hillslopes this bouldery debris was carried slowly away by solifluction, a process whereby the soil, periodically saturated with water, becomes mobile and flows imperceptibly downhill. Although the rate of solifluction may have been less than 10 cm per year, over several thousand years a great rock debris was carried away and concentrated on the valley floors to form huge blockfields, or 'stoneruns'. These features are no longer actively forming, but they are without doubt one of the most spectacular elements of the Falklands landscape. Indeed,

where?

one blockfield, 'Princes Street', below Mt Vernet, is probably the biggest of its kind in the world, and has been described in extravagant terms by visitors from Charles Darwin onwards.

At least one period of glaciation preceded this most recent phase, occurring more than 26,000 years ago. Conditions then were more favourable for glacier development, and valley glaciers up to 3 km long swept down Trap Valley in the Mt Adam range, and Double Stream Basin near Port Howard: numerous smaller glaciers also occurred around Mt Adam, Mt Maria and Mt Usborne. Less is known about climatic conditions at this time, but westerly winds were still prevalent and mean annual temperatures were possibly as low as 2 degrees Centigrade. Solifluction was again very active outside the limits of the glaciers.

As the great world ice sheets expanded during the glacial periods, water was effectively drawn from the oceans and 'locked-up' on land as snow and ice. This had the effect of lowering world sea level by up to 150 metres (about 500 feet), and thus profoundly influencing the geography of the Falkland Islands. All the islands of the archipelago, including the Jasons and Beauchene, would have joined to form a single landmass as the sea fell, and it is likely that parts of the Burdwood Bank, shallows to the south of the Falklands were also exposed. The ocean distance between the Falklands and Patagonia may have shrunk in places to only 40 miles, having a profound effect on the islands' climate, and probably also on their vegetation, since any plants (and, indeed, animals!) which could have survived the cold conditions would much more readily have migrated across the ocean passage from South America. During interglacials, as the ice sheets melted and water was transferred back to the oceans, sea level returned to roughly its present position.

A great deal has been learned over the past 15 years or so about conditions in the Falkland Islands during the Ice Age. The picture emerging is one of a unique glacial environment, with a very complex climatic interplay resulting from sea level changes and the strong influence of the Andean mountains on snowfall and rainfall. There is also an interesting contrast with conditions in South Georgia and other sub-Antarctic islands. A vast amount of detail on Pleistocene conditions in the Falklands still has to come to light, however, before this important gap in our knowledge of Ice Age environments is satisfactorily filled.

(The author gratefully acknowledges financial support from NERC during his research).

FAVOURITE WILD FLOWERS OF THE FALKLAND ISLANDS

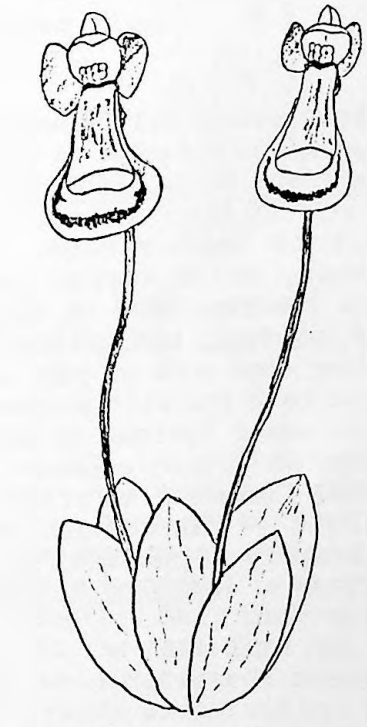
by T H Davies

Many casual visitors to the Falkland Islands tend to find the wild plant life monotonous and uninteresting. This applies especially to those not lucky enough to be here between October and January. A very famous early visitor to the Islands in 1845, no less a person than Charles Darwin, wrote:

"An undulating land, with a desolate and wretched aspect, is everywhere covered by a peaty soil and wiry glass, of one monstrous brown colour".

It is true that the Falkland Islands has fewer different types of plants per square mile than many other countries. Yet, if one happens to be in the right place at the right time, there are a dozen or so plants to be seen that can hold their own for beauty and character with any to be found in the world.

My own absolute favourite is the **LADY'S SLIPPER (Calceolaria forthergillii).** Colleagues in the Agricultural Reasearch Centre know that I will walk miles to check on the odd colonies of this delightful little plant I know of around the Falklands. From small rosettes of characteristically pale green, crinkled, hairy leaves arise thin, wiry, 4 inch stalks each holding a pouched, predominantly yellow, flower of a size which seems out of proportion to the rest of the plant. There is an astonishing bar of pure white across the pouch and a variable amount of red striping in the "throat" and across the "lip". Connoisseurs hold the plants with most red colour in greatest esteem.



LADY'S SLIPPER
(Calceolatia fothergillii)

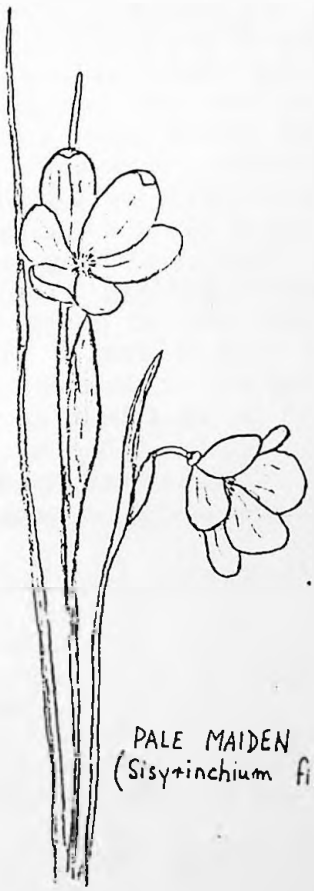
In my experience Lady's Slipper is always found in colonies of 20 plants or so on steep, dry, clay or shale cliffs on the edge of creeks or even open coast. In this habitat I have found it from the south of East Falkland to the north of West Falkland - but the colonies are few and far between.

By contrast, another favourite, **SCURVY GRASS (Oxalis enneaphylla)** is to be found in all sorts of habitats all over the Islands. The first thing to say about it is, of course, that it is not a grass! For some unknown reason all the plants eaten by sailors in the olden days to ward off the dreaded scurvy were called "grass" though few of them were true grasses. People still chew a handful of Scurvy Glass leaves on a hot day as the acid taste is quenching. It is not only the leaves that are eaten. I am told that the flowers taste even better! The flowers are also said to make excellent wine but regretfully I have not had the opportunity of sampling

SCURVY GRASS
(Oxalis enneaphylla)

any. The silvery grey leaflets radiate from the tips of the leaf-stalks and nestling amongst the foliage or carried above it are the large, solitary pearly-white or pink flushed funnel-shaped flowers. In form Scurvy Grass can vary from tiny clusters of leaves and flowers literally at ground level on shallow, dry soils to long, lax plants growing up through whitegrass or diddle dee. Perhaps it is at its most spectacular on high shady banks. In this habitat it was once described by the famous botanist Hooker as growing "in abundance on the banks overhanging the sea at Berkeley Sound, as to cover them with a mantle of snowy white during the spring month of November."

Another beautiful flower seen to best advantage in November is the **PALE MAIDEN (Sisyrinchium filifolium)**. The leaves are stiffly erect and rush-like, usually about 10 inches high. The 2 to 8 flowers, which emerge from a little below the tip, open in succession first into pendant bells then later into flatter open cups of pure white, yellow at the base and with purple veins. One writer waxed lyrical in describing Pale Maiden as "A most ethereal beauty with pendant flowers like translucent fairy goblets - diaphanous white, most delicately veined with pale purplish-red".



PALE MAIDEN
(Sisyrinchium filifolium)

DUSTY MILLER (Primula magellanica) has delighted and intrigued me ever since I first set foot in the Falkland Islands in 1969. I had long had an interest in the Primula (Primrose) family and grew many of them in my garden in North East England. A particular favourite was one known as Bird's Eye Primrose (Primula farinosa). This little plant has a very restricted distribution in UK being a relic of the pre-Ice Age flora. As

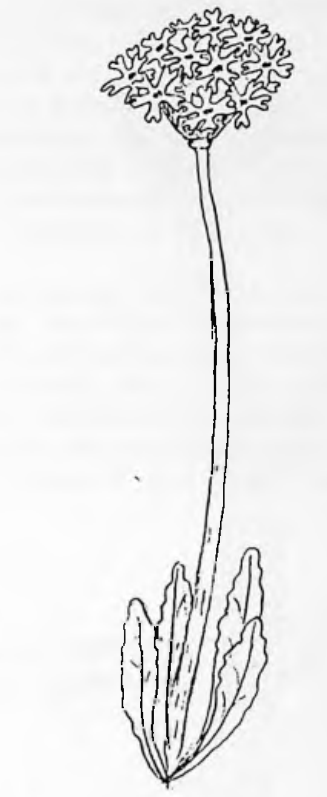
luck would have it one of the remaining habitats of Bird's Eye Primrose is the Upper Teesdale valley near my home.

I was fascinated in learn that at one time Dusty Miller was also called Primula farinosa so I was keen to see how it compared with the English species. Straight away one is conscious of a great difference in that Dusty Miller flowers are almost pure white whereas Bird's Eye Primrose is a distinct reddish pink colour.

This apart they are very similar and it is easy to see why they were once looked upon as varieties or sub-species of the same plant.

The name Dusty Miller is derived from the fact that the undersides of the leaves and the flower stalks are heavily covered with flour-like meal.

It grows as a loose rosette of spoon shaped leaves with toothed edges. The flower stalk is about 6 inches tall and carried well above the leaves. The white primrose type flowers each with a yellow eye form a dense, spherical head - in appearance and size not unlike a golf ball! It is common locally in the Islands generally preferring sandy soils in dwarf shrub heath or short turf.



DUSTY MILLER
(Primula magellanica)

The favourite wild flowers described so far have all been quite dwarf, compact plants which perhaps is not surprising bearing in mind the windswept climate of the Falkland Islands and the absence of shelter. By contrast, the next, the **STONERUN FLOWER (Nassauvia serpens)** is enormous with long, straggly stems of 6 foot or more in length! Only the top foot or two of these stems is seen however because, as the name implies, the plant only grows in stoneruns. These, to the unininitiated, resemble rivers of stone from 3/4 yards to hundreds of yards wide running down mountain sides and across the lower slopes of hills. The huge boulders, often weighing tons each, which make up the stonerun are jumbled together at random to a depth of 8 to 10 feet or more. The roots and woody based stems of Stonerun Flower are down amongst the firmer rubble and peaty soil at the bottom of the stonerun. The stems which are tightly clothed in overlapping scale-like leaves snake their way up through the blocks of stone to form bushes of erect shoots often a yard or more across and 18 inches high. From this allusion to scale-like leaves and snake-like creeping through the stonerun it is easy to see how it got its scientific name of serpens!

This habit and vegetative growth are remarkable enough but to crown it all strange club-shaped heads of flowers are produced in January on the ends of the shoots. They are composed of hundreds of small white flowers densely grouped into globular heads. Each flower has purple stamens so that the

STONERUN FLOWER
(Nassauvia serpens)

infloresence has a pale lavender appearance. It is strongly scented.

A wonderful example of the diversity that exists between closely related plants is to be found in the other species of Nassauvia found in the Falkland Islands. This plant does not seem to have a common or local name so it has to be called Nassauvia gaudichaudii. In complete contrast to the stonerun flower this plant forms a tight cushion of shoots and leaves normally only about a foot across and 3 or 4 inches high. Sometimes it may form a carpet up to 3 feet across.

Part of the reason for the very different growth form of this other Nassauvia is that instead of living in the deep shelter of a stonerun it occurs in bleak rocky or sandy places often amongst sparse, struggling plants of diddle dee. The best specimens I have seen were on the sunny, north-facing, slope of Carcass Island above the King Shag rookery. Around Christmas time the rich green cushions become smothered in tiny creamy white flowers each with brown stamens in the centre. Like its giant relative it is heavily scented.

The high ground on Carcass Island is also one of the habitats of another favourite wild flower, again unfortunately without a common name. It is the brilliantly yellow flowered Senecio littoralis. Although the best compact forms I have seen were on Carcass it is a fairly common plant all over the Falklands though generally amongst rocks or in rock crevices in warm sunny positions. But I have grown it successfully in ordinary garden soil in Stanley as the seeds with their fluffy pappus germinate readily.

The leaves of this little plant, which forms a small bush about 6 to 10 inches high, are an attractive grey colour due to woolly hairs principally on the lower surfaces. The short stems on the tips of the shoots which carry the flowers are also densely woolly. A fine display is made from November to January by the bright yellow, daisy like flowers.

There are two other species of Senecio, apart from the ubiquitous groundsel. Senecio vaginatus is similar in many ways to S. littoralis but the other Sea Cabbage or Sand Cabbage, Senecio candicans, I must include in this description of my favourite Falkland Islands wild flowers.

It is a spectacular plant found growing on sandy seashores just above high water mark. It is spectacular partly because it is big, partly because it is a beautiful grey colour and partly because it is usually the only plant growing in this particular habitat. Sea Cabbage plants are perennial, growing from a stout rootstock and form large clumps often a yard across

and nearly as tall. The leaves, which with their leaf stalks are often 18 to 20 inches long, are dark green and sparsely woolly on the upper surfaces but white below. At any time some of the green parts and some of the white parts are visible giving the overall impression of a grey/green plant. The individual flowers of the Sea Cabbage are not impressive as they consist of yellow disc florets only in a green tube formed by the bracts. But, as they occur in fairly compact heads of a dozen or more mixed in with small grey leaves whose colour they enhance, the overall effect is striking.

There are many more attractive and interesting Falkland Islands plants. Some have handsome flowers like the Vanilla Daisy, Falkland Lavender and Almond Flower, others have attractive berries such as Diddle Dee, Mountain Berry, Native Strawberry and Tea Berry, yet others have interesting vegetative forms like Balsam Bog and Tall Fern. There are even a few shrubs such as Native Boxwood, Fachine and the rare Shrubby Seablite - I wont't even start on the grasses! But as "wild flowers" the ones I have described are my firm favourites.

(Illustrations by the author)

A BRIEF GLIMPSE AT LAFONIA

by Joan Spruce

In 1849 Brenton Loch and the Darwin Settlement area became a hive of activity. Charles Darwin had spent a night in the vicinity looking at the large herds of cattle in 1833 when it was called Rincon del Toro (park of the bulls). Samuel Fisher Lafone agreed when purchasing the land to supply the Falkland Government with tame cattle and beef from the herds there. After he purchased the land south of the Darwin Isthmus it became known as Lafonia.

Lafone's manager, Richard Williams, and one hundred and sixteen other people, mostly Uruguayan Gauchos arrived at Hope Place at the mouth of Brenton Loch in 1849 to establish a Saladero (Salting House for cattle hides) and Main Corral. The buildings erected were made of stone (as were the corrals in the vicinity) which was transported across the narrow stretch of water from Cantera (Quarry).

To ensure the cattle stayed south of the narrow neck of land dividing Brenton Loch and Darwin Harbour, a turf wall was built across the land from beach to beach. This Boca (Mouth) Wall is now covered with thick bright yellow gorse in summer.

Five hundred sheep were also landed in this same year with mention in 1852 of the Boca House where there were also mules and fowls. The remains of this stone house are still visible as are three or four graves which are believed to be of a family who died in the Boca House of dysentry.

Here is a glimpse of cattle and Gauchos from the pen of F E Cobb in August 1870:

"The pasturelands on which the herds or Rodeos are, extends inside Lafonia from about three miles from Darwin Harbour over the land marked on the chart as enclosed by Bodie Creek. The men going round the boundaries every day to turn back the cattle which are moving beyond them and the latter, become accustomed in time to their legitimate grounds, running back to them when the herdsmen come round. A rodeo ground is a place where the herds are periodically collected and one of these grounds is at Viscerio a stream not far from Darwin over at the Brenton Loch side. The cattle by constant herding and being brought very frequently to the Rodeo when first handled, know perfectly well when there are two men coming towards them and they hear them shouting that they have to go to the rodeo ground, and it is only necessary of getting a rodeo together now to go to the ground and round the points or rincons driving the animals with a cry of something like that of a London milkman and they run direct for the ground. Indeed so well trained are the cattle that if a number belonging to a different rodeo are feeding together it is sufficient to shout at them to put them in the different directions according to the grounds they belong to. At the times the Gauchos are not killing and castrating cattle they are posted at Tranquilidad (Peacefulness) or Dos Lomas (Two Hills) to assist the herdsmen or to do any work that may be necessary."

The rough translations from the Uruguayan Spanish names are mine. Below I have included some dates relative to the Darwin area which are taken directly from the original records within the FIC.

1857 The "Manse", a small house for the parson, built at Darwin.

1864 Rudd, the Camp manager, stabbed and killed by Gaucho Gill, who was later hanged in Stanley.

1868 At the Boca the woolshed, 17 bales of wool and various buildings destroyed by fire.

New woolshed built at Darwin. The woolpress was an old cider press.

1869 Bertrand built a new dip at Darwin on the New Zealand lines. The previous manager poured tobacco water and penguin oil over the sheep from a watering can in an effort to eradicate Scab.

1874 Stone Corral at Darwin built.

1890 Stone causeway at Darwin built.
A new manager's house built incorporating the "Manse".

1894 Stone Galpon built near the corral at Darwin.

WHY ARE THERE SO FEW SPECIES?

by Andrew F G Douse

Visitors to the Falkland Islands often remark on the paucity of plant and animal species that they encounter, especially when travelling across the interior of East or West Falkland, where the vegetation is dominated by either whitegrass or diddle-dee for mile upon mile. The numbers and varieties of birds inhabiting this country are low, especially in comparison to the much richer fauna and flora of Britain, an island as far north of the equator as the Falkland Islands are south. A comparison of the breeding bird fauna bears this out: Great Britain has well over 200 breeding species whereas the Falklands can only support 63. Even a comparison with nearby Tierra del Fuego, an island further south with a worse climate shows that the Falklands have about 45 fewer breeding species. This impoverishment is not restricted to birds, but occurs in all plant and animal groups. This situation is sometimes attributed to the effect of mankind, and it is certain that several species have disappeared in the last few hundred years as a direct or indirect effect of man, but in general islands throughout the world have impoverished faunas and floras, especially when compared with the nearest mainland.

In fact when the effect of latitude is taken into account (the range of species generally increases the closer you travel to the equator), there are two main factors that are important in determining the number of species that any particular island holds: size of the island and distance from the nearest mainland. The number of species declines the further the island is from the mainland and as the size of the island decreases. Knowing the latitude, size and distance of any island from the nearest mainland leads to quite accurate predictions of the number of species in any particular group of animals or plants.

The fauna and flora of the Falkland Islands are derived almost entirely from southern South America, though the islands are separated by about 300 miles of the South Atlantic from the mainland. Animals and plants 'attempting' to colonise the islands are thus faced with a formidable barrier to cross, despite the prevailing westerly winds. During the last ice-age there was no land barrier between South America and the Falklands despite the lower sea level. Consequently any would be coloniser (plant or animal) had to fly, be blown by the wind, swim or float across the water. Plants with light seeds can be blown across water, seed or fruit eating birds may carry viable seed. However some groups do not 'make it', in the case of the Falkland Islands tree seeds failed to cross, leaving the vegetation in a 'primitive' post-glacial situation. The climate of Tierra del Fuego is far worse than the Falklands yet trees grow in abundance there, so neither climatic or soil condition can explain the absence of trees from the flora.

Once species have colonised an island their separation from mainland populations of the same species often mean that they can evolve in isolation from these populations. If the isolation is long enough new species will arise, which are unique to that island. The Falkland Islands is no different from many other islands in that it has a large number of endemic species and sub-species. This process is taken to extremes on islands like the Galapagos and Hawaiian groups, where the majority of the plants and animals are found nowhere else.

In the Falkland Islands the flightless steamer duck is indigenous, and many of the land birds are distinct sub-species (such as the upland goose and Falkland thrush). In groups that are less able to disperse (such as insects) the proportion of endemics is higher than that found in birds. At present about 70% of all insects are endemic to the Falklands, but this may be partly due to under collecting in Patagonia. There are about 163 species of flowering plants of which 15 are thought to be endemic, including the well known Felton's flower. Spiders are another group with a high porportion of endemics. Recently two new species to science were discovered on Beauchene Island, a small tussac covered island to the south of East Falkland. Paradoxically, it is often species with the best dispersal capabilities that colonise islands yet, once established, species often lose their powers of dispersal, and in the instance of birds become flightless (eg the Falkland flightless steamer duck). Many species of insect have also lost their wings or reduced their size, none of the endemic species of beetle are winged (eg Malvinus compressiventris), and some of endemic species of fly have greatly reduced wings (eg Scatella spp., the flies seen on sand beaches and rotting kelp).

Some animal and plant groups have never reached the Falklands; the example of trees has already been mentioned. Land mammals are also 'missing' from the fauna, presumably because of the lack of a land bridge between the South American continent and the islands. The lack of land mammals (in particular predators), makes the Falklands a superb place for seabirds that are very vulnerable to ground predators. The introduction of predators often has disastrous consequences for the fauna, and in the Falklands the best habitats for sea and land birds are the islands without cats and/or rats. The case of the warrah or Falkland fox is interesting in that it was long considered to be an endemic mammal. However this is now thought unlikely, and it was probably a relatively recent introduction, probably descended from the dogs kept by the indigenous indians of Patagonia or Tierra del Fuego. Perhaps some poor indian and dog got washed across the open ocean to end up on Falkland shores. Tales from earlier travellers suggest that it was unusually tame for a supposedly wild animal.

Another characteristic of island animals is that they are often bigger than their mainland counterparts. The upland goose is bigger than the sub-species on the mainland, and at least six of the nine species of perching birds are bigger than those on the mainland (eg the Falkland thrush and the black-throated finch). Why this is so is not entirely clear, if indeed it is adaptive at all. Some people relate it to the cooler nature of the climate on the islands: bigger animals lose heat less quickly than smaller animals.

Islands are fascinating places for naturalists and scientists, and the Falkland Islands are no exception. In comparison to many other oceanic islands (such as St Helena) the vegetation and fauna are relatively unchanged, since the history of colonisation is relatively recent. Changes have occurred, in particular the loss of much of the original tussac cover round the periphery of the islands, but hopefully future generations will preserve and maintain the unique flora and fauna of these very beautiful islands.

Sources of reference:

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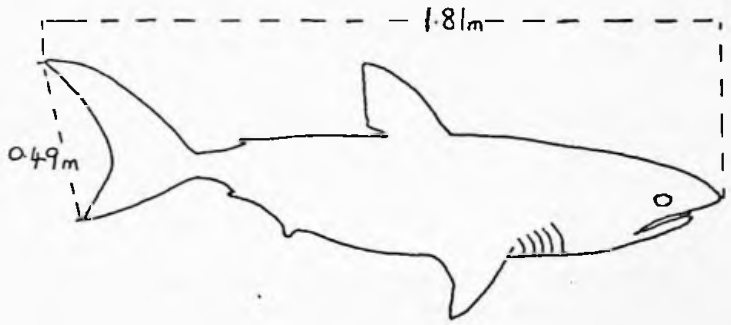
SHARK REPORT
by Robin Woods



SHARK probably **Isuridae** species (Mackerel Sharks) found at West Point Island 6 October 1983.

Specimen found at low water mark in West Point Island harbour, alongside the jetty. It had possibly been dead some days because one side had been attacked by gulls or other scavengers. Overall length 1.81 m; colour light grey above and below jaw and extending to below gills, also extending to lower sides of ribs. Remainder creamy white. Reference: Fishes of the World - J S Nelson 1976, John Wiley.

FALKLAND BIRD REPORT

The following is a list of unauthenticated reports which have been submitted to the Editor. Reports have been credited with the observers initials in brackets where this information is known. A list of contributing observers is at the end of the report.

It will be seen from many of the species' entries that very little has been reported and much more information is still to be recorded. All records of all species would be very welcome to be included in future issues of Warrah.

At the time of going to press many very interesting records for 1986 have already been received. These have not been included in this, the 1985, Annual Report. They will however be included in the 1986 Annual Report which will be published early next year.

CORRECTIONS TO **Warrah 1:**

1. **COSCOROBA SWAN Coscoroba coscoroba**
   The 14 birds sighted in the NW Point area of Carcass Island on 15 February 1981 were incorrectly identified as Coscoroba Swans. Photographs taken by Cindy Buxton and seen by Robin Woods in 1982 showed them to be Feral Domestic Geese.

2. **SHARP-SHINNED HAWK Accipiter striatus** on **Warrah 1:12**
   Date should read 29 May 1981 NOT 29 June (per J Peatfield 8 April 1986).

KING PENGUIN Aptenodytes patagonicus
The colony at Volunteer continues to thrive and indications are that the colony is slowly increasing. In 1983 about 71 downy young were counted; in 1984 about 78 were counted (June). In addition this species seems to be spreading, with one or two pairs turning up in what appear to be new breeding sites, often associated with gentoo penguins. Two birds 5 miles off Volunteer Point 29 November 1982 (WFC).

GENTOO PENGUIN Pygoscelis papua
The mobility of this species has been very apparent with colonies around Stanley changing size and location frequently. In 1982 the Lagoon colony near Bluff Cove contained about 700-800 pairs (AFGD). Well distributed at sea as far out as the shelf break. Nine rookeries in the Port Albemarle/Albemarle Sealing Station area - 5 rookeries along the eastern side of West Falkland. Colony near Sparrow Cove contained about 650 pairs in November 1983 (WFC).

CHINSTRAP PENGUIN Pygoscelis antarctica
13 January 1984: 1 at Elephant Bay sand beach, Pebble Island (SW). September 1983: 1 at Whalebone Cove, near Stanley.

ROCKHOPPER PENGUIN Eudyptes crestatus
A decline in numbers had been noticed on Kidney Island from a count made in 1983 compared to the early 1960's (AFGD).

MACARONI PENGUIN Eudyptes chrysolophus
A colony of about 20 pairs exists at Seal Bay (East Falkland). Otherwise small numbers associating with Rockhoppers. Hybrid pairs have been recorded.

MAGELLANIC PENGUIN Spheniscus magellanicus
No counts available but subjective evidence suggests a decline in numbers of this species. Nevertheless a widespread species.

WHITE TUFFED GREBE Podiceps rolland rolland
Widespread though not common breeding resident.

SILVERY GREBE Podiceps occipitalis
Breeds throughout the Falklands but is uncommon. Six pairs with young seen on Green Pond, Pebble Island in January 1982 (AFGD).

GREAT GREBE Podiceps major
One at Goose Green in 1979 (?). 24 October 1981: 1 seen well and present for 3 days near Horse Point, Stanley. 11 February 1983: 2 close to shore at Goose Green settlement (PL).

WANDERING ALBATROSS Diomedea exulans
Uncommon close to the shore except during easterly winds, more numerous along the shelf break - few juvenile birds reported.

ROYAL ALBATROSS Diomedea epomorphora
The common "great" albatross, particularly inshore between Cape Carysfort and Cape Dolphin and to the southern end of the Falkland Sound. Individuals seem to be of the Northern race. One ringed individual was found on Great Island (April 1985), which originated from Campbell Island.

BLACK-BROWED ALBATROSS Diomedea melanophris
Very common breeder and offshore all year round. Population may be 500,000-1,000,000. Very common to the south and west, less numerous between Lively Island and Volunteer Point. Smaller numbers over the deeper water beyond the shelf break. Concentrations around fishing vessels and with Pilot Whales. Between 1961 and 1967 nearly 11,000 fledglings were banded on nests at West Point Island under the United States Antarctic Research Program, Bird-banding Program. Several banders were involved with R & L Napier from 1962, including A & R Woods, D Davidson and P Richards. On visits to the colonies on 7 and 8 October 1983, many adults were seen with bands. All of these birds were at least 16 years old and all had returned to breed at the island where they were hatched. Out of about 410 adult birds examined, in three small sections of the colony, 66 were banded, or 16% of those present. The double-inscription aluminium bands showed considerable wear, many having the outher inscription partly or completely obliterated. One band, almost broken through and gaping badly, was removed from a sitting bird. The inner inscription was unmarked; banding records held by R Napier showed that it was marked as a fledgling on 4 March 1961 on the Mt Misery colony. This bird was therefore 22.5 years old and appeared to be in good health.

It would be interesting to know if there are other West Point banded mollymawks at Grand or Steeple Jason, Keppel, Bird, Saunders, New or Beauchene Islands. 3,000 of those marked in 1962 were double-banded, using the aluminium band on one leg and a very hard monel band on the other. Only one bird was seen with a monel band on West Point in 1983; the numbers were unworn and clearly visible.

SHY ALBATROSS Diomedea cauta cauta
Single bird approximately 40 miles east of Pembroke on 16 June 1984 (this the first record for the Falkland Islands). Two seen on 8 July 1984 about 25 miles southeast of Lively Island and a single bird 18 miles east of Pembroke on 10 April 1985.

GREY-HEADED ALBATROSS Diomedea chrysostoma
Occurs regularly off the Falklands, generally beyond the shelf break. Scarce during the Summer months. Widespread in Winter particularly to the southeast in association with fishing vessels (1984). More associated with the deeper water off the shelf break being less common than the Black-browed Albatross close inland. 1969: 1 present on West Point Island, probably also in 1968 (CG).

LIGHT-MANTLED SOOTY ALBATROSS Phoebetria palpebrata
Several individuals seen close inshore eg Port William in spring 1982.

GIANT PETREL Macronectes giganteus
Generally Falkland individuals belong to the southern species (cf both species on South Georgia). The pale and white phases of the southern species occur off the Falklands in winter (Sea Lion Islands, April 1983 and off the Falklands on 6 days in 1984) (WFC).

ANTARCTIC FULMAR Fulmarus glacialoides
One of the commonest pelagic seabirds off the Falklands in winter and early spring. Frequently seen following fishing vessels into Port William Sound and occassionally during 1982 in Port Stanley Harbour. 1,000 with trawlers 25 miles southeast Lively Island on on 8 July 1984; 1,300 near New Island/Beaver Island on 10 July 1984 (WFC).

ANTARCTIC PETREL Thalassoica antarctica
Single bird 20 miles east of Pembroke on 12 June 1984; 5 in the vicinity of fishing vessels between Sea Lion Island and Beauchene Island on 8 July 1984 (WFC).

PINTADO PETREL (CAPE PETREL) Daption capense
Status similar to Southern Fulmar - largest numbers around fishing vessels - up to 3,000 - particularly to the southeast. Frequent in Port William, occassionally in Port Stanley Harbour.

SNOW PETREL Pagodroma nivea
Single bird 12 miles east of Pembroke on 12 June 1984; 5 seen some 25 miles southeast of Lively Island, after prolonged southeasterly gales, on 8 July 1984 (WFC).

WHITE HEADED PETREL Pterodroma lessonii
Single bird 8 miles west of Beaver Island on 10 July 1984; single 12 miles east of Bluff Cove on 27 February 1986 (WFC).

ATLANTIC PETREL Pterodroma incerta
Several birds 30 to 40 miles east of Pembroke on 3 June 1982 (first for Falklands ??) (WFC).

KERGUELEN PETREL Pterodroma brevirostris
Common offshore, seen inshore especially after easterly winds. Six near Eddystone Rock on 13 September 1982; 40 about 10 miles southeast Pembroke 19 May 1984; 4 in Berkeley Sound on same day with 94 counted in one hour 20 miles southeast of Lively Island, again on same day (WFC).

SOFT PLUMAGED PETREL Pterodroma mollis
Occasionally inshore to the east of Pembroke particularly after east or northeast winds. Four off Mengeary Point on 31 December 1982 (WFC).

BLUE PETREL Halobaena caerulea
Uncommon though fairly well distributed over the shelf break during the winter. One found dead on West Falkland 1981. One in Falkland Sound February 1984 (AFGD); 45+ 25 miles southeast of Lively Island on 8 July 1984; 30 some 20 miles to the east of Pembroke on 9 July 1984; 3 15 miles to the north of Pebble Island on 26 July 1984 (WFC).

DOVE PRION Pachyptila vittata desolata
Scarce, occasionally to southeast of Lively Island and towards Beauchene Island. Two seen Falkland Sound in winter 1983.

FAIRY PRION Pachyptila turtur
Small numbers to the south and southeast along the 100 fathom line.

THIN-BILLED PRION Pachyptila belcheri
Very common breeding species, a huge feeding flock seen in Queen Charlotte Bay in January 1982. Numerous offshore in breeding season, scarcer in winter.

WHITE CHINNED PETREL Procellaria aequinoctialis
Few seen during the winter months except in the vicinity of Beauchene and Beaver Islands. Widespread during the summer though nowhere particularly numerous - highest counts being in the area of Kidney Island and to the south of Falkland Sound.

GREAT SHEARWATER Puffinus gravis
Small numbers offshore during late summer but increasing in autumn. A large passage (~300) seen off southeast of East Falkland February 1983. Also seen off Kidney Island in February 1982.

SOOTY SHEARWATER Puffinus griseus
Large numbers flying north off Pembroke (evening) and to the east off Bougainville (3,000 in one hour) - during the breeding season; large movements noted off the southern end of the Falkland Sound in the evenings - heading towards George/Speedwell or perhaps Sea Lion. Birds gathering off and seen flying into Low Island during the evening on several days in late March (breeds?). The numbers of birds seen in coastal waters during the breeding season would indicate other breeding colonies apart from those on Kidney and Cochon: 300 were in the vicinity of New/Beaver Islands on 10 July 1984 - single birds off Beauchene on 14 July 1984 and off Eddystone Rock on 7 August 1984 (WFC).

WILSON'S STORM PETREL Oceanites oceanicus
Commonly seen offshore and may breed in reasonable numbers.

GREY-BACKED STORM PETREL Garrodia nereis
One dead individual found on Kidney Island in November 1982 (AFGD). Six off Mengeary Point on 31 December 1982 (WFC). Less common than Wilson's.

BLACK BELLIED STORM PETREL Fregetta tropica
Three off Mengeary Point on 31 December 1982. Single bird some 20 miles northeast of the Jason Islands on 2 July 1984 (unusual) (WFC).

FALKLAND DIVING PETREL Pelecanoides urinatrix berard
Several individuals seen in Port William (date unknown) and off Beauchene Island in October 1984.

ROCK CORMORANT Phalacrocorax magellanicus
Common breeding resident. Not recorded as far out to sea as King Cormorant. A small colony in Stanley harbour has declined in recent years.

KING CORMORANT Phalacrocorax albiventer
Forms large 'rafts' at sea, engaging in communal and coordinated fishing, similar to the related sub-species, the blue-eyed shag in antarctic waters. Recorded up to 40 miles out to sea. 1,500 near New Island on 10 July 1984 (WFC).

COCOI HERON Ardea cocoi
1 May 1981: 1 probable flew down Stanley harbour at dusk (JP, AP).

GREAT WHITE EGRET Egretta alba
One on Bertha's Beach pond September 1985 (AFGD).

CATTLE EGRET Bubulcus ibis
The incidence of this species is now a very common occurance, mainly in the autumn. Most records fall in the period March to May and involve juvenile individuals. Flocks of up to 30 birds have been reported eg in Stanley April 1984. Several unconfirmed incidences of overwintering have been reported, however most birds are in poor condition and rapidly fall prey to cats and birds of prey. Comprehensive record of 1986 occurance will be produced in 1986 Annual Report.

BLACK CROWNED NIGHT HERON Nycticorax nycticorax cyanocephalus
Well distributed with 1 to 4 birds recorded from the following areas: San Carlos, Albemarle, Hearnden Water, Stanley Harbour/Canache, Hill Cove, West Point, Dunbar, East Cove (WFC). The colony on Carcass appears to be increasing (AFGD).

BUFF-NECKED IBIS Theristicus caudatus melanopis
1 April 1981: 1 near Eliza Cove, seen by children (JP).

CHILEAN FLAMINGO Phoenicopterus chilensis
1967/68: 1 reported by P Richards; 24 September 1985: 1 at pond, south side West Arm, Port Albemarle, photograhed by Gunner Robbins 7(PARA)RHA (TN).

COSCOROBA SWAN Coscoroba coscoroba
One individual reported from North Arm, though year unknown.

BLACK-NECKED SWAN Cygnus melancoryphus
Large breeding and moulting numbers on Pebble Island noted in January 1982 (AFGD); 3 west end of Murrell River 3 December 1982 (WFC); about 30 moulting at the Murrell River in summer 1983; about 100 at Swan Inlet in September 1983 (AFGD).

ASHY-HEADED GOOSE Chloephaga poliocephala
1968: Pair with goslings in Packes Port Howard area (RC); September 1983: 1 at West Point Island for several days (LN, RN); November 1984: 1 at Ronda, Salvador. No recent positive breeding records.

RUDDY-HEADED GOOSE Chloephaga rubidiceps
Population of 50,000 to 100,000 estimated in the Islands.

UPLAND GOOSE Chloephaga picta leucoptera
Population of 300,000 to 500,000 estimated in the Islands. This and the preceding species are under study at the ARC in Stanley.

KELP GOOSE Cloephaga hybrida malvinarum
No population estimates. Several observers have noticed the relatively poor breeding performance compared with the two previous species of sheldgeese.

PATAGONIAN CRESTED DUCK Lophonetta specularioides specularioides
Numerous round the Falkland Islands on fresh and sea water.

FALKLAND FLIGHTLESS STEAMER DUCK Tachyeres brachypterus
Numerous. A large flock of juveniles(?) noted in Stanley harbour in April 1983 (134), also in April 1985 (73).

FLYING STEAMER DUCK Tachyeres patachonicus
Almost certainly under-reported because of its similarity with the flightless steamer duck, but probably present all over the Falklands in small numbers. Six Hearnden Water 18 November 1982 (WFC).

SPECKLED TEAL Anas flavirostris
Probably the commonest duck in the Falklands seen on fresh, brackish and salt water.

CHILOE WIGEON Anas sibilatrix
Locally common.

YELLOW BILLED PINTAIL Anas georgica spinicauda
Pair Weir Creek November 1982; 6 near Stanley (Moody Brook) 3 December 1982.

SILVER TEAL Anas versicolor fretensis
Relatively scarce though large numbers seen on Pebble Island in January 1982.

CINNAMON TEAL Anas cyanoptera
14 June 1981: 2 males present at pond near Surf Bay until August 1981 (JP, AP).

RED SHOVELER Anas platalea
20 October 1985 and 24 October 1985: One in Swan Pond, Seal Bay, East Falkland (MJM).

ROSY-BILLED POCHARD Netta peposaca
13 October 1981: 1 at Sea Lion Island (JP); 1 on Pebble Island January 1981 (AFGD).

ANDEAN CONDOR Vultur gryphus
14 April 1984: 1 'possible' near Kelp Creek, Weddell Island; no other information available (SW).

TURKEY VULTURE Cathartes aura falklandica
Very common around coastal areas of Falkland Islands eg 42 on Kidney Island in September 1983 (AFGD).

RED-BACKED HAWK Buteo polyosoma
The commonest bird of prey around Stanley, often very tame (AFGD). Probably bred Mount Low 1983. Recorded from Bluff Cove, Albemarle, San Carlos and Hill Cove (WFC).

STRIATED CARACARA Phalcoboenus australis
Main breeding areas are on islands to the northwest and south of the Falklands. Most individuals seen on the mainland are dispersing juveniles. Single juvenile in the Sparrow Cove/Hell's Kitchen area on 7 July 1983; 16 September 1983; 21 September 1983 (WFC).

CRESTED CARACARA Polyborus plancus
Fairly common throughout the Islands.

PEREGRINE FALCON Falco peregrinus cassini
Immature birds regular over Stanley especially in winter. Diet may depend mainly on small petrels in summer (eg thin billed prions). 30 March 1984: 1 brought prion aboard ship 30 miles east of Berkeley Sound; 3 April 1984: 1 seen to kill over sea twice, south of Falkland Sound; 18 April 1984: 1 killed a Wilson's Storm Petrel south of Falkland Sound (all records by BB).

AMERICAN PURPLE GALLINULE Porphyrula martinica
February 1983: Corpse of immature bird found by Lord Buxton, probably near Stanley; identification confirmed by British Museum. The 3rd record of this notorious long-distance wanderer.

WHITE-WINGED COOT Fulica leucoptera
30-31 October 1983: 1 adult with citrus-orange frontal shield on pond at northwest end of Carcass Island (RH, JH, RW); 1 on Sea Lion Island in September 1983.

MAGELLANIC OYSTERCATCHER Haematopus leucopodus
Common on coastlines in the Falklands, generally on sand beaches.

BLACK OYSTERCATCHER Haematopus ater
Tends to occur more on rocky beaches or coastline, probably specialising on mussels and limpets compared with the magellanic oystercatcher, that feeds mainly on polychaete worms and small species of bivalve molluscs.

SOUTHERN LAPWING Vanellus chilensis
10-11 October 1983: 1 at West Point Island (RW, RN).

TWO-BANDED PLOVER Charadrius falklandicus
Common on beaches and inland throughout the year.

RUFOUS-CHESTED DOTTEREL charadrius modestus
A common species generally nesting inland. Small numbers do overwinter but many must migrate for the Falklands winter. An interesting species that deserves further study. 7 September 1984: 1 circled ship at 52 degrees 29' South 52 degrees 11' West (WRPB).

LESSER YELLOWLEGS Tringa flavipes
1 January 1982: 1 at Chata Creek, East Falkland (RH). Description received by R Woods, particularly of bill-length, suggested it was this species and not the Greater Yellowlegs Tringa melanoleuca. One near Fitzroy in March 1984.

BAIRD'S SANDPIPER Calidris bairdii
30 October 1981: 1 at Eliza Cover (JP, AP); 14 November 1981: 1 or 2 near Yorke Bay (JP, AP).

WHITE-RUMPED SANDPIPER Calidris fuscicollis
Very common in summer with most arriving in September and October, and departing by the end of April.

PECTORAL SANDPIPER Calidris melanotos
Summer 1981/82: 1 at Bull Point (KS). A bird that was probably this species seen at Ronda, Salvador in December 1984.

SANDERLING Calidris alba
Regular but uncommon summer visitor. About 36 seen at Surf Bay, Stanley in april 1985 before passage north, (one moulting into breeding plumage).

RED KNOT Calidris canutus
A bird that was probably this species was seen at Ronda, Salvador in December 1984.

WHIMBREL Numenius phaeopus hudsonicus
19 November 1969: 1 'probable' at NW Point, Carcass Island (CG); 13 November 1981: 1 near Glassland Trials Unit, Stanley (JS); May 1983 to 2 February 1984: NW Point, Carcass Island: 2 present from May to October 1983 (RH, RMcG); 5 on 16 October 1983, 6 on 26 October 1983, 5 on 31 October 1983 (RW); 8 on 19 January 1984 and 'some still present' on 2 February 1984 (RH, JH); 1 on 19 and 22 December 1985 in Port Louis (MJM).

These birds were of the North American Arctic breeding race N p hudsonicus that winters as far south as Tierra del Fuego. Marchant, Prater and Hayman (1986) comment that many non-breeders are present all year in the winter range. These Carcass Island records suggest that the Whimbrel is now wintering regularly in the Falklands; some individuals definitely stayed through their normal breeding season (May to August).

HUDSONIAN GODWIT Limosa haemastica
31 December 1983 to 2 February 1984: 1 at NW Point, Carcass Island (RH, JH, KSh). Description received by R Woods: 'tall, slender, pale wader about same height as Black Oystercatcher. In flight showed white rump, black end to tail, long legs trailing behind tail, small light wing bar. Bill slightly uptilted, dark but pinkish orange near gape. General plumage very light colour on head,

back and upper breast, much lighter underneath. Legs very dark. Small pale eyestripe extending from above eye forward and towards bill.' This is the first record since 1860. Marchant, Prater and Hayman in Shorebirds (1986) note that it is a scarce bird, once thought to be very rare but it is now known that over 7,000 winter in Bahia San Sebastian, on the NE side of Tierra del Fuego.

MAGELLANIC SNIPE Gallinago paraguaiae
Very common. One individual found with chick in mid-July 1984 (AFGD).

SNOWY SHEATHBILL Chionis alba
Very common especially during the winter but present all year round. May breed.

GREAT SKUA Catharacta skua antarctica
Very common during summer when it is a scavenger and predator of other seabirds. During winter it is pelagic, one individual was seen attacking a wandering albatross in an attempt to get it to disgorge food in August 1983 (AFGD).

ARCTIC SKUA Stercorarius parasiticus
15 November 1982: 1 adult of the light phase plumage type in Port William (WFC). The first record in Falkland waters.

LONG-TAILED SKUA Stercorarius longicaudus
11 November 1982: 1 immature flying around Narrows, Stanley Harbour (WFC) - first record for Falkland Islands; 29 November 1982: 2 adults and 1 immature 9 miles east of Volunteer Point (WFC).

DOLPHIN GULL Leucophaeus scoresbii
Common all over the Islands.

KELP GULL Larus dominicanus
Common everywhere. One adult individual has been seen around Stanley with a metal ring and is probably about 24 years old.

BROWN-HOODED GULL Larus maculipennis
Less common than above gull species. It does not take much food from human habitations and may therefore be commoner than is apparent.

SOUTH AMERICAN TERN Sterna hirundinacea
A very common breeder. Breeds: Fanning Island, Carcass, Sea Lion and many others.

ARCTIC TERN Sterna paradisaea
Seen occasionally around the Islands in winter, easily confused with common tern.

EARED DOVE Zenaida auriculata
One on New Island, summer 1984.

BARN OWN Tyto alba
One near Stanley in November 1981. Also Limpet, Salvador roosting in an outside house. Some pellets were obtained (10); all contained house mouse remains and one had the remains of a black-throated finch. One also indicated scavenging on dead sheep. March 1983: 1 found dead in perfect condition and another seen around the settlement at West Point Island for some days (RN).

SHORT-EARED OWL Asio flammeus sanfordi
Breeds throughout the Islands in low numbers. May depend on sea birds during summer (storm-petrels and prions).

TUSSOCK BIRD Cinclodes antarcticus antarcticus
Very common on tussac islands but has been seen on the mainland. Possibly very prone to predation by cats, which explains its abundance on cat and rodent free islands.

FIRE-EYED DIUCON Pyrope pyrope
17 September 1981: 1 near Hill Cove and in settlement since April 1981 (Manager, Hill Cove); March to 3-4 May 1984: 1 at West Point Island (RN, LN).

DARK-FACED GROUND TYRANT Muscisaxicola macloviana macloviana
Very common over most of the Islands. 4 April 1984: 1 on board ship 44 miles south of Cape Meredith (BB).

CHILEAN SWALLOW Tachycineta leucopyga
13 November 1981: 1 near Government House (JP, AP); 13 February 1984: 1 at 62 degrees South 50 degrees West (MK); February 1984: many at Stanley and Fox Bay for 3 days (WRPB); 11 March 1985: 1 at 53 degree 02' South 60 degrees 05' West, 60 miles SSW of Cape Meredith (TG).

SOUTHERN MARTIN Progne modesta
4 December 1984: 3 in Port William, 1 died on ship (BB).

ROUGH-WINGED SWALLOW Stelgidopteryx ruficollis
5 November 1981: 1 in John Street, Stanley with Barn Swallows - excellent views reported (JP, AP); 6 November 1983: 2 'probables' over pond on west end of East Sea Lion Island - only brief views possible (SdaP, RW).

BARN SWALLOW Hirundo rustica erythrogaster
14 October 1981: 1 at Black Point (Mengeary?) (JP, AP); 29 October 1981: 2 at Lively Island (JP); 5 November 1981: 3 in John Street, Stanley (JP, AP); 21 November 1981: 3 (2 adults, 1 immature) in John Street; others above not seen since 5 November 1981 (JP, AP); 26 October 1983: 1 at 51 degrees 46' south 56 degrees 38' west, 10 miles east of Stanley (WRPB); 13 November 1983: 1 at Kidney Island (RW); 2 October 1984: 1 at 45 degrees 25' south 46 degrees 34' west (WRPB). Unconfirmed reports of breeding at Port Stephens in 1983/84.

GRASS WREN Cistothorus platensis falklandicus
Common in open camp often noted in damp areas. Seen on Kidney Island, Rolon Cove, Carcass Island.

ROCK WREN Troglodytes aedon cobbi
All records from boulder beaches on tussac islands eg Kidney Island, West Point Island and Carcass. 20 October 1983: Partial albino male holding territory in Dyke Paddock, Carcass Island had 4 or 5 white primary and secondary flight feathers, symmetrical in both wings; also few white upper tail-coverts and scattering of white feathers on head (RW).

FALKLAND THRUSH Turdus falcklandii falcklandii
Very common in camp and around settlements.

FALKLAND PIPIT Anthus correndera grayi
Records from all over the Falklands. A bird of open whitegrass camp.

LONG-TAILED MEADOWLARK Sturnella loyca falklandica
A very common bird: forms noisy mobile flocks in winter generally feeding on soil invertebrates.

BLACK-THROATED FINCH Melanodera melanodera melanodera
A common bird of open camp. Gathers in large flocks in winter (up to 50 individuals). One nest found had 4 eggs in October (1984).

MOURNING SIERRA-FINCH Phrygilus fruticeti
WRPB saw a female/young bird near Ajax Bay on 25 July 1984. It was feeding crouched on the ground along the edge of a path through long grass, and flew ahead with a low undulating flight using a loud "chip" note. It appeared a large, solid finch-type with a horn-coloured conical bill, long legs, a markedly streaked crown, back and flanks, a trace of rufous on the ear and wing coverts, buff underparts with a streaked breast, dark central and fairly prominent white outer tail feathers. It lacked the darker under tail coverts present in comparable specimens of Phytoma rara. It was originially suspected to be Malenodera xanthogramma, but the bill, build and note seem inappropriate.

RUFOUS-COLLARED SPARROW Zonotrichia capensis
23 July 1984: 1 at New Island (GSC); 12 March 1985: 1 52 degrees 48' south 60 degrees 21' west, 30 miles southeast of Cape Meredith (WRPB).

BLACK-CHINNED SISKIN Spinus barbatus
Common in areas with trees and also on tussac islands. Large flocks noted especially at Hill Cove around the plantations of trees.

HOUSE SPARROW Passer domesticus
Very common in Stanley, also at several other camp settlements, but not in open camp.

LIST OF CONTRIBUTORS TO THE BIRD REPORT

B Bewsher	BB	R McGill	RMcG
W R P Bourne	WRPB	L Napier	LN
G S Clark	GSC	R Napier	RN
R Cockwell	RC	T Nugent	TN
Bill Curtis	WFC	A Peatfield	AP
Andy Douse	AFGD	J Peatfield	JP
C Gallimore	CG	S da Prato	SdaP
T Godfrey	TG	K Shackleton	KSh
J Hutchings	JH	K Standring	KS
R Hutchings	RH	J Stephenson	JS
M Kelly	MK	Steve Whitley	SW
P Lackey	PL	R Woods	RW
M J Morrison	MJM		

IS THERE A FALKLAND MOUSE?

by Kitty Bertrand

Dr J E Hamilton, who was Government Naturalist for many years, told me that he had been told some years before that there was, at one time, a Falkland mouse. He said that this mouse was said to have had a white tummy. Forty years ago he asked me to watch out for such a mouse and would I send it to him if I ever found one.

I do not claim to have spent over 40 years looking for a white bellied mouse but I did look at any mouse I caught. I also told Ian Strange about what Dr Hamilton had said when I knew that Ian was going to the Steeple Jason some years ago. My father who used to go out there to shear sheep for Carcass Island had told me there were many mice there. However I do not think Ian found any unusual mice there, if he did I have not heard about it.

Some years ago I mentioned this mouse story to my late husband, Cecil, and he was very interested because he also had an odd mouse story which was told to him by the late Jack Cusack. Jack told Cecil that many years ago during a very bad winter, he was riding across a big white grass flat on East Falkland. Only the seed stems of the white grass were above the hard frozen snow, and on many of the stems there was something that looked like a big seed head..... He got off his horse to look closer and they turned out to be frozen mice, hundreds of little frozen mice. I do not think he mentioned anything about their colouring but some 'old-timer' reading this may have heard the story and know more than I do. Jack was very puzzled as to why the mice had climbed up the seed stems, if it was for food was there such a very sudden hard frost that they froze while eating, or was there nowhere else to go because the ground was too hard for them to dig a hole?

Anyway, having had these two mouse stories at the back of my mind, I have always looked to see what colour the tummies are of any Falkland mice I have found.

On the 19th and again on the 20th June 1986 I caught ordinary grey mice in the front porch, both had paler grey tummies. I was rather reluctant to trap them, however they were a bit too close for comfort. I found where they were getting in, so no more mice there, but there were mice getting into the meat safe. So I set a trap there and on the evening of the 23rd June I caught a very small browny grey mouse with a white tummy! The white is very distinct and extends from the base of the tail to the lower jaw and it is on the insides of the legs as well. The tail reaches to the back of the head when curled over the back. It weighed just under 1/2 oz but that was 24 hours after I caught it and after it had been in the deep freeze. I have only got a balance letter scales that weighs in ounces.

At first I was sure I had caught the famous Falkland mouse! However I soon realised this was very unlikely in the middle of the town but what was likely was that it was a foreign mouse and most likely, one that had descended from mice brought in by the British when they were unloading so many tons of cargo onto 'B' Slip and leaving the rows of containers stacked along the grass verge. The soldiers said that when the containers were lifted there were mice going in all directions.

Someone asked if I was sure it was not a baby rat but although I have now shown it to several people they all said they thought it was a mouse. I have since caught five other mice, one was slightly bigger than the first but was browny grey all over. The others appear to be ordinary house mice, some paler grey underneath than others. That still leaves the mystery of the Falklands Mouse. I hope someone can find out more than I am ever likely to, not having any scientific training.

One point I have forgotten to mention; the mystery mouse has very fine soft hair on its tail and the underside of the tail for its full length is a paler (slightly brownish) grey than the top.

BLACK FISH AT CAPE ORFORD

by Owen Lewis

(Major Owen Lewis visited the Falkland Islands as the Military/Civilian Liaison Officer between March and July 1986. He sent me the following report. Eds.)

In early June my duties took me to Cape Orford, a place not often visited because of its remote location. Mike Alazia of Port Stephens reported the beaching of many 'black fish' in the Cape Orford area, and I decided to take a look if possible.

It is much harder than one might think to spot naturally coloured and shaped objects from a helicopter travelling at about 110 mph and at several hundred feet about the ground: binoculars can help little because of the blurring effect caused by the aircraft's vibration. On this occasion however, as the helicopter approached the beach, flocks of gulls and stinkers took to the air, wheeling in all directions, showing the presence of something in the nature of food. Our attention focussed in this manner, we quickly saw several skeletons, lying on their sides, half buried in the sand below the high water mark.

I approached the beach through the white sand dunes that fringed it. My aim was simply to establish the species and approximate number of creatures beached. This changed as I came out of the dunes.

There, on the beach against a backcloth of glaring white sand, was whale after whale after whale. The effect can only be described as surreal.

I was quite unprepared by what I had seen from the air for what was in front of me. It was not simply a beaching of twenty or thirty pilot whales, which could be accounted for by the usual theory of deranged 'sonar' or that of a diseased or wounded leader. There were the remains on this single small beach of hundreds of whales. The majority, and all the more recent arrivals, appeared to be pilot whales (or 'black fish') but there were remains of larger whale species too. Moving around the beach it seemed clear that at least three separate beachings of schools of black fish could be identified. Below the high water mark were remains that showed markedly different stages of decay.

Nearest the sea were twenty or so black fish that were still substantially intact and, though smelling powerfully, did not seem particularly corrupt. They ranged in size from young ones to adults in excess of twenty feet in length. Stinkers and gulls had been at work on them but their ravages had concentrated on the smaller specimens and the belly region where the flesh was soft enough to yield to their beaks. There appeared to be no mummification, by dehydration, as these beasts were lying in the inter-tidal zone and would be covered by the sea twice a day. Nevertheless, when I cut into the head of one specimen the toughness of the meat indicated why the stinkers concentrated their attacks elsewhere. A piece of flesh was freed, the colour being the normal deep red of whale meat and its smell being uncorrupt but strong; this activity stimulated the lively interest of the seabirds. When I looked up, the air was filled with birds hanging, balanced on the wind, just out of arms reach. All these fairly fresh whales were lying free on top of the sand.

Moving a little higher up the beach, but remaining within the inter-tidal zone, I next examined what appeared to be a separate and earlier incident of beaching. Here there were fewer remains showing and those that were had only their uppermost sides visible above the sand. The skeletons of these were almost totally exposed with only some flesh still adhering in the head area. Their fleshy remnants were very feathery and could be pulled apart with relative ease. The bones had not yet whitened but were creamy yellow and were, in the main, still held in place by cartilaginous ligaments.

Above the high water mark there was a flat area of sand with sparse vegetation, and a very shallow lagoon between the beach proper and the dunes at the rear. In one area here there was a large concentration of black fish bones. In one spot, about twenty skulls were concentrated with many other skulls and other bones beyond number scattered across the area. Here too were some remnants of larger whales, seemingly from one of the varieties of baleen whale. All the bones in this area were either clean and bleached white or, rather older, were somewhat eroded by the sand, wind or water. They lay in complete disorder with no sense of which bones might have formed a particular skeleton.

The overall impact of all these bleached remains was enormous. Was this really a whale's graveyard, a spot to which whales would come time and again to die, or simply the site of one mass landing, the result of disease or disorientation?

Well, from what I saw, I am inclined to believe it was a graveyard - as legendary as the supposed elephants' graveyards of East Africa. The reasons for coming to this conclusion were as follows:

Firstly, from the condition of carcasses and bones there was clear evidence that the whales had arrived on at least three and probably more occasions. To try and estimate when these landing had occurred is difficult, particularly for me as I am not too familiar with rates of decay and erosion in whale carcasses. My best guess, based on what I saw, was that the most recent landing, lowest on the beach, had probably occurred between two and six weeks before my visit. The next higher remains seemed to be months rather than weeks old and the highest and driest remains a varying number of years old.

Secondly, it was clear that the remains I saw would only be a fraction of those deposited on that beach. As their bodies regressed to bare skeletons, they seemed to sink into the sand which may have covered many more than I could see. Again, the sea may have washed away some of the carcasses nearest the low water mark. As I said, the beach was sand and fringed with dunes. Such areas are never absolutely static but as a result of winds, currents and tides are continually moving and changing their shape. Hence, the presence of masses of dry bones in an area now well above the high water mark. Here, too, one would expect those old bones showing on the surface to be only a fraction of those deposited in the area in total.

There are, of course, a number of theories with scientific basis for why whales will, from time to time, beach themselves in a determined manner, defeating any efforts made for them to return to open water. However, no theory I have learned of so far can explain why groups of whales should choose this one small beach, time and again, to come and die. It is not the only place in the Falklands where black fish beachings have happened. In my short time here, I have seen some remains from a beaching in the Hill Cove area and have heard of another in the Spring Point area. Even so, Cape Orford remains the only place I know where there is evidence of successive landings in one small area.

Is there really such a thing as a whale's graveyard? What knowledge or theory of whale behaviour would allow for such a concept? There are surely others here who have learned far more than I over many more years. It would be interesting to learn their views.

ALIEN PLANTS ON SOUTH GEORGIA

by David W H Walton

Any European visitor to Grytviken whaling station today would be struck by the number of flowering plants he could recognise immediately with no previous knowledge of the Southern Hemisphere floras. The limited range of native flowering plants (25 species) has been supplemented over the past two centuries by man's accidental introductions to the Island, and these alien species have in some cases assumed an important role in the plant communities.

Over 60 introduced species have now been recorded from South Georgia, some only as simple plants, others as major components of the present vegetation. Not surprisingly the majority of the species are to be found only around the areas currently or previously inhabited, but some more tolerant species have now spread outside these confines. At this moment Husvik Whaling Station has the most alien species, with Grytviken second and Leith Harbour third. Prince Olav Harbour, abandoned long ago, has few species as have Ocean Harbour and Godthul.

The introductions can be divided into three classes:

(a) Transient species - surviving for only 1 or 2 years;

(b) Persistent species - surviving for many years but without spreading significantly;

(c) Naturalized species - surviving for many years and competing successfully with native species.

The transient category includes the largest number of species (over 20) and contains many species found as weeds in the Falklands. Examples include Pineapple Weed (Matricaria matricarioides), Red Deadnettle (Lamium purpureum), Common Nettle (Urtica dioica), Groundsel (Senecio vulgaris), Foxtail (Alopecurus geniculatus), Timothy Grass (Phleum pratense) and Chickweed (Stellaria media). Peas, cabbage, potatoes and oats have also been recorded.

The persistent category contains rather more interesting species, Chives (Allium schoenoprasum) was established at King Edward Point but has since died out. A population still exists by the manager's house at Stromness. Although the clover populations (Trifolium spp.) at Grytviken have now been overgrown the patches at Husvik are flowering and spreading. The plantains (Plantago media) and the Wormwood (Artemisia sp.) at Grytviken have now been overgrown by native Acaena magellanica but the Pearlwort (Sagina procumbens) and Thyme-leaved Speedwell (Veronica serpyllifolia) are still flourishing near the bakery. Occasional plants of Curled Dock (Rumex crispus) are still to be found and there are three plants of Chervil (Anthriscus sylvestris), two by the kitchens at Grytviken and one by the old boat slips at Husvik. The two strangest persistent species are a single clump of Nardus stricta near the cinema at Leith Harbour and a huge patch of Carex aquatilis near the manager's house at Husvik. Neither of these could normally be described as weedy species and their presence at South Georgia is surprising.

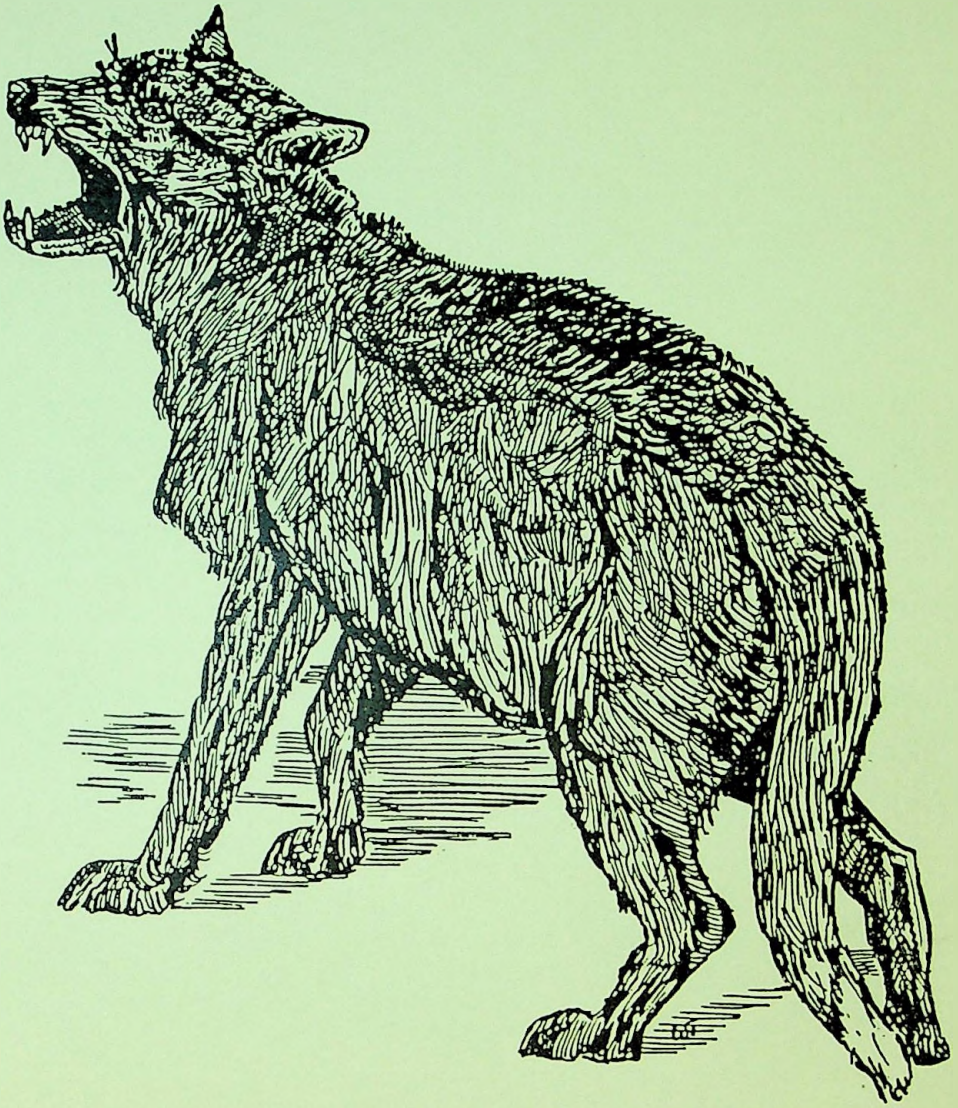
The persistent species are of two sorts - those with a restricted distribution (often to only one site) and those growing successfully within native plant communities. The more restricted species include Yarrow (Achillea millefolium) at Grytviken and Achillea ptarmica at Leith Harbour and Stromness. Buttercups (Ranunculus repens and R. acris) are established at several sites, including King Edward Point, Grytviken and Leith Harbour. Couchgrass (Agropyron repens) grows luxuriantly, amongst the oil tanks, at Grytviken, whilst patches of Rough-Stalked Meadow Grass (Poa trivialis) are to be found up on the hillside above Grytviken cemetery. Two unusual species fall into this category - Carex nigra at Ocean Harbour and Juncus filiformis at Ocean Harbour and Grytviken. Both these species are typical of wet habitats in arctic-alpine areas of Northern Europe. Their introduction was probably in fodder for South Georgian reindeer released at Ocean Harbour in 1909.

Degradation of the native plant communities by reindeer, especially on the Barff peninsula, has allowed Annual Meadow Grass (Poa annua) to become naturalized throughout all the reindeer range. It is tolerant of grazing and forms replacement "Lawns" where overgrazing has eradicated the native species. It is the most widespread and successful South Georgian alien species, and has recently found to be the first coloniser on glacial on moraine debris. Plants flower profusely throughout the summer, producing very large numbers of viable seeds. Bent grass (Agrostis tenuis) is widespread around Grytviken and at most of the other whaling stations.

Mouse-eared chickweed (Cerastium fontanum) has spread widely and is found considerable distances from human habitats (in the Olsen Valley and on Hestesletten) as indeed is Smooth-stalked Meadow Grass (Poa pratensis). Sheeps Sorrel (Rumex acetosella) occurs at all the whaling stations (except Prince Olav Harbour) with particularly large populations at Grytviken and Husvik. The cemetery at Grytviken is dominated by Dandelions (Taraxacum officinale) with scattered plants throughout the whaling station. Dandelions have been found at all the other whaling stations (except Prince Olav Harbour) and the species has spread outwards with a flourishing population on Hesterletten and scattered plants in other areas some distance from human habitation. All of these naturalised species flower each year and set seed, but for some species seed ripening only occurs occasionally. Poa annua, P. pratensis and Cerastium fontanum appear to produce viable seeds every year and are therefore more successful in spreading to new areas.

There are three species on South Georgia which appear to have been introduced directly from the Falkland Islands. Diddle-dee (Empetrum rubrum) is known from a single plant, on Hestesletten, which may have been introduced with sheep and horses from the Falklands. A simple plant of Cotula scariosa was found in 1969 growing on soil discarded from the conservatory attached to the magistrate's house at King Edward Point. Since then the plant has spread vegetatively into the surrounding vegetation to establish a thriving colony which has not yet flowered. The most recent FI introduction to be discovered (in 1979) is a small patch of Pratia repens growing near the slopchest at Grytviken. There appears to be at least three separate plants all of which flower profusely.

Of the alien flowering plants on South Georgia and other sub-Antarctic islands the most successful are weedy species native to northern European temperate regions. It is strange that there have been no introductions of species native to North or South America, or even Japan, considering the repeated shipment of cargo to South Georgia from these places. Although the possibilities for new introductions have been greatly lessened since the closure of the whaling stations new plants are still likely to be recorded. Within the once inhabited areas seeds of many species may still be present in the soil, awaiting the chance to germinate in an unusually favourable summer. The continued occupation of the BAS base at King Edward Point is a possible source for future introductions whilst any of the ships or yachts visiting the island may bring new species with them. None of the introduced species present on South Georgia pose any threat to the native vegetation except in areas damaged by reindeer. We must however take care to prevent the introduction and spread of any of the noxious aggressive weeds which have so altered the natural vegetation on many other islands.



WARRAH

Annual Report

1986

FALKLAND ISLANDS TRUST

WARRAH

Annual Report
1986

FALKLAND ISLANDS TRUST

COMPILED AND EDITED BY SHANE WOLSEY, ENDURANCE AVENUE, STANLEY

CONTENTS

EDITOR'S NOTE

Following last years "Warrah" I was a little worried that I might have difficulty in gathering enough information to fill this edition. I need not have worried. Articles appeared and records of birds came in and I believe we have ended up with another very healthy Annual Report of the Falkland Islands Trust.

The contributions are again of very mixed content. Some are of a scientific nature prepared in a scientific manner. Others are much more general in content, but all will be of interest to those with an interest in the Falkland Islands. This mixed content reflects our own membership and bodes will for the future. I would like to thank all the authors of articles, for the annual report would be a poor document without their contributions. I would also like to give my sincere thanks to Natalie McPhee for all her typing and to Anne Morrison and Annagret Adams for their tremendous assistance during the photocopying of the report.

I now have to think ahead to the 1987 Warrah and would ask anyone who would like to contribute an article to feel free to do so. I would be very pleased to receive articles, long or short, scientific, historical, folklore or whatever, please let me have them.

Shane Wolsey

FALKLAND ISLANDS TRUST

OFFICE BEARERS

	up to 31.3.86	from 31.3.86
Chairman	Tom Davies	Norma Edwards
Secretary	Jessie Booth	Noreen Keenleyside
Treasurer	Stuart Booth	Roger Spink
Editor	Andy Douse	Shane Wolsey
Committee Members	Simon Armstrong	Kitty Bertrand
	Kitty Bertrand	Andy Douse
	Rene Rowlands	Peggy Halliday
		John Smith (co-opted)
		Joan Spruce (co-opted)

NOTE: Norma Edwards had to retire as Chairman on 1 October 1986 when she moved to live on her new farm at Fox Bay West. Noreen Keenleyside took on the position of Acting Chairman in Norma's absence.

THE FALKLAND ISLANDS TRUST

INCOME AND EXPENDITURE ACCOUNT FOR PERIOD ENDED 31 MARCH 1987

	£	£
INCOME		
Subscriptions	589.00	
Interest	177.12	
Donations	2.00	
		768.12
EXPENDITURE		
Stamps	173.20	
Stationery	27.80	
'Jhelum' costs	232.20	
Mr Rodhouse (BAS Scientist)	91.22	
Donation to Penguin Deaths investigation trip	500.00	
		1,024.42
EXCESS OF EXPENDITURE OVER INCOME		£ 256.30

BALANCE SHEET AS AT 31 MARCH 1987

	£	£
ASSETS		
Cash at Bank	1,967.68	
Cash in Hand	7.70	
		1,975.38
LIABILITIES		
Outstanding donation towards cost of Dr Ian Keymer's trip		(500.00)
		£1,475.38
REPRESENTED BY:		
Balance 1.7.85		1,731.68
Less: Excess of Expenditure over Income		256.30
		£1,475.39

A POLLEN PROFILE FROM TUSSAC PEAT, SEA LION ISLAND, EAST FALKLAND

by Dorothy Gennard and Jim McAdam

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In certain years the leaves of Tussac Grass become infected with a fungus which causes them to be covered with a yellow-brown 'dust' - the 'rust disease'. Although several types of fungi have been found on Tussac Grass, Puccinia striiformis has been identified as the cause of the epidemics in recent years (McAdam, 1985).

Samples were collected from the greatest depth of peat beneath Tussac grass stands on Sea Lion Island (approx 90 cm) in 1985. Using pollen extraction methods attempts were made to discover how long Tussac may have been present at the site and to provide evidence for the preservation of agents of fungal disease indigenous to Tussac grass.

The pollen and spores present in samples taken at 10 cm intervals were counted to a total of at least 100 cm at a magnification of x400 and the length and breadth (including pore) for 50 grass grains was estimated. From this it was hoped to determine the range of grass species, in addition to Tussac, present in the pollen rain.

Results

The greatest contributor to the pollen profile at all levels was grass which comprised between 97.9% (at 10 cm) to 100% (20 cm to 70 cm) (Fig 1). Tussac Grass pollen of a similar size to that formed the greatest contributor throughout the profile with the exception of the 10 cm depth. However, as was to be expected in a windy environment, at least 3 other species of grasses were found at depths of 10, 20, 30, 40, 70, 80 and 90 cm in the peat.

Prior to settlement in 1764 there were approximately 17 indigenous grass species present in the Falklands (Moore 1968). Further detailed work on these grains to determine their species is underway, however Tussac Grass contributes most to the pollen profile of the Tussac peat.

Pollen grains of Diddle dee and members of the Chenopodiaceae family are present at 90 cm though they contribute to less than 1% of the total pollen. The Diddle dee is most likely to have been introduced from a distance since it is not normally associated with Tussac. Because of the growth form of Tussac the pollen rain is most likely to be localised pollen. The 10 cm sample had the most varied range of grass pollen present along with pollen from the Ericaceae and Compositae families. Members of the Compositae (eg Senecio candicans - sea cabbage) are often found in the vicinity of Tussac Grass.

Nothofagus (Southern Beech) pollen was recorded in the 80 cm sample. Southern Beech trees are not indigenous to the Falklands and the pollen must have therefore blown from the South American mainland some 500 km to the west. Thus the influence of windborne pollen from both within and without the Falklands cannot be ruled out in any attempt to interpret the pollen diagram.

Fungal remains were present within the profile (Fig 1). In particular the conidia of Tetraploa aristata a fungal pathogen of dead and dying grasses, were found at depths 90, 80, 40, 30 and 10 cm. Its presence is to be expected given the lifecycle of Tussac Grass where the base of the tussock contains a high proportion of dead leaves. Fossil Tetraploa have been reported from Colombia by van Geel and van der Hammen (1973) who described the pathogen as an independent fungus of grass and sedge leaf bases and stems.

A range of ascospores of other (likely non-pathogenic) fungi were present at 90 cm and 20 cm depth. Also recorded at 90 cm, 30 cm and 20 cm are fungal microfossils resembling Gelasinospora sp or Anixiella. Although the presence of these species in association with a Lichen cannot be excluded, it is possible that the presence of the ascospores may be related to ash material or dry conditions (van Geel, 1976).

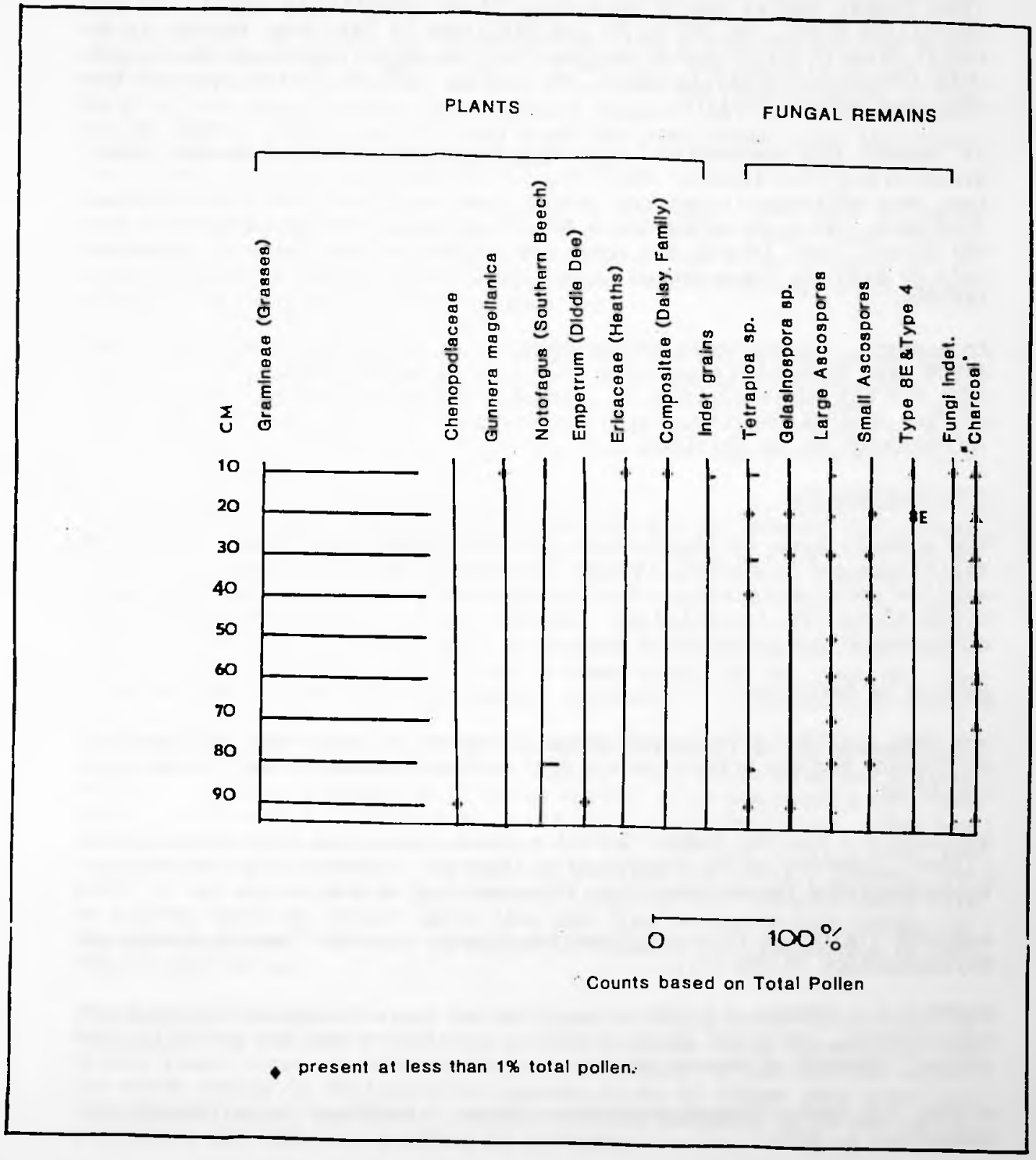
Throughout the profile above 80 cm, dark flakes of ash and burnt material are present. These were particularly prevalent at 70 cm, 50 cm and 30 cm and are undoubtedly the results of spontaneous fires which have been recorded throughout the history of the Falkland Islands.

Discussion

Pollen of Tussac Grass was recorded from the site throughout the period represented by the peat sampled on Sea Lion Island. As pollen of Tussac Grass was found in all samples and since the sample was probably from the greatest depth of Tussac peat on the island, Tussac is confirmed as indigenous to Sea Lion Island. The variation in contribution to the pollen rain of different grass species - as reflected by the range of the pollen present can only be clarified by further work. However Moore (1968) records that the grasses Alopecurus antarctica and P. annua (annual meadow grass) can be found in association with Tussac together with Apium australe (wild celery), Callitriche antarctica and Stellaria media (chickweed). Where the Tussac stands are interrupted on the cliffs Poa antarctica has been recorded in assocation with Luzula alopecurus and Senecio littoralis.

The most frequent fungal pathogen recorded from the profile was Tetraploa sp. No evidence was found of the presence of the main agent of "rust disease", Puccinia striiformis throughout the peat profile. If "rust" was indigenous and had always been a pathogen of the Tussac Grass it is likely that at least some evidence of its presence would have been available. Given the caution which must always be expressed when utilizing negative evidence to infer total absence of the pathogen it is likely that the disease is a recent immigrant to the area and the rate of peat formation is such that only the top few mm (which were not sampled) represent the time span of the period of introduction of Puccinia into the Falkland Islands. This supports the available local field records where rust is recorded as having been first noticed in the Falklands on Carcass Island in 1972 and subsequently on Sea Lion Island in 1974 (Mrs K Bertrand - personal communication). However the agent of rust disease has been recorded for the Northern Hemisphere at least since the time of the Roman Empire and is readily windborne over long distances (Hirst & Stedman, 1967). Hardison (1976) records the presence of Puccinia into South

Fig 1 POLLEN PROFILE FROM TUSSAC PEAT ON SEALION ISLAND, EAST FALKLAND.



America in 1934 and the fungus almost certainly spread southwards onto wheat crops growing in the relatively fertile Sarmiento valley (Prov. de Chubut, Argentina).

From there, spores could have been blown relatively easily in the prevailing winds, the 800 km to the Falklands or have been brought in by people travelling through Argentina after the establishment of the airlink with Comodoro Rivadavia (Prov. de Chubut, 100 km to the west of the Sarmiento valley) in 1972.

It appears that successive, extensive fires have occurred in the Tussac Grass on Sea Lion Island. Hardison (1976) records that good control of rust was achieved in Oregon, USA by burning grass fields at regular intervals. In a situation where fungal pathogens (though apparently not the present rust fungus) may have been indigenous such natural fires may help to explain the apparent longevity of Tussac Grass in the Falkland Islands.

In summary, Tussac Grass has probably been present on Sea Lion Island since peat formation started on this site (possibly since the last ice-age) and has suffered from at least 3 major fires in its history. The results confirm the observation that rust disease is a relatively recent introduction to the Falklands.

Acknowledgements

The authors wish to thank Terry Clifton, Sea Lion Island for field assistance and Dr Roy Watling for identification of fungal spores. The samples were collected while J McAdam was on a visit to the Falklands financed by the UK Falkland Islands Trust. D Gennard gratefully acknowledges the provision of funding by NERC.

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FALKLAND ISLANDS CORRALS

by Joan Spruce

Careful study of a map by Fitzroy and Sulivan (1838-1845) shows some corrals on East Falklands. Obviously stone ones were yet to be built. "Third Corral" is marked on the San Carlos River, upstream from the house of the same name. This was of turf, as were all the corrals on the map, and these remains can still be seen. In the Cape Dolphin area, at the North of the large harbour there appears another, called "Corral Brazo", whilst "Second Corral" can be found where the Pedro River flows into Chata Creek, between Douglas Station and Teal Inlet.

Near the Swan Inlet River, according to the map, there was a "Large Corral" somewhere between L'Antioja and the South coast (East Cove). According to our FIGAS Islander pilots there seem to have been a lot of earthworks in this area at one time. A day on the Islander with camera and map would obviously be very worthwhile!

Teal Inlet also has quite a large amount of turf walls with gorse tops, and a turf corral, but like the majority, have become flattened over the years, entirely covered in thick gorse and quite difficult to see. I have seen the small turf corral remains which lie near the Estancia to Malo track, but only from a helicopter. Finding it on the ground would be a different matter.

Stone corrals on West Falkland seem quite few and far between, but to date I know of one on Saunders Island, another at Spring Point and one at Dunbar. I have no idea of the size or condition of these three corrals except a quick look from the Islander aircraft confirmed that the Dunbar one is quite small and in good condition. Fox Bay East settlement corral was built about fifty years ago, with a small circular addition about fifteen years ago. Roy Cove did have a stone corral at one time, but some years ago the rock was used for another purpose.

On East Falkland, there is a stone corral at Salvador, in the Limpet Creek area, which I am told is in need of repair. Port Louis also has a stone corral. Stanley's Sapper Hill stone corral is in the middle of a "Red Area" (minefield) but appears to still be in good condition. This was extensively repaired some years ago by the Browning family, when the corral was on the boundary line between the farm and Stanley Common. The mouth of the corral was on the boundary line, and with animals being able to clamber over the broken walls they had free access to both areas. Mr Browning "enlisted" the help of his entire family, who, regardless of age, rebuilt the corral.

There is also a stone corral in the Onion Mountain area, at the foot of Bull Hill and near the Pedro River. This is quite large apparently, and drapes itself over the rocks rather in the fasion of the Ceritos corral. The stone corral in Smylies Creek appears to be in rather poor condition unfortunately, but considering the age of these corrals, it is not really surprising that they are starting to collapse.

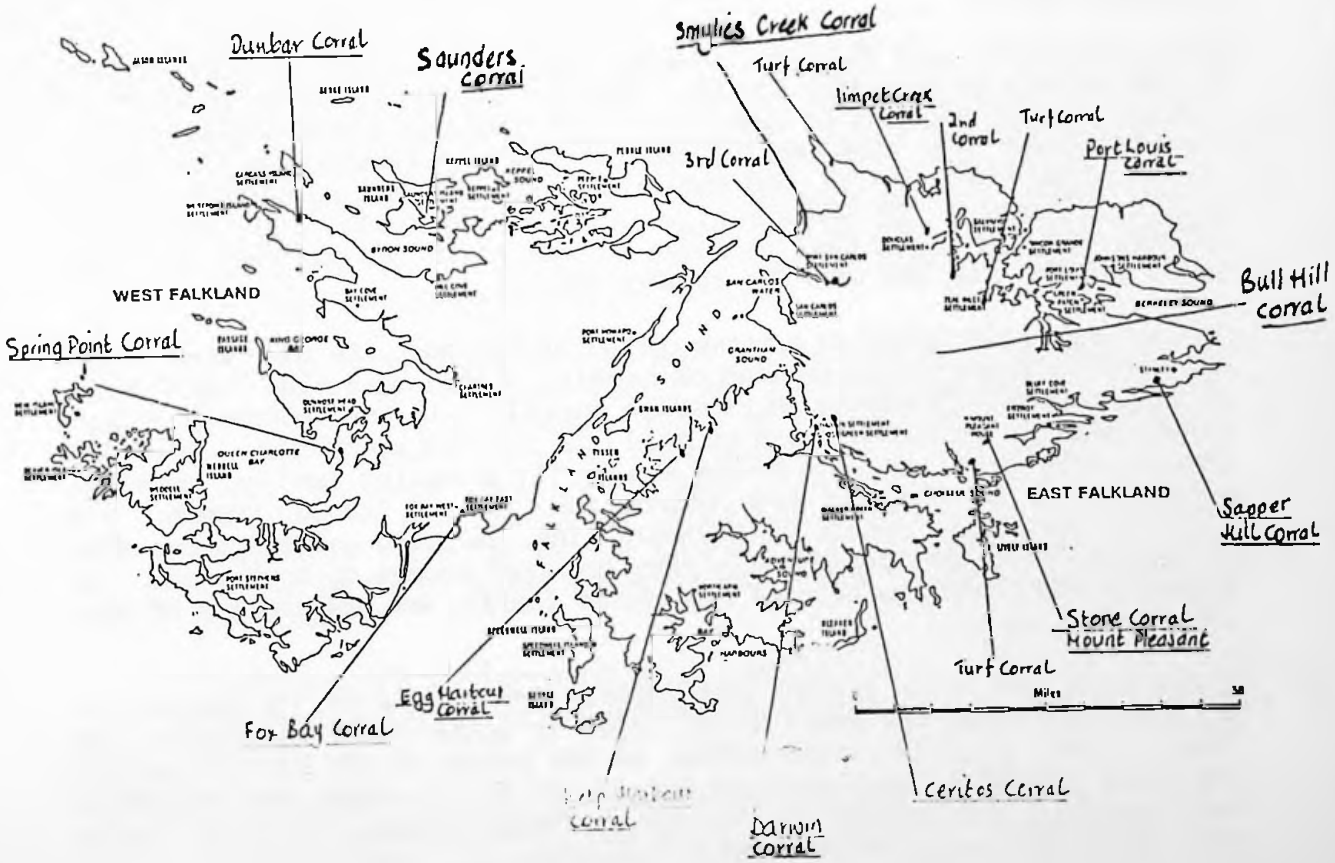
A small stone corral also lies somewhere within the boundary fence of Mount Pleasant airfield close to a proposed small arms range. I have no idea where the corral is, and can only hope it remains safe. Small stone

shelters also exist, the most easily seen being at Elephant Canyon, Bluff Cove. One would presume that these would have been used as base camps by the Gauchos, when doing cattle work away from settlements. Two more shelters can be seen on a high rocky ridge at the base of Mount Usborne.

This brings the total number of stone corrals, that can be identified, to fourteen. There may be more yet. These corrals should certainly be high on the list of items to come under the new Preservation Bill introduced in the Islands.

Finally, as in interesting little note, in 1838 Lt Lowcay wrote, during a voyage round the Islands surveying on HMS "Sparrow": "In January 1838 the Sparrow visited Port Pleasant Fitzroy, and the ship's company built a corral there 150 yards in circumference, eight feet high and six feet thick."

The question is, of course, what type of corral and where did they build it? No one seems to know.



THE 1986 CATTLE EGRET 'INVASION'

by Andy Douse

In the autumn of 1986 one of the largest influxes of cattle egrets occurred, many more than in previous years. This species is a recent vagrant in the Falkland Islands since Woods (1975) does not record it as a vagrant, and the regular occurrence of these birds represents part of the recent range expansion of this species. Although a highly opportunistic species it does not survive the winter, probably because of its traditional dependence on accessible insects - maybe if it turned to the marine environment survival would be possible. Most arrive in poor condition and either die here or attempt to continue their migration, probably dying out at sea. The distances flown are shown by the fact that records from South Georgia are a common occurrence (a distance of about 1,100 miles from the mainland coast of South America).

This article summarises the sightings sent in to me and Shane Wolsey last year, and must represent only a fraction of the total birds arriving in the islands. This means that the 1986 influx was in excess of 5,000 birds.

The first birds were seen in early March (6 and 7) in Stanley, then a further 2 'about a week later'. No records exist from then until 17 March, when about 15 were reported from San Carlos, remaining there for some weeks. This was then followed by a large influx from 22/23 March, when about 300 were seen briefly on West Point. Single individuals were seen in Stanley, at North Arm, Goose Green, Fitzroy, Fox Bay (East and West) and on Sea Lion Island. Earlier four were seen at Grytviken (South Georgia) and Stromness (on 15 March). Large parties were seen at Hill Cove (about 30) and Teal Inlet (about 80) in late March. On 30 March a large party were seen at Cape Pembroke with smaller numbers in Stanley as far west as Moody Brook. A dead cattle egret was also found at Cape Pembroke in a very emaciated condition. Moribund cattle egrets frequently fall prey to hungry peregrine falcons.

From 3-5 April about 37 were seen in the Hill Cove/Carcass Island area as well as 12 at Hill Cove itself and 7 at Hope Harbour. Another big influx occurred in mid April when a flock of 200 were seen to the east of Stanley (16 April) and then after dark about 450 flying around FIPASS. On 17 April 400 were seen in the East Cove area, with fewer on 18 April. However, at MPA itself 'at least 3,000' were seen in the airport area, presumably attracted by the airport lights. Cattle egrets were seen at Albemarle (1) on 19 April, at Dunbar (1) on 20 April, and at Hill Cove (7) on 22 April.

A final small influx occurred in mid May with 5 at Mullet Creek on 10 May, and then 1 at the same location on 14 May, and 1 on Sea Lion that same day.

In summary it appears that there were three periods of cattle egret influx; mid-late March, mid April, and mid May. The size of the largest record (3,000) suggests that a minimum of 5,000 cattle egrets arrived in the Falklands during the autumn, though this estimate is more likely to be an underestimate. To my knowledge none of the egrets that arrived survived the winter.

THE IMPACT OF THE SHEEP FARMING INDUSTRY ON UPLAND GEESE

by Andy Douse

The author makes no apology for the highly speculative nature of the following article.

After about seven years research into the upland goose (Chloephaga picta leucoptera) the biology of this species is well known. We know roughly how many there are, what they eat (when and where), and details of their breeding biology. On the basis of this information it seems that the 'goose problem' is a direct consequence of the introduction of sheep farming to the Falklands, in that changes brought about by sheep grazing have benefited the geese and led to substantial increases in their numbers. At first this seems paradoxical since if they compete, then goose numbers might be expected to decline as sheep numbers increased.

Early reports from sealers, sailors and early colonists show that upland geese have never been a rare bird. For many ships they were a welcome change from the normal ship's diet, and ship's logs often tell of large numbers killed for the pot. They also note the almost absurd tameness of upland geese, to the extent that stones and clubs were used to kill the unfortunate birds rather than shot. John Strong (in 1592), Byron (in 1765), Clayton (in 1774), Pernetty (in 1771) and De Bouganville (in the same year) were all early visitors to the islands who commented on the abundance and palatability of the indiginous geese. It is a fact though that tameness of birds coupled with inquisitiveness often leads to considerable overestimation of animal numbers - even today geese are remarkably curious, particularly young geese. Some of the best early descriptions of the flora and fauna of the islands were given by Charles Darwin when he visited the islands as part of the voyage of the 'Beagle'. Darwin commented on how dispersed geese (and he meant upland geese) were in the 'camp', but since his visit occurred in March, this is to be expected as this is the time of year when berries are eaten. For much of the remainder of the year geese (especially non-breeding geese) are more concentrated on areas of short green pasture.

The vegetation of the Falklands is very different today than in the early 19th century, before large scale sheep and cattle ranching. Changes had been occurring for some time as the widespread tussac fringe around the islands gradually disappeared as sealers and other visitors set fire to it, either deliberately or in some cases, accidentally. One of the striking features of the upland and ruddy-headed goose populations is their almost total dependence for much of the year on two species of grass, Poa pratensis (smooth-stalked meadow grass) and P. annua (annual meadow grass), both of which are non-native to the Falkland Islands. How they got here is not known but they are abundant throughout the islands and form the main grass species of the short green swards along coastlines, river valleys, around settlements, and around ponds. Part of the reason for their success must be their tolerance of heavy grazing, whereas much of the native flora is less tolerant and has been grazed out. One wonders what the diet of the upland goose was before the invasion and colonisation of these species. Perhaps the so called finer grasses made up more of the diet (such as native fog, Trisetum spicatum, mountain blue grass, Poa robusta). Around coastlines where large stands of tussac once

stood, now exist extensive swards of these meadow grasses that are an important grazing area for both sheep and geese. Upland geese rarely eat tussac (except the very young plants that grow between the larger 'bogs', so that the effect of the clearance of these coastal areas of tussac by fire and later, uncontrolled sheep and cattle grazing, has been to allow the ingress and spread of the Poa species creating ideal feeding conditions for the geese. The attraction of these areas is further enhanced by the large inputs of guano from nesting penguins (gentoo and magellanic) as well as seals. Along river and stream valleys a similar story unfolded. It is likely that in the early 19th century many stream and river valleys were covered in thick stands of fachine, Chiliotrichum diffusum) an evergreen shrub that is very intolerant of heavy grazing. Valleys with dense stands of this plant can still be seen where the grazing pressure has traditionally been light (such as horse paddocks). Heavy grazing eliminates fachines with the result that short green grass (mainly the introduced meadow grass, Poa sp.) takes over. These areas are used extensively by breeding geese, and the clearing of much of the natural vegetation must have allowed an expansion of area available for breeding geese.

It seems likely then that with the introduction of grazing animals (first cattle then sheep), and the extensive decline in the original dominance of tussac around the coast, grass species that are very palatable to geese (and sheep) have taken their place.

The second factor that almost certainly limited goose numbers was the existence of the warrah or Falkland fox (Dusicyon australis). Darwin commented in 1833 that geese did not nest on the main two islands, rather they established breeding territories on the smaller offshore islands where foxes were either absent or less of a problem. However it appears that foxes still accounted for a large number of adults, eggs and goslings as the closely related Patagonian fox does today on Weddell and Beaver Islands. With the rise in sheep farming the warrah was heavily persecuted, with shooting and poisoning all taking their toll of fox numbers. The extermination of foxes may have occurred by 1840 on East Falkland, but it was not until 1876 that the last fox was killed on West Falkland.

The decline of the fox would have allowed a simultaneous expansion in the range of the upland and ruddy-headed goose. Today geese breed just about everywhere throughout the Falklands, and, apart from some egg collecting and predation by feral cats and red-backed buzzards, have few problems with predation.

At the turn of the century concern about the numbers of geese were expressed by sheep farmers, and a desire for their control was expressed. While this sentiment was by no means universal, a control campaign was started in 1905 by paying a bounty on geese. The campaign was continued (by government) until 1912, though after that many farms continued to pay bounty. A few farms still pay bounty today, though most geese are not shot for bounty money. Despite the large numbers shot and killed each year since the turn of the century, the culling has had little impact on the goose population and there has been no measurable impact on the sheep farming industry. After the 1905-1912 control campaign sheep numbers continued to decline and wool output dropped, despite the fact that nearly

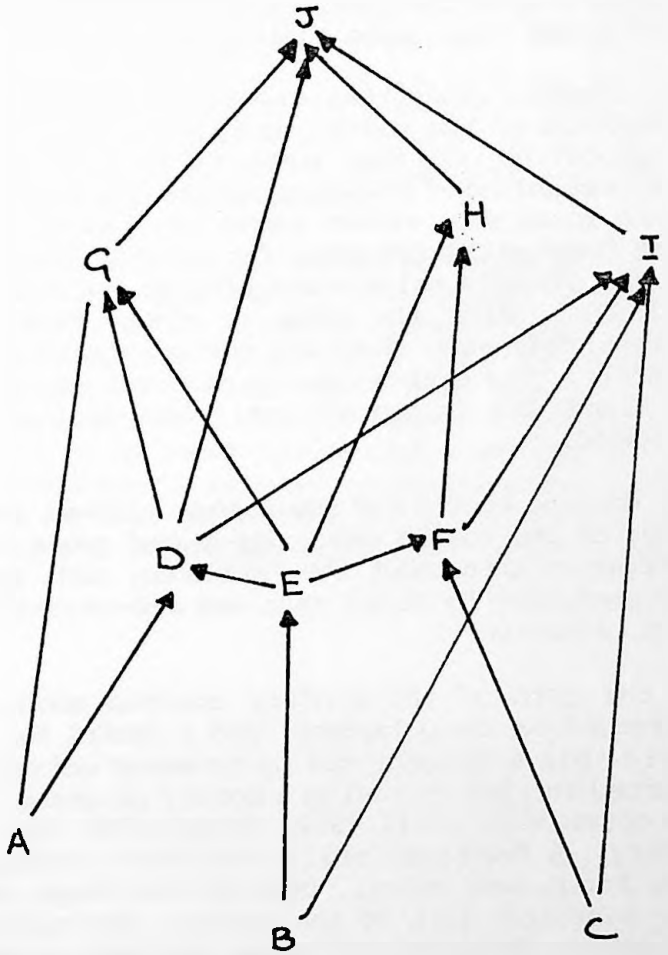
550,000 geese were culled. The simple reason for this is that geese can compensate for losses due to culling, and that the only way of reducing numbers is to reduce 'habitat quality', a singularly difficult feat, considering that it has been the introduction of sheep farming that has so markedly improved breeding and feeding conditions for the geese. The major factor that probably limits the upland goose population is the availability of breeding territories, and this is determined in the main by pasture quality and quantity.

SEABIRD POPULATIONS AND OVERFISHING

by Andy Douse

Much concern has been expressed over the possible effect of heavy fishing pressure on the local populations of seabirds (penguins and albatross in particular). While this concern is understandable, the situation in the South Atlantic seems to be quite complex in that seabird numbers might not react in the way one might intuitively imagine. To be sure, catastrophic declines in seabird populations have occurred as a result of overfishing; the demise of the Peruvian booby can be linked with excessive fishing on anchovies, and in Norway the breeding success of puffins has been negligible for many years on the island of Rost as a result of overfishing in the North Sea, on their preferred species of fish.

A food chain: uncommon in nature.



A food web: the rule rather than the exception in nature.

Two things seem to matter most in determining whether overfishing will affect the seabird populations or not; the extent of overlap in diet, and the existence or not of other prey species that the birds can resort to. Most animals do not form part of linear food chains (see figure) but rather belong to complex food webs, with numerous cross linkings. The advantage of this arrangement is that if one prey species declines in abundance the predator can compensate by feeding more on another species. In the South Atlantic most seabirds seem to feed on squid, lobster krill and other crustaceans and some fish. Little is known about the biology of most of these species and how they overlap with the species (and sizes) taken by the fishing fleets. It is apparent though that many seabirds are dependent to some extent on Lobster krill (Munida sp.) and pelagic crustaceans that are not caught in great quantities by the fishing fleets. Moreover many of the fish and squid species also feed on these crustaceans, so that by catching the fish and squid more crustaceans may be left for the seabirds. This has been seen with the whaling industry, as whales declined, the surplus krill was eaten by seabirds leading to probable increases in the populations of many species.

At present we know little about the diets of many of the common seabirds, though this situation is changing with the work being carried out by Kate Thompson and Dann Hale on New Island. The question is how adaptable are our seabirds? Many albatross and related petrels have taken to foraging around fishing boats in the same manner as many northern hemisphere seabird species, and the impact of this is hard to predict. It is possible then that with increased fishing pressure we might even see some species actually increasing in abundance, others may not change and only those species (if any) that are directly dependent on the species taken by the fishing fleets may decline in abundance.

In short we know very little about how the penguins and other seabirds will react to the continued existence of the fishery in Falkland waters, indeed some species may feed in areas well away from the fishing zone. The imposition of the fisheries "conservation zone" is a measure that is much more likely to ensure the continued good health of our seabird populations as well as ensuring a regular source of income into Falkland Island coffers. It is to be hoped though that some form of monitoring of our seabird populations can be created to ensure that major changes in numbers are spotted as soon as possible - birds are just as good as complex computer models in indicating whether overfishing is occurring or not!

SOMETHING ABOUT KELP

by Brigit Patterson

Kelp is a collective name used for certain species of seaweeds. There is some confusion about which seaweeds can be classified as kelp. Officially the name kelp is reserved for large brown seaweeds belonging to the orders Laminariales and Fucales (footnote 1.). If this definition is followed 5 (7)* species occur in the Falkland Islands. A description of these species follows below together with some notes about the sites where they can be found in the Falkland Islands. All measurements are approximate. A more detailed account will be given of Macrocystis pyrifera (giant kelp) as this is the most abundant species in the islands.

As I have been asked many times about economic uses for kelp I have included a small chapter about possibilities for the exploitation of kelp in the Falkland Islands.

Lessonia nigrescens (treekelp)

A mature thallus consists of a thick, long stipe on which numerous blades are borne (see footnote 2. for terminology). The blades are firm and usually 30 cm long and 2 cm broad. The edges of these blades are slightly serrated (ie there are small teeth on the edges). The stipe (which can reach a length of 4 metres) is attached to the substratum by a close-knit mass of haptera (fig. 1.).

L. nigrescens is found on relatively exposed rocky shores, just below the low water mark to a depth of several metres. This species never falls completely dry, usually at low tide the blades can be seen sticking above the water level (fig. 7A.).

Lessoniafrutescens (common name unknown)

The stipe of L. frutescens is very short (2-3 cm). From this stipe broad blades arise (the length being 50 cm with a corresponding width of 10 to 15 cm). The blades lie just above the substratum or even rest on the bottom. The short and thin stipe is attached to the substratum by a mass of haptera (fig. 2.).

L. frutescens is found in shallow, relatively sheltered waters. At spring low tides some thalli of this seaweed fall completely dry. Usually, however, they are found scattered in between Macrocystis pyrifera from just below the water line to a depth of 3 metres (fig. 7B.).

Lessonia flavicans (southern brown kelp or treekelp)

A mature plant of this species can reach several metres in height. The stipe can become more than 4 metres long and as thick as a human thigh. The blades borne on the stipe are 40 cm long and 10 cm broad, on the edges there are many pappilae. As with the other species belonging to the genus Lessonia the holdfast consists of an interwoven mass of haptera (see fig. 3. for a juvenile plant).

* Of 2 types of kelp it is yet uncertain whether they can be classified as a separate species.

Fig. 1. Lessonia nigrescens

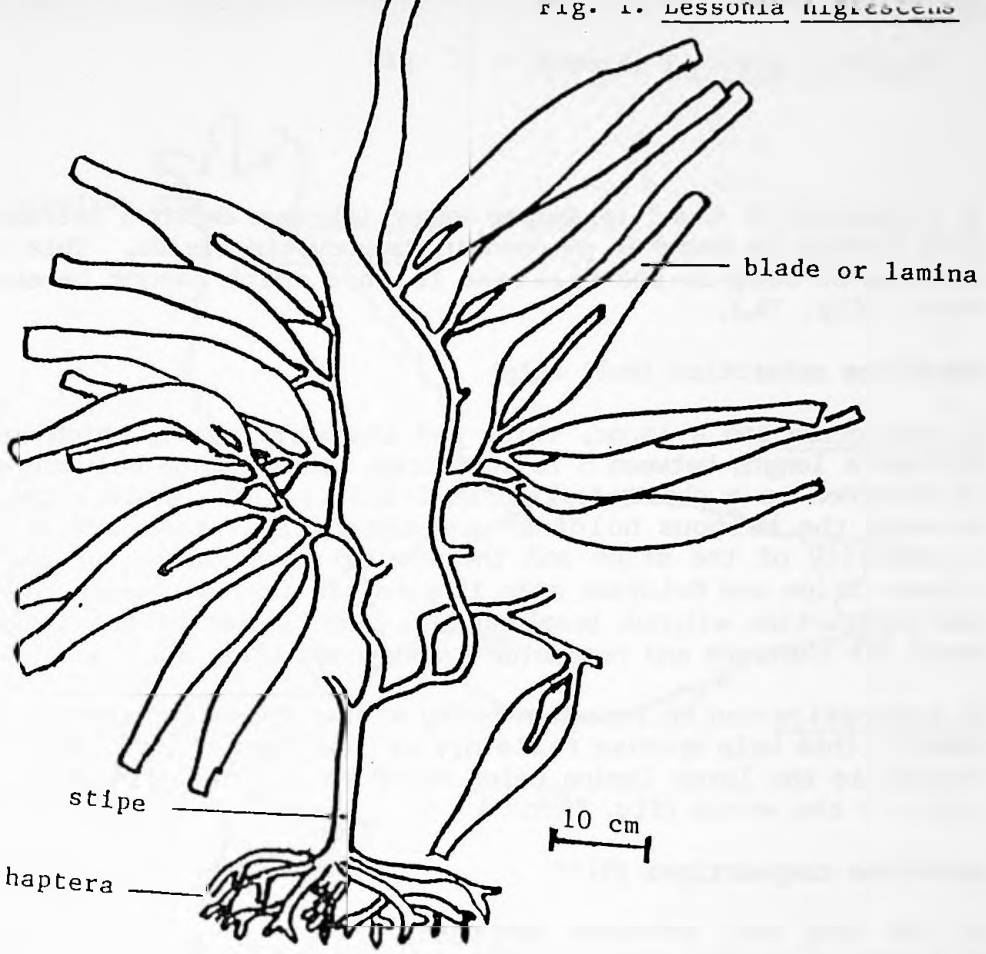
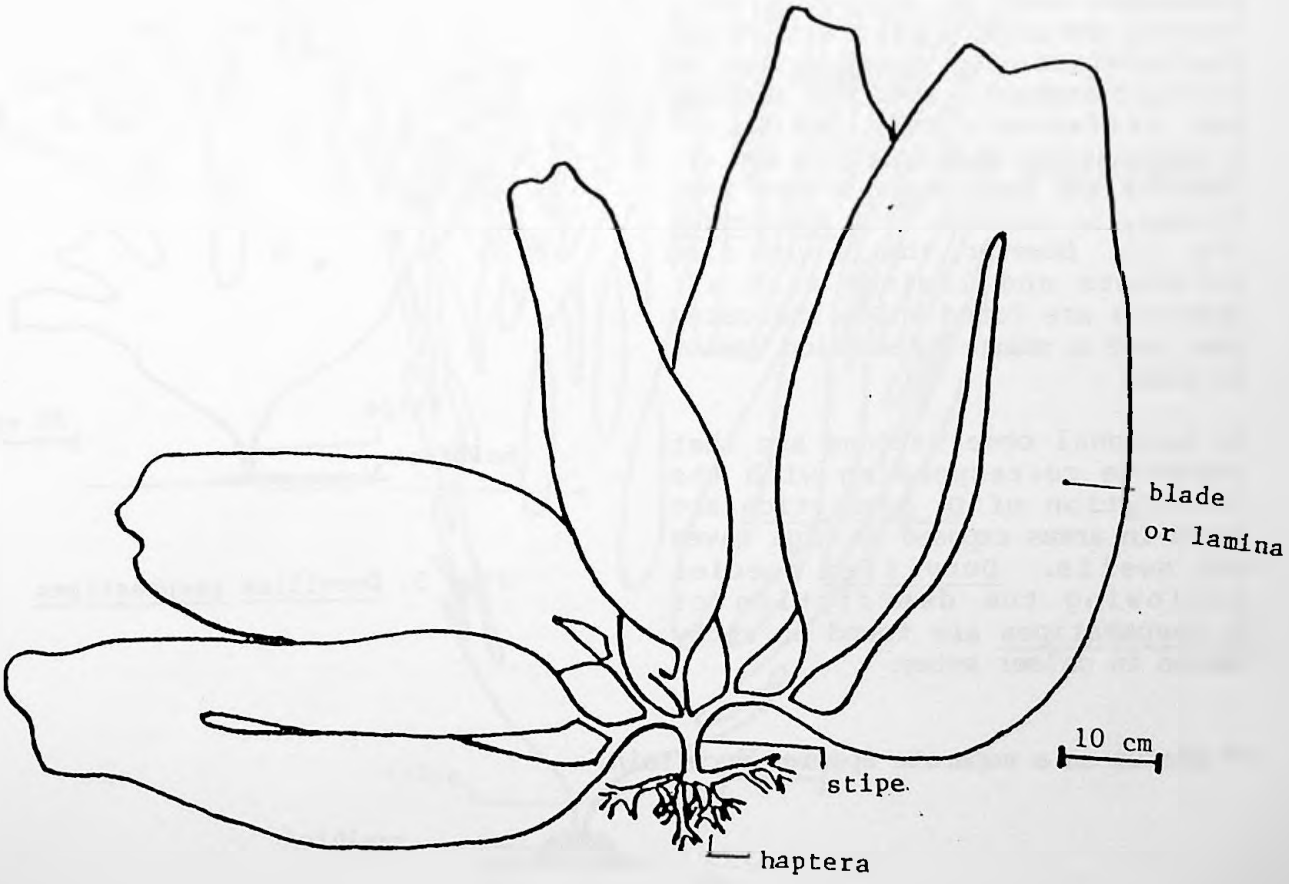


Fig. 2. Lessonia frutescens



L. flavicans is found in deeper water (minimum depth 5 metres). Usually this species is found in patches in Macrocystis fields. This is the only species of kelp in the Falkland Islands which cannot be seen from the shore (fig. 7A.).

Durvillea antarctica (bull kelp)

D. antarctica has a large, thick and leathery lamina, which in many cases reaches a length between 5 to 10 metres. This lamina has many fringes and is attached to a short, cylindrical and flexible stipe. The connection between the bulbous holdfast and this stipe resembles a joint. The flexibility of the stipe and the special construction of the connection between stipe and holdfast make it possible for the lamina to be moved in every direction without breaking off. The inside of the lamina has many small air chambers and resembles a honeycomb (fig. 4.).

D. antarctica can be found on rocky shores exposed to waves and swells. Usually this kelp species falls dry at low water. A typical view of this seaweed is the large lamina being moved to and fro and smashed against the rocks by the waves (fig. 7A.).

Durvillea caepaestipes (?)**

It is not yet certain whether D. caepaestipes is a separate species or a morphological variation of Durvillea antarctica. The differences between the two given in the literature are: D. antarctica has a bulbous and hollow holdfast whilst the holdfast of D. caepaestipes is flat and compact. Also the laminae are different; the lamina of D. caepaestipes does not have any air chambers and does not have many long fringes, in contrast to D. antarctica (fig. 5.). However, thalli with flat holdfasts and laminae with air chambers are found which indicates that such a sharp distinction cannot be made.

My personal observations are that seaweeds corresponding with the description of D. antarctica are found in areas exposed to high waves and swells. Durvillea species following the description of D. caepaestipes are found on rocky shores in calmer water.

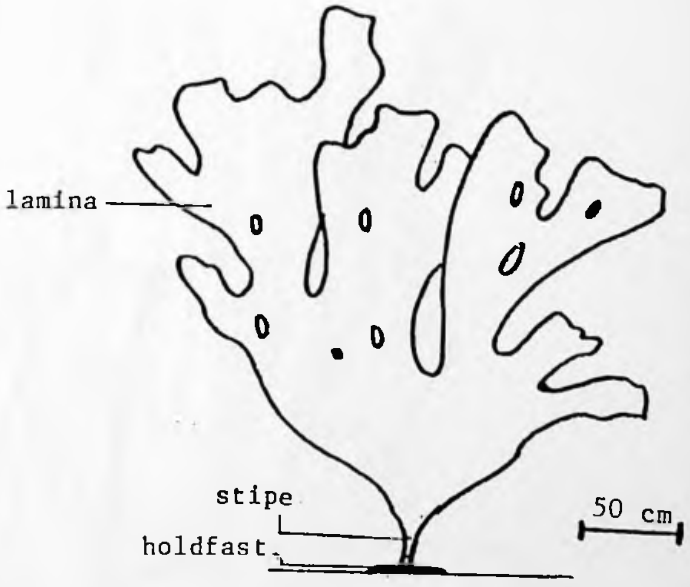


Fig. 5. Durvillea caepaestipes

** Status as a separate species uncertain.

Fig. 3. A juvenile Lessonia flavicans

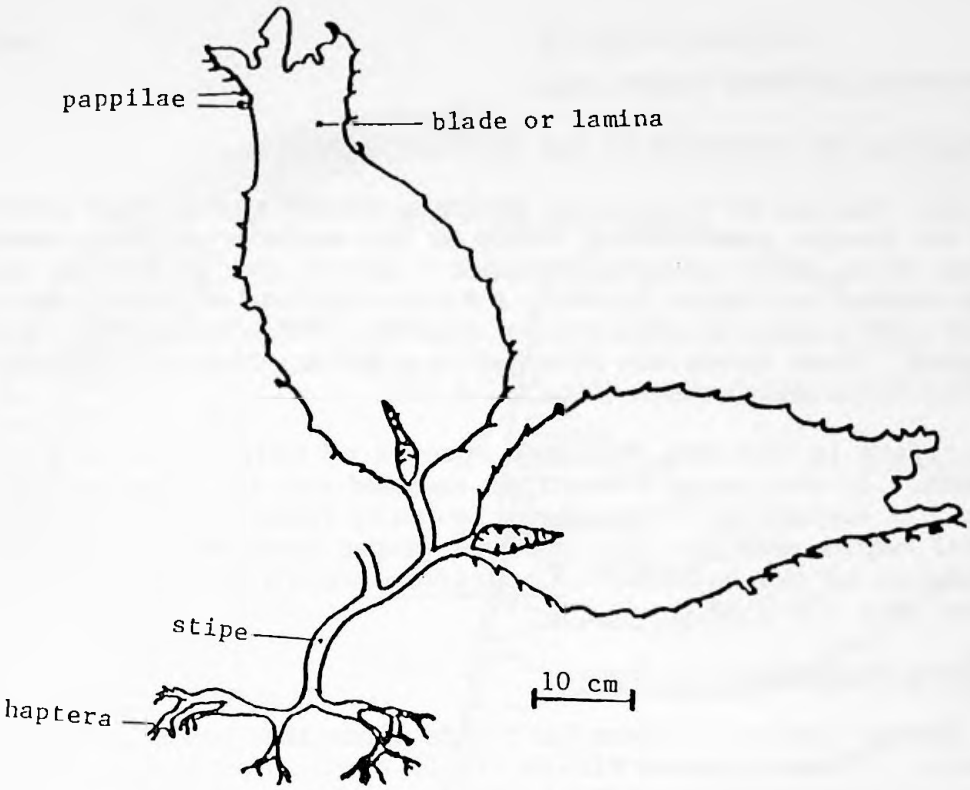
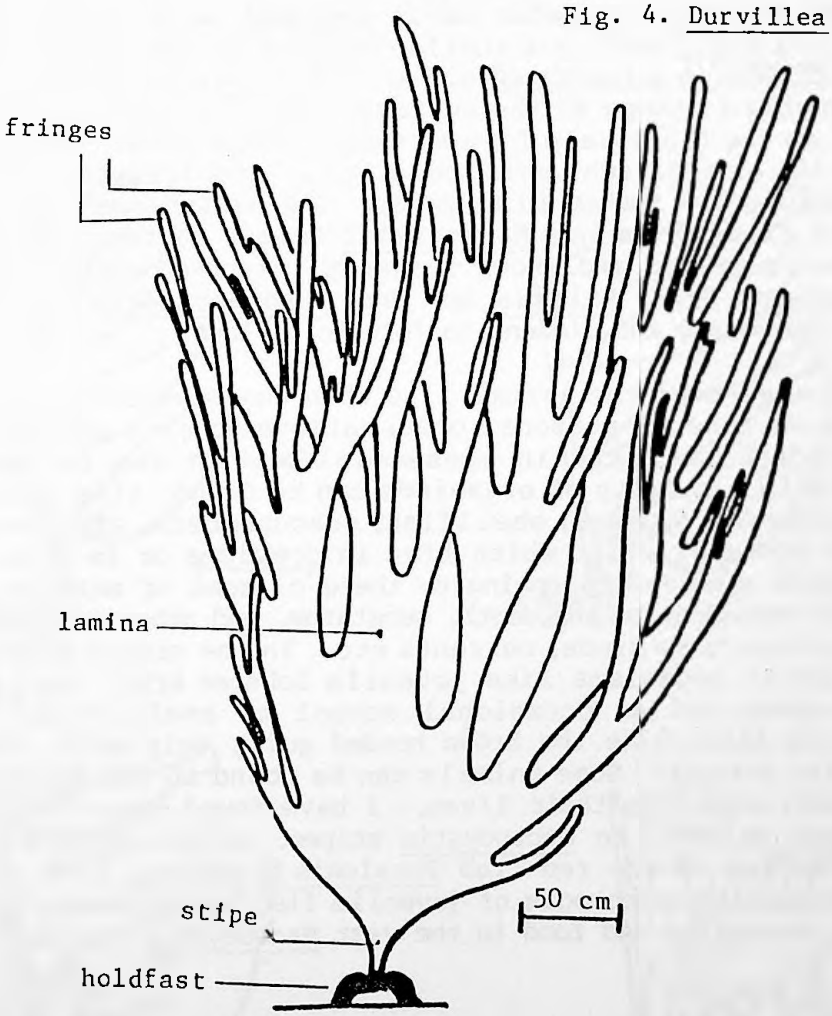


Fig. 4. Durvillea antarctica



Macrocystis pyrifera (giant kelp)

Description and occurence in the Falkland Islands

The huge thallus of Macrocystis pyrifera consists of between several and over 100 fronds, which form a canopy at the surface. A frond consists of a long stipe, which generally reaches a length over 10 metres, bearing a large number of blades (50-80). A blade consists of a long (60-100 cm) lamina with a basal pneumatocyst or bladder. The edges of the laminae are serrated. These fronds are attached to a large, closely interwoven mass of well developed haptera (fig. 6A. & 6B.).

M. pyrifera is the most abundant species of kelp around the Falkland Islands. In sheltered areas this seaweed can fall dry at spring low tides. In exposed sites Macrocystis can be found from a depth of 1.5 to several metres onwards. Provided that proper substratum is available for attachment of the holdfast, M. pyrifera occurs to depths of 20 to 30 metres (fig. 7A. & 7B.).

Fields of Macrocystis pyrifera

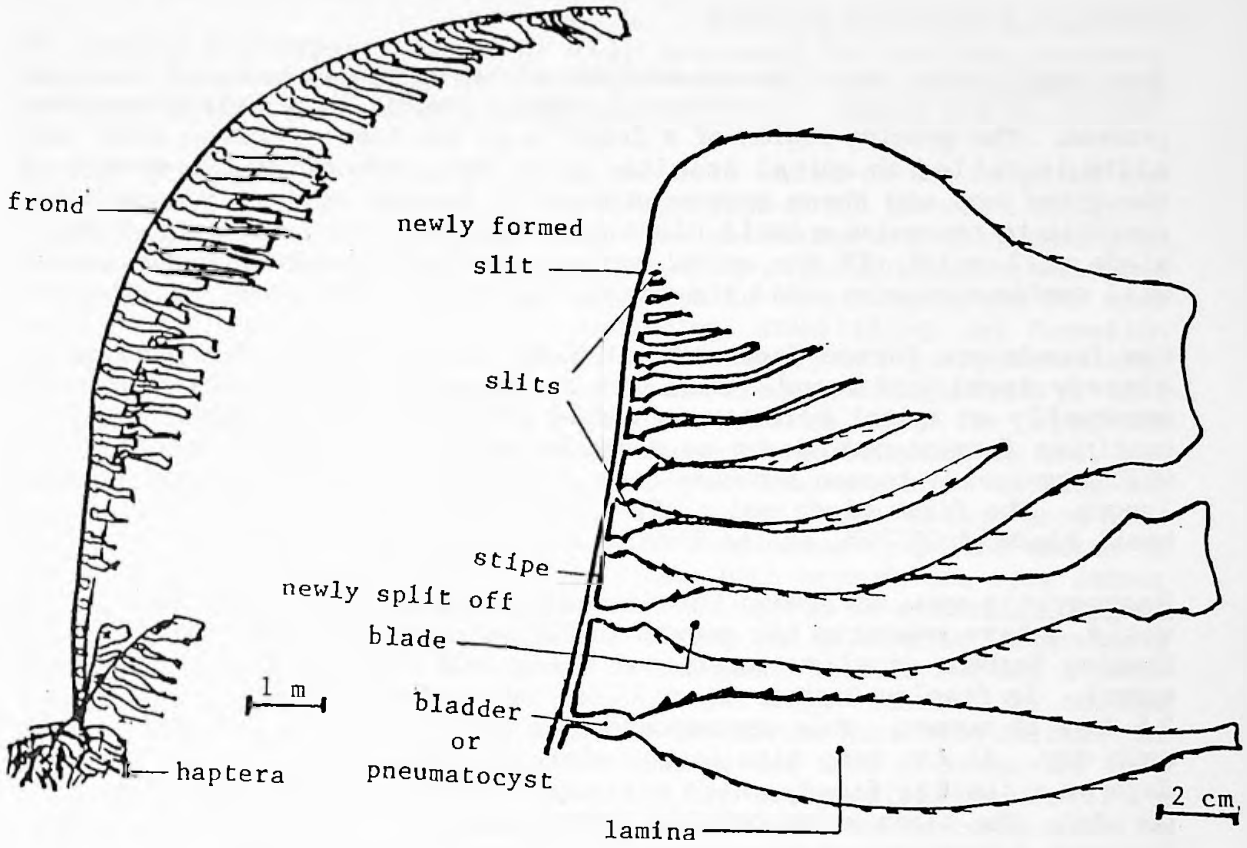
This seaweed occurs in extensive fields along the coasts of the Falkland Islands. Although these fields are an obvious part of the landscape virtually nothing is known about them.

In some ways the Macrocystis fields can be compared with forests on land. The seaweeds in a field grow in a similar pattern of vertical layers as the trees and plants in a forest (fig. 8.). The M. pyrifera thalli, with the blades forming a canopy at the surface, can be compared with trees which as well as the giant kelp form a canopy. This canopy takes away a large proportion of the light available to the undergrowth. Lessonia flavicans resembles the bushes in a forest. The herbal layer in forests (ie grasses and flowers) is in a Macrocystis forest represented by many different species of red and brown seaweeds. Stone-encrusting seaweeds like Lithothamnion spp., Ralfsia sp. and Hildenbrandtia sp. can be compared with the mosses and lichens in forests on land.

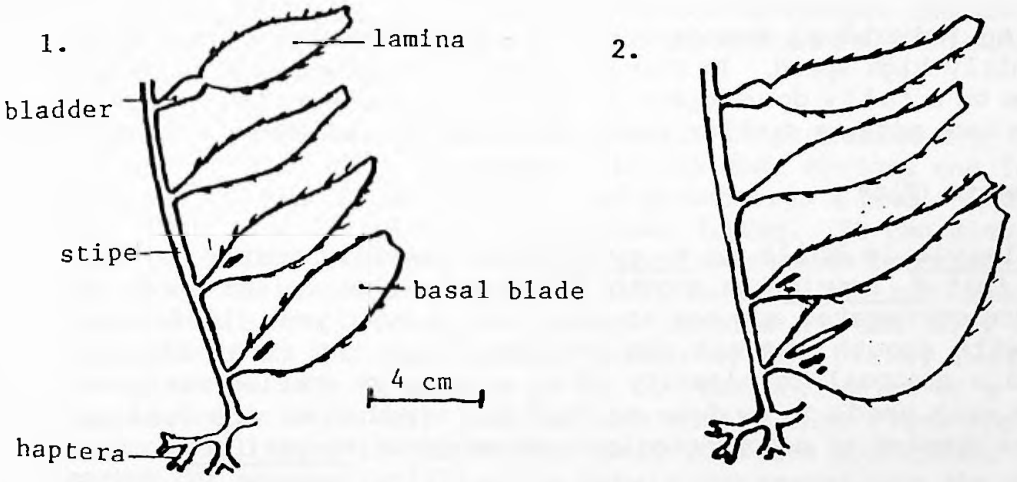
Even less is known about the animal life than the seaweeds, and I will only mention some general personal observations to give an impression about the abundance of life in these fields. On the bottom of a Macrocystis field a variety of organisms can be found, like tunicates, bryozoa, polychaetae, sponges, shellfish, seacucumbers, starfish, sea-urchins, crabs and small fish which live in crevices or in between the undergrowth. Which species, belonging to these classes of animals, occur in the field is dependent on the depth, substatum, and other environmental factors like exposure to winds, currents etc. In the canopy there is an abundance of small organisms like juvenile lobster krill (Munida sp.), amphipoda, isopoda and an occasional school of small fish. These organisms attract birds like the brown hooded gull, kelp gull, rock and king cormorants, tern etc. Some animals can be found in the Macrocystis fields at certain stages in their lives. I have found eggs of the small squid Loligo gahi attached to Macrocystis stipes. From literature it is known that juveniles of the red crab Paralomis granulosa live in these fields. I have seen large schools of juvenile fish in between M. pyrifera which look for protection and food in the vast Macrocystis fields.

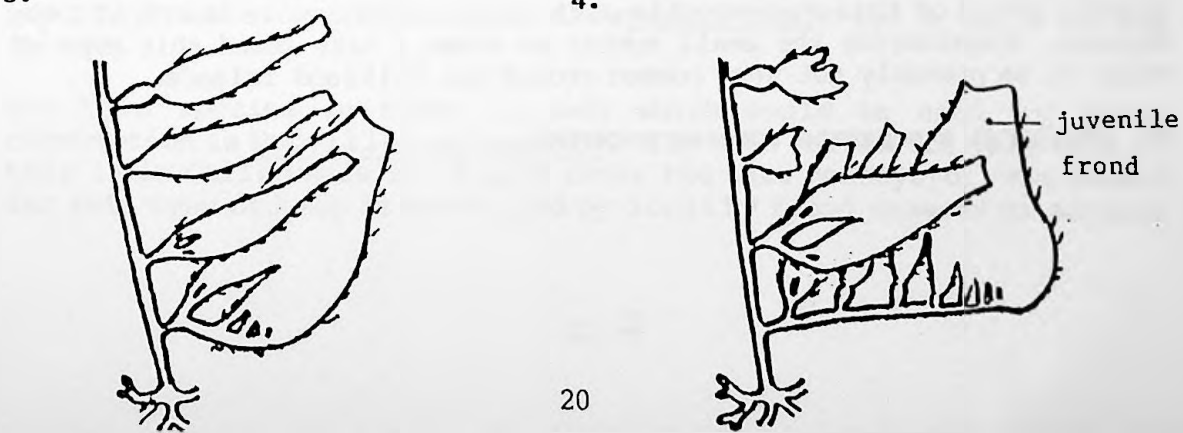
A. Thallus

B. Apical scimitar



C. Development of new fronds





Growth of Macrocystis pyrifera

Macrocystis spp. are, from an anatomical point of view, one of the most complex algae known. Consequently their growth is a fairly complex process. The growing region of a frond is at the tip: a lamina with many slits is called an apical scimitar (fig. 7B.). New slits are formed at the upper end and these become gradually larger, and very soon it is possible to recognise a small blade with a bladder and lamina. This small blade will split off the apical scimitar and the bladder and the lamina will continue growing until the lamina reaches a length of 60 to 100 cm.

New fronds are formed from a basal blade positioned at the base of an already developed frond. Small slits appear in this basal blade and eventually an apical scimitar is formed (fig. 7C.). This apical scimitar continues forming new blades as described above, and this juvenile frond will eventually become a mature canopy-forming stipe of more than 10 m in length. The first blade split off the newly formed apical scimitar is a basal blade which can, in its turn, develop into a new frond.

Macrocystis spp. are among the fastest growing macro-organisms in the world. I have measured the growth in two sites in the Falkland Islands, Stanley Harbour (shallow water) and Kelly Rocks in Port William (deeper water). In Stanley Harbour a new blade is formed on a mature stipe every 2.5 days in summer. This corresponds with a growth in length of 4 to 5 cm each day. At the same site in the winter a new blade is formed every 5 days on a similar frond, which corresponds with a growth of 1.5 to 2 cm per day. The giant kelp at Kelly Rocks grows even faster. In the summer it takes 2 days before a new blade is formed at a mature frond. Such a frond grows 10 to 15 cm per day.

Not only do the individual fronds grow very fast, new fronds are also formed at a fairly high speed. In Stanley Harbour one new frond is formed every 1.5 days on a fully developed, large plant in the summer. In the winter, at the same site, a similar plant develops one new frond per week.

Macrocystis laevis (?)**

Macrocystis laevis is built as M. pyrifera. The only morphological difference is that M. laevis has smooth and firm laminae whilst those of M. pyrifera are corrugated and not as firm. Only last year (1986) this Macrocystis with smooth laminae was mentioned for the first time in literature and a proposal to classify it as a separate species was made. However, more work needs to be done to find out whether we are dealing with a separate species or a morphological variation of M. pyrifera.

I have found several fronds and juvenile plants of this type of giant kelp washed ashore in various sites around the Falklands. Only once have I found a field of this Macrocystis with smooth laminae, ie North of Cape Dolphin. Considering the small number of times I have found this type of kelp, it is probably not very common around the Falkland Islands.

** Status as a separate species uncertain.

Economic uses for kelp

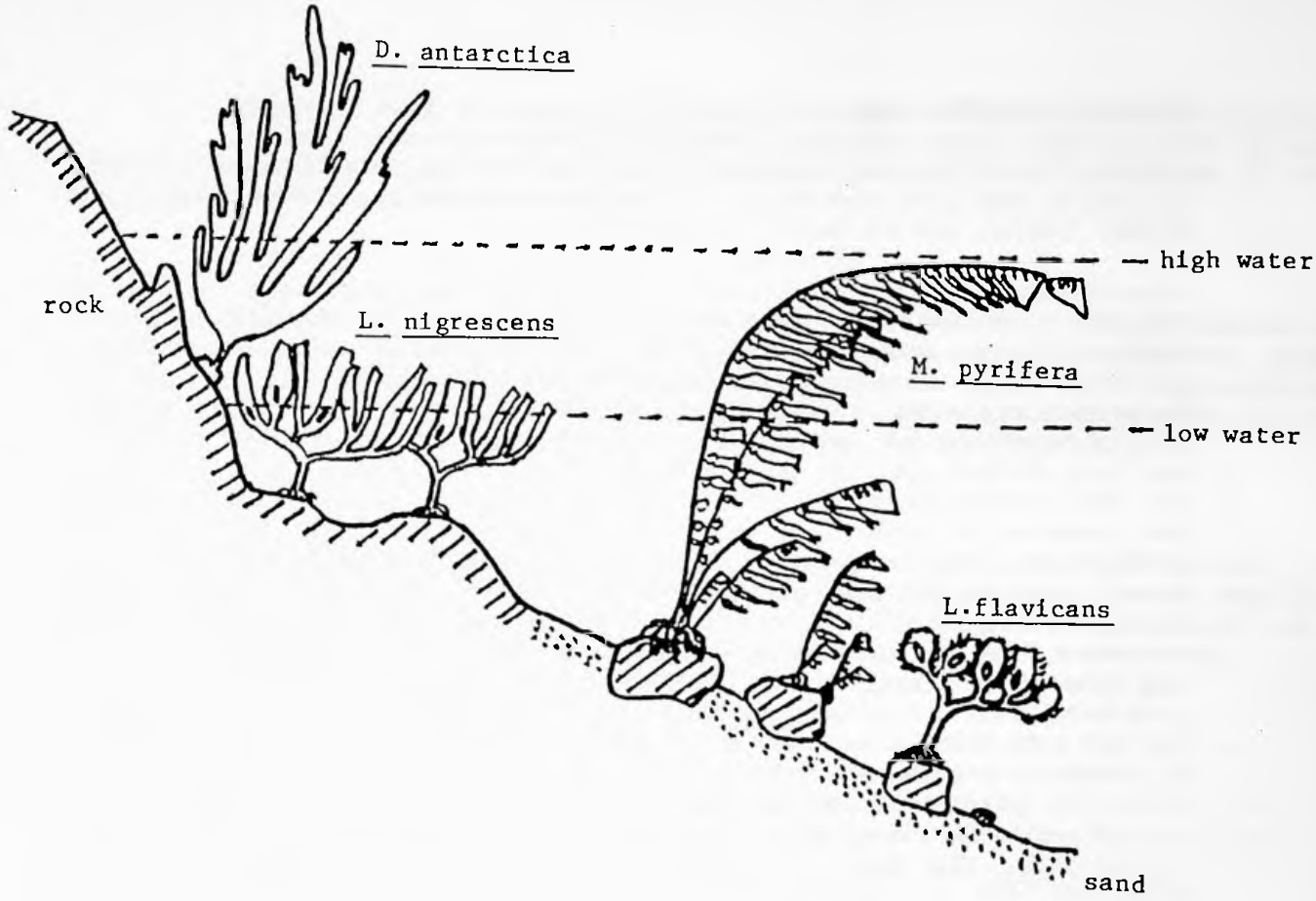
At present different species of kelp are used for various economic purposes, the main ones being for alginate production, fertiliser (and animal fodder) and for human consumption.

Alginic acids are the constituents of the cell walls of the kelp and the structure is similar to that of cellulose from which the cell walls of land plants are made. However, cellulose molecules are long chains of glucose whilst alginic acids are composed of sugar acids, the main one being mannuric acid. A solution of alginates is very viscous and its uses mainly depend on its properties of thickening, stabilising, gel formation and film formation. The main branches of industry using alginates are: the textile industry, the food industry and the cosmetic industry. All the species of kelp in the Falklands could be used for alginate production. However, Macrocystis is the most obvious one to use, not because its content of alginic acids is higher than any other species but because it is easier to harvest. Durvillea and Lessonia spp. grow near the shore line and harvesting can only be done manually on the shores at low tide or with small boats at high tide. Both methods are very labour (and cost) intensive. Macrocystis, however, grows in extensive fields further away from the shore and the harvesting can be done in larger boats in a more mechanical way. The canopy of the giant kelp is cut off 1 metre below the water line and brought on board the ship. Feasibility studies for the exploitation of kelp for alginate production have been carried out in the past. The conclusion of these studies was that although the kelp resources were unlimited it was economically not possible to install a processing plant in the Falklands. The capital and running costs would be higher than anywhere else due to the lack of sufficient energy, skilled labour, infrastructure, fresh water supply and high transport expenses. At present the demand for alginates is low as cheaper chemical substitutes are being found and the demand is at the moment fulfilled by processing factories elsewhere.

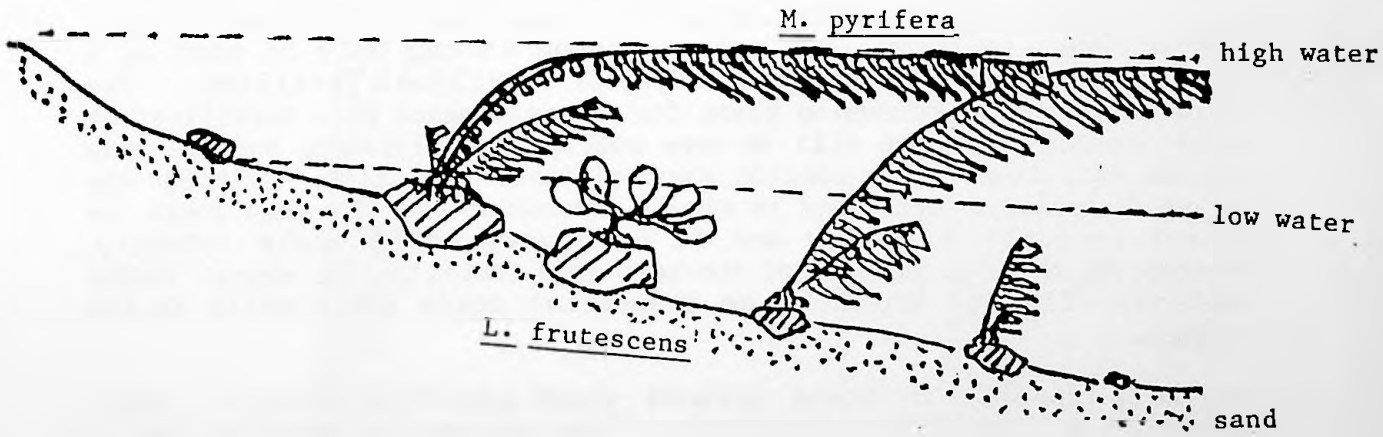
Each of the 5 (7) species of kelp could be processed for fertiliser or animal fodder. Again Macrocystis is the most obvious one for harvesting reasons. The kelp can be dried and ground into a meal. This meal can be used both as a fertiliser or as animal fodder. It can also be processed into a liquid fertiliser for which many extraction processes are possible. Although the mineral content of kelp is high, the nitrogen and protein content are very low. For these reasons it can only be used as a supplement to the usual animal fodder or artificial fertiliser. The installation of a processing plant for the production of a fertiliser or animal fodder from kelp will be more costly than elsewhere for the same reasons as listed in the section about alginate production. Although the market for seaweed fertiliser is slowly increasing over the past years the demand is still very low and it is a very small scale industry. Considering this, processing of the kelp into fertiliser or animal fodder probably will not happen on an industrial scale for a while in the islands.

The kelp species in these islands which could be used for human consumption is Durvillea antarctica. The main market for this type of kelp is in Chile where it is sold under the name cochayuyo. The demand for this type of kelp is fulfilled by locally found seaweed or seaweed

species of kelp found on these shores



B. Sheltered sandy shore



imported from elsewhere in South America. As for the use of kelp for alginate production and fertiliser or animal fodder, exploitation of kelp for human consumption is, in my opinion, unlikely to happen in the Falklands in the near future.

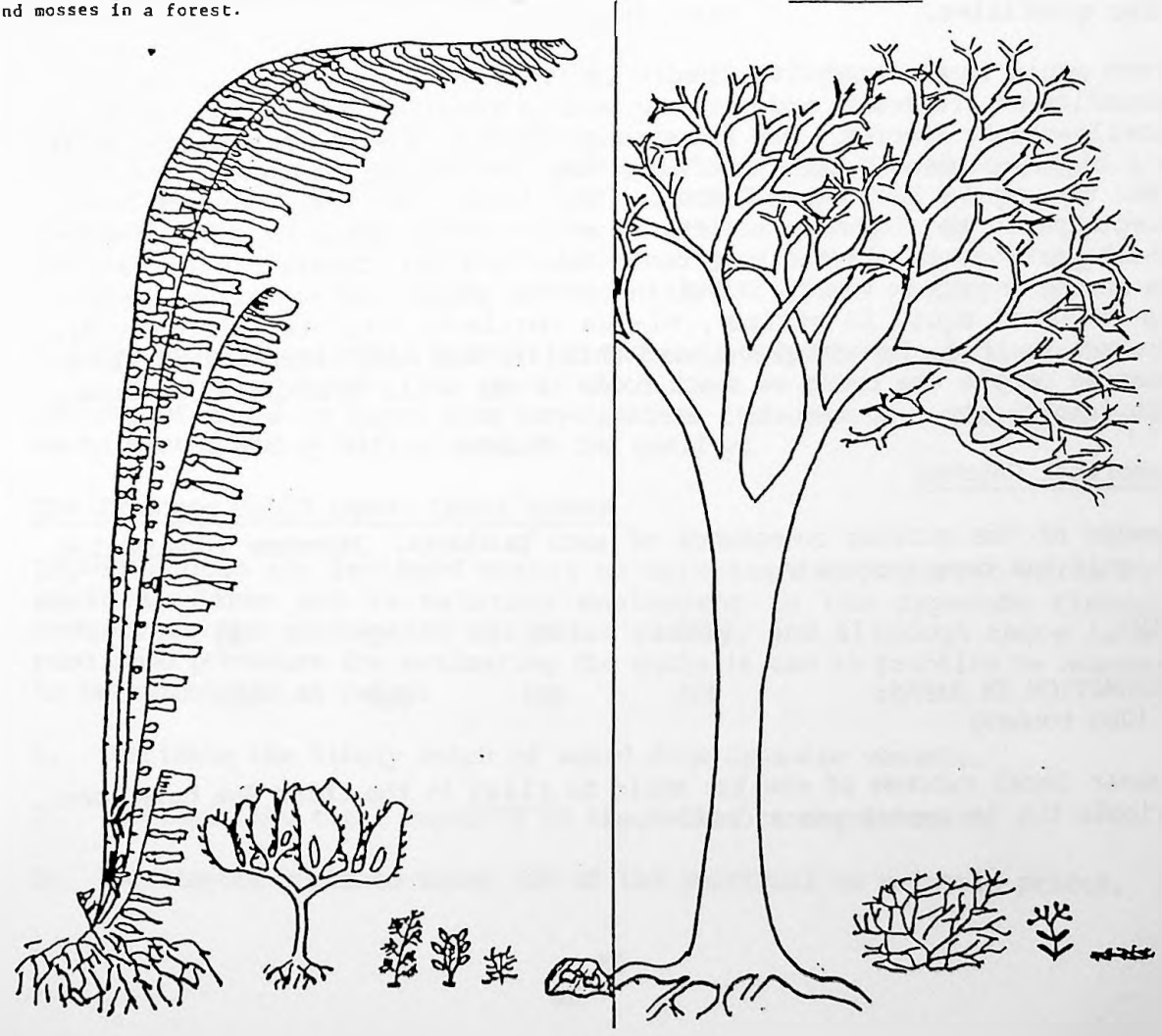
Footnote 1. The main division of seaweeds

Seaweeds are divided into 3 main groups after their colour caused by certain pigments. These 3 division are: green algae (Chlorophyta), brown algae (Phaeophyta) and red algae (Rhodophyta). The way of reproduction and the chemical composition of cellwalls and reserve substances are, as well as the pigments, distinctive features for each division.

Footnote 2. Terminology

Seaweeds are completely different from the more complex land plants like trees, shrubs, grasses and flowers (ie vascular plants). It is therefore inappropriate to give the same names to the parts of a seaweed and a vascular plant, even though these parts look similar in some cases. So a complete seaweed is not referred to as a plant but a thallus. It is not correct to talk of the leaves of a seaweed, the leaflike structures are called laminae or blades. The structure which attaches the seaweed to the substratum is named holdfast. Some holdfasts consist of rootlike structures called haptera. See the figures of the species of kelp for further explanation of the names given to the various parts of a seaweed.

Fig. 8. Schematic drawing comparing the vertical layers formed by seaweeds in a Macrocystis field and the trees, plants and mosses in a forest.



ARGENTINE SHORTFIN SQUID

by Ken Patterson

1. Introduction

There are five important fisheries around the Falkland Islands. These are for the southern blue whiting Micromesistius australis, for the hoki or whiptail hake Macruronus magellanicus, for the hakes Merluccius polylepis and M. hubbsi, for the common or Patagonian squid Loligo gahi, and for the Argentine short-finned squid Illex argentinus. Although other species may at times make up a valuable by-catch (for example kingklip, Genypterus blacodes; southern cod, Salilota australis) they are usually of comparatively small commercial value. Of all these the fishery for Illex argentinus is the most valuable.

2. The Markets for Illex argentinus

By far the major market for Illex is in Japan, although small quantities are sold also in Spain, Taiwan and Korea. Japanese people traditionally eat a lot of seafood because of the large population of the country and scarcity of good farmland. There has been a long history of squid fishing in Japanese waters from small boats using hand-lines, but from the 1950s onwards there was a progressive increase in the squid fishery due to postwar recovery and investment. In the 1960s new methods were developed for processing squid that enabled it to be sold in the Japanese market in large quantities.

Fresh squid is an expensive luxury in Japan. Japanese people are very demanding of freshness and quality, and in addition prefer the taste of locally-caught species. New and strange species of squid can best be sold in a highly-processed form that disguises the strange taste and the fact that the squid has been frozen. The form that has found a ready acceptance in the Japanese markets is as processed squid in small ready-to-eat portions in plastic bags containing 50-100g. Typical products are ika-moromi (squid in miso), ika-mirin (in red pepper and soy sauce), yaki-ika (roasted squid in strips), ni-ika (boiled), koji-ika (fermented), shiokara (salted, fermented and with chilli), and many other preparations. Japanese people use these as snack foods to eat while watching television, with drinks, etc.

Historical Catches

Because of the growing acceptance of such products, Japanese consumption of squid has been increasing:

YEAR:	1980	81	82	83
CONSUMPTION IN JAPAN: (x 1000 tonnes)	455	489	559	587

However local catches of similar squid to Illex in the China Sea have been variable but in recent years declining:

YEAR:	1978	79	80	81	82	83
JAPANESE DOMESTIC SQUID CATCH (x 1000 tonnes)	234	234	379	260	248	227

Peak catches were achieved in 1968 at 774,000 tonnes, so there has been a considerable decline in catches which can be attributed to poor fishery management. This is largely because these squid stocks are shared between South Korean, North Korean, Japanese and USSR waters and there is no overall management strategy. Additionally fishery management within Japan is the responsibility of local "Sea Area Fisheries Adjustment Committees", whose main aim is to keep employment (and therefore fishing effort) high. As there is no unified stock management policy the stock is overfished and catch rates are declining. However squid stocks can be very variable from year to year and catches could still increase for a short time.

The shortfall between the high, and increasing, domestic consumption and the declining domestic catch is made good by importing squid from foreign fishing nations and by Japanese vessels fishing in foreign waters. There are three main squid fishing areas outside Japan: There is a fishery in New Zealand for Nototodarus gouldi, off Newfoundland for Illex illecebrosus, and also the Patagonian shelf fisheries for Illex argentinus. There is also a stock of Illex illecebrosus in the waters of the USA, but this is not very accessible at the moment to Japanese fishermen due to the very strict fishery licensing regulations. The total catches in recent years from these areas were:

YEAR:	1978	79	80	81	82	83
AREA:						
Japan	549	600	757	564	608	604
New Zealand	36	42	79	62	70	75
Newfoundland	96	196	111	69	49	38
Patagonia	73	122	30	53	207	202
Total	754	960	977	748	934	919

x 1000 tonnes total squid catches in FAO areas 61, 81, 21 and 41 (FAO).

Imports of squid to Japan from non-Japanese fishermen are restricted by a quota system and by strict demands for quality.

The Japanese Squid Import Quota System

Import quotas are designed mostly to maintain a high market value for squid in Japan and to maintain employment in the Japanese fishing industry. The quotas are set twice yearly, and although there is no published procedure for estimating the quota it can in practice be assumed to be calculated as below:

1. Estimate the likely catch of squid from Japanese vessels.

2. Estimate the total capacity of the market to absorb squid.

3. Set import quota to about 60% of the shortfall to maintain prices.

4. When allocating import licences, give preference to companies that have Japanese involvement (this has led to the formation of joint venture companies to fish for squid).

Japanese-owned vessels operating overseas need no import licence to land their catch.

Future Prospects for the Illex Market

Squid fisheries can fluctuate widely from year to year, and this is reflected in a very unstable price for squid in Japan. It is therefore scarcely possible to predict with any accuracy what will happen in any given fishery and in any given year. However certain long-term trends can be noted. Firstly it seems as if there is an underlying increase in the Japanese demand for consumption of squid (including Illex). However the domestic squid catch is declining and therefore an increasing proportion of the squid will come from far-seas fisheries.

These fisheries are however becoming progressively more restricted. Almost all coastal states with significant fisheries have a 200 mile Exclusive Economic Zone, and manage the fisheries according to their domestic priorities, typically generating revenue from vessel licences and maximising employment.

The situation where a coastal state will grant licenses in preference to domestic fishermen, together with the quota system described above for Japanese imports, often leads to the formation of cooperative and joint venture agreements of a variety of kinds. This trend seems likely to continue.

The Newfoundland and New Zealand stocks of squid are strictly protected and the fisheries for these squid are licensed and restricted. This increased the attractiveness of the previously unlicensed Patagonian fisheries, so it seemed likely that pressure on this stock would increase.

However there are logistic and political difficulties for Japanese fishermen in exploiting this stock, which has meant that in the past non-Japanese distant-water trawlers have mostly been responsible fro catching the squid and exporting it to Japan. Recently Japanese fishermen have nevertheless been able to exploit the stock themselves, and it seems very likely that they will continue in this and displace the non-Japanese trawlers from exploiting this fishery by virtue of the import quota system (and technical factors).

In conclusion the likely long-term prospects for the Patagonian stocks of Illex is for continued demand and an increase in the proportion of Japanese fishing vessels.

3. The Biology of Illex Argentinus: a summary

Illex argentinus is an annual species. All the adults die after spawning in August and all of the next years' stock are hatched at about the same time. After hatching the young squid are carried in water currents and later migrate over very long distances - some hundreds of miles - during

which they feed and grow very quickly. The main foods of Illex are Galatheid crustaceans and amphipod crustaceans.

When they have grown to nearly full maturity the squid will return to their spawning grounds, lay their eggs and die. The whole cycle takes one year to complete.

Illex are to be found over nearly the whole Patagonian shelf at different times of the year. It looks as if the squid probably constitute a number of discrete stocks. Other taxonomically similar squid have been found to have separate substocks associated with different ocean currents, but with a high degree of mixing between the substocks. Studies of migration are very difficult on squid because they have a high mortality after tagging.

This type of life cycle makes fishery management and prediction very difficult as conventional methods are not applicable. The size of the spawing stock will have an influence on the number of squid available to the next years' fishery, but other factors such as climatic changes, fluctuations in ocean currents and availability of food also have a very strong influence.

4. The South Atlantic Fisheries for Illex

Introduction

As noted above, the Illex stocks are distributed right across the Patagonian shelf, and much of the stocks lie in waters claimed by Argentina. Greatest fishing intensity takes place just outside the limit of Argentine jurisdiction, which can be subdivided for convenience into an area more than 200 miles from the Argentine coast (and so not claimed by Argentina) and the area from which Argentine military vessels are excluded by British military activities (the Falkland Islands Protection Zone, a circle of 150 n.m. radius centred on position 51%40' S 59% 30' W).

In addition to the Argentine domestic fisheries, there are three separate fishing areas available to distant-water fishermen for Illex. These are considered in turn below.

One main area lies at 46%S and 60% 61' W. This is an area where the continental shelf extends beyond the Argentine 200 mile limit. The Illex fishery at this area starts around the beginning of January, but the start is variable from year to year.

The Illex fishery to the North of the Falklands and within the FIPZ starts in early March, and continues until late June, when the squid appear to migrate to the north-west and into Argentine jurisdiction. Female Illex grow from ca. 23-26 cm mantle length during this period.

A third fishing ground is exploited far to the North of the Falklands, at about 42% S in July. Only spawing squid of 32-36 cm mantle length are caught here.

This rather complex pattern might suggest that populations of Illex might spawn on the edge of the Patagonian continental shelf during June, July and August. The newly-hatched larvae could then drift northwards in the

Falkland Current, towards coastal feeding grounds around the coast of Northern Argentina. The young squid could then migrate south-eastwards to the spawning grounds, but a substantial amount of feeding and growth probably occurs during the migration.

The Trawling Fleet

Trawling vessles have been fishing in this area for the longest time and are responsible, for the bulk of the catches. The fleet consists mostly of large stern trawlers of approx 2500 GRT, with some smaller trawlers and a few larger ones. Most of the ships of the eastern bloc are about 10 to 20 years old and have ships crewed with some 70 to 90 personnel. Most of the trawlers are registered in Poland, USSR, Spain, East Germany or Korea.

The trawlers are however being displaced by the Japanese, Korean and Taiwanese jigging vessels. These fish by drifting slowly in a large group spread over a wide area. A large freezer-trawler cannot fish in the same area partly because of risk of collision but also because the jiggers attract the squid upwards in the water column and around their vessels.

After the end of the Illex season in August most trawlers either fish for the small squid Loligo gahi to the south of the Falklands, or return to the northern Illex fishing grounds.

The Jigging Vessels

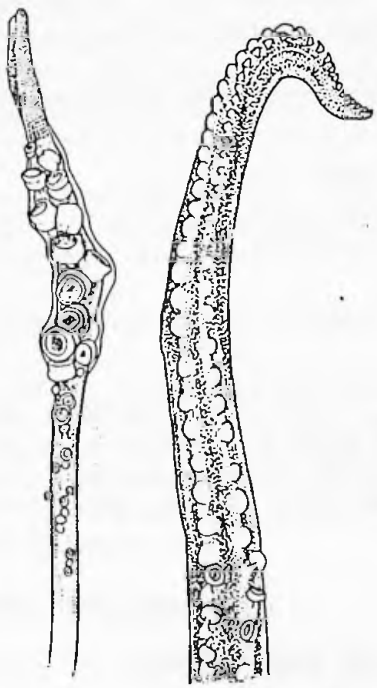
These are much smaller vessels of some 300 to 500 GRT and have a quite different fishing method, which depends on the attraction of squid by light. These boats have rows of powerful lights suspended above the deck, as much as 150KW. They fish at night, the boat held steady in the water with a sea anchor, and squid are attracted from over a wide area by the lights. The squid gather in a shoal below the boat and are caught from there. Rows of automatic machines on either side of the boat repeatedly drop and retrieve weighted lines with sets of plastic lures bearing hooks. the line is wound in over an elliptical drum so that the lures move jerkily up through the water. Squid which have been attracted by the lights attack the lures and are impaled on the hooks. The hooks are barbless, so when the lures are wound inboard and turned upside down the squid fall off. An arrangement of chutes and watercourses leads the squid to the processing deck where they are packed neatly and frozen in blocks.

The jigging vessels make shorter trips than the trawlers and are less self-contained than these ships. Their fish holds contain on average some 300 tonnes of squid, so they can only make short trips. Their crews are only of some 20 men, yet their catch rates can equal those of the trawlers, making these ships very profitable and efficient.

5. A Stock Assessment for Illex argentinus in the FIPZ

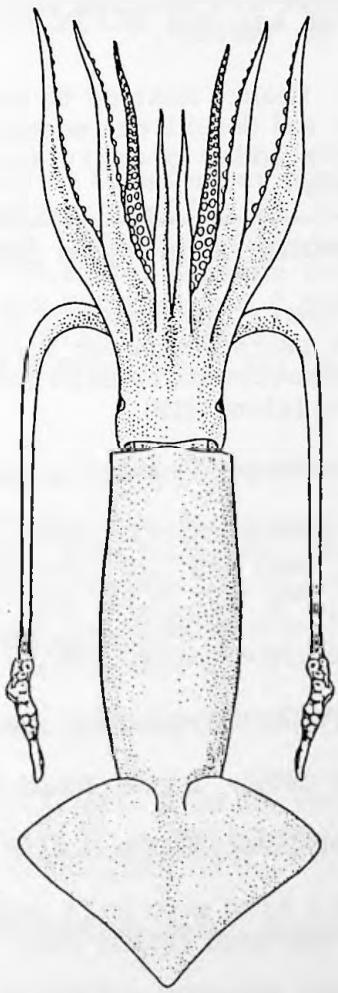
As noted above, the short life-cycle of squid make any accurate estimation of stocks by conventional methods very difficult. Perhaps the best method is to consider stock-recruit relationships. Csirke (1987) gathered data to do this from various of the fishing nations (Fig. 1). This showed that stocks of Illex did not show any very clear stock-recruit relationship over the years in question; indeed after the year of lowest spawning stock

size, recruitment was greatest. This suggests that fishing for Illex can safely be allowed to reduce the spawning stock size to 1985 levels. However fishing in 1986 greatly exceeded this safe level, leading to fears that the fishery would be depleted.



tentacular club

arm IV of male hectocotylized



dorsal view

FALKLAND BIRD REPORT

The following is a list of unauthenticated reports which have been submitted to the Editor. Reports have been credited with the observers initials in brackets where this information is known. A list of contributing observers is at the end of the report.

It will be seen from many of the species' entries that very little has been reported and much more information is still to be recorded. All records of all species would be very welcome to be included in future issues of "Warrah".

Special thanks must go to Bill Bourne and Bill Curtis for the quantity, quality and detail of records submitted. They have been quoted many times and have added greatly to the knowledge of the seabirds around the Falklands.

KING PENGUIN Aptenodytes patagonicus

Birds known to be breeding in 1986/87 season: 1 pair Sea Lion Island (TC, DG); 192 pairs Volunteer Point (SW); 9 pairs Lagoon Bar, Volunteer (SW); 1 pair (unsuccessful) Bold Point, Bluff Cove (AD); 1 pair (unsuccessful) Saunders Island (TP).

GENTOO PENGUIN Pygoscelis papua

The following colonies have been noted: 3 near Port Stephens, N side of Fanning Head, Smylies Creek (250 pairs), E side of Speedwell Island, Bull Harbour (WB, WC); Bluff Cove Lagoon (500-1000 pairs), Bertha's Beach (200 pairs), Bottomless Pond, Fox Bay East (783 pairs) (AD); Kelp Point, Fox Bay East (1000 pairs) (SW).

ADELIE PENGUIN Pygoscelis adeliae

February 1986: 1 bird found dead on Carcass Island (RMc).

CHINSTRAP PENGUIN Pygoscelis antarctica

10.12.83 1 bird seen Gull Island near Port Louis (MM); February 1986: 1 bird on Sea Lion Island (AA).

ROCKHOPPER PENGUIN Eudyptes crestatus

Recorded at Stephens Peak to a height of 350 feet (5,000 pairs) (BB) in 1983; 2 colonies on N side of Fanning Head (1,000 and 250 pairs) in 1985 (WB). There was heavy mortality of non-breeding and breeding Rockhoppers in some colonies between February and May 1986. the cause is unknown but starvation is involved. New Island, West Point Island, Jason Islands and other N and NW of the islands were badly affected. Others such as Sea Lion Island and Beauchene were not believed to be affected. A full report should be published soon.

MACARONI PENGUIN Eudyptes chrysolophus

Birds known to be breeding in 1986: 1 on Kidney Island, 1 on Sea Lion Island. There may be cross-breeding with Rockhoppers.

MAGELLANIC PENGUIN Spheniscus magellanicus

An extremely numerous and widespread species. Nesting in large colonies spreading from the shoreline to over a mile inland. First records of season were several birds on Sea Lion Island on 20.9.86 (LM) and 30 birds on 28.9.86 at Gypsy Cove (SW).

WHITE TUFTED GREBE Podiceps rolland rolland

A widespread species in small numbers. Breeds on fresh water ponds but will frequent the seashore during winter. SW reports 23.2.86: 4 birds Bertha's Beach Pond; 27.3.86: 9 birds on Pebble Island; 28.4.86: 1 bird Fox Bay East; 3.7.86: 1 bird Fox Bay East; 24.8.86: 4 birds Bertha's Beach; 3.8.86: 8 birds Blue Mountain Pond, Fox Bay East and 2 birds on Fox Bay East shore; 8.9.86: 3 birds Pebble Island; 5.10.86: 4 birds Bertha's Beach; 9.11.86: 8 birds Bertha's Beach Pond; 29.12.86: 4 birds Bertha's Beach.

SILVERY GREBE Podiceps occipitalis

A widespread species which is resident on fresh water ponds. Usually seen in small groups but some quite large groups have been recorded. Probably commoner than previously thought. Several pairs on Sea Lion Island (TC); 3-4 pairs on Swan Pond, Fitzroy (AD); November 1986: 40-50 birds at Hawks Nest Pond (AD); 8.9.86: 2 birds Pebble Island (SW); 29.11.86: 5 birds on Swan Pond, Fitzroy (SW).

GREAT GREBE Podiceps major

March 1986: 2 birds at Mare Harbour (MS); 21.12.86: 1 in Chabot Creek (Johnsons Harbour) (LC, CM). This bird was joined by a second on 19.1.87, after very heavy rain. Both stayed until at least 1.2.87 (MM).

GREAT (WANDERING AND ROYAL) ALBATROSS Diomedia exulans and D. epomophora

WB and WC report "The great albatrosses tend to gather over the tide-rips off the headlands and around the fishing fleets, where they spend much time on the water when the wind drops so that they can be examined at close quarters. Their identification still presents problems, however, because while the species can then often be told apart by the presence or absence of the dark cutting edge to the upper jaw found in the Royal Albatross, the races of that species can often only be told apart when they start to fly and show the characteristic markings of the upper wing, when the southern race **D. e. epomophora** of Royal Albatross may become difficult to distinguish from white old male Wandering Albatrosses (although the ringed birds recovered in the Falklands have belonged to this form). In general although the Wanderer appears to be the normal species out at sea, it usually appears to be much scarcer over the continental shelf except when it is blown inshore by east winds.

Great Albatrosses seen in 1986

Observation Hours	N Royal	S Royal	Unident Royal	Total Royal	Wandering Albatross	Unident Great	Combined Total
106.5	166	157	42	365	56	139	560"

BLACK-BROWED ALBATROSS Diomedia melanophris

WB and WC report that "Although this species is sometimes described as a migrant, vast numbers remain out at sea around the fishing fleets in the winter, when GSC also saw many between Punta Arenas and the Falklands in mid June 1984, although it was scarcer out at sea to the west. BB observed that they tend to gather at both ends of Falkland Sound."

SHY ALBATROSS Diomedia cauta cauta

26.6.84: 1 bird 7 miles off Cape Pembroke and on 6.8.84 1 bird 1 mile off Volunteer Point (WB).

GREY-HEADED ALBATROSS Diomedia chrysostoma

This highly pelagic species is only seen regularly beyond the 100 fathom line to the east, where some feed around fishing fleets and may come inshore with east winds. GSC only saw a few over the continental shelf to the west when sailing from Punta Arenas to the Falklands between 15-17 June 1984.

YELLOW-NOSED ALBATROSS Diomedea chlororhynchos

WRPB saw only one on the edge of the continental shelf 20 miles south-east of Fitzroy, on 30 September 1983. Possibly past reports that it is commoner out at sea may be due to confusion with the last species.

LIGHT-MANTLED SOOTY ALBATROSS Phoebetria palpebrata

14.9.83: 3 birds 40 miles E of Stanley (WB).

SOOTY ALBATROSS Phoebetria fusca

11.3.85: 1 bird 50 miles SSW of Cape Meredith (WB).

NORTHERN GIANT PETREL Macronectes halli

Reported to have bred on Beauchene Island for some time (IS). Individuals were seen by WB out at sea at 51 46' S 56 14' W on 1.11.83; N of Falkland Sound on 27.7.84; 15 miles SSW of George Island on 20.4.84; 20 miles north of Cape Bougainville on 26.4.85; at 49 31' N 58 58' W on 11.5.85; off Volunteer Point on 27.3.86. Some were very pale below with a darker crown and breast-band similar to the paler birds breeding at South Georgia.

SOUTHERN GIANT PETREL Macronectes giganteus

Several white individuals were seen in and around Albemarle Harbour during a southerly gale on 3-5 June 1984 (WB). 85/86 season had 1 successful pair on Sea Lion Island while the 86/87 season had 5 successful pairs (SW). 30.3.86: 17 pairs on Pebble Island (AD); 6.10.86: 2 birds of the white morph seen flying S past Cape Pembroke (AD, SW).

ANTARCTIC FULMAR Fulmarus glacialoides

Appear early April until late November. 14.5.86: 500 off the Jasons (WC); 8.11.86: 500 Port William (PD). Very commonly seen from the shore.

PINTADO PETREL (CAPE PETREL) Daption capense

Commoner in winter and further out to sea. 9-10.10.83: 100 birds between southern Falkland Sound and Sea Lion Island (WB); 6.12.84: 10 birds 30 miles E of Port William and 17.1.85: 1 bird in Port William (BB); 8.11.86: 4 birds Port William (PD) and 10 birds Port William (AD); 6.10.86: 5 birds off Cape Pembroke (SW); 6.12.86: 4 birds off Cape Pembroke (SW).

SNOW PETREL Pagodroma nivea

13.10.85: 1 bird 10 miles N of Falkland Sound (BB).

ATLANTIC PETREL Pterodroma incerta

6.12.86: 1 bird seen flying N past Cape Pembroke during Southerly gale (SW).

KERGUELEN PETREL Pterodroma brevirostris

5.9.83: 5 birds 20 miles E of Port William; 14.9.83: 29 birds on the approaches to Port William; 22.9.83: 1 bird 6 miles NE of Pebble Island (WB).

SOFT PLUMAGED PETREL Pterodroma mollis

6.1.85: 1 bird 10 miles E of Cape Pembroke (BB); 10.3.85: 7 birds 80 miles N of Macbride Head (WC); 1.4.85: 7 birds 80 miles N of Macbride Head (WB); 5.4.85: 5 birds 50 miles E of Cape Pembroke (WB); 20.4.85: 1 bird 10 miles SW of George Island (WB); 28.2.86: 1 bird in south Falkland Sound (WC); 1.3.86: 2 birds E of Volunteer Point (WC); 1.3.86: 1 bird 12 miles of Cape Meredith (WB); 3.3.86: 2 birds 12 miles N of Cape Bougainville (WC); and on 9.3.86: 14 birds E of Port William before reaching the 100 fathom line.

DOVE PRION Pachyptila vittata desolata

WB and WC report "Small numbers were seen regularly among the prion flocks feeding along the edge of the continental shelf in the summer, when the birds were often in moult and may have been immature. They may form a higher proportion of the flocks out at sea in the winter, though they were seldom seen well then. Good views of individuals were obtained by WB at

various localities offshore including two in the Falkland Sound off Elephant Cays on 15 November 1983 and one south of Falkland Sound on 20 April 1985."

FAIRY PRION Pachyptila turtur

Seen occasionally along the edge of the continental shelf (WB).

THIN-BILLED PRION Pachyptila belcheri

WB and WC report "The common prion at sea in the summer, when vast numbers take part in a concentrated eastward movement off the north coast and a more diffuse movement out to sea off the coast in the mornings to feed in flocks of thousands along the edge of the continental shelf during the day, returning in the evenings. It is difficult to be sure about the situation in the winter, when the number of prions declines and they can seldom be seen so well, but this species still appears to occur in the smaller prion flocks which remain offshore, though many birds migrate north. Thus in 1984 WB saw 1,125 prions off the Jasons on 12 June and 338 off the Passage Islands on 16 July, and WC also saw 2,000 at 51 55' S 56 35' W, on the edge of the continental shelf 35 miles off Cape Pembroke, on 8 July. In 1985 the winter records include 2,610 seen over pilot whales 18 miles ESE of Cape Pembroke on 21 May, 3,000 at 52 12' S 55 44' W, 60 miles SE of Cape Pembroke, next day, 1,100 15 miles SE of Beauchene Island on 24 May, 1,100 10 miles NNW of Volunteer Point on 1 June, and 2,500 10 miles off Macbrides Head on 21 June."

GREY PETREL Procellaria cinerea

This species occurs regularly over deep water out at sea to the east, but seldom comes inshore. Thus WC saw up to 80 around the task force 100 to 200 miles to the east of the Falklands in May and June 1982, up to 9 to within about 10 miles of Port William during passages between the Falklands and South Georgia in February, March and June 1986, and 2 birds 15 miles east of Bluff Cove on 27.2.86. Birds have also been seen along the edge of the continental shelf in November 1983 and April 1985 and 1986, with one 35 miles north of Cape Dolphin on 21.3.85 (WB).

WHITE CHINNED PETREL Procellaria aequinoctialis

This species breeds on Kidney Island in a colony of over 100 pairs. Not known to breed elsewhere. Burrows on Kidney Island were being renovated by returning adults on 16.9.86 (AD). Individuals are widespread out at sea throughout the year, though they are much commoner in the summer than the winter, with a maximum of about 80 birds seen per hour around the vessels fishing along the edge of the continental shelf.

CORY'S SHEARWATER Calonectris diomedea

5.3.86: 1 bird 8 miles E of Volunteer Point (WC).

GREAT SHEARWATER Puffinus gravis

Known to breed on Kidney Island though only a small colony of about 10 pairs (SW). Not now thought to breed on Sea Lion Island. Seen commonly over deep water throughout the summer with numbers building up along the edge of the continental shelf during the summer (WB, WC). Less common inshore although seen regularly. 27.4.85: 146 birds off Cape Dolphin (WB); 6.5.85: 177 birds off Cape Dolphin (WB). 30.3.86: a few were seen off Kidney Island (AD). WB and WC report that last sightings in the autumn are 14.5.84, 10.5.85 and 12.5.86.

SOOTY SHEARWATER Puffinus griseus

Breeds on Kidney Island in a large colony (5,000+ pairs) and on Sea Lion Island in a very small colony, maybe under 20 pairs (SW, TC, DG). On 23.11.86 5000 birds were seen on the south side of the Tussac Islands in Port william (SB).

WC and WB report: Parties recorded by WC from 10.7.84 when there was an influx of a variety of birds with the onset of east winds during the winter. Becomes widespread over the continental shelf from August, with flocks gathering in the areas of tidal turbulence off Berkeley Sound in the east and around the western islands, though eastward movements along both the north and south coasts in the evenings suggest that more birds nest in the east. The largest total of 1080 birds was seen by WC 5 miles off Albemarle on 6.4.86, after which the numbers fell rapidly, and the last birds of the season were recorded on 7.5.85 and 11.5.86.

LITTLE SHEARWATER Puffinus assimilis

3.4.86: 1 bird seen at 50 08' S 57 03'W, 85 miles north-east of Cape Bougainville (WB).

WILSON'S STORM PETREL Oceanites oceanicus

8.11.86: 40 Port William (PD, RM); 12.11.86: 10 Cape Pembroke (PD). WB and WC report " Locally abundant at times along the edge of the continental shelf to the south and off the entrances to some of the sounds (especially Falkland Sound). First seen on 8.10.83, with a spring maximum of 677 in 30 minutes off the Eddystone Rock at dawn on 19.11.83. Autumn maximum 737 in 70 minutes west of George Island on the afternoon of 1.3.86, with hundreds in April, tens in May, and occasional birds until 10.7.84."

GREY-BACKED STORM PETREL Garrodia nereis

"Widespread over the continental shelf in summer, where it often feeds over drifting kelp. First seen on 21.10.83, with maximum of 26 in 30 minutes over the shelfbreak to the north on 11.11.83 and 78 in 20 minutes 20 miles west of Steeple Jason on 20.3.86 last seen on 27.5.84. Between 15.2.86 and 7.4.86 3 birds in Port William, 1 bird in San Carlos Water and 1 bird west of Weddell Island, all of them young" (WB, WC). 8.11.86: 1 bird in Port William (RM).

WHITE-FACED STORM PETREL Pelagodroma marina

One was brought by a Peregrine to HMS Hermione 20 miles south of Falkland Sound on 26.3.86 (AR). It was the same size as Wilson's Storm Petrel with head marking similar to a White-faced Storm Petrel, dark primaries, white underparts, and the legs with dark feet and no pale patch on the webs.

BLACK BELLIED STORM PETREL Fregetta tropica

31.12.82: 2 birds off Mengeary Point (WC); 19.11.83: 1 bird 30 miles N of Cape Dolphin (WB); 2.7.84: 1 bird 14 miles N of Falklands and 4 birds 37 miles N of Falklands (WC); 7.2.85: 1 bird off Volunteer Point (AD).

FALKLAND DIVING PETREL Pelecanoides urinatrix berard

Known to breed on Kidney Island where one pulli was found dead in November 1986 (TR, MJ). Occurs locally over the continental shelf, but commonest at its edge, throughout the year (WB, WC). Highest counts are 150 in an hour in the southern approaches to Falkland Sound on 27.5.84, over a school of pilot whales on the edge of the continental shelf 20 miles east of Beauchene Island on 14.7.84, and 84 in 30 minutes 9 miles north of Sedge Island on 31.10.83 (WB, WC).

ROCK CORMORANT Phalacrocorax magellanicus

Common breeding resident. Fishes individually along the shore and in kelp fields.

KING CORMORANT Phalacrocorax albiventer

Breeds in dense colonies around the islands. Feeds individually and in packs. Several hundred birds will swim, dive and hunt together in tight packs. Will generally feed further offshore than the Rock Cormorant. High counts include 1850 birds NW of Pebble Island on 14.6.84; 1500 birds of Beaver Island on 10.7.84. Seen up to 30 miles offshore (WB, WC).

COCOI HERON Ardea cocoi

One bird, probably Cocoi Heron at North Arm late March 1986 (PH); 27.3.86: 1 bird at Dunnose Head (AD).

GREAT WHITE EGRET Egretta alba

One bird, probably Great White Egret, at North Arm late March 1986 (PH).

CATTLE EGRET Bubulcus ibis

1982: 500 miles NE of Falkland Islands; 2 on board RFA Sir Bedivere; 10.4.84: 1 Port William (BB); 11.4.84: 4 Moody Brook (BB); 11.4.84: 2 15 miles WSW of Cape Meredith (RFA Tidespring); 14.4.84: 1 30 miles E of Volunteer Points (N R Essenhigh); 14.4.84: 1 Berkeley Sound (BB); 29.4.84: 1 40 miles SSE Cape Meredith (BB); 30.4.84: 2 Beauchene Island (RFA Tidespring); 16.3.85: 1 San Carlos (WB); 12.3.86: 4 Grytviken (South Georgia); 14.3.86: 2 Stanley (SW); 15.3.86: 2 at Stromness (South

Georgia); 17.3.86: 15 Waimea (IB); 23.3.86: 5 Fitzroy (JS); 26.3.86: 1 Pebble Island (SW); 26.3.86: 1 Saunders Island (SW); 26.3.86: 1 Fox Bay East (SW); 27.3.86: 4 Pebble Island (SW); 28.3.86: 1 Surf Bay (SW); 28.3.86: 1 Stanley (SW); 29.3.86: 7 Fitzroy (JS); 29.3.86: 2 San Carlos (IB); 30.3.86: 8 Cape Pembroke (SW); 3.4.86: Total of 37 in the Hill Cove, Carcass Island area (WC); 4.4.86: 12 Hill Cove (WC); 5.4.86: 7 Hope Harbour (WC); 14.4.86: 6 Stanley Harbour (WC); 15.4.86: 4 Stanley Harbour (WC); 16.4.86: 300 Keppel Island; 16.4.86: 200 Brookfield Farm; 16.4.86: 600 Dunbar; 16.4.86: 500 Saunders Island; 16.4.86: 200 Port Howard; 16.4.86: 200-400 Fox Bay East; 16.4.86: 87 Teal Inlet (ASa); Teal Inlet; 16.4.86: 24 at Western end of Canache (Stanley) (WC), 20 at Eastern end of Canache (Stanley) (WC), 153 to East of Airport Road (near Surf Bay) (WC), c450 flying around FIPASS (Stanley) between 2100 and 2200 during drizzle (WC); 17.4.86: 12 Teal Inlet; 17.4.86: 250 Bold Cove; 17.4.86: 30 Lively Island; 17.4.86: 80 Horseshoe Bay (MG); 17.4.86: c400 East Cove (WC) - seen flying across bay - possibility exists that this could have been the same flock as at Stanley the previous night though there did not appear to be quite as many birds; 18.4.86: 4 San Salvador (SW); 18.4.86: 19 East Cove (WC), 9 flying to the West across Falkland Sound and inland near Albemarle (WC), 3000 MPA (NH); 19.4.86: 1 on board RFA Sir Bedivere in Albemarle Harbour (WC); 20.4.86: 12 Stanley (SW); 20.4.86: 80 Cape Pembroke (SW); 21.4.86: 40 Cape Pembroke (SW); 21.4.86: 4 Dunbar Creek (Byron Sound) (WC); 22.4.86: 7 Hill Cove (WC); 10.5.86: 1 Stanley (IS); 10.5.86: 5 Mullet Creek; 14.5.86: 1 Mullet Creek; 14.5.86: 1 Sea Lion Island.

SW reports that on 20.4.86 there were about 35 Cattle Egrets around Cape Pembroke, virtually all of them huddling out of the light to moderate westerly wind. Only 1 or 2 birds showed any inclination to stalk about to look for food. There were 4 fresh dead bodies and 1 a day old, all eaten by the cats that live on the point.

At 3.50 pm a flight of 20 birds was seen just off to the NE of the point. They were in "V" formation but within minutes had broken into an untidy bunch. They were trying to fly N but were being blown E, giving a NE movement. These birds were definitely migrating, making no effort to return to land. They were watched until more than 2 miles out. A second group, of 23 birds, repeated the performance at 4 pm.

On 21 April 1986 Cattle Egrets were again much in evidence at Cape Pembroke. This was an almost calm day and most of the birds were stalking through the white grass looking for food. Individual birds were making sorties out to sea and then returning. At 3.45 pm a group of 14 arrived on the point from the west. These birds settled on the point for about 3 minutes and then 11 of them took off and flew purposefully due eastward. They gained height to about 200 feet and flew out to sea. They made no attempt to return even though the day was calm. They were watched until about 3 miles out.

BLACK CROWNED NIGHT HERON Nycticorax nycticorax cyanocephalus

Small colony breeding in Schoenoplectus riparius at Hawks Nest Pond (AD). Also reported to be breeding in 1986 at Sea Lion Island, Carcass Island and Darwin Harbour. This species is commonly seen around the shores and wrecks.

BUFF-NECKED IBIS Theristicus caudatus melanopis

October 1981 - March 1982 a single bird at Swan Pond near Macbrides Head (MM); November 1986: 1 bird on New Island (TC); 27.12.86: 1 bird on Beaver Island (KP) which had been there for two weeks (TF).

CHILEAN FLAMINGO Phoenicopterus chilensis

1975: 1 bird, probably this species, was on Saunders Island for some time (TP).

BLACK-NECKED SWAN Cygnus melancoryphus

4.10.86: 45 birds at Swan Inlet (AD, SW); November 1986: 58 Pebble Island (PD); 11.11.86: 65 birds Pebble Island (RM); 15.11.86: about 100 birds in upper reaches of Swan Inlet (RM). In the 1986/87 season a poor breeding success on Pebble Island has been reported due to dry ponds (AD).

RUDDY-HEADED GOOSE Chloephaga rubidiceps

A very common breeding resident normally associated with valley and coastal "greens".

UPLAND GOOSE Chloephaga picta leuoptera

A very common breeding resident and while being densest on valley and coastal "greens" they are found in smaller numbers almost everywhere.

KELP GOOSE Chloephaga hybrida malvinarum

A common breeding resident along rocky shores.

PATAGONIAN CRESTED DUCK Lophonetta specularioides specularioides

A common breeding resident all round the islands, mostly on rocky shores, but also found on fresh or brackish water near the shoreline.

FALKLAND FLIGHTLESS STEAMER DUCK Tachyeres brachypterus

A common breeding species found all round the islands. Collects in large "shedder" clocks which can number several hundred.

FLYING STEAMER DUCK Tachyeres patachonicus

May 1984: 1 bird on Volunteer Lagoon (AD); 3 pairs seen on Hawks Nest Pond (date unknown) (AD); 27.3.86: 2 birds on Pebble Island (SW); 3.9.86: 2 birds Blue Mountain Ponds, Fox Bay East (SW); 8.9.86: 2 birds Pebble Island (SW); 29.11.86: 2 birds Swan Pond, Fitzroy (SW, AD). This species is probably commoner than is normally thought and is under recorded due to difficulties of identification.

SPECKLED TEAL Anas flavirostris

A common breeding resident found on fresh and salt water. Always seen in fairly small numbers.

CHILOE WIGEON Anas sibilatrix

Locally common. 19.11.86: 1 pair on Bottomless Pond, Fox Bay East (AD); 29.11.86: 10 pairs on Swan Pond, Fitzroy (AD); SW reports: "23.2.86: 14 birds Bertha's Beach Pond; 2.3.86: 12 birds Swan Pond, Fitzroy; 27.3.86: 2 birds on Pebble Island; 5.10.86: 5 birds Swan Inlet; 8.11.86: 1 bird Kidney Island; 9.11.86: 5 birds Bertha's Beach; 23.11.86: 2 birds Carcass Island; 29.11.86: 7 birds Swan Pond, Fitzroy; 27.12.86: 4 birds Stanley Airport; 28.12.86: 2 birds Surf Bay; 29.12.86: 8 birds Bertha's Beach."

YELLOW BILLED PINTAIL Anas georgica spinicauda

2.3.86: 40 birds Swan Pond, Fitzroy (SW); 3.9.86: 2 birds Blue Mountain Ponds, Fox Bay East (SW); 29.11.86: 8 birds Swan Pond, Fitzroy (SW); 29.12.86: 4 birds Bertha's Beach (SW).

SILVER TEAL Anas versicolor fretensis

5-10 pairs breeding Swan Pond, Fitzroy in 86/87 season (AD). SW reports: "30.1.86: 2 birds Sea Lion Island; 23.2.86: 9 birds at Bertha's Beach Pond; 2.3.86: 6 birds Swan Pond, Fitzroy; 24.8.86: 3 birds Bertha's Beach Pond; 5.10.86: 1 bird Bertha's Beach Pond; 9.11.86: 1 bird Bertha's Beach Pnd; 29.11.86: 14 birds Swan Pond, Fitzroy; 27.12.86: 1 bird Surf Bay."

CINNAMON TEAL Anas cyanoptera

1980: 1 bird at Lond Island (NW).

TURKEY VULTURE Cathartes aura falklandica

Very common around coastal areas of the Falklands especially over tussac islands where loose groups of 20-30 are common. Up to 40 birds are regularly seen over the dump/abbatoir area to the west of Stanley.

RED-BACKED HAWK Buteo polyosoma

Commonly seen throughout the Falklands usually individually. A great variety of plumages can be seen.

STRIATED CARACARA Phalcoboenus australis

A locally common breeding resident. Breeds on offshore tussac islands. TC reported 60 birds around the new hotel on Sea Lion Island durings its construction in mid 86 and over 60 birds on Steeple Jason on 13.11.86 (RM, SW, PD, AD). With post breeding dispersal juveniles are regularly seen on the main island.

CRESTED CARACARA Polyborus plancus

Not an uncommon breeding resident but rather local in its distribution. Usually seen in pairs, however up to 20 birds can be seen around the abbatoir west of Stanley.

PEREGRINE FALCON Falco peregrinus cassini

Seen regularly around the coast. 30.3.84: 1 brought prion on board ship 30 miles E of Berkeley Sound (BB); 18.4.84: 1 killed Wilson Storm Petrel S of Falkland Sound (BB). There are several other records of Peregrine killing Wilsons Storm Petrels and bringing them aboard ship (WB, WC).

AMERICAN KESTREL Falco sparverius cinnamominus

One bird was caught on Saunders Island in 1975 and a second on Pebble Island in 1980 (OE).

MAGELLANIC OYSTERCATCHER Haematopus leucopodus

A common wader breeding on sandy and stony beaches. Occasionally seen in groups of up to 20. A dead adult found near Fitzroy Bridge in April 1984 had remains of mussels (Mytilus), crab (decapod), other unidentified bivalve molluscs and the jaws of a nereid polychaete worm in its stomach (AD).

BLACK OYSTERCATCHER Haematopus ater

A common breeding resident that breeds on stony beaches and feeds on rocky shores. Rarely seen in anything more than family groups.

TWO-BANDED PLOVER Charadrius falklandicus

Common on beaches and inland throughout the year. 28.3.86: 100-150 birds at Surf Bay (AD).

RUFOUS-CHESTED DOTTEREL Charadrius modestus

A common breeding migrant. 7.9.84: 1 bird circled a ship 180 miles WSW of Cape Pembroke (WB). First records on 25.8.86 with large flocks being seen in the following two weeks (AD). A juvenile bird found dead in February 1984 at Fitzroy had the remains of a number of weevils in its stomach (AD).

LESSER YELLOWLEGS Tringa flavipes

March-April 1984: 1 bird at Fox Bay East (SF).

BAIRD'S SANDPIPER Calidris bairdii

29.11.86: 1 bird possibly this species at Swan Pond, Fitzroy (AD).

WHITE-RUMPED SANDPIPER Calidris fuscicollis

A non-breeding species which is common during the summer months. November 1986: 20 on Sea Lion Island and 150 on Pebble Island (PD). SW reports: "29.1.86: 2 birds Sea Lion Island; 30.1.86: 6 birds Sea Lion Island; 30.1.86: 30 birds Long Island; 16.2.86: 10 birds Surf Bay; 22.2.86: 40 birds on Sorf Bay; 23.2.86: 30 birds Bertha's Beach; 9.3.86: 10 birds Carcass Island; 21.3.86: 30 birds Surf bay; 27.3.86: 50 birds Pebble

Island; 28.3.86: 50 birds on Surf Bay; 12.4.86: 40 birds Surf Bay; 30.9.86: 5 birds Surf Bay."

SANDERLING Calidris alba

29.1.86: 1 bird Sea Lion Island (SW); 14.3.86: 30 birds Surf Bay (AD); 21.3.86: 25 birds Surf Bay (SW); 28.3.86: 17 birds Surf Bay (AD); 12.4.86: 6 birds Surf Bay (SW); 21.4.86: 2 birds Surf Bay (SW); 18.5.86: 2 birds Surf Bay (SW).

WHIMBREL Numenius phaeopus hudsonicus

3.12.86: 1 bird at Fox Bay East (SH).

MAGELLANIC SNIPE Gallinago paraguaiae

A common breeding species which is widespread, even into the remote camp areas. Usually found in ones or twos.

LEAST SEEDSNIPE Thinocorus rumicivorus

27.3.86: 1 bird first seen and stayed for over three months near Port Louis (MM).

SNOWY SHEATHBILL Chionis alba

Common in winter around the coast especially associated with roosts of other species. Many records of birds on board ships out to sea (WB, WC).

GREAT SKUA Catharacta skua antarctica

Common breeder, especially on headlands and offshore islands. Scarce at sea. Early records 7.10.83, 10.10.84 (WB, WC). Latest records 24.5.84 (WB, WC). First records in Stanley were 1 bird on 28.10.86 (AD) and 2 birds on 31.10.86 (SW).

SOUTH POLAR SKUA Catharacta maccormickii

Appears to be mainly a scarce autumn passage migrant; WC has seen single birds about 150 miles north-east of the Falklands on 10.10.83 and on 11.5.84, and at Hill Cove on 3.4.86, Hope Harbour on 5.5.86, and in Falkland Sound on 20.5.86. WB saw one in Port William on 21.2.86.

ARCTIC SKUA Stercorarius parasiticus

5.5.85: 1 dark bird 50 miles east of Stanley.

LONG-TAILED SKUA Stercorarius longicaudus

26.2.85: 4 birds 200 miles east of Stanley (WB).

DOLPHIN GULL Leucophaeus scoresbii

Only seen close to shore. This species is fairly common around the islands.

BAND-TAILED GULL Larus belcheri

WC saw an adult in winter plumage at Albemarle on 6.4.86. It was intermediate in size between the Dolphin and Kelp Gulls, and had a dark head, mantle and upperwing and a white tail with a dark subterminal band. As it flew past the ship it was seen that while the top of the head and back were blackish-brown, the nape and sides of the head were lighter and greyer and the forehead paler. The secondaries and inner primaries had a white trailing edge although the outer primaries were entirely dark (unlike those of the Kelp Gull). The underparts (except for the head) appeared entirely white, and the stoutish bill was yellow with a dark tip and a hint of red. The underwing, legs and feet were not seen. In view of its small size, dark head, brownish back and bill markings it would appear to belong to this Pacific form rather than its larger Atlantic representative **Olrog's Gull L. (b.) atlanticus.**

KELP GULL Larus dominicanus

The commonest gull, breeding in dense colonies all round the islands. Seen regularly up to about 10 miles out to sea and occasionally further out (WB, WC).

FRANKLIN'S GULL Larus pipixcan

5.4.86: 1 bird in winter plumage at Hope Harbour (WC). Description "Seen initially at a range of about 400 yards flying low over the sea into force 9 winds with occasional gusts to 70 kts. Conditions thus affected the flight but first impression was of a smallish, darkish winged gull - wings not particularly long - giving an impression (build/proportions) not unlike Little Gull. Flight a steady plod into the wind, again reminiscent of Little Gull.

Size: roughly same as Brown Headed Gull (seen the previous day) - certainly no bigger than that species.

Head: white forehead, dark around eye, mostly behind, top of head, dark becoming more so towards the nape, ending neatly, with broadish, pure white nape.

Upper wings: darkish grey, as was mantle, excepting outer primaries which had white thence black thence white tips. White trailing edge along whole of wing.

Tail: white.

Underparts: white.

Bill: dark shortish, stubby.

On one occasion I thought I saw white above the eye but this was certainly not a distinctive feature.

BROWN-HOODED GULL Larus maculipennis

In 1986/87 season 200 pairs bred on Swan Pond, Fitzroy (AD). The colony on Sea Lion Island was unsuccessful because of a bad storm that covered the eggs in sand (DG).

SOUTHERN AMERICAN TERN Sterna hirundinacea

Colony on Sea Lion Island was unsuccessful in 86/87 season due to storm (DG). 20 pairs bred on Swan Pond, Fitzroy in 85/86 season (AD). Seen up to 10 miles out to sea (WB, WC).

ARCTIC TERN Sterna paradisaea

9.4.77: 1 on West Point Island (DD); 27.2.86: 1 bird in southern approaches to Falkland Sound (WB); 22.9.86: 30 birds, probably this species, on Surf Bay after storm (AD); 9 and 10.10.86: 1 bird off Kidney Island (AD); 6.12.86: 12 birds Cape Pembroke (SW, RW); 28.12.86: 3 birds Cape Pembroke (SW).

EARED DOVE Zenaida auriculata

Winter 1985: 1 bird at Port Howard (DM); 2.2.86: 1 bird arrived in Port Louis and then stayed for two weeks (MM); 18.2.86: 1 bird near Macbrides Head (MM).

SOUTHERN AMERICAM TERN Sterna hirundinacea

Seen up to 10 miles out to sea (WB, WC).

ARCTIC TERN Sterna paradisaea

9.4.77: 1 on West Point Island (DD); 27.2.86: 1 bird in southern approaches to Falkland Sound (WB).

BARN OWL Tyto alba

1976: 1 bird found dead during construction of Stanley Airport (IM); 1985: 1 bird found dead on Pebble Island (RMa).

SHORT-EARED OWL Asio flammeus sanfordi

Reports of breeding from Kidney Island (1 pair), Sea Lion Island (5-10 pairs), Pebble Island (1 pair). Likely to be present on many tussac islands.

WHITE COLLARED SWIFT Streptoprocne zonaris

12.11.86: 1 bird watched flying ashore from the east at Cape Pembroke (SW, PD, RM). This bird fed for at least half an hour over the rocks just wast of the lighthouse. This is the first record for the islands.

TUSSOCK BIRD Cinclodes antarcticus antarcticus

Very common (and tame) on cat and rodent free islands. Not seen often over the mainland.

FIRE-EYED DUICON Pyrope pyrope

10.3.77: 2 birds at Verde House, San Carlos (MM); Winter 1985: 1 bird at Port Howard (DM); July 1985: 1 bird in Stanley (AD); 9.9.86: 1 bird on Beaver Island (SW) apparently arrived on 15.4.86 (TF) with a mate. The second bird disappeared but this one stayed very close to the settlement.

DARK-FACED GROUND TRYANT Muscisaxicola macloviana macloviana

Common breeding resident throughout the islands. 4.4.84: 1 on board ship 44 miles S of Cape Meredith (BB); 26.3.85: 7 birds came aboard ship in northern approaches to Falkland Sound (TG); 6.8.86: 51 birds in a loose "flock" at Kelp Point, Fox Bay East (SW).

CHILEAN SWALLOW Tachycineta leucopyga

18.10.76: 2 on West Point Island (DD) and a pair and maybe 2 pairs seen West Point Island between early March and mid April 1977 (DD). Pair bred at Port Stephens in 1983/84 (PR). They nested on iron struts from roof of dutch barn, between struts and tin roof, 20 feet above ground. The nest was deliberately not disturbed and eggs believed to have hatched. 3 young noted same year (SWh). Between 24.2.85 and 8.3.85 on Sea Lion Island numbers increased from 1 on 24 February to 20 on 8 March. Only one seen on 9 March and none after (BP, AS). 20.3.85: Several on Speedwell Island (JL); 13-14-15.2.84: "many" reported in Stanley and Fox Bay (MK); 11.3.85: 1 60 miles SSW Cape Meredith (TG); 11.11.86: 1 Pebble Island (RM, PD); April 1983: 1 Port Louis (MM).

CLIFF SWALLOW Petrochelidon pyrrhonota

2 seen near Murrel River 6.12.80 (PP, MW). First Falkland Record. They were noted to have "dark head and throat, pale forehead and rufous collar and rump, pale underneath. One generally bluey, the other browner - presumably immature".

SOUTHERN MARTIN Progna modesta

4.12.84: 1 aboard ship off the Falklands (BB).

BARN SWALLOW Hirundo rustica erythrogaster

22.2.86: 1 bird over Stanley Common (SW); 19.10.86: 1 bird, probably this species, at the Malo (ID); 11.11.86: 1 bird near Mullet Creek (AD).

GRASS WREN Cistothorus platensis falklandicus

Breeding resident. Not often seen although found regularly at certain damp areas.

ROCK WREN Troglodytes aedon cobbi

Locally common in bouldery areas on tussac islands, especially those that are cat and rodent free. Reported from, Carcass Island, Sea Lion Island, Kidney Island and Steeple Jason.

FALKLAND THRUSH Turdus falcklandii falcklandii

Common around settlements and anywhere else there is any tussac or bushes.

FALKLAND PIPIT Anthus correndera grayi

A ubiquitous breeding resident found in the open whitegrass camp.

LONG-TAILED MEADOWLARK Sturnella loyca falklandica

A common breeding resident.

BLACK-THROATED FINCH Melanodera melanodera melanodera

A common breeding resident found almost anywhere. The largest flock was 150 birds at Stanley Airport during the winter of 1986 (SW).

MORNING SIERRA-FINCH Phrygilus fruticeti

9.9.86: 1 bird possibly of this species seen on Beaver Island (SW). It apparently arrived on 15.4.86 (TF) with a mate. Only one bird survived the winter.

RUFOUS-COLLARED SPARROW Zonotrichia capensis

23.7.84: 1 on New Island (GC); 26.7.84 - late September 1984: 1 bird in Port Louis (MM); 12.3.85: 1 30 miles SE of Cape Meredith (WB).

BLACK-CHINNED SISKIN Spinus barbatus

A locally common breeding resident found where there is tussac, trees or gorse, such as the back of Government House, Carcass Island, Sea Lion Island. 17.4.86: 20-30 birds seen in stone run at Port Stephens (AD).

HOUSE SPARROW Passer domesticus

Known to breed at Stanley, Fitzroy, Port Stephens, Fox Bay East. Present on Carcass Island. This species only associates with human habitation. Small numbers have been reported on 3 and 11 March 1986 and 13 April 1986 (MS) at Mount Pleasant Airport but they are not yet regularly seen there.

LIST OF CONTRIBUTORS TO THE BIRD REPORT

A Alsop	AA	R McGill	RMc
B Bewsher	BB	I McPhee	IM
S Booth	SA	R Maddocks	RMa
W R P Bourne	WB	R P Martins	RM
I Butler	IB	C May	CM
T Chater	TC	L Mearns	LM
G S Clark	GC	D Middleton	DM
T Clifton	TC	M Morrison	MM
L Coutts	LC	K Patterson	KP
W F Curtis	WC	B Paul	BP
D Davidson	DD	T Pole-Evans	TP
I Dickson	ID	P Prince	PP
A F G Douse	AD	P Robertson	PR
D Gray	DG	A K Ross	AR
O Evans	OE	T de Roy	TR
T Felton	TF	A Saines	ASa
S Francis	SF	J Simpson	JS
T Godfrey	TG	A Spencer	AS
M Goss	MG	I J Strange	IS
D Gray	DG	M Strickland	MS
S Hardcastle	SH	N Watson	NW
N Holcroft	NH	M Whitehouse	MW
P Hutton	PH	S Whitley	SWh
M Jones	MJ	R Wolsey	RW
M Kelly	MK	R P S Wolsey	SW
J Larsen	JL		

REPORT OF THE CONSULTATION OF THE UNIVERSITY OF LIVERPOOL (DEPARTMENT OF MARINE BIOLOGY) TO THE FALKLAND ISLANDS DEVELOPMENT CORPORATION ON STOCK AND SPECIES IDENTITIES OF PATAGONIAN SHELF *ILLEX*

by Dr J P Thorpe, University of Liverpool
Dr J N Havenhand, University of Liverpool
Dr K Patterson, FIDC

Introduction

The aims of this project are to assess genetic variability within and between catches of *Illex argentinus* taken from different geographical locations around the Falkland Islands. Such information is to be used to determine whether or not separate stocks of *Illex* occur in this area.

Six samples of *Illex* from different areas were available for study (Figure 1), and were labelled A-F. The origins of these samples are given in Table 1.

Throughout, the present study has used the method of starch gel electrophoresis (for reviews see Sargent & George, 1975; Harris & Hopkinson, 1977; Ferguson, 1980). In the previous study an evaluation of four different buffer schemes (Poulik, 1957; Fildes & Harris, 1966; Ward & Beardmore, 1977 and a modification of Ward & Beardmore's (1977) system), revealed that the system of Ward & Beardmore (1977) yielded the most consistently interpretable results. That evaluation was confirmed, for all six samples of *Illex*, in the present study.

This report details the results of extensive analyses of the biochemical genetics of the six *Illex* samples and presents further data which indicate that several enzyme loci can be used to distinguish separate stocks and/or species in these samples.

Summary of Results

A total of 46 different enzyme systems have been studied in squid mantle muscle tissues. Twenty of these enzymes have also been studied in renal organ, gonad, hepatic and eye tissues. The results obtained from enzyme assays in these different tissues are summarised in Table 2. Interpretable results were obtained from all six samples of *Illex* for a total of 20 enzymes coding for a total of 29 gene loci. The remaining 26 enzymes either yielded no, or uninterpretable, results. As predicted in the previous report of this work, for all loci the results obtained from samples which were caught more recently (and frozen in better condition; ie samples C-F) were considerably better than those from the A and B samples.

Of the 29 loci for which interpretable results were obtained, 24 were monomorphic and displayed no variation either within or between the different *Illex* samples. Such a degree of monomorphism is to be expected in any species (eg Lewontin, 1974; Ayala, 1976; Selander, 1976; Nevo, 1978). The remaining five loci were polymorphic in at least one of the six *Illex* samples (Table 2). However, in only one of these loci (Malic enzyme) was it possible to resolve the different alleles present (these

were observed in only two individuals of the F sample - all other individuals in all other samples were monomorphic at this locus). Indiscrete, or fuzzy, banding patterns have been found in other electrophoretic studies of squid mantle muscle tissues (eg Christofferson etc, 1978), and it may be possible that particular electrophoretic conditions will resolve such polymorphisms (although several different buffer systems were used here without success).

Several of the enzymes studied here have been examined in other species of squid. Thus, for example, in the ommastrephid, Symplectoteuthis oualiniensis, a-Glycerophosphate-dehydrogenase, Glyceraldehyde-3-Phosphate dehydrogenase, and Pyruvate Kinase were all found to be coded by single, monomorphic loci (Storey & Hochachka, 1975 a,b,c). In Loligo opalescens, Christofferson et al., (1978) found relatively low genetic variability in 14 enzyme loci assayed in mantle muscle tissue. Interestingly, both Christofferson et al. (1978) and Hochachka et al. (1975) found considerable enzyme activity and a substantial degree of polymorphism at the glutamate-Oxaloacetate-Transaminase (GOT) locus. Despite repeated attempts to improve the resolution of this locus in the gels, it was not possible to discriminate GOT isozyme patterns in this study.

Fixed differences between the different samples were found for six gene loci. Diagrammatic representations of the banding patterns for all samples at these loci are given in Figure 2 (NADH & NADPH Diaphorase); Figure 3 (a - and B - esterases) and Figure 4 (Adenylate Kinase (AK) and Creatine Kinase (CK)).

It can be seen from Figure 2 that Diaphorases from samples A and D are of the same mobility, whilst those from samples B, C, E and F migrate farther down the gel. This indicates that the genes which code for both NADH- and NADPH- Diaphorases in the A and D samples are different from those in the latter set of samples. In a similar manner, Figure 3 shows that samples A, C, E and F are genetically distinct from samples B and D at the a- and B- Esterase loci. [This contrasts with the Diaphorase result in which samples B and D were of different mobilities]. Finally, Figure 4 shows that samples A, B and D are different from samples C, E and F at both the AK and CK loci.

The chances of such consistently discrete differences occurring between conspecific populations is very small (Thorpe, 1982, 1983). Each of the samples used in this study has clearly been shown to be different from all the other samples, for at least one locus, with the exception of samples, C, E and F, although differences between the latter two samples may exist. This latter group of samples have demonstrated no distinct genetic differences at any of the loci studied here. (There is, however, some (as yet unresolved) indication that different levels of polymorphism may be present in the E and F samples, although such differences, even if confirmed, would not necessarily indicate species-level distinctions).

The genetic identities (I; Nei, 1972) between the different samples are presented in Table 3. It has been shown empirically (Thorpe, 1982, 1983) that I values for conspecific populations are typically between 0.9 and 1.0 (only 2% of I values between such populations fall below 0.9), whilst between congeneric species approximately 98% of I values fall below 0.85 (Thorpe, 1982). It is clear from Table 3 that on the basis of the data

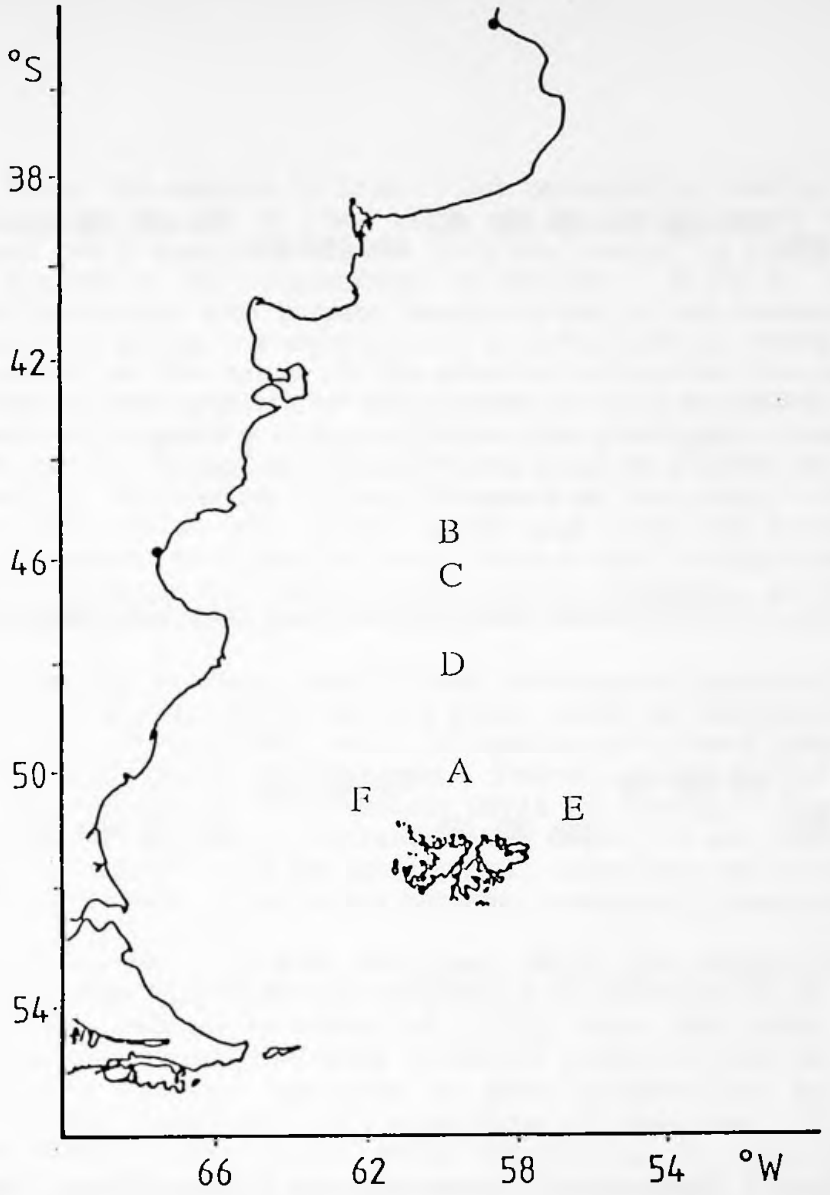


Figure 1 Location of *Illex* sampling sites in the South Atlantic

Table 1 Samples of *Illex* obtained for genetic study

A - May 1985, probably North Falklands

B - Early February 1986, 46° South

C - Late February 1986, 46° South

D - Late February 1986, 47° South

E - April 1986, North-East Falklands

F - May 1986, North-West Falklands

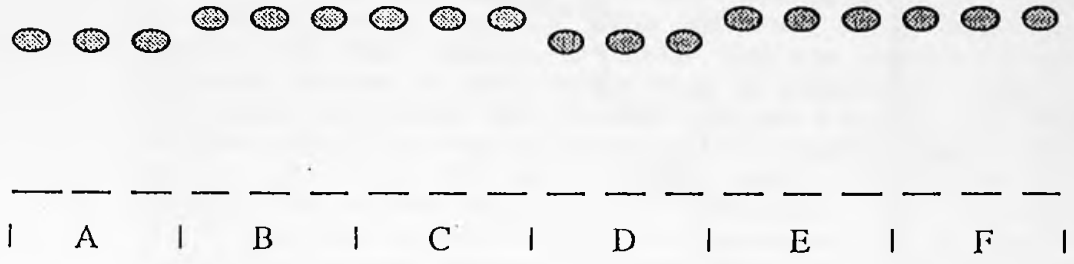


Figure 2 Diagrammatic representation of a typical Diaphorase gel

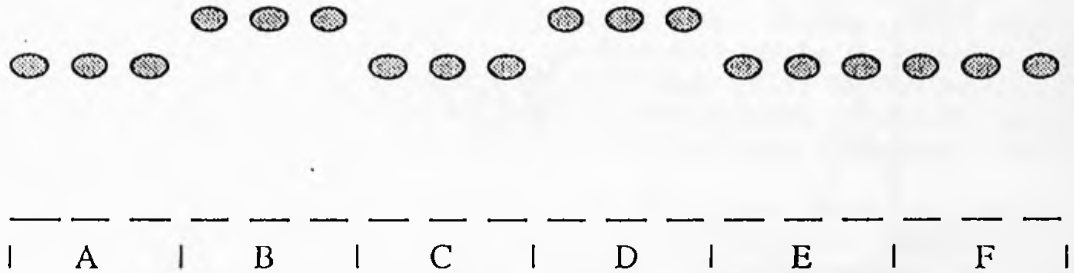


Figure 3 Diagrammatic representation of a typical Esterase gel

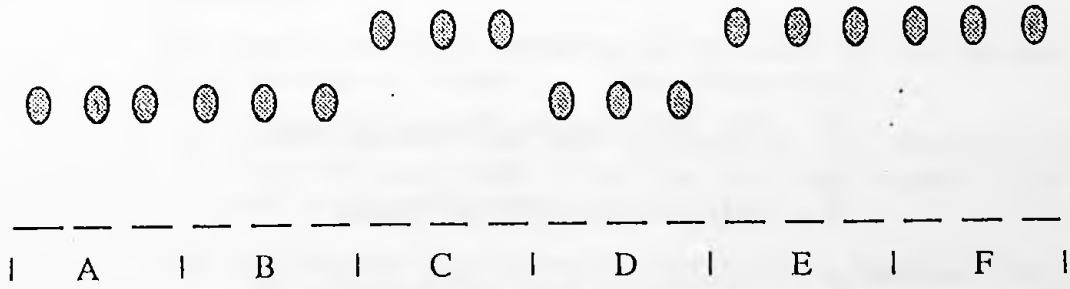


Figure 4 Diagrammatic representation of a typical Adenylate Kinase gel

presented here, the samples C, E and F are genetically idential (I = 1.0). In contrast, the I value of 0.864 which was obtained between these three samples and the D sample indicate that the latter is probably from a different species to that represented by samples C, E and F. The levels of genetic divergence both between samples A and B, and between these two samples and all of the C-F samples are intermediate to those discussed above. Whilst on the basis of the genetic distances (Table 3), it is possible that either sample A or B represents a third species of Illex, it is not possible to reach a firm conclusion from these data alone. Genetic differences between conspecific populations (such as stocks) are likely to consist only of differences in gene frequency at some loci. Fixation for different alleles at any locus (which was observed here) is most improbable between such populations. This is particularly so when the populations concerned are wholly or partially sympatric, as is the case with the present samples.

Other studies of teuthoid squid have discovered separate stock (eg Christofferson et al., 1978; Ally & Keck, 1978) or congeneric species (Smith et al., 1981) within what had previously been assumed to be homogeneous conspecific populations. Indeed, such results have been obtained from many marine invertebrate phyla (eg Grassle & Grassle, 1976; Thorpe et al., 1978; Thorpe & Ryland, 1979; Haylor et al., 1984). In the light of these studies, and the geographical range over which samples were collected, the present results are perhaps, therefore, unsurprising.

The loci coding for a- and B- esterase, NADH- and NADPH- Diaphorase, Adenylate Kinase and Creatine Kinase are certainly of value in discriminating between samples of Illex from the South Atlantic. Undoubtedly, the generally poor state of preservation of the A and (especially) B samples resulted in weak biochemical activity and consequently poor electrophoretic separation at some loci. This problem is not restricted to the present work; substantial degradation of squid enzymes (both before and during storage) has been found in other studies (eg Smith, 1969). Nonetheless, it is quite possible that further genetic differences could be found if samples in good condition (and frozen immediately after catching) were sent rapidly to the UK.

Discussion

The genetic evidence presented in the previous section has been summarised in a dendrogram (Figure 5). This shows that:

(a) Squid samples from 46%S in February, (C), from the north-east (E) and from the north-west (F) of the Falklands appear to be a common stock, and a single species.

(b) Two further species were identified; in samples from 47%S in February (D) and from 46%S in February (B).

(The sample of uncertain provenance from 1985, labelled 'A', probably originates from a fourth species. However in view of the unknown origin of this sample, little further can usefully be discussed.)

It appears, therefore, that one species exists in the north Falklands area, which extends its distribution to 46%S, and at least two further

Table 2 *Illex* enzymes assayed and number of gene loci observed in different tissues

(0 = no activity, X = present, but not resolvable, - = not assayed, * = polymorphic locus)

Enzyme	E.C. Number	Mantle Muscle	Renal Organ	Gonad	Hepatic Area	Eye
Octanol dehydrogenase	1.1.1.1	0	-	-	-	-
Octopine dehydrogenase	1.5.1.11	0	-	-	-	-
Glutamate-oxaloacetate-transaminase	2.6.1.1	X	X	X	X	X
6-Phosphogluconate-dehydrogenase	1.1.1.44	1	-	-	-	-
Glucose-6-phosphate-dehydrogenase	1.1.1.49	X	0	0	0	0
Glucose dehydrogenase	1.1.1.47	0	-	-	-	-
Alcohol dehydrogenase	1.1.1.1	0	-	-	-	-
Sorbitol dehydrogenase	1.1.1.14	0	-	-	-	-
Adenosine deaminase	3.5.4.4	0	-	-	-	-
Nucleoside phosphorylase	2.4.2.1	0	-	-	-	-
Aldolase	4.2.1.3	0	-	-	-	-
Glyceraldehyde-3-phosphate-dehydrogenase	1.2.1.12	X	-	-	-	-
Phosphofructokinase	2.7.5.1	0	-	-	-	-
Acid phosphatase	3.1.3.2	0	-	-	-	-
Alkaline phosphatase	3.1.3.1	0	-	-	-	-
Triose phosphate isomerase	5.3.1.1	0	-	-	-	-
Catalase	1.11.1.6	0	-	-	-	-
Aconitase	4.2.1.3	0	-	-	-	-
D-Aspartate oxidase	1.4.3.1	0	-	-	-	-
D-Amino acid oxidase	1.4.3.3	0	-	-	-	-
Glyoxalase I	4.4.1.5	0	-	-	-	-
Glyoxalase II	3.1.2.-	0	-	-	-	-
Hydroxybutyrate-dehydrogenase	1.1.1.31	0	-	-	-	-
Xanthine oxidase	1.2.3.2	0	-	-	-	-
Aldehyde oxidase	1.2.3.1	0	-	-	-	-
Peptidase	3.4.11	X	-	-	-	-
Leucine Amino peptidase	3.4.11.-	0	-	-	-	-
Lactate dehydrogenase	1.1.1.27	2	-	-	-	-
Superoxide dismutase	1.15.1.1	1	0	0	0	0
Malate dehydrogenase	1.1.1.37	2	2	2	2	2
α-Glycerophosphate-dehydrogenase	1.1.1.8	2	2	2	2	2
Fumarase	4.2.1.2	2	0	0	0	0
Phosphoglucose isomerase	5.3.1.9	2	0	0	0	0
Mannose phosphate-isomerase	5.3.1.8	2-3	2	2	0	3
Phosphoglucomutase	2.7.5.1	1	1	1	1	1
Isocitrate dehydrogenase	1.1.1.42	1	0	0	0	0
Malic enzyme*	1.1.1.40	1	1	1	2	1
Pyruvate kinase	2.7.1.40	2	0	0	0	0
Creatine kinase*	2.7.3.2	1	1	X	0	2
Adenylate kinase*	2.7.4.3	1	1	X	0	2
Hexokinase	2.7.1.1	2	0	0	0	0
Succinate dehydrogenase	1.3.99.1	2	2	2	3	2
α-esterase*	3.1.1.1	1	1	1	1	1
β-esterase*	3.1.1.1	1	1	1	1	1
NADH-Diaphorase	1.6.2.2	1	0	0	0	0
NADPH-Diaphorase	1.6.-.-	1	0	0	0	0

Table 3 Genetic identities (I) between the samples

	A	B	C	D	E
B	0.909	-			
C	0.909	0.909	-		
D	0.954	0.954	0.864	-	
E	0.909	0.909	1.000	0.864	-
F	0.909	0.909	1.000	0.864	1.000

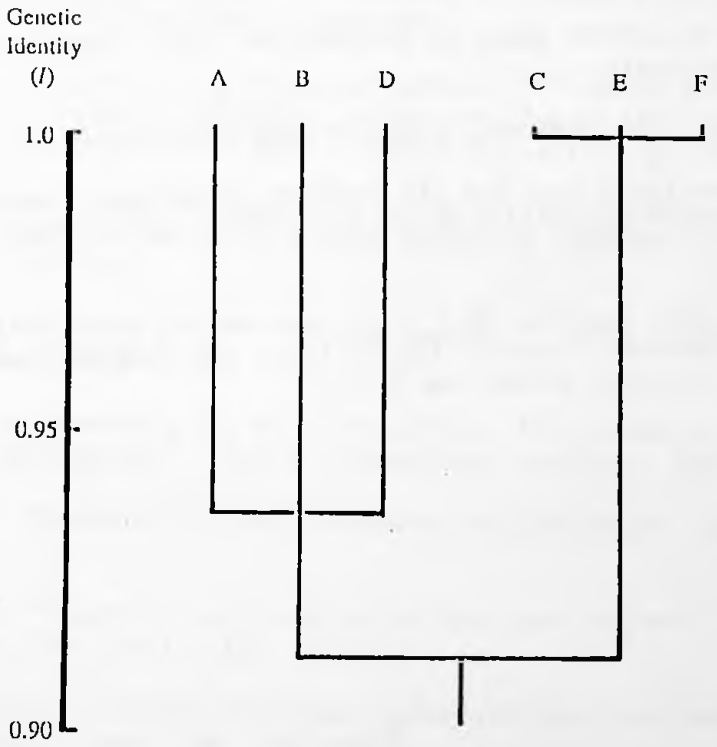


Figure 5 Dendrogram of genetic identity between *Illex* samples

species from the fishing grounds at 47%S-46%S.

It may well be that there pertains no simple pattern of one or two species or stocks of Illex in the South Atlantic, but instead a complex distribution of small stocks with overlapping distributions extending along the Patagonian shelf from the Falklands northwards to Uruguay.

Description and isolation of such closely-related species is clearly no easy task. Electrophoresis has provided a quick and simple method to detect species differences, but such new species cannot be described and named without detailed morphological studies. Due to the plastic morphology of squid species, such morphological studies present unique difficulties. Species can only be described by identification and counting of meristic characters in the soft body and by detailed examination of the hard parts, which is a procedure requiring much skilled attention.

Summary

1. Six samples of Illex were sent from the Patagonian shelf area for study.

2. Genetic variation among 46 enzymes was investigated using starch-gel electrophoresis.

3. 29 enzyme loci gave interpretable genetic results.

4. It is concluded that the six samples included at least four distinct stocks of Illex all of which are likely to be separate biological species.

5. Of the four species of Illex, one was of uncertain geographical origin, two were found to the north of the FIPZ and probably only one species occurred within the FIPZ.

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