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BRITISH ANTARCTIC
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SURVEY ARCHIVES

B A S E "B".

D E C E P T I O N I S L A N D.

R E P O R T, 1 9 4 4.

F O R E W O R D.

The following report is a summary of the main activities and experiences of the shore party, with the following Staff, based at Deception Island:

C. Smith - Cook.
N.F. Layther - Wireless Officer.
G.A. Howkins - Meteorological Officer.
G. Matheson - Stores and Maintenance Officer.
W.R. Flett - Geologist and Acting Magistrate.

The period covered in the main text of the report, is from the time of departure from Stanley on 29th January, 1944, until late September of the same year. Thereafter, any additional points of interest which emerged, and any major change in observed phenomena which occurred, in the interval between late September and the first opportunity of submitting this report to the Leader of the Expedition were inserted as supplements.

The report was compiled by the Officer-in-Charge, Base from reports, received from the members of the party, concerning the work in their respective specialist branches. The identity of the contributor of each section of the report is indicated by appending the appropriate initials.

(Signed) W.R. FLETT,
i/c., Base.

GENERAL HISTORY OF THE OPERATION.

From Date of Leaving Stanley, F. I.

All members of the Expedition left Port Stanley for Deception Island at 7.00 a.m., local time, on Saturday, 29th January, 1944. The Leader, Deputy Leader and Leading Cook Smith were on board H.M.S. "William Scoresby" which accompanied s.s. "Fitzroy", on which the remainder of the expeditionary personnel travelled. In the outer harbour we passed the troop-ship m.v. "Highland Monarch", in which we had made passage from England. The ship dipped her flag as we passed - a valedictory gesture much appreciated by the party.

Once under way, Davies and Flett started the transfer of some Base "B" stores, contained in Base "A" cases. The ships arrived at Darwin at 2.30 p.m., and the s.s. "Fitzroy" loaded a large quantity of fresh meat, which was lashed to rigging, derricks and rails, until the superstructure of the ship was festooned with over 120 carcases of sheep and cattle.

We left Darwin at 5.00 p.m. and, almost immediately, encountered a fresh breeze and heavy swell. Advantage was taken of the fact that the majority of members were now within easy reach, and, that security measures were now not likely to be prejudiced, to distribute personal equipment and essential cold weather clothing before landing.

Fairly heavy pitching and rolling, due to heavy seas, immobilized some of the party for the next two days. On 1st February, the fourth day out, Flett and Davies, with the assistance of the available members of the party, resumed work in transfer of stores.

On the fourth day out, the expectations of making a landfall, and then entering the Bransfield Straits, were not realised owing to dense fog. So both ships hove to during the night. At 5.30 the following morning, s.s. "Fitzroy" stopped and then reversed engines to avoid a reef. Some discussion took place as to its being the Bransfield Rocks. To avoid further unnecessary risk, the ships remained hove to for a great part of the day.

Towards evening, the weather cleared and the ships continued their journey South at good speed. Cape Melville was sighted before 6.00 p.m. For the majority of the party this was their first view of the South Shetlands. At 8.30 p.m. the ships entered the Bransfield Straits where a large berg was observed. Bridgeman Island, with the loftier mountains of Graham Land beyond, was then visible on the port side.

The sixth day was clear and sunny and all morning the journey South continued along the string of islands which form the South Shetlands group. At 10.00 a.m. Deception Island was clearly visible ahead and all members of the Expedition were busy study, sketching and photographing the salient features of the various islands.

At 11.00 a.m. the ships had arrived outside the entrance to Deception Harbour and, in response to a request from the Master of s.s. "Fitzroy", H.M.S. "William Scoresby" took leading position and proceeded towards Neptune's Bellows and, thence, North-westwards towards Point Foster. The "Fitzroy" meanwhile entered, turned North-east, and dropped anchor about 1.00 p.m. in Whalers' Bay just off the derelict Whaling Station.

After lunch a number of the members of the Expedition went

ashore/

ashore and a rapid survey was made of the area around Whalers' Bay. For a time, several of the landing party were actively engaged in the removal or obliteration of sundry items of evidence of disrespect shown to lawful British sovereignty by unfriendly visitors to the island.

The halyards of the flagpole, erected by one of H.M. ships the previous year, had been removed. However N.F. Layther, the Base "B" radio officer, volunteered to reeve new halyards and after a climb, rendered difficult by malicious mutilation of the flagpole, he succeeded in doing so and the Union Jack was broken at the top by 4.30 p.m., on the 3rd of February. This simple, but significant, act of allegiance was loyally acclaimed by all those assisting at the ceremony.

Meanwhile, the ship's scows and motor-boat had been lowered and work in the discharge of stores for Base "B" was soon in progress and work proceeded apace until darkness set in.

Next day, the 4th of February, work of discharging was resumed with the assistance of Base "A" personnel and working parties from H.M.S. "William Scoresby" and, with the unflagging energy of the members of the crew of the s.s. "Fitzroy", who manned the scows and motor-boat, good headway was made with the work. This good progress was maintained throughout the next day and, by the morning of the 6th of February, all the stores for Base "B", except those in some inaccessible cases of Base "A", had been landed.

The scows and motor-boat, which had done such useful work in ferrying back to the ship a vast quantity of salvaged material for use at the other Base, in addition to the discharging of cargo, were hoisted inboard. The Leader came ashore for a final inspection and partook of the first lunch served at Base "B". He expressed satisfaction with the work achieved in the short time. Then Flett accompanied him aboard for final instructions and to assist with the Diplomatic Mail sent from Deception. At 5.30 p.m. Flett left H.M.S. "William Scoresby" to finally take over ashore and shortly after the two ships, in company, sailed. Base "B" bade farewell to them by dipping flag. So the Base "B" Party as a shore unit was established and all members of the party slept ashore for the first time.

Before leaving the subject of the establishment of Base "B" it would be only right to pay a very well-deserved tribute to those who installed or assisted in the installation of the W/T equipment and thus had the station in operation at a surprisingly early stage of the proceedings and, thereby, removed any misgivings, which may have been entertained, regarding the potentialities of the W/T apparatus supplied.

It is no reflection on the very capable Base "B" Radio Officer to say that the rapid assembly of the components and the highly successful results were due in large measure to the expert advice and very active co-operation of Farrimgton - the chief Radio Officer to the Expedition and member of Base "A" Party - and Mr. Tim Hooley, a fellow passenger on the s.s. "Fitzroy" returning to South Georgia to take up duties as Officer-in-Charge of the Wireless Station.

Grateful acknowledgement should also be made to those members of Base "A" Party who so unselfishly devoted their time at Deception to taking a very large share of the hard labour involved in discharging and storing Base "B" supplies.

Immediately after landing it was thought advisable to settle the problem of accommodation for the party without delay. Two of the

dormitories/

dormitories, erected by the former lessees of the Whaling Station, and both of which were in a remarkably good state of repair, were surveyed.

Flett, influenced, to a certain extent in advance, by the report on the visit of one of H.M. Ships the previous year, and the fact that there was an unrestricted view of the harbour entrance from the front of the house, decided to use what has been described in that report as Dormitory "A" facing South-east by South. This building consists of two main portions separated by a large kitchen. A commodious loft or attic runs the full length of the house. A cellar to which access may be obtained from either the kitchen or from a pathway outside extends from the West end of the house to the kitchen.

On the East side of the kitchen there is a large dining-hall and on the other side of the kitchen there are two small messrooms and a suite of ten bedrooms symmetrically dispersed about a main corridor.

The South messroom was retained in its previous capacity but the North messroom after serving as a double bedroom ultimately became a combined library and workshop. Of the ten bedrooms three became combined office and bedrooms, for Magistrate, Meteorological Officer and Radio Officer respectively, whilst a fourth was used as a double bedroom. The remaining six rooms were used as stores, workshops and repositories for useful salvaged material.

As the house was somewhat large for five people it had been hoped to make the living quarters more compact by partitioning off the six West bedrooms. Unfortunately the rooms at the back or North side of the house proved unsatisfactory and, with the exception of the Radio Officer, who elected to remain under rather Spartan conditions, in the room originally selected as a Wireless Room, all personell were accommodated in rooms on the front or South side of the house.

Before proceeding with alterations to the house, it was considered expedient to establish the identity of the building and its inhabitants for the benefit of casual visitors. So, on the 7th Febraury, a white table-top was converted into a signboard, on which was stencilled the British Imperial monogram and the words Port Foster Post Office, and placed in a prominent position outside the Magistrate' window. Its claim to be the farthest South Post Office was quickly outmoded by the establishment of a Post Office, at Port Lockroy, by the Base "A" Party. Also, on the 8th February, a metal Union Jack 4' 6" X 2' 3" was fixed in a conspicuous position on the South side of the house, so as to be clearly visible from the harbour entrance and Whalers' Bay.

Possible dispersal points for emergency food supplies were also investigated and two were chosen. One was the old chemical laboratory and the other a water-tank shed behind the house. The latter was found to be very satisfactory and remained water-tight and weather-proof throughout the winter. In all, rather more than half of the original food supplies were divided between these two places. It should be mentioned that in addition to food and fuel a certain amount of clothing was earmarked as emergency supplies. The spare wireless set and equipment were housed in the other Dormitory "B".

The large No. 50 combustion stove supplied to the Base was installed, at first, in the messroom, but it proved to be too large and extravagant and was replaced by a smaller model, salvaged from the derelict hospital. The hospital also provided a kitchen range 8' X 2' 6", one half of which was used and, as it was very satisfactory it replaced the small cooking range supplied. So, as a result of these two replacements from salvaged material, both the heating stove

and/

and cooking range supplied were returned to store as spares.

A number of small combustion stoves were also salvaged and, as a considerable stock of coal had been left on the Whaling Station, it was thought it would add to the amenities of our establishment if one small stove was installed in each bedroom. Adequate fireproof arrangements for each fireplace was found by flooring with salvaged tiles and lining the adjacent areas of walls with asbestos packing covered by thin sheet iron.

The internal arrangements for fires proved reasonably simple, but the arrangements for flues were settled only after a very considerable outlay of time for experimental purposes, as their efficiency was apparently adversely affected by structural peculiarities in the house, especially with winds from the West to North quadrant. Eventually it was decided that the rooms in the South side of the house were least liable to defects of draughts. So Mathison constructed chimneys of about 26 feet in height and 4" X 7" cross section, which were fastened to a 4" X 4" baulk sunk in the ground. The chimney was then secured by galvanised straps to the house wall and to the roof by three stays, also made from galvanised straps. These stays were subsequently reinforced by stays which passed right over the apex of the roof, and fastened to the outside of the North wall - a reinforcement found necessary by the excessive vibration on the roof, set up by the strain on the stays during high winds. One stay did actually snap for this reason at the height of the most violent gale of the winter. Each chimney served the flues of two fires.

The problem of cleaning these outside chimneys was solved in a very ingenious manner by Matheson. He devised a piece of apparatus whose chief components were - a 24 foot pole, a large porcelain insulator tied to the top of the pole to act as a runner block, a length of chain attached to another length of rope which was rove through the block. By practice, and careful manipulation by two people, it was possible, when the chain was raised to its maximum height at the block, to let the chain drop down the chimney and move it vigourously up and down by means of the rope through the block. Mathison and Flett could handle this simple device very effectively even in a high wind. The soot thus dislodged fell through an inspection plate at the base.

The kitchen was made more compact by the building of a partition closing off an unnecessary volume of space behind the range. This also was a means of conserving heat. A number of large cast-iron pots were salvaged which made it possible to have a reasonably adequate supply of hot water. Two 30 - 40 gallon cylindrical copper containers, found on the premises, were used for stowing snow in the winter, and water in spring and summer.

Before deep clean snow became easily obtainable, water supply problems were partially solved byerection of catchment troughs of corrugated iron below the eaves of the house.

In order to make the maximum use of available daylight, to reduce consumption of lighting fuel, and, what was very important in the absence of spare parts, to reduce the wear and tear of pressure lamps, Double Summer Time was instuted on 12th February and Triple Summer Time on 23rd March. Double Summer Time was resumed on 23rd April and maintained throughout the winter. +

The dinghy, with which we were supplied, proved both heavy and

unmanageable/

+ Triple Summer Time was instituted for the second time on the 1st October, 1944.

unmanageable owing to very high freeboard. It was not very suitable for beach work because of the tendency of the sharp stern-post to dig into the loose volcanic ash. Mathison made two pairs of large oars from salvaged timber to replace the very short ones supplied. He further improved the motive power by making a sail and mast. The sail considerably increased our mobility and range of action. He also made a very workmanlike tent, as an adjunct to field work some distance from Base.

In spite of some misunderstanding regarding the time limit before renewal of food, supplied in accordance with the original requisition for Base "B", adequate supplementary supplies of most of the essential commodities had been acquired from various local sources before winter set in. The only really serious deficiencies not made good in time were salt and yeast.

Before it was possible to make a systematic inventory, on which the rates of consumption of the various items could be established to ensure even distribution over a long period, several articles of foodstuffs, other than essential commodities, were in short suppl. But although their early absence reduced the possibilities of variation in diet, no deep concern became manifest, as long as the more staple comestibles were available.

An extremely generous supply of fresh meat was presented to the Expedition on the passage South by H.E. the Governor of the Falkland Islands. In the hope of preserving the carcases allotted to Base "B", an attempt at natural refrigeration was made by burying the meat in a large snow-drift in front of the house, but unfortunately, the drift diminished very rapidly owing to the continued high temperature. The carcases were then transferred to the cellar, and hung from the roof, care being taken to keep them from making contact with each other. However, decomposition set in, accelerated by the moisture acquired in the drift, and with great regret, about twenty of the carcases were jettisoned.

From this experience, it would seem that large stocks of fresh meat should only be supplied immediately prior to the onset of winter conditions. The beef and mutton, received in April, remained fresh throughout the winter.

It is a very pleasant duty to make grateful acknowledgement of the very generous gifts of fresh vegetables received from His Excellency the Governor and Captain Roberts of the Falkland Islands Company. These vegetables introduced a very welcome variation in diet and were thoroughly appreciated by all members of the Base. Unfortunately the frost produced the converse effect to that produced on the fresh meat, for the tissues were attacked and disintergrated by the freezing of the natural moisture in the vegetables. So in the case of vegetables it seems desirable to store them in a place reasonably free from frost during the winter.

In addition to the stores of food which were imported into the island, local natural resources were frequently used to supplement the larder. Steaks and livers of Weddell seals provided tasty meals and the flesh of penguins and shags also furnished palatable meat. Nor was the chance of fish-diet neglected. The most profitable fishing-ground was at the Bellows, where fairly good catches were made of "Rock-Cod" or Notothenia, and an occasional Ice-fish.

Owing to the small number of people based on Deception the scope of recreation was rather limited. And pastimes, which could be indulged in without interference of routines, were naturally more general.

In mid-winter, during the long evenings, the dart-board, picquet-board, and playing cards were frequently in evidence. The use of

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the gramophone was somewhat circumscribed by the small stock of records, owing to the removal of a large number, due to a misunderstanding.

All members of the party participated in ski-ing, Layther being especially enthusiastic and enterprising. Unfortunately an accident to Smith curtailed this particular activity for a time, as it seemed to be tacitly agreed that a casualty roll in excess of one, at any one time, should be avoided, if possible. Ski-ing conditions were seldom very good owing to the almost continuous hard glaze on the surface of the snow, due to partial thawing, induced apparently by subterranean heat, as well as solar radiation, and subsequent freezing. Also the presence of huge boulders in the most unexpected places and the exasperating frequency of the outcropping of black ash, introduced a disproportionality large number of hazards in most ski-runs.

For the benefit of future residents, it might be added that, one of the very shallow crater lakes North of Whalers' Bay provided a reasonably good skating surface, when the snow was swept away.

The Base was singularly fortunate in having a large amount of salvage material and members of the party exercised their skill and ingenuity in several ways in contriving small additions to the furnishings of the house and Base equipment - a form of occupational recreation which has much to recommend it.

Boating and fishing provided exercise and entertainment as well as useful contributions to the commissariat. The commissioning of the dinghy as a sailing boat under the name "Deception Belle" took place, unfortunately, very late in the autumn.

Short expeditions and walks on the island gave much-needed relaxation. The noting of any specially interesting natural phenomena and collection of natural history specimens was regarded as a recreation as well as acquisition of useful data. Layther, especially, is to be commended for his untiring enthusiasm in collecting a diversity of facts and material.

Reading, both of light and serious literature should not be omitted from the list of milder recreations. In this respect a welcome addition to the Base library was made by the gift of a large number of books from Major Greenshields, A.D.C., to H.E. the Governor.

Apart from rather severe injuries sustained by Mathison and Flett, whilst engaged in field-work in the hills, and a sprained ankle by Smith in a ski-ing mishap, the health of the Base, with one exception, has been reasonably satisfactory. Unfortunately, Howkins, the Meteorological Officer had a recurrence of a chronic stomach and intestinal disorder which appeared rather serious, and which completely incapacitated him for some time. From the slender resources of the Base commissariat, invalid foods suitable for delicate digestive system were contrived and, by frequent consultation by radio with the Doctor at Base "A", and careful nursing, especially by Mathison, he recovered from the worst effects of his illness in due course.

The successful treatment of illness at the Base has been due in large measure to the cordial co-operation of the Wireless Officers at both Bases, and to their willingness to arrange frequent extra schedules to keep the Doctor at Base "A" posted with the patient's progress.

To the Doctor also due credit must be given for his keeping himself available at all times for consultation, and for his

patience/

patience and ability in sifting out the essentials from the lists of symptoms, often conflicting, sent to him.

Howkins acted as medical officer to the Base and, whilst he was in good health himself, he devoted much of his time and energy to the work entailed in such an appointment. He carried out any emergency measures with confident competence.

GEOLOGY and GLACIOLOGY.

Had it been possible to foresee the unexpectedly long spell of comparatively mild weather after landing at Deception, a more generous allotment of time could have been given to field-work at the time of longer daylight. As it was, not being able to forecast the time available for completing essential outside work on the house, the erection of the Meteorological Station, in addition to the immediate problem of arranging stores before winter set in, all these items, incidental to the establishment of the Base as a working unit, rated as high priority demands on the time of all members of the party. Accordingly, field-work was only practicable between periods devoted to, what seemed at the time, urgent tasks, requiring the attention of all hands. Also, owing to certain political considerations in the earlier stages of our stay, it was deemed inexpedient for the Geologist, who was also Acting Magistrate, to absent himself from the Base for any considerable length of time.

Therefore field-work, at first, was done alone, and, without assistance, over areas accessible by foot in the course of a day. Towards the end of this unexpectedly long summer, it was possible, in view of the completion of the essential work on living quarters, stores, and Meteorological Station, to have the invaluable services of Mathison and Smith on small journeys by boat. The weight of the boat, and the nature of the ashy beach, made such assistance a prerequisite to all sea-borne movement.

It was found that very useful field-work could be carried out by boat owing to greater mobility and extended range of action as long detours by land were no longer necessary. Also shore exposures were numerous, and relatively accessible, and there was less liability of critical sections being obscured or totally concealed by overlying snow, ice, or ash.

Unfortunately, in one of these camping excursions by boat, Matheson and Flett were injured by an accident in the hillside on the flanks of Mt. Pond East of Pendulum Cove. Their injuries confined them to bed for a considerable time after reaching Base, and by the time they were fit to move about again, the spell of reasonably moderate weather was ended and their convalescence coincided with the onset of wintry conditions, which with the very brief intervals of daylight reduced field-work to a minimum. The dinghy, also, was laid up under cover, because of the risk of damage by frost.

It had been hoped, when the harbour froze, that access to the other side of the harbour and beyond would have been possible by sledge or skis. Unfortunately, the harbour ice though thick in places was either completely thawed or very thin in the littoral

fringe/

fringe owing to the flow of hot streams. This made movement over the harbour ice quite impracticable.

Excursions by sledge over land were also found to be impracticable owing to the highly irregular topography, due in large part to the instability of the huge accumulations of loose ash over the entire island.

In spite of these handicaps a fair number of good exposures were examined. Representative specimens were collected of all types of volcanic or hypabyssal rocks present in the sections studied. It seems clear from the examination of these exposures and the general topographical architecture that there is more than one unit of extrusion involved in the tectonic structure of the island. It can also be assumed that there were different, though possibly not widely separated, periods of vulcanicity. This later conclusion is supported by the great number of parasitic craters which are apparently the relics of minor eruptions subsequent to the main volcanic episode. It is not unlikely that eruption took place from these minor craters whilst the lavas from the main volcano were still molten or in the semi-plastic condition.

In the one section there is frequently a wide range of variation in texture and composition of the component rocks. The only intrusive rocks encountered in situ were dykes which were, for the most part, basic in character. The comparative poverty in dykes might be taken as additional proof of the relatively recent age assigned to the lavas.

In a general survey it would appear that the lava rocks vary from basic to sub-acid in character. As a tectonic entity the island to have evolved from a series of phases of activity resulting in a ring structure of lava rocks surrounding a caldera subsidence due possibly to a circular fault or series of faults. The side-stepping of apparently congruent adjacent rock faces and the juxtaposition of contrasting types would lend support to the latter alternative. From the evidence available it seems fair to suggest that the structure is more complex than that of a simple volcano whose crater has been flooded by the breaching of its outer rim by the sea.

A number of earlier workers including Ferguson, Holtedahl and Mackintosh have visited the island and collected rock specimens, but in all cases their visits were of very limited duration. Nevertheless a most comprehensive list of rocks from their respective collections have been described by Thomas, Tyrrell, and Barth and Holmsen (the latter two as joint authors) respectively in a number of petrographic papers.

The rocks, described matroscopically and microscopically by these writers, recur with great frequency all over the island, but it is hoped that as a result of the opportunities provided by a protracted stay to extend the range of rock types already collected and possibly fill in gaps in the evidence bearing on the tectonics of the island.

In addition to the collection of specimens of rocks found in situ, a very interesting assemblage of rocks of all types has been obtained, principally from the glacier streams, and, occasionally from loose boulders on the beach. They include metamorphic and sedementary, as well as igneous, rocks. A great number of these igneous erraticas are probably derived from local formations but there are numbers which are clearly of exotic origin.

Of the sedementary rocks, an interesting find was a fossiliferous limestone containing a coral, whose precise identity was difficult to establish owing to distortion of the septa.

Granites and grano-diorites are the most regularly enconntered

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of a number of plutonic igneous rocks of which no local occurrence in situ has yet been found. The presence of these exotic erratics on the island introduces the intriguing problem of transport.

A constant reminder of the volcanic origin of the island is the presence of a large number of hot springs. The more obvious of them are located in the vicinity of beaches and shores of crater lakes. Their presence, in the harbour area itself, is also clearly indicated by the brisk effervescence seen on the surface of the sea, with the noticable evolution of sulphurated hydrogen and characteristics deposits on the sea-bed.

A feature of the crater lakes, remote from the sea, is the variation in level in the lake - a phenomenen due apparently to certain tidal conditions. The water flowing in the hot streams is almost invariable brackish which suggests that the sea has access to the underground reservoirs. It seems probable that the sea percolates through the very considerable barrier of ash which separates the lakes from the sea. That this area of ash can attain a very great thickness, is made manifest by the high cliffs composed entirely of ash, which fringe some parts of Port Foster.

No boiling temperatures have been recorded as yet, but there is doubtless much dissipation of heat issuing from the almost universal thick cover of ash, which also spreads the flow over wide areas. The flow of the streams also seems to depend on both atmospheric and tidal conditions, both, or, either of which, may have affected the hydrostatic equilibrium underground. As most of the investigations of hot springs were done in midwinter, when normal field-work was impracticable, it is possible that higher temperatures may be recorded when the air-temperature is higher and there is less liability of less heat by contact with colder air.

One of the most interesting phenomena observed during these investigations was the action on the surrounding ash by a very fine ochreous emission from the hot streams and springs. This was particularly noticable on the beaches below mean low-water level. This discharge varied in consistency and texture from a very fine scum on the surface of the sea to a fine powder which lay as a very fine coating on the ash. Deposits from this discharge were especially heavy in the miniature deltas, where the streams entered the sea. When the deposit was allowed to pervade the ash, it cemented the ash to form a yellow agglomerate. These were observed in all stages of consolidation from the initial stage of an intimate mixture of ash and ochreous powder which was easily disintergrated by stirring, to the other extreme of a very hard and resistant agglomerate of considerable thichness and lateral extent. Where large boulders had been deposited in the originally loose ash, they appeared, after the cementation process was complete, as large inclusions in the agglomerate.

This "aqueous" agglomerate, whilst lacking the tectonic implications of the normal pyroclastic type, which is an important component of the crater rim, might provide an interesting comparative study in the genesis of the two types, especially in view of the striking similarity in external appearances between the two types.

In addition to rocks collected at Deception, Lamb and Taylor of Base "A" Party contributed specimens from Cape Renard and Port Lockroy respectively. At the invitation of the Leader, and, by the courtesy of the Commanding Officer of H.M.S. "William Scoresby", a very brief personal visit was paid to Port Lockroy. This visit provided a very much appreciated opportunity of seeing the actual exposures of rocks in that locality as well as some most impressive views of the glacial and topographical features of other islands en route.

Taylor/

Taylor submitted his samples from considerations of possible economic importance, as they contained metalliferous veins which, it was thought, might contain a proportion of copper pyrites, sufficiently high to warrant more extensive investigation. He also provided some useful field-notes relative to the mode of occurrence.

Whilst copper is quite clearly present as one of the constituents in the vein, as shown by the characteristic tarnish and pavonic lustre in addition to confirmatory flame test, it cannot be assumed with certainty, in the absence of accurate chemical estimations, that the copper is not subordinate in amount to the iron present in the pyrites. This reservation was suggested by the unusually ephemeral nature of the green flame when the ore was submitted to the normal dry-way tests and also by the amount of iron staining on the country rock immediately adjacent to the vein. Moreover, some of the pyrites appeared to possess the cubic structure as well as the brassy metallic lustre of iron pyrites. Incidentally, though it has no direct bearing on the problem of copper content in the veins themselves, in a petrological description of the country rock in this section, Tyrrell comments on the presence of iron pyrites as a secondary product replacing magnetite.

On the other hand, the possibility of the existence of copper in appreciable quantities is supported by the occurrence of an emerald green certriferous mineral which, on first examination, was assumed to be malachite. (That it was the hydrated carbonate of copper, could not be established beyond doubt, for no effervescence was discernible on application of cold or hot acid even when the moistened portion was observed through a pocket lens. The presence of copper was, however, clearly indicated. Another copper mineral of emerald green colour is droptase - a hydrated silicate of copper, but of rarer occurrence and usually vitreous. Either mineral would serve to support the possibility of the presence of copper, as both are found in the zone of weathering or gossan of copper lodes. Unfortunately the very thin incrustations of ore available made a silica determination by gelatinisation impracticable. In spite of the absence of effervescence with acid, the earthy appearance of the mineral strongly suggests malachite).

In the examination of the country rock it was seen to be traversed by many fine veins of very dark-green mineral, not unlike the mafic constituents of the normal rock. These veins occur as platy concentrations, and, in many cases, the metalliferous veins appear to have utilized the passage thus provided, and insinuated themselves along the planes, the dark-green mineral remaining as a selvedge on either side. The country rock is a tonalite, a form of granodiorilt in which the plagiodase is greatly in excess of the orthodase felspar. Specimens, collected by Ferguson from this locality, have been described by Tyrrell who, in another paper, stated that specimens, from the same locality, submitted to him by Macintosh at a later date, were identical with those previously described. During a brief visit, the writer observed that the tonalite was traversed by conspicuous basic dykes which were responsible for large erosional notches in the rocks thus intruded. Specimens of the dyke rock and its contact with the tonalite were collected for further examination in this section.

A number of rock samples collected at Cape Renard were received from Lamb.

With the exception of two specimens, they were all microgranular so microscopic determination was not practicable. This weight suggests that they are basic, and are probably dyke rock with

basaltic/

basaltic affinities.

It is possible that the two specimens, with the porthyntic crystals of light green colour embedded in a fine-grained groundmass, may be porphyries related to the coarser-grained plutmic rock, previously collected by Ferguson at Cape Renard, and described by Tyrrell as quartz-augite-hypersthene-diorite.

In the absence of thin slides, no reliable identification can be made of these aphanitic rocks.

Before attempting a systematic study of glaciers and land ice on Deception Island, it should be made clear that a vast area of land ice is almost completely concealed by a thick overburden of black volcanic ash. The presence of ice under the ash is usually revealed, only, on close examination by large crevasses, which from the distance look like large irregularities of surface on the ash-covered hills. This widespread cover of ash gives, on cursory examination, a completely wrong impression of the amount of ice ice on Deception Island. The problem is further complicated by the continually changing topography as a result of the instability of the slopes of loose ash, the finer grades of which are also transported by high winds and deposited on other parts of the island. The ashy intercalations in the ice-cliffs are quite characteristic. The intricate folding, and vertical lines of stratification respectively, displayed by these ashy intercalations give some impression of the vicissitudes undergone by the icein its movement or displacement from the original site of deposition of its snow of alimentation.

Apart from land ice thus affected by volcanic ash, there are a number of glaciers whose surfaces remain free from ash, except for superficial dustings during periods of high winds. There are some such small glaciers in the vicinity of the Base, but considerable modification in their natural form at the lower limits of some of them have been made by artificial constrictions for water supply requirements, at the time, when the island was a whaling station.

P. 12 a

That calving of the local glaciers is taking place inside the harbour area is demonstrated by the small ice-bergs seen in Port Foster. Those on the East side are probably derived from the ice-cliff immediately South of Pendulum Cove.

One striking feature, probably peculiar to this area, is the fantastic architecture of the small grounded bergs, as the result of the corrosive action of the warm sea water in the vicinity of hot springs. Owing to the persistent undercutting the bergs graduall assume the form of gigantic toadstools - a very large plano-convex block of ice supported by a very slender pedestal of ice. The whole structure ultimately topples over and disintergrates when the support is finally dissolved.

There is little doubt that the very extensive areas of land free from snow during a large part of the year on Deception, compared to the adjoining islands to the North, is due to the almost continued drift of ash blown over the island by the wind. The influence of heat radiated from rock particles, which lie on the surface of snow or ice, is much greater than is commonly realised. (Practical use of this thermal effect was made in the construction of the Bergen railway in Norway, when the labour of an army of shovellers, which had at first made somewhat ineffectual attacks upon the drifts, were replaced by the sun, a layer of earth or sand, having been spread over the snow surface. It was then observed that drifts, which would otherwise have been but little diminished in size, sank as much as six feet in a month).

Subterranean heat is another factor in accelerating the thawing of snow in certain areas on Deception. In some of the low-lying

parts/

In order to obtain information on the possible advance or retreat of the glaciers over a period, frequent observations were made on the position of the glacier foot relative to rods driven in the ground. In addition, for the purpose of determining the amount of renourishment available from winter snowfall, graduated poles were set up to measure precipitation.

Any conclusions, drawn from observations to date, would be premature as, at the time of writing, the full seasonal cycle had not been completed.

However, in the course of normal field-work, a very significant piece of evidence emerged, concerning the previous more extensive development of the Fildes Glacier. About one hundred feet up the West side of the debris slope of Fildes Point, at the level of the horizontal line of the conspicuous cleft in the rocks known as the Crotch, was observed a deposit of glacial sand about four feet in thickness. This deposit is at least fifty feet above the greatest height of surface alimentation of the glacier at that point during the present winter. In view of the occurrence of this glacial deposit at approximately the same level as the lower limit of the Crotch, it is not too speculative to hazard the theory that the glacier in its former more extensive development accelerated, if it was not actually wholly responsible, for the formation of this breach in the crater perimeter at Fildes Point.

From a survey of some of the glaciers, and from the frequent occurrence of huge transported boulders in areas remote from existing glaciers, it would appear that the local glaciers are now recessive in character.

parts of the island the black volcanic ash has been intermittently exposed throughout the winter. This is especially noticeable in the vicinity of the overturned Floating Dock. Here the ash, when exposed, is invariably soft and warm to the touch.

METEOROLOGY.

Meteorological Report.

The report is mainly a summary of activities. Little attempt has been made at analysis, because this can be carried out more readily when observations from both Bases are correlated with South American synoptic data. The aim has therefore been to maintain as comprehensive a series of observations as possible, leaving the analysis to a later date.

(a) Equipment.

Several instruments suffered damage in transit:-

The clock of the Microbarograph came adrift from the base-plate. As a consequence, the aneroid box was dented and the pivot system damaged. Some weeks elapsed before satisfactory repairs were made.

The Hygrograph and Thermograph suffered superficial damage but the efficiency of neither was impaired.

One Standard Thermometer was broken in transit and another in an attempt to join the broken alcohol column.

Details of performance of the instruments are given in 'Notes on the Stevensen Screen, Instruments etc.'

Requisition of replacements and of certain additional items has been made.

All instruments are disposed as listed in the original requisitions, with the exception of:-

Ship's Mercury Barometer - at present stored in the Meteorological Office, Port Stanley. The instrument is useless on vessels as small as H.M.S. "William Scoresby".

Ship's Barograph - in use at Base "B". It was put ashore when the micrebarograph supplied for Base "B" was found to be seriously damaged.

(b) Erection of Station.

(See also 'Notes on Stevenson Screen, Instruments etc.)

A satisfactory site was obtained in the foundations of an uncompleted brick building. The exposure is as good as the local topography will allow (see photographs).

The hot springs, on the beach nearby, may exercise some effect

in/

in light southerly winds, but winds from this quarter are infrequent.

No mast was supplied with the anemometer, but a very satisfactory one was improvised by Matheson. All members of the Base assisted in its erection.

(c) Hours of Observation.

Observations were made daily at some or all of the following G.M.T. times:- 0300, 0600, 0900, 1200, 1500, 1800, 2100, midnight. They were limited to the daylight hours until the more essential preparations had been made for winter.

An attempt was made in April and May to maintain the complete series of observations. The results obtained appeared to warrant the maintenance of a 24-hour observation system; a Meteorological Assistant was therefore suggested.

Illness of the Meteorologist in June caused the suspension of the above routine. Observations for the period June 13th - 30th we taken at 1200 and 2300 G.M.T.; those at the latter hour by Mr. Flett and those at the former by Matheson.

From July 1st, observations have been maintained at 0300, 1200, 1500, 1800, 2100, 2300 and midnight G.M.T.

(d) Balloon Ascents.

(See also 'Notes on Stevenson Screen, Instruments etc.').

The first ascent was made on March 26th, after a supply of rubber tubing had been obtained from Port Stanley, via H.M.S. "William Scoresby".

Over 40 ascents have been carried out and the collection of data, from many of these, would have proved impossible without the assistance which was readily given by all members of the Base.

(e) Presentation of Data and Statistical Analysis.

A rough log of all instrument observations has been kept.

Two fair logs have been maintained, one containing aspirate values of air temperature and the other, screen values. The logs require the addition of cloud photographs and photographs of screen exposure, for completion.

Monthly averages are contained in the Ship's Logs and copies have been submitted through the courtesy of His Excellency the Governor of the Falkland Islands to the Director of Naval Meteorological Services. These averages have been carefully compiled, but require independent checking.

(f) Dissemination of Meteorological Information.

A request was received on May 2nd, 1944, from N.O.I.C. Port Stanley, for 1200 and 2300 G.M.T. synoptic information, daily. The Ships Code:-

YYGG hN_hVW PPDF

was employed and the signals recorded before transmission. The signals were maintained up to July 18th and were based on the observations taken by Mr. Flett and Matheson for the period June 13th - 30th.

Information was received on July 18th that synoptic information for 1200, 1800, 2300 G.M.T. could be transmitted in International

Code/

Code. The code F 11 was used and symbols AAA, BBB employed until station numbers were allotted. The numbers 099, 098 were allotted to Base "A" and Base "B" respectively on August 31st.

(g) Synoptic Charts and Frontal Analysis.

Commencing August 23rd, the Wireless Officer intercepted the daily transmission of Fleet Synoptic One and Fleet Synoptic Two from Port Stanley. Charts for 1200 and 2300 G.M.T. were drawn from this data.

No attempt has been made to maintain a logical sequence from chart to chart. The limited amount of synoptic data available was employed to test several different constructions, in an endeavour to discover a general isobaric and frontal pattern for the area.

The few charts which have been drawn suggested three premises which may bear further investigation:-

(1) There is evidence of the Travelling Polar Anticyclone (I).

(2) A Field of Deformation (II) often exists in the Graham Land vicinity, between the Travelling Polar Anticyclone and a wedge of high pressure extending from the Antarctic continent. This deformatice field frequently coincides with the Antarctic Convergence (III) in the Cape Horn area.

(3) There is evidence of Wave Formation (I) on the fronts which cross South America in advance of the Polar Anticyclone.

It is emphasised that there is little concrete evidence on which to have the above postulates. Construction of synoptic charts, covering the whole period for which Bases "A" and "B" reports are available, may substantiate them. Two developments, which should appear on such charts and which are consequent on the above premises, are therefore suggested.

(A) Fresh Development in Depression off Cape Horn.

Adopting Palmer's analysis, the depressions arriving off Cape Horn are assumed to start as waves on a Pacific Polar Front.

If a warm sector still exists when the centre reaches the longitude of the Horn, the Frontal Guard Action (IV) of the Andes, will soon complete the process of occlusion. As the depression proceeds Eastward, the more Southerly portion of the occlusion moves on unhindered, while the Northerly extension along the Chilean coast is much retarded.

Suppose that a field of deformation exists, near Graham Land, between a travelling high pressure system to the North and an Antarctic high pressure wedge to the South. Relatively warm air flows towards Graham Land from the North, in the North or North-westerly gradients in advance of the depression. Cold Antarctic air flows to the West from the Antarctic wedge, in an Easterly gradient. The conditions are therefore suitable for the genesis of a warm front. This front is drawn into the circulation of the old centre passing the Horn and the Southerly portion of the old occlusion takes on the role of a cold front.

Thus a new warm sector (occupied by returning polar air) appears. This rejuvenated depression will now tend to travel in a Southerly or South-easterly direction, parallel to the warm sector isobars. In doing so it abuts against the Antarctic high pressure wedge and strong Easterly gales with storms of drifting snow will be experienced at both Bases of the Expedition.

(B) Wave Formation on the Meridional Front (I).

As/

As the occlusion extending along the Chilean Coast slowly mounts the Andes, the warm sector mass spreads over the air lying to the East and the discontinuity, which was originally the warm front, is marked only by remnants of high and middle clouds.

On the other hand, the cold front surface in the occlusion undergoes a marked steepening in its passage over the Andes.

Thus the occlusion reaches Patagonia as a single cold front, with a steep slope. In advance of the front is a Northerly gradient of returning Polar air, in the rear, fresh Polar air in a Southerly gradient. Such a cold front, with a steep slope, is susceptible to wave formation when its translation Eastwards is slow. Two developments may be distinguished:-

(B.1) Large Wave forming off the Horn.

A marked indentation is made in the Meridional front near the Horn as the Southerly portion moves East unhindered and the portion over Tierra del Fuego is retarded. When a strong supply of warm air reaches the Horn in advance of the front, a wave is likely to develop in this indentation.

Since the wave has formed on the section of the front which is lying roughly W - E, the warm sector isobars tend to run in this direction and the wave moves off in an Easterly or East-south-easterly direction. In doing so, it moves roughly along the Antarctic Convergence (III) and will therefore develop repidly.

(B.2) Waves forming North of the Horn.

When the cold front is moving slowly to the East, waves may form on it and travel Southwards, deepening somewhat and occluding rapidly. These centres may eventually feed the semi-permanent low pressure system of the Bellinghausen and Weddell Seas (V).

Some evidence in favour of the above postulates is found in that they will serve to explain a number of facts which are peculiar to the South-western Atlantic. The more important are listed below:-

(a) The lack of frontal significance in the high and middle clouds reaching Port Stanley from the West.

(b) The persistence of deep low pressure centres, off the Horn, which do not always move away to the East.

(c) The sudden appearance of intense low pressure centres near South Georgia, when no such centre has passed the Horn and none could have come from Antarctica.

(d) Heavy continuous rain from Nb. St. banks at Port Stanley in North-easterly gradients.

(e) Frequent occurrence of cirrus cloud in the N.E. and N.W. at Deception Island.

(f) The 'unorthodox' position of the warm sector in the E. or S.E. section of a depression.

Bibliography.

I. Synoptic Analysis over the Southern Oceans
- C.E. Palmer.

II. Weather Analysis and Forecasting
- S. Petterssen.

III. Water Mass Convergences in the Southern Hemisphere and their

Meteorological/

MONTHLY AVERAGES FOR PORT FOSTER, DECEPTION ISLAND, 1944.

Month	No. of Obsers.	Winds. Average Speed/Number of Observations. North	North East	East	South East	South	South West	West	North West	Calms	Mean	Gales	Pressure	Temp.	Rel. Hdty.	Max. Temp.	Min. Temp.	Cloud Cover	Rain	Occns. Pption.	Visibility. Fog	Snow	Poor	Good
Feb.	79	9/6	21/20	15/18	32/4	-/Nil	8/3	17/18	9/8	-/2	16	7	993.2	31.4	84	34.1	29.2	9/10	0.86	27	1	9	16	53
Mar.	155	17/37	13/15	17/15	6/5	4/1	5/1	21/29	14/38	-/14	15	2	991.5	35.1	93	38.4	33.4	9/10	2.94	44	8	3	74	70
Apr.	240	19/22	16/19	24/16	2/2	6/1	24/15	19/92	13/70	-/3	17	4	991.6	31.8	90	35.3	31.3	9/10	2.31	101	10	6	68	156
May	236	10/22	19/35	19/26	6/15	10/5	16/36	18/37	12/41	-/19	14	14	990.5	24.0	83	27.9	22.5	7/10	----	81	9	14	32	181
June	60	10/5	22/16	27/18	-/Nil	9/1	24/12	22/14	9/2	-/2	21	6	987.0	12.0	--	15.0	9.5	8/10	----	35	0	21	8	31
July	186	10/15	18/11	16/14	11/3	9/1	18/2	15/44	14/76	-/20	13	0	1001.8	17.8	95	22.5	14.9	6/10	----	56	21	6	40	119
Aug.	186	7/8	26/42	21/33	3/1	2/1	26/4	16/36	10/51	-/10	16	6	994.1	16.8	95	21.1	14.0	8/10	----	85	21	35	52	78
Sep.	180	8/8	20/21	26/25	4/1	3/3	28/12	18/59	10/31	-/20	16	12	994.7	19.1	94	23.2	16.0	8/10	----	86	17	21	41	101
Oct.	182	18/17	28/45	24/24	5/3	-/Nil	17/7	15/39	14/36	-/11	13	15	996.5	24.6	89	28.4	22.7	9/10	----	80	0	28	34	120
Nov.	175	14/7	20/69	27/21	4/3	3/5	21/6	14/31	12/21	-/12	16	2	1000.5	29.7	84	33.0	28.1	8/10	----	49	10	11	25	129

NOTES.

1. NUMBER OF OBSERVATIONS - in general the observations are at 3 hourly intervals and the number taken each day, varies from month to month.

2. WINDS - (a) The average speed is in m.p.h., readings being taken from the buzzer anemometer.
   (b) Number of observations = number of winds observed in arc $22\frac{1}{2}^{o}$ on either side of the stated direction.

3. CALMS.- include light variable winds.

4. GALES -all wind speeds greater than 38 m.p.h.

5. PRESSURE- in mbs., corrected to M.S.L.

6. TEMPERATURES - in ^{o}F. Nearly all values are obtained from aspirated thermometers.

7. RELATIVE HUMIDITY - values are calculated from aspirated Wet and Dry bulb readings.

8. MAXIMUM TEMPERATURES - The average of all 1200 and 2100 G.M.T. readings.

9. MINIMUM TEMPERATURE - The average of all 1200 and 2100 G.M.T. readings.

10. CLOUD COVER - total cloud cover.

11. RAIN - total monthly precipitation caught in the rain gauge.

12. OCCASIONS OF PRECIPITATION - number of times precipitation in 'ww' of the 3 hourly observations.

13. VISIBILITY - (a) Fog and Mist, visibility less than 10 cables.
    (b) Heavy snow or drift, visibility less than 10 cables.
    (c) Poor to moderate, visibility reduced from any cause.
    (d) Good to excellent.

Meteorological Importance - N.M.B. Memo. 121/43.

IV. Greenland, From the Standpoint of Synoptic Meteorology (A.M. pub.) - Atlantic Met. Report 5.

V. Antarctic Pilot.

Addendum.

The Stevenson Screen is mounted so that its open end faces approximately 40° East of South. This affords the maximum protection from direct sunlight, since the sun is hidden behind the hills to the East and North-east, for some considerable time after sunrise.

The system of baffles is built parallel to the sides of the Screen and the individual baffles have been referred to as the North, West, South or East Baffles. Reference to the North Baffle implies the one facing 40° West of North, the West Baffle 40° South of West, and so on.

Photographs will betaken to illustrate the orientation of the Screen and the disposal of the baffles.

WIRELESS COMMUNICATION.

On February 3rd, 1944, the Expedition arrived at Deception Island. The next day Farrington and Layther spent the morning erecting masts and a temporary aerial. Mr. Hooley, a passenger on the "Fitzroy", rendered valuable assistance in sitting up the station.

On the evening of February 4th communication was established with VPC, Falkland Islands. All the equipment was in good repair with the exception of the six 6-volt accumulators, all of which were broken in transit. A battery was obtained from H.M.S. "William Scoresby" and another from the Base "A" supply to replace those damaged.

Within a week or two, J. Matheson, Supply and Maintenence Officer had erected ywo, heavily guyed, steel pipe masts and a permanent aerial was hoisted. The whole party assisted in these operations but the successful organisation of the details and necessary improvisation were solely Matheson's work.

The Chore Horse generator (petrol driven) is the only power supply and has proved extremely satisfactory as also has the rest of the equipment.

Certain improvements can be made to the existing aerial system but owing to the severity of winter conditions this work has been postponed until the summer.

W/T work, at time of writing, consists of despatching two weather reports daily to Port Stanley, (the evening report usually being transmitted via GNME 1, Base "A"), two schedules daily with Base "A" and copying two, Fleet Synoptic weather reports transmitted each day from VPC. In addition, there is a weekly schedule with 2BH, South Georgia. Daily news bulletins are received for the benefit of the Base.

After eight months work, the equipment is in good repair and giving good service. A few minor repairs have had to be made and in this direction much is owed to Mr. Flett for his unfailing advice and

assistance./

assistance.

No great difficulties have been encountered as far as atmospheric conditions are concerned. Local conditions have at times made working difficult and the aerial frequently becomes "iced over".

On the average, communication is generally satisfactory.

SEA-ICE CONDITIONS.

With the exception of a few days in midwinter, when it was impracticable owing to weather conditions, daily observations have been continuously made on ice conditions in the Bransfield Straits since 25th February, 1944. These routine observations have been undertaken almost exclusively by Layther and Flett, either independently or in company. In the course of some journeys to the convenient view point selected, for the purpose of examination of cloud phenomena over the Straits, Howkins made a number of useful supplementary observations.

On some days, when a significant change seemed imminent, or, when the visibility at an earlier time was very limited, observations were repeated in the course of the day if visual conditions improved. These observations were, for the most part, taken from a convenient gap in the upstanding peripheral rim of the crater at Fildes Point. The ridge of the scree slope forming the base of this U-shaped gap, known as the Crotch, is sufficiently high to give a reasonably good view of the Straits. The cove immediately below, on the seawards side, also provides an indication of ice formation under sheltered conditions.

On occasions, when it seemed desirable to amplify the observations, as seen from this point, a more comprehensive field of view was obtained from the tops of neighbouring hills. This had the added value of embracing the other islands of the South Shetlands group in the field of view.

Under conditions of excellent visibility, the Trinity Peninsula of Graham Land was clearly defined so that the view ranging from the North-east to the South-west covered an immense area of the Bransfield Straits and the intervening islands. The latter, especially, served as useful reference points in determining the distance of the pack when the open channel was very wide.

For some months after commencing the routine observations, the Bransfield Straits remained free from ice, with the exception of bergs, which appeared at widely separated intervals, and varied considerably in number and size. Ice formed for the first time in the Bransfield Straits on 12th June. This formation was completely dispersed by 25th June, following some days of high S.W. winds. After this date it is doubtful whether any ice formed 'in situ' in the Bransfield Straits apart from very thin transparent films interstitical to the pack ice. Between July 1st and July 7th inclusive a small amount of pack ice was seen in the Straits and again dispersed until July 9th. Thereafter, except for a completely ice-free period on August 24th and 25th, pack ice was to be seen until the time of writing in mid-September, in varying concentration and at widely different distances from the island. Generally speaking when the pack was widespread there were extensive leads. Only on a few occasions was the ice, except that locally formed in sheltered coves, less than three miles distant from the island. There were occasions in addition to those specifically mentioned when no ice

was/

was seen but, with any visibility less than excellent, complete dispersal could not be reliably confirmed.

The open channels and pack were usually liberally dotted with bergs ranging from small 'growlers' to some of quite impressive size. In some cases their shape and colour gave a clue to their mode of origin. There was usually, at any one time, however, a remarkable diversity of types, varying from the large tabular type of considerable lateral extent to the higher angular forms with irregular topography.

A frequently recurring feature noted in these observations was the tendency of the edge of the pack nearer to the island to conform to the general 'run' of the coastline but apparently converging slightly on it towards the North. This was noticeable especially when the pack was less than 15 miles distant from the island. When a similar phenomenon was observed on the West side of the island from a high altitude view point it seemed to suggest that there was a North flowing current, which was bifurcated on contact with the South of the island and continued North in two streams, with a sheltered area or vortex to the North, in which the pack tended to accumulate.

Generally the pack had the characteristic fringe of brash, usually a mile or so wide, but, frequently extending beyond the limit of perceptible discrimination between brash and pack density.

A particularly fine display of "Arctic Sea-Smoke" on the Bransfield Straits was observed by the writer on 15th August.

1st Supplement. (Up to 10th November).

With the exception of occasional, narrow, brashy strips of pack, usually in the lee of the island, and bergs, Bransfield Straits remained comparatively free from ice, from the middle of September until the end of September.

Conditions ranged from ice-free to infrequent complete cover of pack during October. On October 22nd there was widespread cover which diminished slightly on the 23rd and 24th October, but on 25th October there was total cover of open pack, whose dispersal, in spite of fluctuations was complete by 30th October.

On November 4th there was again complete cover of close but light pack but this was of short duration and at time of writing had practically dispersed apart from strips of light brash in lee of island.

2nd Supplement. (Up to 4th December, 1944).

Dispersal of ice was complete by 15th November since when Bransfield Straits have remained ice-free apart from bergs.

In the following summary of ice conditions inside Neptune's Bellows, Deception Harbour is used as a convenient inclusive term for Port Foster and Whalers' Bay.

In Deception Harbour, ice formed on 15th June over a considerable area, but was completely dispersed by 25th June. Ice reformed in the harbour on 1st July and, by 3rd July, practically all the harbour, except the areas immediately adjacent to the hot streams, was completely frozen over. From then until July 26th there were occasional partial dispersals but from that date until mid-September the ice had remained as a cover over the main harbour area, excepting the regions of the hot streams, where the extent of open sea depends apparently on wind conditions, as well as the sea temperature in the

immediate/

immediate locality. The latter in turn varies with the activity or temporary quiescence of the hot streams.

As these open leads, due to hot stream activity, intervene between the beach and the main field ice in the harbour, determination of the thickness of the ice in situ was not practicable. Also the number of slushy patches far out in the harbour suggested that emission of hot water was not necessarily confined to the littoral fringe. However when the harbour ice started to break up in mid-September some of it was driven ashore by the high winds. Examination of the blocks cast up on the beach reveals that they are composed for the most part of poorly compacted ice with an average thickness of about eighteen inches.

It would seem that once ice is established in Deception Harbour it has a greater chance of permanency than in the Bransfield Straits due, doubtless, to the fact that the harbour is almost completely land-locked and free from disturbance by currents.

From September 17th up to the time of writing (22nd September) there has been a very large area of open water on the South side of the harbour, extending from Neptune's Bellows for a considerable distance North-westwards up Port Foster. It has continued to extend in all directions, and, at the time of writing, only a very thin strip of slushy ice separates this extensive lead from the ice-free areas on the North and East sides of Whalers' Bay.

1st Supplement. (Up to 10th November).

The last-mentioned conditions prevailed in the harbour until the evening of October 4th when Whalers' Bay was ice-free for the first time during the present spring - the ice moving out towards the South-west side of Port Foster. From that time onwards ice moved to and fro with wind and/or tide. From time to time some ice was driven back into Whalers' Bay by South-west winds.

Ice was generally in loose blocks for some distance to the North-west of Inner Lighthouse. This ice in its movement under the influence of wind or tide occasionally established a small but temporary barrier across the entrance.

But from 4th October onwards any ice which was observed in the harbour South of a line stretching South-west from Crater consisted for the greaterpart of loose fragmentary blocks. Further North slushy patches were seen in increasing numbers in the more uniform ice-field, as the season advanced.

What may be quite an important detail to bear in mind with respect to sea-ice conditions, is the possibility, proved by personal observation, of getting an entirely misleading impression of ice conditions in Deception Harbour when viewed from boat-level at the Bellows, under certain conditions of wind and/or tide during the early stages of the spring dispersal.

With a strong flood tide and/or N.E. wind the ice may be concentrated on the South-west side of Port Foster. On casual examination from outside, this may lead to the erroneous assumption of complete cover inside as Whalers' Bay and the main Northern area of Port Foster are concealed from view.

It should be emphasised that such misleading conditions immediately inside the entrance may be of very short duration and have been observed to undergo several permutations in the course of a day.

Note:- If the weather is calm and the Bransfield Straits are themselves ice-free, conditions under these doubtful circumstances inside the harbour may be investigated by landing at the Outer Lighthouse (East) and proceeding in a West by North direction to

the/

the nearest hilltop, care being taken to avoid approaching too closely the cliff faces of volcanic ash (to the South) which lie East of Fildes Point.

2nd Supplement. (Up to 4th December).

Whalers' Bay remained ice-free from early November onwards except for occasional partial cover by ice from North Port Foster driven in by South-west winds when moving out under the influence of the ebb tide. This cover almost invariably dispersed within a few hours and in most cases appeared to move back to Port Foster with the flood tide or change of wind. This to-and-fro movement gradually broke up and progressively reduced the ice in North Port Foster, until by 3rd December Port Foster was free of ice, South-east of a line running South-west from South end of Pendulum Cove.

NATURAL HISTORY.

Since mid-April, 1944, a record of all observations on local fauna has been kept by Flett. Matheson, with his wide experience and characteristic interest in all kinds of natural phenomena, and, Layther, with his active enthusiasm in reporting observations, have helped considerably in the daily assembly of details.

A brief list, and short description, of likely residents (permanent and seasonal) and casual visitors, supplied by Dr. Hamilton, Government Naturalist at Stanley, was found extremely helpful.

The observations were made in the course of the daily work and routine of the Base and, also, whilst moving about the island or harbour on field-work or fishing expeditions. So, while the record can lay no claim to be comprehensive as regards the island as a whole, it does provide a rough indicator of the period of residence and approximate times of departure and return of the various species.

No attempt has been made to make an accurate census except when numbers were very small, apart from such rough indication as small number, fairly numerous, very large number. It was thought that a census at nesting sites and rookeries at the appropriate time would be more useful. In the course of routine ice observations, fauna, present in the Bransfield Straits, were also noted.

It may be convenient to divide up the observations under the general headings of I Birds, II Seals, III Fauna other than Birds and Seals.

I Birds. The different species observed may be classified as under:

A. Permanent residents - i.e. birds remaining in considerable strength throughout the year.

B. Semi-permanent - birds which remain all year but for some time in considerably diminished numbers or which were not seen for a short period.

C. Migrants or Seasonal Residents.

D. Casual Visitors.

A (i) Sheathbill - very tame - fed in and around house as well as on beach.

B (i)/

B (i) Dominican Gull - They should in all probability be assigned to A, but they were not seen for a very brief period at midwinter. May have been fishing or sheltering elsewhere. Numbers increased steadily, as the open areas of harbour extended, from middle July onwards. At time of writing, late September, they outnumber the Sheathbills.

B (ii) Grant Petrel - considerably reduced in number by mid-April and gradually diminished thereafter until the average number seen per day was one.

B (iii) Snow Petrels - never very numerous but appeared to be in larger numbers immediately before and after mid-winter. This increase may be more apparent than real owing to the relatively small numbers or complete absence of other species.

C (i) Cape Pigeons - majority had gone by beginning of June. Occasional single individuals seen for some time afterwards. There was a reappearance in considerable strength both at nesting and roosting site at Fildes Point and on fishing grounds in harbour on 7th September, following observations of single individuals for a few days beforehand, but they disappeared completely again by 9th September following stormy weather. Reappeared again in fair numbers on 19th September and at time of writing, late September, appear to be firmly established.

C (ii) Skuas - General migration by beginning of April though single individuals were seen till end of April, and a casual visitor on 20th July.

C (iii) Terns - After middle of May Terns were not recorded though single individuals reappeared towards end of August. They reappeared in small numbers but apparently in pairs about 18th September and have remained with no noticeable increase in number up to time of writing - late September.

C (iv) Shags - never very numerous - no record of observation between 1st August and 20th September when one was seen on rock East side Fildes Point.

C (v) Gentoo-Penguins - were seen in large numbers until early May. Thereafter they were seen singly or in pairs at widely separated intervals until late July. Since then they have been occasionally observed in large numbers in Bransfield Straits. In summer and autumn they are established in considerable numbers in the large inlet on West side Port Foster 3 - 4 miles West by North of Inner Lighthouse.

C (vi) Ring Penguins - observed moving off in large numbers in early April. There are large rookeries at both Inner and Outer Lighthouses.

C (vii) Wilson Petrels - seen only in small numbers, and infrequently, so that it is difficult to make even approximate estimate of line of departure. None recorded since April.

D (i) Adélie Penguins - very few probably less than a score all told, seen between middle of May and 10th July, after which none seen up to date of writing.

II Seals.

(i) Weddell Seals - have been recorded more or less continuously in the neighbourhood but numbers have fluctuated very much. For a week or thereabouts on either side of midwinter none were seen. Since then they have been seen in the harbour, on the beaches near sea kept open by the hot streams, and on the harbour ice field itself. In the summer they were observed resting on the beaches in close proximity to leopards.

(ii) Sea Leopards - There is no record of sea leopards since April. Before the end of April they were frequently seen.

Note. (It has been a general belief amongst the members of the Base that leopards only hunted in the sea, but Layther and Flett found the characteristically regurgitated remains of a Sheath-bill which is an apparent contradiction of that belief. At the time the harbour was ice-free so the bird, which is a wader, could not have been removed from floating ice.)

(iii) Crab-eater Seals - have been seen at infrequent intervals and almost invariably suffering from extensive body wounds. It has been suggested that these wounds may be the result of attacks by 'killer' whales from whom they seek sanctuary in the harbour and its beaches.

(iv) Sea-Elephants - a very small number have been seen in the harbour and in the cove on the East side of Fildes Point.

III. In addition to those daily observations already quoted, details were also kept and collections made of both vertebrate and invertebrate fauna as well as the flora of the island.

Of the vertebrates mention has already been made in another section of the report of the presence of notothenia and ice-fish - the catching of which provided both food and recreation.

The invertbrates included a number of modern sea-shells which were surprisingly numerous, considering the prevailing cover of ash on the beaches. As there were no zoological reference-books at the Base, the geneic names, assigned to them, are only approximate determinations and not at all reliable, and should be accepted with the greatest reserve.

Brachiopoda - Terebratula - very small, delicate semi-transparent valves.

Lamellibranchiata - Mya - has peculiar ligamental furrow traversing the valve fromumbo almost to the ventral border. Specimens vary greatly in size. Tellina ??? thin valve.

Gastropoda - Patella - acute angled conical.

Echinodermata - Echinus - echinoid

Crustacea - many examples on which the writer was reluctant to make even an approximate determination of identity - one constantly recurring form was a huge

spider-like/

spider-like type with 8 legs some inches long, two claws and two tentacles.

Coelentera - Medusa - numbers of large jelly-fish have also been observed.

1st Supplement. (Birds) Brought up to date 10th November.

C. ii. Skuas. Singly and in pairs seen consistently from 29th October onwards - never very numerous.

C. iii. Terns. By the end of September established in large numbers and building on factory site.

C. iv. Shags. Seen again on 10th October and thereafter intermittently and usually singly or in very small numbers.

C. v. Gentoo Penguins have been seen continuously and in considerable numbers roosting along beach at Whale Bay at Crater since 11th October. The Gentoo Rookery on West side Port Foster was still ice-bound in early November.

C. vi. Ring Penguins. Examination of Penguin Rookeries at Inner Lighthouse on 16th October and Outer Lighthouse on 22nd October showed no evidence of return of Rings. Single individuals were seen on 5th and 6th November at Crater and Whalers' Bay beach respectively. On 8th November they were observed assembled in large numbers at a rookery a few hundred feet up, at the rocky (yellow agglomerate) bluff immediately above the cliff of reddish columnar rock at South side of entrance to harbour. Nests have been built there and at the Inner Lighthouse but no eggs were found at either place.

2nd Supplement. (Birds) Up to 4th December, 1944.

A. i. Pair of Sheathbills reported nesting at Fildes Point last week of November.

B. i. Dominican Gull - eggs in nests on factory site 14th November. Thereafter seen in large numbers at various parts of island.

B. ii. Giant Petrels observed in increasing numbers from mid-November, especially on S.W. side Port Foster.

C. i. Cape Pigeons - eggs observed in nests on 24th November and thereafter principal nesting site agglomerate cliffs at Fildes Point.

C. ii. Skuas - slight increase in numbers from mid-November.

C. iii. Tern - egg seen in nest 14th November on beach N.W. end of Whalers' Bay and thereafter at factory site and elsewhere.

C. iv. Ring Penguin - eggs found in nests on 17th November and thereafter in large quantities.

C. vii. Wilson Petrels - first observed at Crater on 14th November and thereafter in increasing numbers observed nesting on factory site and at Inner (or West) Lighthouse.

D. i. Adélie Penguin - single individuals seen around Whalers' Bay intermittently from mid-November.

1st Supplement. (Seals) Brought up to date 10th November.

Weddell Seal. Cows and pups were seen for the first time at Crater on 28th September. Thereafter numerous families were seen there and on the sea-ice in Port Foster West and North of Crater. Some well grown pups were seen unaccompanied on 24th October and subsequently.

Sea-Leopards. Two sea leopards were seen at Bellows on 16th October. A sea leopard with pup was seen at Crater on 24th October. Since then leopards have been noticed hunting penguins in Whalers' Bay. Also a few leopard pups have been seen either alone or in company with the cow.

Crab-eater Seals. A pair were seen on 30th September and a pair (possibly the same) were seen intermittently until late October.

Sea Elephants. Two sea-elephants reported as seen on floe in Bransfield Straits near Crotch.

2nd Supplement. (Seals) Up to 4th December.

Sea leopards. Since mid-November several full-grown leopards have been observed on beach immediately East of Inner Lighthouse. Numbers on beach and swimming close inshore usually number between six and twelve. They have also been seen more or less continuously in Whalers' Bay. On 3rd December ten were seen on beach at North-west end of Whalers' Bay and South of Crater.

Weddell Seals. Have been conspicuously few in contrast to leopards.

Sea Elephants. Have been observed intermittently but more frequently since mid-November. (Usually cows or young bulls).

M I S C E L L A N E O U S.

It is no refelection on the other members of the Deception Island shore party, whose co-operation, in practically every circumstance, was all that could be expected, to pay special tribute to the invaluable services of the Stores and Maintenance Officer, J. Matheson.

The successful passage of the Base party through, what was for the remainder of the personnel, their first experience of wintering in the sub-Antarctic, under isolated conditions, was due in no small measure to the experience and guidance of this Arctic and Antarctic veteran, Whose presence at the Base was an inspiration and source of confidence to all.

His expert advice was frequently sought and willingly given on all subjects pertaining to life in high latitudes.

His/

His gifts for improvisation amounted to genius. In his capacity as Maintenance Officer all structural alterations, repairs and constructional details were dealt with by him and were carried out in a very competent manner by him or under his skilful direction.

INVENTORY OF USEFUL MATERIAL ON DECEPTION ISLAND.

Whilst care has been taken, in the assembling of details in the following inventory, not to include any material at an obviously advanced stage of decay, it cannot be strongly emphasised that none of the material is in a really trustworthy condition. On no account should any of it be considered as a potential primary source of supply.

In case of urgent necessity, the material available might possibly be used to supplement existing supplies or, in an emergency, provide metal or timber for temporary erections or repairs.

Influenced by the necessity for caution, implicit in the reservations expressed above, the estimates of available material, in some cases, are probably conservative, when compared to the large stocks, which, on cursory examination, have a sound appearance.

All the items enumerated in the general list are to be found on the Whaling Station at Whalers' Bay but a few details on material left at Pendulum Cove have been added separately.

No articles, which is being used at present, or which is a reasonable reserve for future use, at the Base, has been included in the inventory.

BUILDINGS.

These have already been described in detail in the report on the visit of the A.M.C. "Carnarvon Castle" in February, 1943.

The two dormitories A and B were found to be weatherproof and reasonably watertight.

Magistrate's House in poor condition and with practically every window broken, but not beyond repair.

The Chemical Laboratory, in spite of damage done by forced entry, is in fair condition. Has been used as dispersal point for emergency stores and other purposes.

The Water-Tank Hut behind the dormitories is weatherproof and almost completely watertight. It made a very satisfactory dispersal point for emergency stores during the winter.

All other buildings on the Whaling Station are rapidly disintegrating.

FURNISHINGS./

FURNISHINGS.

		Quantity.
Mess-room tables	15' 6" X 2' 11"	4
	10' X 3' 4"	3
	7' 2" X 3' 2½"	1
Seating Forms	9' 10"	6
	7' 9"	6
Inside Doors		8
Bedsteads (adaptable as single or multiple units)		100
Asbestos lagging in wire netting		5 doz. sheets
" " loose		3 doz. bags.
Wheelbarrows		24
Empty Wooden Barrels (approx. 40 gals.) (mostly oak)		200 estimated.
Steel Barrels, 40, 60 gals. etc.		50 estimated.

TIMBER.

Baulks 6" X 6"	6 dozen

BOATS.

None seaworthy	Powder	6
	Blubber	4
	Coal Scows	3

NAILS. (In 100 lb. boxes)

3"	3 boxes	6"	2 boxes
4"	5½ "	7"	1 "
5"	2¾ "	8"	4 "

METAL.

Iron. Quantity assorted iron bars in blacksmith's store.

Galvanised Piping. Considerable mileage of galvanised piping, but most of it destroyed by frost.

Oil Tanks. Seven large capacity. These have been pierced at base but are in good condition and could be repaired.

Fresh Water Tanks. Two large capacity storage tanks in Hut behing Dormitory.

Digestor Boilers. Nine (in shed at West Jetty) outside circumference 25', inside depth 14' 2".

N.B. The digestor shed is in good condition but foundations are being undermined by the sea since jetty on the West side was broken - making it especially vulnerable to West and South-west winds. Some doubt exists as to whether this shed will survive the present summer.

All other digestors exposed to the weather and would require renewal.

There are large supplies of various kinds of scrap iron but mostly in large bulk.

Copper &c./

COPPER &C.

The supply of non-ferrous metal is extremely small and consists for the most part of some yards of heavy copper wire of different gauges. The three chief sizes are 1/8", 3/16" and 1/4" diameter respectively and have all been previously used for power supply lines.

There is, of course, an immense amount of derelict machinery mostly on a massive scale and none of which could be conveniently utilized and most of which is beyond normal means of repair.

The three large electrical motors in the laboratory and carpenters' shop appear to be in fairly good condition apart from missing parts.

The lathe in the blacksmith's shop is very large and has obviously been power driven - also many of the components and accessories have been removed.

LATHE - multiple speed - 15' overall, 12' bed, 2' diameter c ck. check

DRILLING MACHINE - high speed tools and pulley driven by steam engine; 1' automatic or control vertical travel; 2' pedestal vertical travel.

BUFFS, STAMPING AND CUTTING MACHINES - in poor state of repair.

MISCELLANEOUS.

There was a fair quantity of analytical and therapeutical chemicals in the laboratory and derelict hospital respectively. Except in a few cases where the identity could be easily established the obliteration of writing or removal of labels made their use as reagents impracticable. Practically no glassware was found undamaged in either place.

PENDULUM COVE.

Drawn well above high-water mark at Pendulum Cove are two powder boats. They are dry inside and would be useful as shelters. Neither of them could be classed as seaworthy.

There is also a hut which is partially buried by volcanic ash. A small combustion stove in a fair state of repair was found there and was used for some days. The flue pipe would require renewing This hut provided accommodation during field-work in the neighbourhood of Pendulum Cove. Access was obtained through the window. The hut was cleaned up and left in a reasonably habitable condition with some supplies of coal and paraffin.

Supplement.

OIL-TANKS.	3 large	155' circumference	33' 6" depth	
	4 small	83' "	26' "	

(2 small tanks, no apparent damage).

All had contained whale oil except one which had been used for storing fuel oil. Galvanised service pipes and joints disconnected and broken. All holes in tank could be covered by plates 2' 6" square.

Fresh-water Tanks in Hut N.W. of House.

2 of 25' 4" circumference and 10' 10" depth. Tanks in good condition but galvanised pipes destroyed by frost.

7/

7 steam winches as plan
3 Whale chaser winches } All exposed to weather.

Several old Weston purchases are in various parts of factory.