

Present Site.

4. The present site of the station on Marion Island is not exactly pleasant, the station having been built on a bog. In fact it is quite impossible to step out of doors in a pair of shoes, and rubber sea boots must be worn the whole time in the immediate vicinity of the buildings. Duck-boards, however, have been laid between some of the buildings, and these assist under certain conditions although in frosty weather frozen ice on these boards are a great danger. However, in spite of these local difficulties, and in spite of the fact that more agreeable sites for a station have been found elsewhere on the Island, it is recommended that the present site be maintained as the cost of removal and the difficulties encountered would be very large. Indeed the actual removal of the present buildings elsewhere would be almost impossible due to the boggy nature of the ground, and if ever it was decided at some future date to situate the station elsewhere, in my opinion the existing buildings would have to be abandoned and new ones built at the new site.

Water Supply.

5. The water supply at the present site Transvaal Cove is not altogether satisfactory although it sufficed during our stay. Water is drawn from a pond 20 ft. below the Governor's House and is pumped to tanks situated outside this building. In spite of the pipes being lagged and buried the whole system freezes up for a few days at a time, but that is not a serious disadvantage and is really inevitable during winter months. The two major disadvantages of the present arrangements are

- (1) the water is dirty and has to be boiled
and
- (2) pumping is not the best arrangement as something might go wrong with the pumps and the water supply would be cut off. Gravity feed would be an improvement.

6. A stream of excellent clear water flows from the mountain area and passes the station about a mile to the north. During the establishment of the station in March an attempt was made to deviate this water but the scheme had to be abandoned due to pressure of time. In my opinion and I believe in the opinion of Mr. Dike P.M.D. representative, who was at Marion, it would be quite feasible to deviate this stream so that it would flow past the station, but it would not be a simple and speedy job. A civil engineer would have to be sent down with his levelling instruments together with a gang of 20 or 30 boys and some blasting may have to be done. Weather conditions are usually so bad that it would not be easy to get the job done in a few days. These are the sorts of snags that crop up at island stations and it would probably be expensive to send a second ship down to the island to remove a party left there to carry out this water-work. Under the circumstances therefore it might be as well to try to let the present state of affairs stand. If, however, the personnel should become so dissatisfied with the water system that the success of the station is in jeopardy, then every effort should be brought to bear to deviate this stream.

Possible New Sites.

7. In other parts of the island hard dry ground certainly exists. New Site No.1 above Ship's Cove was examined during the visits of the various frigates in 1948, but the sandy beach at the Cove below no longer remains (it was washed away during recent heavy gales). Although there is plenty of water here, there is no actual running water, and another disadvantage of the site is that all gear would have to be lifted some 250 ft. above sea level to the site.

New Site No.2 has not yet been properly examined. It is however situated at Sealers Cave on the South East of the island and there is a very attractive bay, with natural formations of rocks in the shape of a quayside, where boats could come alongside to off-load cargo. On the cliffs above is level hard ground and plenty of water. But this site would have to be examined from seaward for a decision to be made with regard to landing facilities before it can definitely be advocated as an alternative site for the station. The fact that sealers have used the Cave extensively is, in itself, proof of the facilities which exist there. Should the station ever be moved I cannot advocate too highly an investigation of this site - to my mind the most superior on the island that I know of.

Landing Conditions at Transvaal Cove.

8. Assuming that the station is to remain for the present at Transvaal Cove then something must be done to improve landing conditions or else, before long, lives will be lost. On two occasions now the wooden landing stage has been washed away and at the present time this is non-existent. There appear to be five possible alternatives for off-loading stores at Transvaal Cove:

- (a) Landings of a primitive nature can be made onto the rocks on the beach. This is the only method available at present and life is endangered in anything but the very smoothest of weather.
- (b) Some sort of retractable landing stage could possibly be built on the side of the cliffs. Commodore Dean S.A.N.F. has ideas in this direction. To my mind it is a job for an engineer to design the gear and erect it.
- (c) A slipway of cement could be built on the beach and boats drawn up by winch. This will be a big job and some hundreds of bags of cement would have to be imported to make the slipway.
- (d) A proper harbour consisting of a break-water wall could possibly be built out from the cliffs, in order to make Transvaal Cove into a harbour. Needless to say this job would be a terrific undertaking and the cost probably run into hundreds of thousands. A colossal wall would have to be built to withstand the gales which are experienced from time to time.

- (e) A kind of crane could be constructed on the cliffs (see Mr. King). Something must be done now with landing problems if the station is to be maintained there. The advantages of a good natural harbour like Sealers Cave Bay, where practically no harbour construction would be necessary, are obvious, but then the station would have to be moved.

Prince Edward Island.

9. There would appear to be no meteorological advantage in operating another station on Prince Edward Island as well as Marion. It is only 12 miles away. There is not necessarily a better site for a station on P.E.I. than Marion. On the other hand, because Marion is so much larger, there are better chances of finding suitable sites there.

A subsidiary station on P.E.I. cannot be operated from Marion. The seas are far too dangerous for small boats to make passages across 12 miles of ocean in latitudes famous for tempestuous storms. And secondly, if a large motor boat was utilised a proper harbour would have to be built at each island in which to shelter and anchor. It takes anything from six to a dozen men to handle heavy boats and on islands where no natural sandy beaches exist the handling of boats is a very dangerous operation. If P.E.I. is to be colonised it should be regarded as a separate station and maintained by frigate based on the Union.

Automatic Stations for Marion etc.

10. I understand that work has been in progress in the manufacturing of automatic weather stations for installation at other points on Marion and possibly also P.E.I. These might well assist an observer stationed at Transvaal Cove to determine the true wind direction in the vicinity of the islands. One machine might be placed on East Cape where there is moderately good exposure, and a second on the ridge to the north of the station, distant about one mile. A third might also be set up on Prince Edward Island. It has also been suggested that a station on the highest point of the island would also be useful. The difficulties of installing such a station would be considerable especially on account of the strong winds and perpetual ice and snow on the Peak. However, in the light of experience gained in maintaining automatic stations closer to hand as an initial experiment, these difficulties may eventually be overcome and the proposition found practicable. However, I cannot say that the maintenance of such a station would have a great deal of appeal for members of the staff. It is not without danger that ascents can be made of Marion Island.

Reliefs - Suggested Policy.

11. The ideal arrangement from the departmental point of view for reliefs would be once a year in the summer months, when the weather is better than at other times. Personnel, rations, fuel and other necessary stores should be sent enough to last 15 months approximately. However, life is so unpleasant at Marion that it would not be easy to get volunteers to remain that length of time. It is suggested therefore that a six monthly basis of reliefs should be initiated when necessary, and the months of September and

March used for these visits. The main relief expedition however should be March, and as little cargo as possible sent down in September. This should be limited more or less to fresh fruit and vegetables for the winter relief.

Every endeavour should always be made to try to get one member of the staff to stay on and overlap into the next cycle of duty.

Rations, Protective Clothing etc.

12. The rations and protective clothing supplied by the department heretofore have been most suitable and adequate. The only additional item of clothing which should be sent down is some sort of fleece-lined snow cap with ear flaps which button up over the head. With regard to smokes, licquer and other consumable comforts, free daily or weekly issues of these commodities are made to the personnel of our brother expedition the Australians on Heard Island, and I understand that in future we too will benefit from free issues likewise.

Livestock etc.

13. During the summer when a relief expedition is sent down a quantity of geese, ducks and sheep should also be sent and the leader of the expedition encouraged to kill once or twice a month so that the party has fresh meat. There is no local produce which makes pleasant eating except for penguin eggs. The island however is not suitable for cattle and other heavy animals, due to the boggy nature of the terrain.

Economic Possibilities of Island.

14. Horticultural:

Seeds including most common varieties of vegetables were planted in boxes soon after our arrival and although they sprouted the plants did not grow properly even after 5 months. The soil is poor for growing vegetables and the experiment unfortunately must be described as a failure. It is not possible to spade a patch of ground as we know it, as the soil is a spongy mass of fibrous matter which does not break up even when dried. It resembles peat. However quite apart from the poor character of this soil on which grass nevertheless grows fairly abundantly, the strong winds and gales common in these latitudes are not advantageous to the growing of vegetables. Even Tristan da Cunha some hundreds of miles further north, presents great difficulties for the gardener and one would expect Marion to be many times worse.

The soil on Marion can of course be likened to peat. But although there is plenty it is hard to dry in a country where rainfall amounts to about 80 inches a year, and I am sure it would not be an economic proposition to try to work these peat deposits.

15. Fish:

Although Marion Island abounds in bird life of many varieties we caught no fish of any consequence during our stay. One member of the party however caught two small fish amongst the rocks. These are believed to be "Rock Cod" and although they might have been good to eat were not pleasant looking and resembled barbel. Bad weather and little other opportunity did not inspire any further efforts to obtain fish, which we believed did not abound in any large quantities. The sea birds on the other hand live largely on krill, plankton and other shrimp-like things.

16. Sea Elephants:

Several hundred or a thousand sea elephants inhabit the Marion and Prince Edward Islands' shores and in the old days used to be a source of oil supply for the old sealers. The quantity of these beasts on Marion today however is hardly thought to be worth a special expedition of exploitation on account of the high cost of equipping such an expedition and the difficulties encountered such as bad weather, lack of beaches etc. However Mr. Kruger of the Dept. of Agriculture (Guano Islands) visited Marion in the Camtoos and I am sure he considered this question in the light of his experience.

17. Silver Foxes:

Mr. Sauer the Minister for Transport considered there might be possibilities of making the island useful in various ways mentioning specifically the Silver Fox. Personally I have had no connection with Silver Fox breeding but as carnivorous animals I take it they would have to be kept well under control if introduced as otherwise they would eat up all the penguins and other sea birds which are protected in the interests of science. The idea however is good and should be reconsidered if some other uses of the island were contemplated.

18. Sheep:

Sheep seem to thrive well on Marion and do not appear to need much attention except for one major disadvantage of the place - the swamps. Being heavy animals in proportion to the size of their feet they are apt to sink into soft ground and drown. In this manner I lost two full grown ewes and one lamb. The rest however did very well, stood up to the winds, rain and snow without the necessity of shepherding, and when killed for the table the mutton was of excellent quality. In the event of transferring the station elsewhere the existing station buildings might well be turned into a sheep or silver fox farm and the buildings let out at some profit.

19. Ducks, Geese, Fowls etc.

Six Tristan da Cunha geese brought down to Marion from Tristan in January, 1948, did very well indeed and when one was killed for the table in August proved to be in best condition. It is thought that ducks might also thrive well. Fowls, however, do not take to the wet climate and of the ten brought down in January all have died of cold except four. Marion therefore is a washout where fowls are concerned.

Aircraft Landing at Marion.

20. Although I know that modern aircraft can travel great distances these days and the science of aeronautics is well advanced beyond the experimental stage, I could never recommend except in the case of utmost necessity, an aircraft making a flight from the Union to Marion. The weather is very changeable in the vicinity of Marion and latitudes below the "roaring forties" have hardly the reputation for the encouragement of such flights. There are however several days in a month when a seaplane could land near the station, but to refuel it, especially under such primitive conditions as exist today, is a very different matter. It is not easy handling 44 gallon drums amongst boulders almost as big as the drums themselves.

Although there are elsewhere on Marion patches of hard ground which are absolutely solid, there is nowhere where an aeroplane could land without constructing a proper aerodrome, and to do that would cost probably many thousands.

Weather - General.

21. The weather at Marion can be described as being decidedly unpleasant. Strong winds, gales, rain and snow are the order of the day throughout the year, but the winter months of June, July and August appear to be the worst months. There is little sunshine, the daily average during the summer months being in the region of 2.5 hours compared with 1.5 or less hours a day in the winter months. The annual rainfall appears to be from 70 to 80 inches a year, which no doubt accounts for the awful swampyness of the island. Rain falls summer and winter.

Snow occurs on the average three to four days a week in the winter months, but the snow coverage on the lower levels is never permanent for more than a week at a time. As soon as the wind veers to north or northwest, rain and warmer winds soon melt the snow once more. There is always snow however on the Peak and there are a few small glaciers in that area. Daily summer mean temperatures for 24 hours are in the neighbourhood of 44°F, the corresponding figure for the winter months being about 38°F. No very low temperatures were recorded, the minimum during my stay being about 27°F.

Additions to be Carried Out Next Summer.

22. The following jobs are outstanding for Transvaal Cove:

- (1) Some type of landing facilities (see para 8.)
- (2) A Radio Sonde filling shed.
- (3) A new food store should be erected.
- (4) The water supply might need attention if Mr. Triegaardt signals accordingly.
- (5) The department might consider supplying a quarter-sized billiard table.
- (6) A 35 m/m Enlarger would be an asset.
(There is plenty of wood on the island for the construction of "duck-boards" between the buildings, so it would appear no additional wood is needed for this work).

General Remarks on Continuation of Met. Station on Marion, etc.

23. Decisions concerning the departments policy with regard to the continuation of the station on Marion rest of course elsewhere. After all that has been done up to now regarding the establishment of the station and the operating of it during the past eight months, I think it would be a pity if it were decided to abandon it. Although living is unpleasant it is far from impossible, and provided the department continues to do everything in its power to make life agreeable for the personnel, there should be no difficulty in obtaining volunteers to stay down there. Personnel should be provided with free rations, quarters, protective clothing, disability allowances and half cost of living, as well as a daily or weekly free issue of cigarettes, licquer and chocolates if and when required. All these issues should of course be recorded by the officer in charge. In this manner it will be possible for the department to offer something specific and attractive as an inducement for fellows to stay there. They will be able to save up their salary and others might like the opportunity of studying in a place where there are no counter-attractions.

24. Although it would be possible in this manner for the Government to maintain a small population there, the selling of land to farmers to start sheep farms is not recommended.

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Quite apart from local drawbacks such as weather and swamps, no ships visit Marion except warships sent down by the department, and "Nature" itself has decreed that Marion remains to all intents and purposes unpopulated. If the habitation of the island were practicable Marion would already have a population of its own. "Nature" however has seen to it that she remains deserted.

25. Nevertheless in spite of (24) above, should the station ever be removed, the Government might consider sending a couple of men and possibly some scientists, from time to time, to occupy the existing buildings and experimentally run a sheep or fox farm.

Survey of Marion.

26. During our stay on Marion I made as complete a land-survey of the island as we believed humanly possible, triangulating about $\frac{3}{4}$ of the whole island. The west coast however remains uncharted. I am proceeding to the "Trigonometrical Survey Office, Mowbray, Cape Town, on Wednesday evening to complete this new survey.

Bird Life etc.

27. A very thorough investigation of bird life at Marion was made and 51 skins comprising at least 22 different species were brought back. These were handed to the Director South African Museum, Cape Town, for study by Dr. Leonard Gill, the well-known South African Ornithologist. This is the largest collection ever brought back and appears to be so complete that a naturalist spending a season on Marion to study birds will find little new. Botany, Geology, and some of the other sciences however remain practically virgin and there is plenty of scope on Marion and Prince Edward Islands for investigation in these sciences.

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