MACQUARIE ISLAND AND ITS FUTURE.

By

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Plates I.-VII.

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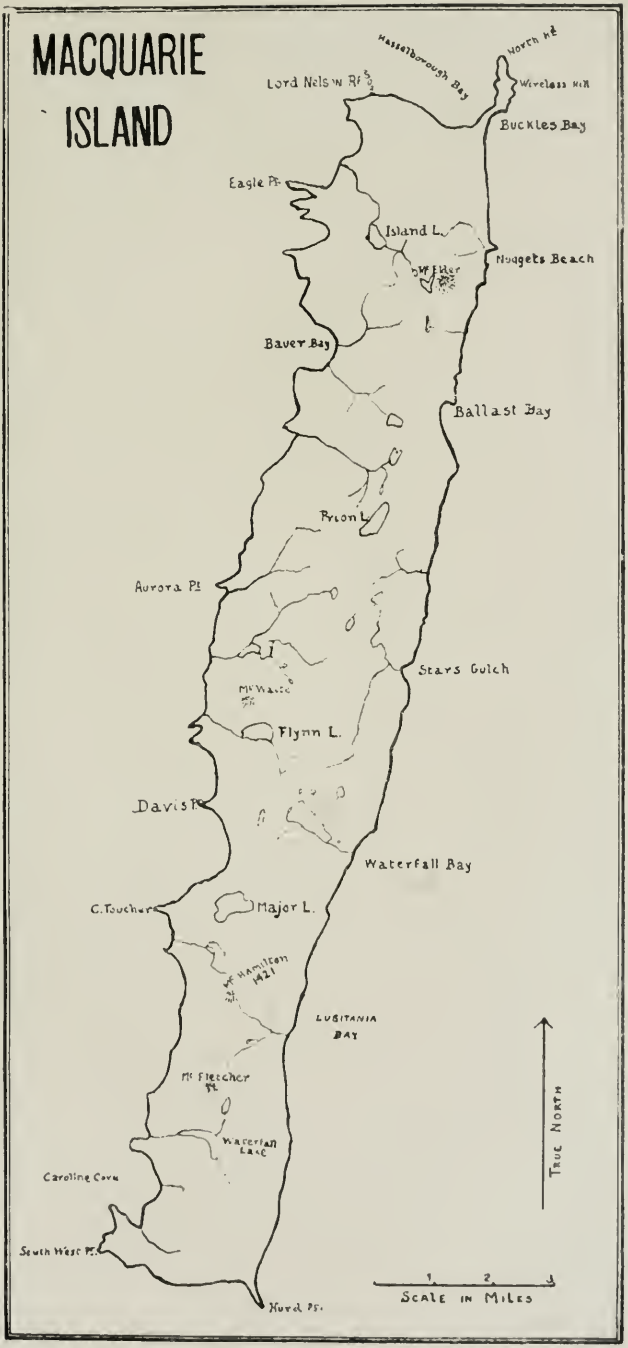
Macquarie Island has recently assumed an importance in the public mind far beyond that suggested by its modest proportions. This distinction emanates from its wonderful population of quaint Subantarctic* life. From the days of its discovery in the year 1810, it has ever been remarked by visitors to its shores as a wonder island of marine bird and seal life.

The hand of man has, alas! cast a shadow over its myriad inhabitants, and wrought irreparable havoc; but this devastation is not yet so complete as that of the more accessible islands to the south of New Zealand, where the destruction of the native fauna is much further advanced.

In the consideration of its animal population, the island is quadruply unique in the Australasian seas. Firstly, for the abundance of the life; secondly, for the variety of species frequenting its shores, some, like the King penguin and the Sea-elephant, breeding nowhere else in Australasian waters; thirdly, for the fact that it is the only speck of land in the vast expanse of ocean to the south of Australasia and New Zealand between latitude 52 degrees south and the Antarctic Circle, and is consequently the only possible breeding place for such life in those seas; finally, for the fortunate circumstance that up to the present man has not completely wrecked nature's handiwork, though certain species of life formerly abundant are now extinct, and others so greatly reduced that they are in danger of complete extermination.

In these days the nations of the world are taking council. Realising the economic and scientific value of perpetuating, as far as practically possible, the varied forms of life which, in association with man, populate mother earth, they are making more and more provisions to ensure the continuance of species.

*This spelling, in preference to "sub-Antarctic," is adopted in conformity with the decision of the Philosophical Institute of Canterbury, N.Z., in connection with their Report on the Subantarctic Islands of New Zealand, published in 1909. It is thus made a definite and specific regional name.


MACQUARIE
ISLAND
Hasselborough Bay
North Pt
Wireless Hill
Lord Nelson Rf
Buckles Bay
Eagle Pt
Island L.
Nuggets Beach
Mt Elder
Bauer Bay
Ballast Bay
Pyson L.
Aurora Pt
Stars Gulch
Mt Wandle
Flynn L.
Davis Pt
Waterfall Bay
C. Touchers
Major L.
Mt Hamilton 1421
LUSITANIA BAY
Mt Fletcher Pt
Waterfall Lake
Caroline Cove
South West Pt
Hurd Pt
TRUE NORTH
1 2 3
SCALE IN MILES

In illustration may be mentioned National reserves where indigenous life is afforded absolute protection, as, for example, Laysan Island, in the Sandwich Group, which is entirely set aside by the United States Government as a sanctuary and breeding ground for marine birds; also our own reserves in the several States of the Commonwealth, where areas are set aside for the indigenous fauna. At other times protective measures are adopted in relation to the exploitation of certain animals where there is a danger of indiscriminate slaughter leading to the extermination of "the goose that lays the golden egg." As examples of this kind may be mentioned, firstly, the International legislation controlling the fur seal industry of the Pribyloff Islands, where alone there now remain extensive rookeries of fur seals; secondly, the control effected over the whaling and sealing industry of that part of the Antarctic and Sub-antarctic that falls within the jurisdiction of the Falkland Islands and Dependencies.

In both cases these latter restrictions refer to very lucrative industries, which, but for the passage of wise legislation, would ere this have been a thing of the past. Prior to the inauguration of protective measures, the days of the fur seal of the North Pacific were numbered; each successive year saw the rookeries greatly reduced. But in the long period that has elapsed since indiscriminate slaughter gave place to a rational treatment of nature's bounty, the numbers of the fur seals resorting to the Pribyloff Islands during the breeding season have at least remained undiminished. It would appear that fur seals were relatively as numerous[1] in the Southern seas in past times as their kindred in the Sub-Arctic; but the slaughter was carried on with such vigour and without discrimination in the days before measures for regulating the traffic were thought of, that they have been practically exterminated, and thereby a great and valuable trade lost to the Southern Hemisphere.

So it is with all the larger wild animals of the world; they are rapidly diminishnig in numbers, and this is especially so in the case of animals yielding products of commercial value. It is only by the adoption of strict control over the slaughter that such can hope to be preserved. In no instance is this better marked than in the case of the whale.

(1) There is record that 320,000 fur seals were taken from the South Shetland Islands in the two seasons 1820-21. From Marquarie Island it is likely that not less than 180,000 skins were taken between the years 1810-13.

Referring to whaling, Dr. Harmer says[2]: "In every "case the history of the operations has been identical, the "period of prosperity with which they opened having been "succeeded by a notable fall in the numbers caught, so that "in most of the localities where whaling was once profitable "the industry has become a thing of the past."

In the Arctic Regions where the Right Whale has been hunted for a very long period, its numbers have now reached a vanishing point.

Antarctic whaling began in earnest in the year 1904, when the vast schools of finner whales were attacked by modern methods, with bases at the island of South Georgia and at the South Shetland Islands. Dr. Harmer[3] says: "At both these localities whaling has been extraordinarily "successful, and in a single year the total catch of both "together has exceeded 10,000 whales; a number which "should be contrasted with 1,437 Greenland whales captured "in 1814, a year described by Scoresby as a specially good "one."

But already the whales are becoming scarcer in those seas, which diminution would be the more accented but for certain restrictions imposed by the administration. The falling off is specially noticeable in the case of the Humpback whale, which constituted 90 per cent. of the catch in the years 1910-12, but had diminished to less than 10 per cent. in the season 1916-17.

In the case of the whales, which animals live their entire lives in the sea, there is far less chance of extermination than in the case of the seals and penguins, which spend a part of the year, the breeding period, ashore; this is especially so with the Antarctic life which has never been hunted by man or predatory land mammals, and is consequently an easy prey.

It would be an easy matter, by the exercise of uncontrolled slaughter over a period of several years, to wipe out the Sea-elephant and penguin life in Macquarie Island. Once gone, it would be practically impossible to regenerate the lost fauna, and the feasible project of perpetual economic exploitation, whilst at the same time maintaining their numbers, would be gone for ever. With the extinction of the seals and penguins goes the economic future of the island.

(2) Scientific Development of the Falkland Islands and Dependencies, by Dr. S. F. Harmer. Jour. Geog., Vol. LVI. (1920), p. 61.
(3) *Ibid.*, p. 62.

A MACQUARIE ISLAND GULLY. (Henderson, photo.)

It is, therefore, only common sense that postulates that the very least that should be done in the case of Macquarie Island, if killing is to be permitted, is the passage of legislation to secure the maintenance of its animal population by limiting the slaughter. But without Zoological advice and proper oversight on the ground such administration could never expect to be effective.

Considering its small size and its absolutely unique position as the *sine qua non* for certain Subantarctic life in our Australasian Quadrant, I am convinced that the wisest course is to reserve Macquarie Island as a sanctuary and breeding place, interfering as little as possible with the balance of existing life.

How this protection can best be secured necessitates a divergence for the brief consideration of its geographical features(4) and administration.

Macquarie Island is situated about 900 miles S.S.E. of Hobart as a solitary speck in the stormy seas of 55 deg. South Latitude. In actual miles it lies nearer to New Zealand than to Tasmania, but on account of the prevalence of strong westerly weather, it is easier of approach from the latter. For the same reason the direction of New Zealand is the more favourable to navigation for the return voyage. On these grounds, voyages to the island in sailing craft would be best included in an itinerary between Hobart and New Zealand. In the case of power-driven craft, however, the existence of the Auckland Islands, with good harbours, situated in an intermediate position, rather favours communication backwards and forwards to New Zealand.

As it is placed on the map, Macquarie Island does indeed suggest a genetic connection with the New Zealand Archipelago. It has the appearance of being an outlying member of the company represented by the Auckland Islands, Campbell Islands, and Snares Groups. But the latter all stand in comparatively shallow water upon the New Zealand platform, from which the Macquarie Island ridge is separated by a deep submarine trough.

Since its earliest days it has been attached as a dependency of Tasmania, though until recently few Tasmanians were aware of their charge. In the year 1890 an endeavour was made by the New Zealand Government to annex the Island. Upon discovering that it had been attached to

(4) For fuller particulars refer to "Macquarie Island" by D. Mawson. Proc. Roy. Geog. Soc. Australasia (S. Aust. Branch), Vol. XX., pp. 1-15.

Tasmania for some 70 years past, efforts[5] were made to have it transferred to New Zealand, but without success.

As a result of this awakening to the existence of Macquarie Island the Tasmanian Government passed regulations[6] prohibiting the killing of seals of any kind. Henceforth a permit was needed granting permission to kill.

There are rumours that representatives of the New Zealand Government have again recently probed the ground to ascertain whether the Tasmanian Government still holds the same opinion with regard to the transfer.

Macquarie Island is somewhat over 20 miles in length, and not exceeding 3¼ miles in width, with the long axis nearly north and south across the direction of the prevalent winds. It represents the backbone of a ridge which can be traced for a long distance beneath the sea, reappearing 8 miles to the north in the Judge and Clerk rock, and again 20 miles south from the southern extremity in the Bishop and Clerk, another isolated spray-swept outpost.

The land rises steeply from the sea except here and there along the coast, where strips of a boggy, raised beach platform intervene. The summit of the island is an undulating plateau at almost 1,000ft. above sea level, dotted at intervals with lakelets at least partly of glacial origin. Evidence is everywhere afforded that the island was overwhelmed with an ice sheet in the recent past, though no permanent ice now remains. The rocks are chiefly volcanic—basic lavas, agglomerates, and cinder beds.

The climate in terms of our own, here in Australia, is rather a miserable one. The mean annual temperature ranges between 38 deg. F. and 40 deg. F., and is kept surprisingly uniform throughout the year by reason of the great body of the surrounding ocean. The almost continuous strong westerly winds, combined with fogs and driving rain, result in a climate almost, but not actually, glacial.

As to the vegetable and animal life[7] sustained by this comparatively inhospitable spot, little can be said of the former beyond that the island supports no tree growth, the only vegetation being rank tussock grass, Kerguelen

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(5) See N.Z. Parl. Papers App. to Journal of House of Reps., Sess. II., 1891 A. -5 in cont. of A. -5 1890.

(6) Under Section 12 of the Fisheries Act, 1889 (53 Vict., No. 11), proclamation issued in 1891 by the Tasmanian Government, and published in the Hobart *Gazette*, 21st Apl., 1891.

(7) For a detailed account refer to "The Home of the Blizzard," by D. Mawson. Heinemann and Co. 1915.

THE NUGGETS BEACH, MACQUARIE ISLAND. (Henderson, photo.)

cabbage, a variety of ferns, moss, and such like. On the other hand the animal life resorting to those shores is of the greatest possible interest, both on account of the wealth of population and the interesting forms represented.

The beaches are still well stocked with that largest of all the seal tribe, the sea-elephant, the bulls of which quite commonly attain a length of twenty feet. Fur seals, formerly so numerous, are now practically extinct. The only other variety of seal haunting those shores is the sea-leopard, which preys on the other seals and the penguins.

Of bird life there is an amazing population, remarkable for its numbers, its variety, and the lesson that it teaches in adaptation to environment. They are principally marine forms; albatross, petrels, and the like on the one hand and penguins on the other. Of land forms, there is little to say beyond the presence of a species of duck frequenting the boggy flats; the former existence in great numbers of a flightless parakeet now extinct; and the presence of innumerable Maori hens (Wekas), which have multiplied from a few specimens brought down from New Zealand by sealers many years ago.

This is no occasion for detailed reference to the wonderful penguin population, beyond stating that four species regularly resort to the island in the breeding season, namely, the King, the Royal, the Victoria, and the Gentoo. The noble and handsome King penguin is one of the worst sufferers from the scourge of the sealer, and is in imminent peril of complete extermination. The Royal penguins are still found congregating in rookeries of hundreds of thousands in several localities, notwithstanding that their numbers have been heavily drawn upon by the sealers for many years past. The Victorian and the Gentoo penguins are less attractive to the oil seekers, being smaller in size and never herded together in the same numbers.

The story that this bird life teaches of evolutional change along lines fitting it for existence under the special conditions of that great wind-swept belt of the southern seas, is something to be particularly remarked upon.

Records concerning the green parakeets which existed in great numbers in the earlier years of last century indicate that, in all probability, they were descended from a normal parakeet stock transformed to an almost flightless condition by long existence under the wind-swept and treeless environment. Though not wingless, the bird was gradually losing the use of the wings, under conditions

where it was doubtless safer to keep to the ground than battle on the wing against the ever-prevalent gales.

The case of the specialisation exhibited on the one hand by the penguins, whose wings have degenerated to mere swimming appendages, and on the other by the albatross class of birds, which plane on the wind without flapping their wings, appears to be the direct outcome of an evolutional development to meet the possibilities of an existence in that great wind-swept region encircling the Globe northward of the margin of the ice belt. The region between 40 deg. and 60 deg. south latitude is famous for its ever-blowing westerlies. The existence of these winds in their present strength hinges upon the continuance of the great heat engine of the Antarctic ice-cap. That great ice-cap was greater still in the recent past, pushing out farther to the north, and therefore doubtless more efficient than it is to-day in keeping the southern atmosphere constantly circulating. The roaring forties and the screeching fifties may have then been even more formidable than is the case now.

At least we can be sure that these winds have continued to blow around the earth in these latitudes for a very long time in the past; under which conditions the bird life would find no profit in flight by flapping the wings. The two evolutional alternatives to meet the conditions would be either to abandon flight altogether, and become a penguin, or else to master the art of planing on the wind, thus turning the very power of the storm to account, as do the albatrosses and petrels. It is significant that the natural range of the penguin and the albatross is just this great storm-swept belt around the earth. Macquarie Island is the very soul of the tempestuous south, and the natural home of its specialised life.

Now turning to the history of human occupation, we find that the island has been visited from time to time since the days of its discovery by vessels in search of seal pelts and blubber oil. The rush during the first three or four years after its discovery served to practically exterminate the fur seal. Thereafter visitations were less frequent, though the blubber oil industry appears to have been revived on occasions during last century.

Apart from the damage to fauna directly wrought by these sealers, they are indirectly responsible for irreparable losses arising out of the introduction by them of the domestic cat. The wild descendants of these felines are scattered about the island spreading destruction amongst the

BULL SEA-ELEPHANTS, MACQUARIE ISLAND. (F. Hurley, photo.)

smaller forms of bird life. The final extinction of the ground parakeets is ascribed to the depredations of these cats. They are also a factor to be reckoned with in the depletion of the smaller petrels.

Short references to the wonderful bird population have been recorded at intervals during its history by exploring expeditions[8], which, in passing, made brief calls at the island. But no proper chart or detailed survey of Macquarie Island was made known until the work of the Australasian Antarctic Expedition in 1911-14. Up to this latter campaign, the only important contributions to the Natural History[9] came from Professor J. H. Scott and Mr. A. Hamilton, of the Otago University, who made short visits there: the former in 1880 and the latter in 1894. These visits resulted in the publication of a general description of the plant and animal life, and drew attention to that fascinating field for further observations.

This brief record is not complete without some reference to Mr. Joseph Hatch's association[10] with the island. For many years past he has conducted a blubber oil industry, with headquarters at Invercargill. Every year parties of men have been sent down to the island to kill the sea-elephants and penguins and render them down for their oil. This was then brought back in casks to Invercargill to be refined before marketing. The slaughter of about 700 sea-elephants and some 300,000 Royal penguins would, so far as one can ascertain, be considered a fair season's work at Macquarie Island.

This trade was never attended with any proper financial compensation for the toll of life involved. As a result Mr. Hatch has passed through a series of financial crises, and, indeed, the nominal rent of £20 per annum for the lease of the island remained for years unpaid. This is an indefensible position for anyone seeking to justify the great slaughter.

More recently, in 1914, the trade was revived with greater vigour, Mr. Hatch having interested additional capital in the venture, which was then floated off under the title of "The Southern Islands Exploration Company." From

(8) Bellinghausen, 1821; Wilkes, 1840; Scott, 1901; Davis (Shackleton Expedition), 1909.

(9) See: Scott, Repts. A.A.A.S. Vol. III. (1891), pp. 226-227. Proc. N.Z. Inst. XV., pp. 484-938. Hamilton; Proc. N.Z. Inst. (1894), pp. 559-578.

(10) He has operated at Macquarie Island at least as early as 1891.

this date the business was pressed with still greater energy under a lease renewable annually at the discretion of the Tasmanian Government for the sum of £40 a year. During this period much of the crude oil was returned to Hobart and refined there.

This lease continued between 1915-1918, but, even with the high war prices ruling for the products, the Government experienced difficulty in collecting the rent. In connection with the operations of this company, a further extension of lease for one year was granted in 1918 to enable them to remove their plant, which operation was apparently never effected; doubtless, for the simple reason that value of the said plant did not warrant its removal.

The proposition had not been a payable one, and the company had gone into liquidation(11). Yet there were those who had the temerity to be again contemplating a lease of the island, with a view to further prosecution of the blubber industry. This is surely unjustifiable slaughter, though Mr. Hatch has recently delivered propaganda lectures(12) in Tasmania and New Zealand with a view to substantiating a claim for a further lease. The very interesting life of the island lends itself as a subject for a lantern lecture, and, if skilfully handled, can doubtless be made very good propaganda to draw the sympathies of the audience to the lecturer. In this way must be explained the psychological anomaly of some, at least, of these audiences, which, after admiring the views of the wonderful animal life, have ended by expressing confidence in the very gentleman who, for practically thirty years past, has made it his business to slaughter annually vast numbers of the island population.

The argument which counsels the withholding of a lease of the island for the prosecution of the blubber oil industry is that, unless conducted on a scientific basis and under proper control, the annihilation of certain species will be quickly accomplished. It has been asserted that the kill-

(11) See the Hobart *Mercury*, 26th November, 1920.

(12) I regret that Mr Hatch, on account of my efforts to maintain the island as a sanctuary for the fauna, has, in the course of these lectures, according to press reports, found it necessary to make disparaging and wholly unfounded statements regarding myself. Contrary to Mr. Hatch's assertions, the establishment of the Australasian Antarctic Expedition station at Macquarie Island was a great boon to his commercial operations. Twice in the period of the two years the Expedition rendered signal assistance to his undertaking at some financial loss to ourselves. On the other hand, Mr. Hatch never went out of his way at any time to assist our operations.

Judge by the records of other expeditions, we were not alone in these unsatisfactory relations with the gentleman.

SKUA GULLS, MACQUARIE ISLAND. (R. L. Blake, photo.)

ing as conducted by the sealers does not reduce the numbers. This is obviously untrue, though the reduction in numbers over a short period may not be apparent where the original number is very great, as is the case with the Royal penguins.

The life frequenting the island at the date of its discovery was unquestionably a balanced population at its full capacity. Any new factor of destruction entering that metropolis must assuredly, by continued exercise against any members of the community, effect a reduction in numbers. Exacting a constant annual toll, the population will decrease in continually increasing proportion. This principle must obtain, though in practice somewhat modified by the operation of several contributing influences.

The effect of past sealing operations at Macquarie Island has been disastrous to its economic and scientific interests, a statement which is quite indisputable.

The sealers first attacked the most valuable of its animals, the fur seal, making a clean sweep of these, so far as they were able, in the first three or four years. Odd survivors of that senseless butchery, being the special mark of all subsequent sealers, were never afforded that respite necessary for the recuperation of their numbers.

The flightless parakeets[13], which are recorded on the island up to the year 1880, were extinct by about the year 1891. The early sealers killed these in great numbers, as they were reported particularly good to eat. The final extinction must have been due to the ravages of the wild domestic cats.

The sea-elephants, fortunately, still maintain themselves in considerable numbers, though greatly reduced, if we judge by early reports. Several fortunate circumstances have contributed to the survival of this monster: In the first place, much of the coastline is not economically accessible to blubber oil operations, and it is on the stormy western coast where the elephants now principally congregate; secondly, it is certain that in these latitudes sea-elephants often travel far, so that accessions from distant Kerguelen and other resorts are to be reckoned with; finally, on account of its immense size—therefore blubber value—in comparison with that of the female, the bull elephant is naturally the particular mark of the sealer, and a considerable toll exacted amongst the numbers of the bulls should have no

(13) Other less conspicuous finch-like land birds appear to have suffered extinction also in like manner with the parakeets.

serious effect in the birth-rate in the case of such polygamous animals.

The next creatures to attract the attention of the oil seekers would be the handsome King penguins at Lusitania Bay, the only rookery of this the largest of the Subantarctic penguins, that now exists[14] in the Australasian seas. The oil yield of this penguin of course exceeds that of the smaller species, hence the persecution these birds have suffered, resulting in the dwindling of the rookery to a mere handful—perhaps a few hundred birds—at the present day. They are indeed in serious peril of extinction in the near future, though the sealers have ceased to trouble them of late years, beyond levying a not inconsiderable toll upon their eggs on account of their palatability.

Compare this state of affairs with the position in the year 1894 as reported by Mr. A. Hamilton[15].

"At Lusitania Bay we went in and dropped anchor "within a few hundred yards of the shore in 15 fathoms of "water." . . . "We had to amuse ourselves by watching "the thousands of King penguins sporting around us. . . ."

"The factory at Lusitania at the King penguin rookery "is not now used; the great heap of refuse testifies to the "great numbers of the birds destroyed. No impression, "however, seems to have been made on the numbers occupy-"ing the beach, as every available place seemed full of "birds."

"The interest and the novelty of the sight of thirty or "forty acres of penguins (King) made up for the deafening "noise and the fearsome smell. . . ."

"Nearly the whole of Lusitania Beach, over half a mile "in length, is occupied by King penguins."

The lamentable dwindling of these once countless birds has all taken place within a period of twenty years, during the continuance of Mr. Hatch's connection with the island.

The Royal penguins, which for some years past, in normal seasons, have been levied upon to the extent of 300,000 birds per annum, have not given unmistakable evidence of this drain upon their numbers. At least this was so in the year 1913. Fortunately for them, several very large rookeries occur at other parts of the island inaccessible to the sealers, and these must help to maintain the numbers at the

(14) Mr. H. Hamilton, of the Australasian Antarctic Expedition, found abundant bones of the King penguin on the spit at the north end of the island, indicating the site of another rookery apparently wiped out during the reign of the sealers.

(15) Proc. N.Z. Inst., 1904, p. 562, *et seq.*

VICTORIA PENGUINS, MACQUARIE ISLAND.
(H. Hamilton, photo.)

Nuggets rookery, where the boiling down works is situated. Viewed in the light of what has happened elsewhere, it may be reasonably predicted that under the continued pressure of a steady drain on the rookeries by the sealers, a very serious decline in their numbers must be expected after the lapse of a few years.

What has been said is sufficient to show the practical inadvisability of leasing the island for the indiscriminate killing of the fauna.

The question presents itself—How can the island be turned to permanent profitable account consistent with maintenance of the animal life?

Inquiry into the possible future of Macquarie Island suggests several alternative courses, which will be considered *seriatim*.

1. *An unrestricted lease*, such as has been granted in the past. There is no need to add more to emphasise the unwisdom of this policy.
2. *A limited lease*, defining conditions of occupation framed in the interests of the general fauna.

   A. With license to slaughter each year a stipulated number of bull sea-elephants and Royal penguins. The numbers considered safe to kill would be a matter for agreement annually by a board of advice, of which one member at least would need to be a zoologist. Such a board would require to be well informed as to the condition of the rookeries each season, a stipulation that would call for an annual inspection.

      In order to cover the expense of such administration, the rent would need to be a figure far above that recently demanded. Under this circumstance it is very questionable whether anyone would be found willing to invest in the venture, in view of past experience where operations working under more favourable conditions have ended in failure.

   B. With absolute protection for the native fauna, but granting rights for fur-farming or grazing rights for sheep, cattle, or reindeer.

      On first consideration much might be expected by developing the island on these lines, but, knowing its limitations, I would be very chary to recommend such undertakings as profitable.

The artificial rearing of black foxes is now a settled industry on Prince Edward Island. Good skins sometimes fetch many hundreds of pounds sterling, and £1,000 for a single animal as prize stock for breeding purposes is not considered an exorbitant charge.

Sheep[16] have been fattened on the island, and if the Romney Marsh variety recommended by His Excellency Sir William Allardyce[17] were introduced, they should thrive satisfactorily. Success might also attend the introduction of Highland cattle, or even reindeer. The latter recently introduced into the Island of South Georgia are reported to be doing well, and increasing in numbers.

But in estimating the grazing value of the island, the map area is no indication of the available pasture land. The whole summit of the island is either bare of vegetation or at the most supports only mosses and lichens. The steep hillsides, leading from the sea, carry a very considerable clothing of tussock grass and other vegetation, and present possibilities for grazing. The best fodder, including abundance of Kerguelen cabbage, is that on the flat strips of raised beach along the coast, but much of this is so boggy as to be more suited for ducks than for cattle.

The occupation of the island for any such grazing purposes would undoubtedly have some effect upon the native fauna and flora; for example, the burrows of the prions would be trampled in by the presence of anything like herds of these animals.

3. The permanent withdrawal of the lease and the proclamation of the island as *a National Faunal Reserve*. To my mind, this is the best course to pursue, in view of its advisability from a scientific standpoint, and in the face of the great difficulty

(16) See: "Report on Macquarie Island," by A. C. Tullock: Parl. Papers No. 7; Hobart, 1916. Also in "The Home of the Blizzard." Heinemann and Co. 1915.

(17) Furnished with a long experience of the Falkland Ids., His Excellency the Governor of Tasmania could not be better equipped to advise on the future of Macquarie Island, where many of the natural conditions are identical.

BULL SEA-ELEPHANT, MACQUARIE ISLAND.
(Henderson, photo.)

of economically exploiting an island hampered by such natural deficiencies as absence of harbours, remote situation, absence of fuel, semi-glacial climate, etc.

To make such a sanctuary efficient, some form of supervision is called for, if for no other reason than to prevent poaching[18].

Such supervision, unfortunately, necessitates expenditure. If the island were placed under Commonwealth control[19] it would be an easy matter for a gun-boat or lighthouse vessel to make an annual visitation, at no great additional expense to the community.

Considering the desirability of making any scheme as self-supporting as possible, the practical solution of this problem may lie in the maintenance on the island of a small Government party, whose chief work might be to maintain the "wireless" meteorological station, to kill limited numbers of bull sea-elephants for skins and oil, possibly develop a penguin egg industry for dried egg substance, attempt to re-establish the fur-seal, and to run a few sheep and reindeer sufficient at least for their own requirements.

Should these operations be carried out under adequate control, the result ought to be satisfactory, as far as the question of the fauna is concerned, and the financial return perhaps sufficient to pay expenses.

(18) Mr. Hatch has reported that sealing vessels from Newfoundland have in recent years been known to make raids upon the island. With the two boiling down plants left on the island, the inducement to poachers will be enhanced.

(19) In 1918 conversations took place between the Tasmanian and Commonwealth Governments on this matter, resulting in an offer of the island to the Commonwealth Government for a faunal reserve on the basis of 5s. an acre, amounting in all to a sum of £14,000. But as the value of the island, judging by the rent (which rent of £10 per annum included the right to wipe out practically the only asset the island possesses) asked, had been previously valued at less than £1,000, nothing further eventuated.

EXPLANATION OF PLATES.

Plate I.

Map of Macquarie Island.

Plate II.

Luxuriant herbage in a gully on the south-west side of the island. The waters of the highland lakes descend by rapid and deeply-entrenched courses to the sea.

(Photo. by F. J. Henderson.)

Plate III.

The Nuggets Beach at Finger and Thumb Point. The shore is thronged with Royal Penguins (*Catarrhactes schlegeli*), which come and go between the sea and their rookery inland, high on the hill slopes.

(Photo. by F. J. Henderson.)

Plate IV.

Bull Sea-elephants in combat, a not unusual sight during the months of spring. Such frays continue until one or other is vanquished, sometimes lasting the whole day long.

(Photo. by F. Hurley.)

Plate V.

Macquarie Island Skua Gulls (*Megalestris antarctica*) feeding on the carcase of a seal left by the sealers.

(Photo. by R. L. Blake.)

Plate VI.

Victoria Penguins (*Catarrhactes pachyrynchus*), a variety made specially handsome by the adornment of a crown and golden eyebrows.

(Photo. by H. Hamilton.)

Plate VII.

A Bull Sea-elephant, just emerged from the ocean water, challenges the Island population.

(Photo. by F. J. Henderson.)