

WEDNESDAY, MARCH 27TH, 1895.

ANNUAL GENERAL MEETING.

The twenty-first Annual General Meeting of the Society was held in the Linnean Hall, Ithaca Road, Elizabeth Bay, on Wednesday evening, March 27th, 1895.

The President, Professor David, B.A., F.G.S., in the Chair.

Miss Anderson, Mr. J. G. Anderson, M.A., and Mr. R. L. Jack, F.G.S., of Queensland, were present as visitors.

The Minutes of the last Annual Meeting were read and confirmed.

PRESIDENT'S ADDRESS.

The twentieth year of the Society's history, notwithstanding the still prevalent depression and continued "hard times," was one of almost unwonted activity. Sixty papers requiring a more liberal allowance of illustrations than usual were contributed at the nine Monthly Meetings of the Session. Five Parts of the Proceedings, including a legacy of arrears of three Parts from the previous year, were issued, while Parts 3 and 4 of the Vol. for 1894 have been issued since the commencement of 1895. These complete a Volume of average size, with more than the average number of plates; but they do not include three lengthy and important papers requiring illustrations, read at the November Meeting. To prevent delay and to distribute expenditure, these have accordingly been held over, and will without avoidable loss of time be issued as Part 1 of the Proceedings for 1895. Ever since the Macleay Memorial Volume was put in hand, four years ago, the Society has been uninterruptedly in the printer's hands,

a state of things which—with the matter held over from 1894 still for some time likely to occupy attention—even under favourable circumstances must continue for another year before we can hope to become quite free from the toils of arrears. The issue of five Parts instead of the usual four per annum means of course extra payments, and introduces a disturbing element into both the publishing arrangements and the finances for the year. Under these circumstances, therefore, it has become highly desirable that by the beginning of next year existing arrears should be cleared off in order that the Society may again revert to its normal condition; even though if necessary this should involve an unusual discrimination in accepting matter for publication during the coming Session.

By the operation of Rule ix. the Members' Roll has been depleted to the extent of forty-five names of Members whose annual subscriptions have continued in arrears. Some at least of these, it may be hoped, will take advantage of the last clause of Rule ix., and by the discharge of arrears again qualify themselves for Membership.

During the year five new Members were elected, two forwarded their resignations, and we have to lament the death of one—Dr. Craig Dixon—who was a prominent member of the Medical Profession in Sydney, and like his brother Dr. Thomas Dixon, to whose services on our Council we are all much indebted, was always a consistent supporter of our Society. For the reasons given above, and more particularly through the continued widespread commercial depression—though for this the Council is desirous of making all possible allowance—the number of effective Members on the Roll is at present smaller than it has been for some years—a fact which I commend to the consideration of the Members generally, in the hope that such a state of affairs may be only of a temporary character.

In the hope of encouraging a larger attendance of Members at the Monthly Meetings the Council early in the year decided as an experiment to hold the Meetings from June to November in town, at the University Chambers, kindly placed at our disposal by

Professor Pitt-Cobbett. The results either in the way of increased attendance or accessions to Membership were not of a striking character; and as an accompaniment of music practice in a contiguous building, and the absence of our books of reference were not found to enhance the interest of the Meetings, the Council has decided to return to our home at Elizabeth Bay. The inauguration of a new line of 'buses from the Railway Station to the top of William-street, via Oxford-street, providing for the convenience of residents in the western suburbs, and of the cable-tram to Ocean-street will be found to offer new and hitherto unattainable facilities of access to the Society's Hall.

Three vacancies on the Council occurred during the year through the successive retirement, on account of pressure of official duties, of Dr. Cobb, Mr. E. G. W. Palmer, and Mr. R. Etheridge, junr. In accordance with the provisions of the Act of Incorporation, the Council filled two of these vacancies for the unexpired portions for the then current year by electing Mr. A. H. S. Lucas, M.A., B.Sc., and Dr. Fick—who was, however, on the eve of leaving for Europe, and therefore unable to act—and whose place was thereupon filled by the appointment of Dr. C. J. Martin: the third vacancy occurring later in the year was left unfilled until the Annual Meeting. Mr. Henn, one of the Auditors, being absent on a visit to India, Mr. E. G. W. Palmer has been elected in his place.

As there arise from time to time questions of priority in the matter of species described in the first seven Volumes of our Proceedings which were issued undated, it is desirable that the effort should be made to ascertain the exact dates with a view to their publication in the Proceedings. Unfortunately the Society's official records for the period covered by Vols. i.-vi., and Parts 1 and 2 of Vol. vii., were entirely destroyed in the Garden Palace Fire. The Secretary, however, hopes by the co-operation of the Librarians of the various Sydney Libraries to be able to ascertain at least the dates on which the publications were received at those Institutions—which would be approximately those of publication. Old Members who are in a position to afford information are also cordially invited to do so.

With regard to the bequest of the late Sir William Macleay of £12,000 for the founding of a Chair or Lectureship in Bacteriology at the University of Sydney, or (failing the acceptance of the bequest by the University) for providing the salary of a bacteriologist to the Linnean Society of New South Wales and equipping a laboratory, the Senate accepted the bequest upon the terms and conditions mentioned in the will and memorandum. The Senate, however, of the University considering the fourth clause of the will rather stringent approached the Council of the Linnean Society with a view to obtaining a *cy pres* modification of this fourth clause. The fourth section of the memorandum provided that—"It shall be necessary for every student before being admitted to a Science or Medical degree at the University to attend a six months' course of bacteriology." The reply of the Council of the Linnean Society to the letter of the Senate was to the general effect that it declined to be a party to any scheme for modifying the late Sir William Macleay's will. The Senate then carried the matter into the Court of Equity, making the Linnean Society defendants.

As only a *résumé* has appeared in the newspapers, and the matter is one in which the Society is interested, I think it right that the full text of the decision of Mr. Justice Owen, Chief Judge in Equity, should be placed on record in the Society's Proceedings. It is as follows :—

Judgment of His Honour the Chief Judge in Equity.

IN THE SUPREME COURT OF NEW SOUTH WALES.

IN EQUITY.

Between The University of Sydney,
Plaintiff, and Her Majesty's
Attorney General for New South
Wales and the Linnean Society of
New South Wales, Defendants.

"This is a suit to obtain the declaration of the Court as to the construction of the will of the late Sir William Macleay.

The testator bequeathed a sum of £12,000 to the Senate of the University of Sydney in these terms:—“To be held upon trust for the foundation of a chair or lectureship of bacteriology subject to the conditions set out in a memorandum on the subject which I intend to leave with my will to be read as part thereof, but if the said Senate shall not, within one month after being notified by my executors of this legacy, accept the conditions set forth in such memorandum, then the said legacy shall be void, and I give the said sum of £12,000 to the Linnean Society of New South Wales.”

The memorandum referred to in the will is in these words:—

“To my Executors,

“This is the memorandum as to the legacy of twelve thousand pounds for a chair or lectureship of bacteriology referred to in my will of even date—I desire that the following conditions be strictly insisted on before handing over to the University the sum of twelve thousand pounds bequeathed in my will for the endowment of a chair of bacteriology :

“First the Senate must agree to accept the said sum for the purpose of providing from the interest of the same a salary for a lecturer or professor of bacteriology and whose duty shall be to give instructions practical and theoretical in the morphology and physiology of the Schizomycetes and Saccharomycetes :

“Secondly the bequest if accepted by the Senate shall be used for the abovementioned purpose and no other and the lecturer shall not have additional duties imposed upon him :

“Third the appointment of a professor or lecturer of bacteriology shall be made by the Senate and not delegated to people in England or elsewhere who know little of the country and care less.

“Fourth it shall be necessary for every student before being admitted to a science or medical degree at the University to attend a six months' course of bacteriology.

“My reasons for insisting upon these conditions being observed are that I am very deeply convinced of the extreme importance

of the study of these minute vegetable organisms both to the biologist and the physician but I am by no means sure that the importance is as yet sufficiently recognised by scientific men and I am unwilling to trust the fate of my bequest to the very uncertain views of the Senate on the subject. I therefore wish my executors to procure very distinct pledges from the Senate upon all the points above mentioned. Should the Senate decline all or any of these conditions I empower my executors to hand over the aforesaid sum of twelve thousand pounds to the Linnean Society to provide a sufficient salary by the year to a competent bacteriologist who shall be called the bacteriologist to the Linnean Society and whose duties shall be to conduct original research in the laboratory of the Society and to give instruction to one or two people at the discretion and under the orders and control of the Council of the Society any surplus to be applied to laboratory requirements."

The plaintiff prays for a declaration—

1st. Whether or not the words "science degree" in the fourth condition mean a degree in science generally or in biological science or other sciences analogous thereto; and

2ndly. Whether or not the words "a six months' course of bacteriology" in the fourth condition mean any and if so what definite amount of lectures or teaching or whether the words mean such amount of lectures or teaching as shall from time to time be prescribed by the Senate.

The will and memorandum bear date the 23rd December, 1890.

In the argument before me it was admitted that the "science degree" must be limited to a degree in biological science or other sciences analogous thereto, as the study of bacteriology would have no place in the curriculum for other science degrees, such as engineering, &c., and as the testator in the memorandum refers to the importance of such study to the biologist and the physician, I have therefore no difficulty in declaring that the "science degree" must be construed with such limitation.

The question as to the meaning of the words "a six months' course of bacteriology" presents greater difficulties. If those

words are to be construed according to their ordinary or grammatical meaning, they mean only that the studies are to extend over a period *of six months and two academical terms*, but it is contended that they have a technical meaning and imply a course of 100 lectures.

If that construction is to be put on the words, the Senate points out that such a course of lectures would in the present state of the science of bacteriology be only a waste of time to students both in medicine and science, and that the lectures for the most part would be mere repetitions of the few topics with which such lectures could deal.

The question, therefore, whether the Senate could properly comply with the condition or ought to reject the legacy depends on the construction of these words.

From the year 1875 up to the time of his death Sir William Macleay was a member of the Senate, and doubtless acquainted with its by-laws. Between the years 1875 and 1882 (before the School of Medicine in this University was fully organised), the by-laws in connection with the Faculty of Medicine required the candidate for the degree of Bachelor of Medicine to furnish evidence (amongst other things) that he had attended certain specified classes, "each for a course of six months." Between the years 1882 and 1884 the by-laws provided that the undergraduates in medicine should attend a six months' course of dissections, but I cannot find that the amount of instruction in such six months' course is anywhere laid down or defined. So far as I can ascertain, the expression "six months' course" nowhere else occurs in the by-laws of the University and is never used in connection with one course of study in science. From the year 1884, the expression appears to have dropped out of the by-laws, and from that year to the present the fourth by-law relating to the Faculty of Medicine provides for a "long course" and a "short course," to denote respectively a course of 100 hours' instruction extending throughout two terms; and of 50 hours' extending throughout one term.

I cannot see, therefore, from the by-laws that any such technical meaning as is contended for has been affixed to the expression "a six months' course," so that I must construe the words of the testator in that meaning. Indeed, if I am to suppose that the testator had in his mind the provisions of these by-laws when he drew up this memorandum, and intended students to attend a course of 100 lectures, I would have expected him to use the words "long course," which alone are defined as meaning a course of 100 hours' instruction extending throughout two terms.

Then it is said that at Edinburgh the expression "six months' course" is used to denote a course of instruction in medicine similar to the "long course" of the by-laws of the Sydney University; and that as the testator had in his youth been a student of medicine in that University, he used those words in the remembered sense of his early days. But I think I am right in stating that Sir William Macleay never took his degree in medicine, and that from early youth till his death at a very advanced age he resided in this colony, where he was for the last 15 years of his life an active member of the Senate of the Sydney University.

It appears to me, therefore, that a circumstance so far distant from the time when this will was executed ought not to compel the Court to hold that the testator used these words in the sense they bore in the University of Edinburgh.

Again, the evidence before me does, in my opinion, bear out the contention of the Senate, that in the present state of the science of bacteriology a course of 100 lectures on that subject could not benefit students, but would be a mere waste of time which could otherwise be more profitably employed – but as that science advances, a more extended course could from time to time be prescribed. If that is so, it must have been well known to the testator, and it is most improbable that he would have tried to force the Senate to give at the present time and under all circumstances such an extended course of lectures as would be useless to the students.

It is contended that the memorandum shows that the testator attached much greater importance to the study of bacteriology than the Senate did, and that that consideration shows that he must have intended to secure a maximum number of lectures on that subject.

I do not think that necessarily follows. The passage in the memorandum refers to all the conditions which certainly bind the Senate to give great prominence to the study of bacteriology in the degrees of medicine and science, but it does not at all follow that the testator meant himself to prescribe for all time the actual number of lectures to be delivered on the subject, especially when the evidence before us shows that so great a number of lectures as is contended for would at present be useless.

I gather from the by-laws that the Senate, on a report from the different faculties, determines from time to time the number of lectures to be delivered on each subject during the terms. And from the evidence of Professor Liversidge the number of lectures varies considerably. That course of procedure I must presume the testator, as a member of the Senate, was aware of.

It appears to me that in prescribing a six months' course of bacteriology, the testator did not mean to take from the Senate the power from time to time to prescribe the number of lectures to be given on the subject, but only to provide that each student for the degree of medicine or science should devote two terms to that particular study under a competent professor or lecturer.

I therefore declare that the words "a six months' course of bacteriology" mean such an amount of lectures or teaching throughout two terms as shall from time to time be prescribed by the Senate, having regard to the great importance which the testator attached to that study.

I think those last words ought to be added to the declaration of the Court, not through any fear that the Senate would in any way seek to evade the conditions, but as more fully expressing the intention of the testator.

The costs of all parties will be paid out of the legacy as between solicitor and client."

The Council of the Linnean Society decided, after due consideration, not to appeal against this decision. Mr. H. M. Makinson and Mr. J. J. Fletcher, as executors of Sir William Macleay, subsequently stated in a letter to the *Daily Telegraph*, of November 14th, 1894, that had they been parties to the suit they would certainly have appealed. In arriving at the decision not to appeal, the Linnean Council were actuated, partly by the desire for peace and quietness, but chiefly by the consciousness of lack of funds to enable them to carry on a protracted legal contest, which might in the end have involved the Society in heavy expenditure.

Subsequent to this decision by the Court of Equity, the Senate appointed a committee consisting of the Chancellor, the Vice-Chancellor, Dr. MacLaurin, Sir Arthur Renwick, Dr. Sydney Jones, Professor Liversidge, Mr. H. C. Russell, and Professor T. P. Anderson Stuart to advise them further on the subject. As recommended by this committee, the Senate sent circular letters to the principal European and American Universities, asking for as full information as possible on the subject of the teaching of Bacteriology. Replies to these circular letters are now being received. It is hoped that it will be possible to have an appointment made to the Chair of Bacteriology by the beginning of the Academic year in 1896.

AUSTRALIAN MUSEUM.

Dr. E. P. Ramsay, owing to continued ill health, was forced last year to resign his position as Curator, after over 20 years' service. Mr. R. Etheridge, junr., who had for a considerable time previous been discharging the duties of acting Curator, has been appointed his successor.

The lack of funds during 1894 very much retarded the general work of the Museum, the efforts of the staff being chiefly confined to the preservation, and in some cases the rearrangement, of the existing collections, with the view of making room for future additions in the already overcrowded cases. The Mammalia have been enriched by the addition of examples of the second Australian

species of Tree Kangaroo (*Dendrolagus benettianus*, De Vis). Numerous nest-groups showing birds, nests, and eggs, and often the young, with natural surroundings, have been added to the Bird collection. The Reptilia and Batrachia were to a great extent withdrawn from exhibition, consequent on substitution of specimens and rearrangement in more appropriate cases. In connection with the lizards, this work had to a considerable extent progressed. A series of coloured casts of snakes have also been introduced. The general collections of Insects, Mollusca, and other Invertebrates were entirely transferred from their former resting places to the upper gallery of the new hall, and are at present undergoing a complete revision. The two latter are now practically completed. A very valuable addition to the Ethnological Collection was made by the presentation by the N.S. Wales Commission World's Columbian Exposition of a fine set of weapons and implements of the Alligator River Tribes, Port Darwin, and numerous urns and vases from the burial mounds of Arkansas, U.S.A.

The addition of the year, however, was the presentation by the Government of the "Cook Relics." These relics of the great circumnavigator, Capt. James Cook, R.N., F.R.S., were chiefly purchased, on a statutory declaration, from the surviving relatives of Mrs. Elizabeth Cook, relict of Capt. Cook. The declared value of these specimens is £1100. The entire general collection of Minerals and Rocks has been transferred to the lower gallery of the new hall, rearranged and re-labelled, to the number of about 5000 specimens. From causes it is unnecessary to mention, little palæontological work has been accomplished. The staff remains on its retrenched basis.

GEOLOGICAL MUSEUM, DEPARTMENT OF MINES AND AGRICULTURE.

Mr. G. W. Card has been working hard at the displaying and arranging of the mineral and palæontological collections. Important additions, chiefly of silver ores and opals, have been made to the collection during the past year. The palæontological collections have been classified by Mr. R. Etheridge, junr., and Mr. W. S. Dun.

UNIVERSITY.

At the Biological Laboratory of the University, Mr. J. P. Hill is working at the development of the teeth of the bandicoot. At the laboratories of the Medical School Professor Wilson is studying the same subject in collaboration with Mr. Hill, and also the development of the teeth of the platypus. Dr. C. J. Martin is still continuing his investigations on the subject of snake poison, and is working out the general development of the platypus. At the Macleay Museum Mr. George Masters is still employed at his task of classifying the collections of foreign *Orthoptera* and *Coleoptera*, and has mounted on ground glass all the collections of Australian and foreign birds' eggs and a large number of marine and land mollusca.

SCIENTIFIC PAPERS, &c.

It would, of course, be quite beyond the scope of this address to review the principal papers of scientific interest which were published by Australian Societies last year. A few publications, however, relating to my own subject will be referred to. The very important paper by Mr. R. L. Jack, at the Brisbane meeting of the Australasian Association for the Advancement of Science, showed that his geological survey of the intake beds of the cretaceous formation proved that the supply of rain water draining into the beds was fully forty times as much as had been previously estimated. On the assumption, therefore, that a total of about one hundred million gallons flow now daily from the Queensland artesian bores, it should be possible to draw at least forty times as much as the above amount of water out of the beds without encroaching on the supply. The geological explorations by Mr. E. F. Pittman, the Government Geologist, during the past year, on the cretaceous rocks of the Upper Darling and in the Parish of Bidura, Balranald district, have shown that it is very probable that the artesian basin may extend far to the south-west of Wilcannia, possibly underneath the overlying Tertiary deposits of West Victoria and South-East South Australia to the coast.

During 1894 the Department of Mines and Agriculture have published Parts I. and II. of Vol. IV. of the Records of the Geological Survey of New South Wales and Part III. No. 8 of the Palæontology Series of the Memoirs. The last-mentioned is entitled "Contributions to a Catalogue of Works, Reports, and Papers on the Anthropology, Ethnology, and Geological History of the Australian and Tasmanian Aborigines," and should prove of great service to workers in that branch of science. A very interesting memoir by Mr. A. S. Woodward, of the British Museum, on the subject of the beautifully preserved fossil fish, discovered at the Talbragar River, has just been received by the Government Geologist, and will shortly be published. The reputation of the Survey is well sustained in these publications.

Mr. R. Etheridge, junr., and Mr. W. S. Dun, assistant palæontologist and librarian, contribute (*op. cit.* Part II. pp. 68-99) "The Australian Geological Record for the Year 1893, with Addenda for 1891 and 1892." This is an invaluable work, and no geological library in Australasia should be without it.

Mr. W. S. Dun, who has been assisting Mr. R. Etheridge in his palæontological work for several years, was this year appointed definitely to the position of assistant palæontologist to the Geological Survey.

MINING NOTES.

I am informed that the "Sydney Harbour Collieries Company" has been successfully floated in London, and that arrangements are being made to purchase Kurraba (Karubah) Point, between Neutral Bay and Shell Cove, and also for the sinking at this spot of a pair of shafts, which should reach the Bulli Coal Seam at approximately the same depth below sea level as that at which the seam was struck in the No. 2 bore at Cremorne, namely, 2774 feet, or probably a trifle deeper. The sinking of these shafts will afford good opportunities for obtaining a series of observations on underground temperature.

The output of gold for 1894 was 324,787 ozs., valued at £1,156,717, as I am informed by the Honourable the Minister for

Mines and Agriculture. This is nearly double the quantity raised in 1893, the amount for that year being 179,288 ozs., valued at £651,285.

Of the amount of gold raised last year the new goldfield of Wyalong contributed 9649 ozs., valued at £35,946, and Garangula 1205 ozs.

As representing the subject of geography as well as geology at the University of Sydney, I trust I may be allowed to say a little about recent research in the Arctic and Antarctic regions. The latter region in particular touches very nearly the work of our Society, and the problem of the possible biological relations of the Australian fauna to that of the old fauna of the Antarctic continent of New Zealand and South America has already engaged the attention of one of our most active members, Mr. Hedley.

ARCTIC EXPLORATION.

At least three expeditions last year were making for the North Pole. Nansen, the hero of the "First Crossing of Greenland," strong in will and limb, was, and we hope still is, drifting with his thirteen men in his wooden ship the *Fram* in the ice pack, from N.E. Siberia towards the strong ocean stream flowing south between Spitzbergen and Greenland, to which he trusts for carrying his ship over the North Pole. Nansen, when he bade good-bye to Dr. John Murray, who had expressed some doubt as to whether he should ever see again Nansen's ship, the *Fram*, said, "I think you are wrong. I believe you will welcome me on this very deck, and after my return from the Arctic, I will go to the South Pole, and then my life's work will be finished."

The American naval engineer, Lieutenant Peary, with a party of fourteen, including Mrs. Peary and her maid, started in July, 1893, for Whale Sound, on the west coast of Greenland. The chief object of the expedition was to complete the map of Greenland, but he also intended to reach the highest northern latitude available. He landed at Bowdoin Bay on March 6, 1894, and started overland with dogs and sledges for Independence Bay.

After pushing north for over 200 miles very severe weather compelled him to return. The temperature at times was 40° to 60° below zero. The sledges had to be abandoned, and only twenty-six dogs out of the ninety taken with him returned alive. Professor Chamberlin accompanied the expedition, and the publication of his observations on Greenland glaciers is being eagerly awaited by geologists in all parts of the world.

Mr. Walter Wellman, a journalist of Washington, attempted last year to attain a high northern latitude, north of Spitzbergen. He took with him aluminium boats, made at Baltimore, weighing about 450 lbs. each, 18 ft. long, 6 ft. wide and 2 ft. deep, capable of carrying nineteen men. The aluminium plates were riveted together Clinker fashion, being only one-tenth of an inch thick. Ash runners were fitted on to the bottom of the boat, so that it could be used as a sledge. Wellman's expedition failed in its attempt, so far as the attaining of a high northern latitude was concerned. Four days after he had left his ship (the *Ragnvald Jarl*) on his journey across the snow, she was crushed by ice, and only some of the stores were saved. Wellman and his party, after making some interesting geographical explorations, returned to Tromsø on August 15th, 1894.

An English expedition, known as the Jackson-Harmsworth expedition, was fitted out last year at the private expense of Mr. A. C. Harmsworth, for Arctic exploration. Mr. T. G. Jackson sailed from the Thames on July 11th, 1894, in the *Windward*, a wooden steamship of 321 tons. She is barque-rigged, and strongly fortified for ice-work. He has taken a whaling boat, a copper boat with collapsible canvas gunwales altogether weighing less than 200 lbs., a light boat of Norwegian pine and an aluminium boat built in three sections, with a duplicate of the middle section, and a birch bark canoe, together with sledges and twenty-four pairs of ski in lieu of snow-shoes. He takes a number of scientific instruments, travelling tents, sledges, four ponies and thirty dogs. It is hoped that scurvy, the bane of Arctic explorers, will be avoided by the frequent use of fresh meat, of which large supplies have been taken. A series of

depôts are to be established from Franz-Josef Land towards the North Pole, which should constitute well-stocked larders for the travellers as they return. Seven men, each of special skill or scientific attainments, accompany Mr. Jackson on this well found expedition.

The latest news of it which has reached me is to the effect that, towards the end of August, the *Windward* was seen by the captain of the walrus-sloop *Betsy* in latitude $75^{\circ} 45'$ N., and longitude 44° E., "steaming in the direction of Franz-Josef Land without let or hindrance, the ice being in this locality brashy and rotten, the *Windward* actually steaming up a lead of which no termination northward was visible."*

A somewhat novel proposal, which is likely to lead to the actual fitting out of an expedition to carry it into execution, comes from the famous Arctic explorer Julius V. Payer. He proposes to send an artistic expedition to paint the North Pole.†

The expression to "paint the town red" is a familiar one, but Payer does not propose to do anything so frivolous. No attempt has ever yet been made to do justice to the beauties of Arctic scenery, of which he gives a glowing account in the article just referred to. He proposes to take, on a 400 ton ship, two landscape painters, an animal painter, and a photographer. Movable glass studios lighted by electricity supplied by benzine or petroleum motors are to be provided, and oils which remain liquid at very low temperatures may be used instead of water colours. Cape Franklin, at the entrance of the little-explored Kaiser-Franz-Josef Fiord in East Greenland may be selected as the first camping ground. It is proposed that the expedition should start in June, 1896.

ANTARCTIC EXPLORATION.

Just now Dr. John Murray, of *Challenger* renown, has strongly stirred the hearts of the English people to fit out an expedition to the South Pole on somewhat similar lines to the great exploring

* The Geogr. Journ. Feb. 1895, Vol. v. No. 2, p. 173.

† The Geogr. Journ. Feb. 1895, Vol. v. No. 2, pp. 106-112.

expedition under Sir James Ross and Captain Crozier in the *Erebus* and *Terror* in 1839-1843.

Dr. Murray remarked in his address to the Royal Geographical Society last year that it was now nearly two thousand five hundred years since the Phœnicians sent out the expedition under the command of Necho into the Southern Hemisphere. They arrived at the Cape of Good Hope, about 600 B.C., and reported that when rounding the Cape, heading westwards, they had the sun on their right hand, a statement of which Herodotus says, "This for my part I do not believe; but others may." Since the time of this voyage of the Phœnician sailors in their frail craft, we have no reason to be proud of the rapidity of geographical exploration in the Southern Hemisphere.

Until the beginning of this year only three exploring parties had passed beyond the limit of 70° S. lat., Cook in 1773, Weddell in 1823, and Ross in 1841 and 1842. This year, however, the whaler *Antarctic*, which has just returned to Melbourne, has had the honour of being the first ship for the last 52 years to penetrate beyond the 70th parallel, reaching lat. 74° S., in long. 171° E.

As a result of his explorations, Cook, as quoted by Murray, was convinced that "the greater part of this Southern Continent must lie within the Polar circle, where the sea is so pestered with ice that the land is thereby inaccessible. The risque one runs in exploring a coast in these unknown and icy seas is so very great that I can be bold enough to say that no man will ever venture further south than I have done." To prophecy thus is also risky, as both Weddell and Ross did subsequently venture much further south, as already stated.

The explorations of Ross, the discoverer of the North Magnetic Pole, stand pre-eminent in the record of Antarctic work. In his case the path of duty was the way to glory. His orders were to try and discover the Magnetic Pole, and accordingly he steered as straight as he could towards where previous observations showed that the Magnetic Pole probably lay, and this proved to be also the best direction for successful geographical exploration. Sir Joseph Hooker, one of the only two members now surviving of

Ross' expedition, thus describes Ross' forcing a passage through the ice*—

“He steered for the position of the Magnetic Pole, and, after passing through much loose ice, met the main pack, about lat. 67° S. and long. $174\frac{1}{2}^{\circ}$ E. It was a formidable pack. Neither he nor any of the Arctic officers or men, of whom there were not a few in the ships, had ever seen anything like it in the north. Nevertheless, Ross determined to try it, and in doing so the boldest held his breath for a space. In four or five days he pushed through it and entered comparatively open water.” This proved to be a huge ocean pool 600 miles across, with a magnificent chain of extinct volcanoes, and one active volcano, bounding it on the east, the highest peak, Mount Melbourne, being estimated to be 15,000 feet high. The sun often shone brilliantly on those stupendous snow-clad peaks as Ross and his men fought their way gallantly southwards until they reached the great ice barrier rising in a sheer cliff 150 feet to 200 feet above the sea, and barring further progress to the South. On the East the ice pack, composed partly of floe ice (frozen sea water), partly of fragments of icebergs, hemmed them in, and they were compelled to return by the way they came. Speaking of the hardships endured by Ross and his men, during the third year of his commission, Hooker says (*op. cit.* p. 28), “It was the worst season of the three, one of constant gales, fogs and snowstorms. Officers and men slept with their ears open, listening for the look-out man's cry of ‘Berg ahead!’ followed by ‘All hands on deck!’ The officers of the *Terror* told me that their commander (Crozier) never slept a night in his cot throughout that season in the ice, and that he passed it either on deck or in a chair in his cabin. They were nights of grog and hot coffee, for the orders to splice the main brace were many and imperative, if the crew were to be kept up to the strain on their nerves and muscles.”

Ross' dredging showed that animal life was abundant right up to the edge of the great ice barrier; and the observations made during the Challenger Expedition quite confirmed this conclusion,

* The Geogr. Journ. Vol. iii. No. 1, January, 1894, p. 27.

for it was found that *tetrasporæ* were so abundant over wide areas as to give the sea a peculiar green colour, and "diatoms were frequently in such enormous abundance that the tow nets were filled to the brim with a yellow-brown slimy mass, with a distressing odour, through which various crustaceans, annelids and other animals wriggled."

One of the most recent Antarctic explorations was made in the *Jason* in 1893-1894. During the voyage of the *Jason* (Captain C. A. Larsen) to the Antarctic lands the discovery was made of a new active volcano, named by Captain Larsen Christensen Volcano, lat. $65^{\circ} 5' S.$, long. $58^{\circ} 40' W.$ *

"The volcano had the shape of a sugarloaf and was of considerable height. The ice was melted for a considerable distance around it. It presented a remarkable aspect, as round the top and on the slopes there were funnel-like holes, from which a very black and thick smoke issued from time to time, covering the top itself."

It is also stated (*op. cit.* p. 342) that to W. by N. from Christensen Volcano there are five islands, one of which is very high, and all probably volcanic, as their tops were free from snow, whereas those of the mountains on the mainland are snow-clad. On the sketch chart accompanying this paper the active volcano of Sarsee is shown in the same neighbourhood, and also Lindenberg Volcano [extinct (?)].

The *Jason* also visited Paulet Island, once an active volcano (*op. cit.* p. 344). It was quite clear of snow, its steep red cliffs thrown into relief by the grey background of the interior of the island, giving it a striking appearance. The most important discovery of the *Jason*, from a scientific point of view, was that of Lower Tertiary fossils *in situ*, at Cape Seymour. These were *Cucullæa*, *Natica*, *Cytherea* and pieces of petrified wood, all of course indicating a former climate much warmer than that which now prevails.

As regards climate, and distribution of animal and plant life, the Antarctic regions are in strong contrast with the Arctic.

* The Geogr. Journ. Vol. iv. No. 4, Oct. 1894, pp. 340-341.

In the Address to the Royal Geographical Society in July, 1894, by Clements R. Markham, C.B., F.R.S., it was stated (p. 9) that "from Payer's furthest point in $82^{\circ} 5' N.$, a water sky made its appearance in the north, the temperature rose, and the rocks were covered with thousands of auks and guillemots. From a height Payer looked down on a dark sheet of open water dotted with icebergs." On April 12 the thermometer was at 54° Fahr. In the discussion following the reading of Dr. Murray's address, Mr. W. S. Bruce, of the *Jason*, said (*op. cit.* p. 36) that as far north as man has penetrated in Arctic regions "he has found reindeer, flowers and bees, brilliant sunshine, and the country green; but in midsummer in the Antarctic no plant grows—the summer sun is not sufficient to melt the snow. The temperature observations on our voyage show that in the height of summer the average range of the thermometer is below 32° , and that in the latitude corresponding to the Shetland and Faroe Islands in the north."*

Dr. Murray also states that "No land animal, and no trace of vegetation—not even a lichen or a piece of seaweed—has been found on land within the Antarctic circle."†

Briefly summarised, what is known at present about the Antarctic Continent is this:—A. Its outline is probably something like that shown on the map exhibited, enlarged from Dr. Murray's map. That there really is a continent there and not merely a group of islands is proved by the following facts:—

- (1) The great ice barrier is a vast land glacier which must have a gathering ground of continental proportions, estimated by Dr. Murray as being slightly larger, perhaps, than that of Australia, namely, about 4,000,000 square miles.

* These observations, however, do not agree with those recently made by Mr. C. E. Borchgrevink of the whaler *Antarctic*. See Note 1, at end of this address.

† See Note 2, at end of this address.

- (2) Granite and various ancient crystalline rocks have been proved to occur *in situ* at the South Shetlands and Trinity Land, and granite and gneiss occur *in situ*, forming nine small islands off Terre Adélie, as observed by the French corvettes *L' Astrolabe* and *La Zélée*.^{*} Drift fragments of granite, dioritic rocks, quartzites, clay shales, &c., were dredged by the *Challenger* not far from the supposed Termination Land of Wilkes. Ross dredged a large piece of coarse granite off Victoria Land, and Dr. McCormick, the surgeon of the *Erebus*, frequently found fragments of granite in the crops of the penguins. His researches constantly proved that the penguins were invaluable as collectors of geological specimens. Granite is almost always characteristic of continents or of islands bordering continents, but is usually absent from oceanic islands.
- (3) Glauconite in the blue muds near the Antarctic barrier is probably indicative of the proximity of a continent.
- (4) Commenting on the fact that the observations during the *Challenger* expedition showed that 162 new species out of 398 identified are peculiar to Antarctic regions, Dr. Murray states (*op. cit.* p. 22), "It is most probable, indeed almost certain, that the floor of the ocean, as well as all pelagic waters, have been peopled from the shallow waters surrounding continental land, and here in the deep waters of the Antarctic we appear to have very clear indications of the existence of the descendants of animals that once inhabited the shallow water along the shores of Antarctica, while in the other regions of the ocean the descendants of the shallow water organisms of the northern continents prevail."

^{*} Voyage au Pôle Sud et dans l' Océanie. Sur les Corvettes *L' Astrolabe* et *La Zélée*, exécuté pendant les Années 1837-40. Géologie, Minéralogie, et Géographie physique du Voyage, Vols. xxii.-xxiii. Paris, 1848.

There are numerous volcanoes in the Antarctic Regions. Altogether there are about five active and seventeen dormant or extinct volcanoes, as far as I can learn from the somewhat imperfect information at my disposal. The volcanoes of Victoria Land show a tendency to linear arrangement. From Mount Sabine, 9,500 feet high, to Mt. Melbourne, 15,000 feet, the trend is sou-sou-westerly. Mount Erebus, 12,367, an active volcano, and Mount Terror, 10,884 feet, extinct, lie almost due South of Mount Sabine. Further north from Mount Sabine the great earth-fold, on the *septum* of which this chain of volcanoes is situated, probably bends a little westwards, as shown partly by the soundings, partly by the position of Balleny's Isle, an active or dormant volcano, estimated by Balleny to be about 12,000 feet high.* North-west of Balleny's Island the great fold trends perhaps to the knotting point between the Tasmanian axis of folding, described in my address last year, and that of New Zealand, the former perhaps running through Royal Company Island, and the latter through or near Auckland Island and Macquarie Island. The knotting point would probably be somewhere (approximately) near the intersection of the 60th parallel of south latitude with the 150th meridian of longitude east from Greenwich. It would thus join the line of extinct volcanoes along East Australia on the west; and perhaps the active volcanic zone of the North Island of New Zealand, or at all events the fold which bounds that continent, on the east.

Traced in the opposite direction, the volcanic zone probably runs through Seal Islands, the active volcanoes of Christensen and Sarsee, and through Mount Haddington, an extinct volcano in Trinity Land, to Paulet and Bridgman Islands, active volcanoes.

* Mr. C. E. Borchgrevink of the whaler *Antarctic* informs me that when he was in the vicinity of this island in 1895 he saw no trace of the volcano being in eruption. Sir James Ross, however, states (*Voyage to the Southern Seas*, Vol. i. p. 272), quoting from the log of the *Eliza Scott*, "as we stood in for it [Balleny's Isle, T.W.E.D.] we plainly perceived smoke arising from the mountain tops. It is evidently volcanic, as specimens of stone, or rather cinders, will prove."

The volcanic zone bends easterly from here on account of the easterly trend in the fold, which appears to make a loop towards South Georgia before it swings back towards Cape Horn. That there is a real easterly trend in the earth-fold at Trinity Land and the South Shetlands is proved by the observations made by the *Astrolabe* and *Zéleé* expedition, which record a strike in a N.N.E. and S.S.W. direction for the greyish-white limestones and phyllite-schists at the South Orkneys.* Towards Cape Horn from near South Georgia the fold probably trends west-nor-westerly, then follows an approximately meridional direction parallel with the chain of the Andes. It may be noted, however, that whereas the *Erebus* chain of Victoria Land is on the east side of the fold, the Christensen-Bridgman group are apparently on the opposite side. This may be due to the fact that at the latter locality the eastern slope of the fold is steeper than the western, as seems probable from the presence of the deep ocean abyss east of Graham's Land, as shown on Dr. Murray's map. The volcanoes of the Antarctic are thus situated on the same great earth-fold which has determined the position of the Cordillera and coast line of South America, and form part of that great "girdle of fire" which runs round about the earth, from the Andes along the west coast of North America and the Dominion of Canada through the Aleutian and Kurile Islands towards Japan, thence through various volcanic islands of the Pacific, including Krakatoa, towards the north-east extremity of New Guinea, to the Tonga Islands, and thence back to the White Island of New Zealand. It is probable, therefore, that the volcanic chain of Victoria Land will continue towards the South Pole, probably bending somewhat to the eastward, and will thence change its position to the fold on the other side of the Antarctic continent, so as to run through the Christensen-Bridgman line of volcanoes. In any case it is almost certain that high land, covered of course more or less by snow and glaciers, will be found at the South Pole.

It may be mentioned here that the gneissic rocks in the small islands off Terre Adélie strike in an east and west direction.

This seems to prove the presence of a subsidiary fold trending easterly along the coast of Antarctica till it joins what may be termed the federated folds of New Zealand and Australia, near their knotting point. It will be important for future exploring expeditions to trace by a systematic series of soundings the position of these folds on the ocean floor, southerly from Tasmania and south by west from New Zealand.

That one, perhaps two,[†] well organised expeditions may shortly be expected in Antarctic regions is extremely probable, as may be judged from the following facts:—The Royal Geographical Society, after Dr. Murray's address in 1894, appointed an Antarctic committee. This committee moved the Council of the Royal Society to advocate strongly the need for further Antarctic exploration, and last December the Council of the British Association passed a resolution strongly in favour of the work being undertaken, and various scientific bodies, as well as the Agents-General of the Australasian colonies, have been approached on the subject. It is proposed to send a Belgian expedition into the Antarctic next September, the expedition to extend over eighteen or twenty months. It would be fully equipped for scientific observation, and the route suggested is one to the east of Graham's Land, in the direction of the recent discoveries of the *Jason*.

With reference to the lines on which Dr. Murray would suggest that an expedition to Antarctica should be conducted, he states (*op. cit.* p. 25):—"A dash at the South Pole is not, however, what I now advocate, nor do I believe that is what British science, at the present time, desires. It demands, rather, a steady, continuous, laborious and systematic exploration of the whole southern region with all the appliances of the modern investigator. This exploration should be undertaken by the Royal Navy. Two ships not exceeding one thousand tons should, it seems to me, be fitted out for a whole commission, so as to extend over three summers and two winters. Early in the first season a wintering

[†] Reference to a third proposed expedition is given in note 3, at the end of this paper.

party of about ten men should be landed somewhere to the South of Cape Horn, probably about Bismarck Strait at Graham's Land. The expedition should then proceed to Victoria Land, where a second similar party should winter, probably in Macmurdo Bay, near Mount Erebus. The ships should not become frozen in, nor attempt to winter in the far south, but should return towards the north, conducting observations of various kinds along the outer margins of the ice. After the needful rest and outfit at the Falklands or Australia, the position of the ice and the temperature of the ocean should be observed in the early spring, and later the wintering parties should be communicated with, and, if necessary, reinforced with men and supplies for another winter. During the second winter the deep-sea observations should be continued northwards, and in the third season the wintering parties should be picked up and the expedition return to England. The wintering parties might largely be composed of civilians, and one or two civilians might be attached to each ship; this plan worked admirably during the *Challenger* expedition."

"What, it may be asked, would be the advantages to trade and commerce of such an expedition? It must be confessed that no definite or very encouraging answer can be given. We know of no extensive fisheries in these regions. For a long time seal and sea-elephant fisheries have been carried on about the islands of the Southern Ocean, but we have no indication of large herds or rookeries within the Antarctic Circle. A whale fishery was at one time carried on in the neighbourhood of Kerguelen, but this right whale, if distinct from or identical with *Balæna australis*, appears to have become nearly, if not quite, extinct. Some expressions of Ross would lead one to suppose that a whale corresponding to the Greenland right whale inhabits the seas within the Antarctic ice, but we have no definite knowledge of the existence of such a species. Although "sulphur-bottoms" (*Balænoptera musculus*), "finbacks" (*Balænoptera Sibbaldii*), and "humpbacks" (*Megaptera boops*) are undoubtedly abundant, they do not repay capture. Ross and McCormick report the sperm whale within the Antarctic ice, but there is still some doubt on

this point. Though penguins exist in countless numbers they are at present of no commercial value. Deposits of guano are not likely to be of great extent. But it is impossible to speak with confidence on the commercial aspects of such an expedition—the unexpected may quite well happen in the way of discovery.”

With regard to the whales seen by Ross in the Antarctic ocean, Sir William H. Flower said (*op. cit.* p. 34): “The only right whale which has hitherto been found in the south is the black whale, which, if it exists in sufficient numbers, is profitable, and has yielded a great deal in former times, and was diffused pretty nearly all around the Southern Hemisphere, being once abundant off the Cape of Good Hope, Australia, and New Zealand, and I have no doubt is the species seen in Sir James Ross’ expedition further south.”

Dr. Murray thus sums up the work of a modern Antarctic expedition: “To determine the nature and extent of the Antarctic continent, to penetrate into the interior, to ascertain the depth and nature of the ice-cap, to observe the character of the underlying rocks and their fossils, to take magnetic and meteorological observations both at sea and on land, to observe the temperature of the ocean at all depths and seasons of the year, to take pendulum observations on land, to bore through the deposits on the floor of the ocean at certain points to ascertain the condition of the deeper layers, and to sound, trawl, dredge, and study the character of marine organisms.”

Professor Neumayer says: “It is certain that without an examination and a survey of the magnetic properties of the Antarctic regions, it is utterly hopeless to strive, with prospects of success, at the advancement of the theory of the earth’s magnetism.” It is certain also that without a knowledge of the geography and meteorology of the Antarctic regions no weather predictions for any part of the globe, much less for the Southern Hemisphere, can be considered absolutely reliable, however wisely they may have been forecasted.

All these expressions of opinion on the part of leaders of modern scientific thought as to the desirability of an expedition

being sent to the Antarctic regions to learn more about its meteorology, more about its biology, more about its physics, geography, and geology, the Linnean Society of New South Wales will, I feel confident, most heartily endorse. That the last great work of geographical, biological, and geological exploration in the world should be undertaken by the people of the British Empire is a consummation devoutly to be wished for; and it would be a very worthy end of the grand work begun and continued by the great *Challenger* expedition.

There is more than mere political glory and problematical guano to be gained by such an expedition as that which is now contemplated to Antarctica. There is the good of humanity and the cause of truth. Scientific Societies have been appealed to to help on this enterprise, and we all can help, if not with our money at all events with our minds. If the Linnean Society of New South Wales cannot contribute men or money, I hope most sincerely that it will at least contribute a very hearty sympathy.

NOTES.

1. Mr. C. E. Borchgrevink, who accompanied the whaler *Antarctic* on its voyage to Balleny's Island and Victoria Land, stated in his lecture delivered in Sydney on April 24th that the shade temperature was by day as high as 46° Fahr., and the mean temperature for January, 1895, was 32.5° Fahr.

2. Mr. C. E. Borchgrevink obtained land plants (which Mr. J. H. Maiden, F.L.S., F.C.S., informs me are probably lichens) from Possession Island, and from Cape Adair, on the mainland of Victoria Land.

3. While the proofs of the above Address were being revised the following announcement in the *Scientific American*, March 30th, 1895, p. 202, has been brought under my notice by Mr. H. C. Russell, the Government Astronomer:—"Dr. Frederick A. Cook, the well-known explorer, has recently declared his intention of leading a small but well-equipped body of scientific men on an exploring expedition to the Antarctic regions. The time for leaving New York has been fixed for September 1st, 1895, and it

is expected that the voyage will last for probably three years. The party intend to sail in two small sailing vessels, each of about 100 feet in length and of from 100 to 200 tons burden. Each vessel will be of the type known as 'Sealers,' and will be manned by five men. . . . A fine pack of Esquimaux sledge dogs will also be provided. The scientific corps will consist of five men, who will carry with them such equipments as will assist them in carrying out their various lines of investigation. It is expected that it will take about three months to reach the Gulf of Erebus and Terror, where the expedition will probably disembark. A substantial wooden house will then be erected to be used as the headquarters. Later on, sledging parties will be sent out from this point to penetrate as far south as possible."

On the motion of the Rev. J. Milne Curran, seconded by Mr. T. Steel, a very hearty vote of thanks was accorded to the President for his very interesting Address.

The Hon. Treasurer being detained by Parliamentary business, Mr. P. N. Trebeck presented and read on his behalf a satisfactory financial statement, and also the Auditors' report.

On the motion of Mr. Trebeck, seconded by Mr. R. Etheridge, junr., the statement and report were adopted.

The following gentlemen were elected

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