ANTARCTIC RESEARCH.

THE desirability of a well-equipped expedition for the study of the Antarctic regions has been so frequently set forth by men of science, and recorded in the columns of NATURE, that little can now be said on the subject without repetition. But if little that is new can be said, much remains to be done; and unless the unanimous and often repeated declarations of British scientific men culminate in action, the reputation of science in this country will suffer seriously. The large and enthusiastic meeting of the Royal Society on Thursday last, February 24, showed more emphatically than had before been possible how great is the importance attached to the renewal of Antarctic exploration by the leaders of all departments of natural science. The meeting is fully reported below; but the steps which have led to it, and the reasons why the goal has not sooner been attained, may be referred to here.

Sir Wyville Thomson, on the return of the *Challenger*, and of the Arctic expedition which followed it, came to the pessimistic conclusion that "we can only anticipate disasters multiplied a hundred-fold should the South Pole ever become a goal of rivalry among the nations" (NATURE, xv. p. 123); but much has been learnt as to methods of polar travel since 1876, and the fear of possible disaster was, we believe, never strong enough to check any British scientific expedition. Dr. Neumayer had several years previously very strongly urged the importance of Antarctic work on many grounds (NATURE, vii. p. 21), and to him, more than to any other, is the recent revival of interest due. As early as 1875 the question was seriously raised in Australia, though not pressed.

At the British Association meeting in 1885 Sir Erasmus Ommanney urged the advisability of renewing Antarctic exploration, and a Committee was appointed to consider the matter. As a result the Royal Society of Edinburgh and the Scottish Geographical Society appointed Committees to draw up reports in 1886, which were published as an appendix to a paper on Antarctic exploration, by Dr. John Murray, in the *Scottish Geographical Magazine*, vol. ii. p. 527. At the Birmingham meeting of the British Association in 1886, a Report was presented stating the importance of a Government expedition, and Captain Creak, R.N., read a paper giving forcible expression to the necessity of research in the Far South from the point of view of terrestrial magnetism. The Australasian Colonies became keenly interested, and the Legislature of Victoria actually voted 5000*l.* to assist in an expedition if the Imperial Government would also take part in it. The Manchester meeting of the British Association in 1887 again considered the question, and at Bath in 1888 Sir Erasmus Ommanney's Committee gave in a final report expressing regret that Her Majesty's Government had declined to support the Australian proposals; which they did on the ground that if successful a more expensive expedition would be called for. During the year 1891 an effort was made in Australia to initiate a joint Australian and Swedish expedition, but without result, and financial difficulties afterwards prevented the renewal of Australian offers. At the Fifth International Geographical Congress at Bern, and at the British Association at Cardiff, papers were read by Sir Erasmus Ommanney and Mr. Delmar Morgan on the advisability of getting up an expedition. In 1892 a new phase of the question was entered upon. Whaling expeditions to the seas south of the Falkland Islands were despatched from Dundee and from Norway. Thanks to the efforts of Mr. Leigh Smith and the support of the Royal Geographical Society, the *Balæna* and *Active*, of Dundee, were supplied with instruments, and their surgeons, Messrs. Bruce and Donald, were selected with a view to making scientific observations. Captain Larsen, of the Norwegian whaler *Jason*, also made good observations. They returned in 1893, and the results, although not very striking, were sufficient to show the necessity for finding out more, and the comparative ease with which steam vessels could navigate Antarctic waters. The British Association again appointed a Committee, which reported in 1894.

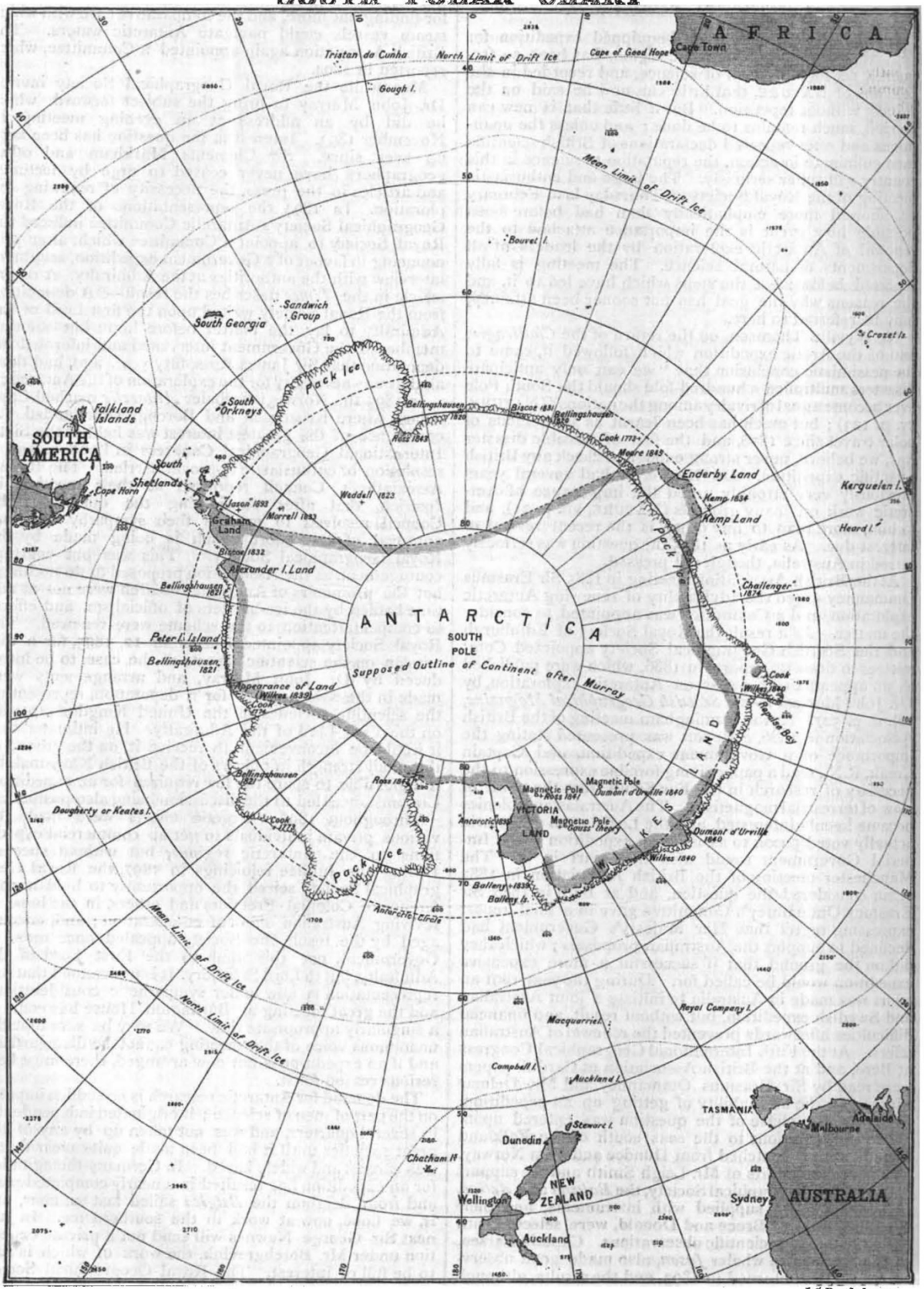
Meanwhile the Royal Geographical Society invited Dr. John Murray to bring the subject forward, which he did by an address at an evening meeting in November 1893. Interest in the question has been kept up ever since. Sir Clements Markham and other geographers have never ceased to urge by lectures, and articles in the press, the necessity of renewing exploration. In 1894 the representations of the Royal Geographical Society's Antarctic Committee induced the Royal Society to appoint a Committee which, after pronouncing in favour of a Government expedition, sought an interview with the authorities at the Admiralty. A recent article in the *Times* describes the result—"A deputation from the Royal Society waited upon the first Lord of the Admiralty to lay the matter before him; but another member of the Government intervened and informed the deputation that Sir James Ross, fifty years ago, had done all that was necessary for the exploration of the Antarctic."

In 1895 the Norwegian whaler *Antarctic* reached Cape Adare, where Kristensen and Borchgrevink landed. A conference of the greatest interest was held at the Sixth International Geographical Congress in London, and a resolution of enthusiastic approval carried. The British Association's Council reported, at their meeting in Ipswich, that after considering the question "the Council resolved to express their sympathy with and approval of the effort which is being made by the Royal Geographical Society." This was but cold encouragement, as the Association proposed to do nothing; but the promoters of Antarctic research were not at any time baffled by the ice-barriers of officialism, and efforts to compel attention to the scheme were renewed. The Royal Society appointed December 12, 1895, for a discussion on the scientific aspects of the case, to be introduced by Dr. John Murray, and arrangements were made in the same month for a deputation, representing the scientific societies of the United Kingdom, to wait on the First Lord of the Admiralty. He intimated that it would be inconvenient to receive it, on the ground of the small strength in officers of the British Navy making it impossible to spare the few required for an expedition. Circumstances led to the discussion being also postponed.

Throughout 1896 energetic efforts were made by various private individuals to get up commercial expeditions to the Antarctic regions, but without success. During the Jubilee rejoicings in 1897, the Royal Geographical Society seized the opportunity to hold a conference of Colonial Premiers and others, in the hope of reviving Australian offers of co-operation; and, encouraged by the result, the Society appealed once more to Government, not this time to the First Lord of the Admiralty, but to Lord Salisbury. It is understood that this representation is now under sympathetic consideration; and the great meeting at Burlington House has come at a singularly appropriate time. We may be sure that the unanimous voice of that meeting cannot be disregarded; and if an expedition is not now arranged, there must be a serious reason for it.

The demand for Antarctic research is no sudden impulse on the part of men of science; it originated independently in several quarters, and was not taken up by any of the great societies until it had been made quite clear that it was earnest and widely based. In Germany the agitation for an expedition has resulted in a nearly completed plan, and from Belgium the *Belgica* sailed last summer, and is, we hope, now at work in the southern ice. In July next Sir George Newnes will send out a private expedition under Mr. Borchgrevink, the work of which is sure to be full of interest. The Royal Geographical Society

SOUTH POLAR CHART



J. G. Bartholomew.

also could easily have arranged for a small expedition under competent leadership, had it not felt that preliminary work is not now so much wanted as substantial and sustained research, the expense of which would be too great for an individual or a society, though trifling to a nation. A large expedition is necessary, and a vast amount of anxiety and uncertainty as to the manner of working would be spared if it could sail under naval discipline, like the *Challenger*. There must be no mixture of commercial with scientific interests: when the conditions of the region are investigated, and its resources tested, private enterprise will not be slow to take practical advantage of useful discoveries. The incidental scraps of scientific value which commercial cruises have produced are undoubtedly useful to a certain degree; but scientific men on board vessels of that class have too frequently failed to work smoothly with the executive authorities. The exact relations to be observed between naval officers and civilian scientific staff can be determined in the light of past experience.

The object of Thursday's meeting was to elicit expert opinion as to the scientific advantages likely to be derived from adequate exploration of the South Polar region. In the absence through illness of Lord Lister, Sir John Evans presided, and the meeting-room of the Royal Society was crowded by a remarkable audience. In addition to the leading authorities in London on every branch of science, there were present the three men who have been nearest the two poles, Dr. Nansen and Lieut. Johansen from 86° N., and Sir Joseph Hooker from 78° S., the only survivor of Ross's expedition, and the last man alive who has seen Mount Erebus and the southern Ice Barrier. Dr. Neumayer, of the Deutsche Seewarte, came from Hamburg specially for this meeting, an example of international generosity to be the more esteemed because the German Antarctic expedition, which he has done so much to promote, is at last on the verge of taking definite shape. The Italian Ambassador also represented by his presence the friendly interest of a country which in 1880 made a courageous attempt, under Lieut. Bove, to take an active part in south polar work. Invitations to many of the younger scientific men engaged in departments of research bearing on the subject of the meeting had been sent out by the Society, and these were taken advantage of to the full. The interest of some who could not be present was conveyed by letter; a communication from the Duke of Argyll was read by the Secretary, dwelling on the value of the proposed expedition. Lord Kelvin had the evening before, while presiding at a lecture by Dr. Nansen in Glasgow, expressed his own views very strongly. Stating that the lecturer was leaving immediately after the lecture to attend the Royal Society meeting, he said, as reported in the *Glasgow Herald*: "The object of that meeting was to consider a proposal for an expedition to investigate the Antarctic polar regions, and Dr. Nansen was going to help the Society in its deliberations. If such an expedition were undertaken, and he hoped it would, it ought to receive the help of the Government. The British Government should make one of its primary objects the work of exploration, so that there should be nothing unknown of the whole ocean coast-line"

Dr. John Murray introduced the discussion by touching on all the scientific desiderata of the Antarctic regions; and after him nine speakers enforced and extended his arguments. Sir John Evans wisely decided that the discussion should be confined to the purely scientific aspect of the case, and the speakers closely followed his advice. The audience received the various addresses with applause such as is seldom heard in Burlington House. A good deal was made of the extent of our present knowledge, and an outsider might suppose that there was less diversity of opinion than really exists. The different estimates of the value of an Antarctic expedition to zoology, expressed by Dr. Sclater and Prof. D'Arcy Thompson, and the emphatic statement of the discrepancy between Ferrel's (or rather Dr. James Thomson's) theory of atmospheric circulation, and the indications of meteorological observations in the Far South, by Dr. Buchan, were stimulating and suggestive. How little we know of the Antarctic may be gauged from the map accompanying this article.

The meeting, the Chairman observed in closing it, was of unprecedented length, and a number of gentlemen who were prepared to take part had no opportunity to speak; while some of the speeches, especially that of Sir W. J. L. Wharton, in which he spoke of the popularity of such an expedition in the Navy, had to be cut very short. It would be worth while to consider whether some further opportunity might be given to bring before the scientific public the unheard arguments of last week.

The historical argument was not brought forward; but it is of importance in relation to the motive for exploration. At first the Antarctic question was the purely academic one of the possible existence of Antipodes, and was discussed by the ancient Greek geographers from analogy alone. On the revival of exploration in the fifteenth century, the existence of an Antarctic continent shutting in the Indian Ocean to the south, as supposed by Ptolemy, was a matter of much practical concern, for it affected the possibility of a sea-route to India. After the discovery that Africa could be rounded on the south, the appearance of the continent of America was looked on as a sign of the existence of a mass of Antarctic land. When Magellan penetrated his straits, and even after the rounding of Cape Horn, a vast Antarctic continent reaching to the tropics was a matter of common belief. Cook's first voyage of exploration detached New Zealand from this hypothetical continent; his second proved that any continent which might exist lay within the Antarctic circle. With this discovery the political motive for Antarctic exploration vanished. The only possible reason for adequate exploration was thenceforward scientific, and sixty-four years after Cook returned the ships of Sir James Clarke Ross set out on their great cruise. That was fifty-nine years ago. The intervals of sixty-four and fifty-nine years were both marked by the incidental work of other expeditions, such as the circumnavigations of Bellingshausen and Dumont d'Urville, and that of the *Challenger*. Commercial enterprise also sent out a number of daring sailors, the fleets of the Enderbys before Ross, and those of the Scottish and Norwegian whalers since. The commercial motive has proved insufficient in the south, potent as it was for many centuries in the north. The fact stands to-day that if the scientific motive fails to produce the result, the Antarctic regions will never be explored.

Putting the matter in its simplest form, civilised man must understand his dwelling-place; the key to many puzzles, the end of many controversies affecting the theory of the phenomena of the whole world, lies behind the vast Antarctic veil. It is the duty of the human race to lift that veil, whether there be much or little behind it, and the British people, as represented by the Government, ought to take the lead. We ought to take the lead because our territory in Australasia, Africa, and the Falkland Islands comes nearest to the unknown region; because our national welfare is more concerned than any other in the intelligent and safe navigation of the Southern Ocean; and because our Government, our Navy, and our scientific societies are richer and stronger now than they were in the days of Cook and of Ross, both absolutely and with reference to other nations. That other nations are preparing, or have prepared, to take part in wiping off this huge reproach on the enterprise and the self-respect of nineteenth

century man should surely be an inducement to action rather than a deterrent. The value of simultaneous expeditions working in friendly rivalry is in such a case far greater than that of consecutive or isolated work.

HUGH ROBERT MILL.

ERNST CHRISTIAN JULIUS SCHERING.

ON November 2, 1897, as already announced in NATURE, Göttingen lost, at the age of sixty-four, its senior mathematical professor, Ernst Christian Julius Schering, best known as the editor of Gauss's works.

Prof. Schering's life presents one curious feature, rare in the German academic world. Göttingen was the only University with which as student, teacher, or professor he had any connection. The forty-five years of his life there go back to the days when Gauss, Wilhelm Weber and Dirichlet still lived and taught. Although the first of these was to exercise paramount mastery over Schering's future, we can trace the influence of each in his life and writings. Schering's published work deals entirely with subjects in which his celebrated teachers were pioneers—theory of numbers, non-Euclidian geometry, hydrodynamics, electricity and magnetism. As far as one can judge, Schering's personal predilections were for a strictly analytical treatment of pure mathematics; the force of circumstances, however, directed part of his energies to applied mathematics and practical physics. He is said to have shown great mathematical promise at school at Lueneborg and at the Polytechnikum at Hanover; so much so that he abandoned his intention of becoming an architect, and went up to the University in 1852. His studies were crowned with success, and he received prizes both for his Doctor's dissertation, "On the mathematical theory of electric currents," and for his Habilitationsschrift, "On the conformal representation of the ellipsoid on the plane."

In 1860 he became Professor, and was at first engaged in astronomical calculations under Prof. Klinkerfues. In 1863 he embarked on his life-work, the editing of Gauss's papers. Gauss left, besides a large quantity of published work, a mass of notes and of half-finished productions. The work of collecting the published papers, and of looking through, arranging and collecting the unpublished, fell to Schering. From 1863 to 1874 he edited six volumes of collected works, published by the Gesellschaft der Wissenschaft, of Göttingen. He subsequently edited the *Theoria Motus* for the owner of the copyright; this volume, though apparently uniform with the others, does not properly belong to the set, and, the copyright having now expired, the Gesellschaft propose to publish the *Theoria Motus*, together with some still unpublished writings, in a seventh volume of their edition.

It is difficult for any one who has not seen the documents to estimate the labour required to bring them into a form fit for publication. There still remains an enormous mass of unpublished matter, notes on scraps of paper and backs of envelopes, calculations without explanations, statements without proofs, and so on. Until a lingering illness rendered him unfit for much exertion, Schering went on working to bring order into this chaos; but he was unwilling to publish except in a perfected form. Since 1874 no volume had appeared, and, except Prof. Schur, no one had access to any of the original manuscripts.

There was consequently great curiosity about the MSS. when, on Prof. Schering's death, they were brought out and examined. A number of mathematicians have been enlisted by Prof. Klein, and it is hoped that at least the notes on planetary disturbances and the correspondence on non-Euclidian geometry will soon be published. Work that is too imperfect for publication will in future be always accessible at the University library.

Apart from those already mentioned, Schering published numerous papers, mostly to be found between 1870 and 1887, in the Göttingen *Nachrichten* and *Anzeiger* and the *Comptes rendus*. His lectures, which for some years he had done little more than announce, were usually on higher pure mathematics.

In 1868 he became director of the Gauss Magnetic Observatory. His work consisted partly in directing the studies of students in magnetism and kindred subjects, partly in conducting observations, &c. Generally he continued and extended the work as Gauss had planned it. Accounts of his observations, and of various improvements made by him in the instruments, will be found in papers by himself and his brother, Prof. Karl Schering, of Darmstadt.

W. H. AND G. CHISHOLM YOUNG.

NOTES.

ON Saturday last, at the Trocadero Restaurant, a dinner was given to Prof. T. McKenny Hughes by his old students, on the occasion of the twenty-fifth anniversary of his election to the Woodwardian Professorship of Geology at Cambridge. Sir Archibald Geikie presided, and covers were laid for old students and friends to the number of sixty-five. An illuminated address was presented to Prof. Hughes by Dr. R. D. Roberts and Mr. A. Strahan as the oldest and earliest of his Cambridge students in the company; and the healths of Prof. and Mrs. Hughes were proposed by Sir A. Geikie. In the course of his speech, Sir A. Geikie alluded to the great and continued growth and success of the Cambridge Geological School, which he characterised as second to none in the world. Prof. Hughes replied, and subsequently the President of the Geological Society (Mr. Whitaker), Sir Henry Howorth, M.P., Prof. James Stuart, M.P., and Dr. Hicks spoke and testified to the value of Prof. Hughes's professional work, and to the wide extent of his personal influence. In addition to those above mentioned, there were present Prof. Wiltshire, Mr. W. Hudleston, Prof. Etheridge, Dr. Henry Woodward, Prof. Lapworth, Prof. Watts, Prof. Ainsworth Davis, Messrs. Teall, Herries, Bauerman, Marr, Harker, Seward, Woods, Reed, Rudler, Kynaston, Mond, and several ladies, many of whom had studied under Prof. Hughes at Cambridge. Letters and telegrams of congratulation from leading Continental geologists were read by Sir A. Geikie. A magnificent silver loving-cup was presented to Prof. McKenny Hughes on Monday, February 28, by his past and present students at Cambridge as a permanent memento of his twenty-five years' work as Woodwardian Professor of Geology, and as a mark of their esteem and gratitude. The cup bore a suitable inscription in Latin, and the arms of the University and of Trinity and Clare Colleges; and an illuminated list of the subscribers was presented with it. Mr. Cowper Reed, Miss Blanche Smith, Dr. Roberts, Prof. Ainsworth Davis, and Rev. W. L. Carter made appropriate speeches, and Prof. Hughes replied.

THE Physico-Mathematical Society of Kazan has made its first award of the Lobachévski Prize to Prof. Sophus Lie, of the University of Leipzig, in consideration of the third volume of his work, "Theorie der Transformationsgruppen." The prize, which is of the value of 500 roubles, is to be adjudged every three years for work in geometry, preferably non-Euclidean geometry, and all works published in Russian, English, French, German, Italian, or Latin in the six years preceding the award are eligible. In Prof. Lie's treatise the theory of non-Euclidean geometry has been exhaustively re-stated and re-established in a profound investigation on the space-problem, based on the work of the late von Helmholtz.