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### Scottish national Antarctic expedition

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“subjects,” each to be treated by its teachers and examiners in its separate hour and compartment, but to unify and vitalise the whole by help of this literal “Return to Nature.”<sup>1</sup> How can we from this contemporary “conflict of studies” return towards their completeness and harmony? How are the many and legitimate claims now before state and family, teacher and child—those of naturalist and of humanist, of utilitarian and of idealist, of statesman and of poet—to be practically harmonised in some reasonable and ever-increasing measure? And how may this be done so far as may be here and now, for the present generation of teachers and schools, and without waiting either for the infinitely distant completion of specialist sciences, or for the settlement of administrative machinery, as so many would have us do? These are the educational problems clearly before us, and particularly before the geographer, as the exponent not of any one special science of nature, nor of any one tradition of culture, but as the concrete synthetic of all these. Hence in a subsequent paper will be attempted more definitely to outline some of the contemporary experimental contributions towards this incipient educational synthesis, and especially of course those within the writer’s immediate experience, which have been growing up for many years past in the Outlook Tower and its associated vacation and other studies.

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### SCOTTISH NATIONAL ANTARCTIC EXPEDITION.<sup>2</sup>

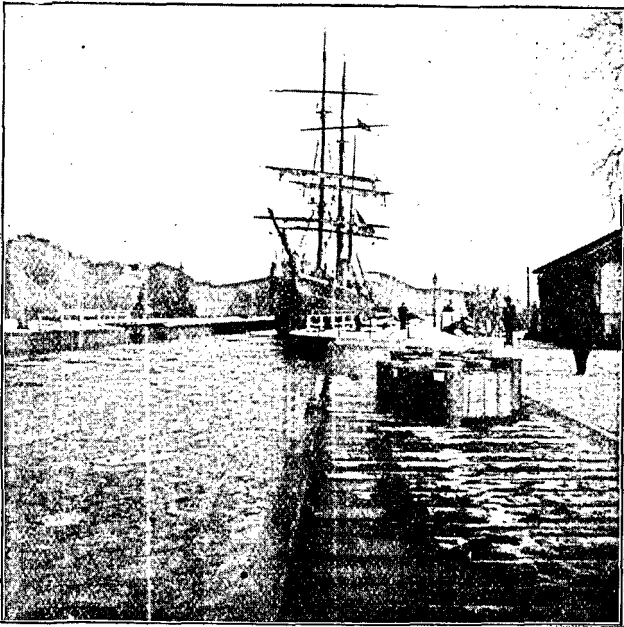
By W. S. BRUCE, F.R.S.G.S.

NEXT month another expedition sets sail for the Antarctic regions. As is generally known, there are already three such expeditions in the field—German, Swedish, and British. Scotland sends out the fourth expedition. The value of so many Polar expeditions at the same time is questioned by some, but those who have an actual knowledge of our ignorance of this part of the globe see that there is room even yet for other expeditions at the same time in the same region. Few people realise the immense unknown area of that part of the South Polar regions, within which no human being has ever penetrated, but an idea of this area can be obtained when we find that it is possible to include in that area two and a half Europes or three Australias. The second largest unknown area of our globe is the North Polar regions, but even this territory can easily be included within the outline of Australia, whilst the British Isles fill a mere corner when placed within that of the North Polar regions. We do not know exactly the land area of Antarctica, but it is probably as great as the continent of Australia, and of this we only know a fringe of the coast-line along a very limited extent, and know nothing at all of the interior. With the exception of one sounding taken by Ross half a century ago, and of a few soundings taken this year by the Swedish Expedition, there is not a single oceanic

<sup>1</sup> Prophesied and prepared alike by Rousseau and Pestalozzi and many other living educationists before and since, and now happily coming within our reach.

<sup>2</sup> Read at the British Association Meeting, Belfast, 16th September 1902.

sounding travelling northward in the Atlantic within 3000 miles of the South Pole. We are almost in a similar condition of ignorance regarding the other great Southern Oceans, namely, the Pacific and Indian Oceans, only being able to point to a few soundings taken by the *Challenger* Expedition thirty years ago, and more recently by the Belgians and Germans. It is extremely improbable that the ships of the various expeditions will meet each other, so great is the distance between the sphere of each, although an attempt to co-operate will be made to make the work of each expedition join up with the work of its neighbours. Not only do the different expeditions work in different localities, but the work of these expeditions

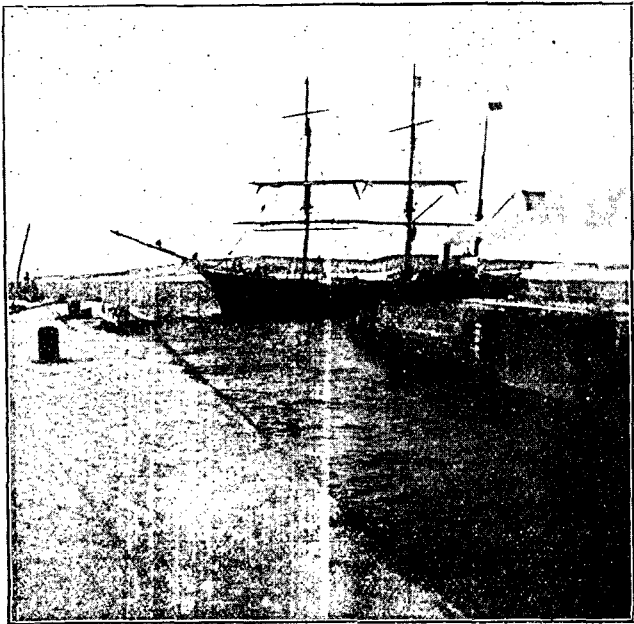


The *Scotia* in the Caledonian Canal.

is distinct; thus, the German and British expeditions are fitted out in the first place to secure the best possible results in magnetism, and for this purpose the two ships, the *Gauss* and the *Discovery*, have been specially built for magnetical work at a cost of about £50,000 or £60,000 each. The work of the Swedes is mainly geological, whereas oceanography and meteorology form the basis of the Scottish expedition. Although each specialises in one or more sciences, yet it is not intended that this particular branch of science shall occupy the whole time of the expedition. All the ships have therefore been fitted out in such a manner as to enable them to undertake every possible form of scientific research in the localities they are visiting. Each vessel therefore contains not only implements but specialists in every branch of geographical science. So

much for the general idea of the scheme of work for the exploration of the Antarctic regions; now let me turn my attention more particularly to the scheme of work of the Scottish expedition, which I am naturally acquainted with more thoroughly than any other.

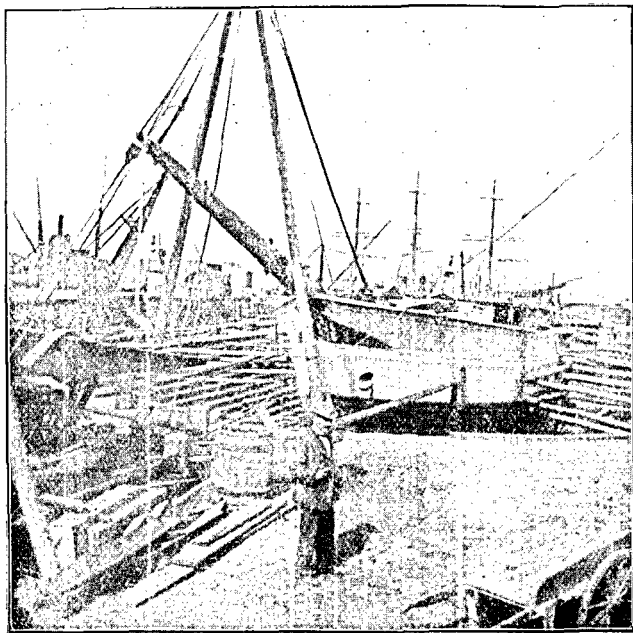
The object of the Scottish National Antarctic Expedition, as I have already said, is to specialise in oceanography and meteorology, and its sphere is to the south of the South Atlantic Ocean, between the tracks of the Swedish and German expeditions. Here it is intended to reach as far south as is compatible with the attainments of the best results to science. It is not my intention to allow the *Scotia* to be frozen in the ice as the German and British ships have been,



The *Scotia* in the Caledonian Canal.

although one must recognise that there is always a chance of being caught in this manner contrary to one's intentions, for I maintain that a ship is of the greatest possible value as long as she is a free moving agent and can go her own way in spite of many difficulties which may beset her. A wintering party, I consider, should not be too large, and should be entirely composed of educated men, and should set up a station definitely with a house on some point of land. Funds do not allow this in our case, unless some generous donor comes forward and helps us in the way we most desire. Our work will take place on or from the ship, which, as I have said, I trust we may be able to keep moving if not in the region we most desire, at least approximately in the neighbourhood of that region. The plan will, however, be to spend

the first summer and autumn in the Far South, well within the limit of the ice, and there to sound, trap, trawl, tow net, carry on meteorological, magnetical, and general geographical observations. During the winter we will retreat to the north and our operations will be carried on outside and up to the limit of the Polar ice. This part of the cruise will possibly be less enticing than the more southern cruise, for our work will be in a region of storms, and that during winter. If funds allow, a third cruise will be made during the second summer to complete the work begun during the first; also, as I have indicated, if some one comes forward with money, we have still an opportunity to set up a wintering station, where a wintering party could be left to carry on scientific



The *Scotia* in process of reconstruction at Tron, July 1902.

investigation for twelve months. The expedition will thus be absent for a period of about one to two years, according to the funds placed at our disposal.

The ship of the Scottish Antarctic Expedition was formerly a whaler named the *Hekla*. During the last seven or eight months this vessel has been so thoroughly overhauled that she is practically reconstructed and is absolutely as good as a new ship. This work has been carried out by the Ailsa Shipbuilding Company, Troon, under the able guidance of the eminent naval architect, Mr. G. L. Watson of Glasgow.

The vessel will be known as the *Scotia*, a name which carries with it an indication to all countries of the land to which she belongs. She is a barque-rigged auxiliary screw steamer of about 400 tons, having a

length of 140 feet and breadth of 29 feet, and drawing about 15 feet of water. With her new engines and boiler it is expected that a speed of fully seven knots will be attained. In spite of the immense strength of the *Scotia*, whose wooden walls amidships are no less than 25 inches thick, she is an exceedingly graceful craft, and it is a pleasure to look at her fine lines as they curve from her stem, which, it may be said, will meet the ice backed by nine feet of solid timber. Huge beams at frequent intervals will resist immense ice pressure, and I have little doubt that, besides being a good sailing ship, her form is such as will enable her to rise to ice-pressure and thus evade it.

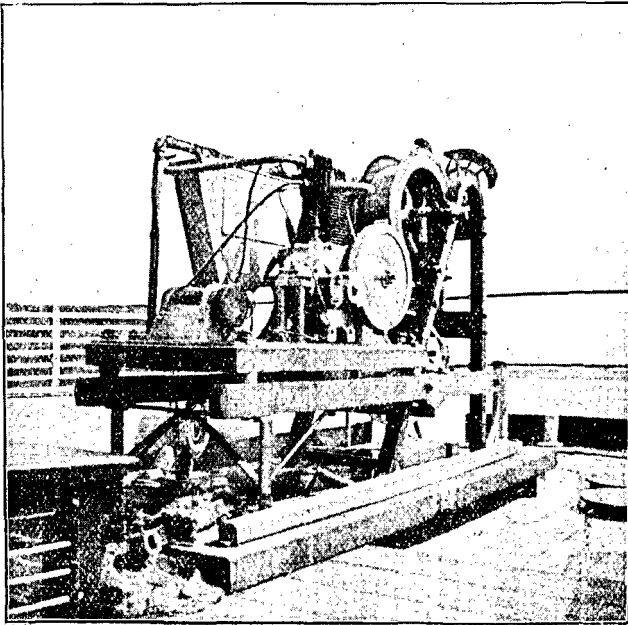
The leader, the captain, and the scientific staff are accommodated in



Kite-flying at sea.

an after-deck house, the officers in a comfortable cabin amidships, whilst the crew are quartered forward in the fo'c's'l, which is not the least luxurious part of the ship. Simplicity has been aimed at, but at the same time necessities have not been neglected. The scientific work will be carried on in a deckhouse amidships, the after part of which forms the galley. Here there is good light for those who have to undertake delicate work, such as that with the microscope, hydrometer, and other delicate and finely graduated instruments. A second laboratory, mainly for zoology, lies almost immediately below the upper one, 'tween-decks, and is reached directly from the upper laboratory. Adjacent to this is a compact and completely fitted dark-room for photography. 'Tween-decks also will be found two great drums each containing 6000

fathoms of cable, each of which weighs six tons; this cable is led up on deck to a specially constructed forty horse-power steam winch, and from thence over the side of the ship by means of a derrick for the purpose of trawling and trapping in the greatest depths. The roof of the scientific deckhouse and its extension in the form of a bridge forms a centre of activity for the scientists, for this is where all the operations connected with sounding and the physical investigation of the ocean take place. Right aft on the poop is to be found an important instrument, namely, that which secures and hauls in, by a special motor engine, huge kites which suspend meteorological instruments at great heights in the atmosphere. This machine, as well as all the hydrographical machines, can also be



Motor-engine for reeling in kites.

driven by a special horse-power engine which is capable of hauling up instruments from the depth of the sea at the rate of 80 to 100 fathoms per minute.

The captain of the *Scotia* is Captain Thomas Robertson, of Peterhead, who has had over twenty years experience in Arctic navigation, and who, in addition, made a voyage ten years ago to the Antarctic regions. While he has been carrying on his work as a whaler, both in the north and in the south, he has found the time and shown the interest which has enabled him to make important geographical discoveries. He is in the proud position of being able to say that in all his experience he has never lost a ship nor a man. The scientific staff consists of half a dozen picked scientists; four senior, and two junior men. Mr. R. N. Rudmose-



Brown is botanist. His chief work will be to investigate the small oceanic "plankton" or those minute forms of animal and vegetable life which, through their feeble powers of propulsion, are drifted helplessly whither the ocean will. Mr. Brown is a graduate in science of Aberdeen University, and has, up to the present, held the post of chief assistant to the Professor of Botany, University College, Dundee. He has also had extensive experience at Kew, and in the British Museum under Mr. George Murray.

Mr. R. C. Mossman is the meteorologist and magnetist, and is almost too well known in meteorological circles to need any further mention than his name. He has undergone a course of magnetism at Kew Observatory. For fourteen years he has directed the chief meteorological observatory in Edinburgh, as well as an observatory in Glen Nevis, and on several occasions has acted as superintendent at Ben Nevis Observatory. In addition he is the author of about fifty papers on meteorological subjects, the most notable being his monograph on the climate of Edinburgh in the *Transactions* of the Royal Society, Edinburgh.

Dr. J. H. H. Pirie is geologist and medical officer. He is a graduate in science and medicine of Edinburgh University. He has worked at deep-sea deposits in the *Challenger* Office under Sir John Murray, and has been trained in field-work with the members of the Geological Survey of Scotland. He served with the Imperial Yeomanry in South Africa with distinction, and was promoted to a lieutenancy in the Royal Field Artillery.

Along with myself, Mr. Wilton undertakes the zoological work. Mr. Wilton has a wide experience of Arctic life and work, having spent several winters in the north of Russia, which enabled him to become an expert ski runner and an adept in all that pertains to sledging. In 1896 and 1897 he joined the Jackson-Harmsworth Expedition to Franz Joseph Land, and there assisted me in zoological work. Thereafter he returned to Edinburgh, studying at the University and Royal Colleges, attaining distinction in zoology and botany. During his vacations he has acted as an observer on the summit of Ben Nevis at the Observatory, and has since taken part in an expedition to Turkestan and Western China, whence he returned with collections which materially added to our knowledge of the fauna of these countries.

Two younger men will probably accompany the expedition as artist and taxidermist respectively. Their appointment, however, has not yet been definitely concluded. It is hoped that a bacteriologist will accompany the expedition, but this specialist appears to be one of those *rarae aves* which is not easily procurable. It is therefore possible that bacteriology will have to be carried on by one of those already mentioned.

These are the plans of the Scottish National Antarctic Expedition which sets sail next month, and I again appeal to men of science present to support, if not directly, at least indirectly, the efforts we are making to open up new vistas to human knowledge. Most scientists are not wealthy men, but many can afford at least to subscribe their guinea, and all can help to secure the interest of those who are blessed with riches

to use a portion of that wealth towards an object which they appear to consider worthy of support.

The accompanying photographs show the *Scotia* on her way to Troon, as well as the motor-engine for the kites, and one of the kites. In a subsequent issue we hope to exhibit the *Scotia* in her reconstructed form.

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## GEOGRAPHY AT THE BRITISH ASSOCIATION.

On Thursday, September 11th, the proceedings of Section E (Geography) were opened at Belfast by the President's address (see p. 505 of this number), which was listened to by a large audience. Later in the day Major Molesworth Sykes read a paper on "The Geography of Southern Persia as affecting its History." This paper we hope to publish in full in a subsequent number. Major Sykes showed how the trade-routes in Persia have been determined by geographical features, and spoke especially of the new overland cable to India and the course which it is to follow. In the subsequent discussion the President, Sir Thomas Holdich, expressed the hope that the existing telegraph line, which skirts the Persian Gulf, will not be allowed to fall out of repair, for though the new line is not only much shorter but is, geographically in a more suitable situation than the old, yet it will be less easy to repair damage to it than to the latter. Sir Thomas Holdich appeared to entertain no doubt that the new line will end at Quetta instead of going *via* Kurachi like the present one.

No papers of directly geographic interest were read before the other sections on Thursday, but among those treating of kindred subjects should be noticed Professor Haddon's luminous address on the vexed subject of "Totemism" in section H (Anthropology), and an exceedingly interesting paper on the "Geology of the Country in the Neighbourhood of Belfast" by Professor Greenville Cole in Section C (Geology).

On Friday the first paper in Section E was read by Captain Ryder, R.E., and was upon the province of Yünnan, with special reference to the question of the feasibility of railway communication between Burma and China. Captain Ryder was attached by the Government of India to an expedition under Major Davies which was fitted out by the Yünnan Company to survey and report on Yünnan. One result of the survey was to show that, owing to the mountainous nature of the country, and the scanty population along the only feasible route, no railway could be constructed between Burma and Yünnan with any prospect of success. Captain Ryder, however, pointed out that although the railway between Tongking and Yünnan, now in course of construction, is French, yet much of the trade which now follows the route of the railway is in British hands. Captain Ryder describes Yünnan as a mass of hills with small plains nestling among them. The plains are chiefly inhabited by the Chinese, while the hills and deeper valleys are occupied by the original inhabitants, such as the Lolos, Shans, and so on; during their explorations the members of the