systems," and the like, which may point a finger from a distance to the pulsating life of the cell.

Prof. Küster has opened up an exceedingly interesting line of inquiry, and he states his case in cautious and undogmatic manner. It appears to us that at this stage he would not have weakened his position by leaving out the reference to such complicated "structural rhythms" as the striping of vertebrate animals.

## *SHACKLETON'S TRANSANTARCTIC EXPEDITION*, 1914.

THOUGH Sir Ernest Shackleton has adopted plans for an antarctic expedition that were formulated and published by me even before his return from his last expedition, and details of which have appeared since that time in various scientific journals, and in the public Press,[1] my view has always been that one explorer should not stand in the way of another, but as soon as one has secured money—a task more arduous than carrying out any plan whatever in the field—he should carry out whatever plan he pleases, and should receive, if he desires, any assistance that the other may be able to give. Therefore I welcome Sir Ernest Shackleton entering what has for a century mainly been, so to speak, the Scottish sphere of influence in the antarctic regions.

It is a curious fact that those who have done the most strenuous work on antarctic land have been seamen, while landsmen have been left to carry out the most strenuous work in antarctic seas, and it is, perhaps, for this reason that Sir Ernest Shackleton concentrates his attention again mainly on the land, whereas, as I have already pointed out,[2] it is a study of "antarctic seas that is at present most urgent, including an exploration and definition of the southern borders of those seas," that is to say, the coastline of the antarctic continent. This part of the programme cannot be efficiently carried out in the time that Sir Ernest Shackleton proposes to allow himself, either for necessary preparation or for his expedition. Hurry is unfavourable to detailed scientific research.

But no one is better fitted than Shackleton to carry out to a successful issue the transcontinental journey, as is shown by the brilliant way in which he conducted his south polar expedition in 1907–1909. Shackleton is a trained seaman and a capable business man, appreciative of the work that scientific people carry out under his leadership. Abundant testimony to this fact has been given by his former colleagues, especially Dr. D. Mawson, Prof. Edgeworth David, and Mr. James Murray. It is certain, therefore, that he will give his scientific staff every opportunity of carrying out important scientific research.

Granted that his ship is able to reach Coats Land or Luitpold Land—and this is entirely dependent on whether it is a good or bad ice year in the Weddell Sea—the expedition should endeavour to unite and chart in more detail Coats Land and Luitpold Land. It should endeavour to map out the coast line between Coats Land and Enderby Land, between Coats Land and Luitpold Land, and between Luitpold Land and New South Greenland. The investigation of New South Greenland is in itself one of the most interesting and difficult problems of Weddell Sea. Detailed soundings should be taken, especially to the south and west of those of the *Scotia* and *Deutschland*, so that, if new coastlines are not actually discovered, their presence and general outline may be indicated. This can be arrived at with a wonderful degree of accuracy. It is of great interest to obtain considerable quantities of bottom deposits, especially macroscopic specimens, along with indications of the distribution and drift of icebergs which have been the means of carrying them to the place where they have been deposited. The important discovery of Archæocyathinæ at a depth of 1775 fathoms in lat. 62° 10′ S., long. 41° 20′ W. is a lucid example of the value of this type of research, for it most certainly indicates that the Cambrian rocks found by Shackleton in the vicinity of the Beardmore Glacier stretch across Antarctica towards the shores of the Weddell Sea, and possibly form part of that mountain system seen by Morrell in about lat. 69° S.[3]

But will Shackleton be able to spend time to carry on these researches when the main object is to cross the antarctic continent? On her outward voyage the ship will be full to the gunwale with stores and equipment, and every effort must be made to find a suitable landing place along a practically unknown coast, to build a house, and set up the base camp for the tremendous task of crossing Antarctica, and this along a coast that Ross failed to reach because of heavy ice in 1843, that the *Scotia* failed to reach in 1903, where the *Scotia*, in 1904, was heaved right out of the water, and left stranded on the top of the ice, her keel being 4ft. above water-level, and where the *Deutschland*, in 1912, was beset and driven northward helplessly during the whole winter.

These are difficulties that may be met with again in the Weddell Sea, difficulties which have never been experienced by any ship in the Ross Sea, where no one has ever failed to reach the Ross Barrier. It is therefore to be hoped that Shackleton will not meet with such conditions, but will find a favourable season such as Weddell and Morrell found in 1823.

Once landed at or in the vicinity of Coats Land—more likely to the east than to the west—Shackleton starts his main objective. A meteorological station here will be of immense importance, and should be cooperative with those of the Argentine Republic in Scotia Bay and South Georgia. Detailed discussion of the meteoro-

[1] *Scottish Geographical Magazine*, vol. xxiv., No. 4, April, 1908; vol. xxvi., No. 4, April, 1910. NATURE, March 24, 1910, p. 101; and October 27, 1910, p. 551. "Polar Exploration," by W. S. Bruce, chap. x., pp. 252, 253. (Williams and Norgate, 1911.)

[2] "Polar Exploration," by W. S. Bruce, p. 247.

[3] Morrell's Voyages, 1822–31, Capt. Benjamin Morrell, 1832, chap. p. 69.

logical programme with Mr. R. C. Mossman is strongly advised. Magnetic work of the usual kind at the base station and, so far as possible, on the cross journey will fall in with other work that has been done; in both these departments of science it would be specially profitable to have other expeditions in the field synchronously. Local zoological and botanical work will also be of great interest. But, undoubtedly, solving some of the many great topographical and geological problems is the leading work to be done both in the vicinity of the base station and in the interior.

According to evidence at present at our disposal, Shackleton, if he penetrates southward from Coats Land, will gradually rise without much interruption over completely and heavily ice-clad land—over inland ice, in fact—until he reaches the South Pole, an ice-field that continues until it reaches the Beardmore Glacier and Axel Heiberg Glaciers. It would be a great triumph if, after Shackleton reached the South Pole, he could strike a new route, say, to the west of the mountains of South Victoria Land; but if this sacrifices the life or even limbs of the party, it is not worth attempting. Another expedition can carry out that work in time to come from the Pacific side. The intrinsic value of the expedition is to seek and find out what lies between Coats Land and the South Pole.

The route will probably be to the east of the antarctic continuation of the Andes, but possibly Shackleton may have to cross another range—the continuation of the South Victoria Land Mountains—but all is new, and all depends upon whether previous conceptions have been based on sufficient facts. It is expeditions such as Shackleton's that we require as the only way of obtaining data for the solution of many theories founded on too few facts. We therefore wish him all possible success, and trust that he will receive all the support he requires. The 50,000*l.* provided by a generous friend is an absolute minimum; 70,000*l.* is nearer the figure, and may we also trust that even another 10,000*l.* will be forthcoming to enable the gallant leader to have the scientific results of the expedition described in detail; for an expedition of this kind is not completely successful unless the technical results of the work are published. WILLIAM S. BRUCE.

## *DR. WEIR MITCHELL.*

DR. SILAS WEIR MITCHELL died at Philadelphia on January 4, and in him has passed away one of the most remarkable men of America. At different times in his life he took a place in the very first rank of experimental physiologists, of practical physicians, and of novelists.

Dr. Weir Mitchell was born at Philadelphia, February 15, 1829, and was educated at the University of Pennsylvania and the Jefferson Medical College. He began researches on various physiological subjects in 1852, and in 1860 he published his researches "On the Venom of the Rattle Snake," a work which, even at this day, remains a perfect model of what an investigation into the physiological action of a poison ought to be, and is of itself sufficient to establish his claim to a front rank amongst American physiologists, past or present.

During the American Civil War Dr. Weir Mitchell had charge of a hospital in which cases of injury to nerves by gunshot wounds were specially treated. In 1872 he published a book on the effect of such injuries. After the war was over his patients were scattered over many parts of the United States, and he was thus enabled to make some very extraordinary observations upon the effect of weather upon disease. He was struck by the fact that one day, for example, he would get a batch of letters from California, a day or two afterwards from Denver, and a day or two later from Chicago, in which the patients complained of pains in their old wounds. These coincidences led him to inquire into the cause of the pain, and on communicating with the meteorological office he found that a wave of rain and a wave of pain were passing simultaneously over the American continent from west to east at the same rate. The "rain area" and the "pain area" were concentric, but the pain area was much larger than the rain area. The radius of the rain area from the storm centre was 550 to 600 miles, while the radius of the pain area was 150 miles greater than this. As a consequence of this, patients in the rain area felt pains, and, seeing the rain, concluded that their pains were due to change of weather. Those in the pain area felt pains, but saw no rain, and could not understand why they were suffering, although the real cause of their pain was the climatic disturbance. He afterwards extended his observations to the effect of weather on chorea and infantile paralysis. The curve of cases of infantile paralysis closely corresponded with the curve of temperature, but no such relationship could be noticed in the case of chorea either with temperature, height of barometer, or relative humidity. But a very close relationship indeed could be observed between the number of attacks of chorea and the number of storm centres within a radius of 400 or even 750 miles of Philadelphia.

Dr. Weir Mitchell's attention having been thus directed to diseases of the nervous system, he was led to give special attention to the treatment of nervous diseases in women, and more especially to hysteria and neurasthenia. In the treatment of these diseases he effected a complete revolution, introducing the system of seclusion, rest, massage, and feeding, which is now known as the Weir Mitchell treatment. It has been extraordinarily effectual in very many cases which would have otherwise proved hopeless, and establishes his claim to rank as one of the greatest practical physicians of his time.

From the published catalogue of his works it appears that he did not begin to write novels or poems until 1880, when he published "Three Tales of the Older Philadelphia," and in 1882 he