a common stock of antidote which can be released very swiftly and which is capable of inflicting death on most of our microbic foes.

These are revolutionary opinions and it would be idle to pretend that, at present, they meet with general acceptance. Their importance, however, can not be disputed. Nor is it likely that the "pain in the mind" which gave them birth will suffer them to remain without the sustenance of continuous experimental proof. Vaccination is now fighting for first place among the weapons of cure. Thanks to Sir Almroth Wright, Professor Dreyer and others possessed of the same temper of mind, it has literally forced itself on the world. Failure in more than one direction has already been changed into conspicuous success; no failure has been accepted as inevitable or irremediable. It may be that this urgent spirit is about to win its greatest triumphs and that, as Mr. Neville Chamberlain suggested at Birmingham on Saturday, a new vista of hope is opening before our eyes. In any case the future is big with possibility, inasmuch as many minds in the scientific world at this time are held in that "emotional tension" from which all progress and discovery proceeds.—*The London Times.*

SCIENTIFIC BOOKS

The Life of Sir Ernest Shackleton, C.V.O., O.B.E. (Mil.), LL. D., with many illustrations. By HUGH ROBERT MILL, Heinemann, Ltd., London, 1923, pp. 312.

THAT truth may be stranger than fiction is occasionally proven in the career of a remarkable man, but seldom more strikingly than in the life of Sir Ernest Shackleton, the Antarctic explorer, whose sudden death so profoundly moved the entire civilized world. This account of his life by Dr. Mill, which is sponsored by Lady Shackleton, if we except the rather dull Part One, which deals with Shackleton's boyhood and youth, is a romance which grips the reader and fastens his attention to the very end.

Even more, perhaps, than others, readers already familiar with Sir Ernest's own narratives of his expeditions ("The Heart of the Antarctic" and "South") will here see the explorer in a new light. In this intimate portrayal by his friend Mill, Shackleton stands out not only as perhaps the best exponent of British pluck and endurance, but as the idealist with a strong passion for poetry—for the lofty sentiments of Browning, Tennyson and Wordsworth even more than for the strong liquor of Kipling and Service. A few stanzas from the hero's favorites have been inserted with rare skill at the headings of chapters. On occasion Sir Ernest wooed the muse himself and not wholly without success, as the following lines show, dedicated to the sailors who were his devoted companions in so many adventures:

> But since that vision left me
> I have looked on those sailor men
> As worthy the brightest idyll
> That poet could ever pen.

The biographer of Shackleton was well chosen, for Dr. Mill is a foremost authority on the history of Antarctic exploration as well as a geographer of distinction, and his intimate friendship for the explorer extended over the entire period of the latter's explorations. Attachment for his friend has not, however, blinded Dr. Mill to the fatal optimism which in Shackleton's business ventures seems to have lacked that fertility of resource held in check by a well-ordered judgment which in his exploring expeditions amounted almost to genius.

As a boy and in early youth Shackleton showed apparently no indication of the remarkable powers which in maturer years were to make him stand forth as one of the dominant figures in all polar exploration, and it is this which accounts for the dullness of the first part of the book. Shackleton was a boy of good ideals, quite religious, and of poetic sentiments. At Dulwich College, which he attended, near his home in Ireland, he made no strong impression either upon his teachers or upon his mates. Returning nineteen years after leaving college to preside at the award of prizes, he delighted the boys when he said that he had "never been so near a Dulwich prize before."

At sixteen Shackleton went to sea as an apprentice, and in the hard life of the sailing ships of the time rose in eleven years to the rank of second mate. Of conscientious scruples and of clean habits, he had little real fellowship with the rough sailors whose respect and even whose love and affection he later commanded in so remarkable a degree. A glimpse of what was in the heart of the young man we learn from something which he wrote when twenty-four:

> I would attain but the goal is that to which Aprile yearned. What can I call success? A few years' praise from those around and then—down to the grave with the knowledge that the best thing has been missed unless the world's success brings that to pass, and for me it seems a long ways off. . . .

Who, from anything recorded in the earlier chapters, would have suspected there was to come the hero who on his first independent polar expedition threw away a portion of the warm clothing so as to carry more food and by a supreme effort in the last étapes pushed nearer the goal; or that here was the leader of the forlorn hope steering a little whale-boat across eight hundred miles of the stormiest seas of the world to achieve the rescue of his party marooned on Ele-

phant Island? Hardly less remarkable was the escape from the drifting floe after the crushing of the *Endurance*. Here the situation called for patience in a leader popularly regarded as impetuous; yet it was he who now played the waiting game in opposition to his party and so saved them when the time was ripe.

In evaluating what was both Scott's and Shackleton's judgment with respect to one important matter, Dr. Mill takes a peculiarly British viewpoint when he says of the party's poor effort in dog driving, "it served to strengthen the fine old British tradition which Sir Clements Markham set such store by, that the best polar draught animals are the human members of the expedition. And in their hearts the *Discovery* people did not believe in dogs." To the reviewer Shackleton once defended the British use of ponies as a substitute for dogs on the ground that their noses were more generally above the heavy drifting snow, ignoring the more important considerations that ponies can not endure the cold, break through the snow, and soon finish, leaving to the human members of the party the heartbreaking work of dragging the sledges at a snail's pace. Fine tradition though it may be, this obsession of British explorers has cost terrible sacrifices. Scott's last expedition proved that the Antarctic summer is too short for men to safely venture to the pole with man-hauled sledges, and Shackleton must have reached the pole on his first expedition had he been fitted out with good dog trains.

The sense of humor which was always keen in Shackleton is well illustrated by a Christmas talk to children. In response to their applause he said: "Now you kids, I'll put you up to a good thing. If you want to see what sledging is like, go home and harness the baby to the coal scuttle and drive round the dining-room table, but don't tell your mother I told you."

After setting out on his last expedition Shackleton wrote:

> I love the fight and when things are easy I hate it, though when things are wrong I get worried. . . . I don't think I will ever go on a long expedition again. I shall be too old. [A little later he wrote:] Except as an explorer I am no good at anything. . . . I want to see the whole family comfortably settled and then coil up my ropes and rest. I think nothing of the world and the public. They cheer you one minute and howl you down the next. It is what one is oneself and what one makes of one's life that matters.

WILLIAM HERBERT HOBBS

Silurian. Maryland Geological Survey. Baltimore, The Johns Hopkins Press, 1923, roy. 8vo; 794 pp., 67 pl.

THE Maryland Geological Survey has just published the volume on the "Silurian" of Maryland, the eighth of the series of reports dealing with the systematic geology and paleontology of Maryland. Like the preceding volumes, this is the result of cooperative work on the part of specialists. While there is always the danger of a lack of uniformity in such cooperative undertakings, it also leads of necessity to clarifying discussions among the associates and to an illuminating discussion of problems from somewhat different angles. The latter is, to some extent, also the case in the Silurian of Maryland, for we find on the one hand a careful, conservative description, with numerous sections (largely by W. F. Prouty), of the geographic distribution, geologic, stratigraphic and paleontologic relations, as well as interstate correlation, of the Silurian by C. K. Swartz; and on the other hand a general statement of the American Silurian formation by E. O. Ulrich and R. Bassler, combining the well-known vigorous and incisive criticism of the senior author with the minute, painstaking investigations of the junior author and through this excellent combination furnishing, after much necessary destruction of antiquated views, highly important constructive additions to our knowledge. This is especially apparent in the case of the Clinton formation, which by means of the most detailed study of the Clinton ostracods is divided into a number of zones, the tracing of which into the adjacent state has, so to speak, solved the troublesome Clinton problem for us by establishing reliable datum planes for long-distance correlations. In looking over the many plates of endless species of similar ostracods of the Beyrichia type, one might well think that the limit of refinement in species discrimination had here been reached and passed, but after all the results obtained warrant the outlay of time and money. It is another illustration of the general postulate of biology transferred into faunal stratigraphy, which is that the foundation has first to be laid by unlimited analysis for that final synthesis which is to yield the underlying laws of the biologic procession, as well as of the incessant movements of land and sea in the history of the earth.

The Silurian fauna of Maryland, save the ostracods, is carefully described and illustrated by Swartz and Prouty.

The volume is well illustrated, without being padded, by diagrams, photographs of typical sections and paleogeographic maps (by Ulrich). This new addition to the stately series of Maryland reports is in every way a credit to the state geologist, his collaborators, and to the state which shows its progressive interest and laudable pride in the geology of its territory by this magnificent series of publications.

RUDOLF RUEDEMANN

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