

duction of such drugs as salvarsan, aspirin, and salicylic acid, and in these cases the Commission assisted by securing the release of controlled raw materials.

The report alludes to the help rendered by the Royal Society, under whose auspices the manufacture of a number of drugs was undertaken in about forty university and other laboratories. It is satisfactory to learn that the knowledge so acquired of the best methods of manufacture has not been wasted, but has been placed at the disposal of manufacturers. As a result the Commissioners are able to report that some sixteen medicinal chemicals, in which Germany had a virtual monopoly before the war, are now being made in this country, in some cases on a scale large enough to provide a margin for export.

On the whole, though difficulties arose from time to time, the needs of the Army and the nation appear to have been met adequately so far as all essential drugs are concerned.

In view of this it seems clear that of the hundreds of synthetic drugs which used to be imported from Germany before the war many were unnecessary additions to our therapeutical resources. It is, in fact, an interesting exercise to look through such a publication as Arend's "Arznei-Mittel," or one of the "Guides" and "Mentors" to therapeutics, which used to be distributed by the German drug manufacturers, and see how many of the products, each with its carefully plausible name duly registered, have passed out of use and almost out of memory.

The Commissioners point out that the manufacture of fine chemicals developed in this country during the war will need to be watched carefully, suitable encouragement being given, where necessary, and means provided for keeping manufacturers in touch with scientific workers. These functions they consider might well form part of the duties of the Ministry of Health.

While it is important that the manufacture of synthetic drugs should be assisted in every possible way, it is no less important that the old-established British fine chemical industry in the manufacture of alkaloids should not be neglected. In this connection it should not be forgotten that the supply of some of the raw materials, such as cinchona bark and opium, required by this branch of the industry is now in urgent need of attention from an Imperial point of view.

ERNST HAECKEL.

AFTER a prolonged illness Prof. Haeckel died at his house in Jena on August 8 at the age of eighty-five. His signature of the infamous manifesto issued by ninety-three German professors in 1914, his recent bitterness towards Britain, and his acquiescence in Germany's crimes need not blind us to what is lasting in the work he did, to features of greatness in his character, and to the irresistible charm of his personality. He was a champion of evolutionism from the publication of the "Origin of Species" onwards,

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in days when the doctrine was unpopular and upholding it meant obloquy; he broke new zoological ground in many directions, and he was the teacher of many illustrious naturalists.

Ernst Heinrich Haeckel was born at Potsdam on February 16, 1834, and went to school at Merseburg; he studied medicine at Würzburg, Berlin, and Vienna; he was much influenced by the writings of Schleiden, one of the founders of the cell theory; by Johannes Müller and Virchow among his teachers; and by his friend and fellow-worker, Gegenbaur. After a short period of medical practice he became lecturer in the University of Jena and full professor of zoology in 1865. In spite of repeated and tempting offers, he remained in this position until his retirement from active duties a few years ago. He found opportunity, however, for many journeys, from an early pilgrimage to Down in 1866 to later explorations in Ceylon and further east. He wrote three interesting volumes of travel, and indulged his love of sketching in a large series of landscapes. In his early youth he had dreams of becoming a painter, and his artistic skill is familiar to those who know his monographs on Radiolarians, Sponges, Siphonophora, and Jellyfishes. Indeed, his facility became almost a snare, for he was sometimes guilty, they say, of improving upon Nature and allowing art to mingle with his science. The symmetry which is exhibited in his well-known genealogical trees, which are often referred to contemptuously, as if it was not a legitimate zoological ambition to discover and describe relationships, was an expression of the same artistic sense, which the rugged facts of Nature do not often gratify.

Haeckel was a popular teacher, and students from many parts came to listen to his lectures and to work in his laboratory. He lectured rapidly and picturesquely, with infectious enthusiasm, and the beautiful diagrams and blackboard drawings added to the vividness of the impression. While he was always very busy with work of his own, especially perhaps during the *Challenger* period, he took a keen interest in those students who showed anything of his own temper, helping those who helped themselves. At his best he was a very handsome man, with overflowing kindness, with no end of energy, with a passionate love of the beautiful whether in the microscopic Protists or in mountain scenery. His bible was Goethe.

In addition to his technical systematic work and his championing of Darwinism and freedom of thought and speech, what services did Haeckel render? By his vivid style he made biology popular and diffused concepts of development and evolution throughout the world, for the sale of books like "The Natural History of Creation" was colossal. His "Generelle Morphologie" (1866), as a generalising survey, occupies a place beside Spencer's "Principles of Biology," and, like it, is held in considerable esteem by the few who have read it. He led the way in applying evolution ideas to zoology in general, as in his

adoption of Fritz Müller's law of recapitulation—that individual development (ontogeny) tends to be a condensed epitome of racial evolution (phylogeny); and although this generalisation requires very careful handling, and has often led to abuse in the writings of undisciplined popularisers, few would go the length of saying that its recognition has not enriched zoology. In his studies of Monera and the like Haeckel did not a little to show the fundamental biological importance of the Protozoa; his gastræa theory had a considerable and, on the whole, useful influence on embryology, though it has now been superseded; he was an explorer of the rarely visited field of pro-morphology (the study of shape and symmetry), in which the pioneers of bio-physics are now finding treasure. We might recall many of his suggestions which subsequent research has justified or may still justify: he was very early on the track of phagocytosis; he was sure that crystals have much to tell the biologist; he felt that heredity and memory were in some way related phenomena, and that the unconscious-psychical was not a contradiction in terms; he insisted that we have not heard the last of the application of the second law of thermodynamics to organisms; he was one of the early voices crying in the wilderness that biology was an integral part of education.

Anti-metaphysical by profession, Haeckel nevertheless expressed in his theory of cell-souls and the subjective aspect of the movements of matter a poetical hylozoism, akin to that of the early Ionic philosophers. He has been likened in this respect to a re-incarnation of Xenophanes. It was characteristic of his buoyant optimism that he never seems to have suspected how naïve his monistic philosophy was; but those who deplore the mischievousness for the ignorant of such a book as "The Riddle of the Universe" ought to take their share of the blame for not providing for the people equally readable antidotes or prophylactics. The rancour he displayed in these tragic years towards a country where he had many friends and in which he had been highly honoured must be viewed in the light of the fact that he was an octogenarian in enfeebled health when the war broke out, yet in his attitude and his utterances we see the continuation of that aggressiveness and bitterness which marked his attacks on conventional Christianity. It is in general terms a difficult riddle which his fellow-countryman Ostwald had the frankness to express in 1914: "Dieser unversöhnliche Gegner alles dogmatischen Christentums erwies sich als der beste und vorgeschrittendste 'Christ' den Ich je persönlich kennen gelernt hatte." The explanation may be in part this, that Haeckel had several moods almost equally dominant. He was scientific, doubtless, and he himself declared that he was all for science, yet he had not that resoluteness of precision which Huxley referred to when he said that the assertion that outstrips the evidence is not only an error, but also a crime. He had the artistic and romantic temperament,

he was a worshipper of beauty, he was to an extraordinary degree a passionate man of feeling. But he was also a preacher, a reformer, a propagandist—hence his surprising sympathy with Luther. He was so convinced in his own mind that he had got hold of the truth, and that those who differed from him were following errors and superstitions, that he was incapable of calmly considering criticism, still less of changing his views. His enthusiasm for science and his passion for Nature showed themselves in another expression in something like fanatic intolerance in his propagandist writings. Yet Haeckel did a day's work and a man's work in a fine, vigorous way, always himself and no other, and if he overdid the hunt for superstitions, who shall say that there was no excuse? Many people are not so good as their creeds, but everyone who knew Haeckel in his prime will agree that he was much better. *Vale.*

NOTES.

A CONFERENCE of representatives of the Meteorological Services of the British Dominions is to be held in London on September 23-27, when the subjects to be considered will include the meteorological arrangements for the exchange of observations by wireless at comparatively long distances; specification of observations for the surface and the upper air with the codes for transmission; the consideration of instruments and material for the investigation of the upper air; the selection of stations of the "Réseau Mondial" for the purpose of the general climatology of the globe (see "Réseau Mondial," 1911-12-13, M.O. Publications 207g, 209g, and 214g); the provision of current meteorological information for the main air routes of the world; co-operation in the investigation of the meteorological conditions of aerial navigation; and the trade routes and the meteorological survey of the oceans by observations transmitted by radio-telegraphy from ships. The following official meteorologists of the Dominions beyond the seas are expected to be present:—Capt. A. J. Bamford (Director of the Meteorological Service of Ceylon), the Rev. D. C. Bates (Director of the Meteorological Office of New Zealand), Mr. H. A. Hunt (Director of the Weather Bureau of the Commonwealth of Australia, Melbourne), Mr. H. Knox Shaw (Director of the Meteorological Service of the Public Works Ministry, Egypt), Mr. C. Stewart (Chief Meteorologist of the Union of South Africa), Sir Frederick Stupart (Director of the Meteorological Service of Canada), and Dr. G. T. Walker (Director-General of Indian Observatories).

IN connection with the autumn meeting of the Iron and Steel Institute, which is to be held at the Institution of Civil Engineers, Great George Street, Westminster, on September 18 and 19, there is to be, on the first-named date, a general conference on fuel economy, at which the following communications will be read:—Report on "Fuel Economy in Steel Works," Dr. W. A. Bone, Sir Robert Hadfield, Bart., and A. Hutchinson; Report on "Fuel Economy in Foundry Practice," H. J. Yates; and "Fuel Economy in German Iron and Steel Works," Cosmo Johns and L. Ennis. Papers down for reading and discussion on September 19 are:—"Synthetic Cast-Iron," C. A. Keller; "The Fluxing Action of Iron Oxides on Acid-Furnace Structures," J. H. Whiteley and A. F. Hallimond; "The Woody Structure of the Fractures of Transverse Test