

the machinery and plant on board and the methods of working them. Photographs of the *Vikingen* and of her catchers at work are also included. To this are added a brief outline of the history of whaling and an account of various important modifications and improvements in whaling operations.

Mention is also made of the immense value of the whaling industry both to Norway and Great Britain. Since 1928, new factory ships totalling 140,000 tons and costing £2,500,000 have been built, excluding catchers. In addition to these new vessels, the whaling companies have bought in Great Britain about 250,000 tons of steamers for conversion into factories and transports. The

approximate figures of expenditure in Great Britain during this period are :

Steamers converted into factories . . .	£1,000,000
Floating factories (new buildings) . . .	2,500,000
Transport ships for factories . . .	950,000
Repairs to all types of vessels . . .	550,000
Whale catchers (new buildings) . . .	2,200,000
Total	£7,200,000

In addition to the above, the purchase of coal, oil, and equipment in Great Britain has amounted to millions of pounds, and the British Government derives a large income from licences and duties paid by the companies on the oil and guano they produce.
G. A. S.

Obituary.

DR. LOUIS DOLLO.

DR. LOUIS DOLLO, who died at Brussels on April 19, will always be remembered for his numerous and valuable contributions to our knowledge of extinct vertebrate animals. Early in 1882 he was appointed assistant-naturalist in the Royal Museum of Natural History, Brussels, where he afterwards became conservator, and was actively engaged in research until his retirement in November 1925. He arranged and labelled the unique collection of Belgian fossil vertebrates in the new museum which was opened in the Leopold Park in 1905, and he published preliminary descriptions especially of the fossil reptiles in a series of remarkable papers, besides preparing a general guide-book to the vertebrates, both living and fossil.

Dollo was born at Lille on Dec. 7, 1857, and completed his education in the university of that city, where he graduated as a civil engineer. He studied geology under Prof. J. Gosselet, and he also devoted much attention to the zoological sciences both at Lille and in the marine biological station at Wimereux, under the direction of Prof. A. Giard. His inclination was towards natural history, and he abandoned an engineering career as soon as the opportunity for biological research presented itself in the appointment at Brussels in 1882. His early training, however, influenced him throughout life, and nearly all his writings are in the peculiarly mathematical form of brief numbered statements and proofs.

In the Brussels Museum, Dollo began immediately to study the fossil reptiles, and his first paper, published in October 1882, was a description of *Mosasaurus* and a new allied genus, *Pterycollasaurus*. The finest specimens of Mosasaurians in Europe were found in the Upper Cretaceous rocks of Belgium, and Dollo in subsequent years made many contributions to our knowledge of these extinct sea reptiles. In 1882, however, much progress had already been made in extracting from the rock the wonderful skeletons of *Iguanodon* and other reptiles which had been discovered four years previously in the Wealden of Bernissart, near Mons. Dollo was then entrusted with the study of this collection, and he soon produced a series of

"Notes" in the Museum bulletin which described whole skeletons of *Iguanodon* for the first time, made known many new facts, and discussed them in a brilliant manner. He also published notes on the associated crocodiles and turtles, and the oldest known newt. These papers were intended to be preliminary to an exhaustive monograph on the whole collection which he hoped to prepare, but difficulties arose which unfortunately prevented the accomplishment of the task. Dollo, indeed, was forbidden by the director of the Museum at the time to proceed with his researches on fossil reptiles, and was ordered to pay attention to the fishes. Thus originated his classic paper on the evolution of the Dipnoi, and many other suggestive papers on evolutionary problems which made fundamental advances in the methods of studying fossils. He established the general principle that during evolution "an organism never returns exactly to its former state even if it finds itself placed again in circumstances identical with those through which it has passed". He described this as the irreversibility of evolution, and it is sometimes termed Dollo's law. He also emphasised the importance of 'ethology', or the study of organisms in relation to their natural surroundings, and furnished many striking examples in his later papers. His last paper, on the carpus and tarsus, published in 1929, fully maintained his old standards, and was written in the characteristic logical form.

Dollo had many ardent admirers among contemporary biologists, and a distinguished group of his friends made contributions to the first volume of a new serial *Palaeobiologica* which was published by Prof. O. Abel in Vienna in 1928 in honour of his seventieth birthday. He was a foreign member of the Linnean, Geological, and Zoological Societies of London, and was awarded the Murchison Medal of the Geological Society in 1912. He was also an honorary Sc.D. of Cambridge. He was professor in the University of Brussels, and member of the Royal Belgian Academy. He was also a corresponding member of the Academies of Science of Berlin, Munich, and New York. He was an acknowledged leader, with a devoted following in the new generation.
A. S. W.