

curative properties of fabulous stones, and of the mysterious bezoar, which were thought to have originated in the eyes of deer, in the liver of various animals, or in similar strange ways. The use of precious stones in religious ceremony goes back to a very early date, and still prevails. The instance of the High Priest's breastplate of the ancient Jews is well known, and identification of the stones composing it has given rise to much interesting discussion. A long chapter is devoted to the description of amulets in ancient and modern times, and in the concluding chapter Dr. Kunz has collected many strange stories about precious stones. As an unusually brilliant imaginative effort we may select the old Burmese legend of the origin of the famous ruby mines: "In the first century of our era three eggs were laid by a female *naga*, or serpent; out of the first was born Pynsacoti, a king of Pagan; out of the third came an Emperor of China; and out of the third were emitted the rubies of the Ruby Mines."

The book is superbly illustrated and well printed, and contains an adequate index.

A BIOGRAPHY OF EDISON.

Thomas Alva Edison. By F. Rolt-Wheeler. Pp. ix+201. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1916.) Price 2s. net.

IN this life of Thomas Alva Edison, the author has given a very interesting description of the childhood, youth, and manhood of America's—one might almost say, the world's—greatest living inventor. We learn that, as a boy, Edison proved unsatisfactory under school routine, but was a great success under his mother's private tuition. He incessantly asked questions on and about everything, and insisted on an answer or wanted to know the reason "why." He also showed, from the earliest records, that he was a keen thinker, worker, and planner on all work which interested him, but under "routine" of any kind he was a complete failure.

The account of Edison as a newspaper boy on the Grand Trunk Railroad, and his original methods of disposing of his papers, as well as the description given of his services as a telegraph operator, illustrate the extraordinary ingenuity of the youth. He seems to have an uncanny foresight or "guessing power," as he calls it. He is no mathematician, and declared "he could guess a good deal closer than they could figure." In later years, as he developed his inventions one by one, he collected a number of valuable and enthusiastic assistants. He inherited from his father an exceptional power of gaining the confidence of people in his work and their financial support.

Edison's first important invention was the vote-recorder, which he placed before Congress men, who examined and acknowledged that it was a great success, but thought it was not required. This was a severe shock to the inventor, who at the time was hard up for money and hoped to

make something out of it. But it taught him a lesson; "for there and then he made up his mind never to waste time in inventing things which were not wanted." Later he became manager of the Law Gold Recording Company, and invented many improvements on their instruments. At this time he married, but he denies the story that "he forgot his wife an hour after his wedding." He later became connected with the Western Union Telegraph Company, which gave him every help in completing his inventions. Among these are the duplex and quadruplex telegraphy, also the telephone carbon transmitter, and numerous other inventions well known to all.

On one occasion Edison was asked, "What is a genius?" and his answer is well worth repeating. "A genius is about 2 per cent. inspiration and 98 per cent. perspiration." His part in the construction of the carbon filament lamp (which was not entirely his work, for the late Sir Joseph Swan had much to do with it) is well known, as also in the production of the phonograph, which may be considered the most wonderful of all his inventions, and will always be associated with his name. Of his recent inventions, the storage battery is of enormous importance, especially to England at the present time. It is impossible to give more than a rough impression of his wonderful energy and enthusiasm and his determination to master all problems. America and the world are richer and wiser for his genius; and though he is now sixty-seven years of age, we hope that he will not only reach, but also pass, in activity, the great ages of his father and grandfather. S. G. BROWN.

THE DESIGN OF DIESEL ENGINES FOR MARINE PURPOSES.

- (1) *Land and Marine Diesel Engines.* By G. Supino. Translated by Eng. Lieut.-Commander A. G. Bremner and J. Richardson. Pp. xv+309. (London: C. Griffin and Co., Ltd., 1915.) Price 12s. 6d. net.
- (2) *Diesel Engines for Land and Marine Work.* By A. P. Chalkley. Fourth edition, revised and enlarged. Pp. xvii+368. (London: Constable and Co., Ltd., 1915.) Price 8s. 6d. net.

JUDGED from the titles given above, it might be supposed that these two recently published treatises on the Diesel engine covered the same ground, but a careful perusal will show that the ideas of the authors are by no means identical, and as a result it may be predicted that although both volumes will appeal to all engineers and others who have to do with internal combustion motors and motive power for the propulsion of ships, the first of the above two books is one that will find its way into the reference department of every drawing office where Diesel engines for marine purposes are being designed, whilst the second book, by means of its description of the gradual development of the Diesel engine from the early experimental engines of Dr. Rudolph Diesel down to the modern practice of to-day, will appeal

more to the student of heat engines and the prospective user of this particular type of prime mover.

(1) The keynote to the first volume is undoubtedly the explanation of the actual designing of the marine Diesel engine and its component parts, and it seems quite wonderful that modern practice has so rapidly become to a large extent standardised. The translation from the original has evidently been undertaken by engineers skilled in the practice of their profession and in sympathy with the subject-matter of the text. The original treatise is the work of an Italian specialist in the development of the Diesel motor, Giorgio Supino, whose early decease is a real loss to Italian engineering. Naturally the reader will ask what has this eminent foreign author to say about British-made Diesel engines and British manufacturers; at the end of part i., page 72, is a table giving a list of ships and the types of engine adopted, viz., high speed, low speed, 4 cycle, and 2 cycle, and it is noticeable that one only out of some twenty names is that of a British firm.

This surely is a matter which vitally concerns a manufacturing country such as ours. Recollections of the early years of the petrol motor and motor-car industry and a comparison with the state of our present manufactures makes one devoutly hope that history will repeat itself and that full advantage will be taken of the experience and experimental labours of our Continental competitors, so that the supply for our colonies may come from this country. No discussion on the merits of Diesel engines can be entered upon without reference to that class known as semi-Diesel, which latter are perhaps better termed hot-bulb engines. It is good to think that our output of these is more satisfactory, but the magnitude of the units employed of this class is small compared with that of engines of the Diesel type. It is also good to remember that the engine called semi-Diesel is in reality the direct outcome of the work of an English engineer, Mr. Stuart Akroyd, whose name is associated with the firm of Messrs. Hornsby and Sons, Ltd., in the production of the Hornsby-Akroyd engine, and it would therefore seem a better name for this type of engine that it should be termed "engines working on the Akroyd cycle," rather than "semi-Diesel."

A brief review of the first book shows that part i. deals with a general survey of the types of oil engines in general use, with a discussion on efficiencies. Chapter vi. gives methods of calculating cylinder dimensions; this is succeeded by chapters dealing with the designs of various parts, such as bed-plates, crank cases, engine framing, crank-shafts, pistons, cylinder heads, valves, fuel injection and regulation, etc., all very clearly illustrated by excellent drawings and plates. Methods of reversing marine engines give up-to-date practice, and it is startling to realise that the whole cycle of reversing can be performed in 12 seconds. A final chapter deals with trials and tests of Diesel engines. It would be a help if a tabulated form of "report on a trial" were in-

cluded, as standardisation is very desirable in any form of comparative tests. From this short review it would appear that the subject-matter is really the complete design of Diesel engines for marine purposes, and as such it is a meritorious addition to engineering literature.

(2) The second volume is a greatly enlarged and much rewritten edition of a work which first appeared in the spring of 1912, almost contemporaneous with the last public appearance of Dr. Diesel in London. The defects of the first edition (which bore traces of hurried preparation) have disappeared, and we now have a copiously illustrated and enthusiastic survey of the progress of the Diesel engine, with many examples of modern types for land and marine installations, and an optimistic claim for its future development as the prime mover for mechanical transport. In this volume are upwards of forty-five folded plates, which give the main dimensions and cross-sections of the chief types of engines constructed. It is satisfactory to note that British types figure more prominently in this book. One of these, viz., the Tanner-Diesel, is shown on page 264. The writer remembers the early struggles of Mr. Tanner to get his designs taken up, and is glad to pen this tribute to his faith and earnestness in carrying through his designs to a successful issue in the face of great difficulties. It will be noticed that the progress made in the last four years has been mainly in the development of the two-stroke cycle type, and the increase of h.p. developed per unit employed. A perusal of the table on page 317 shows that the maximum diameter of cylinder is now 30 inches, and that the maximum h.p. per cylinder is 650 for a 2-cycle engine, but the average h.p. per cylinder is only 230 for this class, and for the 4-cycle slow-speed type the average is only 125 h.p. per cylinder, a figure which represents the performance of the *Selandia*, the boat Londoners had a chance to inspect whilst she was lying in the Thames in 1912. The figures given justify the claim of the author of this book that the 2-stroke cycle is that of the future. To the student and others who desire to understand this engine and its working this volume will be of great service.

It would be interesting to refer to the development of the Diesel engine and its use to extend submarine warfare, but the present is not opportune for any remarks on this point. A. J. M.

OUR BOOKSHELF.

Instincts of the Herd in Peace and War. By W. Trotter. Pp. 213. (London: T. Fisher Unwin, Ltd., 1916.) Price 3s. 6d. net.

An interesting and useful sociological survey. The author contends that the subject can really become a science, practically useful by conferring foresight. It is not necessarily only a mass of dreary and indefinite generalities, but may become a guide to the actual affairs of life, giving an understanding of the human mind which may en-