being as indicated above, but limited by circumstances in many instances. The metals that have been in use from earliest times, either in native state or in ores, naturally occupy more space than those of comparatively recent origin; especially since in the former class is included the development of metallurgical operations used at different periods to make the metals available.

The occurrence in nature of many of the metals is very fully shown by lists of localities and of ores, or minerals, the latter accompanied in many cases by formulæ giving their chemical composition. References to authorities cited occupy footnotes on nearly every page, and as an example of their thoroughness may be mentioned a note calling attention to a 'peculiarly American and wonderful' company for extracting gold from sea-water, formed in Connecticut. The history and exposure of this fraud is well known to the readers of Science.

In sketching the history of processes for extracting metals from their ores, the modern extensive application of electricity has not been neglected, especially with reference to aluminium, antimony, gold, copper, silver and zinc. In this connection German, British and American patents are occasionally cited.

Unusual forms or conditions of some metals are named, and their chemical preparation described—colloidal mercury discovered by Lottermoser, and Leo's colloidal silver, but the researches of Carey-Lea seem to be unknown to the author.

Among the most valuable features of this work should be mentioned the statistics of production and the prices; when possible the figures are given for the entire nineteenth century in five-year averages; and a study of them brings out some striking features. The contrasts in production and price of aluminium are especially notable; from 1858 (three years after the labors of St. Clair Deville had made it an article of commerce) to 1884 a kilogram of aluminium was quoted at 100 marks, during the year 1890 the price per kilo fell from 27.6 to 15.2 mks., and in the following year it fell to 5 mks.; the price in 1897 was 2.5 mks., and the output amounted to three and four tenths millions of kilos, of which nearly two millions were produced in the United States. Sodium was quoted at 32.5 mks. per kilo in 1866, and at 5 mks. in 1897. Manganese has suffered an extraordinary fall in price, showing that as soon as an article is positively demanded by commerce, means for securing it cheaply are devised; in 1886 manganese was quoted at 550 mks. per kilo, and four years later at 40 mks.; it fell in 1896 to 16 mks. per kilo.

The price of metallic sodium in 1879 was 20. mks. per kilo, and it had fallen to 5 mks. in 1897. Some metals of minor importance maintain a relatively uniform price, as antimony and palladium; while that of platinum has risen from 500 mks. per kilo in 1870 to 1297 mks. in 1895, and largely owing to the demand made for it by electrical apparatus.

In pleasing contrast to these rapid fluctuations in price is the steady behavior of the king of metals—gold; the figures (in part) are as follows:

1801–05,	2736.8	mks.	per	kilo.
1846–50,	2736.3	"	"	"
1876–80,	2730.7	"	"	"
1891,	2736.3	"	"	"
1892,	2743.2	"	"	"

The important bearing of this is obvious to students of monetary science.

The author is to be commended for the pains he has taken to prepare a valuable work of reference; the reviewer regrets that he feels obliged to point out a blemish in the manufacture of the volume, for which the publisher is primarily responsible. The running-head lines, particularly important in a dictionary or a book on the alphabetic plan, have been omitted and their place is inadequately filled by the page numbers; this makes it difficult to find a given metal readily, although in alphabetic order, except by scanning the text closely on a given page, or by examining the table of contents. This economy by publishers is to be deprecated. Henry Carrington Bolton.

Practical Marine Engineering, for Marine Engineers and Students, and with Aids for the Applicants for Marine Engineers' Licenses. By Wm. F. Durand, Professor of Marine Engineering, Cornell University. New York, Marine Engineering Co. 8vo.

It too seldom occurs that men of high attainments and experts in their professions, possessed of both technical and scientific, practical and 'theoretical,' knowledge, are either able or willing to give time and thought to the production of works of this sort, and the task of provision of much-needed text-books and hand-books is too generally left either to the man of science without expert knowledge in the practical field or to the practitioner lacking sound and extensive scientific culture and training. This, which is a text-book for those desiring to secure practical knowledge of marine engineering with, at the same time, accurate understanding of its scientific foundations, is a model which it is to be hoped will furnish stimulus to many other able men in as many other departments. Its field is well laid out, its scheme and details well planned and handled and it is concise, simple, clear and satisfactorily full. Dr. Durand is an authority in his department, expert in its practice and familiar with its scientific basis, accustomed to combine science with practice, an experienced engineer, a trained and successful educator. The book is authoritative and cyclopedic and in it practical marine engineering is reduced to its simplest and most exact terms.

Its chapters discuss the materials of engineering, including the fuels, their methods of preparation and production, and their characteristics and qualities; boilers and their construction; marine engines, auxiliaries and accessories, their operation, management and repair. Special topics and problems illuminate and render usefully applicable the principles enunciated, and the second part of the work is devoted particularly to 'Computations for Engineers,' carefully selected and skilfully solved problems.

The introduction on board the modern steamship of refrigerating and other special machinery leads to the study, in appropriate chapters, of the apparatus of electric light and power distribution and of refrigeration, their care and management. These chapters are admirably concise and yet complete for their purpose.

The book is well made, the type excellent and the illustrations clear and freely supplied, especially as illustrating the details of construction of marine machinery. So far as can be seen at a first review of its contents, the book is thoroughly up to date and very accurate, a credit alike to author, publisher and printer. It has its origin, apparently, in the public spirit and enterprise of the publishers of the technical journal, *Marine Engineering,* under whose imprint it appears.

R. H. T.

Studies in Physiological Chemistry. Edited by R. H. CHITTENDEN, Ph.D. New York, Scribner's Sons. 1901.

This volume of 424 pages, one of the Yale Bicentennial publications, contains reprints of the more important studies issued from the laboratory of physiological chemistry of Sheffield Scientific School of Yale University, during the years 1897–1900.

The twenty-six papers, representing the work of Professor Chittenden and his pupils during this time, are simply reprints from the *American Journal of Physiology,* the *Journal of Experimental Medicine* and *Zeitschr. f. physiol. Chemie,* Bd. XXIX., and form a valuable sequel to the three volumes of studies previously issued from this laboratory in 1885, 1887 and 1889. A complete bibliography of the Sheffield Laboratory of Physiological Chemistry from its commencement in 1875 until the end of the year 1900 is also given.

As these studies are more or less familiar and as they have been reviewed in the original, it is hardly necessary to enter into any detailed criticism of them. In viewing the work coming recently from this laboratory, one is struck with the radical change in direction in the line of research from the earlier investigations. It would be most interesting to have researches from the Sheffield laboratory on the products of proteolysis, in view of the recent researches of Kutscher, Siegfried, Balke, Lawrow, Pick and others. This line of work, so ably carried out by Kühne and Chittenden in 1883–4, has undergone such radical modifications in latter years that the views and investigations of one of the