

liquid heat of water and specific volume of superheated steam, when the former can be read directly from Callendar's steam tables and the latter be calculated from the rational formulæ, also included in his tables.

It is surprising how many modern writers dealing with the action of steam in the cycles of a reciprocating engine still adhere to the old theory that initial condensation is almost exclusively responsible for all the losses, although it has been repeatedly shown by eminent authorities that this is not the case. The author is not altogether exempt from this criticism, despite the fact that 'leakage' is mentioned in a small paragraph.

The chapters on internal combustion engines form a welcome addition. The matter is well developed and the illustrations are numerous and well chosen, especially those dealing with the heavy oil engines, which are all of modern design. This part of the book, together with the description of a high-pressure marine steam plant, should prove of great interest to all engineering students.

The descriptive matter is very clearly developed throughout the book, indicative of the author's experience of good teaching practice, and the new edition can be said to be a distinct acquisition to a student's bookshelves.

Our Bookshelf.

Geology of Gold (South Africa, Australia, New Zealand). By E. J. Dunn. Pp. x+303+163 plates. (London: Charles Griffin and Co., Ltd., 1929.) 35s. net.

THIS treatise is founded on the author's personal experience in South Africa, Australia, and New Zealand. In the first-named country he spent many years, from about 1872 to 1886, when he left for Australia. His knowledge of the geology of these countries, especially in regard to the occurrence of gold, is perhaps unique. It is not quite up-to-date in regard to South Africa; although in the early days Dunn was a pioneer in South African geology, having given the first description of the Pretoria Series under the name of Lydenburg Beds, and the name of Dwyka to the famous glacial conglomerate.

The book contains much material founded on the author's observations in mines he has reported on; and his notes and diagrams are of considerable interest in connexion with ore genesis. In twenty-two chapters, the first of which is an introductory description of the earth's crust, he deals with country rocks, fissures, faults, lodes, dykes, veins, indicators, conglomerate reefs, walls of lodes, sources of gold, solubility of gold, secondary deposition of gold, metasomatic gold, minerals associated with gold occurrence, the forms of lode and alluvial gold respectively, the distribution of lode and alluvial gold, deep leads, high-level leads, and

gold in glacial deposits. A special chapter is devoted to a description of the famous Mount Morgan mine in Queensland, which, from its inception to the end of June 1926, yielded 5,305,979 ounces of gold and 139,427 tons of copper, of the aggregate value of £29,739,276. This chapter is of especial interest, as the author had an opportunity of studying the secondary enriched ore, which is a feature of the Mount Morgan mine. On the occasion of the author's first visit, the daily yield from this ore amounted to 1000 ounces of gold. Exact surveys were made by the author while yet the mine was in a youthful stage, and at intervals, until the last of the secondary ore was removed. In this way a record was secured, and a complete suite of samples collected, which in the end was presented to the Victorian Mines Department.

Special attention is given by the author to the occurrence of alluvial gold, from which the bulk of the gold production of Australia has been derived, and the author's photomicrographs of the different forms of alluvial gold are of great interest and invaluable for reference and comparison. There are 250 photomicrographs, of which 60 are of alluvial gold and the remainder of lode gold and country rocks. The 172 diagrams (plans and sections) illustrate the occurrence of lodes and veins, faults, dykes, saddle-reefs (Bendigo, Victoria), indicators, auriferous conglomerates (Transvaal), and alluvial deposits.

F. H. HATCH.

The Nautical Almanac and Astronomical Ephemeris for the Year 1931 for the Meridian of the Royal Observatory at Greenwich. Standard edition. Pp. vii+865. (London: H.M. Stationery office, 1929.) Paper, 5s. net; cloth, 7s. net.

THIS issue marks an epoch in the history of the "Nautical Almanac"; it is the first drastic revision of its general arrangement since 1834. All elements that were formerly given for Greenwich mean noon are now given for mean midnight; also, all the data referring to the sun are grouped together, and the same is done for the moon. The rectangular co-ordinates of the sun are given for midnight only, but first and second differences are printed, also auxiliary interpolation tables. The co-ordinates are given both for the equinox of 1950-0 and for that of 1931-0. It is desired to encourage the use of the 1950 equinox, and tables are given for reducing observed positions to this equinox.

For the convenience of users of calculating machines, both natural and logarithmic values of the sun's radius vector, Besselian day numbers, etc., are given. Much fuller information than before is given relating to the satellites of the planets. These include satellites VI. and VII. of Jupiter, but not VIII. or IX.; it is to be hoped that they may be included in the future. The list of observatories has been revised and extended. The inclusion of Uranibourg among "Former observatories" will be welcomed. The table of Julian days has been expanded, and now includes day 0 of each month from 1850 to 1940; outside these limits there are reduction tables, which diminish the risk of error.