Review: The Atlantic Ocean
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volume, covering all latitudes and declinations between 24° and 60°, appeared in 1909. A second edition of the first two volumes was published last year with several additions, such as a traverse table, acceleration table, tables for the correction of observed altitudes, etc., so that no other book should be necessary for working out observations but the Nautical Almanac. Another important addition is the table giving difference of altitude corresponding to 8 minutes' difference of hour-angle from the equator to lat. 60°. Although primarily intended for navigation purposes, Ball's tables furnish a ready means of checking observations taken by explorers on land, or at any rate of preventing them from going seriously wrong with their work. The actual labour of computing the tables, which must have been considerable, has been entrusted to experienced computors at the Greenwich Observatory, under the superintendence of Mr. Crommelin, and the greatest care was taken to ensure accuracy.

The second set of tables is by Lieut. Radler de Aquino, of the Brazilian navy. The purpose for which these have been computed is similar to that which Mr. Ball had in view; but instead of computing the altitude by solving the spherical triangle directly as an oblique-angled triangle, with the latitude, declination, and hour-angle as the known quantities, the solution has been arrived at in this case by letting fall a perpendicular from the position of the heavenly body, and computing the angles and sides in the two consequent right-angled triangles by Napier's rule of circular parts. By this means, owing to the proportion that the various triangles bear to one another, and to the fact that only two terms are required to be known instead of three, the tables are rendered very concise and compact. Other advantages are that they extend to 90° and give not only altitude, but azimuth as well. Still, they take considerably longer time, and are by no means so easy to use as Ball's tables, notwithstanding the great ingenuity Lieut. Radler de Aquino has shown in his method of computation and arrangement, and the pains he has taken to explain their construction and method of use in this introduction, which, by the way, might in some places have been more clearly expressed. The cross references and double headings to the columns are puzzling, at least at first, and then a certain amount of computation is necessary, all of which tends to do away with simplicity, which after all is the chief merit of works of the kind. However, there is no doubt that these tables will be found useful when their arrangement and manner of working has been once mastered.

E. A. R.

The Atlantic Ocean.

'Segelhandbuch für den Atlantischen Ozean.' Hamburg: L. Friederichsen & Co. 1910. 20*m*.

This work of nearly 600 pages, issued by the Deutsche Seewarte, is based on observations contributed by numerous navigators, past and present, principally by those under the German flag; and is admirably arranged.

It forms a concise book of sailing directions for the whole Atlantic; and the carefully edited information is naturally grouped into two main sections which deal respectively with the physical condition of that ocean, and the application of the knowledge of these conditions to the determination of the best routes from port to port. By the aid of the data given in this work the seaman may shape his courses with a view to securing a maximum of advantage with a minimum of risk in conformity with the limitations imposed upon him, either by the normal conditions of the seasons or by the environment of the ports of departure and call. The seventy-nine diagrams interspersed through the body of the work, together with the six plates introduced immediately behind the

copious index at the end of the volume, assist the reader materially in following the recommendations given in the letterpress as aids to safe navigation.

Included in the first section, which may be broadly termed theoretical, are nine clearly compiled chapters or books, which, taken as a whole, form a compendium of oceanography for the Atlantic. These chapters give detailed descriptions, respectively, of the greatest depths of the Atlantic; the nature of the deposits on the ocean bottom; the specific gravity of the sea; its temperature at the surface and at varying depths; the set and drift of the surface currents; the frequency and distribution of icebergs and other forms of drifting ice; and the height of waves as recorded by seamen navigating the Atlantic.

A general review is then given of the wind circulation known to prevail over the open ocean; the conditions of wind and weather off its coasts from the Far North to the latitude of Cape Horn; the temperature and humidity of the air; falls of red dust in the Atlantic near the west coast of Africa; the cyclonic storms of that ocean; its tides; also the magnetic variation.

In the first section of nine chapters, 287 pages in all, the storms of the Atlantic, from birth to death, are especially dealt with. A chapter, opening with a general exposition of atmospheric disturbances, goes on to define the special characteristics of the various forms of disturbance which are germane to the several parts of the ocean. The second part of this volume comprises twenty-three chapters of 267 pages, in each chapter of which information is given regarding the best tracks to be followed on the various routes according to the time of year. It indicates, in fact, the application of the principles enunciated in the first section. Information is furnished relating to wind distribution; sea surface currents; ice; fog and mist frequency on the various routes beginning with those in high latitudes of the North Atlantic, followed by others across different zones of that ocean. Sailing directions are laid down for passages to and from the equator, the Cape of Good Hope and Cape Horn, Europe and the east coast of North America; between the Cape, England and the east coast of South America; between Europe aud North America and the west coast of Africa, the West Indies and north coast of America; and between Cape Horn and the east coast of South America. The whole work should appeal to the seaman who is eager to make quick and successful Atlantic passages.

M. W. C. H.

Coral Reef Formation.

'Coral and Atolls, their History, Description, etc.' By F. Wood-Jones, B.Sc. London: Lovell, Reeve & Co. 1910. 24*s. net.*

Under the above somewhat broad title we have a work mainly devoted to the Cocos-Keeling atoll. The author passed some fifteen months there in medical charge of the cable station which lands at Cocos-Keeling on its journey from Africa to Australia. Cocos-Keeling atoll and Christmas island lie well out from the Malay archipelago, and are of peculiar interest in being the only two purely oceanic islands in this eastern part of the Indian ocean. The latter, which is of elevated limestone, has recently been made well known to us by the researches and publications of Dr. C. W. Andrews, and now Mr. Wood-Jones gives us a full account of Cocos-Keeling.

The atoll is one which has been visited and to some degree investigated by Darwin, Guppy, and Forbes, but none of them spent the time on the atoll that Mr. Wood-Jones has done. However, Darwin largely founded his theory of coral-reef formation on his investigations there, and now Mr. Wood-Jones tests that and most other theories of the same by his researches in the same atoll.