

notes make them most instructive publications. No. 7 of the series contains papers of prime importance in the history of meteorological instruments, viz. the correspondence between Torricelli and Ricci on the measurement of atmospheric pressure, in which Torricelli announced the invention of the barometer (1644); and the paper "Saggi di naturali esperienze fatte nell' Accademia del Cimento," in which the first continuous observations with the thermometer and hygrometer are described. This paper appeared in 1666 and passed through eight Italian editions, and was translated into English (1684), Latin (1731), and French (1754). Prof. Hellmann gives a list of the most important works upon the invention of the barometer, thermometer, and hygrometer, and adds some interesting historical notes.

No 8 of the "Neudrucke," entitled "Meteorologische Karten," contains facsimiles of the first wind-chart, isotherms, isobars, and synoptic weather-map, with an introduction in which the various charts are described. The wind-chart is Halley's (1686); the isotherm map is Humboldt's (1817); and the synoptic chart is Loomis' (1846). Two maps of Le Verrier's show the distribution of barometric pressures on September 7, 10, and 16, 1863, as telegraphically communicated to the Paris Observatory from different parts of Europe on those days; and M. Renous' map (1864) of mean atmospheric pressure over France is given as the first chart of mean isobars.

The discovery of the secular variation of magnetic declination is told in Gellibrand's "Discourse mathematical on the variation of the magnetical needle," which appeared in 1635, and is reproduced in facsimile as No. 9 of Prof. Hellmann's "Neudrucke."

The three reprints are worthy additions to a very attractive and serviceable series.

Colliery Surveying: a Primer designed for the Use of Students and Colliery Manager Aspirants. By T. A. O'Donahue. Pp. 163. (London: Macmillan and Co., Ltd., 1896.)

WITH a view to reducing the number of colliery accidents, the law now requires that an accurate plan shall be kept of the workings of each mine. This has led to increased attention being devoted to the subject of mine surveying. Hitherto, it is true, mine surveying has not kept pace with the advances made in other branches of surveying. Great improvements have, nevertheless, been made during the last decade. Colliery managers are now submitted to a severe educational test before certificates are granted to them, and surveying classes are now held at most mining centres. For elementary students attending such classes, Mr. O'Donahue has written this concise little primer. Taking for granted that his readers have merely a knowledge of arithmetic, he has endeavoured to compress into his pages a complete course of instruction in surface surveying, mine surveying and levelling, together with the requisite preliminary information regarding mechanical drawing, geometry, mensuration and the determination of inaccessible heights and distances. With so comprehensive a scheme, and with so small and inexpensive a book, the instructions are necessarily brief and, for the most part, unaccompanied by theoretical explanations. It is to be feared, therefore, that an elementary student working with this book without guidance might be led to learn by heart details without having grasped principles. Used under the supervision of a capable teacher, however, it should prove useful as an *aide-mémoire* to young students. The absence of an index is a serious drawback, whilst the superfluous section on the mensuration of solids could easily have been spared. Numerous typographical errors in the figures have escaped the author's notice. Thus in the first example,

worked out on p. 34, there are three mistakes in one line, and in the next line the correct value of 15° is stated to be 1 in 3'74, whilst in the table of incline measure, on p. 142, it is 1 in 3'73. In that table itself there is often an uncertainty about the final figures; for example, the correct inclines for 3° , 4° and 5° are 1 in 19'08, 14'30 and 11'43 respectively, not 1 in 19'09, 14'29 and 11'42, as stated. On p. 140 the reduced level given is 50'3, but the measurement plotted in the drawing is 55'3. Again, the base line of the Trigonometrical Survey was measured in 1784, not 1874, as stated on p. 29. Trifling misprints of this kind, whilst perfectly obvious to the advanced student, are apt to prove stones of stumbling to the beginner.

The British Mercantile Marine. By Edward Blackmore. Pp. xix + 248. (London: Griffin and Co., Ltd., 1897.)

MESSRS. CHARLES GRIFFIN AND CO., Ltd., in their nautical series, have here a book not only serviceable to the men of the mercantile marine, but interesting and enlightening to those who wish to know the true state of our merchant service, which, to a great extent, and especially in smaller vessels, is manned by foreigners.

The history commences with the infancy of the mercantile marine, giving the different laws passed, the state of trade, the different classes of vessels, and the modes of discipline at various times. Further on, the attention of the reader is drawn to the fact that our mercantile marine is suffering from the want of proper education, in that the examinations held for testing the efficiency of the masters and mates can practically only be passed by them through the medium of a "crammer," who teaches them by rule of thumb, what is taught scientifically to the same class of men in other countries by their respective Governments.

It is pointed out, further, that the apprentice, who is on board to learn his profession, at the commencement of his sea career performs only manual labour, seldom, if ever, having the opportunity of learning the art of navigation as opposed to seamanship; this holds good even for mates of smaller vessels.

The book concludes with a postscript, entitled "The serious decrease in the number of British seamen: a matter demanding the attention of the nation," in which the author, in a few words, enumerates some of the points to which the decrease of British seamen is probably due.

Bulletin of the Philosophical Society of Washington. Vol. xii. 1892-94. Pp. xxix + 567. (Washington: D. C. Jude and Detweiler, 1895.)

THIS volume, though dated 1895, was only received a few days ago. A number of very interesting papers, some of which have been already referred to in the columns of NATURE, are contained in it, among them being the following:—"The Mexican Meteorites," by J. R. Eastman; "Peculiarities in the Rainfall of Texas," by A. W. Greely; "The Origin of Igneous Rocks," by J. P. Iddings; "The Moon's Face, a study of the origin of its features," by G. K. Gilbert; "The Texan Monsoons," by M. W. Harrington; "The Earliest Isoclines and Observations of Magnetic Force," by L. A. Bauer; "Mean Density of the Earth," by E. D. Preston. Mr. Preston's observations were made at Hawaii by two different methods, one depending upon triangulation and astronomical latitudes, and the other upon the diminution of gravity from the sea-level to the summit of a mountain, as revealed by a pendulum. The former method, carried out on Haleakala, gave for the mean density of the earth the value 5'57; the latter method, carried out on Mauna Kea, gave 5'13 as the density. The adopted mean is 5'35.