measures so discordant that it has been decided to abandon the line. India has hitherto used wooden staves, and it is not stated if these have been rendered non-hygroscopic; change in length, which appears to have a diurnal range, being attributed to temperature. In any event, staves with invar strips were to be substituted.

Heights are subject to orthometric and dynamic corrections, the former to take account of the non-parallelism of the equipotential surfaces at different altitudes, the latter to refer all heights to a standard equipotential surface of sea-level at a mean latitude, in India 24° north. The corrections are easily computed by formulæ, in which case they depend on theoretical, not observed, values of gravity. The Director of the Geodetic Branch, Dr. De Graaf Hunter, discusses the question of a rigorous investigation, and finds that the effect at Mussoorie, 7000 feet, is 0·7 ft.; he concludes that the severe labour involved in applying a rigorous correction is not justifiable in hilly country and is unnecessary in flat country, even though in strictness values derived by formula give heights in an unknown unit above an unknown datum.

India controls tide-gauges at forty eastern ports and issues predictions. An outstanding discrepancy in 1928 was 4·6 feet at Basrah on a certain date—not surprising at the mouth of great rivers and at the head of a great gulf. By arrangement with the Admiralty, the tide-tables will be extended to sixty-eight ports in the Indian Ocean, and they will be issued in cheaper form—sufficient evidence of the success of the Survey in deriving harmonic constants in a region where monsoons and unique tides must sometimes give rise to peculiar conditions.

It has been decided to re-map at least a portion of the Dependency on areas of conical orthomorphic projection; in such an immense area the change-over will be gradual. The areas proposed are 8° in latitude by 16° in longitude. In this matter South Africa and India represent extreme views, the former adopting a width of 2° as against 8° in India. At the bounding parallels the scale error is about 1/400, which will be reduced one-half by a scale factor. The magnitude of the scale error and, perhaps more particularly, the rapid change of scale at the bounding parallels will doubtless evoke criticism.

The Survey has constructed a mural base for standards of length. Such bases already exist at Sèvres and Teddington; yet the writer doubts if this is the best form of construction, even though the thermal expansion of the wall becomes fairly well known after some years.

In the course of the longitude campaign the variation of latitude was studied; the results appear to show a well-marked correlation with the moon's age, as already described in NATURE.[2] The mean longitude of Dehra Dûn as derived from the Bordeaux and Rugby signals in 1928–29 is 5 h. 12 m. 11·79 s., precisely the same as in the longitude campaign of 1926. A Shortt clock was installed this year to supplement the Riefler.

The most interesting portions of the Report deal with gravity and the geoid in India; it would be impossible to deal adequately in a short review with the wealth of material here provided. The Director reaffirms his conclusion that conditions of approximately perfect Hayford isostasy are not met with in peninsular India; but the interested reader must be referred to the Report itself for a description of the numerous investigations. Work with the Cambridge pendulum apparatus is being vigorously pursued, old values being revised and new stations added, with the object of having one station in every seventy-mile square.

The Survey of India has made remarkable contributions to geodesy in the past. It is doubtful if any single volume has approached in interest and instruction that of the year under review.

G. T. McC.

[1] Geodetic Report, Vol. 5, of the Survey of India. From Oct. 1, 1928, to Sept. 30, 1929. Published by order of Brigadier R. H. Thomas, Surveyor-General. 8vo., pp. 150+29 charts. (Dehra Dûn: Geodetic Branch Office, 1930.) 5*s.* 3*d.*

[2] Bomford, G., NATURE, June 8, 1929, vol. 123, p. 873.

Obituary.

THE death on Dec. 28 of Prof. Eugen Goldstein, head of the Astro-Physical Section of the Potsdam Observatory, removes an observer whose work on the phenomena which accompany the passage of electricity through rarefied gases is well known. He was born at Gleiwitz on Sept. 5, 1850, was educated at the Ratibor Gymnasium and the Universities of Breslau and Berlin. At Berlin he worked under Helmholtz at the electric discharge in vacuum tubes, and in 1876 his first paper on the subject appeared in the *Berliner Berichte*, and was followed for fifty years by a long series dealing with cathode and anode rays and the influence of magnetic fields and of the dimensions of the discharge tube on the character of the discharge. He maintained throughout that the luminous discs of the positive column were repetitions with decreased intensity of the cathode glow. His recent work was mainly on the complex discharge near the anode, but he is probably best known for his discovery of the anode or canal rays. He was awarded the Hughes Medal by the Royal Society in 1908.

WE regret to announce the following deaths:

Mr. R. G. Lunnon, lecturer in physics at Armstrong College, Newcastle.

Dr. A. P. Maudslay, president in 1911–12 of the Royal Anthropological Institute, who was well known for his investigations of Mayan and Aztec sites in Mexico and Central America, on Jan. 22, aged eighty-one years.

Mr. H. W. Monckton, sometime treasurer and several times vice-president of the Geological Society, and vice-president and treasurer of the Linnean Society up to the time of his death, on Jan. 14, aged seventy-four years.

Prof. C. Y. Wang, professor of pathology in the University of Hong-Kong, author of numerous papers on tuberculosis and other bacterial diseases, on Dec. 16, aged forty-two years.