

The signal is constructed of metallic trellis-work formed by T-bars the base of which is a parallelepiped terminating in a pyramid which in turn is surmounted by a tube defining the axis of the signal and serving to support the lining-mark. The trellis-work is itself completed by frames which may be of iron and between which sufficient intervals are provided to avoid too strong wind pressure. The feet of the signal are fitted in sockets and are completely enclosed in what may be described as open-work iron cages. These cages are meant to hold a mass of stones which, by their weight, serve to hold each foot of the signal firmly in position. The instrument is placed in the free central space between the feet and observations around the whole horizon are then possible. The method of securing the feet requires neither cement nor water. The weight of material to be transported varies from 350 to 500 kilograms according to the height of the signal. Signals of this kind, used by the Italian Military Geographical Institute, are constructed by the PIGNONE metal works, Florence. In addition, the signal may be fitted with earth blocks and metal lightning-rods of the Melsens type, for protection against lightning.

H. B.

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### PROFESSIONAL PAPERS

NEW SERIES - PUBLISHED BY THE ORDNANCE SURVEY OFFICE, SOUTHAMPTON.

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The International Hydrographic Bureau has received from the Ordnance Survey Office, Southampton, a new series of the *Professional Papers* published by this Department since 1912.

A short review of such of those Papers as are of particular interest to Hydrographic Offices is given below :

N<sup>o</sup> 1. — *An Account of the Measurement of a Geodetic Base Line at Lossiemouth, in 1909, together with a Discussion on the Theory of Measurement by Metal Tapes and Wires in Catenary.*  
39 pp. - 3 figs. — H. M. Stationery Office, London, 1912 — Price : 2 Shillings.

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On the initiative of the Council of the British Association for the Advancement of Science, the Ordnance Survey carried out in 1909 the measurement of a new base for the purpose of ascertaining, by modern methods, the accuracy of a portion of the Principal Triangulation of the United Kingdom which has as its mean date of execution the year 1835.

The various chapters of the publication explain the reasons for the selection of the base, the method of measurement adopted, the instruments used and their method of use during the work, the fundamental standard of length used.

One chapter is devoted to Invar Tapes and their Standardization.

In chapter VII, which is specially interesting from the geodesist's point of view and constitutes a very useful part of the publication, Professor C. HENRICI presents a theory of measurement by metal tapes or wires in catenary.

Chapter VIII is a study of Accuracy of Measurement and the numerical estimation of certain errors.

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N<sup>o</sup> 2. — *An Investigation into the Accuracy of the Principal Triangulation of the United Kingdom* - by Captain H. St. J. L. WINTERBOTHAM, R.E.  
20 pages - 5 pl. - photo. ill. — H. M. Stationery Office, London, 1913 — Price : 2 shillings.

The angles of the principal triangulation of the United Kingdom were observed between 1783 and 1855. The much greater accuracy resulting from the use of modern instruments for the measurement of angles raised the question of the necessity for remeasurement of certain portions of the British triangulation which connect with European arcs measured at a much later date : and in this connection control measurements were made from 1909 to 1912 by the Ordnance Survey.

The present publication gives an historical account of the measurements for the Principal Triangulation of the United Kingdom and sets forth the detail of the control measurements carried out in Morayshire. Needless to say, these control measurements are solely of scientific interest from a geodetic point of view and do not in any way affect the accuracy of the triangulation for the direct practical purposes of map-making.

N<sup>o</sup> 3. — *Notes on the Geodesy of the British Isles* - by Colonel C. F. CLOSE, C.M.G., R.E. 34 pp. - 3 pl. — H. M. Stationery Office, London, 1914 — Price: One shilling and sixpence.

This publication consists of a general summary of geodetic work as a whole in its special application to the British Isles; it takes up the following questions, retracing their history insofar as Great Britain is concerned: Standards of Length; Forms adopted for the geoid; Triangulation of the United Kingdom; Movements of the Earth's Crust and Ordnance Survey Levelling; Measurements of Density and Gravity; Local deflection and isostasy.

The notes are accompanied by a chronological list from 1731 to 1913 and a bibliographical list of the principal British geodetic operations.

A sketch showing the fundamental levelling marks for the British Isles is included among the diagrams.

N<sup>o</sup> 4. — *Report on the Re-Levelling in 1915 - 17 of a Line from the English Channel to the Bristol Channel originally levelled in 1837* - by Colonel C. F. CLOSE, C.B., C.M.G., R.E., Director-General of the Ordnance Survey. 4 pp. - Southampton, 1917 - Price: Sixpence.

This publication gives an account of the levelling carried out by the Ordnance Survey in 1915-17 for the purposes of comparison with that made in 1837-38, by Mr. T. G. BUNT, between Axmouth on the English Channel and Perry Farm in the Bristol Channel. The original operation is briefly mentioned in a report by the Rev. W. WHEWELL entitled: *Researches on the Tides*, which appeared in the *Philosophical Transactions of the Royal Society* for 1839, p. 151.

The difference between the two measurements found for Axmouth between the two terminal points selected is less than 0.92 inch. Taking into account the accidental errors admitted by the International Geodetic Association, namely, 1 mm. per kilometre, it may be said that the operation has yielded no evidence of any change in the relative levels of these two marks near the shores of the English Channel and the Bristol Channel.

N<sup>o</sup> 5. — *Note on Two Double, or Two-Point, Map Projections* - by Colonel Sir Charles CLOSE, K.B.E., C.B., C.M.G., F.R.S., Director-General of the Ordnance Survey. 8 pp. - 5 pl. — H. M. Stationery Office, London, 1922 — Price: One shilling and sixpence Net.

We have here a study of two kinds of Two-point projections: First: Two-point Azimuthal Projection — which aims at the establishment of a cartographic projection in which, for each of two selected points, the great circles shall be represented as straight lines intersecting each other at their correct azimuths. It follows that, on such a projection, if the azimuths of a third point are known at the two selected points, then the position of the third point can be plotted graphically, and will be found at the intersection of two straight lines drawn from the selected points at the correct azimuths. Thus, if a ship at sea receives messages from two wireless stations giving the true bearings of wireless waves received from the ship, the ship can, on such a projection, plot its own position graphically without calculation.(1)

Second: Two-Point Equidistant Projection — in which two points on the sphere being selected, it is required that the straight line distances from the representations of these two points, on the projection, to any other points, shall be true to scale.

(1) See also: *Notes on Nautical Cartography*, by Captain L. Tonta, Director, Hydrographic Review, Vol. VII, No. 2, November 1930, page 30.

N<sup>o</sup> 9. — *Measurement of the Semliki Base: With some Notes on Invar Wires* - by Captain E. M. JACK, R.E.

10 pp. — H. M. Stationery Office, London, 1924 — Price: 9d. Net.

This report describes the measurement of a base 16  $\frac{1}{2}$  kilometres in length in the Semliki Valley made while carrying out the measurement of the 30th Meridian Arc in the Uganda Protectorate during 1908-1909. A description of the apparatus used is given in a pamphlet entitled: *Les Nouveaux Appareils pour la Mesure Rapide des Bases Géodésiques* (New Instruments for the Rapid Measurement of Geodetic Bases) by Ch. Ed. GUILLAUME, of the International Bureau of Weights and Measures, Sèvres, France. The National Physical Laboratory examined the invar wires used from the point of view of expansion; further information is given in the report entitled: *The Measurement of an Arc of Meridian in Uganda* (H.M.S.O., 1912).

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N<sup>o</sup> 10. — *Professional Papers — New Series of the Ordnance Survey* N<sup>o</sup> 10 — issued by H. M. Stationery Office, London, 1926 — Price: 9d. Net — includes two articles giving general information on:

1. The Work of the Ordnance Survey, by Colonel Commandant E. M. JACK, C.M.G., D.S.O., — summary of a paper read at the British Association Meeting of 1925, and
2. A report on the progress of the International 1/M Map, by Major M. N. MACLEOD, D.S.O., M.C., R.E.

N<sup>o</sup> 11. — N<sup>o</sup> 11 of Ordnance Survey *Professional Papers* consists of a description of the Transverse Elliptical Equal-Area Projection of the Sphere, otherwise Transverse Mollweide Projection (H.M.S.O., 1927).

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N<sup>o</sup> 14. — *The Subsidence of London* - by Captain T. E. LONGFIELD, R.E., Ordnance Survey. 13 pp. - 17 pl. — H. M. Stationery Office, London, 1932 — Price: 2s. 6d. Net.

A paper read to the British Association.

In this publication the author first studies the different varieties of land movement, of which London is suspected of being a victim. These movements, chiefly due to local influence, are referred back to the levelling of Great Britain begun in 1840 which forms the basis of subsequent Ordnance Survey levels. In 1921 a second geodetic levelling was completed. With regard to this second levelling, the author confines his attention principally to the London area, and in this connection describes a method recently brought into use for transferring levels across the river. Comparison between the levellings carried out at different periods reveals a general sinking of the soil; areas of equal sinkage are shown by diagrams. Results seem to indicate that a very definite and measurable subsidence in central London has been going on with fair regularity at any rate since 1865; also that this subsidence appears to be confined to the thickly built-over areas where there is gravel or alluvium overlying the clay.

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N<sup>o</sup> 15. — *Further Notes on the Geodesy of the British Isles including Geodetic Surveys of the Crown Colonies.*

48 pp. — H. M. Stationery Office, London, 1933 — Price: 2s. 6d. Net.

Information on the following questions is given in this work:

*Great Britain:* The Recomputation of Figure 21 of the Primary Triangulation; Changes in the Co-efficient of Thermal expansion of invar Wires and Tapes; Carrying levels across estuaries; Mean Sea Level; Gravity Survey; Developments in Precise Time-Keeping.

The publication also gives a summary of the work carried out in Palestine, Ceylon, Malaya, at Hong-Kong, and in Africa for the measurement of the arc of the Thirtieth Meridian and for the prolongation of the arc into Northern Rhodesia and Tanganyika; brief notes are given on triangulation work in Nigeria, the Gold Coast Colony and British Honduras.

The Ordnance Survey supplies monthly and yearly mean sea levels for Newlyn and Dunbar and a list of computations of Mean Sea Level for various foreign ports is given.

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N<sup>o</sup> 16. — *The National Plans of the Ordnance Survey* - by Brigadier H. St. J.L. WINTERBOTHAM, C.M.G., D.S.O., A.D.C., Director-General of the Ordnance Survey.

107 pp. - 23 pl. Ill. — H. M. Stationery Office, London, 1934 — Price : 4s. 6d. Net.

In this publication the Director-General of the Ordnance Survey has given a detailed historical account of the method of construction of different cadastral plans of British territory during the past century, which forms a continuation of Colonel CLOSE's publication entitled: *Early Years of the Ordnance Survey*. A chronological list shows the most remarkable features in the history of this Service from 1820 to 1934.

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The chapter: *Report on the Progress of the Ordnance Survey to 31st March 1914*, included in the Annual Report of the Survey 1913-1914, gives details concerning the organisation and general functions of the Ordnance Survey: information on the same subject is contained in a work edited in 1902 by Colonel DUNCAN: *Account of the Methods and Processes adopted for the Production of the Maps of the Ordnance Survey of the United Kingdom*. This generally informative work gives in particular notes concerning the trigonometrical survey of the United Kingdom; levelling, field operations, design of the topography, engraving on copper plates, various methods of photographic reduction and the method of printing by zincography and photo-zincography, the anastatic method, method adopted for electrotype, etc...

Among the fundamental works relating to surveys published by the Ordnance Survey may be mentioned the *Text Book of Topographical and Geographical Surveying* by Colonel C. F. CLOSE, revised in 1913 by Captain E. W. Cox, Geographical Section of the General Staff. This publication is accompanied by numerous tables.

H. B.

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## TIDES AND CURRENTS IN NEW YORK HARBOR

by

H. A. MARMER, ASSISTANT CHIEF, DIVISION OF TIDES AND CURRENTS.

(Special Publication No. III of the Coast and Geodetic Survey - Revised (1935) Edition  
200 pp. 48 figures and diagrams - 70 tables).

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Edited by Mr. H. A. MARMER, Assistant Chief of the Division of Tides and Currents of the U. S. Coast and Geodetic Survey, this handbook combines and presents in a particularly convenient form, all the elements necessary for a comprehensive study of so vast a question.

This publication is a revision of the volume under the same title which was issued in 1925. Since that time there has been a very considerable increase in the tide and current data relative to New York Harbor in consequence of new complete tide and tidal current surveys carried out in 1932 conjointly by the Coast and Geodetic Survey and by the United States Engineer Office, New York.

The publication under review includes the results of those surveys and also of previous tide and current observations in the same area. Numerous sketches show the positions from which the observations were taken, on the shore for heights and in the bay for currents. Thus all the rather complex detail of tidal phenomena in New York Harbor has been grouped in the form of statistics in a single volume which will certainly be of great service to all interested in this subject, i. e. not only to the seaman and to the engineer, but also to all those interested in the scientific study of tides.

Numerous tables are given among which may be mentioned those relating to the Harmonic Analyses of Tides, Tables of new constants for Fort Hamilton, 1928, for Willets Point, 1932, and tables giving Current Constant Harmonics for Scotland and Ambrose Light-vessels, the Narrows, Hudson River, Lower East River, and Upper East River.