NOTES

ON PUBLICATIONS RECEIVED BY THE BUREAU.

"THE JAPANESE HYDROGRAPHIC DEPARTMENT" Tokio, 1923.

THE preface of this booklet published by the Japanese Hydrographer on the history and work of his Department is dated in May last year; it is sad to think that the next chapter of the history of the Department, described therein so ably and in such an interesting manner, will have to commence with the story of the terrible earthquake which destroyed the entire establishment on the 1st September, a sequel which could never have been anticipated when the publication appeared; it is, however, satisfactory to have the history of the Department traced from its formation and through the different stages of progress before the recent total destruction of the Offices.

The contents of this publication are very clearly separated under various heads consisting of History, Organization, Surveys, Determination of Latitude and Longitude, Magnetic Observations, Tidal-Work, Oceanography, Meteorology, Almanac Compilation, Chart-making, Sailing Directions, Notices to Mariners, Light-Lists, Printing, Estimates and Personnel; a chart is attached which shows all hydrographic work carried out and projected to the end of 1922.

A photograph of the Establishment buildings together with a group of the personnel of the Department, over 400 in number, is also given.

J. F. P.

"THE MARINE CHRONOMETER, ITS HISTORY AND DEVELOPMENT".— *By Lieutenant-Commander R. T. GOULD, R. N. (Retired) British Navy.* Published by J. D. POTTER, 145 Minories, LONDON, E., 1923.

THE opening sentence of the Author's *Introduction* is: "Will the reader be good enough to imagine, for a few minutes, that he is Christopher Colombus?" I think that this request indicates at once the very unusual character of the writer, and I feel sure that any student of this work will agree with me on this point long before be arrives at the end of the book.

Though in 1861 Captain SHADWELL, of the British Navy published "Notes on the Management of Chronometers", this is the first production dealing with the construction and history of Chronometers themselves; the work placed before us now appears to be one of the most exhaustive treatises possible; it is brimful of the most interesting facts, and the construction of these instruments is dealt with in a thoroughly practical manner by one who is most evidently a practical mechanician; not only are all the makers and inventors concerned referred to at length, but very intimate accounts of them all are also given; the great amount of detail which appears throughout the publication is extraordinary, and it clearly shows the minute nature of the research work which was carried out in its preparation.

The plates, which are very numerous, are beautifully executed and add very considerably to the interest of the publication, as well as being of very appreciable assistance to the reader; the Author's skill as a draughtsman is most noticeable.

To seamen, but especially to hydrographic surveyors, whose work has brought them into close contact with these instruments, this work will prove of absorbing interest, and the style in which it is written, together with the very numerous, original and quaint quotations, all tend to make its persual a matter of pleasure as well as of profit.

A "*Foreword*" by the British Astronomer Royal, the head of the Department which deals with Naval Chronometers, is a sincere tribute to the Author's practical skill as well as to his zeal as an historian.

On page 131 a reference will be found to the fact that the general issue of Chronometers to British men-of-war was commenced in about the year 1825, and that for many years one Chronometer only was supplied, with the proviso, however, that a second would be supplied in cases where the Captain or Navigating Officer of the ship was already in possession of one of his own; the reason for this proviso

was that three Chronometers could be utilised as a check upon one another, while two were useless for the purpose; in this connection it is of interest to remark that during the recent war Chronometers were difficult to obtain and therefore were in great request; as a result, in Great Britain, all Chronometers were commandeered by the Admiralty, and a very large proportion of those obtained tn this manner proved to be the old private Chronometers referred to above, which in many cases had since been regarded as family heirlooms.

The very large amount of work involved in the receipt, testing, maintenance and issue of the Chronometers required for British men-of-war and their auxiliaries during the years of the war is obvious, and the numbers dealt with appears worthy of note; they are as follows : —

Year.	Received.	Issued.
1914	2094	2110
1915	3273	3207
1916	5085	5090
1917	4849	4989
1918	6856	6580
1919	8631	6713

Note: — These numbers include both Chronometers and Chronometer-watches.

The great variation in the numbers of Chronometers which were carried in Surveying vessels and utilised in connection with obtaining meridian-distances in early days is also a matter of some interest :

(1) In 1772-5, Captain Cook, during his Second Voyage in H. M. S., "Resolution" (British), carried two, including a copy of Harrison's watch by Kendall; H. M. S. "Adventure" also carried two.
Note. In his First Voyage for the observation of the transit of Venus, Cook carried no time-piece.

(2) 1802-10, Captain W. D. Urban (British) was employed in fixing important positions in the Mediterranean and utilised six.

(3) 1815-8, Captain O. Von Kotzebue in the "Rurick" (Russian) carried two.

(4) 1817-20, Captain L. Freycinet in the Frigate "Uranie" (French) carried four.

(5) 1818-20, Captain Roussin in the Corvette "La Bayadère" (French) carried two.

(6) 1821-4, Captain W. H. Smyth in H.M.S. "Adventure" (British) carried five.

(7) 1822. Dr. J. L. Tiarks (British Astronomer) employed seventeen to establish the meridian distance between Greenwich and Funchal, Madeira.

(8) 1823, Dr. Tiarks utilised twenty-six in carrying a meridian distance from Greenwich to Falmouth (at that time the principal port of call on the South coast of England for ocean-going vessels).

(9) 1822-4, Captain L. I. Duperrey in the "Coquille" (French) carried four.

(10) 1825-6, Lieutenant Zahrtmann (Danish) was employed in fixing positions in the West Indies and utilised three.

(11) 1826-30, Captain P. P. King in H. M. S. "Adventure" (British) carried eleven.

(12) 1828-31, Commander H. Foster in H. M. S. "Chanticleer" (British) carried seventeen.

(13) 1831-6, Captain R. Fitzroy in H. M. S. "Beagle" (British) carried twenty-two.
Note. It is worthy of remark that the entire chain of the meridian distances obtained during this historical voyage around the world, covering a period of five years, only exceeded twenty-four hours by thirty-three seconds.

(14) 1833, General Schubert (Russian) carried fifty-six in a steam-vessel specially utilised in running meridian distances in the Baltic.

(15) 1835, Captain A. T. E. Vidal in H. M. S. "Etna" (British) carried twelve.

(16) 1838-42, Captain C. Wilkes in the sloop "Vincennes" (U. S. A.) carried twenty-nine on his famous expedition.

(17) 1845, Sir G. B. Airy (British Astronomer Royal) utilised thirty in obtaining the meridian distance between Greenwich and Valentia (Ireland).

It is, I think, usually thought that the modern Chronometer, in its present form, is that which resulted from the labours of JOHN HARRISON, the English watchmaker, who earned the £ 20,000 reward offered by the British Government for a time-piece capable of determining the longitude to within half-a-degree on a voyage to the West Indies, which was successfully accomplished in 1761, but as the system employed was entirely different to that of the modern Chronometer this presumption is incorrect. According to the Author, there is no doubt that PIERRE LE ROY, the French clock-maker, is in reality the parent of the modern instrument as it is known to-day, the first specimen of his work being produced in 1766; "LE ROY's timekeeper was an entirely new departure, and the credit of having designed and constructed the first modern Chronometer is entirely his, and his alone".

In the concluding paragraphs of the book, its Author refers to the generally accepted belief that the advent of W/T with its Time-signals has killed the necessity for carrying Chronometers on board ship;

with this presumption he does not entirely agree, although he concurs that the Chronometer's work will now be confined to carrying on the exact time obtained from a W/T Time-signal to that of the observation for ascertaining the position of the vessel or vice-versa.

J. F. P.

"HANDLEDNING I SJÖMATNING". — Manual for Hydrographic Surveyors, Kungl. Sjökarteverket, Stockholm, 1923.

THIS Swedish publication, which is a new edition of the official handbook for Hydrographic Surveyors, is stated by Director S. H. MÜLLER to be a most excellent and practical manual dealing with the various instruments, appliances and methods used in Hydrography.

The principal heads under which the contents are divided are: —

1. General Instructions for the Surveying Personnel.
2. Instruments and Appliances.
3. Geodesy.
4. Projections.
5. Preliminary work for Hydrographic Surveys.
6. Hydrographic Surveys.
7. Detailed Surveys.
   Land work.
   Sounding and examination of shoals.
8. Outer soundings.
9. Chart drawing on board ship.
10. Appendix.

Under the head of Appliances descriptions are given of various forms of sweeps, including wire-sweeps, spar-sweeps for towing and for attachments to vessels. The methods of using these are described under "Sounding and Examinations of Bottoms" under the head "Detailed Surveys".

The Appendix contains some useful tables, *e. g.* for conversion of Swedish feet into metres, ascertaining distance from an elevated object by angle, *etc.*

G. S. S.

"DE METHODE DER KLEINISTE KWADRATEN EN HARE TOEPASSING BIJ DE HYDROGRAPHISCHE TRIANGULATIE". — The method of the Least Squares and its application to hydrographic triangulation, *by J. L. H. LUYMES, Hydrographer of the Netherlands.* The Hague.

THIS excellent manual is intended to enable the hydrographic surveyor to text the accuracy of his main triangulation in order that it should nowhere fall below the previously adopted limit, which largely depends on the proposed scale of the chart to be published.

It is not a book to be glanced over in search of some binding rule to which one may adhere safely in order that the required accuracy may be attained ; every page of it should be studied carefully, for the author, whose knowledge of mathematics is as great as his knowledge of practical surveying, raises the student gradually to a level from which he can judge for himself and draw his own conclusions.

In his introduction Capt. LUYMES states that the characteristic difference between the triangulation of a land survey, *e. g.* the Ordnance Survey, and of a hydrographic survey is shown primarily in the accuracy required in each. The accuracy of the land survey should be such that it may serve cadastral purposes, which require a very large scale, whereas the nautical survey does not aim beyond the safety of navigation which, as a rule, it is possible to obtain by means of a smaller scale chart. He further describes the way in which a land triangulation is carried out ; how the field is divided up into large triangles of a favourable form, at the angles of which are primary stations and where conspicuous beacons are erected, the positions of which are determined with extreme accuracy, and how this accuracy diminishes gradually, when these large triangles are cut up into smaller ones, for stations of a lower order. Yet the accuracy remains very high, every angle being measured repeatedly with high class instruments and under favourable conditions only.

The results of such measurements will not be identical and, in order that the polygons may fit into each other, these results must be adjusted, and this is done by the *method of the least squares.*

By applying this method the errors made cannot be eliminated, it reduces them to a minimum only and the fundamental rule for its application should be that : —

> the observations for each datum must be numerous and their accuracy should be the same or, if not, the difference should be counter-balanced by the evaluation of each observation.

Inspired by the book of Prof. MANSFIELD MERRIMAN, the method

is fully described for all cases, from the simple to the more intricate, in chapters I to V inclusive, of which the following are the titles and the contents : —

I. *Method of the least squares.* — General considerations. Observations and errors. Mathematical probability. Connection between the amount of error and probability. Fundamental thesis. Formulae of the curve of probability.

II. *Adjustment of observations.* — Rule for the adjustment of observations, indirect observations and conditional observations.

III. *Comparison of observations.* — Determination of the probable error, of the arithmetical mean, of the general mean, of independent observations and of conditional observations.

IV. *Progression of errors.* — Probable error in the algebraic sum of two observed quantities, in a multiple, in a product and in a quantity which is a function of one or more observed quantities.

V. *Application of the method.* — Adjustment of base and angles, determination of the probable error of the adjusted values and adjustment of a round of angles, triangles and quadrangles.

The scale of a nautical survey is smaller that that of a land survey and for this reason the accuracy of the former may be less than that of the latter. Besides, every nautical survey is a compromise between accuracy and time and, provided that the pre-established accuracy is reached, the nautical surveyor should carry on his work as fast as possible.

His instruments are chosen with these lower requirements in view and, as the repetition of observations means delay, he limits this process to the cases in which it is required. Though he must try not to fall below the required accuracy, he will never aim at exceeding it and, as a rule, his work will be performed by rougher methods which allow of quick progress rather than by more subtile methods which require much time. This causes the author to enunciate the paradox : the "nautical surveyor should work as inaccurately as he is permitted".

His triangulation is made in a different way from that described for a land survey. Starting from a base, it is generally carried on by comparatively small triangles, making use as much as possible of appropriate existing conspicuous objects in the field. There is no question of stations of various orders and gradually diminishing accuracy. As far as possible each station of his main triangulation should have the same accuracy and those parts of the field which are of less

importance and which, as a rule, are meant for fixing objects for plotting soundings only, are annexed to this main triangulation by rougher methods. However, no data originating from such parts should be introduced into the main triangulation.

The principal reason for this procedure is that it would require too much time to triangulate the field first and take soundings afterwards. The triangulation and the sounding work should be carried out simultaneously, as far as possible, and the former should never be very far ahead of the latter.

Besides the difference between the two surveys mentioned above, another, and a no less important one, arises from local conditions. The land surveyor can select the stations of his triangulation with care but the hydrographic surveyor has to accept conditions as nature offers them to him and to try to make the most of them, without making an elaborate examination or lengthy preparation beforehand. As soon as triangles on shore are no longer available or the formation of these will delay the survey longer than is advisable, he will make use of the ship as a triangulation point, moored at a fair distance off the coast if possible and even drifting, if the depth prevents anchoring. Taking his angles from a drifting ship will, of course, cause the accuracy of his triangulation to diminish.

Thus the main triangulation of a hydrographic survey cannot be carried on always with the same accuracy throughout. The field should be divided into parts, according to the accuracy which can be reached and, whenever local conditions allow this accuracy to be augmented, the data from the former and less accurate triangulation should be readjusted.

For these reasons triangulation demands of the hydrographic surveyor a good deal more insight into the work than from the land surveyor who proceeds by fixed rule. It is true that the non-agreement of two or more values for the same datum may warn the former that "there is something wrong", that even fixing by angles may betray that the triangulation is no longer completely closed, that the surveyor can check his work by taking azimuths and, over great distances, astronomical observations, but every one of these checks comes after the evil has developed and leaves it an open question as to what is the cause of the discrepancies found. They may have been caused by a continuous accumulation of small errors as well as by a single error of considerable amount which has suddenly crept into the triangulation and, in the latter case, there is no indication as to where this error was made.

Up till now the surveyor has had very little but his feelings by which to sense the accuracy of his triangulation before it falls short of the standard set and, as this is a very unsatisfactory condition, the Author thought that he might investigate the possibility of estimating this accuracy continually, and on a more mathematical basis, by testing the value of each calculation immediately.

This can only be done by conceding, in these calculations, a more important place to the application of the method of the least squares.

It should be well understood, however, that in a hydrographic survey it is impossible fully to comply with the fundamental rule of the method, mentioned above, therefore the application can be neither as scientific nor as extensive as for a land survey. In fact, up till now it has been limited to a few rules for the adjustment of separate triangles and quadrangles, to obtaining some idea of the relative accuracy and to the evaluation of the results of separate series of observations and of calculations. Therefore it should not be expected that a wider application of this method will give an absolute measure of the accuracy of the main triangulation, it will be found to be fit only for *estimating* the relative accuracy of the nautical survey.

This wider application is given in Chapter VI, *Application of the method to the determination of the transition of errors in a hydrographic triangulation,* which is the gist of the manual. It deals with the probable error in : —

1. the latitude and longitude of a station deduced from a former one and in consecutively derived azimuths,

2. the side of a triangle, to which is added a discussion of the forms of the triangles,

3. the transition of errors when triangulating from a drifting ship by application of the method of the correlatives, including a comparison between triangulation by an unfavourable fixed triangle or by a favourable position of a ship adrift and a discussion as to which beacon should be chosen for preference to continue the calculation when two of these are close together,

4. the calculated azimuth and distance ;
5. the intersection of two bearings ;
6. the arc subtending an angle ;
7. the intersection of an arc and a bearing, and
8. the intersection of two arcs.

Further it gives the most probable position of a station determined by more than two bearings or arcs.

Each paragraph includes the calculation of an example taken from an actual triangulation and, alongside this, a separate calculation of the most probable errors is given.

Chapter VI concludes by giving the detailed calculation of a part of the triangulation of the island of Flores in the E. I. Archipelago made by Capt. LUYMES himself, in which some of the probable errors have been estimated as the full account was not to hand in Holland.

The Author states once more that the errors found are but approximations of the real errors, but this approximation affords a solid basis for estimating the accuracy of the triangulation at any moment and gives timely warning of the necessity to augment the accuracy if it threatens to fall short of that aimed at. This advantage is certainly worth the by no means excessive work of maintaining a separate calculation of errors.

It will undoubtedly be an exception if the accuracy proves to be greater than is required, in which case it would appear that too much time was dedicated to the triangulation and it would be permissible, and even indicated, that less accurate methods be used.

Chapter VII. *Errors of stations determined by astronomical observations and accuracy to be observed while calculating.* — This Chapter gives in the first place limits for these errors and states that those of the longitude, which are a multiple of those of the latitude, arise principally from the chronometers. But, if the time is derived from signals by wireless, which procedure is invariably followed in the East Indian Archipelago, the amount of these errors diminishes rapidly.

However, the very serious error arising from local attraction, which cannot be foreseen and very often causes misapplication of corrections, cannot be ascertained even by astronomical observations made in other places. The local situation of the field does not give a conclusive indication of its existence; the large amount of 37" has been observed in the flat island of Tindjil, on the S.W. coast of Java, where huge masses of mountains are many miles distant.

The connection of the triangulation round Soemba Island is given as a reason for the advice not to be rash in applying errors resulting from astronomical observations.

Further the method by which the geodetic coordinates of a station should be made to coincide as near as possible with the astronomical, is discussed.

Taking into consideration the accuracy which should be observed while calculating, it is stated that 5 decimals in the logarithms are sufficient for the main triangulation of a hydrographic survey, except

in the case of a station fixed by angles to very unfavourably situated beacons; in triangulating, such stations should be avoided as far as possible.

At the end of the manual a list of the principal rules and formulae of the method of the least squares is given.

It is most earnestly hoped that this excellent manual will be thoroughly studied by every hydrographic surveyor; the translation into a more generally known language by a fully qualified mathematician is very desirable to enable those to read it who do not understand the Dutch language.

J. M. P.

"THE COAST AND GEODETIC SURVEY". — *Service Monograph of the U. S. Government.* — Washington 1923.

This publication gives a most interesting insight into the work of this important Survey from its creation in the year 1816 to the present time; the book is divided into four principal sections, *viz*. History, Activities, Organization and Personnel, and these are again separated into numerous sub-divisions of a most varied and detailed character.

The operations of the Coast Survey (as it was then) were at first confined to a small part of the Atlantic Coast only, and it was not until the year 1844 that work further afield was taken up; this gradually extended until the purchase of Alaska took place in 1867 when the survey of that territory was commenced.

In 1871 the Coast Survey added geodetic work to its activities, but its present title was not formally adopted until 1878.

It is interesting to note that, prior to the Civil War, military officers were employed in connection with the shore work of the Survey, but since that time no officers of the Army have been so employed; naval officers shared the sea work with civilian assistants, but in 1898, owing to the War with Spain, the naval officers were withdrawn and in 1900 the Survey was re-organized and placed upon a civilian basis.

In the year 1903 the Coast and Geodetic Survey was transferred from the Treasury Department to that of Commerce and Labour, and on the separation of the latter in 1913, the Survey remained in the Department of Commerce.

A separate "Division of Tides and Currents" was formed in 1920, the work formerly being under the "Division of Hydrography and Topography".

The Director of the Survey holds the relative rank of a Captain in the Navy.

In March 1922 the personnel of the Survey consisted of 974 officers and men, of which 728 were employed in vessels and field work; the total appropriation for 1922-3 was $ 2,176,975.

One of the appendices to the monograph consists of a useful Bibliography of works which deal directly with the Survey itself, but does not include books or articles of a technical character.

Reference is made to the Wire-drag survey, which is utilized so very largely and successfully in the waters of the United States.

It appears strange that no reference whatever is made to the new method of sounding by Echo, as its use will obviously increase accuracy and rapidity in obtaining soundings in all but comparatively shoal water.

The utilization of high shore signal stations is mentioned; it is believed that these stations are used more generally in this Survey than is usual in the surveys of other countries; the initial expense in construction is certainly considerable, but it has always appeared to be amply justified on the score of eventual economy of time.

The distinction between the work of this Survey and that of the Naval Hydrographic Service is alluded to as follows: "The Hydrographic work of the Coast and Geodetic Survey and of the Hydrographic Office of the Navy Department is similar in nature, the former being confined to the coasts of the United States and its possessions, and the latter to surveys in foreign waters. The two services thus supplement each other in their work".

An account of the varied international activities of the Survey is given, but it is regretted that no reference is made to the International Hydrographic Conference of 1919, in which two representatives of the Survey took an active and most useful part; no mention is made either of the establishment of this Bureau in 1921 as a direct consequence of the Conference.

J. F. P.

"NAUTICAL ALMANAC and ASTRONOMICAL EPHEMERIS", *(British)*. for the period 1767 to 1923.

From the commencement of the existence of the Bureau it was evident that some form of Astronomical Ephemeris for previous years would be required for reference purposes, and inquiries were therefore made as to the possibility of obtaining copies of a suitable work of this description dating back as far as possible ; for some time the Bureau was unable to obtain anything except copies of the Nautical Almanac for some of the recent years of the present century, but eventually success was attained and the Bureau now has in its Library a complete set of the "Nautical Almanac" (British) from its first year of publication in 1767 to the present time ; the binding in most cases is very good and every volume is perfect, and the cost of the set to the year 1910 was the very reasonable one of £40 sterling.

The British Hydrographic Office had found it an exceedingly difficult matter to collect a set of Nautical Almanacs for the period coincident with that of the British Admiralty Tide tables, viz. from the year 1832 only, the Directing Committee, therefore, has every cause to congratulate itself on the satisfactory result reported above.

From the first volume to that for the year 1831 inclusive, the "Commissioners of Longitude" were responsible for the production of the "Nautical Almanac and Astronomical Ephemeris", as was its full title. The "Board of Longitude", governed by Commissioners, existed from the year 1713 until 1828, when its duties were taken over by the Admiralty; the French "Bureau des Longitudes", which is still in existence, was founded in the year 1795. The volumes for the years 1832 and 1833 continued to be issued in the original form under the authority of the Board of Admiralty, but in the year 1834, under the advice of the Astronomical Society, the contents of the Nautical Almanac were very considerably increased, being more than doubled, and the volume for that year and those subsequent to it are very similar in contents and appearance to that of present day.

A large number of the earlier volumes were originally the property of Viscount MELVILLE, who was First Lord of the Admiralty from 1812 to 1830, and it was interesting to discover, pasted into the volume for 1834, a letter from Captain F. BEAUFORT, then Hydrographer of the British Navy, to Viscount MELVILLE dated 20th July, 1833, as follows : -

My Lord,

"We owe the important improvements that have been made in that great national work, the Nautical Almanac, to your Lordship's assistance, and I therefore feel it to be not less a matter of duty than of gratitude to send you the first copy that has come from the press".

For nearly four centuries before the Nautical Almanac was published the production of such tables was left to private entreprise, and it is interesting to note that the institution of this official Almanac was brought about by the urgent necessity of obtaining a solution for the problem of finding the longitude at sea which, about a century earlier (*i. e.* in the year 1675), had led to the establishment of the Royal Observatory at Greenwich.

It is obvious that the works mentioned above cannot be allowed to leave the Library, but extracts of any information required can be made and forwarded on request.

J. F. P.

"THE MARINE OBSERVER". *(British). — Published by the Authority of the Meteorological Committee, Air Ministry.* H. M. Stationery Office, LONDON. — Price Two shillings, postage extra.

THE subject of Marine Meteorology is so closely allied to that of Hydrography that the production of this new periodical cannot fail to be of interest in the hydrographic world; it is interesting to note that the first biographical notice of leaders of Marine Meteorology is that of Admiral Sir Francis BEAUFORT, who is perhaps better known as having been Hydrographer of the British Navy from 1829 to 1855.

The official advertisement states that this monthly magazine is to be devoted to Marine Meteorology and will be written chiefly for the benefit of those Marine Observers who co-operate with the British Meteorological Office; it will deal with the meteorological problems met with by seamen in their daily life afloat, and it will provide general information concerning wind, weather, climate, currents, derelicts and ice; particulars will also be given of wireless weather reports with instructions for making use of them; it further states that the results of recent researches in Marine Meteorology in co-operation with Marine Observers will be described in non-technical terms.

The above gives a fair description of the contents of this interesting new departure in connection with Marine Meteorology which is produced in the convenient form of a magazine. One of its chief

aims is to afford a means of direct communication between the seaman observer afloat and the scientific offices on shore; this will appeal to everyone concerned and undoubtedly will be beneficial in removing those prejudices which have hitherto existed on both sides ; the certainty that all information will be utilised will cause the seaman observer to report his experiences about which, in the past, he has been somewhat diffident, while those on shore will still further realise how much interesting and valuable material is to be obtained from the practical observer afloat.

The absence of technical terms, so far as it is possible to avoid them, will be much appreciated, although it is obvious that they must be retained for scientific purposes, but their general use has hitherto doubtless considerably influenced the ordinary observer in avoiding discussions involving their use.

It is to be noted that, on the publication of this magazine, the issue of the monthly Meteorological Charts has been discontinued; for some time the space on the face of these charts had become so overburdened with information that their usefulness was much impaired, while the space on the back was found insufficient for the amount of material which it was desirable to utilise; however these charts are still printed, but with the omission of all information of a non-permanent character, thus rendering them considerably more clear.

The January 1924 number of the "Marine Observer" pays a tribute to the energies of Lieutenant MAURY of United States Navy, who was the first to build up a corps of voluntary marine observers, thus laying the foundation of international co-operation; it also refers to the admirable work carried out later in Great Britain by Admiral FITZ ROY.

J. F. P.

IN the November 1923 number of the **REVISTA GENERAL DE MARINA (Marine General Review)** *published by the Ministry of Marine,* Madrid, an article by Commander H. RAFAEL ESTRADA appears in which are given the history of the Bureau from its inception and lengthy extracts from the first number of the Hydrographic Review.

The Author prefaces his article with the following remarks:

" A new maritime organisation called the *International Hydrographic Bureau* has its offices in the Avenue du Port, La Condamine, Monaco.

Here meet, at least once a week, a few men of close acquaintance with the sea

who where elected from amongst all maritime States for their experience and knowledge of the numerous matters appertaining to that element, above all in those which affect navigation and hydrography.

As is always the case in a world-wide agreement many steps were necessary before it was possible to start the work of this international organisation which should be known by all and particularly by those whose interests are more or less directly connected with maritime matters.

The Bureau is essentially a maritime association, it is a permanent committee of a non-political and purely consultative character whose principal mission is to co-ordinate the work done by all countries to facilitate navigation, to harmonize and standardise all the documents dealing with the progress of the theory and practice of the Science of Hydrography. The International Hydrographic Bureau is, therefore, an institution which may produce much good for seamen and should be watched with profound sympathy.

We owe this to two men, both dead, unfortunately without seeing the definite realisation of their ideals. One of them served in the Spanish Navy in his youth and, later, became the PRINCE OF MONACO; the other was a strong personality in the hydrographic world — namely Monsieur RENAUD who held the office of Chief of the Hydrographic Service in France".

The **BOLETIN DE PESCAS (Bulletin of Fisheries)**, *published by the Spanish Ministry of Marine jointly with the Spanish Institute of Oceanography* contains a short notice with reference to the Bureau which summarises the objects and work thereof. It concludes with the following statements : —

"From this very brief summary of the many problems with which the Bureau has to deal, it is possible to estimate its undoubted importance and its practical value; ...

We propose that the International Hydrographic Bureau should have a free field for its work and the assistance of all nations in order that it may bring its most necessary work to a successful conclusion; from the men who form it nothing but the best results may be expected".

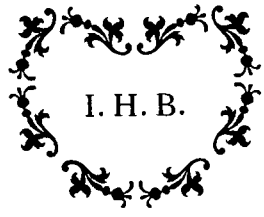
The September-October 1923 number of the **BULLETIN** of the **ROYAL GEOGRAPHICAL SOCIETY** of Madrid contains an article by *Dr. Rafael de Buen* giving a brief statement with reference to the establishment of the Bureau and extracts from the contents of the first number of the Hydrographic Review.

In the 4th number of 1923, the editor of **HET MARINEBLAD,** a nautical periodical published in the Netherlands, gives a review of the first number of the Hydrographic Review together with a summary of the history of the inception of the Bureau, its objects, work, Statutes and relation to the League of Nations.

In **DE ZEE (The Sea)** another nautical magazine published in the same country Mr. *P. H. Gallé,* who was one of the Delegates of the Netherlands to the International Hydrographic Conference of London, 1919, gives a similar review which he concludes as follows :

"This publication and the direct intercourse which we have had with the I. H. B. *e. g.* re the lights of Storbrötten and Grundkallen, give the impression that the Bureau will prove to be an institution of great value to navigation by promoting the interests of a considerable portion of the extensive sphere of action of nautical science".

G. S. S.



MONACO
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