

# LIST OF INSTRUMENTS AMONGST THOSE SHOWN AT THE OCEANOGRAPHIC EXHIBITION OF SEVILLE,

1ST MAY - 15TH JUNE, 1929.

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The Exhibition of Seville furnished an opportunity for various constructors of oceanographic instruments to show a certain number of those most recently invented; the names of these modern appliances and the uses to which they may be put are given in the detailed Report of Proceedings of the Oceanographic Congress of Seville.

In 1924 the International Hydrographic Bureau issued a small publication concerning hydrographic instruments manufactured in various countries, giving manufacturers' addresses for each country and for the different types of appliance.

With a view to completing this booklet, the names of some of the instruments shown at the Exhibition of Seville and which merit the attention of Hydrographic Offices, are given below, with manufacturers' addresses.

## GERMAN SECTION :

ATLAS-WERKE A. G., BREMEN.

*Atlas-Freilot.*

*Freilot* (Detachable deep-sea lead).

AEROTOPOGRAPH G. M. B. H., DRESDEN.

*Special photographic apparatus* for inshore surveying, designed by Prof. Dr.-Ing. R. HUGERSHOFF.

ASKANIA-WERKE A. G., BERLIN-FRIEDENAU.

*Elektrisch registrierender Strommesser nach RAUSCHELBACH* (The RAUSCHELBACH Electric Current Recorder).

## DANISH SECTION :

MARTIN KNUDSEN, COPENHAGEN.

*Insulated water-bottle*, large model.

*Insulated water-bottle*, small model.

*Reversing water-bottle*, Kristiania Laboratory type.

*Metre-wheel* (1000-metre).

*Double-crank hand capstan.*

JACOBSEN'S *Current-Meter.*

## SPANISH SECTION :

*Polea cuenta metros* (Metre-wheel).

Constructed by the firm of GANZER, Barcelona.

*Tubos-sondas BALEARES* (BALEARES Sounding Tubes).

Constructed by the Laboratory of Palma de Mallorca.

## SECTION OF UNITED STATES OF AMERICA :

GURLEY, ENGINEERING INSTRUMENTS, TROY.

GURLEY *Graphic Water Level Recorders.*

*New GURLEY Current Meter, 1927 Model.*

## FINNISH SECTION :

Diagram of the construction of a *tidal-station* with installation of the RENQVIST-WITTING device.

## FRENCH SECTIONS :

## ASTRONOMY :

*Prism astrolabe*, large model, designed by Messrs CLAUDE, member of the *Bureau des Longitudes*, and DRIENCOURT, Ingénieur Hydrographe en Chef de la Marine.

Constructed by the Société d'Optique et de Mécanique de Haute-Précision (S.O.M.), 125, Boulevard Davout, Paris.

*Marine chronometers, Chronometers, Watches* for torpedo-boats, submarines and airplanes.

Constructed by L. LEROY & C<sup>ie</sup>, 7, Boulevard de la Madeleine, Paris.

*Meridian* and various astronomical instruments.

Constructed by PRIN (Pupil and successor of GAUTIER).

## GEODESY :

*Azimuth circle* with microscopes (1926 model designed by Ingénieur Hydrographe en Chef ROUSSILHE).

Constructed by CHASELON, pupil and successor of J. BRUNNER, 20, rue Ducouédic, Paris.

*Micrometric microscope* for accurate astronomical and geodetic observations, also constructed by CHASELON, 20, rue Ducouédic, Paris, instructed by the *Service Géographique de l'Armée*.

## NAVIGATION :

*Marine Binoculars.*

Constructed by :—

BAILLE-LEMAIRE, 26, rue Oberkampf, Paris.

DERAISME, 167, rue Saint-Maur, Paris.

SOCIÉTÉ GÉNÉRALE D'OPTIQUE, 76, Boulevard de la Villette, Paris.

TROISPOUX, 143, Avenue Parmentier, Paris.

*Gyrocompass.*

Constructed by J. CARPENTIER, 20, rue Delambre, Paris.

*Liquid compass and barographs* for marine navigation, hydrography and air navigation.

Constructed by :—

HUE, 28, rue Notre-Dame-de-Nazareth, Paris.

VION, 38, rue de Turenne, Paris.

*Quadrant* (Ingénieur Hydrographe en Chef FAVÉ) for fixing the position in airplane.

Constructed by the Etablissements A. LEPETIT, 6, rue Victor-Considérant, Paris.

## TOPOGRAPHY :

*Self-reducing tacheometer and tacheometer-alidade.*

Constructed by the Ateliers SANGUET (Etablissements), 31, rue Monge, Paris.

*Theodolite, Tacheometer and Heliograph.*

Constructed by the Etablissements H. MORIN, 11, rue Dulong, Paris.

*Theodolite, small model.*

Constructed by the SOCIÉTÉ GÉNÉRALE D'OPTIQUE, 76, Boulevard de la Villette, Paris.

*Alignment circle*, extra small-size model, giving the centigrade.

Constructed by CHASELON (pupil and successor of J. BRUNNER), 20, rue Ducouédic, Paris.

*Slide-rules* of the Etablissements BARBOTHEU-MINOT, 17, rue Bérenger, Paris.

*Independent cell level*, NECTOUX system.

*Wide-angle prismatic binoculars.*

*Graphical tacheometer* (Complete set).

Constructed by the SOCIÉTÉ DES LUNETIERS et NAUDET-DOURDE, 6, rue Pastourelle, Paris.

## TERRESTRIAL MAGNETISM :

*Compass-Theodolite* for measurement of the magnetic declination and of the horizontal component of the terrestrial field and

*Inclination compass.*

Constructed by CHASELON.

## PHOTOGRAPHY :

*Aerial view camera*, shown by the GROUPEMENT D'INDUSTRIELS DE LA PHOTOGRAPHIE AÉRIENNE, 10, rue de l'Arcade, Paris, and by the Etablissements GALLUS, 77, Boulevard de la Mission-Marchand, Courbevoie (Seine).

*Aerial photograph restitution apparatus* (designed by Ingénieur Hydrographe en Chef ROUSSILHE).

Constructed by the Société CINÉMA-TIRAGE L. MAURICE, 66, rue Saint-Denis, Gennevilliers (Seine).

(Apparatus specially designed to further the use of aerial photographs on a large scale).

## HYDROGRAPHY :

*Sextant*, 19 cm. radius, vernier reading to 10", with Galilean telescope, long telescope, sight vane and shades.

Used for astronomical determinations of position.

*Magnac night-binoculars*, adaptable to the 19 cm. sextant.

*Gyroscopic octant* with FLEURIAIS collimator, for astronomical observations in fog. The octant is fitted with a collimating gyroscope, vacuum-running and giving the true horizon.

These three instruments are manufactured by the Etablissements LEPETIT (Successors of PONTIUS & TERRODE and of HURLIMANN), 6, rue Victor-Considérant, Paris.

*Sextants*, 19 cm. and 14 cm. radius.

*Ordinary surveying circle*, 27 cm. diameter.

Constructed by E. BOUTY, 45, Boulevard Auguste-Blanqui, Paris.

*Bubble quadrant*, designed by Ingénieur Hydrographe FAVÉ, for astronomical observations in aircraft and for night observations, including a graduated circle 15 cm. radius with vernier reading to 1', and spherical level, 150 mm. curve, with bubble lighting (type adopted by the *Service Aéronautique de la Marine*).

*Ordinary surveying circle*, 27 cm. diameter for hydrographic surveying at sea, arc graduated on silver, double vernier reading to the minute, with two Galilean telescopes, shades and exchange mirrors.

*Surveying circle to 180°*, designed by Ingénieur Hydrographe ROLLET DE L'ISLE, for hydrographic surveying at sea and in rivers, instrument including 4 mirrors instead of 2, angles may be laid off from 0° to 180°.

These three instruments are constructed by PONTIUS & TERRODE (now Etablissements A. LEPETIT).

## TIDES :

*Submerged tide-recorder*, designed by Ingénieur Hydrographe FAVÉ. Portable tide-gauge for great depths; operates from 8 to 15 days without rewinding; may be used on coasts and on the high sea.

*Immersion recorder*: for sweeping at sea. Manometric device attached to sweeper indicates depth of immersion of instrument.

*Recording Hydrometer*: for recording water levels (at sea and in rivers).

These three instruments manufactured by the Etablissements J. RICHARD, 25, rue Mélingue, Paris.

## SOUNDING APPARATUS :

*Fish lead and depth recorder* (designed by Ingénieur Hydrographe P. MARTI). For sounding with vessel in motion to depths of about 50 metres; very close profiles of sea-bottom may be obtained without the necessity of hauling in the line; it replaces very advantageously the ordinary lead and sounding-line.

This material is constructed by the Etablissements Samuel MARTI, Montbéliard, (Doubs).

*Microphonic sonic depth finder*, type S. I. E. R.

For sounding with vessel in motion to depths of 3,000 metres. This apparatus, using the shock or detonation of an explosive, includes:— a microphonic ballast, an amplifier and a recorder; designed by Mr. P. MARTI, Ingénieur Hydrographe de la Marine.

This material is constructed by the Etablissements de la S. I. E. R. (Société Indépendante d'Exploitations Radio-Electrique), 76, route de Châtillon, Malakoff (Seine).

*Ultra sonic sounding machine* (LANGEVIN-FLOISSON-TOULY type). For sounding at sea, ship at full speed, and at all depths. Apparatus based on the property possessed by quartz to combine the role of sound-transmitter with, at the same time, that of microphonic receiver. Operates exclusively by electricity; gives continuous series of soundings if desired. A self recorder, type P. MARTI, Ingénieur Hydrographe de la Marine, may be adapted to the machine.

Constructed by the S. C. A. M. (Société de Condensation et d'Applications Mécaniques), 42, rue de Clichy, Paris.

#### OPTICS :

*Glass blocks and discs.*

Patterns supplied by the Etablissements PARA-MANTOIS, II, Chemin de Ronde, Le Vésinet (Seine-&-Oise).

*Large Spectrogoniometer.*

Constructed by the Etablissements Félix PELLIN, 5, Avenue d'Orléans, Paris.

By means of this instrument of very high precision, angles may be obtained immediately to within nearly 1 second; specially designed and constructed for Optical Laboratories, it is suited to the study of all service instruments and, in particular, of their optical properties.

#### OCEANOGRAPHY :

*Aperiodic analytical balance* of great accuracy and *Box of weights*, for the requirements of chemical analysis applied to oceanography.

Constructed by Camille LONGUE, 8, Boulevard Edgar-Quinet, Paris.

*Precision refractometer*, for measurement of the refractive index in sea water with 10 drops of liquid.

*Colorimeter*, for determining colour of sea-water at different depths.

Constructed by F. PELLIN, 5, Avenue d'Orléans, Paris.

*Barometers, marine type.*

Constructed by NAUDET-DOURDE, 6, rue Pastourelle, Paris

*Recording Barometer.*

*B. C. M. Recording Thermometer.*

*Recording Hygrometer.*

*Recording Baro-Thermo-Hygrometer.*

*Thermometer with dial.*

*Hand Anemometer.*

*Dynamometrical indicator.*

Constructed by the Etablissements J. RICHARD.

#### CONTINENTAL HYDROLOGY :

*Instruments shown by the Office National de Navigation :—*

a) *The IDRAC apparatus*, recording velocity and direction of submarine currents at all depths.

Manufactured by the Etablissements BARBIER, BÉNARD & TURENNE, 82, rue Curial, Paris; shown by the harbour authorities of the autonomous Port of Le Havre.

b) *High efficiency thermoelectric Sounding Machine*, designed, improved and constructed by the Commandant GORGEIX, 20, rue Alexandre-Lange, Versailles (S.-&-O.).

By means of this apparatus temperatures may be taken up to 150 metres depth, without hoisting the sounder each time, and to within 0.2.

c) *Screw-Meter and Manometer with dial.*

Constructed by the Etablissements J. RICHARD.

## BRITISH SECTION :

## TELEGRAPH CONSTRUCTION &amp; MAINTENANCE Co LTD., LONDON.

## LUCAS PATENT SOUNDING MACHINE.

*Machine for depths up to 5,000 fathoms* ; it is geared to a *Brotherhood* 3 cylinder reversing engine for hauling up the wire.

*Machine for depths up to 5,000 fathoms* ; it is geared to an electric motor for hauling up the wire, and a patent clutch is incorporated so that the motor may attain its full speed before receiving the load.

*Small hand machine* for depths up to 400 fathoms ; it is very portable, weighs only 32 lbs., and is suitable for use from a boat.

*Machine for depths up to 5,000 fathoms* ; it is fitted with a grooved wheel for driving by a rope band from a steam winch or other engine.

20 and 30 lb. *Common Lead with tube at bottom.*

20 and 30 lb. *Snapper Lead* for recovering specimens of the bottom. The Snapper is fitted with spring slip hook for disengaging the 50-lb. cast-iron sinker. The jaws of the snappers are held open until the bottom is struck, when they are closed by a powerful spring, shutting in a specimen of the bottom.

## HENRY HUGHES &amp; SON LTD., LONDON.

*British Ordnance Survey Tide Gauge* : The Ordnance Pattern Automatic Tide Gauge is designed for the measurement of the rise and fall of tides on a large scale ; it is also adapted for recording fresh-water levels in lakes, reservoirs, etc. ; they give a continuous record on a printed chart, or plain paper supplied in rolls.

*The ADDISON-LUARD Course and Distance Indicator* : Marine type "A".

C. BAKER, London.

*The Marine Biological Frame and Deep Sea Thermometers* :

NEGRETTI & ZAMBRA, London.

*Echo sounding machine.*

HUSUN *Micrometer Sextant "The Gothic"* : divided on silver to read 10" to 140°.

HUSUN *Star Globe* : it consists of a 7.5" Star Globe on which are clearly marked all the stars of use in navigation ; this globe revolves and can be set by means of the brass half-meridian circle and horizon circle divided in degrees.

HUSUN *Station Pointer* : approved Admiralty pattern, with silver circle, tangent screw, vernier reading to minutes, etc.

*Transparent celluloid Protractors.*

*The XY Chart Protractor* : Stout celluloid protractor mounted on mahogany bar for holding it.

HUSUN *chart dividers* ; HUSUN *drawing instruments.*

*Patent CAPLIN Parallel Rule* : this latest and greatly improved pattern of field's Parallel Rule is much quicker in laying off courses and bearings.

*Parallel Rule XY HUSUN* : made of pressed and seasoned clear celluloid ; aluminium bridge and bar.

*Admiralty Signal Station Telescope* : Magnifying Power 44 ×, Aperture O. G. 3 in., length 42 in.

*Aperiodic Compass, Mk III A* : for airplanes.

*Aperiodic Compass P 4.*

*Airship compass* : constructed on the lines of the now well-known Dead-Beat Liquid Compass, but in this type the dimensions and weight have been kept down as far as possible to suit its particular use.

## ITALIAN SECTION :

*Apparato a scandagliari* MAGNAGHI (MAGNAGHI Sounding Machine), improved, fitted with automatic brake, band brake and permanent brake.

Constructor: Istituto Idrografico della R. Marina, Genova.

*Maregrafo settimanale* (Weekly tide-gauge), type "M.450" with 1/5 transformer.

*Idrometrografo settimanale* (Weekly hydrometrograph), type "G.440", with accessories and two floats.

*Molinello Idrometrico* (Screw Meter), type "A.100".

Constructor: Ufficio Idrografico del R. Magistrato alle Acque, Officina meccanica di precisione, Stra (Venezia).

*Manometro batimetrico* ALPAGO (ALPAGO bathymetric Manometer).  
*Correntometro* BOCCARDO (BOCCARDO Current-meter).  
*Compasso logaritmico* (Logarithmic Compass), R. KOHLSCHITTER.  
*Circolo a riflessione* MAGNAGHI, *Astronomico* (MAGNAGHI reflecting circle: astronomical).  
*Circolo a riflessione* MAGNAGHI, *Idrografico* (MAGNAGHI reflecting circle: hydrographic).  
*Circolo a riflessione* MAGNAGHI, *Geodetici* (MAGNAGHI reflecting circle: geodetic).  
*Bussola Normale per Siluranti* (Standard compass for Torpedo-boats), Mod. I. I. 1915.  
*Bussola Normale per Navi e Siluranti* (Standard compass for ships and torpedo-boats),  
 I. I. 1928 Model.  
*Bussola di Rotta per Sommergebile* (Steering compass for submarines), Mod. I. I.  
*Bussola per velivoli* (Air-navigation compass), Mod. I. I.  
*Grafometro pendolare* (Pendular graphometer), Mod. I. I. D.  
 Constructor: Istituto Idrografico della R. Marina, Genova.

SECTION OF THE PRINCIPALITY OF MONACO :  
 OCEANOGRAPHIC MUSEUM

LEGER *Sounding Machine*.  
 RICHARD *water-bottle*, large model.  
 RICHARD *water-bottle*, small model.

Firm of A. TAFFE.

Three LEGER *Sounding Machines*.  
 BUCHANAN *Sounder*.  
 Two RICHARD *water-bottle*.  
 MAKAROFF *Fluxometer*.

SWEDISH SECTION :

*Instruments for determining density and salinity* of sea-water, by Hans and Otto PETERSSON.  
*New bottom-sampler*.  
*Current meter* for determining direction and velocity of movement of water at sea-bottom.  
*Water-bottle with recording apparatus* for currents and quantitative collection of plankton.  
 By Otto PETERSSON.  
*Surface temperature recording apparatus*.  
 By Wilhelm PETERSSON.

Note : A description of these new methods is published in N° III (Hydrography) of *Svenska Hydrografisk Biologiska Kommissionens Skrifter*, under the title:—  
*Improvements in the Hydrographic Technic*.

SWISS SECTION :

TRÜB, TAÜBEB & C<sup>o</sup>, ZURICH.

*Apparatus for measurement of water velocity*, D. B. F. system. The instrument is composed of the following parts:— (1), driving screw; (2), indicator; and (3), a few metres of water-tight, armoured cable, fitted at one of its extremities with a stud, also water-tight, and at the other with two leads with thimbles, for connecting up with the indicator.

