

TRAINING SCHOOL OF THE FRENCH HYDROGRAPHIC SERVICE (1)

The scope of the Training School of the French Hydrographic Service is to ensure the professional formation of the various conducting and operating personnels of the Hydrographic Service. It consists of three divisions, each one corresponding to a special category of personnel :

- 1st Division : Hydrographic Engineers
- 2nd Division : Surveying Warrant Officers
- 3rd Division : Technical Officers.

The School is placed under the supreme authority of the Ingénieur Général, Assistant Director of the "Service Central Hydrographique", and is in the dependence of the Commission Division whose Head is in charge of the Instruction Division.

Most of the lectures are delivered by Hydrographic Engineers. However, officers of the different Corps of the Navy, or civilian professors are also entrusted with a few special lectures (*viz*: those on administration, foreign languages, and so forth). Surveying Warrant Officers are also detached to the training personnel as instructors for practical work.

The School is provided with a library including treaties relating to the various matters taught, as well as with a Radio Electric Laboratory and an Oceanographic Laboratory to enable students to perform the various practical exercises required. The School takes charge, for its own needs, of the printing of the various lectures delivered during the course.

The practical exercises take place either on the River Seine, or on its banks, or else at the Hydrographic Office Observatory.

First Division - HYDROGRAPHIC ENGINEERS.

First Division students are recruited in the following way :

(1) From among Hydrographic Engineer students who are either first-class engineers recruited by competition from among lieutenants or sub-lieutenants of the Navy, or from among third-class engineers from the "Ecole Polytechnique" who have spent one year at sea on the training ship for second-class lieutenants of the Navy.

(2) From among French or foreign free students selected by the Director of the Central Hydrographic Service. The latter attend the whole or part of the lectures delivered with the exception of that part which is considered as restricted.

The duration of the course is divided into two sessions of five months each, running from November 1st to April 1st, and during the intervening time between those two sessions the students are taken aboard the surveying ship *Amiral Mouchez* operating on the coasts of France or North Africa.

The teaching includes theoretical lectures and practical exercises a

(1) The Training School of the French Hydrographic Service was reorganized in the year 1946 and as a result therefrom the article published in the *Hydrographic Review* of August 1943 (Vol. XX, page 18) concerning the Program of Lectures for Hydrographic Engineers' instruction is now out of date.

summary of which will be found in Appendix I. It is completed by visits to various services or factories the activities of which are apt to interest the technical formation of the students. Their practical instruction is continued during their stay on board.

Final classification is established by taking into account the marks obtained by the students for the answers to the questions that have been put to them and their written compositions and essays in the course of the two sessions, as well as the appreciation of the Head of the Commission during their stay on board.

2nd Division - SURVEYING WARRANT OFFICERS.

Petty officers and quarter-masters taken from among the following special branches are admitted into the 2nd Division, *viz*: those whose special line is either: Steering - Manœuvring - Radio Electricity - or Pilotage, and whose candidature has been approved.

The lectures last five months, *i. e.* from November 1st to April 1st, and they are followed, for those whose qualifications have been deemed adequate, by a stay aboard a surveying ship in home waters.

The teaching includes theoretical lectures and practical exercises a summary of which is given in Appendix II.

At the end of their stay on board the students undergo an examination with a view to their admission into the special surveying branch.

3rd Division - TECHNICAL OFFICERS.

Probationary technical officers or third class technical officers recruited by means of a competition are admitted as students into the Third Division.

The duration of lectures is five months, from November 1st till April 1st, and they are delivered in common with the students of the First and Second Divisions. However, technical officers attend only part of the lectures, according to their own specialities (*e. g.* whether as calculators, draughtsmen and so on).

The program of this course appears in Appendix III.

By questioning, written composition and practical exercises it is possible to give the students their respective marks.

APPENDIX I

FIRST DIVISION LECTURES.

A. - First Session.

Hydrography (25 lectures).

Hydrographic Survey. Soundings. Shoal researches. Sweeping. Topography.

Practical Tides (15 lectures).

Tidal Observations. Predictions by means of Laplace Formula and from Harmonic Analysis. Sounding Reduction during Hydrographic Commissions.

Instruments (12 lectures).

Constitutional Parts of Instruments. Instruments for Angular Measurements. Base measuring Apparatuses. Levelling Apparatuses. Topographic Instruments. Time measuring Instruments. Construction and Manufacture of Instruments.

Practical Geodesy (12 lectures).

Field Operations. Triangulation and Levelling. Calculation of the Triangulation in Rectangular Co-ordinates by the Method of Approximate Point.

Radio-Electricity and Acoustics (25 lectures).

Study of Closed Circuits. Aerials. Vacuum Tubes. Filters. Velocity. Reflection and Refraction of Sound. Piezoelectricity and Magnetostriction. Sonic and Ultrasonic Sounding Apparatuses. Sound Ranging. Electro-Magnetic Detection.

Calculation Exercises (15 lectures).

Surveying, Practical Geodesy and Tides : usual Calculations.

Practical Training (15 lessons).

Various Plottings for Hydrographic Survey.

Practical Exercises in the Field (15 lessons).

Handling of Hydrographic, Topographic and Geodetic Instruments.

Practical Training on Radio—Electricity and Acoustics (10 lessons).

Handling of Sounding Apparatuses and of Controlling and Measuring Laboratory Apparatuses.

Foreign Languages (20 lectures).

Students must study two foreign languages, the English language being compulsory.

Special Lectures.

Lectures on Optics delivered at the "Ecole Nationale des Sciences Géographiques".

B. - Second Session.**Theoretical Tides** (15 lectures).

Oceanic Undulatory Motion. Upper Layer Undulation and "Mass Waves...". Progressive and Stationary Waves. The Work of Whewell. Dynamic Theory of Tides and the Work of Laplace. The Work of Hough.

Theoretical Geodesy (15 lectures).

The Theory of Errors. Reduction of Triangulation data for the Spheroid. Study of the Earth Ellipsoid and its Geodetic Lines. Triangulation Calculation in Geographic Co-ordinates. Projection Theory. Adjustment. Dynamic Geodesy. Measurements of g on land and on board.

Astronomy (15 lectures).

Spherical Trigonometry. Co-ordinates. Displacement of Fundamental Planes. Atmospheric Refraction. Parallax. Meridian Transit. Time Determination. Latitude and Azimuth. Equal Altitude Methods. Prismatic Astrolabe.

Oceanography (15 lectures).

Hydrology. Lithology. Dynamic Oceanography. Swell and Currents.

Meteorology and Magnetism (8 lectures).

Meteorology. Instruments and Methods. Predictions.
Magnetism. Measurement of the Terrestrial Field Components.

Cartography and Reproduction Process (20 lectures).

Preparation of a Publication, of a new Edition, of a Correction Block from the Plotting Sheets.
Chart Engraving and Printing.
Keeping up-to-date Charts and Nautical Publications.
Typography. Lithography.
Various Systems of Reproduction.
Photography.

Photogrammetry (12 lectures).

Land and Air Cameras.
Geometrical Restitution of Photographs.
Rectification.
Stereoscopy and stereophotogrammetry.

Administration (6 lectures).

Organization of the "Service Central Hydrographique" and of the various Departments and Services of the Navy.

Foreign Languages (20 lectures).**Practical Exercises on Astronomy** (12 lessons).

Use of the Theodolite, of the Meridian Transit and of the Prismatic Astrolabe.

Drafting Operations (6 lessons).

Practical Cartography Plottings.

APPENDIX II

Second Division - LECTURES**Mathematics** (10 lectures).

Elementary Notions concerning Algebra, Plane Geometry and Plane Trigonometry. Calculations by Logarithms.

Hydrography and Tides (20 lectures).

Hydrographic Survey.
Soundings. Shoal Researches. Sweeping.
Topography.
Elementary Notions on Tides. Tidal Observations.
Use of Tide-Tables.

Geodesy (15 lectures).

Geographical and Rectangular Co-ordinates.
Building up of Triangulation Signals.
Use of the Theodolite. Triangulation.
Triangulation Calculations in Rectangular Co-ordinates.
Elementary Notions on Levelling.

Cartography and Reproduction Process (15 lectures).

Selection of Sounding-line. Calculation of Mercator Net.
 Conventional Symbols.
 Charts Engraving and Printing.
 Keeping up-to-date of Charts and Nautical Publications.
 Publications, New Editions, Replacement Printings.

Echo Sounding and Sound Ranging (15 lectures).

Description and Use of Echo Sounding and Ultrasonic Sounding Instruments.
 Performance and Plotting of Echo Soundings.
 Sound Ranging.

Drafting Operations (15 lessons).

The Practice of Plotting Hydrographic Survey.

Calculation Exercises (15 lessons).

Calculation of Triangulation Fixes by bearings and by segment.
 Elementary Calculations on Tides.

Field Training (15 lessons).

Handling of Instruments.

Practical Work in the Laboratory (5 lessons).

Handling of Sounding Apparatuses.

APPENDIX III

Third Division - LECTURES.

Students attend lectures in common with those of the First and Second Divisions, and this, as indicated in the following Table which has been drawn up according to the various specialities of the Technical Officers :

Calculators.

Practical Tides.	(1st. Division).
Astronomy ⁽²⁾	(» »).
Calculations Exercises	(» »).
Hydrography	(2nd. Division).

Draughtsmen.

Cartography and Reproduction Process... ..	(1st. Division).
Mathematics	(2nd. Division).
Hydrography and Tides	(» »).

Charting Assistants.

Cartography and Reproduction Process... ..	(1st. Division).
Mathematics	(2nd. Division).
Hydrography and Tides	(» »).

(2) Lectures attended in part only.

Engravers.

Cartography and Reproduction Process...	...	...	(1st. Division).
Mathematics ... ..	...	...	(2nd. Division).
Hydrography and Tides ... ..	...	...	( » » ).

Specialists for Instruments.

Instruments ... ..	...	...	(1st. Division).
Mathematics ... ..	...	...	(2nd. Division).
Hydrography and Tides ... ..	...	...	( » » ).

Photographers.

Cartography and Reproduction Process...	...	...	(1st. Division).
Photogrammetry ⁽³⁾	(» »).
Mathematics ... ..	...	...	(2nd. Division).
Hydrography and Tides ... ..	...	...	( » » ).



(3) Lectures attended in part only.