

# ITALY'S NAVAL HYDROGRAPHIC INSTITUTE IS A HUNDRED YEARS OLD

by Captain Francesco RIBUFFO,  
Director of the Hydrographic Institute  
of the Italian Navy

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*Extracts from an address given by the Italian Hydrographer to the XXth International Congress on Communications.*

At the time that the Kingdom of Italy came into being the Italian Government was led as a result of the increasing volume of its merchant shipping — and perhaps too by a legitimate sense of national pride — to remedy the inadequacies of its existing chart portfolio both for its own coasts and for the seas bordering the peninsula.

Thus it was that the Central Scientific Office (Ufficio Centrale Scientifico) was created in Leghorn by the Naval authorities who charged it with the task of providing ships of the Navy with their nautical equipment, of giving assistance in all possible ways to mariners in general, and of contributing to the progress of investigations into navigational matters.

It was realised that direct intervention of the State was needed if the humanitarian aim of ensuring safety for all seafarers and their cargoes was to be assured. The nation's defence and the establishment of closer cooperation between all seamen, whether naval or civilian, are also matters in which the State has to be concerned.

One of the first and most important tasks demanded of the Central Scientific Office was the execution of a hydrographic survey of the nation's coasts, with the requirement that "it be of a standard at least equal to that of the very best surveys that other nations have carried out of their own coasts". For this task, within the Central Office itself, a Hydrographic Commission staffed by a small group of Naval officers and technicians was created. In order to conduct its hydrographic campaigns the Commission could call upon a Naval unit equipped for inshore or deep sea sounding work.

The Scientific Office of the First Maritime Region served as the Chart Depot. This office, whose seat was in Genoa, was responsible for both the meteorological and the magnetic service as well as for the compiling and dissemination of corrections to charts by means of periodical issues of "Notices to Mariners".

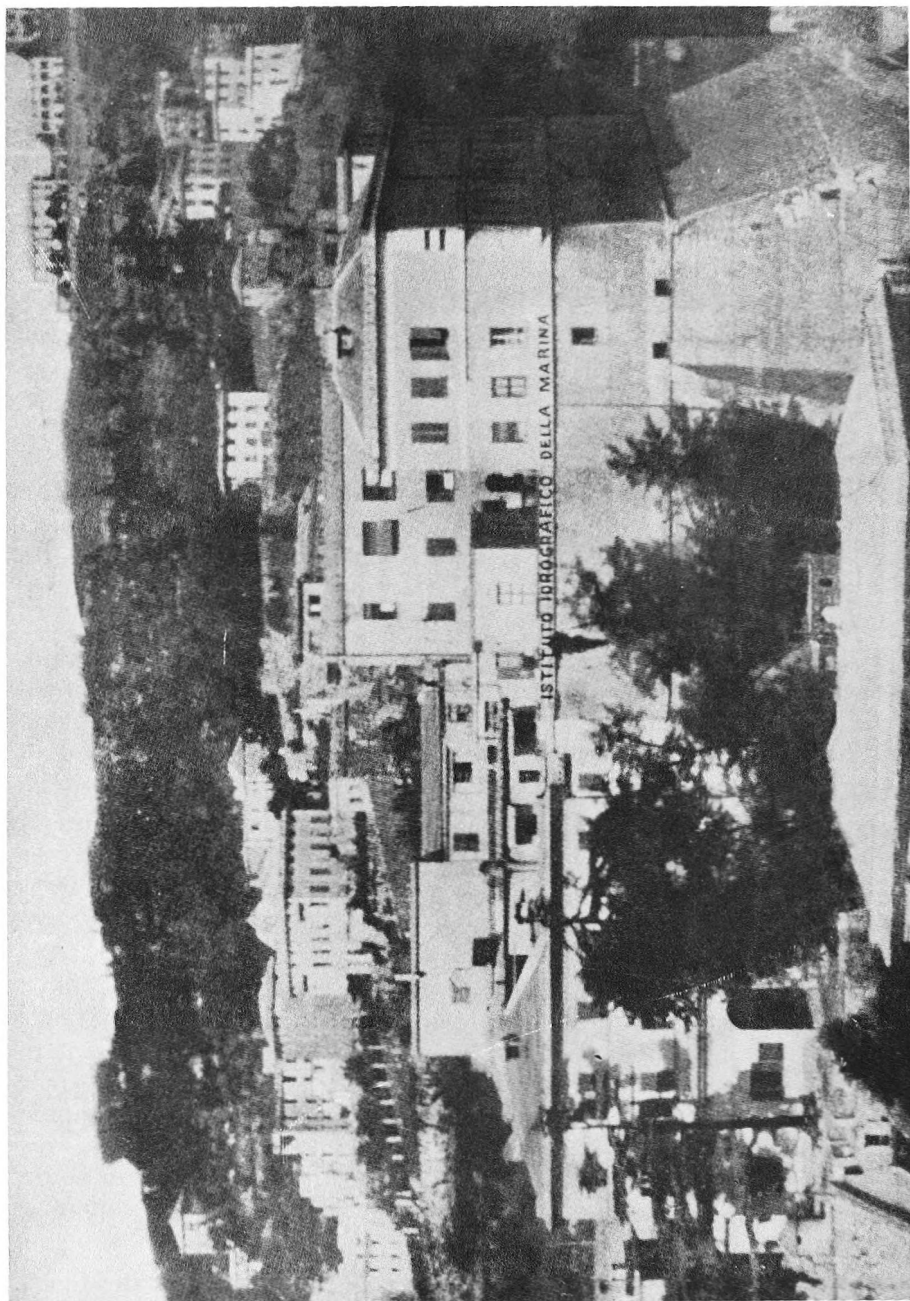


FIG. 1. — Headquarters of the Hydrographic Institute.  
(Photograph reproduced by kind permission of the *Rivista Marittima*).

The year 1872 saw the closing of the Central Scientific Office in Leghorn. At the end of the same year the Scientific Office of the First Maritime Region was renamed "Ufficio Centrale Idrografico della Marina" (Central Naval Hydrographic Office), taking over the offices installed in the old Fort S. Giorgio, part of the fortified ramparts of Genoa, and dating back to the 16th Century. After 1899 its name was changed to "Istituto Idrografico della Marina", the title by which it is known today.

### G. B. MAGNAGHI

The first to assume responsibility for the new office was Commander Giovanni Battista MAGNAGHI from Lomello (Pavia) who was to be its Director for 16 years. He soon made his mark, being conspicuous for his energy and wide culture. The name of MAGNAGHI is closely linked with



FIG. 2. — Vice-Admiral MAGNAGHI, Director of the "Ufficio Idrografico" from 1872-1888.  
(Oil painting by A. Pellicetti in the possession of the Institute).

(Photograph reproduced by kind permission of the *Rivista Marittima*).

this new era of Italian hydrography whose father he can be rightly said to be. He gathered around him both the finest engravers for the new charts and the best constructors and repairers of navigational and geodetic instruments. Under MAGNAGHI the Institute was equipped with workshops, and also with an astronomic observatory. He was thus able to produce charts of the Italian coasts where surveying had started in the Upper Adriatic as far back as 1865, well before the creation of the Hydrographic Institute.

From 1878 onwards, MAGNAGHI personally directed at least 11 campaigns with the steamship *Washington*, executing surveys upon which over 100 charts and 130 views of the coast were based, thus covering about three-quarters of our seaboard. This cartographic achievement was of high artistic and scientific quality, and could thus bear comparison with the very best contemporary charting.

The Institute was at the same time carrying out much work in such different fields as astronomic positioning, triangulation, topography, soundings, tidal observations, magnetic and meteorological observations, etc., besides the draughting and printing of charts, the repair of instruments, the publication of Notices to Mariners — all tasks that the Institute is called upon to undertake.

Although the largest effort was necessarily devoted to providing cartographic coverage for all the nation's coasts MAGNAGHI also determined to inaugurate a regular programme of oceanographic research. The first problem he attacked was the need to verify the validity of an assertion made by Dr. CARPENTIER who, on the basis of results of research in the Mediterranean with the *Porcupine* in 1870, thought he could draw the conclusion that its pelagic depths — some hundreds of fathoms or more — were almost entirely azoic in character and consequently animal life could not exist there.

It was in the year 1881 that MAGNAGHI undertook what was in fact the first truly Italian oceanographic survey, for which the *Washington* was specially fitted out for oceanographic research and equipped with instruments that he himself had designed and arranged the construction. For this survey he had as collaborator the scientist Professor Enrico HILLYER GIGLIOLI. By the end of the campaign its object had been definitely attained, since doubts about the existence of animal life at pelagic depths in the seas around Italy were completely dissipated.

The importance of his scientific results, together with the experience gained both in instrumentation and in the conduct of oceanographic expeditions, led MAGNAGHI to pursue further research work in the Mediterranean, and he was able to obtain some outstanding results notably concerning the study of currents in the Straits of Gibraltar, the Dardanelles and the Bosphorus.

#### ACTIVITIES UP TO THE FIRST WORLD WAR

MAGNAGHI's remarkable work was continued by his successors with the same determination, and by 1895 — thus only 23 years after the Insti-

tute's foundation — it could be said that Italian hydrography had been finally achieved for it had a set of 229 charts, including those of Lakes Maggiore and Garda, to its credit.

For the period this was an imposing achievement, but more important than this, it enabled most of the problems of navigational safety to be resolved. Nor was activity confined merely to the seas around Italy; it extended also to the many places in Africa in which Italy had an interest.

The first of these surveys was of the Bay of Assab which was carried out in the very same year that Italy established its first naval base there.

In 1886 the *Scilla* surveyed the recently occupied district of Massawa, a survey that was later extended to the surrounding archipelago and to the coastal strip of Eritrea.



FIG. 3. — Topographic surveying in the Red Sea with the Royal Italian Navy's *Scilla* during the 1891-1895 campaign. Note that the Lieutenant is wearing a white uniform of the model worn up to 1902.

(Photograph reproduced by kind permission of the *Rivista Marittima*).

The most important ports of Somaliland together with the principal banks along the Somali coast were all surveyed between 1890 and 1903.

In the course of the ensuing years and right up until 1914, the Red Sea and the Indian Ocean were the scene of intensive hydrographic work, leading to the production of some 30 or more charts.

Finally, some of the most important coastal regions of Libya were surveyed in the years that followed 1911. Hitherto only very few charts of that region had existed, and these foreign and not very reliable.

Another of the Hydrographic Institute's activities during the period preceding the First World War was the drafting and publishing of nautical documents. The preparation of Sailing Directions, those indispensable complements to nautical charts, advanced but slowly at first, with the result that even in 1900 the Italian Navy was using British and French publications. All that then existed in Italian was a pocket edition of "Sailing Directions for the Mediterranean" compiled by Captain PRESBITERO which was in fact mainly a precis of foreign publications.

In 1904 publication was started of the first volumes of what were to become known as "Portolano delle coste d'Italia" (Sailing Directions for Italian Coasts). By the eve of the First World War seven volumes had appeared, in which all the coasts around Italy itself were described.

The List of Lights and the Nautical Ephemerides, those other publications of which the mariner has need, were also published.

In addition to the strictly hydrographic work referred to above it should be stressed that much scientific activity was being pursued at the same time. We may mention amongst others the astro-geodetic determinations carried out in collaboration with the Istituto Geografico Militare (an Institute contemporary with our own) for fixing the fundamental points for the national geodetic net; gravimetric measurements — among them the celebrated Genoa-Potsdam connection achieved between 1904 and 1910; and finally the help given to the scientific expeditions of the period which have remained memorable in the annals of our knowledge of the Earth — such expeditions as the Alaskan land and sea surveys under the Duke of Abruzzi in 1897, the Arctic Ocean Expedition of 1899, and those to Ruwenzori in 1906 and to Karakorum in 1909.

### ACTIVITIES BETWEEN THE TWO WORLD WARS

After the forced interruption due to the first World War, activity once again resumed in full force. Attention was turned to completing the survey of the coasts of Libya as a result of which 23 original charts of the area were published. The entire coastlines of Eritrea and Somaliland were surveyed, and 41 charts of the Red Sea were produced as well as 25 charts for Somaliland. Even today, after so many years, these charts

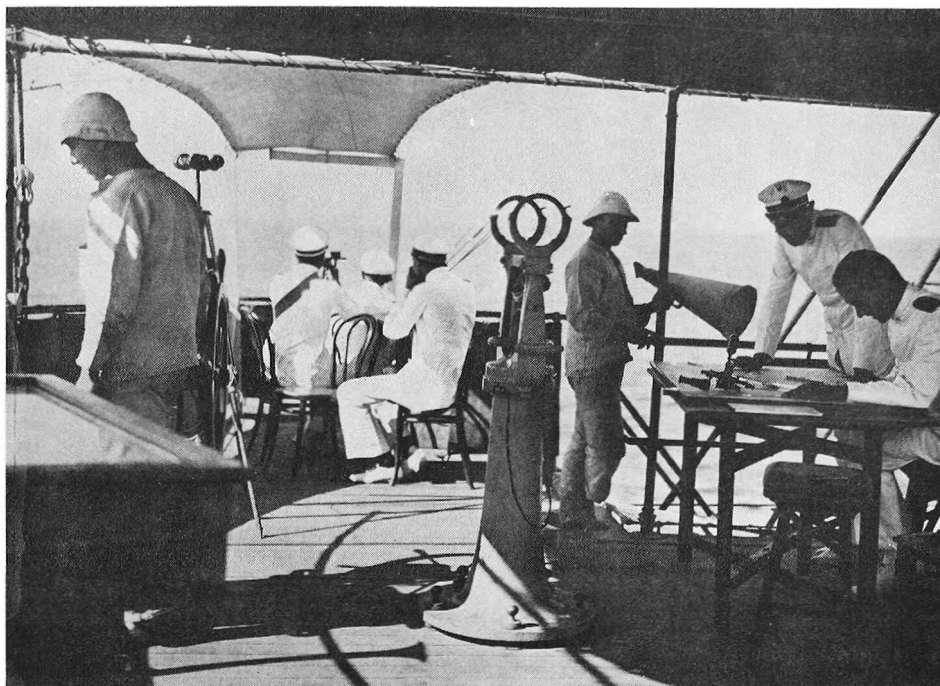


FIG. 4. — On the bridge of the *Magnaghi* during a hydrographic survey of the Gulf of Sirte. (Photograph reproduced by kind permission of the *Rivista Marittima*).

remain a most valuable source of information for these areas. The Dodecanese islands and seas were also surveyed and 23 charts compiled.

Mentioning in passing the surveys to update the charts of Italian coasts, let me end by referring for a moment to the assistance given to the airship *Italia* for its Arctic Expedition in 1928. Not only did this entail aid in the way of men and material but it also led to much scientific activity as evidenced by the survey of Spitzbergen anchorages, gravimetric measurements, current measurements at polar latitudes, and finally tidal and magnetism studies — the former confirming Nansen's theory on the continuity and the depth of the Arctic Ocean and the latter providing proof of the very close correlation between magnetic disturbances and the radio-telegraphic disturbances in the shortwave band.

Amongst other work at this time we should also mention the astronomical observations for determining differences in longitude of certain of the principal towns in Italy and of Mogadiscio; the scientific campaigns in the Black Sea, the Sea of Marmara and the Aegean aboard the *Marsili*; a study of the tidal regime in the seas bordering Italy and in the Red Sea; the creation of a Service for providing meteorological information — the Servizio Meteo Marina — extending also to colonial coasts, a service that functioned up until 1961 when it was superseded by a world meteorological service run according to rules laid down by the World Meteorological Organization.

## ACTIVITIES BETWEEN 1946 AND THE PRESENT DAY

At the end of the war resurveys of all the coasts and seas of Italy were a necessity. The destructions caused by the war, the many alterations, whether natural or artificial, and the new and more accurate information available, together with new demands of navigation, all encouraged Italy to undertake an imposing programme of updating surveys, a programme that even today is still in progress. With this in mind the Hydrographic Institute decided to set up a new national geodetic net for its coasts — a work that has only recently been completed — on which marine cartography must depend. It also arranged to survey anew all Italian ports and to systematically update surveys after the completion of alterations; and to undertake surveys of the many small ports and approaches to ports in order to meet the ever-increasing needs of pleasure craft navigation. Systematic surveys of all national waters were also programmed, starting with the Adriatic, the Tyrrhenian portion of this survey programme being still in progress. Italian charts were to be modernized with a view to standardizing scale, format and coverage (with this aim sets of charts of varying scales — 1/100 000, 1/250 000, 1/750 000 — were established to cover all Italian coasts), and all nautical publications were re-edited and modernized in order that they should conform to all maritime navigational requirements.

### TASK

Although limited strictly to the principal activities of the Institute during the first century of its existence, this account has been a fairly lengthy one, and I fear somewhat dull. However it is my hope that in recounting them I have ensured that everyone will understand the importance of the work that our Hydrographic Institute must accomplish in order to fulfil its mission. This task amounts to cooperating in efforts towards navigational safety at sea, to the growth of our knowledge of the oceans, and to the effectiveness of our country's Navy. These are responsibilities with which the Institute has been entrusted by either the State (for the Institute is the country's official cartographic service) or by the Navy to meet its own needs.

Finally, I may perhaps be allowed to outline the present activities and capabilities of our Institute, as well as to enumerate what we consider constitute its principal problems, for a solution must be found for these problems if the mission allotted to the Hydrographic Institute is to be accomplished.



## PRODUCTION

The Institute employs a staff of 350. It produces and maintains continually up to date :

400 charts of various types;

9 sets of Sailing Directions for Mediterranean basins;

1 volume of "List of Lights" for the Mediterranean;

2 volumes of radiosignals for the Mediterranean;

and in addition more than 50 other nautical or scientific publications.

It also publishes a weekly edition of Notices to Mariners so that these nautical publications may be continually updated. In addition to this work for the mariner's benefit, the Institute studies, plans, distributes and services all the navigational instruments which ships of the Navy must carry, and it also carries out trials of instruments when requested by private firms.

Sales of nautical documents have increased enormously during the course of the last 10 years, and from 40 000 charts and 11 000 publications has now risen to about 100 000 charts and 33 000 publications.

Among its other important activities we may mention :

1. Nautical and oceanographic studies and research carried out jointly with national, foreign or civil scientific organizations and institutes;
2. Studies and research of a technical nature on matters concerning national defence.
3. Acting as consultants to public and private organizations on matters falling within the Institute's province.

This will perhaps be the appropriate moment to mention the Institute's activity in the field of oceanographic research.

While speaking of MAGNAGHI we emphasized that he made no distinction between the mission of the mariner and that of the scientist, and we recounted how with the *Washington* he took up in Italy the scientific work started two centuries earlier by Count Luigi Ferdinando MARSILI which had later been neglected.

After the last war astonishing strides were made throughout the world in oceanographic research. No longer is this research merely a matter of scientific curiosity, rather is it stimulated today by concrete needs and economic interests. The principal hydrographic offices of the world have as a result widened their interests; they no longer confine themselves simply to the restricted field of hydrography — defined as the study of the sea considered as a navigational route — and now take in the whole and much larger field of oceanography which can be described as the study of the marine environment, its natural phenomena and its resources that are today so vital for the survival of the human race.

Italy has not remained a stranger to this trend, and the Hydrographic Institute — one of the forerunners in oceanographic science — has always

given every assistance, both in men and material, and has been able to initiate action regarding research programmes, which in Italy are mainly carried out by the Consiglio Nazionale delle Ricerche. This aid chiefly consists in the production of purpose-designed nautical charts which are indispensable aids for all later investigations or scientific research work and to any study of the marine environment from the physical and dynamic points of view.

This oceanographic activity is today both intense and continual and is carried out in collaboration with scientific organizations in Italy and abroad. It will certainly be some years before the task is completed, and in the future an effort will be required that is likely to increase as the needs and interests of both the nation and the world community themselves increase.

The Hydrographic Institute has recently been deeply concerned, and at levels, with the problem of marine pollution which is fortunately now attracting world wide attention. Our Institute has made a concrete contribution — in the form of studies and surveys — and has among other efforts carried out two research campaigns in the Ligurian Sea, the results of which we believe will constitute an invaluable basis for finding a solution to this problem.

## OUR PROBLEMS

### Headquarters.

The Institute which one hundred years ago had been entrusted to Captain MAGNAGHI had established its headquarters in the old Fort S. Giorgio dating from the 16th Century, but even at the time these premises were considered only as its provisional home.

The visitor of today is surprised to find the Institute still housed in such cramped and outmoded quarters. It has seen its task pass through many phases and its interests widen, and although it has been able to modernize its appointments and its production equipment it has not the space to breathe, and this greatly hampers its progress.

It is essential that a sufficiently large site be found for a new building, although this will not be an easy matter, and if such a site cannot be found near the waterfront in Genoa itself then it will be necessary to search further afield, though the Navy trusts this may never be the case. In any event, however, this problem is a pressing one, and a rational solution consonant with present-day needs must be found.

### Personnel.

In the course of this account the accent has been on the expansion of the Institute's activities and its productions. This progress has been achieved by the introduction of modern methods and by the development

and modernization of equipment. At the present time, however, it is certain that the personnel is insufficiently numerous for the workload, and this situation will be aggravated in the future. From the point of view of professional qualification, there is also a need for refresher courses in order that the staff can adapt to modern methods.

From copper engraving at the time of MAGNAGHI we have moved on and are now drafting our charts on special material using computer controlled automatic flatbed plotters.

We are at a stage of continuous development and this sorts ill with the Government's rigid policy regarding personnel, with all the negative consequences that this is likely to have.

### **Material.**

The numerous surveys being carried out everywhere off Italy have already been mentioned, as has the expansion of activities associated with oceanographic research. After 25 years of effort, this survey work is still far from being achieved, the reason being the high cost of surveys and the plethora of means that have to be used. A year ago Italy's sole hydrographic vessel — the *Staffetta* — was "retired" on grounds of age, and now there remain only two small sweepers adapted to hydrographic/oceanographic work. The assistance of National Research Council vessels (which unfortunately can only be occasional) cannot be considered as a solution. So long as the Hydrographic Institute lacks a sufficient number of well-adapted ships it will run up against serious difficulties if it is to move with the times. Naturally, it is not a question of comparison with the U.S.A. where 321 ships are employed on oceanographic work, but even when we compare ourselves to countries whose scientific and economic importance is less than our own such a comparison is not to our advantage. Fortunately, work is about to begin in Genoa itself on the construction of a new vessel specially designed for hydrographic and oceanographic work, and it is to be hoped that it is not destined to remain the only one for too long.

### **CONCLUSION — THE WAY AHEAD**

Enumerating the activities carried on at the Hydrographic Institute it becomes obvious that these are not solely limited to work for the Navy.

Its principal customer, in fact, is not — as is generally thought — the Ministry of Defence but rather the Merchant Navy which acquires most of the Institute's product output.

The Institute's operational and scientific activity in fact extends to many matters on the national scale, in which such Ministries as those of Research, Public Works, Education, Tourism, Industry and Commerce, the

“Partecipazioni Statali”, Posts and Telecommunications and the “Cassa per il Mezzogiorno” are concerned.

The Navy which from the very beginning has been responsible for the our nation's hydrographic office is more than willing to continue this responsibility to the State. However, with its present financial means it is not in a position to meet this responsibility adequately, and is unlikely even to be able to do so in the future.

To our mind, the role a hydrographic office must play is an essentially universal, continuous and dynamic one. It seems to us at the Hydrographic Institute that if partial or complete disarmament should one day come about it would be safe to say that the Institute would be one of the few organizations not merely to retain its functions but even to expand them, profiting from a consequent increase in financial resources.

It appears to us that a maritime nation's importance should be measured not only by the number and the tonnage of its merchant ships — and our merchant fleet is amongst the first in the world — but also by its hydrographic and oceanographic fleet of well designed ships able to contribute efficiently to an accurate knowledge of the seas. Accordingly, it is not therefore surprising that we now feel it necessary to pass from a cartography that is purely national to one that will at least embrace other parts of the Mediterranean.