

THE GERMAN HYDROGRAPHIC INSTITUTE

by Dr. Günther BÖHNECKE, Director

The German Hydrographic Institute has been established with the aim of furthering the safety of navigation in German waters and of German ships in those foreign seas which they may navigate, and to contribute to the protection of the German coasts against the attacks of the sea. These tasks, after having been outlined at first in a very general form, were set by the occupation authorities soon after the German surrender and were conferred upon those parts of the former Deutsche Seewarte, of the former Marine-Observatorium and of the Nautical-Hydrographic Department of the former Oberkommando der Kriegsmarine, which at that time were still available for hydrographic work. The British authorities of occupation fully acknowledging the importance of the forementioned problems, the necessary organization could be established already in summer 1945 under the name of "German Maritime Institute". In December 1945 the Allied Control Council Germany authorized the new organization which was now called "German Hydrographic Institute". The Institute's work is directed by an Interallied Board of Directors appointed by the Allied Control Council; the British Naval Supervisor, as member of this Council is officiating as Manager of the Institute. Detailed instructions were issued concerning the extent of the different fields of work and their supervision as well as the number of personnel to be employed.

Almost two years having elapsed which were chiefly employed in overcoming the material and other difficulties of establishment and moreover in changing the inner structure of the Institute by reorganization, it is now possible to give a summary of the tasks and the results obtained so far. Detailed particulars will be found in the Annual Report.

The solution of the above mentioned problem: Safety of navigation, fisheries, and coast protection must rely on those branches of science and technique which in a wider sense are comprised as "Hydrography" in international terminology. As a consequence, scientific research and development play a considerable part in the work of the Institute.

The organization of the Institute corresponds to the variety of the problems to be dealt with. There are seven special departments, whose duties will be described on the following pages. Besides there is a department of *Administration* for budgetary and personnel affairs and for the supply of instruments, material, &c. (see: *International Hydrographic Bulletin*, No. VIII, Monaco, August 1947, p. 107).

Department I is in charge of *Publications and Informations on Navigation*. The working province of these nautical publications is to be seen from Enclosure 1. A general task attended to in this department is the *evaluation of log-books* for navigational and scientific work (e. g. current charts) and for special information to mariners. Much of this work is done by aid of the Hollerith system of punching-cards. As an important aid to navigation the *Sailing Directions* are compiled here. They contain in a general part above all the rules and regulations governing navigation in the waters in question and other notices on the respective countries, which are important for sailors, moreover chapters on tides and currents, ice, magnetic variation &c. In the principal part directions are given for approaching the coasts, based on detailed descriptions of the coasts and harbours. The sailing-directions are supplemented by the *Lists of Lights and Radio Signals*; i. e. complete registers of all fixed and floating lights and radio-beacons including their characteristics and geographical positions. All alterations in these lists are published in the weekly issues of the *German Notices to Mariners*. Urgent warnings on dangers to navigation as, for instance, light-ships going adrift, are immediately broadcasted.

Nautical Geodesy and Cartography, i. e. production of Sea Charts is the object of Department II. Its first branch, *Geodesy*, deals with the mathematical and geodetic foundations of nautical survey and sea chart production, with special regard to the problem of connecting land and sea surveying, and evaluating progress in science and practice for surveying work at sea. The next branch, *Cartography*, is exploiting for the German sea-charts the observations which are collected by the survey-vessels put at the disposal of the Institute or are sent by other authorities, i. e. "Seewasserstrassnämter" (sea waterway authorities), the German and foreign Notices to Mariners and the foreign sea charts in question, and in the *Technical Group* this material is transferred on to the printing-plates. The present field of work of the German Chart Establishment is shown in Enclosure 2; older German charts

outside of this area are not being reprinted and will not be corrected. An essential part of these plates (of copper, aluminium and, sometimes, of stone) for the areas which the Institute has to work at (North Sea and Baltic, Norwegian Sea including Iceland waters, East coast of Greenland, Spitsbergen and the West coast of Norway) has been rescued, so that the charts can be printed in the technical group after the necessary alterations have been inserted and the special printing-machines have been set up. By courtesy of the Hauptvermessungsamt Schleswig Holstein (Main Survey Office Schleswig Holstein) in Hamburg the charts could be printed in that office in the meantime. Until August 1947, 57,791 copies of 256 charts could be delivered in spite of the delay caused by shortage of paper, restriction of electric current &c. Because of these difficulties of manufacturing it takes nowadays some time to finish printing of a chart after it has been finally drawn, whereas on the other hand its contents must not lag behind the actual state by more than one week when it is delivered from the *Charts Store* and the *Distribution Office* of the German Hydrographic Institute to the agencies officially authorized for distribution to the ships. Therefore the corrections which become necessary in the meantime, as for instance the insertion of newly found wrecks, must be made in manuscript. In Enclosure 3, above the distribution of the present agencies of the German Hydrographic Institute, the distribution organization of the nautical publications, especially charts, and the officially accredited dispatch and correction offices are shown.

The above-mentioned practical surveying-work is performed by Department III : *Sea Surveying*. The German waters having been greatly neglected during the war, and wide areas having been inaccessible on account of mines, practically the whole German coast of the North Sea, and almost all bights, "Foerden" (inlets) and harbour entrances in the Baltic must be re-surveyed. Enclosure 4 conveys a summary of these urgent tasks and shows in addition (hachured) the tasks dispatched in 1947. Those areas surveyed anew until August 1948 inclusive have been edged with red. During the past years in spite of many difficulties the survey-ship *Paul-Beneke* (447 GrRT) and the three sounding-boats *Ahne*, *Ruden* and *Hooge* (about 120 GrRT) have succeeded in re-surveying rather wide areas in the Ems, Jade and Elbe Estuaries, moreover Flensburg Foerde, Schlei, Kiel Foerde and the inner part of the Lubeck Bight, altogether about 350 square miles. During this year in the North Sea the coast between the rivers Elbe and Eider, in the Baltic Fehmarn-Sound, and the bights of Neustadt and Wismar were surveyed, and the boats *Atair* and *Wega* (60 GrRT each) were fully engaged in searching for and buoying wrecks, particularly along the convoy-routes. Since 1945 the positions of 393 wrecks have been ascertained, and Enclosure 5 shows the sea areas in which the wrecks have been located. After having been thoroughly examined in the *Checking-Office*, the results obtained by the survey-vessels are handed to Department II, where they are used for the newly prepared charts, and finally they are deposited in the *Planningroom*.

The work of Department IV which includes *Oceanography* and *Terrestrial Magnetism* is essentially tending to geophysical research. Detailed investigation of the hydrosphere is not only justified but even demanded by the mere fact that by far the greater part of the earth's surface is covered by water, and above all by the economic importance of navigation and by the essential part which the sea can contribute to our food supply. Moreover the influence of the sea upon the configuration of the coasts, particularly in such lowly districts as are prevailing along the German coasts of the North Sea, requires thorough investigation of oceanographic phenomena. To know the physical and chemical properties and the movements of the sea water at the surface and in the depth is important for the branches of science in question as well as necessary for practical navigation and fishery. It is hoped that the Institute may keep a seagoing vessel at its disposal which is fit for oceanographical research work, but for the present the ship must be used as accomodation and working room for a large number of the Institute's personnel, on account of the shortage of dwelling and working rooms.

The branch *Dynamic Oceanographic* is evaluating the mass of observations obtained during the past years, furthermore it is dealing with research methods, with the physical and chemical structure of the oceans and the adjacent seas, as well as with the dynamic effects in the sea and the water-transport produced by them. The work of this branch is also in close connection with the measures for the protection of the German coasts and so are the investigations of the *Geological Branch*, including the problems of formation of new land, erosion, foundation, destruction of shores and dikes. Transportation of sand, sedimentation and their connection with other oceanographic features are further essential problems. For practical purposes atlases of the surface currents are edited.

The *Ice Service* which has to inform mariners and other interested persons about the ice conditions in Northern European Waters and, if possible, also to give short-time forecasts,

is directly connected with oceanography. Ice reports are published daily by letter, cable and radio as soon as ice begins to appear. They are based on a network of about 70 German stations and on exchange of ice-observations with several countries around the Baltic.

Two other branches, one dealing with the *Chemistry* of the sea water, the other with its *Physical Properties* besides working at their special problems, are above all procuring results of direct practical importance for navigation as well as for fisheries, by contributions to sailing-directions and by compiling atlases of temperature, salinity and density of the sea-water and—for fisheries—the results of investigations on nutrient substances and on marine optics. The numerous instruments which are required for modern oceanographic research work are also attended to here.

The work of the Institute in *Terrestrial Magnetism* includes investigations about basic elements, cartographical work, development of instruments and observations at the Wingst Observatory, which is the only German observatory of this kind that has sustained no relevant damage during the war. Here in every month the regular absolute measurements of declination, horizontal intensity and inclination are made as base line values for the registrations of D, H and Z. The computation of daily and monthly means and of the characteristics of magnetic activity, which from 1943 are proposed to be published in a year-book, is kept up to date. The connection with the Niemeck observations is secured. At present earlier observations of horizontal intensity in the Baltic are worked up.

Various *Astronomical Subjects*, viz. Tide, Nautical Astronomy and Time Service are combined in Department V. The *Tidal Branch* provides an indispensable aid to navigation and water economy by editing annually the German Tide Tables for European Waters. In addition to these voluminous tables which contain the times of High and Low Water for 12 German and 22 foreign standard ports, as based on astronomical calculations, and the tidal differences for about 1800 connected places and various other informations, a small booklet is published containing Times of High and Low Water for about 150 stations of the German Bight and its Rivers. For the sake of simplicity and uniformity the predictions for the foreign standard ports are usually obtained from the foreign Hydrographic Departments in exchange for the German predictions for German places. These are based upon the non-harmonic and harmonic tidal constants derived from current tidal observations, which the waterway authorities obtain by means of self-registering tide-gauges and place at the Institute's disposal, partly as raw material, partly evaluated. For tide prediction by means of the harmonic method there is a large tide predicting machine. The constants which are derived from the observations are not only used for tide prediction but also for the determination of the charts' datum, to which the depths in the charts refer, as well as for a great variety of investigations concerning the theory of tides, the methods of computation and problems of water-engineering. For instance in connection with an extensive redetermination of all tidal constants for the German coast of the North Sea, which has been started after the restrictions of work owing to the war had been removed, a detailed investigation has been carried out of the modifications which the tides of the Lower Eider have undergone since 1935 in consequence of the heavy silting caused by the construction of a dam near Nordfeld. A branch of great importance to wide circles of the population in the coastal districts is the *Wind Effect and Storm Surge Service*. This group regularly forecasts the additional influence of the weather on the heights of high water, giving two daily forecasts over the North West German Radio Station. If extraordinarily reduced water-levels are imminent, warnings are given to mariners. In case of extraordinary high water, special storm surge warnings are broadcasted and signals sent to a great number of waterway authorities, dike associations, regional administrations &c.

The *Nautical Year Book* edited by the branch *Nautical Astronomy* once a year, contains all ephemerides required for the astronomical determination of position and time and for the astronomic control of compasses. The methods of terrestrial and astronomic navigation will be the subject of further scientific investigations to be made by this branch, continuing the tasks already accomplished by its members. A detailed report on the problem of the dip of the horizon based on a great variety of observations will be completed shortly.

The *Time Service* (responsible for determination and keeping of time, for time-signals, and chronometry) whose instruments, implements, and documents were completely lost in spring 1945, was able to commence work in some rooms kindly offered by the Hamburger Sternwarte (Bergedorf Observatory), after some instruments given in loan to firms and institutions had been recovered. The astronomic determination of time has been resumed by means of a transit-instrument on loan; pendulum and quartz-clocks obtained in the meantime being used for time keeping. The transmission of short time signals will be commenced soon. Normal frequencies of 50 Hz and 1 kHz, and shortly also of 440 Hz, are

already delivered to the North West German Radio Station, the Post, and other authorities and persons interested, and transmitted by the North West German Radio Station. Preparations to resume the official tests of watches and chronometers, including the great chronometer tests, are started.

Of the numerous tasks formerly fulfilled by the department of *Nautical Engineering* (Department VI) only a minor part appropriate to the present state of German navigation can of course be continued. At present various investigations concerning the magnetic compass are carried out; testing of compass-cards made of plastics and development of methods and implements for testing compasses. Experiments are also going on in order to improve the heeling-error instrument ("Vertikalfeldwaage"), for determining the ship's field when adjusting compasses on board ships. For small gyrocompasses bearings of various construction are tested.

Among the *optical instruments for astronomic navigation* the development of the gyroscopic sextant, an instrument for determining heights of stars above an artificial horizon stabilized by means of gyroscopes, is worked at from the view point of physical technics. Two further instruments are specially designed for surveying: A pelingator with following-up system, an instrument for taking bearings which allows to keep the objects in line of vision even if the ship is deviating from her course (its German name is "nachgedrehter Peilaufsatz"), (driven sight-vane) and an instrument for calculating the dead reckoning position.

The *Institute's Workshop* which is gradually being established plays an essential part in carrying out this technical work.

The knowledge obtained by the engineers and scientists in developing nautical instruments is practically applied by the group in charge of *Testing and Adjustment of Nautical Instruments* and the eight *Agencies* and 5 *Branch-Offices* connected with this group. Here the instruments used on board are tested and attested according to the rules of the Seberufgenossenschaft (German Board of Trade) and to the official directions issued by the German Hydrographic Institute. From May 1945 until August 1947 for instance 15,327 ship's lanterns, 1296 magnetic compasses, 385 sextants, 592 chronometers have passed the official examinations. During the same time 788 compasses were adjusted and about 800 items of official information were given on request.

The *Library*, the *Archives*, and the *Hollerith Group* have been united in Department VII. The Library mainly consists of the stock of the former Deutsche Seewarte and has survived the war without considerable losses. The number of books available at present is about 55,000. They include the literary aids for all branches of science and technics which are the concern of the Institute. By ordinance of the Military Government the library is common property and in common administration of the German Hydrographic Institute and the Meteorological Office for North Western Germany.

In the Archives the basic material in nautical science (for instance the plotting and fair charts, the foreign charts and sailing directions) is collected, sifted and kept at hand for the departments. The fair charts and sounding plans obtained till the end of 1947 give an impression of the really carried out surveyings and views drawn anew etc. (see Enclosure 6), available for the correction of charts. In particular this branch is in charge of the exchange of publications with German and foreign authorities and institutes; by authorization of the Board of Directors exchange has been arranged with the Hydrographic Offices of 17 nations since December 1946.





Besides being used for statistical purposes, as e. g., for the evaluation of log-books, the punching cards method (Hollerith system) is also employed in extensive scientific calculations. The Institute's set of machines, including machines for magnetic punching of cards, checking, doubling and sorting of cards, tabulating, furthermore punching-machines for addition and calculation, allows to carry out the harmonic analysis of tides, and to ascertain the disturbances of the harmonic constants of one tide by the other, to calculate the coefficients of Fourier series, to develop the tide-generating potential, to employ the method of least squares, and to solve systems of linear equations.

On the whole it is the aim of the German Hydrographic Institute to help and to serve, in the widest sense, German and international navigation and to contribute to the science of the sea. The close connection of science and practice, obtained by collaboration of seamen, scientists, and engineers, and the assuredness not to be restricted in their work by the German zone frontiers, is a hopeful prospect for the members of the Institute.



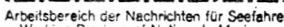
Zeichenerklärung
Explanation of Signs
Légende

Seehandbuchwerk
Sailing Directions (Pilots)
Instructions Nautiques




-  Arbeitsbereich des Seehandbuchwerkes
Working Province of the Sailing Directions
Zone de Travail
-  Nachtrag in Vorbereitung
Supplement in state of preparation
Supplément en préparation
-  Nachtrag in Arbeit
Supplement taken in hand
Supplément à l'étude
-  Neuausgabe in Arbeit
New edition taken in hand
Nouvelle édition en cours

- 1 Ostsee, nordl. Teil - Baltic, Northern part - Baltique septentrionale
2 Ostsee, mittl. Teil - Baltic, Middle part - Baltique médiane
3 Ostsee, südl. Teil (Nachtrag in Arbeit) - Baltic, Southern part (Supplement taken in hand) - Baltique méridionale (Supplément en cours)
4 Belts und Sund (Nachtrag in Vorbereitung) - Belts and Sound (Supplement in state of preparation) - Les Belts et le Sund (Supplément en préparation)
5 Skagerrak und Kattegat (Nachtrag in Vorbereitung) - Skagerrak and Kattegat (Supplement in state of preparation) - Skagerrak et Kattegat (Supplément en préparation)
6 Nordsee, östl. Teil (Neuausgabe in Arbeit) - North Sea, Eastern part (New edition taken in hand) - Mer du Nord orientale (Nouvelle édition en cours)
7 Nordsee, südl. Teil - North Sea, Southern part - Mer du Nord méridionale
8 Nordsee, westl. Teil (Nachtrag in Vorbereitung) - North Sea, Western part (Supplement in state of preparation) - Mer du Nord occidentale (Supplément en préparation)
9 Nordsee, nordl. Teil - North Sea, Northern part - Mer du Nord, septentrionale
11 Island, die Färöer und Jan Mayen (Nachtrag in Arbeit) - Iceland, the Faeroe Islands and Jan Mayen (Supplement taken in hand) - Islande, Iles Féroé et Jan Mayen (Supplément en cours)
12 West- und Nordküste Norwegens, I. Teil - West and North Coast of Norway, Part I - Côtes Ouest et Nord de la Norvège (1ère partie)
13 West- und Nordküste Norwegens, II. Teil - West and North Coast of Norway, Part II - Côtes Ouest et Nord de la Norvège (2ème partie)
14 Spitzbergen - Spitsbergen - Spitzberg

Nachrichten für Seefahrer
Notices to Mariners
Avis aux Navigateurs

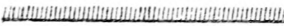
 Arbeitsbereich der Nachrichten für Seefahrer
Working Province of Notices to Mariners
Zone de Travail

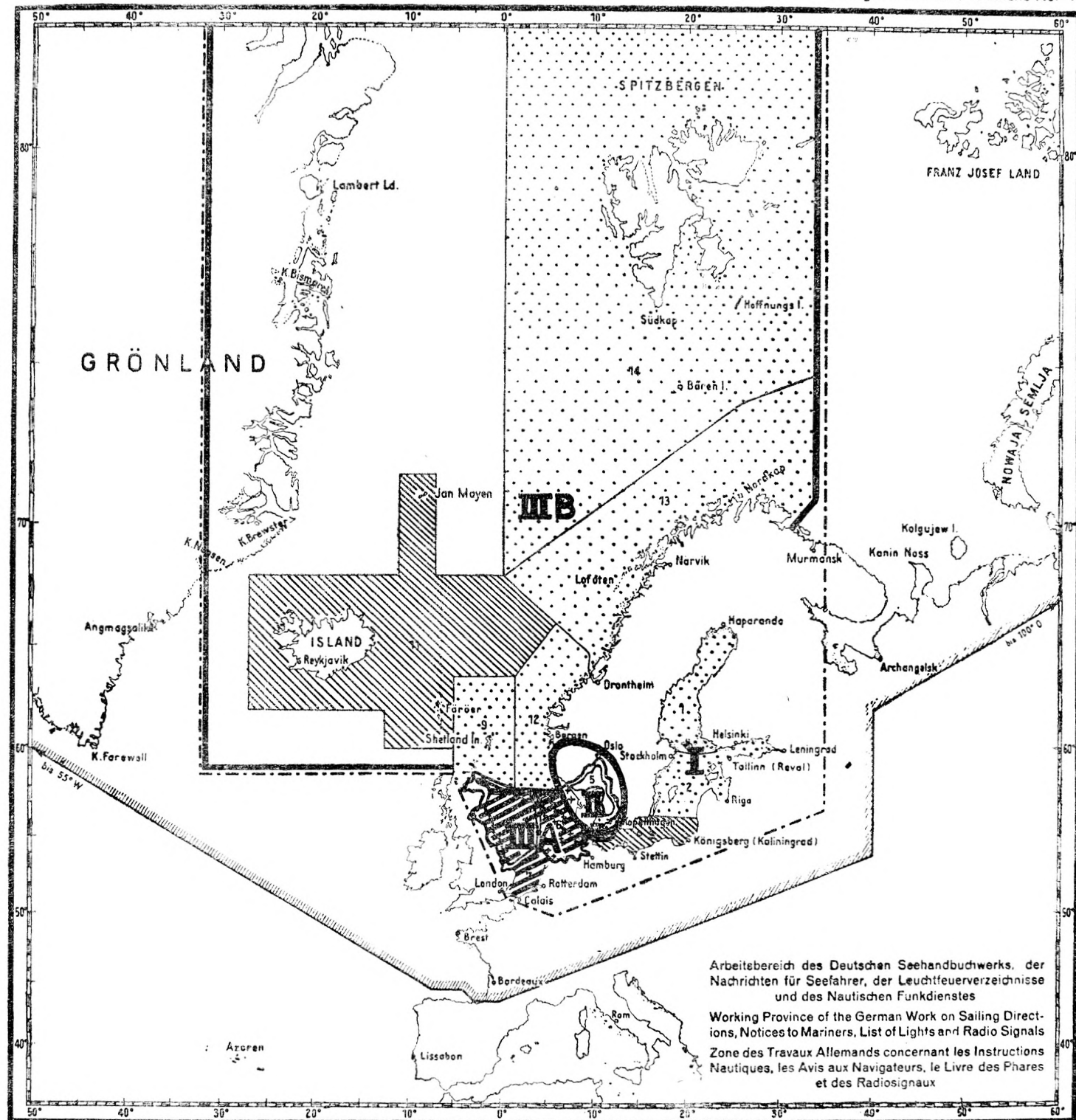
Leuchttfeuerzeichnisse
List of Lights
Livres des Phares

-  I Arbeitsbereich der Leuchttfeuerzeichnisse
Working Province of List of Lights
Zone de Travail
-  Neuausgabe in Vorbereitung
New edition in state of preparation
Nouvelle édition en préparation
-  Neuausgabe im Druck
New edition in the press
Nouvelle édition à l'impression

- I Ostsee - Baltic - Baltique
II Gewässer zwischen Ost- und Nordsee (Neuausgabe in Vorbereitung) - Baltic entrance (Revised edition in state of preparation) - Passages entre la Mer du Nord et la Mer Baltique (Nouvelle édition en préparation)
III A Nordsee, südlicher Teil (Neuausgabe im Druck) - North Sea, Southern part (Revised edition in press) - Mer du Nord méridionale (Nouvelle édition à l'impression)
III B Nordsee, nördlicher Teil (Neuausgabe in Vorbereitung) - North Sea, Northern part (Revised edition in state of preparation) - Mer du Nord septentrionale (Nouvelle édition en préparation)

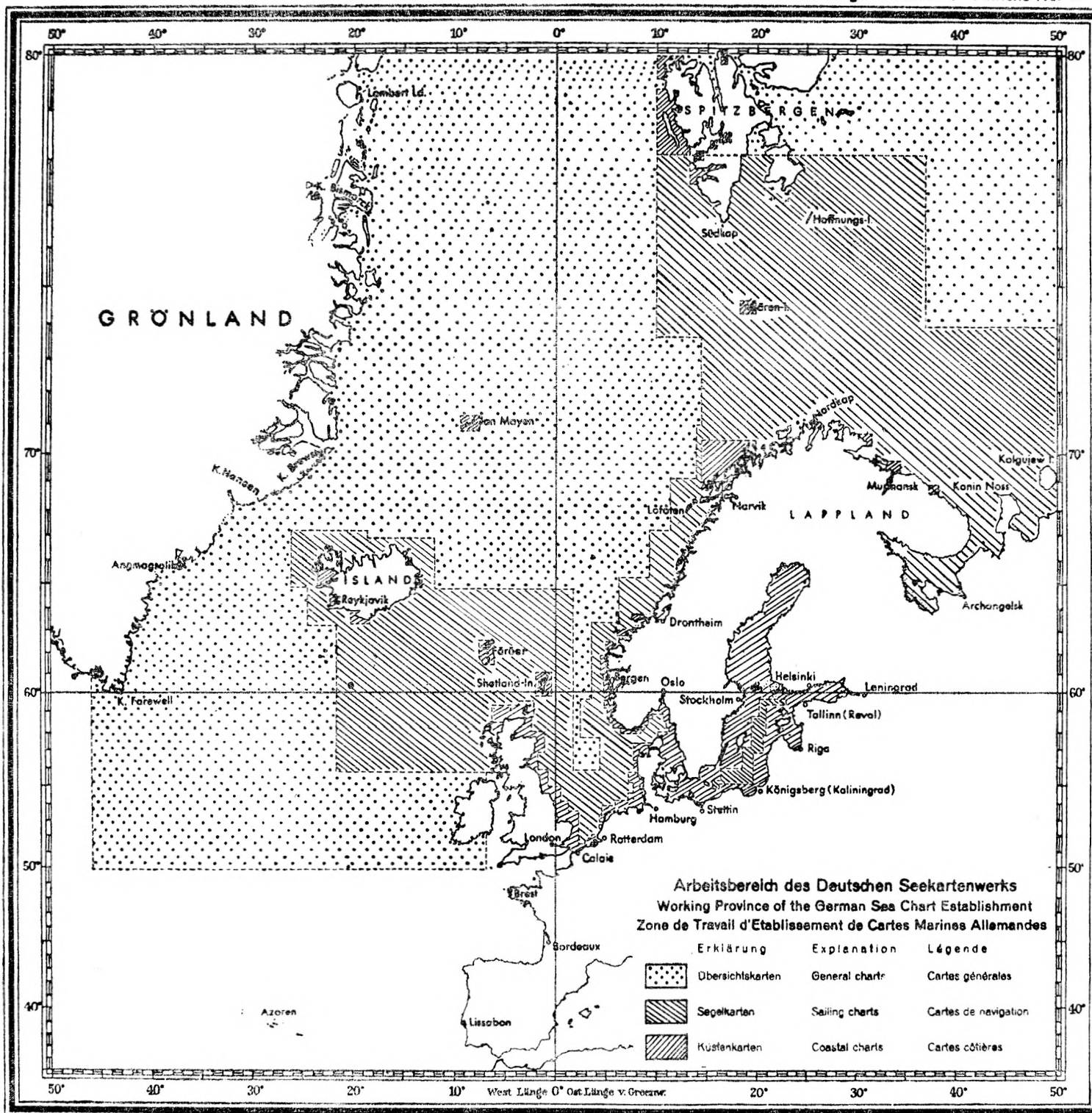
Nautischer Funkdienst
Radio Signals
Radio-Signaux

 Arbeitsbereich des Nautischen Funkdienstes
Working Province of Radio Signals
Zone de Travail

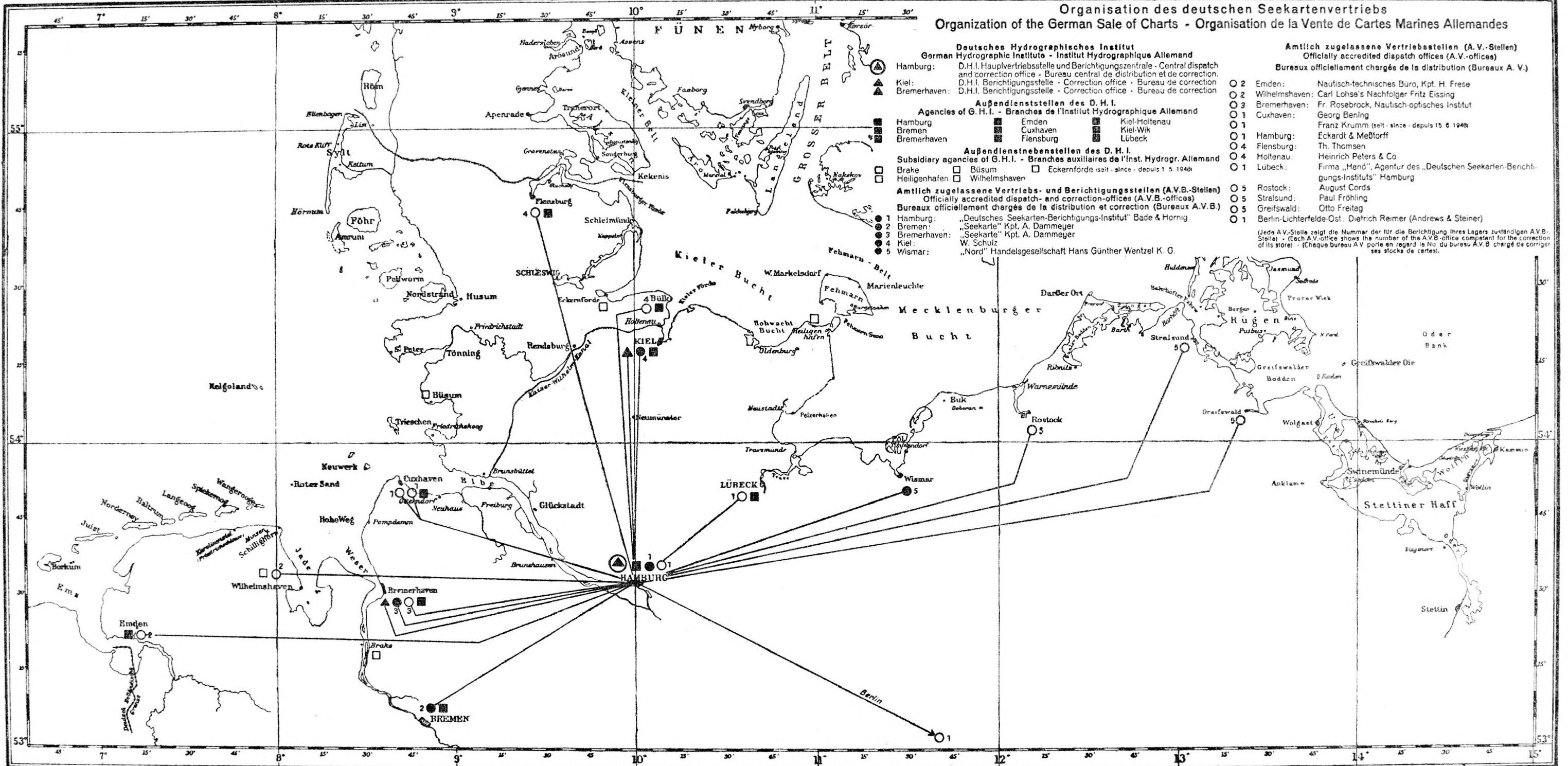


Arbeitsbereich des Deutschen Seehandbuchwerkes, der
Nachrichten für Seefahrer, der Leuchttfeuerzeichnisse
und des Nautischen Funkdienstes

Working Province of the German Work on Sailing Direc-
tions, Notices to Mariners, List of Lights and Radio Signals
Zone des Travaux Allemands concernant les Instructions
Nautiques, les Avis aux Navigateurs, le Livre des Phares
et des Radiosignaux



Organisation des deutschen Seekartenvertriebs
 Organization of the German Sale of Charts - Organisation de la Vente de Cartes Marines Allemandes



Deutsches Hydrographisches Institut
 German Hydrographic Institute - Institut Hydrographique Allemand

Hamburg: D.H.I. Hauptvertriebsstelle und Berichtigungszentrale - Central dispatch and correction office - Bureau central de distribution et de correction.
 Kiel: D.H.I. Berichtigungsstelle - Correction office - Bureau de correction
 Bremerhaven: D.H.I. Berichtigungsstelle - Correction office - Bureau de correction

Außenstellen des D. H. I.
 Agencies of G. H. I. - Branches de l'Institut Hydrographique Allemand

Hamburg: Emden, Kiel-Holtenau
 Bremen: Cuxhaven, Kiel-Wik
 Bremerhaven: Flensburg, Lübeck

Außenstellennebenstellen des D. H. I.
 Subsidiary agencies of G. H. I. - Branches auxiliaires de l'Inst. Hydrogr. Allemand

Brake, Büsum, Eckernförde (seit - since - depuis 1. 5. 1948)
 Heiligenhafen, Wilhelmshaven

Ämtlich zugelassene Vertriebs- und Berichtigungsstellen (A.V.B.-Stellen)
 Officially accredited dispatch- and correction-offices (A.V.B.-offices)

Bureaux officiellement chargés de la distribution et correction (Bureaux A.V.B.)

1 Hamburg: „Deutsches Seekarten-Berichtigungs-Institut“ Bade & Hornig
 2 Bremen: „Seekarte“ Kpt. A. Dammeyer
 3 Bremerhaven: „Seekarte“ Kpt. A. Dammeyer
 4 Kiel: W. Schulz
 5 Wismar: „Nord“ Handelsgesellschaft Hans Günther Wentzel K. G.

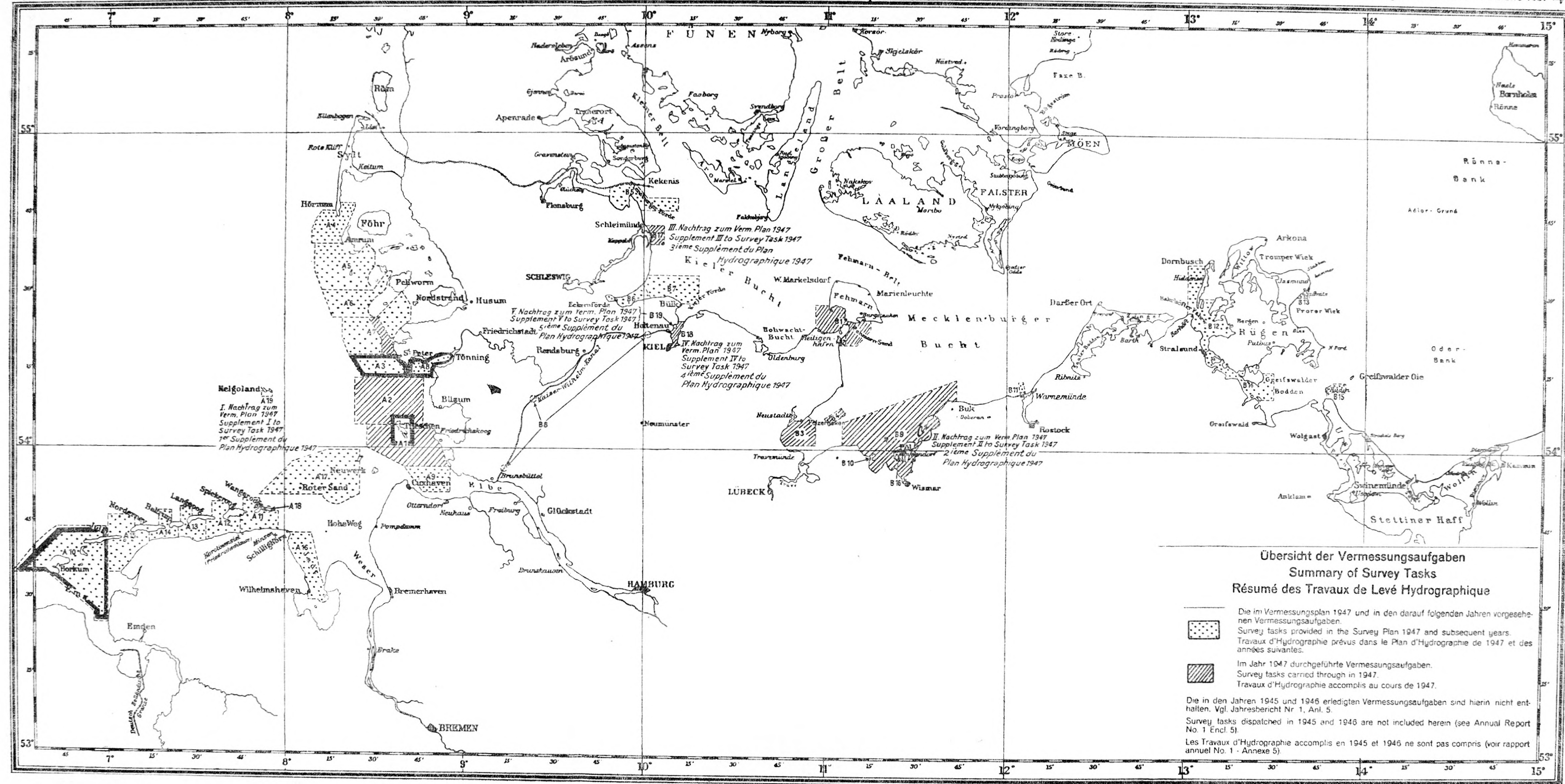
Ämtlich zugelassene Vertriebsstellen (A.V.-Stellen)
 Officially accredited dispatch offices (A.V.-offices)

Bureaux officiellement chargés de la distribution (Bureaux A. V.)

2 Emden: Nautisch-technisches Büro, Kpt. H. Frese
 2 Wilhelmshaven: Carl Lohse's Nachfolger Fritz Eissing
 3 Bremerhaven: Fr. Rosebrock, Nautisch-optisches Institut
 1 Cuxhaven: Georg Benling
 1 Hamburg: Franz Krumm (seit - since - depuis 15. 6. 1948)
 1 Hamburg: Eckardt & Meßtorff
 4 Flensburg: Th. Thomsen
 4 Holtenau: Heinrich Peters & Co
 1 Lübeck: Firma „Hend“, Agentur des „Deutschen Seekarten-Berichtigungs-Instituts“ Hamburg

5 Rostock: August Cords
 5 Stralsund: Paul Fröhling
 5 Greifswald: Otto Freitag
 1 Berlin-Lichterfelde-Ost: Dietrich Reimer (Andrews & Steiner)

Jede A.V.-Stelle zeigt die Nummer der für die Berichtigung ihres Lagers zuständigen A.V.B.-Stelle) - (Each A.V.-office shows the number of the A.V.B.-office competent for the correction of its store) - (Chaque bureau A.V. porte en regard le No. du bureau A.V.B. chargé de corriger ses stocks de cartes.)



Übersicht der Vermessungsaufgaben
Summary of Survey Tasks
Résumé des Travaux de Levé Hydrographique

- Die im Vermessungsplan 1947 und in den darauf folgenden Jahren vorgesehenen Vermessungsaufgaben.
 Survey tasks provided in the Survey Plan 1947 and subsequent years.
 Travaux d'Hydrographie prévus dans le Plan d'Hydrographie de 1947 et des années suivantes.
- Im Jahr 1947 durchgeführte Vermessungsaufgaben.
 Survey tasks carried through in 1947.
 Travaux d'Hydrographie accomplis au cours de 1947.

Die in den Jahren 1945 und 1946 erledigten Vermessungsaufgaben sind hierin nicht enthalten. Vgl. Jahresbericht Nr. 1, Anl. 5.
 Survey tasks dispatched in 1945 and 1946 are not included herein (see Annual Report No. 1 Encl. 5).
 Les Travaux d'Hydrographie accomplis en 1945 et 1946 ne sont pas compris (voir rapport annuel No. 1 - Annexe 5).

