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## OBITUARY

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### THE LIFE AND WORKS OF INGÉNIEUR HYDROGRAPHE GÉNÉRAL (VICE-ADMIRAL, SURVEYING CORPS) ANDRÉ GOUGENHEIM (1902-1975)

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Ingénieur Général de l'Armement (hydrographe)  
Director of the Hydrographic and Oceanographic Service  
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On 21 March 1975 the death occurred in Paris of Ingénieur Hydrographe Général André GOUGENHEIM, Director of the French Central Hydrographic Service from 1957 to 1964.

Born in Paris on 31 January 1902 to a family of Alsatian origin, André GOUGENHEIM was admitted at the age of 18 after a brilliant school career at the Lycée Rollin, to the "Ecole Polytechnique". On leaving there in 1922, he chose to enter the Hydrographic Corps. His career as an Ingénieur Hydrographe lasted for 42 years, devoted not only to a vast number of hydrographic tasks but also to considerable scientific work in astronomy, geodesy, oceanography and geophysics, which he was to pursue right up to the time of his death. In addition, there was his teaching, which made him the mentor revered by a whole generation of hydrographers and oceanographers. Throughout his life he was a wise counsellor to all who called upon his great wealth of knowledge, an expert whose counsel was heeded all the more readily since he had the gift of dealing with one and all in so friendly and simple a manner and yet with such finesse and wit.

At the start of André GOUGENHEIM's career hydrographic activities, which had been interrupted by the Great War, were entering a period of

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expansion, and he naturally took a very active part in this. After a training period in Paris, then on the survey ship *Utile* and subsequently aboard the training cruiser *Jeanne d'Arc* he took part prior to 1927 in four surveys off the north coast of Brittany (from Cancale to Cap Fréhel, Chenal du Four and the approaches to Porsall and Aberwrach).



As a fully qualified hydrographer he personally directed a vast amount of work at sea. In 1927-28 he was in Djibouti surveying the port, the roadstead and approaches. In 1929, in France, he surveyed the salt lake of Hourtin, a Naval Air Arm base, and in the same year took part in a study for a port on the Lower Congo. In Indo-China 1930-31, he surveyed the approaches to Phan-rang and Than-hoa and several channels in the Fai-tsi-long archipelago, together with most of the length of the Saigon river. In 1932, back in France, he was busy around the Island of Bréhat. In 1934 he directed extensive work in Tunisia — coastal surveys at Sidi-Daoud, Hammamet and Gabès and part of the Kerkennah channel, explorations between Tunisia and the Sardinia channel, and check sweeps off the north coast. Later he commanded the survey group operating in France off the

west coast of Cotentin, and finally, in 1938, directed work off the coasts of French West Africa (Conakry, Mellacorée and Dakar). All this work in the field was to result in the publication or revision of a considerable number of charts and nautical documents.

This wealth of activity did not suffice for André GOUGENHEIM and he had already begun to establish the main heads of a scientific career closely linked to his career as a hydrographer, and stimulated by his teaching responsibilities. In 1926 in Algiers he took part in the operation to revise the world's longitudes, observing with a prismatic astrolabe; and for the second revision in 1933 he was in San Diego (California), again using the prismatic astrolabe but with measurement of the personal equation. His results when compared with those of the meridian instrument were remarkably consistent, and this contributed to show that instruments of equal altitude, when corrected for the personal equation, were the best instruments for the determination of geographic position, not only for field measurements but also for observatory work.

The second World War was to snap for a time the thread of a career which had begun so brilliantly. Called up in the early days into the small French Navy team responsible for developing military applications of underwater acoustics, Ingénieur en Chef GOUGENHEIM made a study visit to the United Kingdom before taking over, in Toulon, a service responsible for the commissioning of all submarine listening and detection equipment.

Removed, unjustly, from the active list at the end of November 1942, he retired to work on problems dear and familiar to him — those concerned with geodesy. The fruits of his studies were two volumes of a course in geodesy — still current — which contain, in particular, along with classic questions presented in an original manner, new solutions for several problems which had remained unanswered thus far.

After the liberation of France, in which he was active in the Resistance movement, he returned to the Central Hydrographic Service, where he took charge of the Tides and Geophysics section. Here he remained for 11 years. This was, for him, a period of intense scientific activity during which, without relinquishing his studies in geodesy and positional astronomy, he not only made important contributions to the solution of problems of tide prediction, but also pioneered the development of oceanography in France.

It was, indeed, under his inspiration that in 1947 the Committee on Oceanography and Coastal Studies was created, which brought together naval officers, engineers, and scientists interested in oceanography. This Committee, of which he became the first Secretary, drew attention to the increasing importance of the ocean to mankind and consequently the necessity for, and value of, all aspects of oceanic studies. On his initiative a *Bulletin d'Informations*, later re-entitled *Cahiers océanographiques*, was created (1 January 1949) and this acquainted France and the world with the achievements of French researchers in this field. The work of the

Committee which he promoted was, and is, considerable, and it may be said that all oceanographic teams in France today owe their creation or their development to this Committee.

But the greatest of responsibilities awaited André GOUGENHEIM at the Central Hydrographic Service. In 1956 he was made Ingénieur Hydrographe Général (2° classe) and appointed Assistant Director of the Service. He became Director the following year and was promoted to the rank of Ingénieur Général (1° classe) (Vice-Admiral) on 1 January 1958.

The new responsibilities which he undertook did not cause him to abandon his scientific work nor cease to contribute his support to many scientific organizations, which were grateful to have in their midst a personality of international renown gifted with an immense capacity for work and never-failing devotion to duty. He was a member of the Bureau des Longitudes, the French Naval Academy, the Academy of Overseas Sciences, the National Committee for Scientific Research, the French National Committee of Geodesy and Geophysics, the French National Geographic Committee, the Committee of Historic and Scientific Works, and many other bodies. He very often held office as President or Chairman of such bodies and was always an active member whose counsel was greatly prized.

As the crowning point in his scientific career he was elected, on 22 January 1962, to the Academy of Sciences, whose prizewinner he had already been on two occasions, in 1931 (Prix Givry) and in 1958 (Prix Binoux).

In 1962 he was elected President of the 8th International Hydrographic Conference and conducted the proceedings with mastery and skill, so contributing further to increase the prestige of French hydrography among the hydrographic community. He retired from the Hydrographic Service in 1964.

André GOUGENHEIM did not cease to be active himself, however, and when death came with brutal suddenness he had been working only a few hours earlier at the Oceanographic Institute of which he had accepted the Directorship.

André GOUGENHEIM has left mankind the benefit of his many scientific achievements. In astronomy he first concentrated his studies on the method of equal altitudes conceived by GAUSS. He subsequently himself conceived a new method for determining position by azimuth lines of position. Finally, he gave particular attention to the use of graphic methods for simplifying the final phase of the solution of problems in astronomy and geodesy.

In geodesy, apart from brief research on the deflection of the vertical, he was especially interested in the plane representation of the earth's surface or the celestial sphere, either to simplify the calculations for triangulation or for cartographic application, or again to develop the theory of systems of conformal representation by showing that the systematic

use of compound variables considerably simplifies the study of such systems.

In his studies of tides, GOUGENHEIM contributed a considerable simplification to the calculation of the tides at Brest, on which are based tidal predictions for all the French coasts. He also studied the frequencies of tidal coefficients, work which was of direct benefit to the French tidal generating stations.

In physical oceanography he promoted the revival of oceanographic research in France through his wise and persistent activity at the Secretariat of the Committee on Oceanography and Coastal Studies. Finally, in geophysics, he interested himself in the measuring of gravity at sea and in earth tides.

All the original research which he successfully carried out, and the marvellous gift he had of clarifying and explaining problems which before his coming had seemed muddled and confusing destined him to be a brilliant teacher. He lectured in astronomy from 1946 to 1953, then was examiner in astronomy for the Ecole Polytechnique until 1969, lecturer in astronomy at the Hydrographic Service training school from 1932 to 1957, professor of tidal studies at the same school from 1950 to 1957, in charge of a course on dynamics of the sea at the Institute for Global Physics from 1950 to 1956, and a course of further education in 1956-57, to mention only his principal teaching work.

André GOUGENHEIM was awarded many great honours and distinctions and held the following titles : *Grand Officier de la Légion d'honneur, Commandeur des Palmes académiques, Commandeur du Mérite maritime, Commandeur avec plaque de l'Etoile Noire, Commandeur de l'Etoile d'Anjouan, Chevalier du Nichan el Anouar and Commandeur du Ouissam Alouite.*

These honours, fitting rewards for his merits, never changed his extreme modesty. He leaves us with the memory of a great hydrographer, a glowing credit to the Corps which welcomed him to their midst in 1922, and a most accomplished scientist. At the news of his death, all those who had enjoyed the privilege of close contact with him and the opportunity to appreciate his qualities felt not only the sorrow one feels at the loss of a master and a friend but also a sense of loss to French hydrography and oceanography which can never be redeemed.

(Translated from the French).