OBITUARY

André COURTIER

(1877-1958)

On 8 November 1958 *Ingénieur Hydrographe Général Courtier,* who was Head of the Navy Hydrographic Office from 1938 to 1942, died in Paris.

Born in 1877, André Courtier entered the « Ecole Polytechnique » in 1896; appointed in 1898 to the Navy Surveying Corps, his career was to last 44 years, devoted not only to particularly numerous hydrographic surveys but also to important scientific work which had a decisive influence on the development of various geodetic and tidal theory problems.

The beginning of his career was marked by the very active part he took in the carrying out of hydrographic surveys. After a period of formation during which he was assigned to the training-ship *Iphigénie* for ensigns, then to the hydrographic survey ship *La Chimère* which surveyed in 1899 and 1900 the approaches to Brest, André Courtier participated as subordinate officer from 1901 to 1905 in various hydrographic missions operating in the estuary of the Loire, on the southern coast of Brittany and along the Madagascar coasts.

As a full-fledged hydrographer, in 1906 and 1907 he directed the Hydrographic Mission of Madagascar and in 1913 and 1914 that of Indochina, taking part in the interval in surveys of the Seine estuary and of the French Mediterranean coastline.

In spite of his unceasing activities, which he was obliged to interrupt twice for reasons of health, he managed to undertake theoretical studies between the periods of his work at sea. In 1908, he published a first note on tidal predictions by calculation, with the help of the harmonic formula. Then in 1911 and 1912, after carrying out triangulation work in the Seine estuary, he published two geodetic studies, one on formulas relating to the calculation of the conventional rectangular coordinates, and the other on the choice of a system of representation for plotting hydrographic surveys.

The outbreak of the war of 1914 interrupted his hydrographic activity : he was then detailed to the Army Geographical Service which assigned him to the IInd Army's Artillery Fire Observation Group. At first as assistant to the Group Commander, then as Head of the Group, he accompanied this Army from the Artois region to Champagne and then to Verdun, where he was wounded. The end of the war found him in Mulhouse, where he received the Croix de Guerre, with a highly complimentary citation recognizing his military valour, scientific ability and unflagging activity.

With the country once more at peace, André Courtier returned to the Hydrographic Office, where an important task awaited the hydrographers of his generation. This not only meant carrying on the hydrographic survey work, which had been interrupted for five years, but making the most while surveying of all the new techniques which the war had brought about. During the hydrographic surveys which he conducted from 1921 to 1924, André Courtier successfully devoted his time to this task on board the SS. *Utile,* operating successively along the NW coast of the Cotentin and in the proximity of St. Malo : acoustic sounding, sounding by fish-lead, aerial photography, use of sweepers, etc. Such are the main innovations which he largely helped to adapt to hydrographic survey work.

In 1925, he returned for good to the Hydrographic Office in Paris, where he was put in charge of the Scientific Instrument Section and Tidal Service. While successfully accomplishing this task, he undertook various tidal and geodetic studies. Assigned as a teacher of these subjects to young hydrographers entering the Hydrographic Office (1920-1935), his courses were a model of careful preparation.

Appointed in 1935 as Assistant Hydrographer, André Courtier, became Hydrographer in 1938. Shortly afterwards, the Second World War compelled him, in view of his high position, to face very heavy responsibilities. When in 1942, he retired from the Hydrographic Office, he carried with him the esteem of all who knew him.

André Courtier's achievements are of a very important and varied nature, for he dealt with all forms of activity and investigated all the problems that confronted a hydrographer of his time.

The hydrographic missions in which he took part led to the publication of about 50 new charts, of which more than half were drawn up through survey work supervised by him personally. His survey reports contain a vast number of original comments on tides, currents, triangulation, sweeping, etc.

As for his scientific work, its scope largely surpasses the field of hydrography.

As regards geodesy, he at first studied in a critical manner the conventional rectangular coordinate systems, i. e. those which are obtained by referring to the plane tangent to the origin the spheroidal triangles previously rendered plane by applying the Legendre theorem. Next dealing with the use in geodetic computations of rectangular coordinate systems in general, he discussed the choice of the type of plane representation to be adopted when the scope of the field of application involves consideration of the curvature of the terrestrial spheroid.

He demonstrated that the best systems of representation, i. e. those which are so selected that, given an acceptable limit of distortion, a maximum part of the earth's surface is included within the chosen system, are conformal projections : the stereographic projection for polar caps; Lambert's conformal conic projection for extensive areas along a parallel and Gauss's projection for areas along a meridian. These results, which apply to all geographical, hydrographic or cadastral surveys, were adopted by countries which had to choose a system of representation for producing their maps. The first recognition of this work was the adoption in France by the Army Geographical Service of Lambert's projection in replacement of the Bonne projection. It was during the First World War, while serving in the Army in the artillery fire observation groups that, turning to account the theoretical researches he had carried out a few years before, André Courtier recommended Lambert's conformal conic system to solve the practical problems confronting the artillery. But since this projection had seldom been used in the past by cartographers and was but little known, he was obliged to devise formulas for its use. Following this work, which is an important original contribution, the Army Geographical Service adopted the Lambert projection. Other countries later also recognised its merits and made wide cartographic use of it.

In the tidal field André Courtier established rules designed to facilitate the use of the harmonic formula in current prediction practice and published various notes on the mean sea level at Brest, on numerical data with regard to the tides of the French coast, and on the advantage which can be drawn from the Chaldean (Saros) cycle for the approximate prediction of the tide at Brest. The course on tides which he gave at the Hydrographic Office included an original contribution to the tidal problem in a canal, as well as to various problems of practical experience such as the establishing of a concordance table between the tides of two ports, the classification of the tides into four

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types, the rapid determination of the essential particularities of the tide in terms of harmonic constants, the determination of the level of lowest low water, etc.

André Courtier was a member of several scientific organizations and won many distinctions : Commander of the Legion of Honour, *Croix de Guerre 1914-18, Officier de l'Ordre du Dragon d'Annam, Officier de l'Instruction publique, Chevalier du Mérite Maritime.* He had been a laureate of the Geographical Society in 1916 and of the Academy of Sciences in 1927.

He will be remembered as a great hydrographer who passionately loved a profession to which he devoted his entire life. Those who had the privilege of approaching him and of penetrating beneath his occasionally blunt exterior will remember him as a man of great subtlety whose austere activities had left unaltered his qualities of justice and kindness.