OBITUARY NOTICE

Dr. WILLIAM BOWIE (1872-1940)

Dr. William BOWIE, U.S. Coast and Geodetic Survey, retired, died in Mt. Alto Hospital in Washington on Wednesday morning, August 28, 1940, after an illness of about three weeks.

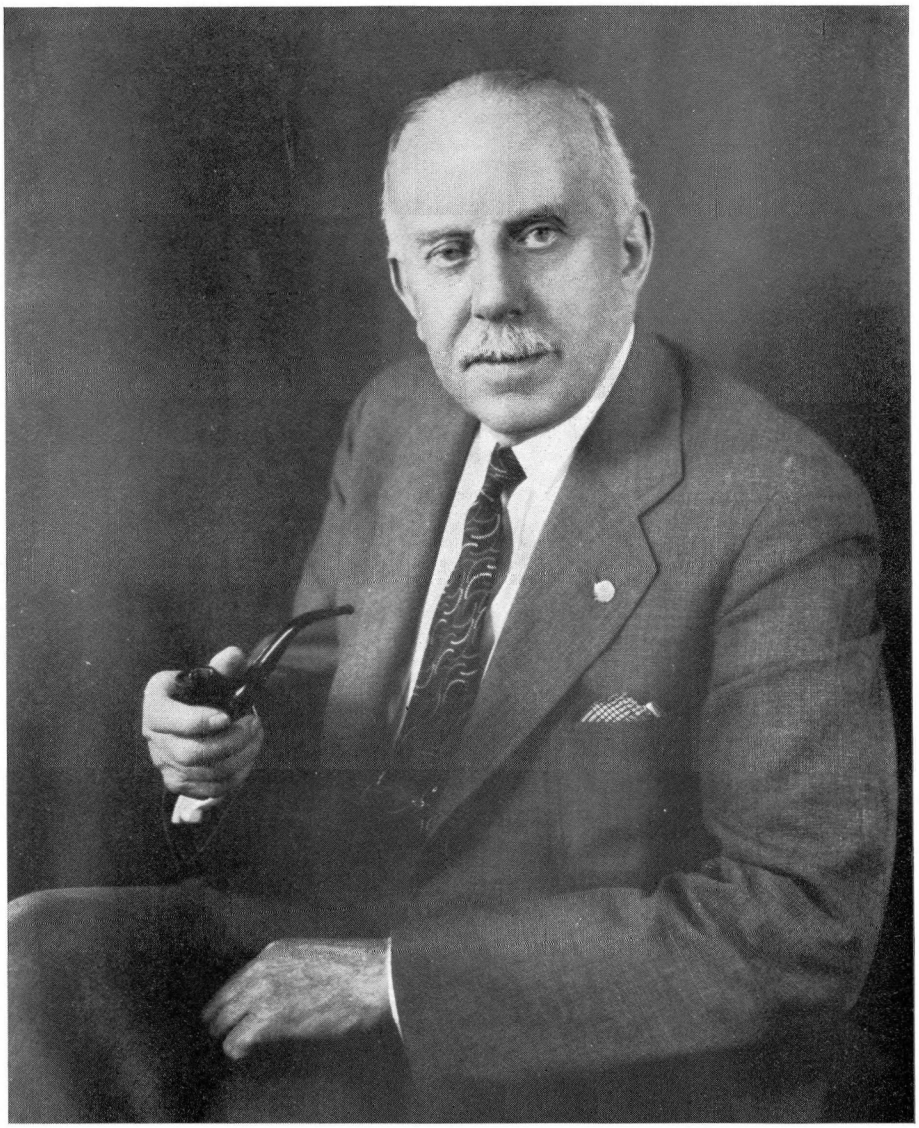
Born in Anne Arundel County, Md., May 6, 1872, the son of Thomas John and Susanna (Anderson) BOWIE, Dr. BOWIE received his early education in the public schools and at private academies. He received degrees at Trinity College (B.S. 1893, M.S. 1907, Sc.D. 1919); Lehigh University (C.E. 1895, Sc.D. 1922); University of Edinburgh, Scotland, (LL.D. 1936); and George Washington University (LL.D. 1937).

Entering the service of the Coast and Geodetic Survey on July 1, 1895, he served as a junior officer in the field and later as chief of party engaged on triangulation and base-line measurements in many states of the Union as well as in the Philippines, Puerto Rico and Alaska until his appointment as Chief of the Division of Geodesy in 1909. He rendered distinguished service in this position until his retirement December 31, 1936 with the rank of Captain.

Major BOWIE's entire career was devoted to geodetic work and related sciences, and his outstanding contributions to scientific and engineering knowledge were in the fields of surveying and mapping where he promoted the control surveys throughout the United States and by his personal efforts greatly expedited the mapping of the country.

The insistence of the founders of the U.S. Coast and Geodetic Survey on an adequate system of geodetic control as an essential foundation for coastal surveys, and the great advancement which Major BOWIE and his predecessors were able to effect in expediting and improving the accuracy of control surveys, have played an important part in the progress of the U.S. Coast and Geodetic Survey and have contributed materially to the quality of its nautical charts.

During Dr. BOWIE's tenure of office as Chief of the Division of Geodesy the control system surveys in continental United States were increased as follows : Triangulation from 10,000 to 68.000 miles; leveling from 30,000 to 261,000 miles; gravity stations from 60 to 720 stations; astronomical Laplace stations from about 32 to 390 stations.



Dr. WILLIAM BOWIE.

A new method for the adjustment of the triangulation net was needed; so early in 1924 Dr. BOWIE conceived the idea of the establishment of junction figures and the adjustment of intervening arcs as separate sections. This method simplified enormously the work of such an adjustment.

Due primarily to the efforts of Dr. BOWIE, a division of surveying and mapping of the American Society of Civil Engineers was organized in January 1926. He was elected its first chairman and has since continued in that capacity.

A further contribution of geodesy to the charting of the waters of the North American continent is the rigid connection it provides between the various coasts of the United States and between the charts of United States waters and those of adjoining countries. The latter results from the adoption in 1913 of a uniform geodetic datum for North America by Canada, the United States and Mexico for which Major BOWIE was largely responsible.

Dr. BOWIE early in his career gained international recognition for his work in the field of isostasy. He was co-author with Dr. John F. HAYFORD of the first publication in which the theory of isostasy was definitely applied to the study of gravity data. This publication described a workable method and contained the necessary tables for computing the effect on a gravity station of all the topography of the world and of the isostatic compensation of that topography based on certain assumed conditions of equilibrium in the so-called crust of the earth..

BOWIE continued the isostatic investigations very vigorously and published his findings in a large number of articles, papers and publications. He demonstrated that the isostatic anomalies can be very useful in studies of underground structure.

The present widespread use of gravity instruments for work of this kind is due to a large extent to Dr. BOWIE's pioneering work in showing the possibilities of interpreting gravity results.

Dr. BOWIE was continually on the lookout for better methods and more efficient instruments for gravity work and many of the improvements in the gravity operations of Coast and Geodetic Survey are directly traceable to his ideas and to his initiative and enthusiasm.

Throughout his career Major BOWIE was always keenly interested in the hydrographic work of the Coast and Geodetic Survey; both because of his general interest in the progress of the C. & G. Survey and because of the bearing of hydrographic data on the theories of isostasy which he advocated and the contribution of such data to the study of the relation between the geology of continents and of oceanic areas.

The Federal Board of Surveys and Maps is a direct result of Major Bowie's efforts to create in 1919 an organization to co-ordinate the mapping work carried out by the many agencies of the Federal Government.

The Board has acted as a clearing house for many problems concerned with mapping and without doubt has promoted greater cooperation and uniformity throughout the services.

During the World War W. BOWIE was commissioned a Major in the Corps of Engineers, U.S. Army, and was assigned to the mapping division of the Office of the Chief of Engineers in Washington.

His brilliantly alert mind and thorough knowledge coupled with his untiring energy won for him a high place among the leading geodesists of his time. He was widely recognized, both in this country and abroad, for his notable engineering and scientific attainments and for his many valuable contributions to the advancement of his profession.

His development of the theory of isostasy gained him international recognition.

Dr. BOWIE greatly strengthened the international relations with regard to geodesy and geophysics. He represented the United States at the general assembly of the International Geodetic Association held at Hamburg in 1912. This was the last assembly before the World War. He was chairman of the Section of geodesy of the Geophysical Union from 1919 to 1922, secretary of the Union from 1922 to 1925 and chairman of the Union from 1929 to 1932.

In 1933 Dr. BOWIE was elected president of the entire Union of Geodesy and Geophysics (1933-1936) and presided over the next general assembly, held at Edinburgh in 1936. Edinburgh University conferred the degree of doctor of laws on Dr. BOWIE in September, just prior to the meeting.

His predecessor at the Head of the Division of Geodesy in the Coast and Geodetic Survey, John Fillmore HAYFORD, was the first to make practical use of the calculations for isostasy, both as a means for the measurements of the deviation from the vertical as well as a means for the measurement of gravity effected in the United States of America. In 1909 he published :

The Figure of the Earth and Isostasy from measurements in the United States, Washington, Gov. Print. Off.;

Then in 1910 :

Supplementary investigation in 1909 of the figure of the Earth and Isostasy, Washington, Gov. Print. Off.

In 1912, in collaboration with William BOWIE, who had succeeded him in 1909 as Chief of the Division of Geodesy, he published :—

The effect of topography and isostatic compensation upon the intensity of Gravity (Coast and Geodetic Survey, Special Publication, N° 10, Washington, Gov. Print. Off.).

Under the same title, W. BOWIE published in 1912 the Special Publication N° 12, Second Paper —

Then, in 1917 :

Investigations of Gravity and Isostasy (Spec. Pub. N° 40);

In 1924 :

Isostatic investigations and data for gravity stations in the United States established since 1915 (Spec. Publ. N° 99).

A Gravimetric test of the " Roots of mountains " theory. (Coast and Geodetic Survey, Ser. N° 291).

In 1927 :

Isostasy — E.P. Dutton Co., New-York.

W. BOWIE has also published numerous articles concerning isostasy and other questions relating to geodesy.

The Directing Committee of the International Hydrographic Bureau was glad to publish two his articles in the Hydrographic Review :

In Vol. XIII N° 1, page 99; Science in the United States Coast and Geodetic Survey.

In Vol. XVI, N° 1, page 133: Use of Triangulation.

Dr. BOWIE recommended the adoption of silver circles in the place of bronze circles on theodolites in order to obtain a homogeneous material and at the same time to be able to place the graduations on the body of the circle itself.

Dr. BOWIE developed a base tape stretcher apparatus for use on base measurements. This apparatus consisted of stretcher bars and balances so that the required tension could be put on the tapes at any desired height with a certain knowledge that the proper tension was applied throughout the tape. The original apparatus was improvised in the field and later a more finished apparatus was made in the instrument shop by E.G. FISHER, but the original idea was that of Dr. BOWIE.

Dr. BOWIE was also responsible for a great advance in the development of gravity instruments and equipment. The bronze half-second pendulum apparatus of the Mendenhall type then in use has been supplanted by the Brown type of apparatus. The late Lieutenant BROWN was working in the Division of Geodesy under the direction of Dr. BOWIE whose influence was undoubtedly one of the great incentives which led Brown to work up and develop the apparatus which is now in use in obtaining gravity observations

at the rate of 20 or more stations per month. For observations at present, time signals are received by radio and the pendulum swings are recorded through the operation of a photoelectric cell actuated by the swinging of the pendulum.

Dr. William BOWIE was awarded the Elliott Cresson Medal in 1937 by the Franklin Institute of Philadelphia for his contributions to the science of geodesy. He was also awarded the Charles Lagrange Prize by the Royal Academy of Belgium, 1932; made an officer in the Order of Orange-Nassau by the Queen of the Netherlands in 1937, and received the decoration of the Cross of Grand Officer of the Order of St. Sava from Yugoslavia in 1939.

The first impression of the medal of the American Geophysical Union, known as the William BOWIE Medal and established for award for distinguished attainment and outstanding contribution to the advancement of cooperative research in fundamental geophysics, was presented to Dr. BOWIE at the meeting of the Union in April 1939.

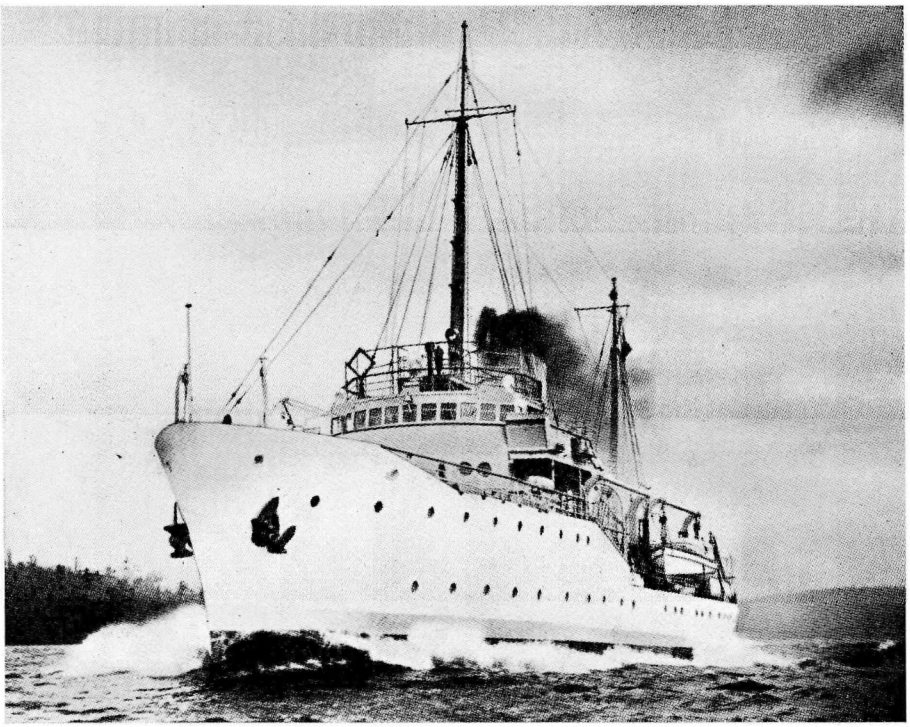
Dr. BOWIE was interested in many scientific societies and organizations to which he contributed much of his time. He was President, Washington Society of Engineers, 1914; President, Philosophical Society of Washington, 1926; President, Washington Academy of Sciences, 1930; Chairman, American Geophysical Union, 1919-1932; Chairman, Board of Surveys and Maps of the Federal Government, 1922-1924; Member, Committee on Surveying and Mapping, American Engineering Council; President, Society of American Military Engineers, 1938; Chairman, Division of Surveying and Mapping of the American Society of Civil Engineers since its organization in 1926; President, District of Columbia Chapter of the Society of Sigma Xi, 1935-1936; Honorary President, Pan American Institute of Geography and History, 1929 to date. He was a member of the National Academy of Sciences, the American Society of Civil Engineers and the National Research Council. He was Foreign Member of Videnskapsakademie of Norway, and corresponding member of the Russian Geographic Society, the Academy of Science of France and the Academy of History and Geography of Mexico.

He was appointed Executive Secretary of the Society of American Military Engineers in December, 1939, and served in that capacity, and as Editor of the Society's magazine until his death.

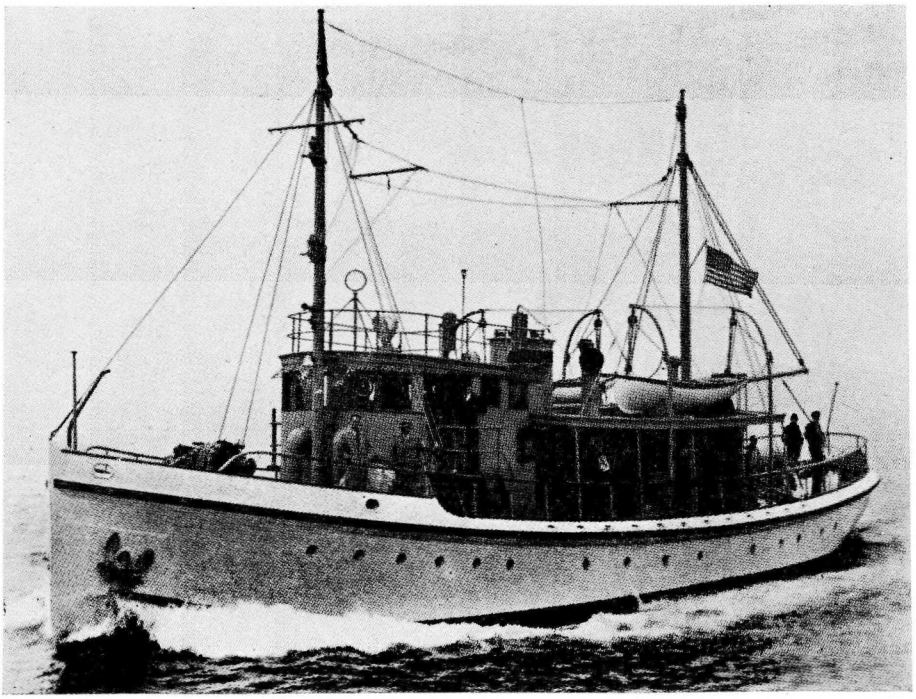
Dr. BOWIE is survived by his widow, Mrs. Elizabeth T. BOWIE; a son, Clagett BOWIE of Baltimore; and two brothers, John BOWIE of Grassland, Md. and Major Edward BOWIE of Berkeley, Calif.

Funeral services were held at St. Thomas Episcopal Church, Washington, D.C. at 1.30 p.m. Friday, August 30, 1940, followed by burial in Arlington National Cemetery.

His decease leaves a void in the world of Science and in the hearts of those who came in contact with him.



The new ship "*Explorer*" of the U.S. Coast & Geodetic Survey.
Le nouveau navire hydrographe "Explorer" *du Coast & Geodetic Survey.*



The Motor Vessel "*E. Lester Jones*".
Le navire à moteur "E. Lester Jones".