units which will insure the farmers of the area at least a living, even during the bad years. The farm management experts of the department are devoting a great deal of effort to the solution of this problem. The Soil Conservation Service and the Bureau of Agricultural Economics are both endeavoring to bring about the necessary mechanical and physical adjustments at a cost which can be borne by the farmers.

The Bureau of Agricultural Economics which, through its Land Utilization Program, administers the provisions authorized under Title III of the Bankhead-Jones Farm Tenant Act, maintains regional offices at Amarillo, Texas. The region comprises the states of New Mexico, Kansas and Colorado, and parts of Texas and Oklahoma. Its Land Economics staff is engaged in research work to study the long-range phases of the program. It also functions as a service organization to assist those staff members who are engaged in action programs. Studies carried on include land classification, soil reconnaissance, range studies, public finance and agricultural credit, flood control and underground and surface water studies. A staff of state planning specialists, with offices in each state of the region, assists in keeping in close touch with local programs and with the state colleges. The Farm Management staff of the bureau conducts intensive studies designed to enable the bureau to present recommendations for well-balanced farm plans. The Project Organization staff prepares plans and submits purchase projects; the Land Acquisition staff secures options and acquires the land. The Land Development staff is engaged in supervising the building of numerous dams and will have charge of the development work on the purchase projects; at present it is also engaged in development work on the old land use projects.

The Agricultural Adjustment Administration can eliminate a great many of the present difficulties by making its payments contingent upon the performance of soil-conserving practices.

The states and local governmental units have a responsibility in this matter which, so far, many of them have failed to meet. Many land owners would restore their land to grass if they were not discouraged from doing so by the tax situation which prevails. There should be a wide differentiation between the tax rates on regular crop land and on that which is more suitable for grazing land.

A more responsible ownership of land must be brought about if any improvement in land use is to be achieved. The present pattern of ownership is conducive to the worst kind of land use. The proportion of non-resident land ranges from 50 per cent. in some of the southwestern Kansas counties to as high as 83 per cent. in others. Land operated by non-resident owners is generally abused. The same applies, to a certain extent, to the tenant farmer who, because of his short lease, must plan his operations on a year-to-year basis, and is not, therefore, interested in a sound and efficient farming program. These are important factors causing the exploitation rather than the conservation of the soil. The Farm Tenancy Program is expected to play a very important part in the restoration of land ownership. Although only a small beginning is being made at present, it is considered a step in the right direction. The delineation of problem areas is proceeding. Such areas are being designated on the basis of soil reconnaissance, present land use, underwater facilities and fiscal conditions. Much of the research is carried on in cooperation with the local state colleges. A wise use of the credit opportunities provided by the Federal Government and other agencies will be important in restoring the land to a self-sustaining basis. With land purchases within the Soil Conservation Districts as nuclei, with agreements with states and large landholders, with demonstrations to farmers of what a well-designed land utilization program can do, it is hoped that effective adjustments will be brought about. That this will take considerable time is obvious, but it is hoped that the lessons learned will not be forgotten too soon, and that the demonstrations will prove effective in bringing about improved land use adjustments.

OBITUARY

OTTO HILGARD TITTMANN

OTTO HILGARD TITTMANN was born at Belleville, Ill., on August 20, 1850, and died at Leesburg, Va., on August 21, 1938. He was buried at the latter place on August 24.

He entered the service of the U. S. Coast Survey (later designated the U. S. Coast and Geodetic Survey) in 1867 and was assigned to field duty. As a result of his strict attention to the tasks assigned him he rose to the position of superintendent of the survey in 1900 and remained in this capacity until his resignation in 1915, after 48 years of service.

Among his important assignments were those of assistant astronomer with the expedition sent to Japan in 1874 to observe the transit of Venus; in charge of the Office of Standard Weights and Measures from 1887 to 1895; assistant in charge of the office from 1895 to 1899; assistant superintendent, 1899 to 1900; member of the Permanent Commission of the International Geodetic Association from 1901 to 1915; and delegate, representing the United States, to the meetings of that association in 1895, 1903, 1906, 1909 and 1912.

In addition to his duties with the Coast and Geo-

detic Survey, Dr. Tittmann took a leading part in the location, survey and monumentation of the boundaries between the United States and Canada and between Canada and Alaska. In 1903 he went to London, England, as a technical expert for duty in connection with the presentation of the case of the United States before the Alaska Boundary Tribunal. In 1908 he was appointed the sole commissioner for the United States, under the treaty of 1908, which clarified and amplified certain portions of previously executed treaties relating to the boundaries of this country, Canada and Alaska. He continued to serve as commissioner until his retirement in 1915.

Under Tittmann's supervision the greater part of all our northern boundaries was surveyed or resurveyed, adequately monumented and mapped. The technique for boundary surveying developed under his direction has become the model for boundary surveying and demarcation. He wisely demanded that the geographic positions of all boundary points should be determined by geodetic surveying methods, and that they should be firmly monumented or referenced. The splendid work on our boundaries inaugurated by Tittmann and his Canadian associate, W. F. King, has been continued by their successors. There are no other countries of the world having common boundaries that are so fortunate as our country and Canada in regard to their boundaries. The commissioners settle in an amicable manner any disputed points concerning the lines, and the citizens have no difficulty in knowing just where the boundaries are. Our northern boundaries are monuments to Tittmann's career of public service.

While he was superintendent of the Coast and Geodetic Survey, that organization made great progress in the development of instruments and methods for carrying on its engineering and scientific work, and in the interpretation of the data secured in the office and field. Among the noted accomplishments may be mentioned the following:

The adoption of the United States Standard Datum for the triangulation system of this country and incidentally also for the charts of the coasts and the maps of the interior. This datum was, in 1913, adopted also by Canada and Mexico, when, on account of its international character, it was designated the North American Datum. North America is the only continent that has a single system for its horizontal control surveys, charts and maps. This avoids the gaps, overlaps and offsets that exist in the maps and charts of the countries of other continents. Such confusion at times leads to controversies over the location of international boundaries.

The determination of the figure of the earth from geodetic measurements and data for the area of the United States. Its dimensions were accepted in 1924, as the most accurate ones, then existing, by the International Geodetic Association. This figure of the earth is still the international standard.

The proof of isostasy. Before Tittmann's administration of the Coast and Geodetic Survey isostasy was considered to be an unproved hypothesis. It is now recognized as a scientific principle, and is now given consideration by workers in the fields of theoretical and economic geology and geophysics.

The development of the theory of tides and the epoch-making reports on this subject by Rollin Harris, a mathematician of the Survey.

The development of the wire drag or sweep, by means of which many large boulders, pinnacle rocks and coral heads were discovered in our coastal waters. These objects had been menaces to navigation. They could not be readily found by the customary hydrographic methods.

The development of a precise levelling instrument that was free from the effects of troublesome systematic errors.

The completion of the Tide Prediction Machine, which made it possible to predict tides with great accuracy and with far less effort and time than had been required previously.

The inauguration of a comprehensive gravity survey, whose purpose is to furnish accurate values of gravity to those working in the physical and chemical sciences, and to those testing isostasy.

The inauguration of the use of invar tapes for the measurement of geodetic base lines.

The building and operation of five magnetic observatories as our part of a comprehensive international attack on some fundamental problems in the field of terrestrial magnetism.

Tittmann was thoroughly imbued with the scientific spirit and he imparted this to the members of the engineering and scientific staffs of the Survey.

As a recognition of his achievements he was awarded the degree of Sc.D. by Stevens Institute and Washington University and the degree of LL.D. by George Washington University. He was one of the original incorporators of the National Geographic Society and its president from 1915 to 1919; a member of the Philosophical Society of Washington and its president in 1899; a member of the Cosmos Club of Washington, D. C., and its president in 1904. He was also a member of the Washington Academy of Sciences, the American Society of Civil Engineers, the American Meteorological Society and the American Association for the Advancement of Science.

Dr. Tittmann was a gentleman in the best sense of that word, a public official of the highest character, whose sole object was to serve his country to the best

of his ability, a delightful comrade and a true friend. Those who had the pleasure of knowing him will never forget his unselfishness, fairness and unfailing courtesy.

He is survived by his son, Major Charles Trowbridge Tittmann, of Washington, D. C. Dr. Tittmann's wife died at their home in Leesburg on February 14 of this year.

WILLIAM BOWIE

RECENT DEATHS AND MEMORIALS

DR. ALEXANDER FRASER, professor of pathological histology at the New York University College of Medicine from 1920 until his retirement in 1934, died on September 18 at the age of sixty-nine years.

DR. JAMES ERNEST BOYLE, professor of rural economy at Cornell University, died on September 18. He was sixty-four years old.

SIR ANDREW MACPHAIL, from 1907 until his retirement in 1937 professor of the history of medicine at McGill University, died on September 23 at the age of seventy-three years.

DR. SAMUEL ALEXANDER, honorary professor of philosophy in the University of Manchester, died on September 13 at the age of seventy-nine years.

Nature reports the death of M. de la Baume-Pluvinel, member of the section of astronomy of the Paris Academy of Sciences, on July 18, aged seventy-seven years, and of Sir Basil Mott, president in 1924 of the British Institution of Civil Engineers, on September 7, aged seventy-eight years.

THE *Journal* of the American Medical Association reports that during the recent Congrès des sociétés savantes, a plaque in commemoration of the work of the late Professor Brown-Séquard was placed in the lobby of the Central University at Nice. Before Brown-Séquard's election as professor of experimental and comparative pathology in the University of Paris, he had been professor of the pathology of the nervous system at Harvard University and was subsequently a member of the attending staff of the Paralyzed and Epileptic Hospital in London.

SCIENTIFIC EVENTS

SECTIONAL ISSUANCE OF BIOLOGICAL ABSTRACTS

A NEW plan for the publication of *Biological Abstracts,* beginning with 1939, has been adopted by the Board of Trustees. It provides for continuation of the monthly issues covering the literature of all the life sciences with increasing completeness and promptness at a uniform price of $25 to libraries and individual subscribers, alike. In addition, specialized sections of each monthly issue of *Biological Abstracts* will be published separately so that those who do not feel the need for the complete publication may acquire at low cost the sections in which they are especially interested. The sections adopted as seeming to promise the greatest usefulness are the following:

Abstracts of General Biology to include General Biology, Biography-History, Bibliography, Evolution, Cytology, Genetics, Biometry and Ecology. $4.

Abstracts of Experimental Animal Biology to include Animal Physiology, Nutrition, Pharmacology, Pathology, Anatomy, Embryology and Animal Production. $9.

Abstracts of Microbiology and Parasitology to include Immunology, Bacteriology, Viruses, Parasitology, Protozoology and Helminthology. $5.

Abstracts of Plant Sciences to include Phytopathology, Plant Physiology, Plant Anatomy, Paleobotany, Systematic Botany, Agronomy, Horticulture, Forestry, Pharmacognosy and Pharmaceutical Botany. $6.

Abstracts of Animal Sciences to include Paleozoology, Parasitology, Protozoology and Helminthology, Systematic Zoology and Economic Entomology. $6.

Subscribers to any of these parts will receive the indexes to the whole of *Biological Abstracts.*

The subscription prices quoted above are for the United States. Subscription rates for other countries will be announced at an early date.

The extent of coverage must, of course, depend on the extent of support. With no national society treasury to draw upon, this must be so. To insure publication a minimum of 1,250 subscriptions to the complete edition and four times as many orders for section issues are required.

In order to facilitate the plans for 1939, subscription blanks will shortly be distributed throughout the membership of the societies composing the union as well as to libraries and institutions generally. It is hoped that as large a response as possible by November 1st may be recorded in the office of the Business Manager, *Biological Abstracts,* University of Pennsylvania, Philadelphia, Pennsylvania.

BOARD OF TRUSTEES,
Biological Abstracts

THE ALLAN HANCOCK FOUNDATION BUILDING FOR BIOLOGICAL RESEARCH

AT the University of Southern California ground has been broken for the new Allan Hancock Foundation building for biological research, the gift of Dr. Allan Hancock.

The building will be three stories and will contain over a hundred laboratories for scientific research in