antiseptics, pure water, insecticides, fumigants, waste disposal, etc., as well as in purely practical ways. A few instances of the way it has lowered prices are given: "Before research one pound of iodine cost $4.50, after research, $1.30; one ampule of salvarsan before research cost $3.50 a dose, after research 20c a dose."

Products have also been improved by chemical research: "In 1910 an automobile tire costing $50 produced 5,000 miles; in 1936 a tire costing $15 will give 20,000 miles. The estimated annual savings to American motorists amount to $3,002,580,000." Chemical research has created new industries: "The production of synthetic resins in 1934 was over 100 million pounds, as compared with around 8 million pounds in 1924." It has freed industries from foreign monopolies: "Domestic production of dyes has risen to over 100 million pounds and our imports have dwindled from 50 million to about 5 million pounds a year; on the other hand, our exports have risen from nothing to about 20 million pounds annually." Out of every $100 in sales of inorganic chemicals, $2.25 is spent for research; out of every $100 in sales of organic chemicals, $4.30 is spent for research. Chemical research has resulted in:

New and improved processes.
Lower costs and lower prices of products.
New services and new products never before known.
Change of rarities to commercial supplies of practical usefulness.
Adequate supply of chemicals previously obtained only as by-products.
Freedom for American users from foreign monopoly control.
Stabilization of business and of industrial employment.
Products of greater purity.
Products of superior service, *e.g.*, light-fast dyes.
New medicines and other new health aids.
More efficient use of raw materials.
More efficient by-product recovery.

Chemical and Metallurgical Engineering writes:

Even during depression times there were in the United States approximately 1,600 industrial research laboratories with more than 22,000 technically trained men and women at work. Process industries were outstandingly first in rank as to number of laboratories, number of investigators and amount of money expended.

Educational records show the growing importance of chemical research. Nearly a third of all the doctorate degrees conferred by American universities are in the field of chemistry and chemical engineering. Over 3,000 graduate students are engaged in chemical research during their postgraduate college years. And to-day the demand for graduate degrees in chemical engineering exceeds the demand in all other divisions of engineering combined.

Research creates, chemical engineering develops and chemical industry makes commercially possible the advances of science. The result is human benefit, as well as industrial achievement, worth many times the immediate cost in dollars and cents.

THE AMERICAN STANDARDS ASSOCIATION

AT a meeting of the Board of Directors in New York City in October Dana D. Barnum, president of the American Standards Association, announced that eleven new industrial groups had joined the association since last March. These are the National Elevator Manufacturing Industry, the National Retail Dry Goods Association, the Brick Manufacturers Association of America, the Brick Manufacturers Association of New York, the American Trucking Association, the U. S. Independent Telephone Association, the Associated General Contractors of America, the American Society of Refrigerating Engineers, the Asphalt Shingle and Roofing Institute, the Heat Exchange Institute, the Hydraulic Institute.

This brings the basic membership of the association to a total number of seventy national organizations—trade associations, technical societies, departments of the federal government.

Following election in the summer two new members took their seats on the board. R. E. Zimmerman, vice-president of the United States Steel Corporation, represents the American Iron and Steel Institute, and C. E. Collens, president of the Reliance Electric and Engineering Company and past president of the National Electrical Manufacturers Association, fills the place left vacant last July by the retirement from active business of S. L. Nicholson.

As a result of the recent meetings of the International Standards Association in Paris, the United States and Italy have been invited to fill the two vacancies on the International Standards Association Council occurring through completion of the terms of Japan and Hungary. Mr. Cyril Ainsworth, assistant secretary, who attended the meetings for the American Standards Association, reported that the national standardizing bodies of seventeen countries were present. International standardization projects on aeronautics, automobiles, ball bearings, coal, navigation, tools, petroleum products, iron and steel, were among the subjects discussed. C. B. Veal, research manager of the Society of Automotive Engineers, and R. T. Brown, of the Goodyear Tire and Rubber Company, took part in the committee work on automobiles, tires and rims, and tire valves, aeronautics and petroleum products.

Among new projects, the International Standards Association is organizing five committees for standardization work in the field of acoustics—one on International Vocabulary, one on Units and Methods of Measurement, one on Electro-Acoustics, one on Archi-

tectural Acoustics and one on Noise Abatement and Vibration.

REGIONAL LABORATORIES OF THE U. S. DEPARTMENT OF AGRICULTURE

DR. JAMES T. JARDINE, chief of the Office of Experiment Stations, in his annual report to the Secretary of Agriculture states that three laboratories for the investigation of regional problems of agriculture were established last year in the program of scientific research in which the states are cooperating with the United States Department of Agriculture. A laboratory for the study of animal parasites in the Southeast, one for development of swine breeding in the North Central States and a third for sheep improvement in the Range States were approved under provisions of the Bankhead-Jones Act.

These three laboratories supplement three similar developments of the previous year—the vegetable breeding laboratory for the Southeast, the soy-bean laboratory in the Corn Belt and the pasture improvement laboratory for the Northeast—which are now well established.

Regional research has been made possible by appropriations under the Bankhead-Jones Act, which—unlike previous legislation for support of the experiment stations—requires state appropriations to offset the federal contributions. State funds not only met the new offset requirements but amounted to about $12,000,000, or slightly more than $2 from state sources for each $1 from federal grants for support of the experiment stations and approximately six times the federal grant offset requirement. Under the Hatch, Adams and Purnell Acts each state continued to receive equal appropriations. The Bankhead-Jones Act allots funds on the basis of the rural population of each state.

The laboratory for the study of diseases and parasites of domestic animals is being established at the Alabama Polytechnic Institute at Auburn. The experiment stations of thirteen southeastern states are cooperating in the development of the program. These are Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, Arkansas, Tennessee, Kentucky and Oklahoma.

Headquarters for the laboratory devoted to the improvement of swine through breeding methods is to be at the Iowa Experiment Station at Ames. Representatives of thirteen states in the region outlined the program, and Iowa, Minnesota, Nebraska and Missouri have agreed to participate actively. It is expected that the other nine states—Illinois, Indiana, Michigan, Kansas, North Dakota, Ohio, Oklahoma, South Dakota and Wisconsin—and possibly other states, will arrange for active cooperation.

For the improvement of sheep on western ranges, twelve range states—Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Texas, Utah, Washington and Wyoming—are cooperating in the program which will center at Dubois, Idaho, where the department has a suitable range available from its previous work with sheep improvement. Texas is interested in sheep breeding and for this program is included as one of the range states. Plans and specifications for the laboratory required by the enlarged program of research were approved before the end of the fiscal year and the work is now going forward.

The Office of Experiment Stations continued to represent the department in administering and auditing federal contributions to the experiment stations. The office also supervises the insular stations in Hawaii and Puerto Rico. Territorial and federal work is being merged in Hawaii, and after the current fiscal year the relationships of the territorial station to the department will be virtually on a par with those of the state stations.

THE NEWLY ELECTED DIRECTOR OF THE NEW YORK BOTANICAL GARDEN

IN announcing the appointment of Dr. William J. Robbins as director of the New York Botanical Garden, the *Journal* of the garden prints a leading article which reads:

Dr. William J. Robbins, professor of botany, chairman of the department of botany and dean of the Graduate School of the University of Missouri, has been appointed director of the New York Botanical Garden. In a career which has taken him into many American research and educational institutions and into the laboratories of nearly every country in Europe, Dr. Robbins has won a reputation as a plant physiologist as well as an executive.

Born in North Platte, Nebraska, February 22, 1890, Dr. Robbins grew up in Pennsylvania, graduating from the Bethlehem, Pa., high school and attending Lehigh University in Bethlehem. After receiving an A.B. degree there in 1910, he remained to serve one year as teacher in biology. In 1911 he went to Cornell University for graduate study, beginning work for his doctorate under Dr. B. M. Duggar and completing it under Dr. Lewis Knudson, receiving his doctor of philosophy degree in June, 1915. From 1912 to 1916 he taught plant physiology at Cornell and assisted Dr. Duggar in a course at Woods Hole, Mass., during the summers of 1912 and 1913. He left Cornell in 1916 to become professor of botany in the Alabama Polytechnic Institute and plant physiologist at the Experiment Station there.

In 1918 he served as second lieutenant in the Sanitary Corps of the United States Army, spending three months of the time in the Army Laboratory School at Yale University. Upon leaving the army he accepted a position as soil biochemist in the Bureau of Plant Industry, U. S. Department of Agriculture, in the laboratory of Dr. Oswald Schreiner.