Arsenal, Maryland, we have a Medical Laboratory. Therein are conducted experiments on the effect of the many kinds of warfare gases and other chemicals on the individuals and on large groups of human beings. The studies include pathology of warfare chemical wounds, chemical means of neutralizing warfare agents and the efficacy of the several types of gas masks.

Obviously work of this kind must, from its very nature, be highly confidential in times like these, but I do not exaggerate when I say that the things that our research men are doing are quite in keeping with the discoveries and advances made in other fields of scientific work.

Dental Focal Infection

It was one of the greatest military surgeons, Surgeon General Benjamin Rush (1745–1813), Signer of the Declaration of Independence, who first suggested that infected teeth might be the cause of disease. In working on problems pertaining to this, our Medical Corps and Dental Corps have worked in close cooperation.

Major Fernando Emilio Rodriguez (1882–1932), Dental Corps, and American officer born in Puerto Rico, may be regarded as the greatest contributor to dental bacteriology since Müller, the German investigator of half a century ago. His researches as to the cause of dental caries began in 1921. By the development of a special technique he was able, at the laboratories of the Army Medical School, to isolate and classify a high acid-producing group of bacteria, *Lactobacillus odentolyticus,* which he classified morphologically as Types I, II and III. He demonstrated Type III as the primary etiological agent in enamel decay, identifying the organism with the flora of the dentinal tubules in caries.

Veterinary Research

The Veterinary Corps is one of the several corps of the Medical Department of the United States Army. Medically important are certain researches by its officers, particularly its present chief, Brigadier-General Ray Alexander Kelser, into those diseases of animals which may be communicated to man.

Kelser demonstrated the transmission of equine encephalomyelitis by mosquitoes, ten species of *Aedes* already having been shown capable of such transmission. Several thousand cases occurred last year in human beings in Minnesota, the Dakotas and adjacent parts of Canada.

Kelser, a member of the Tropical Board, did important work in developing a vaccine for use against Rinderpest, long a serious disease among cattle in the Philippines. This officer also proved the supposition of Mitzmain, that *Tabanus striatus* is the vector of surra, a uniformly fatal equine disease in the Islands. A rabies vaccine, in which the virus is inactivated by chloroform, has been introduced by Kelser and has been found to be more effective than vaccine made by other methods.

Conclusion

These, then, are some of the contributions made by medical officers of your army to the mass of scientific knowledge ever available to the public health worker in his war on disease. Many others could be mentioned, but these will suffice to remind you that while our medical officers have always performed the duties expected of them in the military service they have likewise found time to do much scientific work of general value. To do this our men have had to be willing to work through long hours and to do things not required of them as mere routine. They have done so willingly and gladly, always remembering that whatever they could learn for the good of humanity was entirely in keeping with their prime military function of conserving the fighting strength of America's soldiers.

THOMAS JEFFERSON, THE SCIENTIST

By FREDERICK E. BRASCH

LIBRARY OF CONGRESS

Thomas Jefferson probably had the most forward-looking mind of his day in America. No other American of his generation so deserves to be termed pioneer, prophet and man of the age. His advocacy of democracy, education, religious toleration and the application of scientific knowledge to the common pursuits of life place him far in advance of his day. No contemporary of his, with possibly one exception, Benjamin Franklin, had so varied an interest in the pursuit of science as Jefferson. And yet, no satisfactory or full story of this interest and accomplishments has been published. There is a wealth of material available and it is therefore one proper function of this Bicentenary to reveal and evaluate Jefferson as a man of science.

Much evidence remains of his broad and analytical interest in matters of scientific import. To mention those of more lasting value, several of the various federal scientific bureaus of the United States are the direct result of Jefferson's farsightedness. Some of these bureaus had their origin while he was Secretary of State. The National Bureau of Standards is one, the germ of which originated in an elaborate report of Jefferson dated July 4, 1790, and presented to Con-

gress on July 13. This report contained suggestions of a plan for establishing uniformity in the coinage and weights and measures of the United States.

The Patent Office was virtually founded by Washington and at the time of its creation, Jefferson was Secretary of State. He became *ex officio* the Keeper of the Records of the Patents and was the most active examining member of the board and therefore its first administrator. The scientific foresight which he exercised at this time must be considered the cornerstone of our Patent System and laws. In 1806 President Jefferson made a recommendation for a Coast Survey to Congress, which took favorable action on February 10, 1807, and authorized the President to cause a survey to be made of the coasts of the United States, including islands, shoals and all other physical features deemed proper for completing an accurate chart of every part of the coast. To-day a continuation of this project is known as the U. S. Coast and Geodetic Survey. During Jefferson's second term much agitation was given to the question of establishing a first meridian within the United States. This was to be similar to the zero longitude at Greenwich, England. Jefferson's thorough knowledge of astronomy and mathematics together with the complementary subject of navigation enabled him to give much encouragement to members of Congress who wished to establish this standard longitude. These discussions led finally to the establishment of the Naval Observatory and Hydrographic Office.

Jefferson, like many of his contemporary men of science, was unusually active in noting the daily climatic changes. His observations were made with high-grade thermometers, barometers and his weather vane, laying the foundation of the U. S. Weather Bureau long before it was actually organized. His own manuscripts of those observations are still extant.

The one great passion of Jefferson for pure science is revealed in his study of paleontology. Jefferson is correctly known as the Father of American paleontology. When Jefferson went to Philadelphia to be inaugurated Vice-President, he carried with him a collection of fossil bones, together with a paper containing the results of his study which was later published in the *Transactions* of the American Philosophical Society. Jefferson apparently never took up the evolution question of his study of "antiquities" but confined himself to the acquisition of bones and the straightforward description of species. He felt that the time was not right for theories.

At his home in Monticello in Charlottesville, there are many evidences of his inventions and devices for labor-saving. The most ingenious is the weather-vane on the roof of the porch, which is connected by a rod running through to a compass on the ceiling. The compass has a pointer which shows the direction of the wind according to the position of the vane and nearby is an outside clock over the door giving the time. This same clock has a second face which is visible in the main entrance hall. It has a unique contrivance for winding which is done once a week. The arrangement is called a "fox and geese ladder." There are weights on both ends of the cable which is extended to both sides of the room. On the right wall there are marks at definite regular intervals giving the days of the week. When the clock is wound up the weights indicate Monday and by Saturday the weights have reached the floor. There is also a double-glass door between the entrance hall and another room, which can be opened or closed with one hand, thus automatically opening or closing the other half.

As a mathematician Jefferson was proficient in the use of logarithms and the study of geometry. This he was able to use in his architectural designing. Jefferson also had a keen appreciation of the advanced study of mechanics and optics which was evident in his various comments concerning Newton's "Principia."

To continue our understanding of Jefferson's encyclopedic mind he discussed in his letters the practice of medicine and vaccination as well as the practical and theoretical understanding of agriculture. He did not allow any subject to be neglected. He recognized and appreciated the difficult aspect of each study and emphasized, whenever possible, its application to technique and life. His relation to men in all walks of life, particularly to men of science, is vividly reflected in his voluminous correspondence. Jefferson's position in science was recognized and honored by his being elected president of the American Philosophical Society for five consecutive terms.

Jefferson's fine library bears testimony of his great interest in and his desire to maintain constant touch with the progress of science and technology. All his varied scientific pursuits, as evidenced by both his correspondence and his library, convey some idea of the greatness of Jefferson as a man of science and his love for the tranquil pursuit of nature's laws. Politics was a duty to perform; science was his real joy of life.

OBITUARY

CHARLES SCHUCHERT
1858–1942

PROFESSOR CHARLES SCHUCHERT, distinguished student of Earth's history, noted paleontologist and foremost paleogeographer of our times, died in New Haven, Connecticut, on November 20, 1942, at the age of eighty-four years. To the end of his days he continued his active research with a vigor and eagerness