SCIENCE NEWS

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THOMAS JEFFERSON

CONJURE up in your mind's eye five images of Thomas Jefferson, whose birth on April 13, 1743, two hundred years ago, is being celebrated this year. Stand them side by side. In the center is Jefferson the lawyer, statesman and public servant. To the right is Jefferson the music-lover, violinist and singer, and Jefferson, the horseman and lover of outdoor sports. To the left stands the scientist and inventor, and also the landowner and farmer.

These five Jeffersons together constitute the man whom history records as one of the most versatile persons in America's early days. His music and his horsemanship were his recreation. His inventions were his hobby. His "tranquil pursuit of science" was, to use his own words, his "supreme delight." He inherited nearly 2,000 acres of land and added another 3,000 by purchase. His father-in-law left him a 5,000-acre plantation to manage as an additional farming activity.

As a scientist Jefferson was interested in many branches: geography, geology, botany, zoology, medicine, agriculture, chemistry and the natural sciences. The practical side of all these appealed to him. He once wrote, "I have wished to see chemistry applied to domestic objects, to malting, brewing, making cider, bread, butter, cheese, soap, and the incubation of eggs."

Although the subject had not yet been named, Jefferson was a great early paleontologist. The fossil remains and the bones of prehistoric animals delighted him. He secured a number of the bones of an animal about the size of a bull moose found in a cave in Virginia. Because they included a large claw he called the animal the "big-claw" or Megalonyx. The bones were sent to Philadelphia and the animal "reconstructed." They are still there with the Academy of Natural Sciences. The animal was a giant ground sloth, extinct for some 30,000 years.

Jefferson collected many prehistoric bones through friends in Ohio, Kentucky and elsewhere. His great interest in paleontology was awakened by his contacts in Paris with leading scientists; in the days when Jefferson represented the United States Government there, Paris was the center of the sciences, particularly botany and zoology.

Thomas Jefferson, while president and at other times, seems to have had a keen sense of the important part science would play in the future of the American nation. His foresight is responsible for much of the scientific work done by the Government then and later. He is credited with being the originator of the patent system. The idea of a National Bureau of Standards is in a report by him to Congress in 1790. The report suggests plans for establishing uniformity in the coinage and weights and measures of the United States.

In 1806 President Jefferson recommended a coast survey, on which the Congress took favorable action in February 1807. The continuation of this survey work is carried on by the Coast and Geodetic Survey. Other recommendations had much to do with the establishment later of the Naval Observatory, the Hydrographic Office and the Weather Bureau.

Further evidence of Jefferson's great interest in the sciences is shown by two exploratory trips which he made possible. He sent Colonel Zebulon Pike to explore the peak that now bears Pike's name. He asked the Congress to authorize the expedition of Lewis and Clark. He paid from personal funds $2,500 to help finance the trip. The report of these two men, made from their notes written daily while traveling up the Missouri River and crossing to the Pacific, is filled with scientific observations resulting from instructions received by them from the President.

Jefferson as an inventor never took out a patent. In a large measure he is responsible for the creation of the U. S. Patent law and he was the first administrator of the law. Under it patents were issued by a board composed of the Secretary of State, the Secretary of War and the Attorney General. He was Secretary of State and chairman of the board. The work in connection with patenting was carried out in the State Department and the books and records kept there. Jefferson and his contemporary inventor, Benjamin Franklin, both decided to contribute their inventive genius to their country and to their fellowmen as they contributed their abilities in affairs of state.

Scientific principles were the basis of many of Jefferson's inventions. The moulding board of a common plow may not seem to be scientific, but it is. Jefferson sought a proper shape to turn the soil with the least effort, to break the soil properly, aerate it, and to cover the turned-in vegetation to add humus to the land. It was certainly regarded as a scientific achievement by several French scientific societies which awarded him honors for his invention.

His pedometer sounds more scientific. With it a distance could be measured roughly by walking it. A recording instrument was carried in the watch pocket. A tape led from the instrument through a hole in the bottom of the pocket, down "between the breeches and drawers" to a knee band. This recorded every step taken, by one leg at least.

Jefferson's "whirligig" chair may not be a scientific device, but it was an important invention. It is the great-great-grandfather of all the swivel chairs for which Washington is famous and without which perhaps modern governments could not exist. A combination walking-stick and outdoor seat did not prove as prolific. His hemp machine for breaking and beating hemp into fiber is one of his greatest inventions.

Architecture is a science. Jefferson's great work as an architect was the designing of the original buildings of the University of Virginia, still standing and in use. It is his greatest memorial. Monticello, his home, is also his work. American people are familiar with its outline, as it is now on one face of the new Jefferson five-cent piece.

SEARCH FOR AN ANTIMALARIA CHEMICAL

A GREAT push to find a chemical remedy for malaria "which will not have the deficiencies of quinine, plasmochin and atabrine" is going forward, was reported by Colonel Paul F. Russell, of the Medical Department of

the U. S. Army in the Herman M. Biggs Memorial Lecture at the New York Academy of Medicine.

"The need is apparent," he said, "when it is recalled that not one of this trio will cure with certainty, not one is a true prophylactic drug, and not one is of much value in the control of community malaria. It seems reasonable to hope that a more effective antimalarial will be developed in the not too distant future."

He pointed out that notable progress in controlling malaria even in tropical villages has been achieved with pyrethrum spraying. Experiments in rural South India in 1942 proved that the chain of malaria infection can be broken by this method in typical small villages at a per capita cost of about five cents a year, which is economically feasible even in India. The method consists in weekly spraying of huts, cowsheds and outbuildings where the malaria-carrying mosquitoes tend to remain.

Colonel Russell stated later that malaria kills at least 3,000,000 persons throughout the world each year and there are at least 300,000,000 cases of malarial fever. In such areas as Burma, New Guinea and the Solomons, malaria is by all odds the greatest disease hazard to our troops and is in some places a greater menace than the enemy. He continued, "it seems incredible that malaria still can be so great a scourge, for it is a preventable disease regarding which we possess as complete knowledge as for any human malady. There have been devised potent weapons for treatment and control. But malaria persists, of all diseases to-day probably the most effective barrier to prosperity, contentment and health. What a paradox! Man, with his incredible machines and his streamlined science, stricken each year in millions because he fails to outwit a mosquito carrying Death in its spittle!"

RADIO-QUALITY QUARTZ CRYSTALS

NUMBER ONE strategical mineral problem at present is a domestic source of supply of quartz crystals suitable for radio equipment and other electrical uses in the war effort. Radio is the life line of the armed forces. Battle movements of soldiers, sailors and airforces depend upon it. Dependable instruments in which crystals are used must have crystals of the finest quality.

Brazil and other South American countries are the sources of the present supply. In the United States there are plenty of quartz crystal deposits, but satisfactory crystals for electrical uses had not been developed from them in pre-war days. An intensive search is now being made by the U. S. Geological Survey, the Bureau of Mines and other agencies, to locate quartz crystals with the necessary properties. Results of the search are promising, although specific information will not be released until after the war. The best prospects appear to be in the crystals found in North Carolina, Virginia, Arkansas and California. The western mountain states are being searched as well.

Not all quartz crystals, regardless of their general resemblance, are usable in electrical work. They must be first cut, and then carefully tested in well-equipped laboratories for their electrical properties. Size and appearance are, however, important factors. To be usable they should be at least an inch in diameter and over two inches long. They should be clear, and free from fractures and discolorizations.

Quartz crystals are used in microphones, and as electric filters and oscillators. The so-called piezo-electric quartz crystal vibrates as an electric charge on its surface oscillates. The constancy of the rate of vibration is remarkable. It is more constant than the pendulum on a high-grade astronomical clock. A crystal of good quality kept at a constant temperature will not vary two seconds in ten days. It is this reliability that makes it essential as an electric oscillator.

ITEMS

FOOD crops for production in 1943 are more important at the present moment than guayule plantings for rubber in 1945. Since the recommendations of the Baruch committee were issued urging a greatly increased guayule raising program, the situation has changed. "The need for the maximum food production has become more pressing, and the outlook for synthetic rubber has become somewhat clearer," is emphasized by Secretary of Agriculture Wickard and Rubber Director Jeffers. Both feel that it is not desirable to use any large quantity of land for planting the rubber plant this year as the first rubber yield would not be until two years from now. Not only is the land needed for food crops but the manpower is needed also. The Department of Agriculture is planning to have plenty of guayule planting stock available in the nurseries in case a further survey shows by mid-summer that emphasis should shift again to rubber production.

"THERMOPLASTICS, like their thermosetting cousins, perform many necessary functions in electrical equipment, and the technical apparatus of the electronic world of the future will be served both by the material with which we are familiar, and by newer and better ones," according to H. K. Nason of the Monsanto Chemical Company who spoke at the Pittsfield, Mass., meeting of the American Institute of Electrical Engineers. These plastics are now serving many useful purposes in electronics, he continued, but much work is being done in industrial and other laboratories to develop a thermoplastic that will meet the full needs in the electronics field. This requires material which can be used in situations where high temperatures are encountered, and plastics that will not "creep," better known as cold-flow. The progress being made will not be reported upon until after the war.

VICTORY gardeners who have heavy clay soil to contend with may be able to improve its texture by the addition of sifted anthracite coal ashes and at the same time dispose of the ashes. Coal ash, it is pointed out, improves only the physical state of the soil; it is not a fertilizer. And only anthracite ashes are safe to use. Clay soils are sticky when wet, and hard when dry. Coal ashes will decrease the stickiness and help prevent the hardness. The amount to use depends upon the soil, but ordinarily two inches of ashes plowed or spaded into six inches of the topsoil is sufficient. The ashes and soil should be well mixed. Vegetables, flowers and grasses will grow better in soil so treated and the labor of taking care of the garden is lessened. Sandy soils are also improved by anthracite ashes. Their moisture retention properties are increased. In this the ashes have an effect similar to that of human.