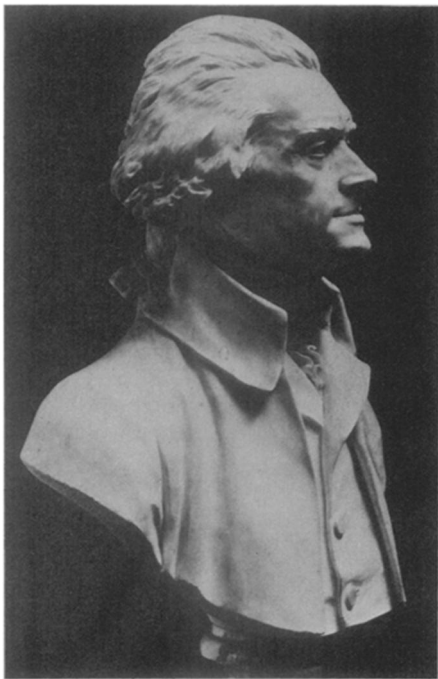


Jefferson as Scientist



A Smithsonian Institution exhibit on the scientific interests of Thomas Jefferson gives new meaning to the words political scientist

BY SUSAN WEST

What U.S. statesman past or present could claim to be at once an astronomer, paleontologist, archaeologist, botanist, inventor, surveyor and draftsman in addition to a political mover and shaker? Only one politician fits that bill — Thomas Jefferson, founding father and third president of the United States. "Science is my passion, politics my duty," he wrote in 1791 while Secretary of State. The offspring of that lifelong passion currently form a new exhibit at the Smithsonian Institution's Museum of American History.

Two things strike a visitor to Jefferson's small corner on the museum's first floor: the wide-ranging energy and near-obsessiveness of the man and his firm belief that science must be utilitarian. There are the silver drafting instruments he carried constantly, a notebook with ivory leaves that could be wiped off, the clock he used for precise astronomical observations and the telescopes with which he scanned the heavens from his study. There are the buffalo skin, fossils and Indian ar-

tifacts from the numerous expeditions he sponsored, the spectacles with interchangeable lenses and the portable music stand he designed for a quintet, sketches of machines for shelling corn, an apple press, a mill for "procuring cyder," a device for raising water to a roof-top reservoir. It is an amazing array of endeavors for any single person, not to mention one who was also consumed with creating a new nation.

Because he was "one of the first time and motion men," Jefferson somehow managed it all, says historian Silvio A. Bedini, who assembled the exhibit and who has been researching since 1955 a book on Jefferson's scientific pursuits. "He told his daughters that no one had occasion to complain of a lack of time who had ever wasted any," says Bedini. "His mind was always working. His memo books are absolutely fantastic. He took notes on everything.... He would record how many steps it took to cross a bridge, how many shovel-fuls of dirt to fill a grave.... He was absolutely obsessed with all these observations and he demanded incredibly of his family and friends." So frustrated was he with the time wasted riding in a carriage, for example, that he designed a lap desk in order to write while he traveled.

It was this nearly obsessive record-keeping that led to some of his most significant contributions. Twice daily, he took meteorological observations of temperatures, rainfall and winds; when he traveled he prevailed on his family to maintain the records. By enlisting — or entrapping — friends, he established a private weather-observing network with "stations" in Canada, Pennsylvania, Mississippi, Virginia and other locations, says Bedini, and he twice proposed a national observing network, which was eventually established. For historical meteorologists and compilers of almanacs, says Bedini, Jefferson's observations are invaluable.

Likewise, his records of an excavation of an Indian burial mound near his home in Virginia show methodical and painstaking observation. In his only book, *Notes on the State of Virginia*, he reports every detail of evidence and stratigraphy, "anticipating the techniques of modern archaeology by about 100 years," says Bedini.

Notes, written in 1780 and 1781, is itself "described as a notable contribution to science and the most important work published in its time," according to Bedini. In addition to discussing the moral, social and political issues of the time, Jefferson describes 129 plants, telling which were indigenous to the state and which introduced, details the Virginia Indian cultures and the fossil remains uncovered in the state. In it, he refutes a theory of European scientist Georges-Louis Leclerc, Comte de Buffon, who claimed that American mammals were smaller than those in the Old World. Jefferson constructed comparative tables showing that there were "18 quadrupeds peculiar to Europe," but that

America had 74 and "of 26 quadrupeds common to both countries, 7 are said to be larger in America, 7 of equal size, and 12 not sufficiently examined."

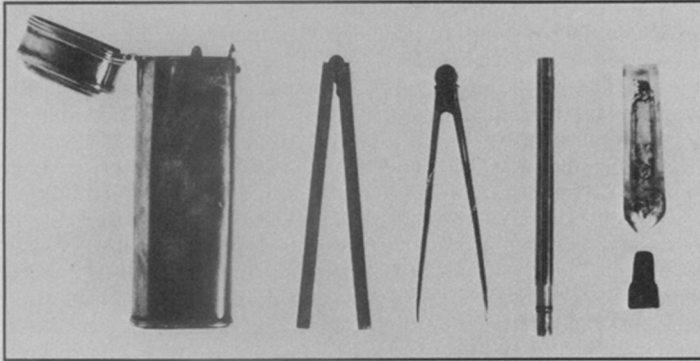
Jefferson's interests also ranged to physics and mathematics, medicine and science education, says Bedini. He devised new methods of surveying, initiated smallpox vaccinations for Indians and designed scientific curricula for secondary schools and universities. But above all he was the practical scientist. Described by his political opponents as "Mr. Jefferson's whirl-i-gigs," his inventions were mostly adaptations of existing devices, many of which he gathered on various travels and with which he hoped to improve the quality of living. Agriculture, for example, which he thought should be the primary industry of the new nation, benefited from his scientific delvings. He converted his home, Monticello, into a progressive experimental farm for testing new machines, methods and crops, says Bedini. Even his design of a plow was such that it could be easily duplicated with the coarsest tools and would minimize the effort of both plowman and animal.

But for all these varied undertakings, Jefferson's "greatest role was as a promoter of science for the nation," says Bedini. "Science is important to the preservation of our republican government and it is also essential to its protection against foreign power," Jefferson wrote in a letter in 1821. He felt the establishment of a system of uniform coinage and precise weights and measures was a high priority for the country, and his efforts in that area led to the creation of the United States Mint in 1792. "He inspired practically all the government scientific agencies — the Bureau of Standards, the weather service, the Coast Survey," says Bedini. He even wrote what may be the U.S. government's first scientific publication, "A Report on Methods of Obtaining Fresh Water from Salt."

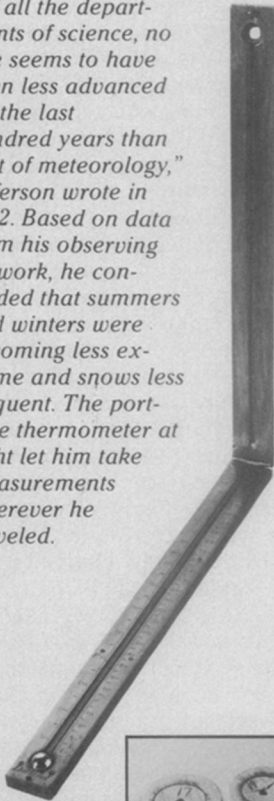
Jefferson also anticipated government funding of science, according to Bedini, in his repeated sponsorships of expeditions to western lands. Setting up the Lewis and Clark expedition in 1803, he selected the scientific instruments they were to take, instructed the explorers in their use, and specified the observations of meteorological phenomena, animal life, vegetation and geology they were to make.

Jefferson's scientific interests continued through his life. When he was 66, in 1809, he wrote Pierre Samuel du Pont de Nemours, "Nature intended me for the tranquil pursuits of science, by rendering them my supreme delight. But the enormities of the times in which I had lived, have forced me to take part in resisting them, and to commit myself on the boisterous ocean of political passions."

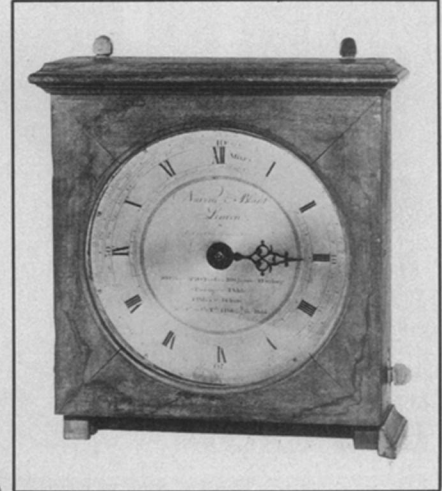
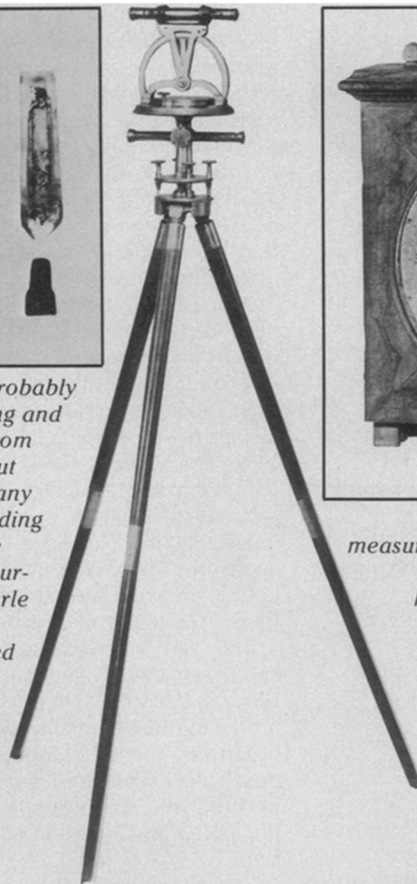
The exhibition, which opened on April 13th, the 238th anniversary of Jefferson's birth, will continue until July 4, the 155th anniversary of his death. □



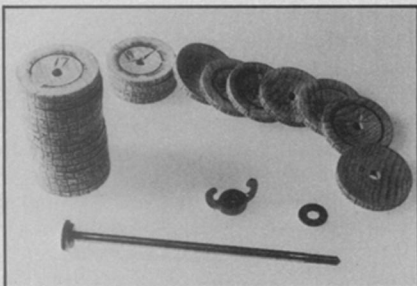
"Of all the departments of science, no one seems to have been less advanced for the last hundred years than that of meteorology," Jefferson wrote in 1822. Based on data from his observing network, he concluded that summers and winters were becoming less extreme and snows less frequent. The portable thermometer at right let him take measurements wherever he traveled.



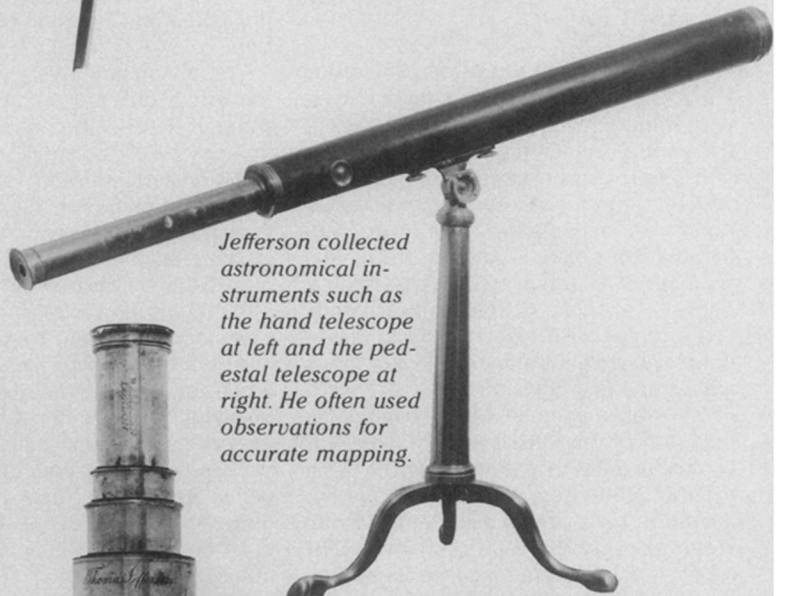
Jefferson, who probably learned surveying and draftsmanship from his father, laid out his lands and many of those surrounding them. In 1773, he was appointed Surveyor of Albemarle County, Va. He constantly carried the silver instruments above and used the theodolite at right for surveying and astronomical observations.



Called a hodometer, this device measured distance and thereby helped satisfy Jefferson's craving for knowing how far everything was from anything. He owned several hodometers and had one designed for his carriage that would give distances in miles, dimes and cents.



Jefferson collected astronomical instruments such as the hand telescope at left and the pedestal telescope at right. He often used observations for accurate mapping.



Worried that U.S. diplomatic communique would not remain secret, Jefferson invented this wheel cipher, or coding device. A message was spelled out along one line and the letters from any line above or below it were sent to a receiver who also had a wheel and who aligned the letters to translate the message. Never patented, the device was later re-invented twice.



Actually from an extinct ground sloth since named *Megalonyx jeffersonii*, Jefferson thought these bones were from a lion-like animal that he called the "Great Claw."

Photos: Smithsonian Institution