SCIENCE NEWS

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LAVOISIER

ANTOINE LAURENT LAVOISIER, the great eighteenth century French scientist who met his death by the guillotine at fifty-one years of age, was born in Paris on August 26, 1743, just 200 years ago. His untimely death left unfinished much important scientific work, a calamity unappreciated in those days. His condemnation to death was due more to his economic, social and political reform activities than to his strictly scientific work.

Lavoisier was only twenty-three years of age when he received his first public recognition as a scientist. At that age he was awarded a gold medal by the French Academy of Sciences for an essay on the best means of lighting a large town. At twenty-five years he became a member of the academy staff as an associate in chemistry. While interested in all sciences, his greatest interests in those days seems to have been in chemistry and the agricultural sciences. Many regard his work in this latter field as his greatest contribution to the world.

Lavoisier may be called the originator of the model farm idea and perhaps of the agricultural experiment station. In 1778 he started a model farm on which he demonstrated the advantages of scientific cultivation of the soil and of maintaining good breeds of cattle and sheep. Thomas Jefferson was familiar with this and undoubtedly secured many ideas from Lavoisier. It will be remembered that the French Academy of Sciences gave Jefferson an award for the plow he invented.

Seven years after establishing the model farm Lavoisier was made secretary of the Committee on Agriculture of the French Government. As such he drew up plans for the establishment and operation of agricultural experiment stations. This was a hundred years before the American government recognized the need of such stations and provided federal financial aid to the few state stations already established, and to help to establish stations in all other states. Lavoisier also advocated the distribution of agricultural implements and the adjustment of the rights of pasturage.

Gunpowder was another special interest of Lavoisier. In 1775 he was given a governmental appointment which gave him considerable administrative power over its manufacture. He abolished a vexatious procedure then practiced of searching private homes for saltpeter needed in powder making. He found ways of increasing the production of this salt and also vastly improved methods of making more and better powder.

The breadth of Lavoisier's interest in the sciences is indicated by some of his early papers. He wrote on the analysis of gypsum, on the aurora, on the conversion of fluids to solids, and a refutation of the then popular belief that water by repeated distillations could be converted into earth.

Later in his life he discovered that water is composed of oxygen and hydrogen, and so announced to the academy in 1783. He did important early work in thermochemistry. His name is associated with the overthrow of the generally accepted phylogistic doctrine, which held that some kind of a hypothetical substance existed in all combustible materials and was given off in combustion.

Lavoisier's governmental activities in financial, social and economic affairs, together with some of his advanced ideas in the fields of science, caused his condemnation by the leaders of the French Revolution. None of these acts was to his discredit. By subjecting him to execution France lost a valuable servant, an able honest statesman and a great scientist.

FOOD DEHYDRATION

BETTER food dehydration through use of radio-frequency energy to drive out the moisture has been developed. The process makes possible for the first time removal of 99 per cent. of the moisture content from a compressed vegetable block, according to a report by Vernon W. Sherman, of the Federal Telephone and Radio Corporation, who developed the method in cooperation with the Office of the Quartermaster General of the Army.

Evidence indicates that vegetables dehydrated by the electronic method will not deteriorate over a period of one to two years even in hot, humid climates. As a first step, 80 per cent. of the water content of vegetables is removed by conventional dehydration. The vegetables are then compressed into blocks from which the remaining moisture is reduced to one per cent. by radio-frequency energy in a partial vacuum. Since other methods of drying require the exposure of as much of the vegetable surface as possible, this process of compressing the vegetables into tight blocks, prior to drying them further, is unprecedented. It is done to concentrate a large amount of food in a small magnetic field for reasons of economy.

About five per cent. moisture is generally left in the food by ordinary dehydration using hot air, which involves danger of spoilage, especially in the tropics. Attempts to reduce this moisture content by warm air often give the dried vegetables a tough, blackened skin, called "case hardening," but this does not occur when radio-frequency energy of the proper wavelength is used. Drying is accomplished in about an hour. The short-wave energy is actually turned on only a part of this time. Due to the speed of the process, apparently, the vitamin content of the dried foods is reported to be unusually high.

The temperature throughout the foods being dried is said to be remarkably uniform, unlike the difference between the outside and inside of food under dehydration by other methods. Electronic drying is well adapted to automatic straight line production, and from laboratory results it is calculated that one pound of water may be removed electronically as described with less than one kilowatt hour of energy, costing about one cent, which compares favorably with the cost of other methods.

To test the new food dehydration method on a com-

mercial scale, plans are being considered for construction of a 50 kilowatt electronic food-drier, which would handle six tons a day of dried food, equivalent to perhaps sixty tons of fresh food.

IMMUNIZATION

A REPRESENTATIVE study of cities of 100,000 population or over shows that a majority of children are now immunized at some time against diphtheria and smallpox, but scarlet and typhoid fever vaccinations, in comparison, are still negligible.

In a survey reported by Selwyn D. Collins, head statistician, and Clara Councell, associate statistician, of the U. S. Public Health Service, a canvass of 213,931 households was made in 28 cities to learn the extent of immunization.

By the time children are eight years old 61 per cent. have been immunized against diphtheria as compared with 85 per cent. protected against smallpox. For the older children the percentage immunized against diphtheria declines, but for smallpox it increases until the score sheet for 14-years-olds shows 90 per cent.

For diphtheria immunization of two- and three-year-olds, which is especially important, the intermediate cities carried off top honors with 34 per cent. and 43 per cent. while the Western cities averaged only 14 per cent. and 19 per cent. for the two age groups. In these early pre-school ages the South, which was lowest in most school ages, was higher than the Northeast and almost as high as the North Central—the highest sections for practically all school ages.

For smallpox the Northeast, intermediate cities, and the South all show above 90 per cent. vaccinations by the time children are eight years of age. The North Central and particularly the West are low. In the number of smallpox cases reported in the survey, the West is above any other section.

Evidence indicates that the level of diphtheria immunization has increased considerably since the survey was made, but the level of smallpox vaccination has probably little changed.

"The percentages of children who had been immunized against scarlet fever were too small in every region," the report states, "to have much effect upon the prevalence of the disease."

Immunizations did not get above five per cent. for any age, although the North Central area and intermediate cities show the best record.

Typhoid vaccinations are even fewer; peak groups hardly top two per cent. in any of the Northeast, North Central or intermediate cities. The maximum in the West was five per cent., while the South showed the best record for typhoid with a 13 per cent. maximum. But the 13 per cent. appears to reflect the size of the typhoid problem rather than the effectiveness of controlling the disease. Percentages of those interviewed in the South who had a case history of typhoid stand well above all other areas and the mortality rates in the South were three times those in northern sections.

ITEMS

PRACTICAL and immediate exploration of new chemical projects to fight the menace of post-war unemployment of millions of workers is advocated by a publication of the American Chemical Society. Release from war production of limited amounts of critical materials and sufficient numbers of trained workers is urged. Chemical projects need from five to ten years from the inception of an idea until a commercial-size plant can be operated, it is explained. Planning in industry is normally a continuous process, but long-term planning has been slowed down during the past year or two because war production has taken all efforts. The American Chemical Society statement points out that all chemical companies have half-developed projects that are now at a point where semi-large-scale or pilot-plant operation is necessary for further progress, but that shortages of critical materials stopped this work months ago. Pilot plants can be built by chemical plants under WPB plan P–43 recently issued and this is considered by the chemists to be the first step toward getting their industries ready for a vigorous post-war development.

SCIENCE books for the blind are being developed by the Westinghouse Electric and Manufacturing Company through cooperation of its research staff and school service department. An experimental Braille edition of the first booklet has been printed and distributed to 85 schools for the blind throughout the United States. Children at the Western Pennsylvania School for the Blind, who acted as judges, were enthusiastic because it put science on the level of their every-day experience. Braille editions of other booklets are now being considered for distribution. The project developed from the Little Science Series, a group of booklets on subjects ranging from microscopic life to the planets of our solar system, which have been already distributed in the ink-print edition to about 600,000 junior and senior high school students.

NEW knowledge of the forces that hold together the heart of an atom may result from studies now being conducted at a mountain-top laboratory in Colorado by a group of physicists from the University of Chicago, led by Dr. Marcel Schein. At the high altitude of the cosmic ray station on Mt. Evans a study will be made of the production of mesotrons, the electrical particles in cosmic radiation coming from the upper atmosphere which are probably 150 times as heavy as an electron. Besides the problems of mesotron formation and distribution, studies of giant cosmic ray showers will be continued. As primary cosmic rays come to earth from outer space they assume changing forms due to the increasing density of the atmosphere nearer the earth. Investigators therefore go to high altitudes where they can study a little closer to their source cosmic ray showers and the mesotrons which produce them.