AGRICULTURE

Atoms Vital to Agriculture

Applications of atomic energy to agriculture may prove to be as important to nation's economy as nuclear power. Using "tracers" already beneficial.

➤ THE NATION'S ECONOMY may get as big a boost from use of atomic energy in agriculture as it will from atom-generated electricity, Dr. Willard F. Libby, U. S. Atomic Energy Commissioner, told the Conference on Radioactive Isotopes in Agriculture at East Lansing, Mich.

Dr. Libby gave $210,000,000 as a "low" estimate of the potential savings to American agriculture each year by using atomic radiation.

Benefits farmers have already gained include knowledge about proper use of fertilizers found through experiments with radioactive "tracer" elements. With tracers, scientists learned that many plant nutrients are easily absorbed directly through the leaves of plants.

For some plants, fertilizer utilization through leaves may be as much as 95%, compared to only 10% if the same quantity of fertilizer is applied to the soil, Dr. Libby said.

Atomic radiation is expected to play a big part in food preservation in the future. Dr. Libby reported that the Department of Defense, with financial support from the AEC, plans to build a nuclear reactor especially designed for pilot-plant studies in the preservation of food by irradiation. The Defense Department expects to use some 1,000 tons of irradiated foods a month for various studies during the next two or three years.

The armed forces buy almost $2,000,000,000 of perishable foods each year, and refrigeration costs are estimated as $40 per man per year.

If preserving these foods by radiation can be achieved to the extent of cutting even one-fourth of this refrigeration cost, potential savings would be $20,000,000 per year with a 2,000,000-man army, Dr. Libby pointed out .

Oat-rust disease is estimated to reduce the nation's oat production 10% or more each year. Rust-resistant strains have now been developed by radiation-caused hereditary changes, Dr. Libby said, giving promise of potential savings of more than 125,000,000 bushels of oats a year, worth approximately $100,000,000.

Except for studies on one insect pest of livestock, no estimates have been made on potential savings from atomic energy in the livestock and livestock products industries, Dr. Libby said.

Therefore, he suggested that the present estimate of $210,000,000 a year savings in agriculture "may well be low rather than high."

Dr. Libby said it is "extremely doubtful" that radioisotopes will be used directly by a farmer to increase the crop yield. Knowledge gained by scientists about how a plant or animal grows, however, can be used directly by the farmer to tell him when it is best to apply fertilizer or to add certain nutrients to the feed of growing animals, Dr. Libby pointed out.

Science News Letter, January 21, 1956

PHYSICS

Fastest "Stop Watch" Times Atomic Events

➤ THE WORLD'S FASTEST "stop watch" for clocking the action of atomic particles has been developed at Westinghouse Research Laboratories.

Capable of timing atomic events taking less than one-billionth of a second, the stop watch is actually a photomultiplier tube.

It is so fast its top speed cannot be determined exactly until laboratory measuring instruments catch up with it. Calculations show it is probably ten times faster than the one-billionth of a second recorded.

The electronic stop watch, designed to aid nuclear studies, strengthens weak pulses of radiations and detects the time intervals between them, Dr. Clarence Zener, acting director of Westinghouse Research Laboratories, Pittsburgh, Pa., said.

It will be used to time the flight of speeding atomic particles.

"It will permit us to measure, with a new order of precision, the speed, and therefore, the energy of atomic particles as they 'smash' into atoms and produce nuclear reactions, or as they are ejected from the atom during such reactions. This precision, we believe, will give us new insight into the causes and effects of nuclear reactions, and, perhaps, into the structure of the atomic nucleus itself," Dr. Zener said.

Electrons released by a radiation pulse entering the tube strike the front surface of an exceedingly thin non-metallic film, knocking free several more electrons, which then bombard a second film. After many such stages, several million electrons are obtained for each one initially released.

Conventional photomultiplier tubes use thick metal plates instead of thin films to obtain the extra electrons.

The tube was developed by Dr. E. J. Sternglass and Milton M. Wachtel, research scientists at the laboratories.

Science News Letter, January 21, 1956

TIMING ATOMS IN FLIGHT—This electronic tube, capable of timing successive flashes of light less than one-billionth of a second apart, is the world's fastest "stop watch." It has an improved type of photomultiplier tube, using cascading electrons ejected from very thin films. Dr. E. J. Sternglass, research scientist at the Westinghouse Research Laboratories, Pittsburgh, Pa., adjusts a source of radiation beamed into the tube.