AERONAUTICS-AGRICULTURE

Airplane Is Economical Farm and Forestry Tool

➤ THE airplane is proving itself as an economical and efficient farm and forestry tool, officials of the U. S. Department of Agriculture in Washington, D. C. stated. In spraying operations, a single plane treated in a half-hour an area seven or eight times as great as would have been covered by a ground crew in a normal spray season of about six weeks.

Reseeding a burned-out forestry area cost half the amount that would have been required by hand in an airplane reseeding test made in the winter of 1948 on a severely burned area in York county, Maine, following the disastrous forest fires of the preceding fall. It was a test by the U. S. Forest Service to determine the most economical way of restoring burned acreage.

In the Maine reseeding, white pine seed was used. To get good distribution on the ground, the seed was mixed with from three to ten times its bulk in sawdust. The seeding was done while snow was on the ground, an effective procedure to protect the seed from the small rodents who are likely otherwise to eat much of it. First season counts show a fairly satisfactory germination. Forestry officials predict that airplane reseeding may prove to be a cheap method of quickly restocking the large severe burns that occur occasionally in the United States.

In a 1949 spraying test against the gypsy moth made in northeastern states, the spray was a concentrated formulation blown out in fine droplets. It was a cooperative experiment, with entomologists of the U. S. Department of Agriculture working with local state officials.

The economy and effectiveness of this newly developed method of control, government agents said, offer the best hope for practical control of several forest pests. A principal advantage is the ability to cover a great area within the short season during which the insecticide is effective against some stage of the particular insect pest. The quantity applied in forest protection, sometimes as little as two quarts to the acre, has relatively little effect on other life in the area, birds, fishes, and beneficial insects, government entomologists assert.

Science News Letter, October 15, 1949

AERONAUTICS

Turbo-Jets Will Fly 500 Miles Per Hour

➤ TRANSPORT planes of 1955 will be powered by four turbo-prop engines, will carry from 50 to 58 passengers on flights from 830 to 3,500 miles, will fly at 35,000-foot altitudes, and will travel at some 500 miles an hour, it was predicted at the meeting of the Society of Automotive Engineers in Los Angeles, Calif.

Instead of turbo-props, turbo-jets may be used. The turbo-prop uses a gas turbine to give one-way rotation to a shaft to which conventional bladed propellers are attached. The turbo-jet is the jet-propulsion engine. Part of the high-pressure gases generated are used in a turbine to power the compressor which provides air for combustion.

The present reciprocating engine may be outmoded by 1955, the turbo-propeller engine well advanced, and the turbo-jet coming into its own, the engineers were told by Donald S. Jordan of Pratt and Whitney, East Hartford, Conn. He predicted that turbo-jet engines might be larger and quite different from those now in use.

Transports of 1955 will have to operate from local airports as well as from major air terminals to build up volume business, according to Carlos Wood, Douglas Aircraft Co., Santa Monica, Calif. Their extreme range needs to be about 3,500 miles, the distance from America to Europe.

Science News Letter, October 15, 1949

MEDICINE

Radar Device Helps Detect Gallstones

➤ SURGEONS in the future will be able to use a radar device to detect and locate gallstones, bullets, shell fragments, bits of glass or wooden splinters in the body if a technique developed at the Naval Medical Research Institute, Washington, D. C., proves as successful in practice as it has in the laboratory.

By this technique, ultrasonic energy (high frequency sound waves), generated by a quartz crystal, are transmitted into the body tissue from the instrument in direct contact with the skin. Reflections of these waves occur from the bones, and from any foreign substance that possesses different acoustical properties from the surrounding tissues. Thus, a gallstone, a shell fragment, a bullet, a piece of glass or a wooden splinter will reflect a portion of the energy that strikes it. The reflected waves are transformed into electrical pulses, which are then amplified and displayed on a cathode ray oscillograph screen.

In this way a foreign body which may or may not be visible by X-ray, appears on the screen as an "echo," in much the same manner as a plane in the sky appears on a radar screen. The distance of the echo from the initial pulse gives the depth of the foreign body in the tissues.

The method was developed by Dr. George D. Ludwig of the Naval Medical Research Institute in collaboration with the Harrison department of research surgery at the University of Pennsylvania.

Science News Letter, October 15, 1949

IN SCIEN

AERONAUTICS

Stresses in Jet-Powered Speedy Planes Studied

➤ THE terrific stresses in airplanes resulting from the use of powerful, high-speed jet-engines are responsible for more intensive investigations now underway to determine whether military planes are strong enough to withstand them. The study is spear-headed at the Wright-Patterson laboratories of the U. S. Air Force, Dayton, Ohio, but the nation's best aircraft designers will help.

Just started is an investigation into the structural flight loads, characteristics and limits of two modern jet fighters, the F-80 and the F-84. The program is planned to include two bombers, the jet-powered B-45 and the reciprocating-engine-powered B-50. A contract has been awarded the Curtiss-Wright Corporation, Columbus, Ohio, to install measuring devices with which to obtain control surface loads and related time histories of surface position and airplane attitude.

More than 30 channels of information will be collected on an automatic recording oscillograph, Curtiss-Wright officials said. They will show complete control position, strains, air speed, angle of attack, temperature and other factors affecting the airplane's flight.

Science News Letter, October 15, 1949

ENGINEERING

Possible Future Lighting System Uses Plastics

➤ LUMINOUS ceilings, made of plastic through which glareless light comes, may be the lighting system of the future.

Mounting many lamps behind a translucent plastic is the most completely adequate way of lighting a room, a special committee on lighting at Massachusetts Institute of Technology reported in Cambridge, Mass.

Luminous ceilings are made by hanging fluorescent lamps from a ceiling that has been painted white. About a foot below the lights, covering the whole ceiling, is a thin sheet of plastic that allows the light to gleam through.

Another suggested way of achieving the same lighting effect is to use special overhead light fixtures. These are two half-cylinders, an upper one of transparent plastic and a lower one of diffusing plastic. When looking up at a ceiling thus lighted, both the lamps and the ceiling itself appear to have the same brightness.

Science News Letter, October 15, 1949

CE FIELDS

GEOLOGY

Prospecting from Air 100 Times Cheaper

➤ MODERN mineral prospecting is 500 times faster and 100 times cheaper than it was before the war. The "astounding developments" that make this possible spring from World War II, just as the two earlier chapters in prospecting history were preceded by great wars.

World War II produced improvements in geologic instruments and planes suitable for carrying them. In three hours such a specially-equipped plane can survey 450 miles of terrain. A team of men on the ground would have to put in a full day to survey about a mile.

These statements were made by Dr. Hans Lundberg, president of Lundberg Explorations of Toronto, before geologists assembled to celebrate the seventy-fifth anniversary of the Colorado School of Mines in Golden, Colo.

Because "it has now become possible to realize the prospector's dream of geophysical exploration from the air," Dr. Lundberg said, "geologists will be able to discover the mineral possibilities of the large unexplored areas of the earth."

American prospecting, Dr. Lundberg declared, falls into three distinct periods, each with its own methods, and each "preceded by a Great War." The wars referred to are the Civil War and the two World Wars.

By combining aviation and electronics the present striking savings in time and money have been accomplished, he said. The post-Civil War period was a pick-and-shovel era, prospectors were mostly wandering Civil War veterans, and discoveries were mostly luck. Some experienced prospectors in time "developed an ore-finding sense," Dr. Lundberg said, but this random skill did not become organized into a science until after the first World War.

In this second phase scientific prospecting came of age. Sensitive instruments for measuring gravitational and magnetic pull and electrical impulses were developed. The necessity for moving this equipment from place to place on the ground was time-consuming and costly. Moreover, ground readings must be taken at intervals of 50 feet or so, whereas air surveys give continuous measurements.

Science News Letter, October 15, 1949

AERONAUTICS

On Again, Off Again Will De-Ice Planes

➤ INTERMITTENT heating is more efficient than continuous heating for de-icing airplane surfaces such as wings and propellers under extremely heavy icing conditions.

So says Dr. Myron Tribus of the University of California at Los Angeles department of engineering.

Although intermittent heating has been used for some time in the de-icing of propeller blades, heavier and more costly continuous heating devices are used for de-icing the other plane surfaces.

Dr. Tribus' studies at U.C.L.A. show that in intermittent heating the formation of ice liberates heat which can be utilized. Continuously-heated surfaces are constantly above freezing and thus are not able to take advantage of the heat liberated by the fusion of ice.

Intermittent heating, therefore, is thermodynamically more efficient for all phases of de-icing in addition to requiring lighter equipment than continuous heating devices.

Other results of the research show that two-thirds of the energy from heaters used to de-ice propellers is wasted in the blade rather than being used to melt ice. The study indicated that placing the heaters inside the blade may result in more effective ice protection than placing them outside.

The research was done with the aid of U.C.L.A.'s new Thermal Analyzer, a device which produces an electrical circuit analogous to thermal conditions of the plane surfaces.

Science News Letter, October 15, 1949

METALLURGY

Aluminum Scrap Yields Pure Aluminum

➤ ALUMINUM scrap containing silicon and iron can be made to yield its aluminum by a new U. S. Bureau of Mines process which involves dissolving.

The aluminum is dissolved in molten zinc and the zinc is then distilled from the aluminum. Both laboratory and pilot-plant distillation tests have been made.

To obtain pure aluminum by direct reduction of clay or siliceous bauxite in an electric furnace requires a practical, inexpensive method for refining aluminum-silicon alloy.

Most pure aluminum today is produced commercially by an electrolytic process, not by direct smelting of siliceous aluminum ores.

Containing information on tests made, a Bureau report covers the production of crude aluminum by carbothermic reduction, multi-stage reduction, and data on the boiling points of zinc-aluminum alloys. Copies may be obtained free from the Bureau of Mines, Pittsburgh, Pa.

The title is "Recovery of Aluminum from Crude Aluminum-Silicon Alloy by Extraction with Molten Zinc."

Science News Letter, October 15, 1949

BIOLOGY

"Osmotic Shocks" Burst Viruses, Leave Ghosts

➤ A NEW kind of killing agent, "osmotic shock," was reported by Dr. Thomas F. Anderson of the University of Pennsylvania at the meeting in Washington, D. C., of the Electron Microscope Society of America.

The victims of osmotic shock are special kinds of viruses which prey on bacteria. These viruses which attack some germs that attack man were formerly called bacteriophages. As scientists have learned more about them, that name has been discarded. The ones whose osmotic shock destruction was revealed by electron microscope pictures are called T2, T4, and T6.

The shock comes when the sodium chloride, or salt, solution the viruses have been living in is rapidly diluted with water or with solutions of ethylene glycol, glycine, glycerol, and either of the two sugars, glucose or sucrose. After the osmotic shock of this rapid dilution, virus "ghosts," empty head membranes with tails attached, are left. The membranes are the outside envelope of the virus, like the skin of a man.

"Presumably," Dr. Anderson said, "the virus heads swell when the osmotic pressure is suddenly reduced, and actually burst if the reduction is sufficiently large and sudden."

The small, odd-numbered viruses, T1, T3, and T7, were not affected by the osmotic shock. Electron microscope pictures of these show that they do not have membranes.

Science News Letter, October 15, 1949

CHEMISTRY-INDUSTRY

"Armalon" Is Used for Truck Seat Upholstery

➤ A TOUGH, strong and pliable plastic-covered fabric, first being applied to truck seat upholstery, has been developed by Du Pont by chemical changes in the ethylene chemical compounds such as are now coming into the synthetic resin field.

Fundamentally made from coal or petroleum, the new material, whose exact nature is still secret, has been trade-named "Armalon" ethylenic plastic.

Brawny truck drivers bounced by rough roads break the springs of the cushions they sit on before the new fabric wears through, it is claimed. The new plastic will not stiffen in use because it needs no plasticizer or softener in its manufacture. It gets along with sponge rubber, not affecting it or being affected by the anti-oxidant additions. Seven-year tests show that it can stand all sorts of weather.

First available for trucks, it will later be offered for other purposes.

Science News Letter, October 15, 1949