

AERONAUTICS

Hovering Makes Helicopter Require More Horsepower

► ABILITY to hover on the part of a helicopter creates a special problem in power plant design for this type of aircraft, the Society of Automotive Engineers meeting in New York was told. Smaller engines could be used if pure hovering were not required.

Horsepower required to hover at zero speed is very large compared to the minimum power required at significant forward speeds for either the helicopter or the airplane, Robert A. Wolf and Carl P. Spiesz, of Bell Aircraft Corporation, declared.

If short ground runs are available to the helicopter, it can take off at reasonably low powers with loads comparable to airplanes, they stated. It is quite conceivable that tomorrow's cargo helicopters, operating from airports where pure hovering is not required, will have smaller power plants or will carry greatly increased loads.

Power plant weight is an important consideration in the helicopter, and continuous research is needed, they said, looking toward reducing engine weight and increasing horsepower output.

Jet-propelled rotors will some day be successful, they predicted. The blade-tip jet appears to offer promise because it might produce reasonable propulsive efficiencies at the fast travelling blade tips, and would produce a light-weight, simple power plant.

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NUCLEAR PHYSICS

Uranium Can Give Birth To Triplets and Quadruplets

► WHEN URANIUM, the atomic bomb element, fissions it can give birth to triplets and quadruplets as well as the conventional twins of hearts of other lighter elements.

This discovery, announced in the *Physical Review*, was made by two Chinese and two French scientists working in Paris at the nuclear chemistry laboratory of the College of France.

When a uranium atom splits into three, instead of the usual two atomic fragments, more atomic energy is actually released.

Since the ternary fission occurs only about once while 300 or more ordinary fissions are happening, this increase of energy is not very important.

Still rarer are the cases of quaternary

fission in which four fragments are produced.

The new fission processes were discovered by use of photographic plates soaked in a uranium compound and exposed to slow neutrons, the kind of particles that sets off the atomic bomb.

The scientists who did the experiments are Tsien San-Tsiang, Ho Zah-Wei, R. Chastel and L. Vigneron.

When uranium and plutonium fission they give off relatively long-range helium atoms, called alpha particles, flying through eight inches of air. This was discovered at the Los Alamos atomic bomb laboratory in 1944 and only now released from wartime secrecy. When observed by Drs. G. Farwell, E. Segre and C. Wiegand it seemingly was not too important in building the bomb and the investigation of this effect is only now being continued.

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ORDNANCE

Largest Water Tunnel To Test Navy Equipment

► A WATER TUNNEL, believed to be the largest in the world, will be built at the Ordnance Research Laboratory of Pennsylvania State College under an agreement between the College and the Navy.

Designed for testing Naval underwater equipment, the giant tunnel will have a capacity of about 130,000 gallons of water. It is to be a sort of water version of the famous wind tunnels used to test model aircraft.

Expected to be completed in less than two years, the tunnel will be constructed as a closed circuit with water circulated by an adjustable pitch propeller. A motor of 1,750 base power will be used to circulate the stream at top speed. The empty tunnel shell will weigh 120 tons.

Some jobs planned for the tunnel include research on improved body shapes for submarines and torpedoes and the development of superior propellers. Elaborate equipment will be used to measure the performance of models in the water tunnel.

Water speeds ranging from 4 to 35 nautical miles per hour will be produced in the test section of the tunnel which will be four feet in diameter and 14 feet long.

The tunnel will be housed in a new building with offices, service shops and other facilities for preparing and testing models.

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IN SCIENCE

AERONAUTICS

Two Inventions to Improve Safety, Travel in Planes

► TWO INVENTIONS aimed at the improvement of air travel and its greater safety are among new U. S. patents.

One, a pickup tow by means of which a plane in the air can help another plane to get up off the water with a minimum run, is the invention of the late Richard C. du Pont of Granogue, Del. The plane to be towed sets up a loop of line, made of nylon or other stretchable material, on two uprights, either from its wing-tips or from a twin tail assembly. The towing plane swoops over it, with its pick-up hook held in proper position by an oblique rod. As soon as the hook engages the loop, the full length of towline needed is run off a braked drum, and the lift begins. Once airborne, the towed plane can cast off the towline when ready.

Rights in this invention, covered by patent 2,418,702, have been assigned to All American Aviation, Inc.

The other invention, protected by patent 2,418,798, is intended to minimize injuries to passengers in crash landings or collisions. More people are hurt in such accidents by being slammed forward against the seat in front than in any other way. Arnold Whitmer of Buffalo has designed a quickly inflatable air cushion, to be stowed in collapsed condition in the back of each seat, which can be instantly blown out to functioning position when the pilot sees trouble ahead.

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OPTICS

New Filter for Infra-Red Is Opaque to Visible Rays

► TWO Massachusetts inventors, R. G. Shepherd, Jr., of Needham Heights and C. D. West of Cambridge, present a filter that is opaque to visible light but transparent to infra-red rays, for patent 2,418,605, which they assign to the Polaroid Corporation. The filtering properties are embodied in a sheet of dyed regenerated cellulose, which is protected against mechanical injury by placing it as the sandwich layer between two panes of glass.

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E FIELDS

ANIMAL HUSBANDRY

High-Bred Cows Are Not So Fertile or Long-Lived

► ARISTOCRATIC cows, bred and selected through generations for high milk and butterfat production, may be uneconomic because they do not live long enough and bear a sufficiently large number of calves. This dairyman's dilemma is pointed out by scientists at the New Jersey Agricultural Experiment Station.

Average life of high-bred cows under their observation is seven years, which means they "come in fresh" only about four times, producing only four calves. The two most frequent causes of the decline in productivity of such cows, which condemns them to the slaughterhouse, are udder troubles and partial or complete sterility.

Breeders in New Brunswick have embarked on a program of selection for longer life and higher fertility, even if a slight sacrifice in annual milk production has to be made.

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MEDICINE

Zirconium Used to Treat Atomic Age Plutonism

► A TREATMENT for the new atomic age disease, plutonism, has been discovered at the Argonne National Laboratory in Chicago. "Encouraging results" in the preliminary trials are reported by Dr. Jack Schubert, now at the University of Minnesota Medical School in *Science* (April 11).

The treatment consists in displacing the poisonous radio-element, plutonium, from the body by injections of a harmless metal, zirconium.

While no one has suffered from plutonism so far, scientists worry lest it become a health peril to atomic energy workers, like the radium poisoning that struck watch dial painters after the first World War. The hazards of plutonium poisoning are much greater than those of radium poisoning because of the relatively large amounts of plutonium available and the greater numbers of persons exposed to it.

Plutonium and many other long-lived

radio-elements which find their way into the body are deposited mainly in the skeleton. An appreciable amount of plutonium also gets into the liver and spleen. Zirconium acts first to displace plutonium from the liver. Later the zirconium migrates to the bones and slowly but continuously displaces the plutonium deposited there, driving it out of the body. The extent to which it does this depends on the amount of zirconium in the bones in relation to the amount of plutonium.

The encouraging results with zirconium were obtained in studies with dogs and rats. Further studies are under way to determine its effectiveness in radio-yttrium poisoning and other radio-elements.

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POPULATION

Latin-American Countries Crowded Without Refugees

► LATIN-AMERICAN lands do not offer the wide havens of refuge and resettlement that have been wishfully pictured for uprooted European populations, William Vogt, chief of the Pan American Union's conservation section, declared in a Cosmos Club lecture in Washington.

Instead, from thirty to forty millions of the people who already inhabit the countries south of the Rio Grande are in need of resettlement because of the exhaustion of the lands on which they are now living and the rapid increase in population.

As examples, Mr. Vogt pointed to conditions in El Salvador and Venezuela. In the small Central American republic the population is so dense that the area of actually tillable land now averages only one-half acre per person. Venezuela, on superficial examination, appears to be under-populated, because of the relatively small number of people living in its great area. However, the actual living space is crowded because geographic barriers at present impassable prevent utilization of a great deal of the country's map area.

Land use in most Latin-American countries is extremely destructive to the soil, Mr. Vogt stated. Forested slopes are cleared and planted to crops, only to have the soil gullied and washed away by the heavy rainfall. With no soil left, the people soon lack food. And in the meantime a declining death rate and a maintained birth rate increase the number of mouths to feed.

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NUTRITION

Special Diets According To Jobs to Be Developed

► YOUR doctor may some day in the future prescribe a diet for you according to your particular job. Workers in automobile plants might get one kind of diet, while workers in the paint industry or in dye houses would get other diets.

Whether special diets could protect workers from illness and what such diets should be are subjects of a long-range research project at Columbia University. Dr. Leonard J. Goldwater is in charge of the research under a grant of \$11,000 from the U. S. Public Health Service's National Institute of Health.

"It has long been known," Dr. Goldwater said, "that individual workers in the rubber, automobile, paint, dye and other industries show marked variations in the way they react to harmful dusts, gases and fumes. Some are relatively unaffected, while others become seriously ill. Present treatments for these occupational illnesses are largely unsatisfactory.

"There have been sporadic reports that vitamins and other nutritional factors may play a part in determining whether workers are susceptible or resistant to harmful atmospheric contaminants. We intend, therefore, to expose white rats fed on various types of diets to all the different types of toxic fumes found in industries manufacturing chemicals, dyes, solvents, explosives and other products. The variable nutritional substances to be added to the rats' diet will consist mainly of vitamins, proteins and minerals."

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CHEMISTRY

Electrolytic Method Gets Cobalt from Natural Ore

► A SUCCESSFUL commercial process for obtaining the metal cobalt from its natural ores was described at the Electrochemical Society meeting in Louisville, Ky., by F. K. Shelton and associates of the U. S. Bureau of Mines, Boulder City, Nev. It is an electrolytic method; the product is a high-grade cobalt.

The process comprises roasting the cobaltic ore, extracting the arsenates which occur in the ore by a caustic leach, extracting the cobalt from the residual solids in an acid bath, purifying the leach solution, preparing cobalt carbonate from the purified solution, and obtaining the cobalt from it by electrolytic action.

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