AERONAUTICS

Belly Landing Makes Runways Obsolete

➤A REVOLUTIONARY method of catapulting and belly-landing aircraft to make obsolete both expensive concrete runways and landing gear was revealed to the British Association for the Advancement of Science meeting in Belfast by Sir Ben Lockspeiser, secretary of Britain's Department of Scientific and Industrial Research.

Many landings of a Vampire jet fighter have been made successfully by the new method developed at the Royal Aircraft Establishment. Launching is by catapult as with carrier-based planes. The belly-landing is made on a tautly suspended flexible sheet, after the plane is snatched from the air by a hook as it flies a few feet above the ground. It lands without bounce on its structurally reinforced fuselage. Placing on the ground the means of absorbing the energy of landing is a new idea.

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PHYSIOLOGY

Snails and Tortoise Not Lazy But Muscles Slow

➤ IT IS not laziness that makes the snail and tortoise shuffle and amble along at the proverbial snail's pace, but the extremely slow rate at which their muscles contract.

Showing a group of scientists at the British Association for the Advancement of Science meeting in Belfast a chart of the contraction speeds of the muscles of a number of animals, B. C. Abbott and Dr. D. R. Wilkie of London University demonstrated that the poor tortoise and snail had muscles which contracted very much slower than those of other animals, only one-sixtieth as fast as that of some.

The London University scientists added that temperature had a great influence on the speed with which tortoise muscles could contract, the speed increasing as much as three times with a 10 degree Centigrade (18 degrees Fahrenheit) rise in temperature. This was noticeable in tortoises transplanted from their native Africa to the cold climate of an English zoo. In their native habitat, the tortoise trotted along at a considerably faster pace.

Mr. Abbott and Dr. Wilkie have studied the behavior of muscles from a wide range of animals, including frogs, men, snails, dogfish, rays, tortoises and toads.

In all cases other than in man, the scientists used isolated muscles kept in nourishing and oxygen-providing baths. If also kept free of bacteria, such muscles could be used for repeated observations over a period of days.

For experiments on human muscles, the investigators found very useful subjects in amputees on whom plastic operations had exteriorized muscle tendons in skin tunnels. Such exteriorized tendons could be used to activate their experimental apparatus.

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CATAPULT TAKE-OFF—A navy jet fighter taking off for Korea is here flung from the catapult of the USS Antietam as the catapult officer and the "talker" crouch to the flight deck to escape the blast of gases from the jet exhaust. The dropped flaps help to catch the wind.

PHYSICS

Football-Sized Core

Experimental breeder reactor creates plutonium and also generates electricity, using sodium-potassium coolant that goes through two heat-exchangers.

➤THE HEART of the Atomic Energy Commission's experimental breeder reactor at the National Reactor Testing Station near Arco, Idaho, is an atomic fuel-holding core no bigger than a regulation football.

Yet from that small core, enough neutrons are sent crashing through a blanket of natural uranium to generate electric power sufficient to supply the entire laboratory's needs. And at the same time, precious plutonium is created.

Alfonso Tammaro, manager of the AEC's Chicago operations office, told the American Society of Mechanical Engineers meeting in Chicago that the process of generating electric power from atomic fuel may eventually become competitive with present-day generating methods.

Basically, the breeder reactor works like this: A blanket of natural uranium surrounds an atomic fuel-holding core. Neutrons shot out by the core are absorbed by U-238 atoms in the blanket. That produces plutonium, an atomic fuel vital in the production of atomic weapons.

The uranium blanket is suspended around the core in a sodium-potassium alloy coolant enclosed in a cylindrical tank. A reflector around the tank bounces back into the reactor neutrons that otherwise would escape. A thick lead-and-concrete shield goes around the whole works.

"Unique mechanical and nuclear devices" in the core control the chain reaction inside to prevent a "reactor runaway" and to keep temperatures from becoming too high. If the temperature gets too high, the tank and fuel will melt.

The sodium-potassium coolant, at about 625 degrees Fahrenheit, carries heat off to a heat-exchanger, needed because the coolant itself is radioactive. The heat-exchanger transfers the heat to a non-radioactive sodium-potassium cooling system. That, in turn, carries it to a second heat-exchanger that transfers the heat to water. Steam is generated to turn turbogenerators and to produce 250 kilowatts of power, more than enough to supply the laboratory's needs.

The experimental breeder reactor was not built to test the feasibility of generating electric power by atomic means. But technical information gained from the Arco reactor should be useful when engineers aim at a reactor capable of generating electric power competitively, Mr. Tammaro said.

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