

The National Aeronautical Establishment will be administered as a joint military and civil establishment and will be operated by the National Research Council as a separate agency along lines somewhat similar to those on which it operated the Atomic Energy Project at Chalk River. Administration policy will be determined by the National Aeronautical Research Committee. Thus, members of the staff of the aeronautical laboratories will serve in a dual capacity; on peacetime problems they will work as Council employees and, on military projects, as members of staff of the National Aeronautical Establishment.

Despite the necessity of their active participation in the defence preparedness program, the Council's several laboratory divisions continued during 1951-52 to carry on an impressive amount of peacetime research on a wide variety of subjects. Staff, including 1,200 at Chalk River, was maintained at a level of about 3,000. Included in this total were 825 university graduates, of whom 440 held the bachelor's degree, 160 the master's, and 225 the doctorate degree in science.

A few highlights from the 1951-52 reports of the several laboratory divisions give some idea of the variety of work undertaken and the wide scope of the National Research Council's interests.

*Atomic Energy.*—The Atomic Energy Project has been preoccupied with the detailed design of a new nuclear reactor to be constructed at Chalk River, Ont. This is a heavy water reactor like the existing NRX pile, but of greater power and improved design.

Operation of the NRX pile has been improved and its high flux of neutrons has been applied to many special investigations. A major advance has been applied to unravel complex sequences of radioactive disintegrations. An event which follows another even by less than a thousandth of a micro-second can be distinguished and timed by electronic circuits used with scintillation counters. This has been applied in studying the radioactive isotopes thulium-170, gold-199, iodine-131, and neptunium-239.

Hitherto undiscovered isotopes have been identified as a result of certain reactions in the NRX pile. These include calcium-41 with a half-life of 120,000 years and actinium-229 with a half-life of 66 minutes.

In co-operation with the Department of Agriculture, insects have been tagged with sufficient radioactive cobalt to be detectable 13 feet away. Observers equipped with counters, which register radioactivity as clicks in earphones, have followed marked insects liberated in the bush to see how far and fast they travel. Radioactive phosphorus was injected into sawfly larvæ infected with parasites, and the radioactivity was still detectable in the second generation of parasites.

*Mechanical Engineering.*—Supersonic tunnels have been built in the Division of Mechanical Engineering. The first of these wind tunnels for work on high-speed aircraft has been placed in operation and is being tuned up. The tunnel has a working section 10" x 10" in which speeds up to five times the speed of sound can be obtained. A second tunnel now being built has a larger working section, 16" x 30", and will have a range up to three times the speed of sound.

A laboratory for work on gas turbines, compressors and combustion is nearing completion and the heavy equipment is under construction. Fuels for gas turbines, Canadian crudes as a source of gas turbine fuels, combustion, thrust augmentation, blading and application to locomotives are some of the studies being made. Present aircraft gas turbines are being tested at low temperatures and different methods