

In aviation, in addition to considerable testing of fuels and instruments and the calibration and repair of instruments, researches are conducted on design and performance of aircraft and their component parts, such as engines, wings, and skis, and on engines and fuels. The effects of such factors as wind and gradient or current on the take-off of land and sea planes have also been investigated.

Apparatus for the study of vibration in aircraft has been constructed and tested in trial flights, and is expected to be valuable in helping to overcome high-frequency vibrations and wing-tip flutter, which have been troublesome and, on some occasions, dangerous.

A small model of a wind tunnel such as is used for aeronautical tests has been designed for the investigation of problems in soil drifting. A model-testing basin is available for the study of problems in the design of floats or ships' hulls. The results of these studies are valuable to designers of naval or commercial vessels.

In addition to research in the above specified fields, a large number of miscellaneous investigations have been carried on.

The asbestos industry has co-operated with the Council in laboratory investigations aimed at the improvement of quality, the testing of the raw and processed material, and the development of new uses for asbestos.

Casein, an agricultural product, has been studied in the Council's laboratories with a view to the preparation of high-quality raw material for the manufacture of coatings, water paints, insecticides and other preparations. The laboratories have investigated problems raised by corrosion of equipment used in various industries.

Among other studies of interest to industry are: the investigation of means of utilizing a recently discovered Canadian source of brucite, a hydroxide of magnesium; the development of highly efficient packings for fractionating columns and scrubbing towers; and use of an adhesive for bonding rubber to metals, particularly aluminium.

Cathode-ray direction-finding equipment for aircraft and marine use has been steadily improved. Marine equipment recently constructed near Halifax will facilitate the taking of bearings by pilots from fixed land stations, and by fixed stations from ships. Observations in atmosphericics have been made at two Canadian stations in synchronism with a station in Puerto Rico and another in Florida.

In the X-ray Laboratory, thousands of articles are examined by X-ray methods, prominent among which are alloys, castings of various metals of importance in industry, and pressure cylinders. Methods of standardizing the examination of such materials are being studied and developed. Instruments for the measurement of radium content have been constructed and, in the year 1938-39 alone, radioactive materials to the value of approximately one million dollars were measured.

Considerable attention has been devoted to equipment for aerial photography in the interests of aviation, forestry, and surveying; the designing and construction of a light-weight camera, and the testing of negative material for survey operations are examples of the work done. Suitable light for colour grading of furs and other products is important in industry, and the laboratories are experimenting with means of producing artificial daylight for such purposes. An impulse generator capable of developing instantaneous potentials up to one million volts has been constructed for the testing of high-voltage insulators for power-transmission lines.

The examples cited above are, as has already been stated, merely a few chosen to illustrate the type and scope of the investigations undertaken in the laboratories. Little mention has been made of routine testing, although a large proportion of the time and energy of many members of the staff is devoted to that type of work.