

## THE ONTARIO RESEARCH FOUNDATION

THE report of the Ontario Research Foundation for the year 1940 includes the Director's report together with the financial statement and a full list of publications to December 31, 1940. The Director's report refers to the new problems created for those engaged in agriculture, particularly to work concerned with remedying the slow depletion of the soil. The Foundation is studying areas which show evidence of trace-element depletion and also characteristic deficiency diseases, such as boron deficiency in the apple, sugar beet and turnip, copper deficiency in the onion and manganese deficiency in oats. A survey of land values in rural Ontario and their relation to soil, climate and economic factors has been commenced. The work on mastitis in cows has continued throughout the year and evidence has been secured proving that the leucocytes present in milk can destroy the characteristic bacteria which are associated with mastitis. A study of the pathological changes in the udder of the cow caused by tuberculosis and other diseases has been commenced.

In the late autumn the pathological and bacteriological staff were fully occupied in field studies of autopsies and laboratory work arising from a widespread outbreak of a respiratory disease among young pigs. Rapid and successful progress has been made in investigating the life-history of a parasitic fly which attacks and destroys the larvæ of the clothes moth. The research has indicated other problems related to the use of parasites for the destruction of pests and also to the nature of the physiological relation between the host and the parasite.

The work of the Textile Department has continued to expand, and much of its testing work in 1940 was in connexion with fabrics and other materials manufactured for war supplies. Co-operative work with various firms associated with the quality control

plan, in which eighteen manufacturers of fabrics and eighty manufacturers of garments are now co-operating, has been concerned particularly with work on the relation between seam construction and serviceability, effects of different finishing processes on the strength of dress fabrics, a comparative study of length of life of wool socks and wool plus rayon socks and the influence of time and other factors on the extensibility of drapery fabrics. Work on the response of silk to water vapour has been extended to cover a number of organic substances such as alcohols, ethers and ketones.

The investigation of the principles of scouring has continued, while in the Division of Engineering and Metallurgy, in addition to important testing work, studies have continued on the resistance of various alloys to abrasion, the malleability of white cast iron in relation to variation in chemical composition and the influence of the cross-sectional area of a test piece on the fatigue strength as measured by the Avery machine.

The Chemistry Division has largely been concerned with analytical work in connexion with specifications, while in the Division of Biochemistry, research in the leather laboratory has been concerned with further improvements in the methods of intermediate alum and chrome re-tannage of heavy leathers. Work has continued on methods for the preparation of organic acids by fermentation as well as the preparation of pure lactic acid for edible and medicinal purposes. Much of the effort of the Biochemistry Division has been given to determinations of vitamins in mill and other food products. The Department is collaborating in the development of rapid cheap and reliable methods for the determination of vitamin B<sub>1</sub>, and is already in a position to carry out accurately and economically biological or chemical assays of vitamins A, C, D and B<sub>1</sub> constituents and riboflavin.

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## USES OF THE 200-IN. TELESCOPE

DR. MAX MASON, chairman of the Observatory Council of the California Institute of Technology, speaking at a meeting in June of the Pacific Division of the American Association for the Advancement of Science and the Astronomical Society of the Pacific, stated that the great 200-inch telescope to be erected on Mt. Palomar is now approaching completion, thirteen years after the late Dr. George Ellery Hale convinced the Rockefeller Boards of the feasibility of such an instrument, and obtained funds for its construction. It will be recalled that Dr. H. Spencer Jones gave some details about this instrument in his Thomas Young Oration before the Physical Society (*NATURE*, June 14, p. 753).

The disk, about 17 ft. in diameter, originally weighed 21 tons, and during five years' grinding at Pasadena, more than four tons of glass have been removed. The disk is carried by a system of thirty-six levers inserted in the holes of the ribbed back. Both the method of support and the structure of the mirror are new in this instrument. The supporting system

must operate so perfectly that no bending of the reflecting surface beyond one or two millionths of an inch will occur as the telescope moves. As the surface of the mirror was brought by polishing close to a spherical form it became clear that the disk, when tipped from the grinding table to a vertical position for optical test, sagged slightly under gravity. This sag has now been eliminated by installing a system of twenty-four squeeze levers, operated by counter weights, distributed around the rim of the glass. The spherical surface required has nearly been reached, after which it will be changed to a paraboloid by deepening the centre concavity five thousandths of an inch.

Dr. Mason stated that it is doubtful whether the new instrument will be useful for photographing moon or planets, due to shakiness of the air, which destroys detail. Instead it will be used to study faint and distant galaxies, and to analyse in high detail light from the stars and planets.

Dr. John Strong, also of the California Institute of Technology, stated that one of the uses of the 200-in.