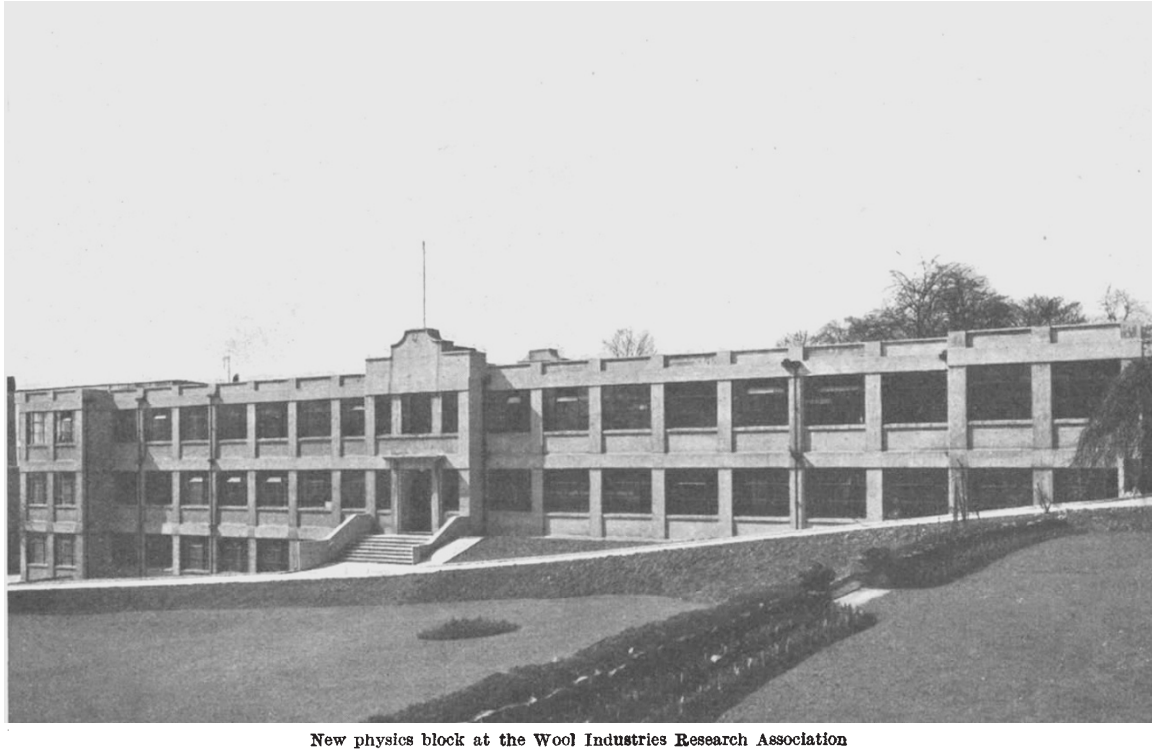
WOOL INDUSTRIES RESEARCH ASSOCIATION

EXTENSION TO LABORATORIES

POST-WAR extensions of the laboratories at Torridon, Leeds, of the Wool Industries Research Association were opened on October 17 by Viscount Swinton, Chancellor of the Duchy of Lancaster and Minister of Materials. The nucleus of the Research Association was formed in 1915 when a 'West Riding Research Committee' of interested industrialists, under the guidance of the late Sir Michael Sadler, vice-chancellor of the University of Leeds, initiated co-operative research which was financed by the local industry. This Committee was able to take full advantage of the Research Association scheme which was put forward by the Department of Scientific and Industrial Research in 1918. Indeed, the Wool Industries Research Association was the second to be formed under the ægis of the Department. The work of the Research Association was originally undertaken at the University of Leeds; but the need for separate laboratories soon became apparent, and in 1920 Torridon, a large residence standing in about four acres of ground, was purchased, and this provided reasonable accommodation for a limited number of laboratories and offices. In 1925 a shed was erected for woollen plant and later another was added for worsted plant, and in 1928 the adjoining estate of Longfield was purchased with a capital grant from the Empire Marketing Board. A new block was built for wet processing in 1939, and looms were installed in some of the original outbuildings.

In 1947 a progressive building plan was started. The wet-finishing block was extended to provide laboratory accommodation together with more extensive facilities for pilot-scale dyeing. This and three large new blocks have now been completed. The first contains pure and applied physics laboratories, including two large physical-testing laboratories where the atmosphere is controlled to 65 per cent relative humidity and 68° F. (20° C.), a drawing office and machine shop. As fibre properties are so sensitive to atmosphere changes, the whole of the block, other than the testing laboratories, is supplied with air maintained at 50 per cent relative humidity and 65° F., except when these conditions require the use of refrigeration. The second block to be finished houses woollen-carding and -spinning machinery, together with a raw-wool scouring plant in the basement. This block is also fitted with humidifying plant. The third block is for research on weaving and is equipped with a full range of preparatory machinery in addition to looms and with laboratory facilities. One room is humidified so that weaving can be done under a range of atmospheric conditions. The new buildings provide roughly sixty thousand square feet of floor area and with their equipment have cost about £250,000.

Research in the past has tended to be fundamental rather than applied, due largely to the big floor areas needed to house processing equipment. The new buildings were designed primarily to overcome this difficulty, and it should now be possible to undertake much more extensive research in fields that lead directly to increased industrial efficiency. As Lord Swinton said in his opening speech: "Research is the eyes of industry, and corporate research, industry combining for research, is the best of all; here in the Wool Industries Research Association you are, I think, a model because it is in very truth a partnership enterprise of a multitude of firms large and small. And those combined operations in the common interest have proved in this industry, as indeed in



New physics block at the Wool Industries Research Association

others, to be no bar to individual initiative and competition." The new buildings are visible evidence of confidence in the success of corporate research because co-operation from all member firms will be essential if these facilities are to play their full part in promoting progress within the industry.

Wool is a most versatile fibre; there are in reality four wool industries—woollen, worsted, pressed felt and mechanical cloth, and the shoddy industry. The facilities now available provide for research ranging from the biology of wool growth to the finishing of fabrics, and although it is impossible to have even one example of every type of machine used in each of these separate industries, the methods and processes that are common to most of them can be fully investigated.

Perhaps the biggest expansion has been on the weaving side. Hitherto, facilities for work in this field have been negligible; but it is now possible to follow every process in preparing yarns for the loom and in weaving them on any of a representative range of looms. This is almost a virgin field for research so far as wool is concerned, and one that is likely to lead to fruitful results because much of the appearance of a finished wool fabric depends on the care with which the yarn is handled and wound between spinning and weaving.

Another aspect of the Association's work which has been increased and will benefit further from the extensions is operational research. The Association has undertaken this work in a small way for very many years, and as far back as 1947 it published to members a booklet on quality control in worsted spinning. The surveys now being made in mills, together with appropriate laboratory and pilot-plant work, provide information to members on the limits that can and should be worked to if optimum productivity and high-quality output are to be maintained with a proper economy in the use of consumable materials. The success of this work is shown by the increase in use of testing facilities in mills. It is worth noting that members installing these facilities often remark that only within recent years have test methods become available which are suitable for use in mills; and most of the examples they quote are the direct result of the Association's work.

The fundamental work of the Association, which has been so strikingly successful in the past, is continuing. Paper partition chromatography[1] was invented and developed in the Association's laboratories to determine the amino-acid composition of wool hydrolysates, work for which Dr. A. J. P. Martin and Dr. R. L. M. Synge have been awarded the Nobel Prize for 1952 (see *Nature*, November 15, p. 826). It continues to be used in the laboratories and has been improved in a number of respects, particularly with regard to the use of radioactive tracers to give a quantitative rather than a qualitative result[2]. Radioactive tracers are also in use to follow the diffusion of ions in keratin membranes, work which aims at elucidating the mechanism of dyeing. It has already yielded the result that hydrogen ions diffuse more slowly than those of bromine at low concentrations of hydrogen bromide[3]. This result is consistent with measured membrane potentials which previously seemed to be anomalous, and it can be quite simply explained on the theories of multimolecular adsorption and diffusion which have been developed for polymers at Torridon[4]. The earlier work of the Association on the importance of moisture absorption for clothing comfort and on the propagation of temperature and humidity changes through masses of textile materials[5] is now universally accepted and used throughout the world, as are the theory of water repellency of porous structures[6] and the theory of the effect of salts on ionic detergents[7].

A subject more recently studied, which has both practical and theoretical importance, is the dissipation of static electricity on fibres or polymer sheets. A solution has been found for the distribution of charge and the distribution of electric field in such systems, and the distribution of the field shows that conductivity in a liquid coating is much more effective in dissipating static charges than is conductivity of the fibre or sheet. Another subject of academic and practical interest is the friction between fibres or polymeric surfaces. Recent work has shown that, in contrast to the behaviour of metals, elastic rather than plastic deformation determines the frictional force; recognition of this difference between the two processes has explained many apparently anomalous features in the behaviour of polymeric materials during rubbing[8]. Thus, although the Association has planned for a large extension of work in the applied field, it has not lost sight of the need for fundamental research which so often inspires new ways of looking at practical problems, leading to their successful solution.

Finally, it might be mentioned that the Association's shrink-resisting process has been used by the Ministry of Supply since 1940 for Service socks and underwear. The Association has received £25,000 in royalties, and the increased life of the garments so treated has provided a saving to the Ministry of at least £5 million, which is several times the total expenditure of the Association since it was formed in 1918.

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BRITISH STANDARD OF RADIOACTIVE IODINE (^{131}I)

In the autumn of 1948, at the request of the Medical Research Council, provisional British standards of certain therapeutically important radioactive isotopes were set up. The Atomic Energy Research Establishment[1] undertook the maintenance of standards of cobalt-60, sodium-24, and phosphorus-32; the maintenance of the iodine-131 standard was undertaken by the Radiotherapeutic Research Unit of the Medical Research Council at Hammersmith[2]. It was intended that these standards should serve for one year; their use has, in fact, continued until the present time.

Following an agreement between various interested bodies in 1950 that the National Physical Laboratory should be formally responsible for standards of this kind in Great Britain, workers from the Radiotherapeutic Research Unit, the Atomic Energy Research Establishment, the Royal Cancer Hospital and the National Physical Laboratory have