

THE ARTHUR D. LITTLE RESEARCH INSTITUTE

THE annual report for 1960 of the Arthur D. Little Research Institute* records an average expansion since 1957 of about 20 per cent per annum. Sixty-five per cent of its income comes from industry and 35 per cent from Government and related agencies, about half its sponsors being British and European and the rest American. Practically all the Institute's work is classified as oriented fundamental research, and has so far been predominantly concerned with the chemistry of plant materials. The Biochemistry Section was established in 1960 to undertake the study of biochemical problems where newer techniques, such as starch-gel and high-voltage electrophoresis and paper and column chromatography with automatic densitometry, are already having their impact. Work has been initiated on the separation of the wheat gluten gel complex into its components.

The Organic Chemistry Section continued work on the polymerization of glucose and its derivatives, and already polyamides with viscosities comparable with those of nylon have been obtained using the new technique of interfacial polycondensation. In the work on the chemical modification of wood, a low-temperature catalytic acetylation process gave wood of permanent shrinkage and only slightly improved dimensional stability. Promising results have been

* Arthur D. Little Research Institute. Annual Report for 1960. Pp. 44. (Inveresk, Midlothian: Arthur D. Little Research Institute, 1961.)

obtained by impregnating wood with monomers and polymerizing *in situ*, and attempts have been made to reduce flammability of wood by introducing non-leachable compounds containing phosphorus. Work was initiated on the release of corrosive volatile vapours from wood at high humidity and high ambient temperatures, that is, greater than 40° C., and also to explore the properties of ethylene sulphide.

In physical chemistry, the Polymer Section continued to study the bulk properties of polyolefins, particularly the kinetics of crystallization of polyethylene, with the view of obtaining a better understanding of the effect of crystal structure on the physical properties, and has shown that the initial crystallization behaviour depends markedly on molecular weight. Work was also commenced on the kinetics of the reaction between molten aluminium and water.

The Metallurgy Section completed a three-year study of corrosion involving the screening of 470 organic compounds, to ascertain any correlation between chemical structure and inhibitory power, and although no clear-cut correlation emerged, some compounds were found to favour the inhibition of corrosion of mild steel and cast iron in acid solution while others opposed inhibition. A study of the hydrogen embrittlement of certain steels is planned. A list of publications of the Institute is appended with abstracts of those published in 1960.

THE WOOL INDUSTRIES RESEARCH ASSOCIATION

IN addressing the forty-second annual general meeting of the Wool Industries Research Association on April 19, the chairman of the Association, Mr. B. A. Smith, after referring to the opening of the new Worsted Processing Block at Torridon on March 22 (see *Nature*, 190, 313; 1961) by the Right Hon. R. G. Menzies, stressed the need for more research and technical education in the industry. The Association was just ending a quinquennial period in which the grant from the Department of Scientific and Industrial Research had been based on £170,000 of industrial income; under the new £70,000 arrangements this grant would be £59,000 on £170,000 of industrial income, but with a further £75 for every £100 supplied by industry up to a total of £25,000, and Mr. Smith asked for support for any proposal in the near future for an increase in levy.

The report of the director of research, Dr. A. B. D. Cassie, for 1960* refers to progress in constructing an apparatus for the automatic quantitative analysis of mixtures of amino-acids by separating them on a cationic exchange-resin column, converting to copper complexes, and determining the copper content polarographically. Excellent results have been obtained in the automatic assay of basic amino-acids,

but citrate buffers cannot be used for chromatography because of the formation of copper-citrate complexes, and new buffer systems are being developed for amino-acid separation. Several protein components of oxidized wool have been isolated by percolating columns of the material with 5 M urea solution, gradually changing in pH from 3.0 to 5.8, and determinations by Sanger's method of the N-terminal groups of the components isolated from wool following treatment with acid gave average chain-weights of 96,500 and 20,500 for component I and component III, respectively.

Search for a method of determining the moisture content of raw wool continued, and a general survey being made of the diffusion constants of a wide range of organic molecules, from toluene and benzyl alcohol to a non-ionic detergent of mol. wt. 558, indicates that the mobility of a molecule in keratin depends more on its hydrophobic-hydrophilic balance than its size. Work completed on the breaking-time and dynamic elastic modulus of nylon confirms that changes in moisture content affect both the elastic properties and the strength of the structural elements as well as the internal viscosity.

Recent work has shown that at least one of the causes of yellowing of woollen yarn on storage is the presence in the olein of small amounts of polyunsaturated acids: linolenic acid causes permanent yellowing, but the effect of linoleic acid is less

* Wool Industries Research Association. Report of the Director of Research for 1960. (Publication No. 215.) Pp. 39. (Torridon, Headingley, Leeds: Wool Industries Research Association, 1961.)