

Sir Harold Hartley, in summarizing the contributions, stressed the part that Boscovich had played in establishing relations between the Southern Slavs and the United Kingdom, and the need for a biography of a great scientist recently unduly neglected. A scheme is under consideration for a volume combining a short biography with an extended

report of the meeting covering additional aspects of Boscovich's scientific work.

¹ Recent studies of Boscovich's atomism, interpreting it as a kinematic theory, have been made by Whyte, L. L., *Nature*, **170**, 284 (1957), and *Notes and Records of the Royal Society*, **13**, 38 (1958); and by Jammer, M., "Concepts of Force", 170 (Harvard Univ. Press, 1957).

PHOTOCHEMICAL REACTIONS

THE Society of Physical Chemists of France organized a symposium on the transfer of light energy and photosensitization at the Physico-Chemical Laboratory of the University of Paris during May 27-30. In his introductory remarks, Prof. F. Perrin discussed the general principles of light-energy transfer and the life periods of activated molecules, fluorescence, chain reactions and their inhibition. D. Curie (Paris) presented the theoretical aspects of energy transfer and its mechanism in the crystals of luminescent minerals, such as zinc sulphide and potassium chloride. H. Haken (Erlangen) considered the theory of excitons and their role in the transfer of energy in the solid state. S. Nikitine (Strasbourg) described his experiments on the absorption, emission and reflexion spectra of thin layers of Cu_2O , HgI_2 , PbI_2 , CuBr , CuCl , TlI , TlBr , TlCl , CdS and CdI_2 . Some experiments on the transfer of energy by excitons in cadmium sulphide were reported by E. Grillot (Paris), and N. Arpiarian (Paris) discussed the luminescence of zinc sulphide activated by gold and nickel at -158°C .

A series of papers on the luminescence and energy transfer by organic compounds such as benzene, naphthalene, anthracene, chrysene, pyrene, dihydro-diphosphopyridine nucleotide, etc., were presented by workers from several countries. Other topics included the spectra of silver halides and the phenomena of optical sensitization and desensitization;

photo-oxidations and photo-reductions and fluorescence of different organic compounds, colouring matters and their acceleration and inhibition; the transfer of light energy, fluorescence and mechanism of plant and algal photosynthesis. N. R. Dhar and co-workers (Allahabad) discussed their investigations on the increase of nitrogen fixation in soils on incorporating molasses, straw, grass, leaves, etc., by light absorption and calcium phosphates. The mechanism of this nitrogen fixation is based on the decomposition of water molecules into H and OH as in plant photosynthesis. As in animal metabolism and photosynthesis, phosphates are of great importance in nitrogen fixation. A. Szent-Györgyi (Massachusetts) contributed an important paper on the transfer of energy in muscles. This transfer is possible to distances greater than atomic dimensions.

As the world as a whole is short of food, intensive investigations on the acceleration of photosynthesis and soil nitrogen fixation are bound to be of great practical value.

On May 31 the Society celebrated its fiftieth anniversary at the Maison de Chimie, and addresses dealing with the progress of physical chemistry with special reference to France were delivered by Profs. R. Lucas, E. Bauer, R. Wurmser and A. Szent-Györgyi and the representative of the Minister of National Education in France.

THE GERMAN STARCH CONVENTION, 1958

THE International Starch Conference, held at Detmold during April 22-24, was well attended, with some 200 delegates from twenty countries.

In the section covering research and analysis, a paper was read by Dr. G. Gilbert (Birmingham), in which the action of air on aqueous solutions of starch was surveyed. An estimate has been made of the rate of hydrolysis of starch by pure water at 100° and 120°C ., and it is found that the molecule of amylopectin is large enough to be affected by such hydrolysis during the dispersion of starch. The molecule of amylose, however, is too small to be affected by such hydrolysis, and it was suggested that oxidation by air contributes to the variation in the published values of the molecular weight of amylose. It was found possible to fractionate starch by dispersing it in cold sodium hydroxide under nitrogen and centrifuging the dispersion. Although sodium hydroxide is usually regarded as a good solvent for starch, the bulk of amylopectin was found to be quite insoluble in it under anaerobic conditions.

The development and present state of the starch industry in the United States was discussed by Dr.

G. E. Hilbert (Washington). He reported recent success in growing a variety of maize, the starch from which contains 82 per cent amylose. It is hoped to raise this proportion to more than 90 per cent in the future. Amylose thus produced is cheaper than that obtained by chemical fractionation of starch. It is converted to the acetate, which is similar to cellulose acetate, and, moreover, it can also be digested in the stomach. Amylose acetate is therefore used for the production of such foodstuff adjuncts as sausage skins. Another development in the United States is the electrolytic oxidation of starch with periodic acid; the dialdehyde obtained is a good tanning agent for skins and is also used as a base for plastics.

Prof. M. Samec (Ljubljana) read a paper concerning the degradation of starch by γ -radiation. He reported in particular on the effects of the radiation derived from the betatron, X-rays and cobalt-60 on potato starch. Irradiation by cobalt-60 for 3 hr. was found to cause in starch complete loss of power to adsorb iodine. After 5 hr. the dialysable fraction had risen to 5.2 per cent and the reducing power had increased three-fold. After 7 hr. irradiation by

cobalt-60, a dispersion of starch in water was reduced to nearly the same viscosity as pure water. It was also found that the amylopectin fraction had acquired an acid pH.

It has been known in the confectionery trade that starch syrups, made by acid hydrolysis of starch, tend to become 'brittle' and cloudy when containing a high proportion of dextrose. Dr. G. Graefe (Hamburg) informed the meeting that stable syrups of low monosaccharide content can be produced by using initial starch dispersions of high concentration. The hydrolysis is carried out in two consecutive stages: first using acid to dextrose-equivalent 50, followed by treatment with malt enzyme.

The ion-exchange properties of freshly prepared and aged starch with heavy water have been studied by M. Čeh (Ljubljana). He reported that the rate of exchange of hydroxyl groups of amylose and amylopectin with heavy water (D₂O) has been measured by means of infra-red spectroscopy on dried films. It was found that the capacity to exchange ions of aged amylose films is much smaller than that of fresh films, whereas amylopectin similarly treated undergoes no change. Treatment of aged amylose films with pot-

assium hydroxide or hot water restores the capacity to exchange with heavy water almost to its former value.

A. W. Davies (London) discussed the production of vital gluten and its application in Great Britain. Vital wheat gluten fulfils a useful function in the fortification of flour or bread doughs, on which it confers increased volume, improved crumb structure, keeping quality and flavour, while enhancing its nutritional value. It permits the manufacture of bread suitable for inclusion in diets prescribed in the treatment of certain clinical conditions. Gluten, at one time considered only a waste product, is rapidly becoming indispensable to the baking industry.

At the conclusion of the conference a meeting was held to discuss the project for standardizing the analysis of starch and its products on an international level. Work has already been started by ten committees covering such items as viscosity, ash, colour and protein content of starches. It was resolved to ask the International Organization for Standardization to take this project under its aegis and to organize further work in the many countries interested in it.

E. Dux

THE WOOL INDUSTRIES RESEARCH ASSOCIATION

REPORT FOR 1957-58

THE report of the Director of Research of the Wool Industries Research Association for 1957-58*, presented at the thirty-ninth annual general meeting on March 25, notes that the increase in the statutory levy obtained by the Wool Textile Research Council and the Wool Textile Delegation has enabled the Association to obtain a maximum grant from the Department of Scientific and Industrial Research. Work at Torridon on behalf of the Technical Advisory Committee of the Federation of British Carpet Manufacturers on the relative merits of East Indian, New Zealand and British wools for carpets has shown that East Indian wools may have a density as much as 30 per cent less than that of New Zealand wools because of the presence of medullated or hairy fibres. Wear tests of an experimental carpet indicate that the abrasive machines used by the Association correctly assess the results likely to be obtained in actual wear. The Association has accepted a sponsored project which aims at combining the Association's shrink-resistant process with some method of stabilizing the fibre, so that the shape as well as the size of the garment will be retained after washing.

Experience with the pilot scouring machine has emphasized the need for a more versatile set for research. The study of the effect of the nature and amount of residual grease from scouring, together with added oil, on breakage of fibres and subsequent tear on combing points to the possibility of considerable improvement. Trials at Torridon have substantiated the claims of some firms that special fancies can reduce the amount of fettling, but a very solid foundation of fettlings may be built up, removal

of which is difficult without damaging the cloth. It is now reasonably certain that the region of high twist occurs in the short portion of yarn between the delivery rollers and spindle tip when the carriage is at its innermost position. This short length is twisted twice on successive draws and the double twisting is not completely removed before the yarn is wound on the top. Accordingly, reducing the length of yarn at the innermost position may be advantageous. Sintered metal bearings for mule spindles impregnated with polytetrafluoroethylene have performed very well under test and are being tried in the mill.

The Raper auto-leveller draw-box is being modified for use with the rotating can method to permit a greater output and larger packages from the draw-box. Considerable progress is reported in the analysis of spinning end-breaks, and extensive experiments have been made to determine whether the 'resting' of wool at different stages in processing contributes to any desirable qualities in the finished fabric. Scouring experiments have been completed with white worsted and fancy woollen pieces, and special scouring routines have been developed to overcome difficulties experienced with wool 'Terylene' worsted cloths, while light bars and streaks in these cloths have been traced to exposure to light before scouring, when the oxidation of the combing oil is accelerated, and this is more readily removed from 'Terylene' as its state of oxidation advances. A survey of crabbing routines in the mills of twenty-three firms was completed, and in the Scottish Laboratory a study of the effect of steaming and storage on wool oils emphasized the importance of tryptophan in the discoloration of wool. Experiments at the Rowett Research Institute on the effect of a light-dark rhythm on the growth of wool indicated a seasonal variation in production of

* Wool Industries Research Association. Report of the Director of Research for 1957-58. Pp. 30. (WIRA Publication No. 211.) (Torridon, Headingley, Leeds: Wool Industries Research Association, 1958.)