

INTERNATIONAL UNION OF LEATHER CHEMISTS' SOCIETIES

FOURTH CONFERENCE

NEARLY four hundred members and guests from twenty-five countries took part in the fourth biennial conference of the International Union of Leather Chemists' Societies held in Stockholm during July 31–August 4. The official opening of the conference took place at the Kungl. Tekniska Högskolan, when in the presence of representatives from the Swedish Tanners' Federation, the Swedish Chemical Society and the University of Uppsala the president of the conference, Dr. K. H. Gustavson, called upon the veteran Swedish leather chemist, Dr. Edmund Stiasny, to declare the congress open. In the presidential address that followed, Dr. Gustavson dealt with the researches of the little-known Swedish chemist of the early nineteenth century, Carl Hyltén-Cavallius, who in the space of a short life of thirty-six years published several papers on tanning processes and also on the conversion of collagen to gelatin. His pioneer work did much to pave the way for subsequent investigations into mineral tannages.

There then followed the Max Bergmann Memorial Lecture delivered by his successor, Prof. Dr. Wo. Grassmann, of the Max Planck Institut für Eiweiss-u. Leder-Forschung in Regensburg. The subject, "Our Present Knowledge of Collagen", provided occasion for a comprehensive and lucid review of the progress of collagen research from the early days of Emil Fischer, through the work of Astbury to the modern concepts of the helical configuration proposed by Pauling and Corey. He also dealt with the many precursors and congeners of collagen that are now being widely investigated.

One novel feature of this congress was the holding of two symposia devoted to "The Properties of Leather" and "The Fundamentals of the Chemistry of Tanning Processes". In this way the organizers of the conference largely avoided one of the dangers that are apt to beset all large scientific meetings, namely, that of loading the programme with a host of unrelated papers. In these two symposia a number of invited speakers presented various aspects of the subjects which were afterwards discussed.

The symposium on "The Properties of Leather" included papers by Drs. R. G. Mitton (British Leather Manufacturers' Research Association and president of the Society of Leather Trades' Chemists), J. R. Kanagy (U.S. National Bureau of Standards), E. Baumann (Bally Experimental Station, Switzerland) and Prof. P. Chambard (École de Tannerie, Lyon). Mitton, in surveying the main physical properties of leather, emphasized the importance of the interfibrillary air spaces and showed how their relative magnitude affected such properties as water vapour and air transmission, thermal insulation, etc. Kanagy dealt mainly with the steps being taken in the United States by the government and by industry to establish standards by which the behaviour and reputation of leather could be safeguarded. Baumann presented the problem of leather properties from the point of view of the shoe-making industry and classified the desirable properties under three headings: (i) properties such as tear- and abrasion-resistance, and plasticity, that are important in manufacturing

processes and in wear; (ii) properties such as flexibility of sole and upper leather and their permeability to water vapour, which are important for comfort; and (iii) properties such as colour stability, freedom from spue, etc., which are aesthetically important. Chambard's contribution mainly concerned methods of testing leathers in current use in France, such as sand-blast abrasion and the softening of leather in contact with water. He also outlined some recent service trials. Largely as a result of this symposium, it was agreed to set up an International Commission on Physical Testing of Leather, of which Dr. Mitton was invited to become chairman.

A whole day was devoted to the symposium on "The Fundamentals of the Chemistry of Tanning Processes", with lectures by Drs. K. G. A. Pankhurst (British Leather Manufacturers' Research Association), D. Balányi (Klippan), Th. White (Forestal Central Laboratories), A. Küntzel (Darmstadt), G. Otto (Badische Anilin- u. Soda-Fabrik), H. G. Turley (Rohm and Haas) and Mr. N. L. Holmes (R. Hodgson and Sons, Ltd.). Pankhurst outlined the work of his department on monolayer studies of tanning reactions and gave evidence of the predominant role of hydrogen bonding between phenolic groups in the tannin molecule and carbonyl groups in the protein 'backbone' in vegetable tanning. The use of model substances had provided confirmatory evidence of this. Otto, in a paper on the interaction of skin with aromatic tanning agents, dyestuffs and auxiliaries, also gave attention to this aspect and outlined the various types of chemical and physical linkage that could occur, from the strongest coulombic binding to the weakest van der Waals–London attractions. A review of the theories of vegetable tannage was given by White, who showed how modern concepts of the collagen molecule have helped in the interpretation of vegetable tanning processes. Küntzel's contribution, which was concerned with synthetic tannages, showed how modern sytan manufacturers had tended to depart from the original object of simulating vegetable tannins, having realized the immense versatility that could be achieved by concentrating on ionic types. Balányi gave a very full summary of the chemistry of chrome compounds and their reaction with hide. The papers of Holmes and Turley were essentially practical, the former dealing with modern sole leather manufacture, and the latter tracing the influence of the pre-tanning processes on the final properties of the leather. Prof. D. Burton provided a concluding résumé.

In addition to the papers presented at these two symposia, fifteen other communications were read. It is impossible to summarize all these here, but mention may be made of the following, which provoked some useful discussion. In "Studies of Leather by means of a Sonic Technique", J. R. Kanagy and M. Robinson described the propagation of sound waves through various types of leather in different directions, showing that the velocity of the waves is correlated with such physical properties as tensile strength. R. G. Mitton, in "The Diffusion of Water Vapour in Leather", provided conclusive proof that the transfer process is almost exclusively by diffusion

through the interfibrillary air spaces and that diffusion through the fibres themselves is negligible. In "Tanning as a Rate Process", N. L. Holmes and H. G. Wollenberg described the use of buoyancy measurements for following the uptake of tannin by skin. Equilibrium values agreed well with chemical analysis. The uptake was exponential, with half-periods varying from several days with dilute solutions to 18 hr. for strong solutions. "The Examination of the Fastness Properties of Leather Dye-stuffs", by W. Weber, put forward a proposal, eventually agreed in a plenary session of the conference, that an international commission be set up to co-ordinate the activities of the various national committees interested in this subject. Other papers dealing with dyeing were: "The Colouring of Suede Leather" (C. Alabouvette and C. Rouanet) and "The Measurement of the Colour of Leather" (J. A. Sagoschen). The problem of effluent disposal, which is becoming increasingly pressing in the leather industry, was discussed in two papers: "The Problem of Sewage in the Leather Industry" (H. Scholz) and "Financing Waste Disposal Installations" (E. B. Thorstensen). The impregnation of sole leather with synthetic resins, with the view of improving wearing properties, was discussed by P. Chambard.

In addition to the scientific and technological communications, useful committee work was carried out by the two existing International Commissions dealing with Leather Analysis and Tannin Analysis.

Social events included a visit to Skansen, where a replica of an ancient tannery and of many other craftsmen's shops attracted much attention, a sea trip to part of the Stockholm Archipelago, a reception by the Stockholm City Council and the closing banquet in the famous Gyllene Salen of the City Hall.

The conference attracted a good deal of attention in Stockholm, and besides the usual news conferences, Radio-Tjänst relayed an account of the proceedings given by the retiring president, Dr. K. H. Gustavson, and his successor, Dr. H. G. Turley. At the final meeting of the conference it was decided to accept the invitation of the Italian Society of Leather Trades' Chemists to hold the 1957 Conference in Rome. K. G. A. PANKHURST

CANADIAN COLLOQUIUM ON THEORETICAL PHYSICS

A COLLOQUIUM on theoretical physics was held at the Canadian National Research Council, Ottawa, during June 9-17, arranged by the Division of Pure Physics of the Council in honour of Prof. P. A. M. Dirac. Owing to a prolonged illness, Prof. Dirac was unable to attend the colloquium, but he was to visit the National Research Council later. The colloquium was attended by a hundred and twenty-one physicists from Canada and forty-one from the United States. At the opening session, Dr. E. W. R. Steacie, president of the National Research Council, welcomed the speakers and visitors, and Dr. G. Herzberg, director of the Division of Pure Physics, explained the general scope and purpose of the colloquium; he said that there would be twenty-one invited papers and twenty-four contributed papers covering a wide range of subjects in theoretical

physics, and he hoped that sufficient time would be available for the speakers to give an account of their subjects which would be of value both to the non-specialists and to the specialists. This purpose was admirably achieved, and the colloquium was a valuable contribution both to theoretical physics in general and, more particularly, to physics in Canada.

The opening lecture was the first of three lectures by H. A. Bethe on the scattering of π -mesons. Dr. Bethe gave an account of the experimental evidence and showed how the main properties of the meson-nucleon system could be deduced. The dominance of the $p_{3/2}$ state in π -meson scattering and the energy dependence and sign of the principal phase shifts were shown to follow from the scattering data independent of any perturbation method or detailed use of theory. His second talk gave an account of Goldberger's proof based on causality that the real part of the forward-scattering amplitude changes sign at a resonance, and then described the successes of the Chew-Low theory of meson scattering, and of the Cornell calculations based on the Tamm-Dancoff equation. Dr. Bethe's third talk gave Wick's derivation of the Low equation in meson theory and noted that Low and Chew had now shown that this equation followed from causality rather than from any detailed structure of meson theory.

S. Chandrasekhar gave a series of five lectures on problems of stability and turbulence in hydrodynamics and hydromagnetics. In his lectures on stability he concentrated principally on the manner of the onset of thermal instability in a layer of fluid heated below when it is subject to rotation and/or a magnetic field. He showed that, when subject to rotation, instability can set in either as convection and a stationary pattern of motions, or as overstability and a purely oscillatory pattern of motions, depending on the ratio K/ν of the thermometric conductivity to kinematic viscosity. The dependence on this ratio is such that, for a layer of water subject to rotation, instability should set in as ordinary convection, while for mercury it should set in as oscillations of increasing amplitude. In these instances the experiments by D. Fultz and Y. Nakagawa confirm all aspects of the theoretical predictions. Similarly, Prof. Chandrasekhar showed that an external magnetic field should inhibit the onset of convection by thermal instability in an electrically conducting fluid such as mercury; and that the extent of the inhibition should depend on the strength of the impressed magnetic field and the electrical conductivity in a determinate way. Here again the theoretical predictions have been confirmed by experiments. In his lectures on turbulence, Prof. Chandrasekhar described his recent efforts to develop a deductive theory of turbulence. He suggested that the similarity principles of Kolmogoroff (and their extensions) provide boundary conditions at infinity for the basic equations he has derived (*Proc. Roy. Soc.*, **229**, 1 (1955), equation 32). In this way he has been able to determine in a unique manner the function and the constant which are left unspecified by the dimensional arguments. In his last lecture he outlined an elementary theory of hydromagnetic turbulence and showed that two distinct modes of turbulence exist. He distinguished these as the velocity mode and the magnetic mode, respectively. In both modes, equipartition between the two forms of energy (kinetic and magnetic) prevail among the largest eddies present; however, in the velocity