

SPECTROSCOPY IN AUSTRALIA

THE fourth Australian Spectroscopy Conference, sponsored by the Australian Academy of Science, and organized by a Committee under the chairmanship of Prof. A. N. Hambly, was held in the Academy of Science Building and in the Australian National University, Canberra, during August 20–23. The Conference was opened by Prof. N. S. Bayliss, chairman of the Academy's Standing Committee on Spectroscopy, who welcomed more than 300 participants and the fifteen firms exhibiting commercial spectroscopic equipment.

The programme was based on ten invited lectures and review papers, the first of which was by Dr. G. Herzberg (National Research Council, Ottawa) on electronic transitions of simple molecules. Following a summary of the ways in which the electronic states of simple polyatomic molecules are related to those of atoms and diatomic molecules, a description was given of the analysis of vibration-rotation bands, leading to a determination of the geometry of molecules in the ground and excited states. Difficulties in determining the change in symmetry on excitation and complications due to vibronic and Jahn-Teller interaction were described and illustrated by a discussion of the structures of HNO, H₂O, NCO, HSiCl, NH₃, HNCN and CF₃I.

The other invited speaker from overseas, Prof. M. Kasha (Florida State University), presented an account of a theory of electronic transitions in aggregates based on the exciton model and showed how this model can be translated into a consideration of the classical interactions of suitably aligned dipoles. The theory predicts shifts, splitting and selection rules which are substantiated by measured spectra of hydrogen-bonded dimers and by the absorption and luminescence spectra of dye aggregates. As a postscript, Kasha described the remarkable chemiluminescence observed when ClO⁻ and H₂O₂ are mixed and which he interpreted as due to a transition in solvated oxygen.

A third review paper on molecular electronic spectra by Prof. N. S. Bayliss (University of Western Australia) was devoted to charge-transfer spectra of solutions with emphasis on the various interpretations of the Benesi-Hildebrand plot based on the formation of charge-transfer complexes or on cage phenomena. The quantum mechanics of the charge-transfer process were discussed in some detail, with particular reference to the manner in which the degree of interaction is related to the ionization potential of the donor molecule and the electron affinity of the acceptor.

These invited lectures were followed by papers covering many aspects of molecular electronic spectra. G. Herzberg reported on recent work on free-radical spectra at the National Research Council of Canada, the radicals which have been studied including NCO, BO₂, NCN, HCO, HNO, HSiCl, HNCN, NH₂, CH₃ and CH₂, for which the geometrical structures in the ground and excited states have been determined. The flash photolysis of tetracyanoethylene vapour was described by C. L. Cook, D. Kilpin and I. M. Napier (Chemistry and Physics Division, Weapons Research Establishment, Adelaide) and the spectra of C₂ and CN reported. A. J. C. Nicholson (C.S.I.R.O. Division of Chemical Physics, Melbourne) described a windowless monochromator for studying photoionization efficiency curves in the 1600–850 Å region and gave results for Xe, NO, O₂, CH₃I and CH₄. The efficiencies of radiation-less transitions between excited electronic states were discussed by J. P. Byrne and I. G. Ross (Chemistry Department, University of Sydney) on the basis

of tunnelling between the zero-point level of one state and vibrationally excited levels of lower states. With the observation that in extremely pure zone-refined anthracene both the energy transfer and luminescence cease to be markedly dependent on temperature, A. R. Lacey and L. E. Lyons (Chemistry Department, University of Sydney) suggested that excitons and impurity-levels might act as traps for the excitation energy at sufficiently low temperatures, with the result that, in a mixed crystal of pure anthracene with any organic compound that fits reasonably well into the lattice, the fluorescence should come from both host and guest at higher temperatures. E. F. McCoy (Chemistry Department, University of Sydney) discussed the analysis of the absorption spectra of the vapour of azulene and azulene-*d*₈, while L. M. Logan (Chemistry Department, University of Sydney) presented data on the fluorescence spectra of these molecules both in the vapour phase and in solution. Analysis of the absorption and fluorescence spectra of anthracene in solid solution was reported by A. Bree and S. Katagiri (Department of Chemistry, University of British Columbia), while R. G. Body (Chemistry Department, University of Sydney) suggested that the electronic spectra of mixed crystals could be calculated by perturbed matrix theory and illustrated the method by a model calculation on naphthalene crystals.

Theoretical considerations on the relation of the position and intensity of spectral transitions in the case of charge transfer complexes, where the transfer is more extensive in the ground state, were presented by R. D. Brown and E. K. Nunn (Department of Chemistry, Monash University) and illustrated by their results for some boron complexes. M. Batley, A. Fulton, M. Lampard and L. E. Lyons (Chemistry Department, University of Sydney) showed that relative electron affinities of electron-accepting molecules and relative ionization-potentials of electron-donating molecules can be obtained from charge transfer spectra. The effect of pH, temperature and organic solutes on the spectra of three β-lactoglobins was discussed by H. A. McKenzie (Department of Physical Biochemistry, Australian National University, Canberra) in relation to the current structural theories of these genetic polymorphs. Ultra-violet and infra-red spectroscopy were used by R. A. Jones (Department of Chemistry University of Adelaide) to show that the 2-pyrrolyl-methylene imines exist in the imine and not in the alternative amine form, while J. N. Phillips (C.S.I.R.O. Division of Plant Industry, Canberra) discussed the influence of various ligands on the spectra of zinc, nickel and iron porphyrin complexes.

The session on vibrational spectroscopy opened with an invited paper by G. Herzberg on the determination of the geometrical structure of simple polyatomic molecules by infra-red and Raman spectroscopy. Advances in instrumentation, particularly the advent of good infra-red detectors, thereby allowing full use of grating instruments, the discovery of the Raman effect and the development of microwave spectroscopy, have enabled accurate determination of the geometry of many small molecules. After discussing the vibrational and rotational energy-levels of polyatomic molecules the theory was illustrated by the rotational Raman spectra of CO₂, CS₂, C₂H₂, benzene, allene and ethane and the vibrational-rotational spectra of acetylene, HCN, HCP, CH₃D, CH₃I, methylacetylene and water. In conclusion, Herzberg discussed the variation of the C—C and C—H bond lengths in molecules in terms of their molecular environment.

In the following session, R. A. Ashley and R. L. Werner (Department of Chemistry, University of New South Wales) discussed the analysis of the high-resolution data for the 800 cm^{-1} fundamental of the pseudosymmetric top molecule HNCO, locating the bond centre at 777.12 cm^{-1} and determining the *A*, *B*, *D* and *H* constants in both the upper and lower states. The infra-red spectra of both solid glyoxal and its vapour were shown by P. J. Black, J. A. Burrows, A. R. H. Cole and D. J. Elias (Chemistry Department, University of Western Australia) to support the *trans* structure, while R. D. Brown, M. F. O'Dwyer and G. P. Poz (Department of Chemistry, Monash University) showed the vapour phase infra-red spectrum of S_2F_2 to be consistent with the hydrogen peroxide FSSF structure. The low-resolution infra-red data for the vapour of CN_3ScCN were shown by W. J. Franklin and R. L. Werner (Chemistry Department, University of New South Wales) to be consistent with a CScC angle in excess of 130° , and with the aid of Raman and infra-red data for the liquid they were able to make a complete vibrational assignment. V. Duckworth and R. L. Werner (Chemistry Department, University of New South Wales) presented infra-red and Raman data for solutions of cyanothioformamide together with the infra-red spectrum of the solid, and by comparison with deuterated and other derivatives were able to make a complete vibrational assignment. The infra-red and Raman spectra of mono- and poly-halogenated acetate ions were discussed by E. Spinner (Department of Medical Chemistry, Australian National University) with particular attention to the effect of polar and mass effects of the substituents on the symmetric and asymmetric carboxylate stretching frequencies and the preferred conformation of the ions. M. Colwell, B. James and P. E. Rogasch (Weapons Research Establishment, Salisbury) presented the infra-red spectra of some nitrophenols and discussed the effect and position of substitution on the asymmetric and symmetric nitro group frequencies. Emission and reflexion techniques for the study of the infra-red spectra of molten inorganic materials at temperatures up to $1,000^\circ\text{C}$ were discussed by J. K. Wilmshurst (C.S.I.R.O. Division of Chemical Physics, Melbourne) and results for the system $\text{Zr}_4\text{F}-\text{NaF}:\text{KF}$ were presented and interpreted in terms consistent with complex-ion formation. Differentiation between different barbiturates using infra-red spectroscopy was discussed by W. F. Ulrich, T. Johns and H. J. Sloane (Beckman Instruments, U.S.A.) and W. J. Cadman (Orange County Crime Laboratory, California, U.S.A.).

The study of association phenomenon by vibrational spectroscopy was the subject of six papers. A. D. Kidman and T. J. V. Findlay (School of Chemistry, University of New South Wales) discussed the infra-red spectra in the 3μ region of mixtures of butanol and pyridine, and of chloroform and pyridine in carbon tetrachloride and derived thermodynamic properties of hydrogen bond formation. The use of partial deuteration as an aid to the study of inter- and intra-molecular hydrogen bonding of amides and amines, and also as an aid to establishing the presence or absence of primary amino groups in unknown compounds, was illustrated by A. G. Moritz (Defence Standards Laboratory, Melbourne), while T. H. Recco (Chemistry Department, Wollongong University College) presented results of his investigations in the 3μ region of the strong hydrogen-bonding between *p*-nitrophenol and alcohols in dilute carbon tetrachloride. H. G. Higgins, A. J. Micholl and B. J. Poppleton (C.S.I.R.O. Division of Forest Products, Melbourne) discussed the use of nuclear magnetic resonance spectroscopy in the determination of the conformation of pyranose sugars in solutions and also interpreted the infra-red data of the OH stretching region of these materials in terms of hydrogen-bonding. Relative changes in the frequencies and intensities of the stretching bands in HNCS and DNCS on hydrogen bond formation with acceptor molecules in

carbon tetrachloride solution were discussed by A. D. E. Pullin (Chemistry Department, Monash University) and related to polarization effects by the acceptor molecule. R. A. Cummins (Defence Standards Laboratory, Melbourne) discussed his work on the effect of solvents on the frequency and intensity of the stretching band about 2100 cm^{-1} in thio- and isothio-cyanates and reported measurements on the frequency and intensity of the CH band of CHCl_3 dissolved in these materials. A study of low molecular weight organic and inorganic cations absorbed on highly oriented sheets of vermiculite by both X-ray diffraction and infra-red spectroscopy was presented by R. H. Laby (Victorian Department of Agriculture) with special emphasis on N-H—O hydrogen-bonding and the interaction of the π electrons of aromatic cations with the surface oxygen atoms. The session concluded with a paper by C. H. Burton, W. B. Lasich, J. H. Noon and R. W. Parsons (Physics Department, University of Queensland) on a study in the microwave region of the pressure broadening by CO_2 and N_2 of the absorption of CH_3Cl due to inversion of the symmetric top molecule.

J. D. Morrison (C.S.I.R.O. Division of Chemical Physics, Melbourne) reviewed some aspects of modern mass spectrometric techniques for the identification and determination of molecular structure and discussed the possibility of programming a computer to compare the mass spectrum of an unknown with a library of known spectra. He demonstrated a tape-recording of a mass spectrum used for transfer of information from a mass spectrometer to a computer. He also described how the energy-levels of positive ions could be obtained from electron-impact measurements and showed that a knowledge of probability laws could be used to distinguish different types of ionization process. J. S. Shannon (C.S.I.R.O. Division of Coal Research, Sydney) reported marked differences in the mass spectra of epimeric hydroxy- and acetoxy-cyclohexane derivatives which he found to be due to different modes of elimination of water or acetic acid from the different ions. The mass spectra of some alkenyl phenols were presented by J. L. Occolowitz (Defence Standards Laboratory, Melbourne), who showed that the base peaks correspond to the rearranged ion type $R-\text{CH}_3$, where *R* represents the molecular ion less its alkenyl side-chain, thus permitting the number of phenolic hydroxyl groups to be determined. P. J. Morgan (Department of Pharmacology, University of Melbourne) reported infra-red and mass spectrometric data on some minor basic metabolites in human urine.

L. M. Jackman (Chemistry Department, University of Melbourne), in reviewing recent advances in nuclear magnetic resonances, commented that, whereas there was one paper on nuclear magnetic resonance presented in 1961 at the third Conference, there were some 13 papers wholly or largely devoted to this topic in Canberra. Recently, publications in this field have poured out in excess of 300 per month.

Three major experimental advances which had greatly affected the application of nuclear magnetic resonance techniques were higher magnetic fields, the locking of field and frequency, and spin-decoupling. The advantages of the first were clearly illustrated in a subsequent paper by P. J. Black and M. L. Heffernan (Department of Chemistry, Monash University) in which indazole, an *ABCDE* spectrum fairly strongly coupled at 60 Mc/s, was sufficiently 'first order' at 100 Mc/s to allow good starting values to be selected for the magnetic parameters.

Spin-spin decoupling was introduced soon after the initial discoveries in nuclear magnetic resonance, but had been popularized and refined recently largely due to the efforts of Freeman. Prof. Jackman outlined the relative merits of the field sweep method, where a constant frequency difference is maintained between the strong (or 'stirring') and the weak radiation while the spectrum is scanned by a magnetic field, and the converse case of fixed magnetic field and varying frequency difference. Not

only can spectra be simplified by spin decoupling, but also chemical shifts between protons, or between protons and other species, can be measured with great accuracy by observing proton spectra, and relative signs of coupling constants can be determined. The use of a field sweep decoupler to assist in the assignment of a strongly coupled *ABCDE* (benzofuran) was described later by P. J. Black and M. L. Heffernan.

On the theoretical side, the practical details of calculation of spectra on digital computers and the use of iterative techniques to produce 'best-fitting' sets of magnetic parameters from observed spectra had been largely pioneered and made practicable by Reilly and Swalen. Two papers presented discussed these points. S. N. Stuart and C. K. Coogan (C.S.I.R.O. Division of Chemical Physics, Melbourne) and P. J. Black and M. L. Heffernan reported the use of such programmes utilizing methods—differing somewhat from one another and from that of Reilly and Swalen—which produced refined parameters from approximate starting values and discussed the probable errors in the parameters so derived.

The theoretical understanding of chemical shifts and spin-spin couplings had progressed with a number of new proposals recently. Long-range chemical shifts due to magnetic anisotropies and ring currents, of the type originally introduced by London, and recently extended and refined by Pople and by Jackman, Hall and Hardisson, were in fairly good agreement with theory. Recent results of Jackman, Porter and Underwood in Melbourne for (3,2,2) cyclazene were reported.

The theory of spin-spin coupling was in a state of flux. The Karplus relation had been found to work well for nearly tetrahedral configurations, but the theory fails for heterocycles or five-membered rings, and is being re-examined. A. D. Buckingham's suggestion of partial orientation of polar molecules in a strong electric field, backed up by theoretical treatment, had allowed absolute signs of coupling constants to be obtained and already it was established that a positive proton-proton coupling existed in nitrotoluene and a negative proton-fluorine coupling in fluoroform.

In addition to the papers mentioned here, L. K. Dyall (Newcastle University College, N.S.W.), S. Winstein and W. G. Young (University of California) discussed shieldings produced by steric interactions in a series of quinone methides; D. J. Collins, J. J. Hobbs (Royal Hospital for Women, Paddington, N.S.W.), J. T. Pinhey (School of Chemistry, University of New South Wales), H. Rottendorf and S. Sternhell (C.S.I.R.O. Division of Coal Research, Chatswood, N.S.W.) reported the steric dependence of long-range proton spin coupling in allylic systems; and A. J. Ryan (Department of Pharmacy, University of Sydney) reported results of infra-red and nuclear magnetic resonance investigations of phenylazopyrazolones.

In the less-represented field of wide-line nuclear magnetic resonance, M. L. Heffernan, D. F. Kerr and P. D. Godfrey (Department of Chemistry, Monash University) illustrated the value of extra-proton nuclear magnetic resonance in an investigation of ^{199}Hg resonance in chloride complexes, and G. J. Troup (Department of Physics, Monash University) outlined work on wide-line nuclear magnetic resonance in powdered radiation-damaged BeO. M. J. Bogaard (Chemistry Department, University of Sydney) presented results of *PQR* experiments on iodo- and bromo-derivatives of five-membered heterocycles, and the effects of other substituents. Of interest to experimentalists was the paper by G. V. H. Wilson (Department of Physics, Monash University) on the deconvolution of modulation-broadened spectra for a number of cases.

Several widely varied papers in electron-spin resonance were also delivered. H. F. Symmons (C.S.I.R.O. Division of Physics, Sydney) presented results of zero-field electron-spin resonance in ferric acetylacetonate, with and without cobalt and aluminium dilution, from 4° K to 275° K. J. R. Thyer and G. J. Troup (Department of Physics,

Monash University) reported the effect of annealing BeO crystals on the spin centres induced by radiation-damage. V. C. Bien, A. J. Harle, L. E. Lyons and J. C. Mackie (Chemistry Department, University of Sydney) had studied charge transfer in solids in the presence of light by electron-spin resonance.

The session on stellar spectroscopy began with a review by T. Dunham (Department of Astronomy, Australian National University) of our present knowledge of the spectra of stars and planets. He stressed the need for more sophisticated methods of direct photoelectric recording which would incorporate video systems for transmitting the spectral data to tapes for storage. The advances which would be possible when spectra could be observed from satellites were outlined. During the Conference, many members visited Mount Stromlo Observatory where they inspected the 74-in. telescope and associated Coude spectrograph designed by Dunham.

H. Gollnow (Mount Stromlo Observatory, Canberra) reviewed our present knowledge of 'magnetic stars' and pointed out that there were many puzzling features in the observed Zeeman effects which could not be explained by any one model. High-dispersion spectral studies of R. Y. Sagittarii were reported by I. J. Danziger (Mount Stromlo Observatory, Canberra), who concluded that the main mass of the stars must be spectroscopically invisible helium and the source of continuous opacity is photo-ionization of neutral carbon rather than the negative carbon ion. The luminosity classification of *G*-type stars was discussed by W. Buscombe and C. Dickens (Mount Stromlo Observatory, Canberra), who pointed out that it was possible from spectra of moderately high dispersion to distinguish effects of pressure in stellar atmospheres. B. E. J. Pagel (at Mount Stromlo Observatory, on leave from Royal Greenwich Observatory) discussed the abundances of metals in cool dwarfs and sub-giants, the data indicating that apparently all the main nucleosynthesis processes were essentially completed in the disk of the Galaxy by the time the oldest galactic clusters were formed. Studies of sub-giants show a range in metal abundance correlated with motion perpendicular to the galactic plane, but not with age. A. Przybylski (Mount Stromlo Observatory, Canberra) reported a very peculiar composition of the star *HD* 101065, which has an effective temperature 400° C higher than the Sun. The spectrum shows the presence in its atmosphere of only the rare earths besides hydrogen and traces of cadmium. Many fairly strong absorption lines are due to holmium, which has not yet been identified with certainty in the Sun or in stars.

The session on analytical applications of X-ray fluorescence spectroscopy began with a review by W. M. B. Roberts (Bureau of Mineral Resources, Canberra) of the developments leading to modern techniques. T. R. Sweatman and K. Norrish (C.S.I.R.O. Division of Soils, Adelaide) then discussed the determination or correction for the mass absorption coefficients and illustrated the application of these methods in the analysis of a wide range of natural materials. Methods for increasing sensitivity were described by K. P. Champion and R. N. Whitem (Australian Atomic Energy Commission Research Establishment, Lucas Heights, N.S.W.), while R. N. Whitem reported on the determination of strontium in samples of biological and geological interest. The analysis of materials adsorbed on alumina was described by V. J. Manners and F. H. Scott (Defence Standards Laboratory, Alexandria, N.S.W.), and I. Macdonald (Philips Electrical Industries, Sydney) discussed the general problem of X-ray spectrographic analysis without standards, using a method of successive approximations.

The review of atomic emission spectroscopy by S. R. Taylor (Department of Geophysics, Australian National University) stressed the desirability of increasing sensitivity to the 'part-per-billion' level and discussed various approaches to the problem. The applications of direct-

reading spectrographs and tape machines to control of a non-ferrous smelting process and to the analysis of steel work raw materials were described by M. D. Amos and P. C. Thomas (Sulphide Corporation Pty., Ltd., Newcastle, N.S.W.) and by Z. Collison and T. Scott (The Broken Hill Proprietary Company, Ltd., Newcastle, N.S.W.). The use of the briquetting technique and direct readers was described by T. Scott and B. Shanley (The Broken Hill Proprietary Company, Ltd., Newcastle, N.S.W.) with reference to the analysis of steelworks raw materials and by K. R. Walker (Bureau of Mineral Resources, Canberra) with reference to the analysis of rocks and soils. D. J. Swaine (C.S.I.R.O. Division of Coal Research, Chatswood, N.S.W.) gave details of the semi-quantitative methods he has developed for the analysis of materials encountered in coal research. The carrier distillation method for the analysis of refractory materials was used by L. S. Dale (Australian Atomic Energy Establishment, Lucas Heights, N.S.W.), who discussed the function of the 'carrier' in the matrix. The operational requirements of a small plasma jet of stable intensity were discussed by R. H. Brockman and R. N. Whittom (Australian Atomic Energy Establishment, Lucas Heights, N.S.W.). The final papers in the session by F. Broch and J. Schuch (Jarrell-Ash Company, U.S.A.) described the use of a laser for vaporizing small areas of sample, the resulting vapour being excited by a spark discharge. The technique offers attractive possibilities as a micro-probe.

D. J. David (C.S.I.R.O. Division of Plant Industry, Canberra) gave a comprehensive review of recent developments in atomic absorption spectroscopy which revealed a rapidly widening acceptance of the method, and he suggested that recent improvements in light sources and atomizers would lead to sensitivities in the 'parts-per-thousand-million' range for most of the 30 elements which are now regularly determined by atomic absorption methods. A further 20 elements are now detectable at 'part-per-million' levels in incandescent oxy-acetylene flames. J. E. Allan (Rukuhia Soil Research Station, New Zealand) reported results for elements having their strongest resonance lines below 2000 Å. For selenium the 1960 Å line gives a detection limit of 0.5 p.p.m. with a hydrogen flame. For arsenic a detection limit of 1 p.p.m. was obtained with the 1890 Å line, but the lines at 1937 and 1972 Å are preferable. Experiments with the mercury line at 1849 Å have so far been unsuccessful. J. V. Sullivan and A. Walsh (C.S.I.R.O. Division of Chemical Physics, Melbourne) described new atomic spectral lamps which gave a hundred-fold increase in resonance line intensity compared with conventional hollow-cathodes, and also yielded more linear calibration curves. The high intensity

makes possible detection by resonance absorption and re-emission. M. D. Amos and P. E. Thomas (Sulphide Corporation Pty., Ltd., Newcastle, N.S.W.) described a spray chamber and burner giving improved stability and sensitivity and reported a detection limit of 0.8 p.p.m. aluminium using an oxy-acetylene flame.

C. S. Rann and A. N. Hambly (Department of Chemistry, Australian National University) reported the distribution of the atoms of some common metallic elements in the type of flame commonly used in atomic absorption spectroscopy and in a second paper reported preliminary results on the determination of selenium. K. Collier and H. C. T. Stace (C.S.I.R.O. Divisions of Mathematical Statistics and Soils, Adelaide) described a statistical method for determining the optimum condition for maximum absorption, while G. C. Baird and B. Envali (Defence Standards Laboratory, Melbourne) reported various anion effects. The application of atomic absorption spectroscopy to the determination of metals in alloys, paints and plasters was described by G. C. McPherson (John Lysaght (Aust.) Ltd., Newcastle, N.S.W.) and methods for the determination of chromium, manganese and nickel in iron and steel were reported by K. Kinoon and C. B. Belcher (The Broken Hill Proprietary Company, Shortland, N.S.W.). G. R. Hercus (C.S.I.R.O. Division of Chemical Physics, Melbourne) discussed the possibilities and limitations of G. R. Isaak's method for the determination of the profiles of atomic resonance lines and J. J. McNeill (C.S.I.R.O. Division of Chemical Physics, Melbourne) reported on the performance of a monochromator he had designed for manufacture in Australia, utilizing plane gratings ruled on the C.S.I.R.O. ruling engine. A notable feature was the particularly small amount of scattered light. Elegant methods for automatically maintaining parallelism in interferometer plates, or for scanning over several orders, were described by J. V. Ramsey (C.S.I.R.O. Division of Physics, Sydney). This instrument also is expected to be manufactured in Australia.

The 15 exhibitors presented a wide range of spectroscopic equipment. Of particular interest was the exhibition for the first time at these conferences of Australian-made equipment, including an atomic absorption spectrophotometer, atomic spectral lamps, a grating monochromator and microwave-powered Raman lamp.

At the end of this very successful conference it was announced that the fifth Australian Spectroscopy Conference will be held in Perth in 1965.

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COLLAGEN RESEARCH IN CZECHOSLOVAKIA

IN many ways the first International Czechoslovakian Symposium on Collagen, held at Velké Karlovice during September 2-7, was the most interesting meeting of its kind since the Cambridge symposium of 1957. At that time there was virtually no fundamental research being carried out at C.S.S.R. institutes into connective tissue, with the exception of M. Chvapil, who might be regarded as the doyen in this field. It was the clear intention of the organizers, comprising the food institute, the three leather institutes, the rheumatism institute and the institute of hygiene and occupational diseases, to acquaint their guests with the effort now being directed at collagen, and there can be no doubt that the eyes of Western observers have been opened widely both to the extent of detailed work now being carried out in the C.S.S.R. and to the enthusiasm with which it is done.

Although it cannot be said that all of this contribution is original in concept, a very clear understanding of the collagen field was amply demonstrated in four excellent review studies: "The Biosynthesis of Collagen", by J. Hurych; "Experimental Lathyrism", by J. Rosmus; "Analysis of High Molecular Breakdown Products of Collagen", by Z. Deyl; "The Technical Aspects of Reconstituted Collagens", by C. Halámek.

It was a strong point of this meeting that it was not dominated by any single discipline, although contributions from Sam Seifter (New York), H. Noda (Tokyo) and A. Nordwig (Munich) ensured that amino-acid sequence experiments in collagen and techniques utilizing collagenases were well represented. Both reconstituted collagen and the effects of ionizing radiation were major points for discussion and these were often linked together;