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;

thus, J. Rosmus (Prague) showed that stabilizing cross-links formed. C. Halámek (Gottwaldov) was interested in following the Highberger *et al.* patents for converting reconstituted collagen into leather sheet. A. Blažej (Bratislava) showed that the X-ray diffraction pattern for collagen was destroyed by irradiation. A most noteworthy paper was given by J. Nichols (Sommerville, New Jersey) on the preparation and cross-linking of reconstituted collagen tape by co-ordinated tanning with formaldehyde and polyphenols. Electron microscopy of collagen was represented by a paper from R. Borasky (Urbana, Illinois), who regarded many of the differences shown between calf skin and shark skin fibres to be appropriated to phylogenetic studies. One gathered that there was no electron microscopy used in present-day collagen work in the C.S.S.R.

The paper by J. P. Bentley (Portland, Oregon) in collaboration with M. Chvapil (Prague) demonstrated the hitherto unreported oscillatory irregularity in the uptake of labelled amino-acids into collagen by guinea pig and chick embryos. It was of interest that work on rat tail tendon collagen was less prevalent than is usual at this type of meeting. Where it did arise, several speakers pointed to the dangers of applying results obtained with this material to human conditions. Both Bentley and Vladimíra Hlaváčková (Prague) emphasized the ageing phenomenon of the collagen along the rat tail, being oldest at the proximal and most recently laid down at the distal end. There were no formal contributions on gelatin research from C.S.S.R. institutes, but A. Courts (Colworth, U.K.) reported on the influence of the molecular shape of this protein on its interaction with sulphated polysaccharides.

The medical aspects of the C.S.S.R. interests in collagen are largely those of the United Kingdom and the United

States and include silicosis; rheumatism, in which gold therapy is being extensively studied by M. Adam (Prague); and atherosclerosis, in which the paper by Z. Hružá (Prague), working with subcutaneous implants of polystyrene sponges, showed the changes occurring in collagen, hexosamines and calcium on rats of different ages and as a function of diet. New methods of arterial implantation are being used by M. Kraljček (Prague) using collagen in association with fibroplastic materials, such as dacron and terylene. It is in this surgical field that the most dramatic advances are likely to occur and may well place C.S.S.R. medico-collagen research squarely on the map.

Unfortunately it is not possible to mention all the contributors to this stimulating congress. Special commendation was reserved for Dr. E. Martin (Sommerville, New Jersey), whose attendance was on behalf of *Collagen Currents*. The directors of Ethicon, Inc., who sponsor this valuable contribution to the collagen sciences, were officially thanked by Mr. Cihlář, the president of the congress. Full abstracts of all the papers presented are to be published in a future edition of *Collagen Currents* in English.

Full marks must be given to the organizers, particularly to the genius of J. Rosmus. There are certain agreeable aspects, which other committee men, whose thoughts are dwelling on conferences, might do well to contemplate. First, the size of the meeting, with seventy scientists and no concomitant sessions, seemed near to ideal conditions. Secondly, the papers were read at morning and evening sessions, with informal afternoons. Thirdly, a location was chosen well outside a large city with some recreational facilities. This was an immediate winner for creating informality, a feature which was spontaneously taken up in the discussion of papers. A. COURTS

HOUSE JOURNALS OF INDUSTRIAL FIRMS: THE GLAXO VOLUME

THE house magazines and journals produced by industrial firms and trading associations constitute a special and growing sector of scientific literature. Some organizations which are heavily dependent on research for their continued existence find it to their advantage to issue journals containing objective commentaries on recent advances in fields of science in which they are interested. As prestige publications, these are usually well written, with illustrations more imaginative and attractive than those to be found in original research papers.

A representative example is *The Glaxo Volume**. The latest issue contains six papers by unsigned contributors. The first elaborates a remark by Sir Henry Dale, that in therapeutic science the object of biological standards is to bring about their disappearance. For after preliminary work with crude extracts of some new drug, a move develops towards a standard preparation, and then an international reference preparation. Finally, the pure substance is isolated and possibly synthesized and the drug becomes available in units of weight.

Another concise paper discusses the possibilities of cybernetics in education and therapeutic work. It refers to the mathematical analysis of the factors concerned in keeping an anti-aircraft gun on its target, which led to the identification of a group of nerve fibres in the vertebrate motor system. The author points out that in a cybernetic sense, all animals are goal-seeking systems, as are also the control of body temperature and of the oxygen content of the blood. On this cybernetic principle a respirator has been produced for premature babies which can adjust its action to the varying needs of the

child. Other machines, working on similar principles, are being used to help patients with spastic or paralysed limbs. Many more possibilities of this nature are in prospect.

A paper dealing with the sequelae from gastric operations for ulcers of the stomach and duodenum brings out the delicate balance which exists between the organs of digestion. Operations of this kind reduce gastric mobility and the secretion of pepsin and acid. As a consequence, partially digested food passes too quickly through the duodenum and upper jejunum, so that the absorption of iron, calcium and vitamin B₁₂ is diminished. It is surprising that in the short run these changes do not more often lead to serious symptoms, except under strain, the reason being that a normal body has sufficient stores of iron to last for several years, and the skeleton may lose half its stock of calcium before displaying any detectable radiological abnormality. In addition, after operations for ulcers, there is a gradual development of abnormality in the gastric mucosa, which, it is thought, may lead to the appearance of carcinoma of the stomach after a period of approximately seventeen years.

A paper on "Master Molecules", which gains much from its convincing diagrams, discusses the process in which DNA molecules make use of messenger-RNA in the synthesis of protein. This sequence is becoming fairly well understood; but the author indicates that it paves the way to the elucidation of the chemical changes involved in a mutation of DNA, towards which biochemists are now groping.

The two most far-reaching papers are concerned with antigens. It is now known that in a virus particle the protein coat is responsible for antigenic specificity, and

* *The Glaxo Volume*, 26 (Glaxo Laboratories, Ltd., Greenford, Middlesex).