

"Tuberculosis" and "Insecticides" have already been held.

The Council has been consulted on a number of occasions regarding various aspects of the teaching of biology, such, for example, as the teaching of human biology in schools, and it was asked to nominate a representative to serve on a national board to consider the recruitment and training of laboratory technicians.

Many other minor matters have been dealt with by the Council; but perhaps one of the most important incidental benefits which members have derived from attendance at its meetings has been the personal contact between the officers of various societies and associations.

MEDICAL RESEARCH LABORATORY OF VOJVODINA, NOVI SAD, YUGOSLAVIA

By DR. P. SCHWARZ
Director

IN 1947 it was announced in these columns¹ that a Yugoslav State laboratory was to be founded in Novi Sad, with the task of dealing with problems of experimental biology and medicine. For certain administrative reasons the laboratory was transferred to Belgrade, and the director, Dr. P. Martinovitch, continued his research in the Boris Kidritsch Institute of Nuclear Science, where there were convenient facilities for carrying out his work. The premises in Novi Sad and a part of the fittings and apparatus were taken over by a newly founded bacteriological and serological laboratory under my leadership, and the whole organization was named the Medical Research Laboratory of Vojvodina. This new Laboratory has fixed research tasks, and its budget is financed by the State.

Novi Sad is a relatively small town of 86,000 inhabitants, but notwithstanding is the cultural and administrative centre of a rather large territory containing about eight hundred medical practitioners. The idea arose that scientific research work should not be the privilege of a fortunate few, exclusively employed for this purpose in well-equipped laboratories with undisturbed working possibilities; the ordinary medical practitioner often has a creative idea, and it was proposed that an organization should be established with the task of preserving creative ideas and not letting them fall into oblivion. The state of medical conditions in Yugoslavia makes it imperative that this help should be given so as to develop ideas which are in close touch with practical questions of health and sanitation.

The Laboratory has therefore been created in two parts: one is the bacteriological and serological laboratory already mentioned, with full-time workers who are allotted research tasks; and the other is the 'service laboratory', where part-time laboratory workers are employed, with the task of helping physicians who are working out their ideas in their spare time. The management of the Laboratory investigates whether the idea is original, whether it has some relations to practical sanitary questions and whether the Laboratory is able, taking into account limitations of staff and finance, to help in carrying out the research. In the service department of the Laboratory the following part-time workers are

employed: a pathologist, a bacteriologist, a haematologist, a biochemist, and a surgeon for carrying out operations on experimental animals. Besides these, the Laboratory employs assistants for part-time work according to the necessity and nature of the work. The above-mentioned sections are in the process of being formed and are at present only very modestly equipped; among other things, it is very difficult to get hold of medical publications and the periodical literature. It might be thought that, under such conditions, it is a mistake to undertake such a job and that it would be better to wait until matters improve. But to do so would be to risk losing ideas and losing the collaboration of ambitious young workers, and this would be an even greater mistake; so we have decided to work under the present conditions, even at the risk of publishing something in ignorance of the fact that the same work has been published elsewhere by others.

The Laboratory has proved to be an active organization, for since the time of its functioning in 1951 eight research workers have asked for help from its laboratory service and have worked on the following topics, publishing them in the Yugoslav medical press and also partly in foreign periodicals: the mechanism of blood clot retraction²; the determination of the value of the thrombocytes with regard to their function in blood clot retraction³; the determination of the serum protein fractions with the aid of salting out with ammonium sulphate⁴; the fractionation of beef heart extract⁵; new methods of making serial dilutions with small gradations⁶; new methods for adjusting colloidal gold solutions and carrying out the colloidal gold test⁷; the nature of the process of fibrinolysis and the products of the decomposition of the fibrin⁸; serum proteins in pregnant women⁹; the estimation of blood plasma clotting and the relation of the calcium concentration to the first and the second phase of blood coagulation¹⁰; the therapy of miscarriage with histamine¹¹; the finding of enhanced sensitivity of some *Salmonella* strains to bismuth and the prescription of a modification of the Wilson-Blair medium for the elimination of the inhibitory power of bismuth (balanced sulphite agar)¹²; experimental hyperfolliculinemia in dogs¹³; and experimental eclampsia in dogs¹⁴. Nearly all the papers enumerated in refs. 2-15 are written in Yugoslavian, but a translation or detailed summary will gladly be sent if requested. Besides these published papers, the following research problems have been registered at the Laboratory and are still under investigation: the disturbances of the antihæmorrhagic mechanism in dogs injured by X-rays; the nature of the S factor of blood clot retraction; contribution to the pathogenesis of eclampsia; the investigation of the effect of the liver on oestrogen metabolism; the changes arising in the antihæmorrhagic mechanism caused by folliculin; the effect of cation combinations of the sulphite-reducing micro-organism; experiments on the quantitative estimation of the accessory growth factor; the effect of artificial hibernation on the incubation of some virus diseases.

The full-time part of the Laboratory has worked out experimentally the possibility of preparing desiccated culture media and has prepared an extract for the Meinicke clarification test. As a result of these investigations, the Laboratory has prepared a rather good desiccated Wilson-Blair agar on a small scale and, in addition, has furnished most of the M-antigen used in Yugoslavia.

I do not know whether such an organization exists elsewhere, and I should be very grateful for any relevant information. If this form of a research organization is a new one, its existence could, in my opinion, be explained by the special conditions of medicine prevailing in Yugoslavia: on one hand, by the great demand for medical aid, which means that medical practitioners are very much preoccupied by routine medical work, and, on the other, by their desire for extending their medical knowledge. This overtime work has proved a great stimulus, and furthered their interest in their profession.

- ¹ Martinovitch, P. N., *Nature*, **160**, 476 (1947).
² Marinkov, S., *Acta Med. Yugoslav.*, **5**, No. 3, 297 (1951).
³ Marinkov, S., *Med. Pregled*, **11/12**, 80 (1951).
⁴ Marinkov, S., *Acta Med. Yugoslav.*, **6**, No. 2/3, 267 (1952).
⁵ Schwarz, P., *Congr. Microbiology*, Rome (Sept. 7, 1953).
⁶ Schwarz, P., *Acta Med. Yugoslav.*, **7**, No. 3, 247 (1953).
⁷ Schwarz, P., *Med. Pregled*, **2**, 125 (1953).
⁸ Marinkov, S., and Timotijević, B., *Med. Pregled*, **1**, 1 (1953).
⁹ Dekanić-Milošević, V., and Marinkov, S., *Acta Med. Yugoslav.*, **7**, No. 3, 215 (1953).
¹⁰ Marinkov, S., and Kostić, D., *Med. Pregled*, **4**, 332 (1953).
¹¹ Dekanić, Dj., and Grunčić, M., *Cong. Gynecol. Belgrade* (1953).
¹² Ivić, M., *Münchener Med. Wochenschr.*, **15**, 398 (1954).
¹³ Schwarz, P., *Higijena, Belgrade* (in the press).
¹⁴ Dekanić-Milčević, V., and Marinkov, S., *Comm. libres Cong. Int. Gynecol.*, Geneva, 1954 (in the press).
¹⁵ Dekanić-Milčević, V., and Marinkov, S., *Gynecol. et Obstet.* (in the press).

THE BRITISH GELATINE AND GLUE RESEARCH ASSOCIATION RESEARCH PANEL MEETING

THE ninth meeting of the Research Panel of the British Gelatine and Glue Research Association was held on December 9. Mr. S. G. Hudson (Messrs. Richard Hodgson and Sons, Ltd.) was in the chair. Three papers were presented, each being concerned with a major item of the research programme of the Association.

Dr. J. E. Eastoe in his paper, "Gelatin as a Chemical Compound", described the stages which must be followed in elucidating the chemical structure of proteins. These include elemental analysis, amino-acid analysis, determination of amino-acid sequence, and also those aspects of the configuration of the intact protein, apart from sequence, which are affected by hydrolytic conditions. The second of the stages was the basis of the work which was being reported. The experimental method used was the chromatographic technique of Moore and Stein, using the ion exchange resin 'Dowex 50'¹, carried out almost exactly in accord with the original paper. This enabled all but one of the amino-acids present in gelatin or collagen to be estimated by means of two chromatographic experiments, one using a long column of resin, and a second run in which a short column was used for the estimation of the basic amino-acids. These are not given accurately with the long column. The remaining acid to be estimated, hydroxyproline, was determined by the colorimetric method of Neuman and Logan² in preference to carrying out a third chromatographic separation.

The method of analysis has been applied to a selection of gelatins and collagens of mammalian origin, and is also being extended to fish materials.

The general conclusions were that the results as a whole showed very satisfactory agreement with the determinations, by a number of methods, for gelatin by Chibnall and co-workers^{3,4}, and for collagen⁵⁻⁶, for which Bowes and Kenten had also carried out careful analyses. The results for the whole range of materials also agreed well with the microbiological determinations of Neuman⁶. The differences between the results for all the mammalian gelatins and collagens studied, with the exception of the content of amide nitrogen, and the ratio ornithine/arginine, were generally so small that they might result from small quantities of impurities. The two exceptions arise not from differences in the native tissues, but from the effect of manufacturing processes. The differences between mammalian and fish collagens, particularly in regard to the hydroxy amino-acids, confirm previous results⁶.

Dr. A. W. Kenchington in his paper, "Gelatin Derivatives and their Properties", said that he had attempted to modify in turn all the more important polar groups of the gelatin molecule. The behaviour of methylated gelatins, in which the carboxyl groups have been esterified with methanol in the presence of hydrochloric acid, had already been reported⁷. The amino-groups were acetylated using acetic anhydride in the presence of sodium acetate. The comparison of the degree of substitution, estimated by acetyl determination, and by measurement of the number of unreacted amino-groups by the titration curve method⁸, showed that at low degrees of substitution only the amino-groups had reacted. At higher degrees of substitution there was evidence of acetylation of hydroxyl groups also.

The number of guanidino-groups of gelatin was increased by means of the reaction between the amino-groups and *o*-methyl isourea. Almost quantitative reaction was produced, as shown by the technique of Moore and Stein⁹, the lysine and hydroxylysine residues becoming homoarginine and hydroxyhomoarginine respectively. Removal of the guanidino-groups by means of alkaline hypobromite, although effective for this purpose, also caused some degradation of the polypeptide chain.

Mr. P. R. Saunders, in a paper on "Degraded Gelatins: their Properties and Structure", described the effect of degradation in solution brought about by heat, extremes of pH, ultrasonics, and hydrogen peroxide. The physical properties of the degraded gelatins which were measured included viscosity in both concentrated and dilute solutions, and gel rigidity over a range of temperatures from 0° C. to near the melting point. It has been established by this work that degradation can both reduce the mean molecular weight of the gelatin and also destroy to a greater or less extent an intrinsic power of gelling. This point has been verified by fractionation of the degraded gelatins according to molecular weight.

A general discussion on the gelling of gelatin was opened by Mr. A. G. Ward, director of research of the Association.

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- ¹ Moore, S., and Stein, W. H., *J. Biol. Chem.*, **192**, 663 (1951).
² Neuman, R. E., and Logan, M. A., *J. Biol. Chem.*, **184**, 299 (1950).
³ Chibnall, A. C., *J. Int. Soc. Leather Tr. Chem.*, **30**, 1 (1946).
⁴ Tristram, G. R., "The Proteins", Vol. 1A, p. 181 (Academic Press, New York, 1953).
⁵ Bowes, J. H., and Kenten, R. H., *Biochem. J.*, **43**, 358 (1948).
⁶ Neuman, R. E., *Arch. Biochem.*, **24**, 289 (1949).
⁷ Kenchington, A. W., reported in Ward, A. G., *Nature*, **171**, 1099 (1953).
⁸ Kenchington, A. W., and Ward, A. G., *Biochem. J.*, **58**, 202 (1954).
⁹ Eastoe, J. E., and Kenchington, A. W., *Nature*, **174**, 966 (1954).