

function of irreversible hydrolytic scission of the branch links in amylopectin. The Z-enzyme is a β -glucosidase, and with its aid it has been found that amylase contains branch linkages. The Q-enzyme has been recognized as a transglucosidase. An excellent oil has been extracted from the eighteen tons of heat-dried oil-seeds of *Tetracarpidium conophorum* received from Nigeria and is now being distributed in the paint industry for technical evaluation. Progress is reported in the study of the germination factor of *Striga*, and highly satisfactory results were obtained in Nigeria with a new machine for harvesting *Hibiscus cannabinus*, and accordingly further trials are being made with jute in British Guiana.

The eighth annual report of the Colonial Social Science Research Council refers to the great restraint which the Council has had to exercise in making new grants. Since October 1, 1951, the Council has had to operate within a limit of £325,000 until March 31, 1956, and on March 31, 1952, only some £200,000 was uncommitted. Accordingly, it was necessary to refuse applications for new grants which were not already receiving considerable financial support from other sources. Although the recruitment position for experienced research staff improved, difficulty is still being encountered in recruiting senior staff capable of organizing research, and in such special categories as demography and law. Much of the present report is occupied by a retrospect of the work of the Council since 1945, and there are appended to it annual reports for 1951-52 from the East African Institute of Social Research, Makerere College, the West African Institute of Social and Economic Research, Ibadan, the Rhodes-Livingstone Institute, and the Institute of Social and Economic Research, University College of the West Indies, as well as a list of publications by research workers assisted by the Council.

Commenting on the progress of Colonial studies in British universities, the Council refers to the work of the Department of Anthropology in the University of Manchester, which is closely associated with the work of the Rhodes-Livingstone Institute on Central African Studies, the work on race relations carried out under the auspices of the Department of Anthropology in the University of Edinburgh, and to the analysis of the social organization and types of society in the highlands of New Guinea and the studies of the appearance of cargo cults in the Pacific Islands and of the Pacific islander in commerce and industry being carried out by the Department of Anthropology of the Australian National University. The Survey of African Marriage and Family Life has been completed and is now in the press. Other reports in the press are Mr. J. N. D. Anderson's synoptic survey of the present position of Islamic law in the British African territories and Aden, Prof. C. M. Dohe's study of the Bantu languages of Southern Africa and the West Indian volume of the late Dr. Kuczynski's "Demographic Survey of the British Colonial Empire", while numerous other investigations are being prepared for publication. The East African Institute of Social Research has completed a survey of the European, Indian and African inhabitants of Jinja township and continued village surveys of immigrant labour in Buganda. A study of the present method of selection and training of African leaders in East Africa is proposed, as well as a survey of the Indian community in and around Kampala. At the West African Institute of Social and Economic Research, the inquiry into the Nigerian monetary and banking system is being completed and also

that into Yoruba social and economic organizations. Definite proposals have been made regarding the functions of the Institute in relation to the Nigeria produce-marketing boards. The major event at the Rhodes-Livingstone Institute was the appearance of its first major publication, "Seven Tribes of British Central Africa". The Institute of Social and Economic Research, Jamaica, reports progress in the projects for the preparation of national income estimates, the determination of the trend in consumption patterns in Barbados and on experiences of management in the adaptation and training of Jamaican industrial workers.

(To be continued)

INDUSTRIAL RADIOLOGY GROUP OF THE INSTITUTE OF PHYSICS MEETING IN SHEFFIELD

THE summer meeting of the Industrial Radiology Group of the Institute of Physics was held at Crewe Hall, Sheffield, during July 3-5. The success of the meeting was in no small way due to J. F. Hinsley and H. S. Peiser, who were responsible for the local arrangements, and to the staffs at Crewe Hall and at the various companies and institutions visited.

A day and a half were devoted to lectures, the opening session on "Training in Industrial Radiology" being given in two parts, the first by Mr. J. C. Rockley, of the Aeronautical Inspection Directorate, Harefield, and the second by Mr. J. D. Hislop, of Solus-Schall, Ltd. Mr. Rockley pleaded for a longer training course than is at present available for industry, with a recognized award, and spoke of what is being done by the exploratory committee of the City and Guilds of London Institute, to which the Institute of Physics has made recommendations.

Mr. Hislop thought that the maximum tuition in the time available in a part-time course can only be given if a good deal of this is devoted to theoretical work. In dealing with the special problems of weld examination, he put forward a plea for standards of interpretation which could be incorporated in any final training scheme and stressed the importance of correct identification and of orderly reporting. He thought that the training of a radiographer is essentially a long-term one, and suggested that managerial staff should become more familiar with the limitations of the method.

The first paper during the afternoon was given by Dr. R. Jackson, of the British Coal Utilization Research Association, on "The Presentation of Results in Radiography with Special Reference to the Terminology of Casting Defects". Dr. Jackson stressed the need for as good a radiograph as could be obtained, followed by careful interpretation, with as full information about the casting as possible in advance. He concluded with a description of the many difficulties which had been met in drawing up the proposed British Standards Institution terminology.

The second afternoon paper had the title "Economic Aspects and Administration of an Industrial Radiology Department" and was a joint paper by E. W. Colbeck, F. Cousins, H. S. Peiser and J. R. Rait (all of Hatfield, Ltd.). Mr. Peiser, who delivered the lecture,

dealt particularly with radiography in the laboratory of a steelworks. Radiography, he said, could be divided into three groups, namely, inspection, *ad hoc* problems, and investigations of manufacturing techniques. In the first, 100 per cent inspection is only justified if failure in service would cause destruction of a valuable engineering unit or endanger life. The chief economic considerations involved were briefly discussed. In dealing with *ad hoc* problems on which the X-ray department has come to the aid of the foundry, Mr. Peiser mentioned the determination in weld repairs of the extent of the defect and the quality of the repair when it has been made, and problems arising in the examination of inaccessible plant or equipment. In dealing with the investigation of manufacturing techniques, he said that this type of investigation is the most valuable economically and, in addition, from it better products usually result; he gave as an example from the hundreds undertaken the elimination of shrinkage cavities. Mr. Peiser concluded with some remarks on the economic operation of a radiographic department.

On the evening of July 3, Dr. O. Vaupel, of the Röntgenstelle, Material Prüfungsamt, Berlin, lectured on the subject of "The Standardization of Radiology in Germany". Dealing specially with X-ray and gamma-ray techniques, he said that new quality standards for X-ray and gamma-ray pictures would be published shortly under standard *DIN* 54110, which would replace the present standard *DIN* 1914. Dr. Vaupel next described the wire penetrometer, consisting of wires of the appropriate material embedded in thin rubber, four gauges being required to cover thicknesses up to $3\frac{1}{2}$ in. Since none of the orthodox types of penetrometer is capable of showing up small differences in defect sensitivity because the gaps (for example, between adjacent wires) were too wide, E. A. W. Müller in 1942 invented a more accurate penetrometer known as the 'bacillæ test', an ingenious device in which short lengths of randomly distributed wires are contained in nine boxes embedded in low-adsorption material, the whole containing thirty-one wires of the same diameter, for example, 0.4 mm. The observer draws the positions of the wires as seen on the film and compares the result with their true positions. This is repeated for wires of different diameter, and the number of observed wires is plotted against the diameter, extrapolation giving the diameter necessary for thirty-one wires. On the subject of the standardization of magnetic crack testing, Dr. Vaupel said that the importance of this method can be judged from the fact that in 1944 there were in Germany as many magnetic crack detectors in use as X-ray equipments. The methods by which magnetism is induced in the specimen had been standardized as well as the direction of the resultant magnetism. There is also a standard test for magnetic inks. Dr. Vaupel also described the Berthold magnetic penetrometer which indicates the efficiency of a magnetic test.

The first paper at the morning session of July 4 was read by Mr. J. F. Hinsley, of Edgar Allen and Co., Ltd., and had the title "The Radiography of Castings". Starting with a review of the casting processes, the subsequent chain of events in the foundry was described. To talk with the foundryman the radiographer needs to understand his terms, and these were explained. The design of castings was next discussed, in particular the formation of defects during the solidification process, and it was shown

how the radiologist can help in this connexion, as also in the feeding process.

The last lecture, on July 4, was given by Mr. G. T. Harris, of William Jessop and Sons, Ltd., who spoke on "Non-Destructive Testing in a Steelworks", which for the purpose of his talk he divided into three sections, namely, identification, checking mechanical and physical properties, and the detection of surface and internal defects. In the first section can be placed the spectrograph and its simplification, the spark test with a grinding wheel; microhardness testers and thermo- and tribo-electric methods were also described. In the second section Mr. Harris spoke of automatic thickness gauges and then described the core loss comparator, in which, by placing a coil round the bar under test and measuring the core loss, quality differences are at once obvious. In discussing magnetic crack detection, the effect of the direction of the field was shown. Inspection by penetrating oil has been improved by using fluorescent oils, and an American method called 'Dy-chek' was referred to. Another method has the advantage of using a water-soluble oil which is easily removed. Electrolytic etching is widely used, said Mr. Harris, as it is a very sensitive method of detecting surface cracks. He discussed the correlation of the results of ultrasonic flaw detection and radiology, and stated that it is difficult to estimate the size of a defect by the ultrasonic method, though he thought that automatic scanning would be an advantage. Speaking of radiology, Mr. Harris said that developments needed are X-ray equipments able to penetrate ten inches of steel, scanning of large specimens by counters, Xero-radiography and the amplification of fluorescent images by image converters. B. N. CLACK

MECHANISM OF PHOTOGRAPHIC SENSITIVITY IN SILVER BROMIDE

IT has been shown recently by Loening¹ that pure silver bromide in the form of an aqueous sol has only a very slight sensitivity to light as judged after development. Sensitization can be achieved by adding silver ions or gelatine or substances such as sodium nitrite to the sol. Ordinary photographic emulsions have already the sensitivity conferred by gelatine, and there are three well-established methods² of obtaining further gains of sensitivity, depending on the addition of one of three substances: reducing agents, gold salts and sulphur compounds. These substances probably react with the silver bromide to form minute quantities of silver, gold and silver sulphide respectively at the grain surfaces: at any rate, that is the simplest supposition. All this refers to 'chemical' sensitization, as distinct from extension of spectral sensitivity by dyes.

According to the theory of the photolysis of silver bromide put forward in 1938 by Gurney and Mott³, the absorption of a light quantum by silver bromide removes an electron from a bromide ion, leaving a 'positive hole'. The electron and the hole should both be highly mobile. If silver particles are present, they become negatively charged by trapping electrons and grow by attracting the mobile interstitial silver ions that are naturally present in the crystal (Frenkel disorder). This theory still holds the field, more recent attempts based on the assumption of Schottky disorder having now been abandoned⁴. As applied