

INDUSTRIAL ARCHÆOLOGY

THE conference held at the London School of Hygiene and Tropical Medicine on December 12 was the first event organized by the recently formed Research Committee on Industrial Archæology of the Council for British Archæology. The large attendance of some 180 people was very encouraging, and confirms the Council in its belief that considerable interest exists as well as concern about the fate of industrial monuments.

Dr. J. N. L. Myres, president of the Council, took the chair, and the conference opened with the reading of a message from the Minister of Works. The first paper was by Mr. M. M. Rix, staff tutor in architectural history in the University of Birmingham, on "Industrial Archæology as illustrated in the West Midlands". This area is a particularly rich field, and Mr. Rix described many fine examples such as Ironbridge and Coalbrookdale, Telford's canal aqueducts, and the earliest existing iron-framed building, a former flax-spinning mill at Shrewsbury.

The second paper, by Mr. J. M. Palmer, was on "The Stamford Canal: a Seventeenth Century Navigation". His chief purpose was to show how the history of a canal, the very site of which can only with difficulty be identified, may be reconstructed by a thorough search of national and local records. The paper was introduced by Mr. Maurice Berrill, honorary secretary of the Railway and Canal Historical Society.

The afternoon session began with a paper by Prof. A. W. Skempton, of the Imperial College of Science and Technology, London, on "Structural Development of the First Iron-framed Textile Mills". He showed how iron-framing was originally developed because of the danger of fire in early factory buildings. The development was one of very great importance as it culminated in the steel-frame buildings of the first examples of modern architecture designed by Louis H. Sullivan in Chicago towards the end of last century. Prof. Skempton showed how skilfully he had combined study of actual buildings and documentary records to establish the sequence of mills in Derbyshire and at Shrewsbury and Salford.

The remainder of the afternoon session was devoted to three short papers. The first was a brief note by Mr. C. W. Phillips, read in his absence owing to illness, on the Ordnance Survey in relation to the recording of industrial archæology. Mr. Phillips, who is archæology officer to the Ordnance Survey, pointed out that surveying and recording are being extended to include early industrial remains. He also made it clear that the records compiled by the Ordnance Survey on such sites will be available to research workers. Dr. P. M. G. Eden, of the Royal Commission on Ancient Monuments, gave a most practical short address on the technique of recording industrial monuments. He encouraged amateur field groups by emphasizing that preliminary work in recording often serves as a basis for specialist studies. Mr. J. M. Richards, editor of the *Architectural Review*, read the final paper on "Visual Aspects of the Subject and the Æsthetic and Landscape Value of Early

Industrial Monuments", in which he distinguished between the architectural quality of industrial buildings and their part in the landscape in so far as it was a creation of man. Mr. Richards's thesis that the best of our early industrial buildings mark the beginning of the functional tradition in architecture is already well known.

In the discussions which were held after the papers during both morning and afternoon sessions a keen concern could be observed with how the recording of industrial remains might be carried out and appropriate examples preserved. The need for the co-ordination of the activities of the different societies working in the field of industrial archæology was emphasized, as was the necessity for an informed public opinion which could bring pressure to bear on the appropriate authorities. It was even suggested that the Royal Commission on Historical Monuments should appoint additional staff to deal with the survey of industrial remains. Hopeful developments were referred to such as the action of Allied Ironfounders in clearing the site of the old Coalbrookdale ironworks, the first scientific excavation of an industrial site by the British Museum at the Longton Hall porcelain factory, and the appointment of an archæological officer in the Staffordshire County Planning Department.

The conference closed with a summary by Mr. Maurice Barley, secretary of the Council for British Archæology, at the conclusion of which he read a draft resolution. A discussion followed in which the chief points made were the necessity to interest industry in the work of record and preservation and to emphasize the educational importance of industrial archæology when so much was being heard of the need for increased technical and scientific training.

The resolution as finally passed declared that the conference was deeply impressed by the need for formulating a policy for recording and, where necessary, preserving early industrial monuments. The Research Committee on Industrial Archæology was further instructed by the resolution to find opportunities to discuss with central and local authorities, as well as with industry and unofficial bodies, the question of record and preservation.

The Research Committee proposed as a first step to prepare a handbook of industrial archæology which would serve as a guide to societies and individual research workers anxious to carry out surveys of industrial remains. Plans are now being made to initiate a pilot survey either of a region or of a particular industry. It is also hoped to hold regional conferences, and as soon as possible to organize courses at which some training in recording and interpreting industrial sites can be given.

The immediate task of the Committee is to establish closer contact between the individual research workers and societies which have been working in different parts of the field covered by industrial archæology and to attempt to direct their efforts towards the creation of a single discipline. The work of the Committee, if successful, will go a long way towards establishing the study of the history of

technology on a more respectable footing in Britain as well as supplementing the work of economic and social historians. Much depends on the degree of interest which can be aroused among scientists and technologists, without whose assistance it will be virtually impossible to go on to specialized surveys of particular industries. The Committee already

includes archaeologists, historians, architects, geologists and technologists, but would warmly welcome the co-operation of more people with specialized knowledge of mining, quarrying, textiles, metallurgy, chemicals, civil and mechanical engineering or any of the other innumerable subjects in this vast field of industrial archaeology. E. R. R. GREEN

NINTH CANADIAN HIGH POLYMER FORUM

THE ninth Canadian High Polymer Forum, held at the Guild Inn, Toronto, during October 26-28, was attended by 142 chemists from Great Britain, the United States and Canada. The chairman was M. H. Jones (Ontario Research Foundation) and the session chairmen were S. Bywater (National Research Council), H. H. G. Jellinek (Essex College), M. Rinfret (University of Montreal) and G. Olah (Dow of Canada).

At the business meeting on October 26 the officers for the tenth Forum were elected: *chairman*, L. A. McLeod, Polymer Corporation; *programme chairman*, K. E. Russell, Queen's University, Kingston, Ontario; *secretary-treasurer*, D. A. I. Goring, Pulp and Paper Research Institute.

At the banquet on October 27, the guest speaker, C. H. Bamford, of Courtaulds, Maidenhead, spoke on "Patterns in Reactions and Polymers". He said that detailed information is now available concerning transfer reactions of polymer radicals with a variety of substrates. For a hydrocarbon substrate such as ethylbenzene, the rate constants for the hydrogen abstraction process involving a series of polymer radicals are fairly accurately proportional to the rate constants for the corresponding reactions with toluene. In these reactions with hydrocarbon substrates, polar factors are very small. With ferric chloride, butyl mercaptan or carbon tetrabromide as substrates, a logarithmic plot of rate constants for the transfer reaction against rate constants for the corresponding reaction with toluene gives a number of scattered points. The pattern of points is, however, very much the same in all three cases. With triethylamine as substrate an 'inverse' pattern is obtained. Patterns of the first type are obtained in addition reactions involving the same polymer radicals and a number of vinyl monomers.

The observed patterns can be interpreted in terms of polar effects, the rate constant depending considerably on the extent to which the substituent in the radical is electron-withdrawing or electron-releasing. From a quantitative treatment, Dr. Bamford concluded that it is possible to express the rate constant for the transfer reaction of a radical with a given substrate in terms of the rate constant for transfer with toluene and the Hammett σ constant for the radical. Predictions based on this quantitative theory are in excellent agreement with experiment.

The main sessions began with a paper by J. K. N. Jones (Queen's University) on "Some Problems in Polysaccharide Chemistry". In pointing out some of the difficulties involved in complete structural determinations of polysaccharides, he said that it is not always possible to decide whether traces of sugars occurring with the main hydrolysis products of polysaccharides were part of the original macromolecule.

Degrees of branching can be readily obtained using the Haworth methylation technique, but frequently it is almost impossible to achieve 100 per cent methylation of a polysaccharide. The major problem in this field is to imitate the action of enzymes on sugars and sugar derivatives to produce polymers similar to those found in plants and animals.

B. L. Funt and F. D. Williams (University of Manitoba) in their paper on "Retardation and Inhibition of Methyl Methacrylate Polymerization" described investigations of the effect of benzoquinone on methyl methacrylate polymerization using quinone and initiator labelled with carbon-14. They observed a transition from retardation to inhibition at a critical concentration of benzoquinone. The Monday morning session closed with a short colour film on polymer interactions made available by W. F. Busse, Du Pont Co., Wilmington.

The first in a series of papers on polymer degradation was given by H. A. Kraessig and J. Neal (Industrial Cellulose Research), who discussed "The Degradation of Cellulose by Megavolt Electrons". They showed that at low dose-rates the number of chemical bonds broken is a linear function of the dose, and the sensitive volume corresponding to cleavage of a single bond is close to the volume of a monomer unit. Experiments on wet cellulose indicate that water has a considerable protective action. H. H. G. Jellinek (Essex College) and W. A. Schlueter described work performed at the University of Cincinnati on "The Photodegradation of Polyacrylonitrile in Solution", using light of wave-length 2537 Å. The rate of degradation *in vacuo* is proportional to the light intensity and the number of broken bonds is less than 10^{-8} per quantum absorbed. W. C. Schneider (American Cyanamid) spoke on "The Thermal Stability of Polyacrylonitrile". At 240° in the absence of oxygen he observed that the polymer breaks down very rapidly giving a complex mixture of products, but in the presence of oxygen a more controlled reaction gives water, ammonia and hydrogen cyanide as the only volatile products. J. R. Schaeffgen (Du Pont) presented a paper on "The Thermal Degradation of Poly-*p*-xylylene". The rate of degradation was measured in a chlorinated aromatic solvent in the range 285-321°. Degradation is random, and the activation energy is 58 kcal./mole. Anthracene decreased the rate of degradation, but common transfer agents are inactive.

R. J. Orr (Polymer Corporation) presented a paper on "Thermochemical Aspects of Free Radical Butadiene-Styrene Copolymerization". A treatment of the thermodynamics of copolymerization has been devised which can be applied to high-conversion material. The sum of the entropy changes for the two heteropolymerization steps was found to be