

Fifthly, the local education authorities must make arrangements for the repair and servicing both of films and of apparatus.

Sixthly, but by no means least important, the teaching profession must be shown how to handle the medium. Up to the present the filmstrip and the film have been used mainly by enthusiasts. All teachers whose lessons can be improved by the use of visual aids should be trained to use them. It is therefore incumbent on all local education authorities to provide teachers with the facilities for acquiring that ability.

Lastly, a great deal more information based upon careful research is needed before educationists can regard themselves as masters of this medium. Scotland has produced two valuable reports which contain important statements about the subjects on which films should be made, the length of film suitable for children of various ages, and the value of sound films. These conclusions and others formulated in the 1947 Progress Report of the National Committee for Visual Aids in Education need testing. It is perhaps most important of all to ascertain the value of the film in teaching children of differing grades of intelligence and of its use in the teaching of adults.

T. H. HAWKINS

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SUMMER SCHOOL IN ELECTRICAL ENGINEERING AT RUGBY

DURING July 12-16, 1948, the British Thomson-Houston Co., Ltd., held, at its Rugby works, a summer school in electrical engineering, which was attended by members of the staffs of the electrical engineering departments of universities and technical colleges, together with representatives of the Service colleges, the Ministry of Education, the Institution of Electrical Engineers, and Government research organisations. In the "Proceedings" of the school, published recently by the Company, are recorded the scientific papers presented by members of the Company's staff.

These papers give an interesting cross-section of the activities of a large electrical manufacturing organisation. Materials, for example, are represented by two papers, one on magnetic sheet-steel and the other on modern developments in electrical insulators. A review is given of some of the mechanical problems affecting the design of electrical machines. Several papers deal with design problems of the magnetic and electric circuits of rotating electrical machinery and one with the design of insulation for high-voltage transformers. Power systems receive attention in papers on switchgear, protective gear and power system analysis. Rather more than half the papers are concerned with electronics or high-frequency phenomena and applications. The fundamental theory of communication forms the subject of one paper, and magnetron generators, pulse modulators and micro-wave transmission techniques are covered by a group of papers. In the field of electronics there are contributions dealing with fluorescent discharge-lamps, arc control in gas-filled valves, the application of the mass spectrometer to leak detection in high-vacuum systems, and a development of the betatron.

One of the most valuable features of this collection of papers is the indication given in many of them of the trend of development and of the directions in

which research in university departments could contribute towards the solution of some of the more fundamental problems. Having regard to the fact that these lectures were prepared by members of design and development departments as well as of the research department, it is perhaps worth while to record the impression that the scientific requirements of design and development are scarcely less stringent than those of research. Of particular interest is the opening address given by Sir John Cockcroft, in which the needs of Great Britain for scientific and technical staff are reviewed.

THE AGORA OF ANCIENT ATHENS: A STUDY IN ARCHÆOLOGICAL RECONSTRUCTION*

By PROF. HOMER A. THOMPSON
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THE excavations which are being currently conducted by the American School of Classical Studies in the Agora, or civic centre of ancient Athens, have led to the identification and restoration of many ancient buildings through the combination of evidence drawn from ancient authors, inscriptions and the exploration itself. As a specimen to illustrate the procedure, the Odeum, or Concert Hall, may be selected.

The remains of the Odeum have been identified from a reference in Pausanias, the 'Baedeker' of the second century. Its date of construction is fixed in the Augustan period, partly by its architectural style, partly by the pottery associated with its foundations and partly by its specific name, the Agrippæum, which suggests that the building was erected by Agrippa, the minister of Augustus.

A close study of the foundations of the building and of scattered marble blocks from its superstructure has permitted the recovery of its architectural scheme in all essentials. The building proves to be unique in its dual nature, comprising as it did a core, in which were an auditorium, stage, dressing-room and lobby, and around the core a raised balcony that opened outward for the accommodation of spectators who might wish to view processions or ceremonies in progress outside the building. Of particular interest among the architectural details of the original period is the stage front, which was decorated with a marble screen supported by terminal figures alternately male and female.

The siting of the building on the axis of the Agora square is reminiscent of the contemporary Forum of Augustus in Rome, while its scheme of lighting through an open colonnade at one end was inspired by the Erechtheum; hence its design may be the work of a team of architects, some Greek and some Roman.

The building collapsed and was afterwards remodelled (as shown by stamped roof tiles) about A.D. 150. The remodelling involved reduction in the capacity of the auditorium from 1,000 to 500, and in the conversion of the original dressing-room into

* Abstract of a Friday Evening Discourse delivered at the Royal Institution on February 18.

an open porch. The entablature of this porch was supported by six colossal marble figures, half of them Tritons and half Giants, both types being adaptations from statues of divinities in the pediments of the Parthenon. In front of the pedestals of these colossal figures were placed seated statues of philosophers. From the radical changes involved in the remodelling and from the fact that Philostratos (writing in the late second century) referred to the building as the scene of public lectures by the sophists, it may be inferred that in its second period the Agrippeum had become a university lecture hall and that its function as a concert hall had been assumed by the great new Odeum erected by Herodes on the south slope of the Acropolis about A.D. 160.

A century later (A.D. 267) the Agrippeum was burned down by a band of barbarians, the Heruli, who sacked this part of Athens. The area lay desolate until about A.D. 400. Then above the ruins of the ancient building was erected a huge complex in the nature of a gymnasium which, in accordance with the Greek practice, would also have served university purposes. In the façade of the new building were incorporated four of the colossal figures from the old. The great structure of A.D. 400 was abandoned in the sixth century, presumably in consequence of the Emperor Justinian's edict closing the University of Athens (A.D. 529), and its ruins were buried by silt. Early in the nineteenth century three of the colossal figures were rediscovered and later re-erected, to be known as the 'Stoa of the Giants', one of the most prominent landmarks in the city and one of the most enigmatic until its riddle was solved by the current excavations.

116 TRAINING FACILITIES IN INDUSTRIAL RADIOLOGY

THE need for extending the available training facilities in industrial radiology was discussed at a meeting of the Industrial Radiology Group of the Institute of Physics held on February 18, at which were representatives of inspecting authorities, technical institutions, the Ministry of Education and industrial firms.

Discussing the necessity for adequate training of industrial radiographers, Mr. J. C. Rockley (Aeronautical Inspection Department) explained the system adopted by the Department, by which certain industrial radiographic departments and the radiographers in charge are 'approved' after satisfying the Aeronautical Inspection Department that the apparatus available is satisfactory for the intended purpose and that the radiographer has received sufficient basic training to be competent. A feature of this system is that if the radiographer moves to another department, his 'approval' is automatically withdrawn; the 'approval' of the department would also be withdrawn pending the appointment of a qualified successor.

Mr. F. C. Cocks (Lloyd's Register of Shipping) explained that the principal requirements for surveyors and other officers of inspecting authorities are provision for acquiring the technical background and experience in interpretation of radiographs necessary to satisfy themselves on the quality of the radiographic examination, and to assess the effect on the structure examined of an internal defect the shadow of which is seen on the radiograph.

Mr. F. Y. Poynton (Northampton Polytechnic, London) reviewed the present position with regard to technical institutions. Only very few technical colleges—among them the Northampton Polytechnic, London; the Royal Technical College, Glasgow; and the technical colleges at Chesterfield and Wednesbury—possess X-ray apparatus suitable for radiography, and none of these has equipment operating above 100 kV. peak. Most of the industrial radiography carried out, however, falls within the range of 150–400 kV. peak, or utilizes gamma-radiation; and it is under these conditions that most of the practical problems associated with scattered radiation, radiographic sensitivity and protection occur. Mr. Poynton said that steps are being taken to provide facilities for training in industrial radiography at the Northampton Polytechnic, London. The detailed form of these courses has still to be worked out; but considerable progress has been made in the provision of apparatus and the necessary laboratory and darkroom equipment.

Dr. L. Mullins described the courses being run by Kodak, Ltd., and explained that the basic introductory course occupies two weeks (75 hours) with an optional third week. This period has been adopted as the minimum in which the fundamental theoretical and practical training can be given, and because industrial firms are generally reluctant to release their staff for a longer period. He also mentioned more advanced courses in casting and weld radiography, lasting two weeks, and in shipbuilding radiography occupying three weeks.

Mr. N. Tunstall (Ministry of Education) said that the Ministry is anxious to participate so far as the demand for training facilities justifies; but it is very desirable that industry should make clear to local colleges the extent and nature of the demand for such facilities. The provision of short intensive courses would be a departure from the more usual method of training in a 'laboratory art', which is usually catered for by a course of part-time study lasting two years. The question of awarding a certificate of competence at the end of a full-time course of two or three weeks duration is one requiring a particularly cautious approach. H. S. TASKER

FORTHCOMING EVENTS

(Meetings marked with an asterisk * are open to the public)

Saturday, April 23—Saturday, April 30

UNIVERSITY OF LONDON (at the Institute of Archaeology, Inner Circle, Regent's Park, London, N.W.1), at 10 a.m.—Public Exhibition of "European Housing in Prehistoric Times".*

Monday, April 25

UNIVERSITY OF LONDON (in the Physiology Theatre, University College, Gower Street, London, W.C.1), at 4.45 p.m.—Prof. Adrien Albert: "Selective Toxicity with special reference to Chemotherapy".* (Further Lectures on May 2, 9, 16, 23, 30 and June 8 and 13.)

ROYAL SOCIETY OF ARTS (at John Adam Street, Adelphi, London, W.C.2), at 6 p.m.—Mr. H. C. Walker: "Present Century Advance in Marine Engineering Science" (Science and Marine Navigation, 3).

ROYAL INSTITUTE OF CHEMISTRY, LONDON AND S.E. COUNTIES SECTION (at Medway Technical College, Gardiner Street, Gillingham), at 7.30 p.m.—Mr. P. H. Prior: "Some Experiences of a Chemist in the Paper Industry".

ROYAL GEOGRAPHICAL SOCIETY (at Kensington Gore, London, S.W.7), at 8.15 p.m.—Prof. George B. Cressey: "China's Prospects".

Tuesday, April 26

ROYAL ANTHROPOLOGICAL INSTITUTE (at 21 Bedford Square, London, W.C.1), at 5 p.m.—Dr. J. G. Peristiany: "Social Structure of the Pokot (Suk)".

MANCHESTER GEOGRAPHICAL SOCIETY (in the Geographical Hall, St. Mary's Parsonage, Manchester), at 6.30 p.m.—Mr. Harry Milligan: "South Devon Story".