

invention was first shown to the English public. M. Lumière was present and was the recipient of a gold fountain pen and pencil as a memento of the occasion. The events of forty years before were re-enacted and copies of some of the films then shown were screened. In one or two cases the original projector was used, and the quality and steadiness of the pictures were remarkable. Among other films shown were early news reels and examples illustrating the stages in the development of motion picture technique and invention, including two short colour sequences. Fyvie Hall contained exhibits, many of them from the collection of Mr. Will Day, illustrative of the history of cinematography, ranging from moving lantern slides of one hundred years ago to examples of the most modern motion picture cameras and projection equipment. The exhibition remained open to the public and the films were shown for three days.

Utilisation of Fuel

TECHNICAL problems of the utilisation of fuel have long been a popular subject of discussion, but the troubles of the coal trade have recently evoked an unusual number of contributions. Sir Harold Hartley, in a paper before the Institution of Chemical Engineers, examined our "National Coal Resources", Sir Frank Smith discussed "Coal, Power and Smoke" before the Junior Institution of Engineers, Sir William Larke addressed the Fuel Luncheon Club, an anonymous "Observer" has recently issued a pamphlet on "Miners, Owners and Mysteries", and Mr. O. W. Roskill discussed before the Institute of Fuel the "Co-ordination of National Fuel and Power Supplies", while chairmen of public utility companies have much to say about coal when addressing their shareholders at this season. The reader will find considerable repetition in these discussions, but cannot escape the impression of the extreme complexity of the problems.

THE technical problems involved, though naturally complicated, are obviously capable of solution, and indeed would present no fundamental difficulty if national fuel services were being planned *ab initio*. The more difficult questions arise from the necessity for reconciling conflicting financial and industrial interests, conflicting local interests, conflicting national interests such as economics and defence, the promotion of fuel economy and the provision of employment. Most of the proposals for promoting efficiency or economy would involve a reduction, at least for a time, of labour or employment for some, and the adjustment of the coal industry to a new level of stability will clearly be long and difficult. Mr. Roskill, after surveying all the coal-using industries, advocates a concentration of the Ministry of Mines, Transport and the relevant section of the Board of Trade, into a new Ministry of Fuel, the chief object of which would be to reconcile now competing interests of the fuel industries. The "Observer", apparently an engineer, believes that the coal trade should adopt the methods of the engineering industry in its treatment of labour problems.

The Municipal Smoke Problem

THE problem of air pollution by smoke has long engaged the attention of scientific workers, but only latterly has the public realised that its solution is of first-class importance to the civil life of the community. The presence of pollutants in the atmosphere is proof of wastage of fuel. If fuel is properly and completely burned, the maximum amount of heat will be obtained without smoke, whereas if it is incompletely burned, smoke will be produced. The ultimate source of all heat, or energy, is the sun, which in its direct form of sunshine should be accessible, and in its indirect form of fuel should be conserved. Air pollutants must therefore be attacked for the two-fold reason that they blot out the sunshine, and are produced only by wastage of fuel. In November last, at the request of members of the General Science Club of teachers in the Pittsburgh High Schools, who considered it essential for all students to have a rudimentary knowledge of fuels and their uses, Messrs. H. B. Meller and L. B. Sisson, of the Mellon Institute of Industrial Research, issued a pamphlet on the subject. Therein are listed the fuels most commonly used, namely, coal (anthracite, semi-bituminous and bituminous), coke, oil and gas (natural and manufactured). Data are adduced to show in as compact a form as possible of what these fuels are composed, how and why they burn, what products they give off and whether such products exert a beneficial or deleterious effect. Finally, indication is given of the efforts which have been made to date to rid the atmosphere of pollutants. The booklet is in effect an exposition of facts which every citizen should know if he is to help in the solution of the problem of obtaining maximum heat from fuel with minimum air pollution.

The Indian Academy of Sciences

IN his presidential address in January of last year to the premier Indian academy, the National Institute of Sciences of India, Sir Lewis Fermor welcomed the formation in Bangalore of the Indian Academy of Sciences, which owes its inception to the energies of Sir Venkata Raman. The Indian Academy of Sciences is already well known through the medium of its publications, and in December last Sir Venkata Raman delivered his presidential address at the first annual meeting, which was held in Bombay. In this he clearly set forth the aims of the Academy, and at the same time he appealed for funds to enable it to continue and extend its activities, and also for the erection of a suitable building for which the generosity of the Maharajah of Mysore had already provided a site adjacent to the Indian Institute of Science. It is somewhat surprising to find in the address no reference to the National Institute of Sciences with which, from Sir Lewis Fermor's remarks, we had gathered it was to co-operate. We trust that the absence of such reference does not imply that this co-operation has ceased. If the growing body of scientific thought in India is to exercise that influence on the government of the country, which is its due, or if it is to be adequately repre-

sented at international conferences, it can only be through the agency of a national organisation. Valuable as may be the local activities of the Asiatic Society of Bengal, and of the Academies at Allahabad and Bangalore, they cannot fulfil these duties.

Preparation of Woad in England

In a paper on "The Preparation of Woad in England", read by Messrs. H. O. Clark and R. Wailes on February 19 to the Newcomen Society, the authors said that, after being cultivated for centuries, dyer's woad (*Isatis tinctoria*) was last grown and prepared at Skirbeck, Lincolnshire, in 1932, and that it is not likely to be grown again either in England or elsewhere. Much has been written on the history, botany and chemistry of the plant and the dye, and the object of the paper was to place on record information as to the technology and the cost of the preparation of woad. Fortunately, on farms at Algarkirk and Skirbeck, the machinery used in the industry remains almost intact and many photographs and drawings have been made of it. At Algarkirk, too, are old account books covering the period 1844-56, and these show that the output of the farm varied from 75 tons to 178 tons and the price obtained for the prepared woad from £9 to £15. The operations involved in the preparation of woad include sowing, weeding, cropping, grinding, balling, drying, couching and packing. The most interesting of these processes was the grinding in large horse- or steam-driven mills. In the mill at Algarkirk is a circular track of oak blocks about 24 ft. in diameter on which the leaves of the plants were crushed and chopped by means of four great tapered rollers each furnished with about thirty-six cutters. The rollers were towed round the track by a large overhead cast-iron wheel with cast-iron spokes and a toothed rack with 456 teeth. Such mills were fine specimens of millwrighting. After the woad leaves were crushed, they were kneaded into balls by hand, and dried. A few weeks later the balls were broken up and the woad spread over the floor of the 'couching house' to a depth of about three feet. It was allowed to ferment for six to eight weeks, being turned over daily, and then was again dried, after which it was packed in barrels for dispatch to the dyers.

Academic Assistance Council

At a meeting of the Academic Assistance Council, under the presidency of Lord Rutherford, in the rooms of the Royal Society on February 21, the Council recorded its gratitude for the generous gift from Mr. and Mrs. Simon Marks, Mr. and Mrs. Israel M. Sieff, Mr. and Mrs. Harry Sacher, Mr. and Mrs. Norman Laski and Miss Mathilda Marks of two research fellowships for displaced German men of science of the value of £450 per annum each for a period of five years. After consultation with the Royal Society, the Council awarded one fellowship for a period of three years to Dr. Walter Heitler, to enable him to continue his research in theoretical physics at the University of Bristol. Dr. Heitler,

formerly of the University of Göttingen, is best known for his work in connexion with the quantum theory of valency and more recently in connexion with the theory of absorption of particles and radiation of high energy. The Council will shortly award the second fellowship. From its general funds the Council established a third fellowship for a period of three years, which it awarded to Dr. Veit Valentin, to enable him to continue his work in German history at University College, London. Dr. Valentin was head archivist and director of the research department for the history of culture of the German State Archives at Potsdam.

THE officers of the Academic Assistance Council reported that the dismissal of university teachers in Germany on account of opinion or race is continuing, and that even after dismissal scholars are further victimised by being denied access to libraries and forbidden to accept invitations from universities and learned societies abroad. The officers also reported that six university teachers have been dismissed in Portugal for other than professional reasons. There is, therefore, continuing need for a non-political organisation to assist displaced men of science and other scholars, and the Council has made plans for the creation of a more permanent body, a Society for the Protection of Science and Learning, to take over its activities. An invitation will shortly be issued for persons to join this Society, and at the same time an appeal for funds will be made.

The Universities, Social Sciences and Local Government

REFERENCE is made in the annual report to the Court of Governors of the University of Birmingham, presented by Sir Charles Grant Robertson (vice-chancellor) on February 20, to the criticisms of Miss Fry, at the recent Annual Conference of Educational Associations: (a) that in the ratio of number of university students to population Great Britain attains only to the fifth place among the European nations; (b) that there does not exist a single university department in Great Britain dealing with causes, incidence and treatment of crime; and (c) that too large a percentage of university graduates go down almost ignorant of the structure of society and its claims upon them. As to these criticisms, the Vice-Chancellor says that "unless the community can annually and suitably absorb the output of the Universities, an increase in the number of university students will defeat the purpose for which it is made. . . . What is needed even more than a knowledge of the existing social structure is the power to amend it and strengthen its capacity to absorb the trained mind . . . ignorance of the structure of society is not confined to graduates; it is shared by a huge percentage of the community, including the House of Lords at one end and the recipients of Public Assistance at the other". He quotes with approval Miss Fry as reported in *The Times* of December 31, 1935: "In the local service there was too little bringing in of generally well educated people in the early twenties, as in the State Civil Service. The