The influence of atomic vibrations on measured values of lengths of bonds is not, of course, limited to electron diffraction work, and a paper by H. Levy discussed this problem in relation to precise structure refinements by X-ray and neutron diffraction methods. It was shown how the apparent interatomic distance for a pair of atoms depended on whether or not their individual thermal motions were linked or independent. Any attempt to deduce the equilibrium distance of separation, as distinct from the centroid separation, depends on reaching a precise knowledge of the atomic vibrations after making measurements at various temperatures, followed by an extrapolation and allowance for zero point motion. In discussion it was made clear that whenever corrected distances are given it is very essential to specify on what assumptions the corrections have been made. The effects are of particular importance when the motions of hydrogen atoms are being considered and are of especial interest in work on neutron diffraction. This paper, in fact, formed part of a session which was devoted to the contribution of neutron methods to our knowledge of thermal motion, which Dr. W. Cochran opened with a discussion of the great value of measurements of energy distributions of scattered neutrons in a review of recent work on lattice dynamics by neutron spectroscopy at Chalk River. Of particular interest were an extensive series of precise measurements of the dispersion relation, between frequency and wave-number, for the acoustic vibrations in single crystals of lead. In order to interpret the results it is necessary to assume that long-range forces are important in the solid and it is shown that their range becomes less as the temperature is increased. From the widths of the peaks in the neutron-energy spectrum it is possible to deduce the life-time of the phonon vibrations. In a further comprehensive set of measurements the lattice dynamics of the alkali halides and of lithium hydride were investigated. As an example of the contribution of neutron methods to disentangling the effects of thermal vibration and bond anisotropy, a paper given by Dr. R. S. Calder described concurrent neutron and X-ray work on lithium hydride.

In the final session of the symposium, Prof. I. Waller described some recent theoretical work on the frequency distribution and dispersion relations for alkali halides at low temperatures, with particular reference to the approximations which have been made in calculating the form of the zero-point energy vibration amplitudes. The conclusions are in good agreement with results of diffraction experiments. In an interesting survey of a wide range of experimental data, F. H. Herbstein examined the values of Debye temperature determined for cubic crystals by methods such as specific heat and elastic constant measurement, as well as by diffraction studies at one or several temperatures. At room temperature there is reasonable agreement between different methods, but at low temperatures such meagre X-ray data as exist suggest that the apparent Θ values may be lower than those found by other methods. It would seem that some accurate and comprehensive X-ray work in this field would be rewarding.

Two papers were given on the contribution of nuclear magnetic resonance to studying thermal motion. In a review of this application, Prof. E. R. Andrew emphasized that whereas previous speakers had been concerned solely with 'vibrations', there were other forms of motion, such as hindered rotation and self-diffusion, which only occurred infrequently—though involving much greater movements—and which could not be examined by diffraction techniques. Examples were given of how these topics can be investigated quantitatively by nuclear magnetic resonance techniques and how the postulated effects on the spectrum can also be demonstrated by absorption measurements with rotating crystals. Dr. J. A. S. Smith described an application of nuclear magnetic resonance methods to the examination of single crystals of urea and thiourea which demonstrated the onset of hindered rotation about the C=O and C=S bonds in the two cases. As a result the molecules flip between two possible equilibrium configurations, giving rise to large apparent temperature factors for some of the atoms as judged by X-ray diffraction work.

In conclusion, it may be worth recording two personal impressions which remain from the papers and discussions. First, although the precision of experimental measurements in these investigations is very high, there still remain some significant gaps in interpretation which leave room for systematic errors and may make some of the apparent accuracy illusory. Secondly, in spite of the increasing identity of equipment used over the world, one can still be struck by the individuality of thought and methods of approach which characterizes the different schools of investigators.

The symposium was attended by about 400 persons, mainly accommodated in the large lecture theatre of the Arts School at Cambridge, but with an over-flow in the adjoining Cavendish Laboratory served by a closed-circuit television set. It was perhaps significant that even for the less-crowded sessions there were many who preferred the quieter, airy contemplation of the television screen to the hurly-burly of the lecture room.

G. E. BACON

THE INTERNATIONAL SCIENTIFIC FILM ASSOCIATION

THE fourteenth annual congress of the International Scientific Film Association was held in Prague during September 16–24. It was attended by 120 delegates and observers from twenty-four countries. The British delegation of twenty people was led by Mr. Edgar Anstey, president of the Scientific Film Association. Associated with the congress was the Third Festival of Films presenting Science.

The International Scientific Film Association is a non-profit-making and non-governmental organization, officially recognized for consultative status with Unesco. Membership is open to any organization representative of the science film movement in the country of that organization.

The congress were welcomed officially by the Czechoslovak Minister of Education and Culture, Dr. Frantisek Kahuda, and by the managing director of Czechoslovak Film, Mr. Alois Polednak.

The Czech Organizing Committee—led by Dr. Vladimir Vaclavek—provided a delightful centre in

the form of the Film Club, at which members of the congress could meet and also dine and drink until the early hours of the morning. They also provided facilities for many visits in their beautiful city of Prague, and opportunities for meeting film makers and scientists in their studios and laboratories. The social life was full and active.

The first International Library for Scientific Film is to be set up in Brussels. It is the result of an agreement between the International Scientific Film Association and the Belgian Institut National du Cinéma Scientifique. There has been much discussion over this film library, and the stage has now been reached where the final documents are likely to be signed sometime in 1961. Van den Borre, director-general of the Belgian Ministry of Education, expressed to the general assembly his Government's keen determination to see the project through, and gave some details of financial support. The main tasks of the Library will be to gather together and keep copies of the best scientific films, to classify them, to publish general and specialized catalogues, to organize congresses, and to arrange special showings of films.

Because cinema and television are rapidly becoming closely linked, resulting in many new problems and possibilities for scientific film makers and users, it was agreed to set up a commission to study television in relation to the aims of the scientific film.

Unesco has suggested a study be made on the provision of films in the natural sciences for use in high-schools in newly developing countries. The International Scientific Film Association has been asked to undertake the research, and a commission was set up for this.

Closer co-operation between the Association and specialized international bodies and associations having film sections, for example, the World Veterinary Association, is to be secured by making provision for observers from these bodies to attend Association's congresses.

Greece and Israel were admitted to full membership of the Association, bringing the number of member countries to twenty-eight. It is expected that next year the American Science Film Association is likely to become a member.

The annual congress provides the main discussion opportunity for international science film makers. To meet their needs, there are three sections, each having its own programme of work. They engage in a vast range of activities.

In the Research Section, 11 lectures and 35 reports were delivered, and 68 specialized films were shown. In the Education Section, 4 lectures and 24 reports were made and 62 films were shown. In the Popular Science Section, there was a major discussion on definition of popular science films, two reports were made, and 72 films were shown. In addition, the Popular Science Section organized for the first time three special meetings of television workers from different countries at which ten TV films were shown.

Two B.B.C. producers—Aubrey Singer and James McCloy—presented a clear picture of what was being done in B.B.C. television, and the B.B.C. won much praise for its co-operation in making available a large amount of TV recording.

The question of definition has very much bogged down discussion in the past, and for the first time this year it was felt that the beginning of a successful solution to this problem had been made. In the Popular Science Section, a paper entitled "Types and Genres of Popular Science Films" was read by Mr. Igor Vassilkov (U.S.S.R.). He divided popular science films into two groups—the didactic and the imaginative—and then used the terminology of literature, because the film has as yet developed no comparable language, to describe the different kinds of films to be found within each category. It was agreed that the nature of such a film is determined by what the writer and director have set out to do. There was long discussion on this paper, in which the writer of this report found general acceptance for his view that the didactic film was now being taken over by TV and specially-made educational films, and that the future for the popular science film lay with the imaginative type of film. It was no longer necessary to popularize science among young people, but to stir their imagination with an understanding of the social implications of scientific development. It was mainly an older generation who had not been taught science at school, who still required the didactic type of popular science film.

The Popular Science Section has agreed to ask member countries to provide details of all the films already made or which will have been finished before January 1, 1961, concerned with the history of science and technology, or of the lives of eminent personalities in science and technology whose discoveries and inventions are of international significance. It will form the basis for a comprehensive catalogue to be published by the Russian branch of the Association.

Among problems that concerned the Education Section was the role of the film in speeding up the rate of learning, that is, to increase the amount learned without increasing the time spent in school. Mr. Vitali Jemtchujni (U.S.S.R.) gave details of a series of new teaching films in physics which were being prepared for production in his country and which were part of an overall attempt to find a solution to this urgent problem.

The Research Section considered films in medicine, biology and botany. Two Russian papers that aroused particular interest were on new Soviet equipment for high-speed still photography and cinematography, and the use of high-speed and ultra-speed filming of technological processes pertaining to agricultural machinery. The latter work has risen from problems caused by the mechanization of cotton harvesting. Film was used to obtain a picture of what happens in separating cotton lobes from the boles when cotton is picked with pneumatic harvesters. It was claimed that economies in picking and an increase of production resulted from the application of these studies.

The general assembly agreed to award diplomas to the following films shown during the Festival: "The Mountain Canal" (China); "Passsport to Space" (Czechoslovakia); "Sea Dancers" (France); "The Magic Tape" (German Federal Republic); "Living Traps" (Hungary); "Morning Sun" (Japan); "Sources of Energy in the Blood Circulatory System" (Poland); "The Revealing Eye" (Great Britain); and "Atomic Ice-Breaker" (U.S.S.R.).

In addition, "Symphony in Steel" (Japan) was given a special commendation for its use of cinemascope, as was "Timber" (Bulgaria) for its witty treatment of a static subject.

Mr. Alexandre Zgouridi (U.S.S.R.) was re-elected president of Association, and the vice-presidents are Mr. Edgar Anstey (Great Britain) and Mr. J. Varossieau (The Netherlands); the honorary secretary remains Mr. John Maddison, one of the founders of the Association, who this year wished to resign, but

was persuaded to stay on for another term. Mr. Mohamed Afifi (Morocco) was appointed assistant to the honorary secretary. The honorary treasurer is Dr. Vladimir Vaclavek (Czechoslovakia). The honorary life members remain M. Jean Painlevé (France) and Mr. Jan Korngold (Poland). The editor-in-chief of *Scientific Film*, the journal of the Association, is Mr. Maurice Goldsmith (Great Britain).

The liaison officer of the Association with the International Science Film Library is Mr. Luc Haesaerts (Belgium); the chairman of the Television Study Commission is Mr. John Maddison, and of the Unesco–International Scientific Film Association Science Films Commission, Mr. Bernard Chibnall (Great Britain). The chairmen of the Standing Committees are: Research, Dr. R. Robineaux (France); Popular Science, Mr. V. Tosi (Italy); and Education, Prof. J. Jacoby (Poland). Next year's Congress is likely to be held in Rabat, Morocco.

MAURICE GOLDSMITH

A BRITISH SOURCE OF NATURAL GAS

THAT in Britain there should be in daily use a supply of natural gas may well surprise many well-informed people. Indeed, it was in 1938 that two discoveries of natural gas in Britain were made, one at Cousland, south-east of Edinburgh, and the other west of Whitby at Eskdale. At that time no commercial outlet existed for these potential supplies and the wells were sealed off for eventual future use. The Cousland discovery has been harnessed by the Scottish Gas Board for the use of Musselburgh, where after being suitably treated it forms part of the gas supply.

Now there comes the news of interest more particularly to the inhabitants of the Whitby district of the actual utilization of the gas from the Eskdale area. The wells are situated in moorland of much natural beauty; but there is no fear that the amenities of that fair land will be impaired by the small surface equipment that marks the source of a sufficient supply of gas to serve a new but sole production unit in the Whitby Gas Works.

Two wells, of some eleven that have been drilled, have proved to be gas producers. These wells have a closed pressure approximating to 2,000 lb. per sq. in., and draw their gas from limestone layers, respectively 4,196 and 4,807 ft. below ground-level. It was only in April this year that these wells were re-opened and now the laying of a 3-in. pipe-line has been completed. Further, in order to produce from the natural gas, which contains 93–94 per cent of methane and has a calorific value of 1,000 B.T.U. per cu. ft., a final gas for public distribution of 500 B.T.U. per cu. ft., a conversion plant has also been installed.

The conversion process of the gas is known as a reforming process. It consists essentially of the reaction of the natural gas with steam to produce hydrogen and carbon monoxide. It is carried out in special heat-resisting steel tubes which are heated to about 1,100° C. and contain a nickel catalyst. It is then enriched with some cold natural gas, and flue gas from the tube-furnace, fired by natural gas. This is necessary to adjust it to the correct calorific value and density for public distribution.

It is also interesting to note that the gas is of such a freedom from sulphur impurity that in order to ensure that gas supplied to the town should have a distinct odour, equipment for the purpose has been installed, employing tetrahydrothiophen as odorant.

The two wells available have a combined flow-rate up to 4·5 m. cu. ft. per day. Three reformer units have been provided, each having a daily capacity of 625,000 cu. ft.

The plant has been put to work in recent weeks, and the venture is so new that the performance tests have yet to be carried out.

R. J. SARJANT

THE LIBRARY IN SCIENCE AND TECHNOLOGY

OF the papers of scientific interest presented at the annual conference of the Library Association at Scarborough, September 12–16, that of Dr. D. J. Urquhart describing the planning of the National Lending Library for Science and Technology and the ideas and motives behind it is undoubtedly the most important, but some of the other papers should not be overlooked by the scientist and technologist. In his presidential address on September 13, Mr. B. S. Page, librarian of the Brotherton Library, University of Leeds, discussed librarianship as he saw it practised in English universities of the twentieth century, and more particularly the research side of such work. Research, he suggested, in fact determined the extent, and very largely the character, of the collections and greatly influenced every aspect of the work of a university librarian, and Mr. Page emphasized, first, that the librarian and his readers were members of the same university community, with all it implied, and secondly, that the reader regarded the library less as an amenity than as a necessity; his use of it was regular and professional; normally his work could not proceed without it, and how it operated made an immense difference to the reader's peace of mind and perhaps his hopes for the future. From this Mr. Page argued that because selection had to make the most of very limited resources, buying must be largely related to specific interests which have to be known and understood by the library staff, while at the same time important works had to be acquired for future needs and a close watch kept over special collections and special emphases in general collections. The librarian must be thoroughly equipped to make the most of the potential co-operation of the experts in the teaching departments surrounding him and, pointing out that a university