

tures were very well attended and in several cases the seating accommodation in the lecture-theatre was over-full. The annual dinner, with the president, Mr. L. S. Suggate, in the chair, attracted more members than ever before, and the excursions on the last day of the conference, though more numerous than previous years, were considerably over-subscribed.

Mr. W. F. Grimes, director of the London Museum, opened the conference with an excellent summary of the present knowledge of London's prehistory. The London theme was taken up later by a series of papers ranging from Mr. A. F. Green's fascinating analysis of the problems of London's underground drainage to Prof. S. W. Wooldridge's interesting commentary on the relationship of London's railways to the relief and structure. Dr. J. H. Bird presented a critical résumé on the activities of the London docks, and Dr. M. J. Wise analysed the role of London in the industrial geography of Britain with particular reference to the recommendations of the Barlow Commission. Both these papers were followed by excursions, one to the docks and the other to industrial areas of East London. The past and present agricultural development of the London Basin was the subject of Dr. H. C. K. Henderson's paper, which was followed by a traverse by motor coach across the northern part of the London Basin to Luton. Another excursion crossed the southern part of the basin and in the afternoon visited the National Institute of Oceanography at Wormley, near Godalming.

Teaching matters were fully discussed by Mr. Suggate in his presidential address on "Some Aspects of Teaching Geography in the Grammar School". His paper was most enthusiastically received by a very large audience, conscious of the very great contribution that Mr. Suggate has made to the development of geography in school. Another very large audience heard a stimulating and provocative paper on river development by Dr. G. H. Dury, who commented, as an examiner, on mistakes commonly found in school examination scripts. Later he took a large party of members to examine a series of river meanders in Enfield. "Sample Studies" was the title given to a meeting sponsored by the Secondary Schools Committee of the Association. The subject was introduced by Mr. R. C. Honeybone, who stressed the value of the approach as one of many ways of teaching geography in a geographical manner and outlined its pitfalls. Mr. D. J. Cadman followed this introduction by a lesson to third-form boys on the Vauxhall Works at Luton as a sample of the British automobile industry.

Prof. A. E. Smailes presented an account of the Association's summer school held last August in Aix-en-Provence; Prof. P. W. Bryan showed two films on Snowdonia and Anglesey; and Prof. A. L. Banks read a paper on what is to most geographers an unusual topic, "Some Aspects of Medical Geography". This last was a combined meeting with the Institute of British Geographers and the Royal Geographical Society, and was held at the Society's house in Kensington.

In addition to the usual large and representative publishers' exhibition, the Association's Standing Committee for Visual Aids in collaboration with the National Committee for Visual Aids in Education and the Educational Foundation for Visual Aids mounted an exhibition of sample study material, projectors and recently published film-strips.

R. C. HONEYBONE

THEORETICAL PHYSICS

SYMPOSIUM AT ST. ANDREWS

THE presence of Prof. W. Heisenberg (Göttingen) as Gifford Lecturer in the University of St. Andrews was used to organize a short, rather informal, conference on theoretical physics during November 18-20. Unfortunately, Prof. Heisenberg had to return to Germany sooner than had been expected and so, regrettably, was unable to be present, but about fifty physicists, mainly from British universities and government establishments, attended. Four sessions were held, one of which was devoted to an informal discussion on the teaching of theoretical physics.

Dr. J. Hamilton (Cambridge) introduced the first session on field theory. In view of the recent confirmation of the existence of the antiproton, his talk was devoted to an account of calculations performed in Cambridge, in conjunction with Bethe, on the possible modes of annihilation to be expected for this particle. He showed that the application of general principles of conservation of angular momentum, isobaric spin and parity is sufficient to make predictions concerning this process in the presence of very light nuclei. In general, the annihilation is expected to occur with the production of π -mesons, the ratio of π^- to π^+ to be expected depending simply on the quantum numbers of the nucleon involved.

Dr. T. H. R. Skyrme (Harwell) gave an account of a relativistic variational method for calculating the properties of a real nucleon in $PS-PS$ theory, and Dr. J. S. R. Chisholm (Cardiff) reported work on the S -matrix in neutral pseudoscalar derivative coupling theory. Dr. J. W. Leech (Queen Mary College, London) described a method for the calculation of long-range interatomic forces; an earlier treatment of this problem by Casimir and Polder led to an inverse seventh power potential, but he finds the dependence to be an inverse third power. Dr. W. K. Burton (Glasgow) described work done in conjunction with de Borde on the method of functional integration for Fermi systems. Dr. D. L. Pursey (Edinburgh) discussed the possibility of having an acceptable theory which, although not covariant in every respect, leads only to covariant observable predictions. Finally, the session on field theory was concluded by Dr. C. G. Kuper (Liverpool), who discussed roton excitation in liquid helium.

Prof. H. A. Bethe (Cambridge and Cornell) introduced the session on nuclear physics by an appreciation of the nuclear model of Brueckner and collaborators. This model uses a generalized Hartree-Fock method and attempts, with considerable success, to deduce a self-consistent nuclear potential from the force between two free nucleons. A principal aim of the theory is to show that, using only such two-body forces, one can achieve nuclear saturation. Prof. Bethe gave an account of his own independent calculations on nuclear energy and radius, in which he has succeeded in taking complete account of the Pauli principle, and he also reported success, with Goldstone (Cambridge), in dealing with the repulsive core of the two-body nuclear potential. Preliminary numerical calculations (not taking account of the repulsive core), using a minimization procedure for the energy, show fair agreement for nuclear binding energy, but a nuclear radius one-third that of the actual radius. Proper treatment of the repulsive core,

now in progress, will certainly change both results in the right sense.

There followed four short papers, in the first of which Dr. H. Primakoff (Oxford) discussed the nuclear absorption of μ -mesons. Then Dr. R. Nataf (Edinburgh) spoke on the foundations of the Bohr-Mottelson nuclear model, and Dr. S. Dedijer (Edinburgh) analysed, in terms of the independent particle model, the similarity in the variation of binding energy of the last neutron for nuclei near carbon-12 and oxygen-16. In the last contribution to this session Prof. N. Kemmer (Edinburgh) proposed a classification of many-body forces in the lightest nuclei based on representations of the symmetric group.

The session on solid state theory was opened by Prof. M. H. L. Pryce (Bristol), who described the information obtained from studying the fine structure of the paramagnetic resonance absorption of ions such as cupric in crystals. He went on to describe the distortion of the hydration sphere of the ion which, by the Jahn-Teller effect, arises from the degeneracy of the electron wave function in a fully symmetrical environment. This degeneracy may or may not be fully removed by the distortion. If rotation about an axis remains free, the system becomes equivalent to a particle moving in an annular potential well. Prof. Pryce finally suggested an analogy between this situation and the Bohr-Mottelson model of the atomic nucleus.

Dr. E. H. Sondheimer (Queen Mary College, London) and Dr. J. M. Ziman (Cambridge) then discussed the transport of heat and electricity in solids. Dr. Sondheimer emphasized the general validity of the Onsager reciprocal relations and showed how in some treatments of thermo-electric processes algebraic obscenity has led to methods of approximation which violate these relations, while Dr. Ziman discussed the variational principle used in the solving of transport equations. Dr. N. H. March (Sheffield) described the results of some measurements of the absorption of high-frequency radio waves in semi-conductors. Dr. K. W. H. Stevens (Nottingham) discussed the construction of bonding orbitals for the first co-ordination shell in face-centred and body-centred cubic metals, and Dr. R. Fürth (Birkbeck College, London) spoke on long-range order in crystals. An account of the recombination of current carriers in a semi-conductor was then presented by Dr. P. T. Landsberg (Aberdeen), and in conclusion Dr. G. A. P. Wyllie (Glasgow) discussed the problem of diffusion at low temperatures.

On the afternoon of November 20 an informal discussion was held on the teaching of theoretical physics. After short introductory talks by Prof. Bethe, Dr. D. ter Haar (St. Andrews) and Prof. Pryce on the teaching of theoretical physics in the United States, Netherlands and United Kingdom, respectively, two topics were discussed at some length: the amount of mathematics to be taught at the undergraduate level to students who will be proceeding to do research in theoretical or experimental physics; the amount of formal teaching in physics (and possibly mathematics) to be given to research students in experimental or theoretical physics. There was a very considerable degree of agreement on the following points: that students proceeding to do research in physics should have a thorough training in pure and applied mathematics, but that this presents difficulties in many British universities owing to the rigid structure of courses and examinations; and that

there should be one year with considerable formal instruction at the beginning of the period of research, and that this should be received by experimental as well as theoretical physicists. This latter point was very forcefully put by several speakers, and its need was considered sufficiently great to outweigh the disadvantage that it might occasionally extend the Ph.D. training beyond the normal three years.

J. F. ALLEN

CHILDREN'S FILM FOUNDATION

THE Foundation was set up in 1951 as a result of the co-operative effort of the British film industry to ensure the production, distribution and exhibition of special entertainment films for children. It began its activities in October 1951 and, during this period, has become accepted, not only in Britain but also throughout the world, as an integral part of the British film industry. It is a non-profit-making organization and is financed by grants from British Film Production Fund, Ltd.

During the four years of its existence there has been time to set a standard for the content and quality of its films and to study their reception by audiences in Great Britain as well as overseas. The steady rise in the bookings is significant of the success of Children's Film Foundation films with the audiences for whom they are made.

Since in most situations the Foundation was starting completely anew, its first films followed the conventional pattern of the 'Western'. This was necessary because children are conventional in their tastes and do not accept innovations easily. It was enough, first of all, to introduce child actors in an English background without altering the simple 'good versus bad' technique. Generally, these pictures have proved highly acceptable.

The content of the films has been gradually changed to introduce ideas of achievement above and beyond the satisfaction of catching thieves or spies. Eight achievement stories have proved as popular as the conventional adventures. The fact that the films are placed with many different companies for production helps to give the pictures vitality and variety, which add to their value in children's programmes.

Although the Foundation has not yet been able to undertake any special research project, the reception of the films is carefully recorded and studied. Besides personal observations of audiences by the officers of the Foundation, a questionnaire, returned and filled in by cinema managers, provides valuable information. There appears to be little difference in taste and response between different parts of Great Britain; but some audiences, especially in the larger cities where they are more accustomed to film-going, like the story to develop quickly; rural audiences prefer a slower pace. Individual tastes vary enormously.

What clearly emerges is the excellent natural taste of children at the cinema. They are anxious to participate in the programme and their interest is lost only by weaknesses in production, acting and, above all, in the script.

It takes time to wear down the old-fashioned idea that children go to the cinema to be excited and stimulated by violent adult action; but it is dying out in Britain. The reports of cinema managers reflect the pleasure their audiences take in films that