William Beveridge, in a masterly summary, pointed out, this may be desirable, but the process of change is bound to be painful. The arrest of the decline can be accomplished only slowly and in one way alone—by increasing the *desire* of the people to have children. Reference was made to existing tax concessions as being a bad joke or, alternatively, a penny in the pound towards the cost of child-rearing. It was suggested that serious State action has nowhere been attempted. The two great questions are thus: Do we want to stop the decline? If so, can we?

A valuable discussion was that on broadcast geography lessons, at which the teachers, the inspectors, the B.B.C., and broadcasters were represented. There was general agreement that systematic lessons should not be attempted, but that first-hand travel talks to be used as 'background' material, and accurate as well as useful and stimulating in content, should be the aim.

Dr. H. A. Matthews detailed suggestions for the study of local climate and had some remarkable illustrations of local variations—the frost pockets by walls so well known to gardeners, the contrasts between the wind rose at the head of a valley (with one calm day per month and predominantly south-west winds) and at a village in the valley only one mile away (with fourteen calm days and the wind predominantly north-west or down the valley).

Mr. G. H. J. Daysh summarized his very important recent work on Tyneside and the north-east, emphasizing two points specially—the contrast between the reviving water-side areas and the stagnant inland coal mining areas, and secondly, his own faith in emigration as the solution.

Mr. S. H. Beaver dealt with the scope of railway geography, and two meetings were devoted to joint sessions with the Leplay Society—with Dr. Stamp on Poland and Dr. L. R. Wood on Norway.

Sir Josiah Stamp's presidential address on "Geography and Economic Theory" can only be described as epoch-making in that it defined clearly, for the first time, the points of impact of two modern disciplines and has provided a gospel for future workers.

Institute of British Geographers

The Institute of British Geographers held its annual meeting at the London School of Economics on January 6–7, Prof. R. N. Rudmose Brown replacing Prof. C. B. Fawcett in the presidential chair.

Mr. W. V. Lewis developed the theme of glacial plucking and corrie formation from the *bergschrund* hypothesis of Willard Johnson, stressing the importance of glacial sapping at the foot of corrie cliffs and the potency of summer melting. Dr. S. W. Wooldridge considered the later stages in the physiographical evolution of the London Basin, thus continuing his well-known work published in the *Proceedings of the Geologists' Association*.

Mr. F. H. W. Green gave a succinct and well-illustrated account of the water-meadow systems of Hampshire; Mr. K. H. Huggins suggested a functional classification of English towns into five major groups: primary production, major industries, other industries, local services and regional services. Miss A. F. A. Mutton presented a detailed study of the Black Forest region and Mr. R. A. Pelham a study of the wool industry in the fourteenth century.

L. D. S.

Mathematical Association

Annual Meeting

THE annual meeting of the Mathematical Association was held at the Institute of Education, London, W.C.1, on January 4-5. At the business meeting, Prof. L. N. G. Filon was elected president for the ensuing year, and the officers were re-elected as follows: *Treasurer:* Mr. K. S. Snell; *Secretaries:* Mr. G. L. Parsons and Miss M. Punnett; *Librarian:* Prof. E. H. Neville; *Editor of the Mathematical Gazette:* Mr. T. A. A. Broadbent.

The report of the Council refers to the continued growth of the Association, which now numbers nearly 1,600. The library of the Association has been enriched by gifts from the Royal Technical College, Glasgow, and Mr. C. O. Tuckey; also by an exchange effected by Prof. Neville with the Centre National de Documentation Pédagogique, Paris, as a result of which a very complete collection of French text-books has been acquired. Reference is also made in the report to reviews of French and German text-books which have appeared in the *Mathematical Gazette*. The Teaching Committees announce that a supplementary report on the teaching of geometry will appear shortly and also that a sub-committee has been appointed to collect information about mathematical films. The Association has become affiliated to the Conference of Educational Associations.

The outgoing president, Prof. A. R. Forsyth, in his address entitled "Applied Mathematics in School Training: Some General Considerations", compared the standards demanded of an entrance scholar to Cambridge at the present time with those demanded sixty years ago. He noticed that, while there has been some modification of method rather than of matter in pure mathematics, applied mathematics is in a general way practically the same at the present day as it was when he himself was an undergraduate. This, he considers, is scarcely less than surprising, having regard to modern applications, and he went on to offer some general observations on the ways in which this defect might be rectified.

Prof. Georg Wolff, of Düsseldorf, read a paper entitled "The Development of the Teaching of Geometry in Germany". He referred to the revolt against the traditional teaching of Euclid which occurred in England partly owing to the work of the A.I.G.T. (afterwards the Mathematical Association) and partly owing to the attacks of Prof. Perry and others. He outlined the phases of a similar revolt which took place in Germany, culminating in the report of the German Sub-Commission of the International Commission on the Teaching of Mathematics. In the newest developments of the subject (which date from

1925), he directed attention to the emphasis placed on descriptive geometry, especially on general topics of transformation such as orthogonal and point projection and perspective.

The proceedings of the second day opened with a discussion on the teaching of astronomy. Mr. J. A. Edgar outlined the work which might be done with boys up to lower sixth form level and gave valuable suggestions for practical work in constructing star maps, plotting the plane of the ecliptic and the measurement of time. Mr. R. L. Marshall directed attention to some dangers which, in his opinion, might attend the addition of astronomy to the curriculum, while Dr. L. E. Lefèvre urged the claims of astrophysics in the work done by science specialists, referring especially to the various results obtained by spectrum analysis. In the ensuing discussion, Mr. W. F. Bushell mentioned the importance of the alliance between geography and astronomy.

Dr. R. R. Kuczynski read a paper on "Population Trends". He explained that, while an adequate device for the measurement of mortality has long been known, a good method of measuring fertility has only recently been evolved. He showed how these two measures can be combined to give the 'reproduction-rate' of a population. He stated that if fertility and mortality remain as at present, the population of western and northern Europe appears likely to drop from 194 to 150 millions by the end of the century. The U.S.S.R. is apparently an exception, and the figures here suggest an increase from 175 to 650 millions. He concluded by warning his audience that a very clear distinction should be drawn between estimates meant as forecasts and estimates meant to show what, on certain definite assumptions, the population trend would be. The figures given were to be taken as belonging to the second of these categories.

Mr. R. M. Gabriel, in the next paper, urged the inclusion of the history of mathematics in the course of study both of schools and universities. Of the different methods of presenting the history of the subject, he preferred that which dealt with the history of various topics as they occur in mathematical work. He pointed out how the history of the subject serves to throw a light on the character of times and men (for example, Cardan and Tartaglia in relation to the Renaissance ; Newton in relation to the seventeenth century). He instanced several mathematical types in which a knowledge of mathematical history would assist both teacher and pupil. In the course of a useful discussion, Sir Thomas Heath, Mr. A. W. Siddons, Prof. E. H. Neville, Mr. M. Black and Mr. G. L. Parsons offered additional suggestions with regard to topics and bibliography.

In the afternoon, Dr. A. C. Aitken read a paper on "Arithmetical Recreations". He stated that his observations were really concerned with approximation, which will assume greater importance as mechanical devices for calculation are developed. After a preliminary discussion of the mental equipment needed by a good computer, Dr. Aitken demonstrated rapid methods of division and squaring, and as an illustration of his methods, squared several numbers of three and four digits mentally with great rapidity. He next showed how the periods of recurring decimals can be determined. These methods of approximate evaluation of a square root were considered and their relative errors dismissed. Dr. Aitken concluded with some remarks on the nature of memory, in which he stressed the rhythmic element, illustrating this by writing down from memory the first two hundred figures in the value of π.

The concluding paper was given by Mr. A. Romney Green on "Geometrical Design". He commenced by describing the construction of certain polar curves and showed how these curves can be used for vases, brackets and other articles capable of being made in the school workshop. He also directed attention to the close conformity with Nature exhibited by certain leaf-designs derived from these curves. He next referred to the use of the conic (drawn as an envelope) and pointed out the superiority of these curves (used in Greek mouldings) over the circular mouldings in general use. The paper was illustrated by slides, including illustrations of pieces of furniture designed by the author.

In consequence of the indisposition of the president, Mr. A. W. Siddons presided over the meetings on the second day. The meetings were well attended throughout, and the usual publishers exhibition was held. A full account of the various papers will appear in the *Mathematical Gazette*.

Mechanized Farming*

OXFORD CONFERENCE

THE second Conference on Mechanized Farming was held in Rhodes House, Oxford, on January 5–8, under the auspices of the agricultural departments of the University, and attracted about 350 visitors.

The opening papers dealt with agricultural and technical problems arising from the extended use of tractors. An important technical problem arises from the use of paraffin rather than petrol as fuel. Under ordinary agricultural conditions, the use of the heavier fuel frequently results in rapid deterioration of lubricating oil, due to its dilution with unburned fuel components. In practice, therefore, the immediate economies which result from the use of paraffin are liable to be offset by increased consumption of lubricating oil, or, since farmers generally do not change the diluted oil often enough, by rapid wear of the engine. Measurements on tractors in the field and on test show that the solution of the difficulty is to maintain the temperature of the cooling water at as near boiling point as is practicable, to avoid changing over from the starting petrol to paraffin until a sufficiently high engine temperature has been reached, and to load the tractor as fully as possible.

* Papers can be obtained from the Institute for Research in Agricultural Engineering, University of Oxford, 1*s*. 6*d*. post paid. A supplement embodying the informal discussions is to be published at a later date.