

MATHEMATICAL ASSOCIATION ANNUAL MEETING

THE annual meeting of the Mathematical Association for 1955 was held during April 13–16 at University College, Leicester, under the presidency of Prof. W. V. D. Hodge, Lowndean professor of astronomy and geometry in the University of Cambridge. On April 14 the presidential address, entitled "Changing Views of Geometry", was delivered. Prof. Hodge referred to the late nineteenth-century view, expressed by Klein in the famous Erlanger Program, that geometry deals with properties invariant under a group of transformations, and pointed out that this formulation had been to some extent misleading and is by now certainly inadequate. By the 1920's, geometry had become separated from the main stream of mathematics and was indeed suffering from a temporary exhaustion, though the development of birational geometry had shown the need to break the tyranny of the Erlanger Program. Prof. Hodge suggested that a geometry to-day might be described as the study of a space with a structure; he analysed the meaning to be attached to the words 'space' and 'structure', and showed that this description would help to re-integrate geometry into the main fabric of mathematics. Whether the geometer works directly from axioms or through an algebraic representation is, Prof. Hodge thought, largely a matter of taste; but he declared that what is required from young people entering a university with the intention of studying geometry is not any great ingenuity in solving tricky problems, but a thorough understanding of what geometry is about, and a sound knowledge of the elementary techniques of the subject.

Mr. A. Prag (Westminster School) spoke to the meeting on "Mathematical Literature", mentioning some of the key developments to be found in the classical works of the early mathematicians, and illustrating these by reference to some of the bibliophile's treasures to be found in the Association's own Library. This is housed at University College, Leicester, and though chiefly used as a postal lending library, it was on show to members during the meetings. On April 15, the first item was a paper by Prof. R. L. Goodstein (University College, Leicester) on "The Definition of Number". He showed the logical difficulties which arise in attempting to give a definition of whole numbers, the Frege–Russell class theory leading to antinomies while the Peano axiomatic method fails to specify a unique set. The extension of the number concept to positive and negative integers, fractions and complex numbers was also critically described. Following this, the Association proceeded to a discussion of its recently issued report on "The Teaching of Mathematics in Technical Colleges"; those opening the discussion were Mr. F. W. Kellaway (North Hertfordshire Technical College), Dr. H. Frazer (Gateway School, Leicester) and Mr. A. J. L. Avery (Derby Technical College). The details of the report were commended; but members showed some anxiety about the general relations between education in the secondary modern schools and in the technical colleges, and with the alleged excessive wastage during the course of the normal five-year curriculum of technical education. The Association was glad to hear that an increasing number of technical students find their way to a university degree.

The first item in the afternoon session was a discussion of "The Disadvantages of a Mathematical Education", led by Mr. W. O. Storer (Department of Education, University of Birmingham); Mr. Storer thought that the logical training supposedly given by mathematics might be arid, and that mathematical insistence on accuracy might lead to intellectual arrogance. Some members were reluctant to accept these inferences. In the next paper, "High-Speed Computers and their Application to Lens Design", Mr. W. M. Wreathall (Taylor, Taylor and Hobson, Ltd., Leicester) outlined the methods of obtaining the optical formulae required, and showed that the very laborious calculations needed in applying these formulae could now be handled readily by modern high-speed computers. After tea, Dr. Paul White (University of Reading) asked "What is the Matter with Negative Mass?". Dr. White asserted that the young research student must be prepared to question and to analyse fundamental assumptions, and illustrated the attitude of mind required by suggesting that the consequences of supposing that a particle might have negative mass could be examined. Some of these consequences are surprising, and Dr. White concluded by exhibiting, not entirely seriously, plausible reasons for believing that the original state of the universe consisted of equal quantities of particles of positive and negative mass, but that fluctuations of distribution had ultimately driven the negative masses to great distances. The final paper, on April 16, "The Applications of Statistics to Industry", by Mr. M. J. Moroney (chief statistician, Unilever, Ltd.), assumed that members were familiar with the mathematical elements of statistics and discussed, with much wit and force, the means whereby works managers could be made to understand that many of their production and distribution problems are amenable to treatment by statistical methods which can be explained in simple terms.

The president of the Association for the year 1955–56 is Mr. G. L. Parsons, of the Merchant Taylors' School, Sandy Lodge.

HYDRAULIC CONVEYING OF SOLIDS

THE tendency of process industries to-day to change from batch-wise to continuous operation is reflected in a renewed interest in pneumatic and hydraulic transport and a wider application of these systems to the conveyance of materials of all kinds. In both cases, the underlying principle is the application of forces to the solid by a conveying fluid travelling through a pipe-line in turbulent flow, so that the solid is carried forward in suspension at approximately the same velocity as the fluid in the case of hydraulic conveying, and at a rather lower velocity in pneumatic conveying. The mechanism is complicated; but the parameters involved can be identified and investigated in comparatively simple plant.

Although hydraulic conveying has long been used for handling a variety of materials, including gravels,