THE TWELFTH CONFERENCE OF THE INDIAN MATHEMATICAL SOCIETY, ALIGARH, 1941

THE INDIAN MATHEMATICAL SOCIETY held its twelfth conference at Aligarh at the Muslim University on the 27th, 28th and the 30th of December 1941. The delegates were welcomed by Prof. A. B. A. Haleem, Pro-Vice-Chancellor, who gave a brief history of the Muslim University and stressed the need for improving the methods of teaching mathematics in the country. The Conference was opened by Sir Zia-ud-din Ahmad, Vice-Chancellor of the University, who among other matters referred to the importance of a great mathematical work by El-Beruni called *Kanoon Masoodi* written in 1038, the translation and editing of which would throw light on the influence of Indian and Greek Astronomy on the researches of the Arabs. The Report of the Society's activities was read by the Secretary, Dr. Ram Behari, of Delhi University.

In his Presidential Address, Dr. R. Vythynathaswami (Madras) said that college instruction could not be separated from research except to its detriment and degradation. Mathematical discovery, he said, was a baptismal experience of something fresh rising in the human consciousness and miraculously revealing a new world of values—an experience which was enshrined in the Vedic Symbolism of *Ushas*, the Deity of the Dawn, or in the glamorous figure of *Lakshmi* rising from the Ocean of milk churned by the *Devas* and the *Asuras*. He then traced the various "dawns" that had illumined and transformed the mathematical outlook at various times and had given a deeper insight into the nature of mathematical thought.

The session was well attended by delegates from different parts of India and over 50 papers were contributed to the Conference. Besides the reading of the papers, there were three symposia—one on "Fourier Integrals and Transforms" with Dr. R. S. Varma of Lucknow presiding, a second on "Group Theory" under the Chairmanship of Dr. F. W. Levi (Calcutta) and a third on "The Origin of the Solar System" presided over by Prof. A. C. Banerji (Allahabad).

There were two evening lectures, one by Dr. A. Narasinga Rao (Annamalainagar) on "Mathematics and Modern Warfare" and the other by Dr. B. Ramamurti (Ajmer) on "How to make the Teaching of Mathematics interesting". Prof. D. D. Kosambi (Poona) addressed the students of the Mathematics Association of the Muslim University on the evening of the 27th December.

As usual there was a Business Meeting of the Society and a Discussion on the Teaching of Mathematics in Schools and Colleges initiated by Sir Zia-ud-din Ahmad.

Special features which made the Aligarh Conference noteworthy were the Annual Session of the Benares Mathematical Society held for the first time in collaboration with the Indian Mathematical Conference, and the announcement of a prize to be awarded once in two years for the encouragement of mathematical research which Prof. A. Narasinga Rao offered to institute. The details of the prize are under consideration by the Committee of the Indian Mathematical Society.

A. NARASINGA RAO.

DRIVE AGAINST MALARIA IN INDIAN CANTONMENTS

THE announcement of a drive against malaria in Indian Cantonments is a significant forward move in a country where malaria forms one of the major health problems. It is estimated on a rough computation that nearly a million deaths a year are directly due to malaria and that at least a hundred times as many people are suffering from the disease. The epoch making discovery of Sir Ronald Ross, elucidating the mechanism of malaria transmission in 1895, was quickly put to test in the field and there have been numerous outstanding examples of control of malaria in mainly urban areas and of populations under control, in several parts of the world.

While available methods of malaria control have been made use of in a few urban areas in India including Cantonments, a more generalised use of these methods to cover extensive hyper-endemic malarious areas has been largely limited on account of peculiar local conditions. India is essentially rural and

till recently the measures available for the control of malaria were much too costly to permit a large-scale control of rural malaria.

Up till recently, measures available for the control of malaria were,

(1) permanent measures—anti-malaria engineering,
(2) recurrent measures—use of larvicides,
(3) naturalistic methods—use of natural enemies, etc., shading, and
(4) use of drugs.

These measures have been used singly and in combination in Indian Cantonments, and other large-scale public works where labour is under control and in a number of other places mostly urban, with good results.

Recent work on the use of insecticides for killing adult mosquitoes, has brought out pyrethrum extract as a most useful addition to the several measures already available. This measure consists in a regular spraying of an extract of pyrethrum diluted with kerosene, all day-time resting places of anopheline mosquitoes once or twice a week. Field trials, with this extract by a number of workers in India have indicated this method as an effective, and at the same time a cheap anti-malaria measure bringing the control of rural malaria within the realms of practical possibility.

The anti-malaria drive now being organised, has more than circumscribed interest. The co-ordination of civil and cantonment agencies for the purpose of malaria control avoids unnecessary overlapping and should yield better control. The neglect of control of the civil population living in close proximity to a cantonment area was a serious omission, now removed. A central control, co-ordinating the work in different units, will considerably help in developing improved technique and valuable standards for future development.

The most important feature of the scheme is the organisation for the training of personnel. Successful control of malaria, very largely depends on efficient direction by men who are well trained in the work. While this scheme supplies an immediate need, they will serve as a valuable nucleus for expanding the work to cover wider areas under peace-time conditions. The example of an effective control of this disease in areas normally hyper endemic for the disease, will have an excellent propaganda value in rapidly expanding this activity into rural areas where it is most needed.

B. ANANTHASWAMY RAO.

SCIENCE NOTES AND NEWS

Indo-European Trade Link.—Beads recovered from the archæological site at Taxila (near Rawalpindi, the Punjab) have provided proof of a trade connection between Europe and Asia before the time of Alexander, when typical European beads from settlements dating as far back as the 5th century B.C. were imported into India.

Mr. Horace C. Beck, the well-known expert on beads, has recorded in a monograph (published as Memoir No. 65 of the Archæological Survey of India) the results of the examination of about 950 selected beads dating from about 700 B.C. to 500 A.D., which were recovered from excavations at Taxila by Sir John Marshall for over two decades!

Mr. Beck has also found about half a dozen beads from Taxila which appear to belong to an altogether earlier civilization. Among other interesting types of beads are those representing animals, birds and forms of human life. These are undoubtedly associated with some symbolism and were probably used as amulets.

A number of glass beads from the Bhir Mound, the earliest site at Taxila, have been found to connect with early Mediterranean culture, being similar to finds recovered in Corsica, Sardinia, and the Etruscan tombs in Italy. The study of glass beads from the Sirkap site, which dates from 200 B.C. to 100 A.D. has, on the other hand, revealed some influence of the Roman Empire.

Applications of Quaternions to Relativity and Radiation Theory.—It is well known that the algebra of quaternions is particularly suitable for representing the rotation group as well as the Lorentz group. In a recent paper (*Proc. R.I.A.*, 1941, 46 A, 129) P. Weiss uses the formalism of quaternions to derive an explicit formula expressing Lorentzian co-ordinates in terms of retarded co-ordinates, for an arbitrary world line of the observer. The 'retarded co-ordinates' are (i) the 'retarded distance' s, *i.e.*, what appears to the observer as the ordinary 3-dimensional distance, (ii) the proper time τ of the observer, (iii) two variables θ, ϕ parametrising the observer's proper sphere (*i.e.*, these points of the light cone which appear to the observer as a sphere of radius s with himself at the centre). Various applications are made of the formula so derived, *viz.*, the retarded electromagnetic field due to a point charge and the classical equations of motion of a radiating point charge. V. R. T.

Solving Eigen-value Problems by Factorisation.—A very interesting method for solving eigen-value problems of the second order by factorisation of the second order operator into two mutually adjoint first order operators was given sometime ago by E. Schrödinger (*Proc. R.I.A.*, 1940, 46 A, 9). A slightly different version of the method was subsequently given by L. Infeld (*Phy. Rev.*, 1941, 59, 9). In a