of organic compounds. As already observed, the phase determination by isomorphous replacement is ambiguous. Detailed considerations[3] show that an unambiguous solution for the phases is possible by making use of a double replacement, *i.e.*, when one has two other isomorphous compounds related to the compound under study in which two different groups of atoms are replaced. It is essential that the two groups of replaceable atoms are not centrosymmetric about the same point in the unit cell or about points differing by integral multiples of half the unit translations. Even if these conditions are satisfied, the ambiguity might still occur for some reflections.

The ambiguity in the sign of the phase angle with reference to the phase of the replaceable atoms can however be resolved if the isomorphous replacement method is used in conjunction with the new method. This is so because the latter gives the two values

$$\alpha_1 = \alpha_A + \pi/2 + \theta \text{ and } \alpha_2 = \alpha_A + \pi/2 - \theta$$

while the former gives

$$\alpha_3 = \alpha_A + \phi \quad \text{and} \quad \alpha_4 = \alpha_A - \phi$$

It is seen that one from each set should agree. Thus if $\alpha_1 = \alpha_3$ the other two are always different, and the choice is obvious. The advantage of this combination is that it requires only one pair of isomorphous compounds, and in such cases, an unambiguous solution for the phase is always possible, irrespective of whether the replaceable atoms have a centre of symmetry or not.

The anomalous dispersion method of determining phases is now being used in the analysis of L-lysine hydrochloride in this laboratory.

1. Pepinsky, R. and Okaya, Y., *Proc. Nat. Acad. Sci. U.S.*, 1956, **42**, 286.
2. Phillips, D. C., *Acta Cryst.*, 1954, **7**, 159.
3. Harker, *Ibid.*, 1956, **9**, 1.

SECOND CONGRESS ON THEORETICAL AND APPLIED MECHANICS

THE Second Congress on Theoretical and Applied Mechanics was held under the auspices of the Council of Scientific and Industrial Research on the 15th and 16th October 1956, at the National Physical Laboratory of India under the Presidentship of Dr. K. S. Krishnan, Director of the Laboratory. About eighty delegates were present including some from Germany, Japan, Poland and the U.S.A. Dr. J. C. Ghosh, Member, Planning Commission, who delivered the inaugural address, expressed the hope that the Indian society would soon establish direct contact with the International Union of Theoretical and Applied Mechanics. He also discussed the construction of a suitable model for the separation of diffusion and kinetic processes in gaseous catalytic reactions.

Dr. Krishnan in his presidential address explained the part played by the polarisation field in determining the observed resonance frequencies of the medium with particular reference to alkali-halides where the dispersion of the dielectric constant may also be regarded as exercised indirectly through its influence on resonance frequencies. Dr. P. Nilkantan gave a technical talk on 'The Origin of Ripples on Sand and Allied Phenomenon' where he suggested that the wave pattern was not due to 'saltation' of sand particles, but corresponded to the hydrodynamical effect of a fluid moving over another highly viscous fluid.

The Congress received eighty-six communications from many parts of the world including China, Czechoslovakia, Egypt, Japan, Poland, U.S.S.R. and the U.S.A. Forty-eight of these were presented before the Congress relating broadly to finite deformation, elasticity theory, vibration and stability, fluid flow, heat-transfer, ballistics and statistics.

The Society accepted an invitation to hold the Third Congress in October-November 1957 at the Indian Institute of Science, Bangalore. Dr. S. R. Sen Gupta, Director, Indian Institute of Technology, Kharagpur, was elected President for the sessions 1957-59.

The following other Office-bearers were elected : *Vice-Presidents* : Sri. V. Cadambe and Prof. N. R. Sen; *Secretary-Treasurer* : Prof. B. R. Seth, Indian Institute of Technology, Kharagpur; *Members of the Council* : Sri. C. V. Joga Rao, Dr. G. P. Chatterjee, Prof. B. M. Belgaumkar, Dr. S. K. Roy, Dr. Ram Ballabh, Prof. V. Lakshminarayan, Sri. S. Krishnan, Dr. K. L. Rao and Dr. A. K. Gayen.