

KRISHNAN MEMORIAL LECTURE—1976

Prof. A Guinier from the University of Paris, delivered the Krishnan Memorial Lecture—1976, on 10 December 1976 (Fig 19). The topic of his lecture was '*The Role of Crystallography in Solid State Physics*'.

Prof. Guinier started his lecture by paying tributes to Sir K.S. Krishnan—the Founder Director of the Laboratory—and said that the contributions made by him are well known to solid state physicists all over the world. He gave an interesting account of the developments that had taken place in the field of crystallography, starting from the work of W.H. Bragg, and W.L. Bragg, and then proceeded to show the potentialities of crystallography in solving problems of solid state physics. He highlighted his talk



Fig 19 Prof Guinier delivering the Twelfth Krishnan Memorial Lecture

with specific examples which are characteristic of this interaction between

the two fields, with particular reference to domains which are likely to have important developments in the years to come.

Developing the subject, Prof. Guinier mentioned about the Lang method which helps one to study the dislocations in a crystal and also their plastic properties. He then mentioned how the experiments of Lang in the field of X-rays, and of Hirsch and Whelan in the field of electron microscopy, led to the development of microplasticity. He also talked about diffuse scattering—also called 'Monochromatic Laue method'—and its potentialities. He said that X-rays coupled with neutron diffraction experiments constitute another important tool for studying the dynamics of crystals.

Prof. Guinier also talked about structures which cannot be considered either as a crystal or as a typical amorphous body. These intermediate structures have very interesting applications. He mentioned about β -alumina which behaves like a two dimensional liquid, and the KCP which may be considered as a one dimensional conductor. As another example of a one-dimensional conductor he mentioned the famous organic compound TTF-TCNQ which is a good conductor at 50 K. He also talked about liquid crystals in the nematic phase, and said that, 'It is obvious that the properties of these substances depend on the state of local disorder and hence the interest in development of these structural studies inspite of difficulties.'

Prof. Guinier, in conclusion, said, 'Crystallographers have now solved the problem of the structure of perfect crystals. The consequences of their work have been immense—mainly in chemistry, biochemistry etc. But it is a fact that matter in our world is, in a very large proportion, not completely ordered, nor completely disordered. The progress of crystallography allows us to begin to characterize a state of partial disorder. Our knowledge, at the present time is, however, limited not only because of the uncertainties of interpretation of experimental data but also because the number of samples which have been studied is still low. There is an immense field of research which is now open to a new and extended crystallography, and it is certain that any advance in this domain will be very fruitful'.

After the lecture, Prof. Guinier gave away the NPL Merit Awards-1976.