THE CRYSTAL FORMS OF DIAMOND AND THEIR SIGNIFICANCE

By Sir C. V. Raman and S. Ramaseshan

(From the Department of Physics, Indian Institute of Science, Bangalore)

Received for publication, June 4, 1946

CONTENTS

1. Introductory Statement

The crystallography of diamond presents problems of peculiar interest and difficulty. The material as found is usually in the form of complete crystals bounded on all sides by their natural faces, but strangely enough, these faces generally exhibit a marked curvature. The diamonds found in the State of Panna in Central India, for example, are invariably of this kind. Other diamonds—as for example a group of specimens recently acquired for our studies from Hyderabad (Deccan)—show both plane and curved faces in combination. Even those diamonds which at first sight seem to resemble the standard forms of geometric crystallography, such as the rhombic dodecahedron or the octahedron, are found on scrutiny to exhibit features which preclude such an identification. This is the case, for example, with the South African diamonds presented to us for the purpose of these studies by the De Beers Mining Corporation of Kimberley. From these facts it is evident that the crystallography of diamond stands in a class by itself apart from that of other substances and needs to be approached from a distinctive standpoint. It is essential, at the very outset, to emphasise the point—seemingly obvious but often overlooked—that a crystal which exhibits curved faces cannot properly be described in the usual terminology which is based on the existence of plane faces obeying the crystallographic law of rational indices.

One of the most firmly established results of physics is the dependence of the physical properties of a crystalline solid on the symmetry of its structure of which the external form is an indication. There can be little