

SYMPOSIUM ON THE SOLID STATE

held in connection with the

NEW YORK MEETING OF THE AMERICAN PHYSICAL SOCIETY

at

COLUMBIA UNIVERSITY, NEW YORK

January 19-20, 1945

FOREWORD

THE Symposium on the Solid State, which is herein presented to the readers of the *Reviews of Modern Physics*, was presented orally before the American Physical Society at Columbia University on January 19 and 20, 1945. It had been arranged by a committee of six composed of S. Dushman, T. A. Read, F. Seitz, W. Shockley, S. Siegel, and R. Smoluchowski, acting by the authorization of the Council. The popularity of the topic and the distinction of the speakers were attested by the fact that the great lecture hall of the Pupin Laboratories was continually overcrowded, and many who would have been glad to hear the papers at the price of standing found not even standing-room available. This fact bears out the many other indications that the study of the solid state is appealing steadily more and more to physicists. It does not seem very long, and in fact it *is* not very long, since the triumphs of atomic theory were confined almost exclusively to the qualities of isolated atoms, while the physics of the solid state consisted largely of tabulated data. Many remember the classical electron theory of metals of the time of Lorentz and Drude, which had to be bolstered up by so many *ad hoc* assumptions (and failed so often even with all the bolstering) that it did not make a convincing impression. Quantum theory improved this situation so greatly that it won its credentials as a technique

for investigating the solid state. Very much, however, remains for the theorist to do, and these pages supply him with ample material, as do also the pages of the article "Catalysis—A Challenge to the Physicist" which was given at the same meeting and is here joined to the Symposium. The solid state is itself a challenge to the physicist, and one which is being worthily met. Incidentally it is a curious fact that many of the phenomena of solids have to be interpreted by postulating cracks, crevices, dislocations, domains, and other inhomogeneities in the solids. Apparently the notion of a perfect lattice of atoms is about as violent an idealization as the notion of an elastic continuum which is supplanted.

I do not wish to suggest that the only object of these papers is to supply material for the theoretical physicist. Such an imputation would justly be resented by the speakers and probably by most of the audience which attended the Symposium. The topic is of immense interest in itself, and would continue so even if theoretical physics should never make another step of headway. Yet if the theorists should not cultivate it, it might become detached from atomic physics; let us wish them all success in preventing such a sad event.

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