

present some theoretical highlights of the particularly interesting stimulated superconducting state, whereby a strong microwave field may increase the magnitude of the energy gap, but omit any reference to experiment. This book is a translation of the 1972 Russian edition.

Both books are highly specialized, of limited scope in the field of superconductivity, and for the most part are intended for the advanced reader.

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## Weather and Climate Modification

W. N. Hess, ed.  
842 pp. Wiley, New York, 1974, \$29.95

This book is written by 32 selected experts in some aspect of weather or climate modification and edited by Wilmot N. Hess assisted by an editorial review committee consisting of three well known meteorologists, George Benton, Eugene Bollay and Patrick Squires. It is aimed at the level of an educated layman or college student in allied fields. As the editor comments in the preface, the treatment of the various subjects, written by the selected experts, is uneven; however, the editor and his editorial review committee have done an excellent job in bringing the various chapters together. In some instances the material covered is repetitious, but this allows each one of the contributions to be read independently of the others. Each of the contributions contains an excellent bibliography, and the book is adequately cross-referenced.

There are very valuable and stimulating reviews in the book containing les-

sons, not only for the educated layman, but for the experts in weather modification and allied fields as well. Because of the complexity of the subject, specialists in one field of weather modification will find useful reading in areas outside their speciality. The book contains reminders of the important interactions of one subfield with respect to another.

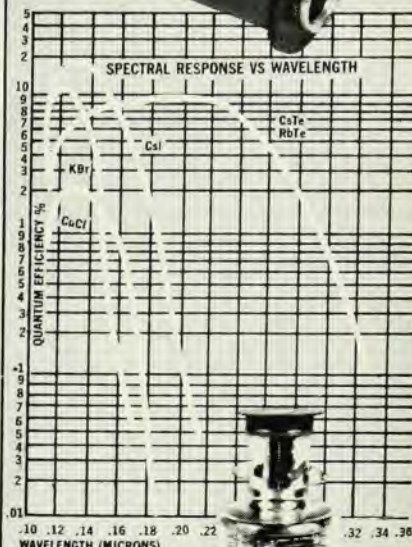
To all potential readers, I especially recommend the contributions by Horace R. Byers on the "History of Weather Modification," by Morris Neiburger and Helmut K. Weickmann on "The Meteorological Background for Weather Modification," by Joanne Simpson and Arnett Dennis on "Cumulus Clouds and Their Modification," by Joseph Smagorinsky on "Global Atmospheric Modeling and the Numerical Simulation of Climate," by Lester Machta and Kosta Telegadas on "Inadvertent Large-Scale Weather Modification" and by Helmut Landsberg on "Inadvertent Atmospheric Modification Through Urbanization."

It is very difficult to give a concise summary of the many different subjects covered in this book, however, I can list a few useful conclusions one could draw from reading it. First, in attempts at weather modification, one must be aware of the controlling role that the existing atmospheric circulation and stability, on all scales, play in defining those situations when weather modification is possible. Simpson and Dennis stress this point by specifying atmospheric conditions with seeding potential for modifying precipitation and cloud dynamics. They conclude that by limiting seeding operations to days with high seeding potential, Florida cumulus clouds can be modified to produce more vigorous growth and additional rainfall. Second, it is firmly established that adding more ice nuclei or ice nuclei active at warmer temperatures, a supercooled cloud mass (temperature less than  $0^{\circ}\text{C}$ ) can be very rapidly converted to ice crystals. In this way supercooled fogs and stratus clouds can be dissipated operationally. Under favorable atmospheric conditions precipitation from orographic clouds can be increased by adding artificial nuclei. Third, our general circulation models are not ready to be used for long-range predictions of climate. Also, models of cloud dynamics and precipitation processes can be used to assess the modification potential on a day-by-day, hour-by-hour basis but they must be continuously verified and upgraded with field observations.

A fifth useful conclusion from the book is that man's activities already are changing the local climate especially in and near urban areas. Sixth, man's opportunity to interfere with nature rests in his ability to interfere with cloud mi-



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crophysical processes. For many complex reasons then, it appears most promising to attempt to modify the microphysical contents of clouds, thereby changing the character of the precipitation into a more desirable form, for example, changing damaging hail to rain or to smaller or softer hail. Seventh, all aspects of weather modification are in the research or research-operational stage in which we must incorporate physical understanding with statistical evaluation. And finally, the economist and social scientist perform a valuable service when they interact with the scientist to interpret his activities for the citizenry and when they evaluate the ultimate value to mankind of weather and climate modification possibilities.

Even though this book fills a need in allied scientific fields and for the educated layman, I feel that one or more of the present contributors to this book should be encouraged to provide a more comprehensive scientific text for the serious student of weather modification.

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### Introduction to the Properties of Crystal Surfaces

J. M. Blakely

261 pp. Pergamon, New York,  
1973. \$10.50

There has been a dramatic increase of interest in the physics and chemistry of surfaces in recent years due to the rapidly expanding importance of surfaces in modern technologies such as solid-state electronics and catalysis. This interest has undoubtedly been strengthened by the significant improvements in surface analytical equipment that have been made during the last decade. New experimental techniques and modern ultrahigh vacuum apparatus are allowing the experimental study of well-characterized surfaces for the first time. While a number of surface science texts have appeared recently, they have generally been limited to some specialized aspect of surface properties.

*Introduction to the Properties of Crystal Surfaces*, by J. M. Blakely, is intended to provide a much needed general introduction to the study of surface phenomena for the advanced undergraduate or beginning graduate student. The book begins with a discussion of the thermodynamics of surfaces, the foundations of which are found in the work of Willard Gibbs in the 1800's. In the first three chapters Blakely develops this material with a well-referenced survey of both theoretical and experi-