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data. The times of their double-pronged attempt are clearly visible; the space between them is noticeable also.

There are five substantive chapters. One on "Apparatus and Methods" contains a survey of various types of electron impact apparatus. The descriptions are brief, and refer to recent books and review articles for details of construction and operation. Time-of-flight instruments are not mentioned. The authors take up the nature of ionization efficiency curves, appearance potential determination, instrumental factors affecting electron energies and reliability of impact experiments, all qualitatively, at length, and with comment. A short chapter entitled "Theoretical" contains a qualitative exposition of the Franck-Condon principle and a more detailed discussion of the quasi-equilibrium theory of the mass spectra of large molecules. The ionization and dissociation of N_2 are used as an illustration of the former. The longest chapter (85 pp.) is on "Energetic Considerations", and deals with measurement and interpretation of heats of formation of ions, activation energies, bond strengths, and related subjects. The last two chapters are entitled "Mass Spectral Considerations" and "Implications for Chemical Reactions". In the first of these are reviewed the few qualitative and empirical general rules known for relating the more than 900 mass spectra that had been tabulated at the time of writing. The second presents examples of the use of impact measurements to aid in interpretation of some organic chemical reactions. The appendix, over one fifth of the book in length, is a table compiled from ionization and appearance potentials of positive and negative ions published during the period 1930 to 1955, inclusive. Wherever possible, ionization mechanisms are postulated. The table is arranged according to key atoms by increasing atomic weight. The reference list contains 534 entries.

The book is written clearly, and its extensive table, reflecting the judgment of its widely experienced authors, is a substantial contribution. Critical remarks sprinkled through the descriptive parts will be a guide to successful operation of instruments and to interpretation of results. However, considering its rather special slant and consequently scant treatment of basic physical processes, a more descriptive title would have been appropriate.

Etude des Textures piézoélectriques. By A. V. Shubnikov, I. S. Zheludev, V. P. Konstantinova, I. M. Silvestrova. Translated from Russian by A. Daknoff. 207 pp. Dunod, Paris, France, 1958. 2750 fr. *Reviewed by Hans Jaffe, Clevite Corporation.*

PARTLY ordered arrays or "textures" of polar particles is the subject of this book. The first chapter begins with the general theory of textures which Shubnikov pioneered, and then gives the fundamentals of piezoelectricity.

The second chapter presents a detailed account of a texture made by solidifying molten Rochelle salt under mechanical agitation. As Shubnikov has shown, this texture can be piezoelectric, although no direction is

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polar in the absence of mechanical stress. The observed piezoelectric effects are quite strong and mechanical resonances are readily excited. The dielectric properties are, however, rather unsatisfactory and there is no indication that these Rochelle salt textures have found use outside the laboratory.

Electrically polarized polycrystalline ferroelectrics of the barium titanate type are another texture. Ceramic barium titanate, a highly practical piezoelectric, is mentioned only in passing to allow a detailed description of piezoelectric bodies made by incorporating barium titanate powder in a resin. Such bodies can be made cheaply in large shapes and to close tolerances, and their dielectric strength is superior to that of the corresponding ceramic bodies. Since, however, the embedding resin is the continuous component, the dielectric constant of the mixture is one order of magnitude below that of the ferroelectric material, and the piezoelectric coefficients (d_{33}) are reduced in a similar ratio. An interesting application of this development is a coating of resin-bonded barium titanate on a metal plate whose flexural resonances are studied by piezoelectric excitation of the coating.

The reviewer has the suspicion that some ambiguities in the theoretical part are a result of translation. Confidence in the translator's expertness is not increased by references to Russian imprint books by P. V. BRIDZHMEN and U. KEDI. One wonders if P. W. Bridgman and W. C. Cady ever received royalties. Nevertheless, the specialist in piezoelectricity will appreciate the convenient access to Russian work obtained through this monograph.

Frottement et Echanges thermiques dans les Gaz raréfiés. By F. Marcel Devienne. 135 pp. Gauthier-Villars, Paris, France, 1958. Paperbound \$4.93. Reviewed by R. Bruce Lindsay, Brown University.

THE advent of the age of rockets and missiles traveling in highly rarefied atmospheres has lent increased interest to theoretical study of the motion of solid bodies through gases at very low pressure. In such motion it is necessary in the calculation of physical effects to employ the molecular theory of gas constitution. The aim of the author of the present book, who is director of the Mediterranean Laboratory of Thermodynamic Investigations, is to provide a review of this field with special reference to ultrararefied gaseous media. The theory used is based essentially on the classical kinetic theory of gases and the Maxwell-Boltzmann velocity distribution, as modified by the Enskog-Chapman theory of real gases.

The first five chapters are devoted to flow of rarefied gases through tubes, with applications to pumping. The remainder of the book discusses the friction and heat exchange at the surface of a solid object moving through a gas at very low pressure. There is some comparison between theory and experimental results, though the author complains about the general lack of reliability of the latter and the present inadequacy of the former.