with respect to one of its coordinates (the reaction coordinate) it has a *maximum* rather than a *minimum* free energy. If the reaction coordinate measures proton transfer, we can therefore say that in the transition state the weaker base will be more nearly neutralized than the stronger base; that is, if, in the reaction above, A^- is a weak base like a carboxylate ion, and B^- is a strong base like a carbanion, the value of α will be high (0.6 to 1.0), since the transition state must resemble the product in such a case. If the observed value of α is outside this range, the mechanism should be discarded. A proper value of α is one more criterion for an acceptable mechanism. In the base-catalyzed mutarotation of glucose we may discard the hypothesis that the nonconcerted formation of the glucose negative ion is rate-determining. The value of α is so low that the transition state would have to resemble un-ionized glucose. But this will not do, since the glucose ion must be a stronger base than carboxylate ions. The necessity for dependence of α on base strength means that, for extremely large changes in ionization constant, the Brønsted relationship will depart from linearity. This sort of restriction is typical of most linear free energy relationships.

There are several other possible applications of α not yet tested because of insufficient data. It should be possible to apply an α chosen for best fit to the relationship under changes in structure to the relationship under changes in solvent, and vice versa. Structural data should help in predicting the effect of solvent changes, and solvent data should help in predicting the effect of structural changes. This is not surprising, because the effect of solvent on reactions is very much like the effect of a substituent and can sometimes be explained by electronic interpretations similar to those applied to substituents. A still more conjectural application is to the absolute prediction of reaction rates largely from nonrate data. We may shortly expect a solution to the problem of predicting the free energy of stable molecules in mixed solvents. It should then be possible to predict the free energy of the transition state by a linear combination of the predictions made for the reagents and for the products.

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Book Reviews

Seismic Prospecting for Oil. Charles Hewitt Dix. New York: Harper, 1952. 414 pp. Illus. $7.50.

For some 30 years, applied seismology has occupied a position of supreme importance in the search for oil deposits. A textbook specifically devoted to present-day seismic prospecting and, more particularly, to the techniques of converting the field data into terms of geological significance on maps, is therefore to be welcomed. This book, in fact, treats all phases of the interpretation procedures, from the reading of "raw" seismograms to the compilation of the finished maps and reports. It does not deal with instrumentation.

The book consists of five parts, containing some 15 chapters. Each chapter is preceded by a paragraph or so introducing its material and stating for whom it is specifically intended. Consequently, the field man on a seismic crew and the exploration geologist will find the book good reading and of considerable value, even though it is strictly functional—that is to say, it is primarily a manual of procedures, rather than a continuous development of its subject matter.

The author has been engaged in seismic prospecting for oil for almost 20 years. This practical experience, coupled with his scholarly background, serves to make him an outstanding authority. Aware of these facts, the reviewer is disappointed to find the looseness of language and presentation which pervades the book. Presumably in the interest of economy of printing, practically all the mathematical developments are arranged as parts of the figures, with results that are most unfortunate insofar as clarity of expression is concerned. A more conscientious editing of the text, and a more orthodox arrangement of the mathematical arguments would have enhanced the value of the book for both the professional seismologist and the student.

For the student, in fact, the functional aspect of the book is at times disturbing. The economics of seismic operations, the personnel components of a crew—such matters are all discussed. Elasticity, wave propagation, and seismic recording are sketchily, although perhaps adequately, presented. There is, however, no historical background of seismology, applied or otherwise, which one might expect to be treated at least briefly in a book of this type. The refraction technique of seismology is only lightly touched upon—a fact presumably in keeping with its present-day low economic importance.

As a textbook, it presents little challenge to the ingenuity or the initiative of the student. It is for that reason that it will find its greatest use as a reference book for men already working as seismologists in the oil industry, and in those many college courses of the "spoon-feeding" type.

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