Book Reviews

American Chemists

The Professional Scientist. A study of American chemists. Anselm L. Strauss and Lee Rainwater. Aldine, Chicago, 1962. xiv + 282 pp. $6.

In view of the fact that the authors had previously made a survey of one of the nation's leading governmental scientific agencies, they must have been aware of the "unique characteristics" which are required of a career government scientist and which distinguish him from the academic and the industrial scientist. The government scientists (and scientists who work in State and foundation laboratories should be included in this group) constitute a group almost as large as the academic group, and they certainly merit separate consideration in studies of this sort. Combining the government science group with the scientists who work in industry would appear to reduce the differences between the academic and the government-industry group, for it is often obvious that academic and government scientists have similar attributes that are different from those of the industrial scientists. The average of a group is not as informative as the deviations from the average. The average may be gray, but the constituent parts may be either white or black.

The objectives of the survey were apparently to determine the chemist's attitude toward his professional society (the American Chemical Society) and to ascertain what he feels he can do for the society and what it can do for him. Many questions were asked of many people but, in the words of the sage, "we seem to have come out the door wherein we went."

One is often led to believe that the experienced social survey worker has a set of carefully worked out questions and that the answers to these questions lead by machine combination to a series of precise analytical values, although the questions may not appear, to the person interviewed, to be significant or interrelated. If there is a simple key to the questions used by those who conducted this survey, it is not apparent; although the answers to many questions are interesting, in that they show the various attitudes of the professional scientist, there are few indications of what should be developed, or of what should be repressed, other than that which is already known and supported.

The chemist who supports his society is interested in knowing how those chemists who do not belong explain their inactivity. It appears that too few were queried to provide a reasonable sample, and the concentrated geographic locations of the sample would lead to other factors that are not included in the inquiry.

The conclusion that chemists are normal and do what would be predicted or expected is not surprising. Nor is it surprising to know that, because such a wide variety of attitudes is encountered among the group, the average is not typical.

Perhaps I am disappointed because I expected more than can be realized from a sociological survey. If the results portrayed are typical of such surveys, then one must concede that the science of social research has to make considerable progress before it can be as precise in analysis as the chemical sciences.

The survey should provide students, who are concerned with the attitude of scientists, with some useful raw material, but it will not serve as a well-developed guide to those who seek advice on how to administer a scientific society.

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Thermodynamics

Thermodynamic Properties of Helium. To 50,000°K. Wilbert J. Lick and Howard W. Emmons. Harvard University Press, Cambridge, Mass., 1962. v + 122 pp. Charts. Illus. $3.25.

The current interest in gases at temperatures so high that appreciable ionization occurs has led to a demand for information on transport and thermodynamic properties of systems in this region. The advent of digital computers permits the printing of tables of properties, given by the equations of kinetic theory and statistical mechanics, from photographic reproductions of the typed output of the computer. In the present tables Lick and Emmons list (i) the density, energy, enthalpy, entropy, constant volume and constant pressure heat capacities, speed of sound, composition, electron density, and compressibility factor for an equilibrium mixture of He, He^+ He^{++}, and e^- from 8000° to 49,800°K at intervals of 200°, and from 10^{-4} to 10^3 atmospheres at each power of ten; and (ii) the energy, enthalpy, entropy, and constant volume heat capacity of He and of He^+ over the same temperature and pressure ranges. Two large scale Mollier charts for equilibrium helium are boxed with the pamphlet.

Helium was chosen because of the simplicity of the model required to write down its partition function. Even so, approximations are necessary. The thermodynamic properties of each of the species were calculated by neglecting the effect of particle interaction on the determination of system energy levels from particle energy levels (the perfect gas assumption) but including this effect on the particle energy levels. For the latter, the approximate treatment of Unsöld was used.

The properties of the mixture were then found from the calculated composition and the properties of the species were found by application of the Gibbs-Dalton law (mislabeled Dalton's law, as usual).

Many possible sources of error are given careful study and evaluation in so far as this is possible. The authors conclude that their method of calculation yields values which are accurate to within a few percent up to pressures of the order of 10^3 atmospheres and from room temperature up. This esti-