

■ Molecular Optics

The similarity between the electron-diffraction pattern of molecules scattering independently and the optical-diffraction pattern of suitably prepared two-dimensional models is demonstrated. Both patterns have intensity distributions which are proportional to the square of the function called the molecular structure factor. This permits the interpretation of the electron-diffraction pattern to be checked by performing an appropriate optical-diffraction experiment as an alternative to the tedious computation of the molecular structure factor. Some details are given of the experimental procedures which were used in forming the optical-diffraction patterns from the model of a cyanine dye molecule. There is given a possible interpretation, involving many assumptions, of the electron-diffraction pattern of the dye adsorbed on a silver bromide crystal.

C.R.B.

Optical Evaluation of Molecular Structure Factors. By C. R. Berry. *Am. J. Phys.* 18: 269, May, 1950.

■ Talent Prediction

For the past few years there has been a growing interest in the early identification and encouragement of promising science students. An "honors" section in sophomore physics was organized for the superior students at the University of Minnesota. Some of the selection criteria for admission to the above group were based on the results of the investigation reported in this paper.

Zero order and multiple correlation techniques were used to predict the achievement in elementary physics of three large, homogeneous samples selected from Institute of Technology students for 1946-47. It was found that the best single predictor of the final grade in mechanics was the total honor point ratio for the freshman year. The best single predictors for the final grades in the second and third quarters of physics were the physics grades for the preceding quarter. Achievement on co-op physics tests could not be reliably predicted with the variables of the study.

A grade prediction formula was developed for the first-quarter students in physics. The freshman mathematics honor point ratio had the largest relative weight in the equation. The other statistically significant variables were: freshman chemistry honor point ratio, ACE psychological examination, and high school percentile rank.

H.K.

The Prediction of Achievement in Sophomore Engineering Physics at the University of Minnesota. By Haym Kruglak and Robert J. Keller. *Am. J. Phys.*, 18: 140, March, 1950.

■ Microspectrometer

While the infrared spectrometer is now an established tool in chemical and physical research, it has proved difficult to apply such spectroscopic techniques to certain problems because of the relatively small amounts of ma-

terial available. With most substances, 1 to 10 milligrams are necessary for infrared spectral determinations; but by use of newly available reflecting microscope objectives to produce a magnified image of the material on the slit of the spectrometer, it is possible to obtain satisfactory infrared data with 0.1 to 0.01 milligram of sample. An experimental infrared microspectrometer is described and the performance characteristics of such an instrument are discussed in terms of the cross sectional area and minimum specimen volume which can be observed with satisfactory signal-to-noise ratio.

Through the use of an infrared microspectrometer and a suitable polarizer, it is possible to obtain information about the relative positions of certain molecular groupings in small crystals, which is an aid in determining the molecule orientation in the unit cell. Furthermore, application of this type of study to natural fibers having cross sectional areas less than 25 microns may aid in assigning bands to particular modes of vibration and in indicating the relative orientation of such materials.

Although with presently available components the theoretical limitations on size and volume of sample have not been realized, it is expected that with an instrument now under construction the size limit set by diffraction will be achieved. Calculations indicate that it will be possible to obtain infrared spectral measurements of specimens whose linear dimensions approximate those set by diffraction; that is, a linear size of 6 microns at wavelengths around 10 microns.

E.R.B.

Infrared Microspectroscopy. By E. R. Blout, G. R. Bird, and D. S. Grey. *J. Opt. Soc. Am.*, 40: 304, May, 1950.

■ Social Physics

In the seventeenth century, the great period when modern science was being founded, John Graunt, pioneer demographer, was a member of the Royal Society, and Edmund Halley, astronomer, established basic principles of life insurance. Overspecialization is opposed in a recent statement by fourteen representatives of a wide range of subjects, which declares that the study of human nature can be advanced by methods which have succeeded with physical nature.

Strong statistical evidence proves that certain phases of the activity of masses of men conform to on-the-average mathematical regularities of the sort observed in physics. Numbers of people, distance, and time have been listed as among the "dimensions of society". Social physics deals with social phenomena in these terms. As in mechanics, derived quantities are found. Thus "potential of population", defined as the number of people divided by their distance away, has solid observational support as a measure of the influence of people at a distance, evidenced by the flow of automobile traffic, bank checks, etc. The reader is guided by numerous references to other similar studies.

J.Q.S.

The Development of Social Physics. By John Q. Stewart. *Am. J. Phys.* 18: 239, May, 1950.