



and VIEWS

Microscopy Symposium

On June 10, 11, and 12, Armour Research Foundation of Illinois Institute of Technology and the physics department of the Institute sponsored the first joint symposium on electron and light microscopy. International in scope, the Chicago meeting was attended by more than three hundred microscopists, who heard papers on such subjects as metallography, pigments, electron diffraction, fibers, goniometry, fats, particle size determination, bacteriophage action, ultraviolet and infrared microscopy, and metal films evaporated in high vacuum. A portion of the formal program was devoted to phase microscopy, a recent modification which employs the light microscope in such a way as to enhance image contrast, thus enabling the microscopist to observe sections that cannot be examined adequately by conventional methods. The informal panel presentations discussed instrumentation for electron microscopy, preparation of metal surfaces for microscopic examination, and problems in high speed microtomy. In addition, the Symposium featured an instrument display and photographic exhibit. Tentative plans have been made to perpetuate the Symposium. C.F.T.

Applied Mathematics

Electromagnetic theory was under discussion at the Second Symposium on Applied Mathematics of the American Mathematical Society held at MIT on July 29-31. Papers were presented on the status of the new covariant formulation of quantum electrodynamics, reformulations of electromagnetic field theory along classical lines, the solutions of several types of boundary value problems related to the Maxwell field theory, methods of solving boundary value problems, orbit theory and its applications, the response of linear electrical networks, nonlinear electrical networks, the abstract formulation of problems in the communication of information, and on random noise.

The meeting gave a good illustration of the various aspects of the interplay between pure mathematics and applied mathematics, and there were illustrations of the way in which a body of abstract mathematical theorems finds application to seemingly different problems. Thus Heins described the use of the theory of Wiener-Hopf integral equations for the solution boundary value problems in electromagnetic theory and Lee used the same theory in connection with his treatment of the statistical theory of message transmission. Wallman showed how the central linear theorem of probability may be used to predict the response behavior of a number of networks, each of which is assumed to have a monotonic time-function response to a step-function. Taub applied known results on one-parameter Lorentz groups to the integration of the equations of motion of charged particles in constant fields.

Another aspect of this interplay, namely the stimulation

of purely mathematical investigations, was also demonstrated. Infeld discussed the method developed by Dirac, Schroedinger, himself, and his students for solving second order differential equations by a factorization into a system of first order equations. This discussion outlined the method of finding one solution and generating others from it. The method originated with some quantum mechanical problems but leads to a mathematical classification of eigen-value problems. Duffin in his discussion of nonlinear electrical networks illustrated how the theory of nonlinear systems, which is in its infancy, could be guided by answering questions arising from circuits used in practice. Pekeris discussed the mathematical relationship between two methods of solving a given boundary value problem, the ray method and the normal mode method.

Applied mathematicians readily agree, and pure mathematicians usually agree grudgingly, that there are aspects of applied mathematics that have little to do with mathematics. The formulation of various concepts into a theory and the introduction of simplifying assumptions which are reasonable on the basis of nonmathematical grounds are two illustrations of these aspects. Feshbach's report on the new formulation of quantum electrodynamics illustrated both of these. The papers of Synge and Watson which dealt with new formulations of classical field theory, of Kac on distribution problems in random noise, and of Wiener on entropy information were excellent illustrations of mathematical formulation.

The use of various approximation techniques was well illustrated in the papers by Feenberg, Rice, Romberg, Stevenson, and Truell.

The proceedings of this symposium will be published by the American Mathematical Society. A.H.T.

Aligned Nuclei

The Oak Ridge National Laboratory Conference on Low Temperatures and Nuclear Physics, August 7 and 8, was held to foster an exchange of ideas between scientists in these two fields. Since the alignment of nuclear spins interested both groups, particular emphasis was given to this subject. The low temperature physicist is interested in it because through the use of aligned nuclei it may sometime be possible to obtain temperatures as low as one millionth of a degree absolute. The nuclear physicist is interested because the study of neutron scattering and capture by aligned nuclei will give information about the spin of the nuclear compound state, and about nuclear forces.

The theoretical and experimental aspects of the problem of first producing aligned nuclear spins and second using the aligned nuclei in nuclear physics investigations were discussed by M. E. Rose, H. B. G. Casimir, J. G. Daunt, E. M. Purcell, and F. London. Nuclear spins, it was suggested, might be aligned in some such way as this. If a nucleus has a spin, it will also have a magnetic moment. If this nuclear magnet is subjected to an intense magnetic field it will tend to be oriented with the field, but this tendency will be opposed by thermal motion. Only when the magnetic field energy of the