culated using the Kramers Kronig relations. Having the permittivity, the field fluctuations and corrections to the current fluctuations can then be calculated. After developing these results, Sitenko proceeds to apply them to the calculation of the fluctuations expected in unmagnetized and magnetized plasmas in and out of thermal equilibrium; to fluctuations in quantum plasmas and superconducting plasmas. He uses his calculated power spectra to discuss the dynamic friction and diffusion coefficients in a plasma, to calculate the energy loss of a fast charged particle passing through a plasma, and to calculate the differential scattering cross section for electromagnetic radiation and the cross sections for wave species transformation.

This is excellent work, but when Sitenko applies his methods to unstable plasmas I have reservations. The algorithm he has developed, which is, at least in its results, equivalent to a perturbation treatment of the dielectric, does not seem suitable if at any point the predicted fluctuations are large. This is exactly what happens for an unstable plasma; in some regions, Sitenko's method will predict unbounded fluctuations. In his illustrations, Sitenko is careful to avoid consideration of such points, but they remain in the spectrum and must be rendered finite by non-linear processes that are omitted from his treatment. Non-linear processes, however, will distribute the energy in these large fluctuations down into the part of the spectrum in the stable zone. Indeed, these difficulties arrive even in the simplest case, for the unmagnetized plasma can support undamped oscillations at the plasma frequency, and in particular, a calculation of the Raman line at ω_p in the scattered spectrum is disconcerting.

Because of these qualifications—and a few others (for example, although three wave interactions in the same species are forbidden in the unmagnetized plasma, there is no universal law)—I would hesitate in recommending Sitenko's work to the novice, who might, in any case, be put off by the rather abrupt style. It is, however, a work highly to be recommended to the critical reader; it contains a great many useful results, will short-cut a great deal of work, and serves as an essential background to non-linear calculations and the study of plasma turbulence. W. B. THOMPSON

MORE TURBULENT PLASMA

Theory of Turbulent Plasma

By A. A. Vedenov. (Achievements of Science: Plasma Physics.) Pp. iv + 96. (Jerusalem: Israel Program for Scientific Translations; London: Macdonald-Oldbourne Press, 1966.) 31*s.* 6*d.*

THE theory of turbulence which is difficult enough in a classical fluid becomes even more complex in a plasma which can sustain many more modes of oscillation and the accurate description of which requires a larger number of fundamental parameters. The book under review has the encouraging feature of being short, less than 100 pages being devoted to ten chapters, some of which are only two or three pages long. Each chapter is devoted to one particular aspect of the subject and the logical development of the book makes it a good introductory text on turbulence for those with some knowledge of plasma physics. The description of turbulence can be highly mathematical, but it seems that an attempt has been made here to reserve the most difficult mathematics for the appendices at the end of the book and to appeal to physical intuition throughout the text.

The opening chapter is devoted to a formal description of a plasma in terms of magneto-gas dynamics, and this is followed by a review of the conditions in which the various kinds of plasma oscillations may exist. When these oscillations propagate as waves with decaying amplitudes the plasma retains its "laminar" state, but if the amplitude of any parameter such as density, velocity, electric or magnetic field is allowed to grow the plasma becomes unstable, turbulence sets in and the particle distributions depart from thermodynamic equilibrium. A number of these instabilities are already well documented and the third chapter which reviews them is followed by a discussion on the criteria for the onset of turbulence.

In a weakly turbulent plasma the energy contained in turbulent fluctuations is much smaller than that of the random motion of the particles and such a plasma is amenable to the quasilinear theory of the fifth chapter, which discusses the energy growth and decay of these fluctuations. The next two chapters show that it is possible in such a weakly turbulent plasma to consider the interaction between low and high frequency waves and to find equations which describe the situation when the energy in these waves is large enough for the interaction to become a "collision". The quasilinear treatment breaks down when these interactions are so strong that the plasma is highly turbulent and the last three chapters deal with such a plasma.

Even in extreme turbulence some physical description is possible if the assumption is made that the velocity amplitudes of the particles in the strong oscillations are of the same order of magnitude as the phase velocity of the waves the growth of which is responsible for the onset of turbulence. The physical arguments for this assumption are put forward in the eighth chapter and the principle is applied to the examples of electron plasma waves and a turbulent plasma carrying a current. The ninth chapter deals with the transport coefficients of a strongly turbulent plasma and the scattering of electromagnetic waves from such a plasma completes the text.

To sum up, this is the kind of introduction to a difficult subject which encourages further pursuit. JOHN PAIN

SPECTROSCOPY LETTERS

Spectroscopy Letters

An International Journal for Rapid Communication. Vol. 1, No. 1. Executive editor: James W. Robinson. Pp. 54. (Published monthly by Marcel Dekker, Inc., New York.) $3.00 per volume.

THIS is a new journal the aim of which is "to provide a means of communicating all valuable observations in spectroscopy to the community of spectroscopists in general". The first number contains a mixed bag of ten letters, four on electronic spectra, two on electron spin resonance, one on nuclear magnetic resonance, one on the theory of reflectance spectroscopy, one on flame emission with application to analysis and one on M.O. calculations.

There exist already quite a large number of journals in chemistry, physics and spectroscopy in which letters of this kind may be published. To judge from the slender evidence of this first issue, the established journals are doing their job very well. R. F. BARROW

OBITUARIES

Lord Florey

HOWARD WALTER FLOREY, who died on February 21, was a distinguished experimental pathologist, a great university teacher and an outstanding President of the Royal Society. In addition he played the crucial part in the greatest contribution medical science ever made to humanity, the production of penicillin and the