to be confusing metaphysical with empirical analysis, an error he could have avoided by becoming familiar with modern interpersonal theory. Much blood has been shed over the hyphen in the word 'inter-personal'. The battle between hyphenated and hyphenless interpersonalists is an attempt to decide the question whether the basic datum is a more-or-less self-contained individual entity, on one hand, or *relationships* between persons on the other. If the basic datum for empirical study is a set of relationships with other people, as the hyphenless school of thought contends, then the searching for individual entities can be left to the metaphysician.

Mr. Mayo's ideas on the measurement of personality are limited to the notion of scales for rating opposite traits and do not therefore need to be taken very seriously. His views on the 'self' will provoke more criticism. He argues that an entity called 'the self' is based on bad grammar, because there is no precedent for the use of the word 'self' as an independent noun capable of being the subject of a verb. He asserts furthermore that the problem of the self, even if it were genuine, would be irrelevant to the question of personality. This dismissal of an empirical problem as a verbal error is too facile a solution. One may add that in view of the uniqueness of the notion of self an argument based on lack of precedent scarcely carries conviction.

It is a pity Mr. Mayo has not confined himself to purely logical or philosophical questions. His failure to prevent the intrusion of empirical problems into a formal discussion spoils an otherwise valuable essay.

JOHN COHEN

HYDRODYNAMICAL THEORY OF DETONATION AND SHOCK WAVES

Detonation in Condensed Explosives

By J. Taylor. (Monographs on the Physics and Chemistry of Materials.) Pp. xi+196+10 plates. (Oxford: Clarendon Press; London: Oxford University Press, 1952.) 25s. net.

Etat actuel et valeur de la théorie hydrothermodynamique des explosions et des chocs

Par Dr. S. Travers. Première partie: Les ondes de choc pur et la compressibilité par choc sans combustion. Pp. v+116. 900 francs. Deuxième partie: L'épaisseur des ondes de choc et le mécanisme de l'inflammation dans les ondes de combustion. Pp. ix+294. 1900 francs. (Paris: Éditions Eyrolles, n.d.)

THE theoretical and experimental studies of explosion and detonation carried out during the War and afterwards have served to focus attention on the physico-chemical changes occurring in the reaction zone of an explosive, and have led to a more precise formulation and extension of the classical hydrodynamical theory of detonation. It will be recalled that the simple form of the theory assumes the whole chemical reaction providing the energy necessary for the detonative process to occur within a narrow zone, the detonation front, moving with uniform velocity into the stationary explosive. Chapman and Jouguet further assumed that disturbances in the gas immediately behind the front travel at the same speed as the front, giving rise to a

progressive wave of finite amplitude. It is clear, however, that the velocity of detonation must be influenced by the mechanical reaction of the gases streaming away from the front on the gas immediately behind it, and Taylor has formulated and solved the hydrodynamical equation for special cases where the flow field has symmetry.

Another important development relates to the behaviour of shock waves, produced with and without combustion, in solids, liquids and gases. The work of Hugoniot on shock waves in air has been extended by Becker to liquids and by Travers to solids, while Taylor has dealt with the case of blast waves produced by the release of a very large amount of energy unaccompanied by the generation of gas.

These theoretical advances have been accompanied by improvements in the experimental methods for measuring explosion and detonation velocities, and for observing the sequence of events both before and after the passage of explosion waves. As a result, we now have a much better understanding of the physical and chemical changes associated with explosion and detonation phenomena, and it is possible, with some confidence, to design and develop new explosives to meet the more exacting specifications demanded to-day by industry and the Services.

The two books here reviewed deal with somewhat different aspects of the subject. In "Detonation in Condensed Explosives", Mr. Taylor gives, within the compass of some two hundred pages, a brief description of the propagation of detonation in condensed explosives and an outline of the methods for calculating the numerical values of the detonation parameters. The examples quoted are chosen from commercial blasting explosives and much of the data has been obtained in the research laboratories of the Nobel Division of Imperial Chemical Industries, Ltd.

The ground covered in the monograph is extensive, and the theoretical treatment is in consequence somewhat superficial. The chapters on the hydrodynamical theory of detonation and on detonation in explosives where products may consist of gases only or may include a condensed phase are, however, clearly and concisely written and the methods of calculation are carefully explained. The text is well illustrated and a short bibliography is provided.

The two volumes by Dr. S. Travers are compiled from papers in the "Mémorial de l'Artillerie française", and are devoted to a detailed examination of the hydrodynamical theory of explosion and shock waves. The first volume deals with pure plain shock waves produced by mechanical compression without combustion, the basis of the treatment being the work of Hugoniot on waves in air and of Becker on waves in liquids.

The second volume deals with the dimensions of shock waves and the mechanism of inflammation in combustion waves, and contains an excellent historical review of the early work of Rankine, Riemann, Rayleigh, Chapman and Hugoniot.

Dr. Travers has generalized Becker's treatment to include the case of shock waves in solids and gives a method of graphical representation which provides an admirable picture of the physical changes occurring in the case of waves produced with and without chemical reaction.

The mathematical treatment of the complex phenomena associated with detonation is clearly and concisely presented, and references to the literature are complete up to 1953.

D. M. NEWITT