

rather disappointing, because of the authors' rather uncritical tendency to accept the traditional outlook. They agree that the first statement of the cell theory needs modification, since viruses cannot be regarded as cells, and that there must, therefore, be more elementary forms of life than the cell. Schmidt believes in various degrees of life and in the transition of the non-living into the living organization. Aschoff favours this conception, but does not reveal how he reconciles it with his acceptance of Virchow's law, *omnis cellula e cellula eiusdem generis*. All three authors accept the second contention of the theory, and believe that research during the last hundred years has not produced any results incompatible with it.

In considering the validity of the cell theory, one may perhaps ask whether the term 'cell' is sufficiently well defined. Most botanists, speaking of the cell, think mainly of the cellulose wall and its lignified derivatives, while the geneticist is concerned for the most part with the chromosomal structure, and the biochemist has in mind an aggregate of enzymes enclosed within a semi-permeable

membrane. Thus the very meaning of the word 'cell' tends to vary with its context. Further, the character of every actually existing cell depends on the tissue and species of organism from which it is derived, and even in tissue culture cells retain these characteristics and do not become simple living elements. Thus it is impossible to conceive of the cell as a sort of chemical atom, an elementary unit of interchangeable qualities.

It is true that no understanding of structure and form in the living world is possible unless cellular organization is taken into account, but at the same time the reduction of an organism to a combination of similar elementary units is not sufficient to explain the differentiation and functional structure of the different organs and tissues involved. Consequently a number of new conceptions, such as the field theory put forward by Child, Heidenhain's *Teilkörper* theory and the theory of functional systems, are being tried to supplement the cell theory. Unfortunately, Aschoff dismisses all these attempts as being of no importance since they can be worked into the cell theory.

A. GLUCKSMANN.

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## RELATIONSHIP OF CRIME AND INTELLIGENCE

### Intelligence and Crime

A Study of Penitentiary and Reformatory Offenders. By Simon H. Tulchin. Pp. xiii + 166. (Chicago : University of Chicago Press ; London : Cambridge University Press, 1939.) 12s. net.

THIS investigation is primarily an inquiry into the relation between crime and intelligence. But the bearing upon crime of other variables such as age, height, weight, nativity, educational record and employment is also taken into account. The subjects are 4,748 males at the Illinois State Reformatory, 5,512 males at the Illinois State Penitentiary and 153 penitentiary females. The research was carried out over a period of seven years.

No doubt this is a very painstaking piece of work, but the results are presented more as raw material for further study than as data thoroughly analysed. Three criticisms, in particular, suggest themselves. First, the control groups are inadequate. Secondly, no tests of significance are applied to the large number of differences between means ; nor is any analysis of variance attempted. The reader is thus left guessing how many of the observed discrepancies are attributable to chance. Thirdly, the grouping of the criminals into only

seven types of crime is much too crude a classification for a thoroughgoing analysis. The seven types of crime are fraud, robbery, larceny, burglary, murder, sex, and a group described as miscellaneous.

In spite of these defects, the reader feels that certain important conclusions can be accepted. Serious doubt is thrown upon the traditional view of Goddard, Healy and others that there is an abnormally high percentage of feeble-minded among the criminal population. Tulchin shows, on the other hand, that the distribution of ability in his criminal subjects scarcely differs from the distribution in adequate samples from the general community in the United States as, for example, in the American Army samples. Moreover, as Murchison had found earlier, the ability of the offender is definitely related to the type of crime he will commit. The fraudulent are generally the most able. Age and height are also relevant factors in determining types of crime. Finally, scores on the tests used, far from measuring 'innate' ability, correlate significantly with environmental factors such as place of birth, length of residence in a particular region, and educational level.

J. I. COHEN.