

two groups the 'sheep' and the 'goats', respectively. Later experiments have amply confirmed this original finding, and it is one of the not very large number of facts in experimental parapsychology that can be regarded as established.

This fact is interesting, since it is not only an addition to the evidence as to the reality of extrasensory perception, but also an indication that there are personality differences correlated with ESP ability. It leads to many further questions, some of which are further explored in this book; many of which are indicated but not yet answered. The obvious further question as to a more exact specification of the personality correlates of ESP ability has been tackled mainly with the help of the Rorschach test. Since, however, this test is known to have low reliability, no very certain evidence as to the answer has been obtained or is likely to be obtainable by this means. The suggestion by the authors, that some of the diversity in findings of different investigators of this topic may be due to personality differences between investigators, is an important speculation that awaits experimental verification.

The experimental work of Dr. Schmeidler has until now been scattered in the technical journals. In collecting it in one volume and in obtaining the collaboration of Dr. McConnell (particularly for a needed strengthening on the statistical side), she has done the student of parapsychology a considerable service. The result of this collaboration is an interesting and authoritative account of an important piece of research.

R. H. THOULESS

#### The Black Fens

By A. K. Astbury. Pp. xi + 217 + 55 plates. (Cambridge: The Golden Head Press, Ltd., 1958. Distributed in Great Britain and Eire by W. Heffer and Sons, Ltd.) 42s.

THIS excellent book is likely to appeal most to the layman interested in finding out more about one of the most distinctive regions of Britain, but also has much of interest to geographers. The first part of the book is concerned with the origins and physical characteristics of the black peats, which since the beginnings of major drainage schemes in the seventeenth century have come to provide Fenland farmers with exceptionally productive soils. But agriculture in the Fens faces a unique combination of hazards. There can be few areas in the world where, within the span of one year, a farmer may have to contend with his soil being flooded in winter and actually catching fire in summer. Since draining, the peat has shrunk many feet while the silt river beds have maintained their original height. These processes make control of surface-water progressively more difficult and the consequences of a failure of flood protection measures more serious. The problems of farming, and of building roads, railways and houses upon the spongy peat are illustrated with a wealth of detail that obviously springs from a long and intimate acquaintance with the area. Particularly to be commended is the use of carefully selected aerial photographs printed opposite sketch maps of the area covered by them, which serve to show the great importance of the "roddhams". These silt beds of ancient water-courses provide the only stable sites for building in the peat region.

In the second part of the book the question of the origin of the Fen waterways is examined. It is remarkable how little is known about most of these

ancient channels. After an exhaustive study of many of them, based on considerable field work, the author puts forward a good case for believing that many of them were constructed by the Romans, but rightly points out the difficulty of proving this or any other hypothesis.

The book is well served by many good photographs and sketch maps and a large folding map which shows nearly all the places mentioned in the text.

M. A. MORGAN

#### Bone and Radiostrontium

By Arne Engström, Rolf Björnerstedt, Carl-Johan Clemedson and Arne Nelson. Pp. 139. (New York: John Wiley and Sons, Inc.; Stockholm: Almqvist and Wiksell; London: Chapman and Hall, Ltd., 1957.) 70s. net.

ANY information concerning the metabolism of strontium-90 must be welcomed at the present time and the authors have presented a valuable account of work carried out in their own laboratories. One chapter is devoted to a discussion of the distribution of mineral salts in bone in which the techniques of microradiography and microinterferometry are fully described. In another chapter the authors discuss the nature of bone salts and the structure of bone tissue, particularly with reference to the ability of the apatite crystals to attract various types of ions by surface adsorption. A calculation of the radiation dose from beta-rays within a plane parallel sandwich of radioactive trabecular bone and inactive bone marrow is described in great detail. It is a pity that the authors did not also include calculations using cylindrical geometry, which might be more applicable in the case of another concentration site of strontium-90, namely, Haversian systems.

In the discussion summarized at the end of the book, the authors deduce a value, 0.1  $\mu\text{c.}$ , for the maximum permissible burden of strontium-90 in human beings. Since this is 10 per cent of the value recommended by the International Commission on Radiological Protection for occupationally exposed persons, the authors' arguments have been carefully examined. The radiation dose within a microscopic tissue element in bone contaminated with the radioisotope has been discussed in relation to an assumed cancer dose of 1,000 r. of external radiation. There is, however, no discussion about the importance of the relationship between dose or dose-rate and the incidence of cancer, or of the importance of the volume of tissue irradiated. A comparison between a body burden of 0.1  $\mu\text{c.}$  strontium-90 and an unspecified burden of radium known to produce malignancies is, of course, valueless. There is in any event no comment about the effect of alpha- and beta-particle range on the non-uniformity of radiation-dose or about the relative biological effectiveness of the two radiations. A second calculation assumes that a dose of 10 r. to a microscopic site in bone marrow will produce detectable blood changes. In the absence of a more detailed discussion on the type of blood damage expected, on the dose-response relationship and on the effect of varying the time over which the dose is given, this discussion is also without value.

It is unfortunate, therefore, that the authors, who obviously have a valuable contribution to make in this field, did not make a more careful survey of the present position before attempting to suggest a new level for the maximum permissible burden of strontium-90.

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