

discovery of fundamental attitudes than with the functional relations of every cultural item". These fundamental attitudes, she believes, colour and condition the whole of Japanese outlook and behaviour.

The author reveals the following fundamental attitudes in the Japanese character: a strict love of social order involving unswerving loyalty to the Emperor and varying degrees of respect or discriminatory behaviour towards each member of society in accordance with his status; a habitual sense of shame coupled with a fear of ridicule and ostracism; a due regard for bodily pleasures, yet a great insistence on self-discipline and a belief in the superiority of the spirit over material power; and finally a complicated and rigid system of obligations and reciprocity. These obligations are the great sanction of Japanese culture; they range from duty to the Emperor, one's parents, family and ancestors to a proper respect for one's good name and reputation (*giri* to one's name). They are especially interesting in that they are eventually concerned with the rite of *seppuku* or *harakiri*.

So far, the work is an excellent general text-book study of Japanese psychology. It is clearly and, so far as one is able to judge, correctly elucidated and interpreted. For example, much of Dr. Benedict's analysis is borne out by Dr. Embree's field study of Suye Mura; and her elaborate description of the sanctions of obligation and reciprocity well explains the virtual pacifist reaction of the Japanese since August 1945. On the other hand, the book suffers from the author's self-confessed lack of first-hand experience in Japan. The system of mutual co-operation in the country districts, stressed so heavily by Dr. Embree, receives scant mention from Dr. Benedict. Its importance cannot be underrated, for refusal of co-operation is a very strong sanction in village life. Moreover, although the above listed fundamental attitudes may be widespread in the urban districts, one wonders how far they strictly apply to the Japanese peasant, "whose primary object", to quote Embree, "is to raise good rice and get along amicably with his neighbours". Such a man, like Falstaff, surely believes that the man who has honour is "he who died o' Wednesday"; and a punctilious observance of "*giri* to one's name" (often culminating in suicide) is something he acquires when he comes into contact with the Army or some other urbanized institution.

Finally, in analysing these fundamental attitudes, Dr. Benedict is rather prone to attribute them to the Japanese, but to minimize them in, or even exclude them from, the nations of the Western world; whereas they exist in both, perhaps emphasized to a different degree. For most of the traits given it would be by no means impossible to find parallels to them among the nations of Europe and even in the United States. It would be hypocritical to deny the existence of a shame complex (as opposed to a sense of guilt) in the West; and the Japanese belief in the superiority of the spirit over material power is reflected in many of our own maxims and proverbs.

It seems, therefore, that we may accept Dr. Benedict's analysis of Japanese fundamental attitudes as substantially true; but that we should be unwise to apply them on too wide a scale. Moreover, we must remember that the differences in outlook that she finds between the Japanese and ourselves are differences of degree rather than of kind.

PETER LAWRENCE

## ENZYMES IN BACTERIA

### The Chemical Activities of Bacteria

By Dr. Ernest F. Gale. Pp. iv+200. (London: University Tutorial Press, Ltd., 1947.) 8s. 6d.

IN an age long past, biochemistry was the science of food and waste products, the study, it was unkindly suggested, of the letter-box and the dustbin. The limitations of this approach to the chemistry of life were first discarded half a century ago, when intracellular metabolic enzymes were separated intact from the yeast cell. But though the microbiologist may claim that the science of enzymology (like the name) originated in his field, our knowledge of the cellular chemistry of bacteria lagged far behind the rapid progress made with yeast and animal tissues. Only during the last decade have the technical difficulties of extracting intracellular enzymes from the bacterial cell been overcome; at the same time, the usefulness of the washed suspension technique (employing intact cells) has been much enhanced by such tools as the deficient-culture technique and isotope methods. How rapidly the investigators of bacterial metabolism have made up the lost ground will amaze even those readers of Dr. Gale's book who are familiar with this field. But the intensive study of individual metabolic processes must not lead to neglect of the larger physiological system of which they are but the component parts. The bacterial cell is more than "a collection of enzymes surrounded by a semipermeable membrane".

One fundamental problem is kept continually before the reader, however. The reaction of the organism to its environment is peculiarly suitable for study among micro-organisms, since the environment may be precisely defined in simple chemical terms and the organism responds very rapidly, natural selection taking place within a community within a matter of hours. Dr. Gale himself has made extensive study of the relation between enzymic constitution and environment and the part this plays in the continued life of the organism in changing and perhaps unfavourable circumstances. But it is difficult always to avoid 'missing the wood for the trees'. Thus adenosinetriphosphate, once regarded simply as a 'phosphate-carrier', is now known to be the one essential product of perhaps the majority of catabolic processes. Text-books seldom give this vital point the emphasis it deserves, and the student may puzzle his way through the complex chemical cycles by which the bacterium produces its 'acid and gas' without fully realizing what it is all for. The specialist, of course, knows already: and it is essentially for the specialist that this book is written.

Dr. Gale has done a great service by collecting and critically examining much scattered material within a small space. He has achieved this by confining himself mainly to those topics (and they are many) on which he can claim to speak with acknowledged authority. Others are dealt with more briefly; but the reader is directed to authoritative reviews through a small number of carefully selected references. Duplication is thus avoided, but at the risk of giving the student an unbalanced view. Preliminary chapters make the book complete by introducing the non-bacteriological reader to the bacterial world (yeasts and moulds are not dealt with in this book), while a final chapter on the practical details of bacteriological technique invites him into a field peculiarly full of pitfalls for the unwary.

H. K. KING