

the "small brown birds", unless they call or sing, when the novice possessed of a good ear may as quickly recognize the species; and he may turn to the key at the end of the book for alternative methods of identification—colour, structural features, behaviour, voice and habitat. There are a calendar of migration and breeding periods, lists of geographical races and rare visitors, and an index. About half a page is devoted to each common (or not very rare) British bird, and this section forms the bulk of the highly condensed but accurate text. The first to be described is the smallest, the goldcrest, classified under "Land Birds: Very Short". The last is the mute swan—under "Water Birds: Huge". Sensibly included are some introduced semi-feral species. Chinese goose, mandarin duck, 'London' pigeon and budgerigar, for example, are described; and they are likely to confuse the amateur in search of indigenous species, unless he is warned about these 'foreigners'.

This guide depends upon the success of Mr. Richardson's six hundred colour and four hundred black-and-white illustrations, of which Mr. Peter Scott, himself responsible for some free-flying non-indigenous wildfowl in Britain, says in the foreword that "nothing of the kind has been so well done in Britain before" and "a new bird painter of great skill has entered the field". I am inclined to agree that the combined efforts of artist and colour processor have been successful in overcoming the difficulties of presenting the fine differences of shade and tint between related species, to a degree not so uniformly attained before. The warblers have not been, and may never be, portrayed in colour to the satisfaction of the expert, so delicate and changeable are their tints, according to the strength of the natural light. It was a good plan to show alike-coloured, even though otherwise unrelated, species on the same page. The black-and-white illustrations are mainly of birds in flight, usefully showing wing-pattern and form. The whole seems to justify the claim on the jacket, of a pocket-guide which is also "the complete identification book".

R. M. LOCKLEY

HISTORY OF THE NORTH AMERICAN BUFFALO

The North American Buffalo

A Critical Study of the Species in its Wild State
By Frank Gilbert Roe. Pp. viii+957. (Toronto: University of Toronto Press; London: Oxford University Press, 1951.) 90s. net.

IT is unfortunate that our thirst for knowledge of the larger forms of wild-life often postdates their partial or complete elimination. Inevitably, perhaps, the pioneers of a spreading civilization have little interest in preserving, much less documenting, the natural features of the new worlds they open up. As a consequence, we are compelled to search diligently among the ruins of scraps of knowledge in order to build up even an inadequate story of what has been lost for ever. The story of the North American buffalo is but one of many, and in this book the author, after years of research, has written a thousand pages closely documenting the history of the buffalo, from its first discovery in 1530 to its virtual extermination in the 1880's.

Dr. F. G. Roe's text reads like a legal judgment, an objective recital of all the available evidence, with little sign of the possible verdict until, towards the end and preceding the four hundred pages of appendixes, bibliography and general index, he gives a few pages of concluding summary. The twenty-four chapters deal with the general characteristics of the buffalo, and with its habitat, but more especially with its former numbers, the regularity or otherwise of its behaviour, and its influence upon the Red Indians who occupied the same territory. Throughout, his approach is avowedly iconoclastic, and it is perhaps in a subconscious attempt to counteract this that his effort to maintain an objectivity leads to a certain obscurity in the writing.

It is the common practice in referring to the North American buffalo always to speak of their countless millions that blackened the plains. Dr. Roe seems to think that, even as a mere figure of speech, this is widely misleading, and he takes his reader through an analysis of a large quantity of reports and statistics to prove it. Yet there is more support for this contention in the evidence he brings forward to prove his second point, that the erratic habits of the buffalo accounted for the peculiar nomadism of the Indians of the plains.

Our modern information tends to suggest an almost clock-like regularity in the habits of wild animals, so that the idea of anything—bird, beast or even porpoise—wandering or behaving fancy-free is regarded as somewhat old-fashioned. In strong contrast to this, a case is made out in this book for believing that the behaviour of buffalo, singly or in herds, was strongly individualistic. The author goes so far as to reject any notion of vast seasonal migrations. His views are unorthodox, also, in regard to the habits of wolves. Observations in recent years on the North American wolf have suggested a remarkable regularity in its habits, but the evidence put forward by Dr. Roe leads him to suppose that the wolves formerly preying on the buffalo were compelled to an erratic nomadism in order to follow their supply of food. Moreover, he believes the Indians of the plains owed their nomadic habits to that same need for keeping in touch with their main source of subsistence, and he postulates a definite link between the presence of this inexhaustible supply of food and the Indian mentality and general outlook on life. Incidentally, he exonerates the Indians from the criticisms of wastefulness in their slaughter of the buffalo and fixes the blame very certainly on the improvident white settler.

Another conclusion given by Dr. Roe in his summary, especially interesting since he is an engineer by profession and not a biologist, is the more remarkable in that it is reached by way of a severely objective study of documentary evidence. To the many zoologists to-day who deny intelligence in any but the human species, with perhaps a dawning intelligence in the higher apes, Dr. Roe points out that, if the theory of evolution means anything, it must mean that "the dawning of the capacity for individual impulse *must begin somewhere*" (his italics), and he conceives "of no sound reasons why this should not apply to the buffalo species". Finally, "In relation to buffalo in particular, the most philosophic and generally reliable historian of the species at . . . large explicitly credits them with a degree of individual variation in conduct which can scarcely be ascribed to anything else than some form of personal intelligence, define it how we may".

MAURICE BURTON