

is surely of great importance; and if the special actions ascribed to radio-active solutions circulating in the body be borne out by future investigators, it is certain that we shall have to revise our assumption of the universal destructive action of the alpha particles. If we are able to do so, we may well find radium to be a far more valuable therapeutic agent than we have hitherto suspected.

After dealing with the treatment of non-malignant diseases, and with rodent ulcers which are locally malignant and yield readily to the action of radium, the true malignant growths are discussed, and a number of cases described in detail. Temporary benefit is experienced in a large proportion of the cases, the tumours become smaller, while the patient is relieved of much pain. A cure is occasionally obtained, but every case of malignant tumour that can be dealt with by the surgeon should be extirpated. Subsequent treatment with radium may be of the greatest value in destroying any cancerous cells that have escaped removal by the surgeon, and so the recurrence of the disease may be prevented.

Various rheumatic conditions have been treated with some success by radio-active earths. Comparing radium treatment with treatment by Röntgen rays, the chief difference is that the gamma rays of radium are far more penetrating than the X-rays, their effects being manifest on the tissues at a depth ten times as great as that of X-rays. Hence they are to be preferred for deep-seated affections. Radium rays are perfectly "constant" in quantity and quality, whereas X-rays are constantly varying in both these attributes. Hence a dose of radium rays can be measured with a precision that is wanting in the case of X-rays. Radium can be placed in natural cavities or buried in tumours, and left for an indefinite period, giving off its radiation all the time. The quality of the scars left after radium treatment is usually exceedingly good, and is certainly better, as a rule, than the scars left after X-ray treatment. Radium, again, is readily portable from patient to patient. The chief disadvantage of the use of radium is its extremely high price and the consequent risk of loss by breakage or accident. The chief advantage of X-rays over radium is the large area to which the X-rays can be applied.

In reviewing the present state of our knowledge of the therapeutic effects of radium, the feeling reached is that we are making our applications empirically in the hope of lighting, almost by accident, on some property of value in the cure of diseases which have hitherto baffled the physician's skill.

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#### ELEMENTARY ZOOLOGY.

*An Introduction to Zoology.* By Prof. R. W. Hegner. Pp. xii+350. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1910.) Price 8s. net.

THERE are some interesting distinctive features in this new introduction to zoology. Only a few types are studied (all of them Invertebrates); they are discussed so as to illustrate the principles of the science; the morphological aspect is not specially emphasised,

but is coordinated with the physiological aspect (which, of course, includes the study of inter-relations and behaviour). From a mapping out of the subdivisions of the science (which admits of much improvement), the author passes to the characteristics of living organisms (where the autonomy of biology seems too easily surrendered to the mechanists), thence to the cell, and to the Protozoa. After an introduction to the Metazoa, which makes the significance of the transition admirably clear and introduces some exceedingly useful original diagrams, the book goes on to Hydra and other Coelenterates, Unsegmented Worms, the Earthworm and Annelids, the Crayfish and Arthropods, the Honey Bee (which is admirably treated), and bees in general. Then follows a chapter on the history of zoology (entitled "Historical Zoology"), and the book ends with a terse consideration of the factors in evolution and related questions. There is a very useful bibliography, and a glossary.

The author shows a keen educative instinct (though the pemmanic of the chapter on evolution is questionable); there is a marked freshness and individuality of treatment, and the assistance of a number of experts, who have read particular chapters, has secured an enviable freedom from mistakes.

Having expressed our admiration of the outlook and workmanship of Prof. Hegner's book, we may direct attention to what appear to us to be blemishes. (a) Since no complete physico-chemical re-description of any vital activity has as yet been given, it seems to us a great pity to give young students a prejudice in favour of mechanistic theories. (b) Being indifferent to the curricula of American Universities, we cannot reconcile ourselves to an introduction to zoology which practically (and advisedly, of course) ignores the Vertebrates. Especially in a book which is so praiseworthy in its recognition of the animal mind, kept by most "zoologies" at a distance, does it not seem a pity not to have included some Vertebrate with a "big brain" if only to contrast it with the bee's, which is on a different evolution tack altogether? (c) It is probably beyond the reach of human endeavour to write a text-book of zoology without mistakes, and it is with a full and lively sense of our own fallibility that we ask Prof. Hegner to justify his statement that an anus is present in Ctenophora. We are not very sure about the coelom of Nematelminthes either, but "morphology is not specially emphasised" in this book. Besides, what have first-year students to do with coeloms? (d) In looking up the glossary to find what "evolution" meant, we found it was "a theory of development" (see p. 291). But this definition is obviously meant to be the counterpart of that of epigenesis which is given a few lines higher up, whereas p. 291 deals with evolution in the ordinary sense. In a definition given of heredity—a very doubtful one to our thinking—a reference is given to a work in which the definition cited was within inverted commas, and obviously not that of the author of the book referred to. But excepting (a) and (b) these are small blemishes in a work which it has been a pleasure to read, and which deserves a career of much usefulness.