good condition. Several cases of southern forms entering the northern waters have been reported, but so far as we know, on the Atlantic coast no northern boreal species has been observed so far south. The inability to reproduce in water of unfavorable temperature prevents the species from becoming established. It may be that when paleoceanography is better understood fossil examples of this sort of occurrence may be found.

Proceeding from Bimini over the shallow carbonate banks the larger plankton species become gradually less abundant both in number and variety. The average temperature of the water on the banks was 86. Close to shore the temperature was between 90 and 92. Although capable of supporting a scattered sponge colony, the water appears to be particularly devoid of life. The abundance of protozoa and diatoms has not as yet been determined, but it is safe to say that what life there is over the 20,000 square miles of lime bottom derives its food materials from the Gulf Stream and other surrounding waters. Very little can come from the low islands of the vicinity. The soft and unconsolidated bottom is everywhere punctured by several species of burrowing organisms. The holes and tunnels are very closely spaced so that the sediments are being worked over and over again. It is hoped that further studies on the biology of this region may throw important light on some of the geological and ecological problems which are now under investigation.

It is possible that the southwestward curve of the Florida keys or reefs may be due, in part, to a southward drift or current which, while not strong enough in itself to be easily detected or to influence directly the shape of the reef, may do so indirectly by the fact that it carries the principal food supply. There is good evidence to show, as cited above, that the paucity of the life on the Bahama Banks is largely due, not to the bottom conditions, but rather to lack of food supply. It is reasonable to believe that were there more plankton in these shallow waters there would be more corals and sponges. It is an interesting fact that the more or less constant stir-up of the fine calcareous muds (Drewite) seems to have little or no effect upon the sessile benthos, and certain types, such as the sponges, remain buried in the "mud" for several weeks without apparent hurt. There is also evidence that the sponges bury themselves in the carbonate mud during the reproductive period. It seems probable, therefore, that the paucity and character of the life in our epeiric Paleozoic seas, especially as represented by certain limestone and dolomite formations, may be directly the result of the poverty of the plankton, and not because of bottom conditions. Where we can trace the geographic distribution of Paleozoic plankton forms, such as the ostracods and graptolites, this would suggest the directions of the currents which must have carried the eggs and young stages of the adult sessile forms, and thus prove a valuable check on the source and migration of faunas. As so ably emphasized by Dr. E. O. Ulrich, the migration of faunas is one of the most important problems in Paleozoic stratigraphy and paleogeography, and the colonization by the bottom forms must have been partly controlled in the past—just as now—by the direction of ocean currents. It is also suggested that "land barriers" may have been overemphasized in paleogeographic problems and that "bottom control" may be more or less of a negligent factor in the shallow, warm Paleozoic seas, especially where carbonate sediments were being deposited.

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SCIENTIFIC BOOKS

The Normal and Pathological Physiology of Bone. By R. LERICHE and A. POLICARD. Translated from the French by SHERWOOD MOORE and J. ALBERT KEY. The C. V. Mosby Company, 1928. 246 pages, 33 figures.

THIS book is welcome because it is a well-balanced, sane and at the same time a highly original and suggestive account of a branch of physiology which has really been created within the last few years. The authors themselves say that recent researches on rickets have shown us "the capital importance of factors of which no one had dreamed. A few works in biochemistry have done more than almost a century of pathological anatomy."

That the presentation is authoritative is shown by the remarkable fact that although the most recent and debatable advances are discussed, Moore and Key, working in this country, state that they are "in accord with Professors Leriche and Policard in principle throughout, though differing to some extent in regard to details. Where this is true the divergence of views is embodied in footnotes."

The plan of the book is synthetic. A conception of the place of bone in vital activities is built up by a careful consideration of investigations on the subject pursued from many angles by anatomists, physiologists, radiologists, surgeons and others. To create this picture the authors have built upon the foundations laid by those who have gone before. But a tedious review of the literature is not presented.

Credit is given where it is due with discernment in the proper places and is documented by an extensive and detailed bibliography.

That bone is formed through a metaplasia of connective tissue is demonstrated, and the fundamental similarity of the process in all conditions both normal and pathological is emphasized. It is with bone as a skeletal material determining the architecture of the body that the book deals, though appropriate and necessarily brief reference is made to its rôle as a calcium reservoir and as a site for blood formation. Ossification and resorption are considered in detail. A whole chapter, which should prove enlightening to the medical profession, is devoted to the periosteum. Chapters VII and VIII on the repair of fractures and on bone transplantations also supply information of great practical value. The illustrations are few in number but well chosen, for each one of them makes a certain point clear which would otherwise have required pages of text.

To the human biologist it is the last chapter which will prove of all the most stimulating. In it will be found a conservative statement of just how far the misshapen human skeleton can be corrected by the purposeful control of bone resorption and bone formation. A partial answer, in the affirmative, is given to the question "Can one model new ossifications?" because therein lies our hope of constructively recasting the bodies of the many unfortunates in our midst. The book looks to the future, and the translation with its accurate rendering of the complex shades of meaning of the French original makes the presentation available to what I believe will be a much larger group of interested readers.

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Locusts and Grasshoppers: a Handbook for their Study and Control. By B. P. UVAROV, London, The Imperial Bureau of Entomology (1928), royal octavo +, xiii + 352, 118 text illustrations, 8 plates.

THE original edition of this important book was published in the Russian language at Moscow by the Central Cotton Committee in 1927; but this English edition differs essentially, and is much fuller and of much broader interest. It has, in fact, been made not only available but adaptable to all parts of the world, and of course this has necessitated the addition of whole chapters.

The author, already a man of sound training and a well-known student of the Orthoptera, has since the war been connected with the Imperial Bureau of Entomology in London, where, as one of the collaborators on the *Review of Applied Entomology,* he has gained a close acquaintance with the world literature on the subject, and is thus well fitted to put out an authoritative book.

The locust or grasshopper problem has been the despair of many nations, and has undoubtedly in earlier days influenced the trend of civilization. Famine, resulting from crop devastations by locusts, is commonplace in the annals of many countries. Writings about locusts surpass in bulk those about any other group of insects. Man's struggles against them have largely failed in spite of his desperate attempts to save at least a portion of his crops. The fight has been so long and so continuous that at last we are beginning to view the problem in its broader aspects, and it is in its consideration of these broader aspects that this book has its very especial value. In our knowledge of the broad factors of the ecology of migratory locusts there are many gaps, and Uvarov is insistent in pointing out not only what is known but what is still unknown and must be studied by prepared minds.

The book is very comprehensive, including chapters on external morphology, anatomy and physiology, development and transformations, behavior, ecology and distribution, natural enemies, periodicity of mass outbreaks, technique of control and organization of control. To these chapters is added a special part in which the particularly celebrated locusts of the different parts of the world are considered. The chapters of this special part take up the especial locust and grasshopper problems of Europe, Asia, Africa, South, Central and North America and Australia.

American entomologists have been led to a general belief that to the English all short-horned grasshoppers (Acridiidae) are "locusts," whereas we have called them all "grasshoppers," reserving the name *locusts* to the Locustidae, or "long-horned grasshoppers." And the terminology here has been further complicated by the so-called "seventeen-year locust"—a misnomer started by our Puritan ancestors. Of course, this insect does not even belong to the same order. Mr. Uvarov's decision, therefore, to reserve the term *locust* to the migratory Acridiidae, and the term *grasshopper* to the non-migratory species of this family, is novel, but is all right if every one adopts it.

The frontispiece is an outline map on which the locust and grasshopper areas of the world are marked. The author is obviously mistaken in showing a large part of the United States as "subject to regular plagues of locusts and grasshoppers" and the rest of the country as "invaded occasionally." It is more than half a century since any migratory grasshopper or "locust" has done the slightest damage to crops