

proliferation, abnormal inter-actions, and to cancer formation.

The abnormal activities of cancer cells, together with the products of necrosis present in every cancer, may induce cell division and the formation of cells with the right chromosome complex for cancer origin, in neighboring tissues, and so start up secondary or tertiary growths from the primary, thus giving rise to the phenomenon occasionally met with in transplanted tumors of change in type, carcinoma into sarcoma, for example, as Bashford has found.

The varying frequency of cancer in different organs or tissues depends, according to this theory, upon the frequency of mitotic divisions in the normal tissues; the age incidence of cancer, upon the abnormal divisions which accompany physiologically weakened cells, as in the case of protozoa in "depression" periods.

In his treatment of the theory Boveri gives its application to most of the well-known phenomena met with in cancer growth, and meets some of the arguments which have been brought against it. From the nature of the case the theory is difficult if not impossible to analyze by direct experiment, and for this reason, as well as for its impracticability, it is probable that the hypothesis will not be favorably received by the medical profession.

GARY N. CALKINS.

COLUMBIA UNIVERSITY,
DEPARTMENT OF ZOOLOGY

A Text-book of Geology, for use in mining schools, colleges and secondary schools. By JAMES PARK, Professor of Mining in the University of Otago, New Zealand. London, Charles Griffin & Co. 1914. Svo. Pp. xvi + 598, Figs. 263, Pls. 70.

Professor Park has already become well-known to teachers and students of geology in America by his writings upon mining geology. His cosmopolitan attitude and broad sympathies are attested in the present text-book by a frontispiece from the Grand Canyon of the Colorado, and by acknowledgments, in his preface, to the director of the U. S. Geological Survey for aid kindly extended. A reader on

this side of the world would naturally anticipate a text-book specially prepared for Australasia, but one is pleasantly surprised to find that the anticipations are not borne out by the facts. European and American geological sections and remains of life are discussed with the same fulness as Australasian. One can not help wishing that for readers on this side of the world a little more emphasis had been laid on the latter.

Professor Park's text-book is of about the same size and scope as Scott's "Introduction to Geology," or LeConte's "Elements." It will furnish the material, along with laboratory study and suitable field trips, for one year's work in a college or scientific school. It impresses the reviewer as too advanced for secondary schools, despite its title.

There are, of course, several lines along which the subject of geology may be attacked or expounded. Broad, general processes such as erosion and deposition, elevation and subsidence, may be set forth in advance of the handling and learning of minerals and rocks. Or the teacher, as seems best to the writer, may begin with actual rocks and discuss these first; passing later to their large forms and their erosion, disturbance and order in time. A third start is possible if one considers the earth in its astronomical relations and later comes down to the terrestrial details. Professor Park begins with a summary of the science in all its bearings, and in his first chapter outlines the general astronomical relations, history, structure and the play of modifying processes. The chapter closes with seventeen summarizing propositions. Chapter II. in two pages blocks out the subdivisions of the subject and briefly reviews the teachings of several of its founders. Passing then to denudation and the destructive and constructive effects of streams, oceans, and the resulting general rock structures, nine chapters, or about one third the work, are utilized before the rock-forming minerals and the rocks themselves are specifically taken up. One may question if it would not be clearer to a student if the rock-making minerals and the rocks themselves, as formed of them, could

not be most wisely studied first, as they can be, without extended reference to other parts of the subject; and then knowing the raw materials with which forces and processes deal, the student can most intelligently follow out the various modifications produced upon them by the geological agents.

Professor Park does not take up rocks as objects in and of themselves, but views them as products of geological processes. Thus, sedimentary rocks are first outlined following the introductory chapters already mentioned, and even after joints, faults and cleavages have been described. Igneous rocks are introduced by a preliminary chapter on volcanoes and volcanic action. Before the individual rocks are taken up we find the topics—alteration, magmatic differentiation and Atlantic and Pacific types discussed, inevitably with the use of rock names with whose significance the student can not yet be familiar. In these particulars it seems to the reviewer that the natural order of treatment is reversed.

A chapter on fossils and a following one on conformity and unconformity lead up to the great subject of stratigraphical geology which forms Part II., and to which fifteen chapters or more than one third the work are devoted. One hails with satisfaction this recognition of the great stratigraphical part of the subject, by one who writes primarily for mining schools. The tendency to minimize this enormously important branch of the subject in favor of purely structural and dynamic portions has become pronounced in later days, and yet mistakenly. The great conceptions of older and younger strata, of succession in time, of recognition by organic remains; of the growth of land masses, are all fundamental to the applications of the subject as well as to its proper understanding. The treatment is well balanced and the succession of living forms is brought out by reasonably full numbers of illustrations. Sections are given for all the better explored portions of the globe.

Part III., Economic Geology, embraces two very condensed chapters, one relating to mineral deposits of all kinds and one on the methods of field work and geological surveying. Be-

sides two brief appendices on special field methods, a condensed bibliography of geological works, classified by subjects, is given at the close of the work. All in all, Professor Park's work is well written, interesting, and will prove a serviceable text-book.

J. F. KEMP

BOTANICAL NOTES

A STUDY OF A DESERT BASIN

SEVERAL months ago there appeared from the Carnegie Institution of Washington, as "Publication No. 193" an interesting paper entitled "The Salton Sea," by Dr. D. T. MacDougal and his collaborators. It fills a quarto volume of nearly two hundred pages, and is illustrated by thirty-two full-page plates, and four text figures.

The whole book is full of interest to the scientific reader, and especially to the geologist and geographer, as shown by the titles of the chapters, "The Cahuilla Basin and Desert of the Colorado"; "Geographical Features of the Cahuilla Basin"; "Sketch of the Geology and Soils of the Cahuilla Basin"; "Chemical Composition of the Water of Salton Sea, and its Annual Variation in Concentration," etc. Several of the chapters, including the major part of the volume, are devoted to botanical aspects connected with the formation and recession of the limits of the Salton Sea. And here it may be remarked that this sea is in southern California, and occupies a portion of a great desert depression of the earth's surface below sea level. The sea was formed a few years ago by an inrush of water from the Colorado River which flooded an area of over four hundred square miles of the lower portions of the Cahuilla Valley. Since then the sea has been subsiding, and this fact has enabled the botanists to study the incoming vegetation under the peculiar conditions here found.

The distinctly botanical chapters are those on the "Behavior of Certain Microorganisms in Brine"; "The Action of Salton Sea Water on Vegetable Tissues"; "Plant Ecology and Floristics of Salton Sink"; "Movements of