If in the ancient Pacific from long ago, that is from the opening of the Paleozoic on, the denser Sima lay exposed . . . and if that was the site of the permanent abyss, then has the dense material under the Atlantic and Indian oceans been exposed through displacement of the lighter salic continents, as if by the drawing back of a curtain, and the existing coincidence of the limits of density with the outlines of the continents and oceans is explained. The former invasions of the sea, which are shown to have spread over what are now land areas, are passing transgressions; the Pacific and the continents are permanent, aside from the displacements; the Atlantic and Indian oceans are younger deeps, floored with sima which appears at the surface in consequence of the displacements [of the continents]. Thus the problem of permanence is robbed of its contradictions and in essentials is explained.

The speculative section of the work, occupying 200 pages, thus presents some of the greater problems of geology as the introduction to paleography. Another and in the opinion of the reviewer a sounder method is to proceed from the facts of paleogeography toward the solution of those problems.

As a contribution to the science the latter half of Dacqué's work will seem to many the more valuable. In it are assembled the data of sedimentary formations considered as facts appropriate to paleogeographic investigation, estimates of absolute and relative durations of geologic time divisions, and examples of the construction of paleogeographic maps. The facts of stratigraphy and paleontology are admirably summarized, and the assemblage of illustrations constitutes a rich and suggestive reference for students of the subject.

Bailey Willis

Stanford University

Plant Life. By Charles A. Hall, F.R.M.S. The Macmillan Company, 66 Fifth Avenue, New York, N. Y. Cloth. Pp. 380. Eighty text-figures and seventy-four full-page illustrations. Price six dollars ($6.00).

Professor Hall has already written several books presenting various phases of nature-study in a popular way, so that experience in the field, in the laboratory and in the study have combined to make the present volume on "Plant Life" a useful addition to the series. It is addressed, principally, to the amateur botanist and lover of nature, but contains much which should be of interest to teachers of elementary classes.

The treatment follows the general evolutionary order from the lowest plants up to the highest. The excellent descriptions of field characters is an important feature of the work and should enable the beginner to find even the microscopic forms. Interesting bits of information and clever observations afford welcome material to those who wish to brighten their lectures and laboratory work.

The headings of the twelve chapters indicate not only the scope of the book, but also what might be expected in the mode of treatment. The headings are: Asexual Plants; The Development of Sex in Plants and a Study in Evolution; Seaweeds; Fungi and Lichens; Bryophytes—Liverworts and Mosses; Pteridophytes—Ferns, Horsetails and Club Mosses; Phanerogamia, Flowering Plants; Fossil Plants; The Food of Plants and How they Secure It; The Perpetuation of the Race; The Defences of Plants; Ecology; The New Field Botany. There is a general glossarial index.

The illustrations are excellent and most of them are new. In addition to eighty text-figures, there are seventy-four full-page illustrations, twenty-four being from photographs by the author and fifty in color from drawings by C. F. Newall. The binding and typography are in keeping with the high grade of the illustrations.

Charles J. Chamberlain

PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES

The eighth number of volume 2 of the *Proceedings of the National Academy of Sciences* contains the following articles:

1. *The Absorption Coefficients of Soft X-rays:* C. D. Miller, Ryerson Physical Laboratory, University of Chicago.

The numerical constants in the relation between the absorption coefficients, the density,

and the wave-lengths have been accurately determined. The results also indicate that the relationship holds for very much softer X-rays than those of ordinary penetrating power.

2. *Further Evidence as to the Relation between Crown Gall and Cancer:* ERWIN F. SMITH, Laboratory of Plant Pathology, United States Department of Agriculture.

There are discussed: Fundamental concepts, human and animal tumors for which no cause has been discovered, earlier discoveries in plants, further discoveries, other resemblances of crown gall to cancer in man and animals, possibility of the existence of carcinomas and of mixed tumors in plants, production of embryonal teratomata, and bearing of these discoveries on the cancer problem.

3. *Locomotion of Sea-Anemones:* G. H. PARKER, Zoological Laboratory of the Museum of Comparative Zoology at Harvard College.

The pedal portion of a sea-anemone, like its tentacles, must contain a neuromuscular mechanism sufficient for the activity of that part of its body.

4. *The Behavior of Sea-Anemones:* G. H. PARKER, Zoological Laboratory of the Museum of Comparative Zoology at Harvard College.

Sea-anemones are animals whose momentary conditions are dependent upon the combined stimuli of their immediate surroundings rather than forms that are greatly influenced by their past history, and their unity is not of a pronounced type; they are more in the nature of a sum of parts than they are organic units of the type of most of the higher animals.

5. *A Contribution to the Petrography of Japan:* J. P. IDDINGS AND E. W. MORLEY, Brinklow, Maryland, and West Hartford, Connecticut.

Seventeen detailed chemical analyses are given of Japanese lavas.

6. *Is There a Temperature Coefficient for the Duration of Life?* JACQUES LOEB AND J. H. NORTHRUP, Rockefeller Institute for Medical Research, New York.

In three series of experiments on the fruit fly *Drosophila,* it is found that the duration of life in the cases examined has a temperature coefficient of the order of magnitude which is characteristic for life phenomena and chemical reactions in general.

7. *On the Suggested Mutual Repulsion of Fraunhofer Lines:* CHARLES E. ST. JOHN, Mount Wilson Solar Observatory, Carnegie Institution of Washington.

The author is unable to find evidence of the mutual repulsion suggested and in so far as mutual influence is a necessary corollary of anomalous dispersion in the sun, evidence of this also is lacking.

8. *An Attempt to detect the Mutual Influence of Neighboring Lines in Electric Furnace Spectra showing Anomalous Dispersion:* ARTHUR S. KING, Mount Wilson Solar Observatory, Carnegie Institution of Washington.

Although the material in the investigation is limited by the scarcity of suitable pairs of lines, the lines actually tested have shown no tendency toward a repulsion.

9. *Synthesis of the Base $C_3H_4ON_2$ derived from Methyl-Aminomethyl-3, 4-Dihydroxyphenyl-carbinol:* CHAS. A. ROUILLER, Pharmacological Laboratory, The Johns Hopkins University.

A continuation of some work by Abel with a suggestion as to a relation to work by Curtius.

10. *Extinguished and Resurgent Coral Reefs:* W. M. DAVIS, Department of Geology and Geography, Harvard University.

11. *The Origin of Certain Fiji Atolls:* W. M. DAVIS, Department of Geology and Geography, Harvard University.

The two papers offer a discussion of observations made during the author's Shaler Memorial voyage across the Pacific.

12. *Interferometer Methods based on the Cleavage of a Diffracted Ray:* C. BARUS, Department of Physics, Brown University.

The prismatic method of cleaving the incident beam of white light is available for the superposition of non-reversed spectra, under

conditions where the paths of the component rays may have any length whatever. It is thus an essential extension of the same method as used for reserved spectra, heretofore, and also of the methods in which the paths are essentially small.

13. *On the Inheritance of Certain Glume Characters in the Cross Avena Fatua XA. Sativa Var. Kherson:* Frank M. Surface, Biological Laboratory, Maine Agricultural Experiment Station.

A study of inheritance of certain characters particularly directed toward revealing phenomena of linkage.

14. *A Comparison of the Rates of Regeneration from Old and from New Tissue:* Charles Zeleny, Zoological Laboratory, University of Illinois.

The data as a whole show clearly that there is no essential difference between the rate of regeneration from new cells and from old cells. The rate of regeneration seems therefore to be under central control.

15. *The Effect of Successive Removal upon the Rate of Regeneration:* Charles Zeleny, Zoological Laboratory, University of Illinois.

Apart from the slowing due to age there is no indication of the amount of new material that may be produced by regeneration. The actual limitation comes not from the using up of regenerative energy, but from changes in the non-regenerating part associated with age.

16. *The Geologic Rôle of Phosphorus:* Eliot Blackwelder, Department of Geology, University of Wisconsin.

Phosphorus appears in nature in many forms and in many situations. Its numerous transformations, however, follow an orderly sequence—in a broad way form a cycle—which is here discussed in some detail.

17. *Dominantly Fluviatile Origin under Seasonal Rainfall of the Old Red Sandstone:* Joseph Barrell, Department of Geology, Yale University.

Geologists have differed so widely in their conclusions in regard to the nature of the habitat of the early vertebrate faunas whose remains are found in the formations of the Old Red Sandstone, that the author is led to examine critically the criteria for the interpretation of the facts. He comes to the conclusion that the deposits which make up the Old Red Sandstone, although they undoubtedly contain lacustrine beds and other beds laid down in shifting, shallow and variable bodies of water, are dominantly fluviatile in origin. The Great Valley in California may therefore in the present epoch, both in physiography and in climate, be cited as a striking illustration of the nature of the Old Red Sandstone basins.

18. *The Influence of Silurian-Devonian Climates on the Rise of Air-Breathing Vertebrates:* Joseph Barrell, Department of Geology, Yale University.

The evidence for the hypothesis of the continental origin of fishes has been examined and seems to prevail over that for their marine origin. The author also believes that natural selection, although discredited as a cause determining specific variations, appears nevertheless to be a major factor in evolution.

19. *Density of Radio-Lead from pure Norwegian Cleveite:* T. W. Richards and C. Wadsworth, 3d, Wolcott Gibbs Memorial Laboratory, Harvard University.

The density of this lead is found to be 11.273, distinctly less than the density (11.289) of Australian radio-lead and still less than that (11.337) for ordinary lead, the decrease being almost exactly proportional to the decrease in atomic weight in these samples, so that the atomic volume (18.281) is constant.

20. *National Research Council.*

A preliminary report to the president of the academy by the organizing committee recently printed in full in Science.

Edwin Bidwell Wilson
Mass. Institute of Technology,
Cambridge, Mass.

SPECIAL ARTICLES

IMBIBITIONAL SWELLING OF PLANTS AND COLLOIDAL MIXTURES

The swelling of gelatine in distilled water, alkali and acid has long been used as refer-