as regards volume, is by no means clear. Furthermore, it stands on a different plane from the supracellular units recognized by the author, in that these may be seen to form ontogenetically from a cell, but no one has yet observed the ovum developing by the division of chromidia. Indeed, one of the most obvious criticisms of Bernard's book is that it shows throughout a remarkable disregard of the facts of ontogenesis and histogenesis, so much so that it sometimes describes processes as its author supposed them to occur according to his theory, rather than as they actually occur. Further the same disregard has led the author to phylogenetic conclusions which, if they are to be regarded as essential conclusions from the theory under exposition, can only serve to render the reader skeptical as to its sanity. For instance, one is surprised to find that the Alcyonaria form a phylum altogether distinct from the other Anthozoa and related to the platyhelminths, that ctenophores are medusæ with the margins of the bell fused together, that *Sagitta* represents most accurately the primitive annelid and that the leeches may be regarded as representing the invertebrate types from which the vertebrate phylum has arisen!

Much more suggestive than the first is the second main thesis of the work, namely, that there has been a rhythm in evolution, each heightening of which corresponded with the appearance of one of the recognized grades of personality, that is to say, with the establishment of colony-formation of a higher grade. The differentiation and adaption possible for a cell-person is limited, but with the establishment of cell-colonies the potentialities become greatly increased. The author's treatment of this part of his subject is however again marred by a tendency to transcendentalism. Throughout all his grades of personality he finds continuity of structure combined with colony formation, and this theory demands continuity also in the colonies formed by his highest grade of persons, mankind. It is the linin-filaments that serve for the continuity; they are conducting paths for stimuli. But after all it is the stimulus that is the important item and not the material basis of transmission, and in human colonies we find transmission of stimuli without material continuity (telepathy), so that they too fall into line with the theoretical demands. This is much like eliminating the Cheshire cat and leaving only the grin, and why ant-colonies by the same process of reasoning should not be placed with man in the highest grade of persons, it is difficult to understand.

The book is interesting as a study in speculation, but it is doubtful if the speculations will find acceptance at the hands of biologists.

J. P. McM.

The Silva of California. By WILLIS LINN JEPSON. Memoirs of the University of California, Vol. II. Berkeley, 1910.

This magnificent folio volume does credit to the author and to the university which issues such a sumptuous account of the trees of California. It comprises 283 pages of text with 11 figures, 85 full page plates, 3 folded maps, subject and geographic indexes.

After a short preface, the author considers the geographic distribution of California trees, dividing the state into a number of provinces enumerated below. The Sacramento and the San Joaquin valleys form one province, which are essentially treeless, except for five stands or groves of the valley oak, or the interior live oak, while the banks of streams are lined with willows and cotton woods. The south coast ranges with an average height of 2,000–5,000 feet, are forested near the ocean with redwood, Douglas fir, tan oak, madroña and inland with other species, such as live and blue oaks, while Monterey pine and cypress are confined to an isolated arboreal island, constituting the Monterey peninsula. The north coast ranges are considered as to their climatic and floristic aspects with the redwood most prominent and the Douglas fir, tan oak, lowland fir, coast hemlock, Sitka spruce of secondary importance. The forest flora of the Sierra Nevada Mountains is enumerated, as well as that of

southern California, and the following zones are recognized, according to the classification of C. Hart Merriam: Sonoran, Transition, Canadian, Hudsonian and Boreal. A useful census of California trees is given where the species are not only arranged according to families, but the occurrence of each in the several previously mentioned phyto-geographic provinces is given. Jepson recognizes the difficulty of always deciding as to whether a species is a tree or a shrub by a brief account of the arboreous forms of shrubs, such as *Prunus demissa, Alnus tenuifolia,* toyon *Heteromeles arbutifolia,* etc. A list of the typically Californian species is added. Perhaps to the ecologist, the most interesting part of the memoir is the one devoted to the dendrologic characters of California trees. These are considered under the captions, mutilation and regeneration, seed production, architectural forms, wind-controlled tree forms, weeping trees, vanism in endemic species, natural hybrids, the "walnut-oak hybrids," teratology, leaf persistence, age of California trees and a bibliography with consideration of nomenclature.

After a synopsis of families, the author proceeds to minutely describe the characters, botanic habitat and history of each tree found in the Californian region and these full descriptions are supplemented by the plates of trees in the forest, as well as numerous plate figures illustrating the botanic characters of each tree admitted into the volume, as occurring within the confines of the state. Two maps illustrate the geographic distribution of the big trees (*Sequoia gigantea*) and a third is a general map of California showing the mountain chains, valleys and river systems of most importance to phytogeography. To make the work completely rounded, a subject index and a geographic index conclude the memoir. Altogether in a most thorough manner, Professor Jepson leaves little for the future botanist to consider from the purely systematic standpoint. The volume ably supplements the account of the California trees given in Sargent's "Silva," in Ludworth's "Forest Trees of the Pacific Slope" and in Britton and Shafer's "North American Trees."

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Hawaii and its Volcanoes. By Charles H. Hitchcock, LL.D., Emeritus Professor of Geology in Dartmouth College. Pp. viii + 314; 52 plates. Honolulu, The Hawaiian Gazette Co., Ltd. 1909. Second edition, with supplement of 8 pages, 1911.

The Hawaiian Islands have long attracted the attention of vulcanologists because nowhere else in the world can basaltic volcanoes of such majestic proportions be so easily studied as to both past history and the phenomena of active eruption. While but two centers can be described as now active, there are many others where erosion has revealed details of internal structure and petrographic constitution.

It is but natural that with nearly all explorers of the islands the liveliest interest has attached to Mauna Loa and Kilauea, where the spectacular phenomena of basaltic eruptions are displayed every few years and may be observed with ease and safety. Owing to the frequency of these eruptions during the last hundred years there is quite an extensive literature recording the observations of different outbursts, by geologists or laymen.

Kilauea in particular presents such an unrivalled opportunity for the study of the working of a basaltic volcano that several writers have given much space to recording its observed changes in historic times. Dana's well-known "Characteristics of Volcanoes" devotes nearly two thirds of its space to Kilauea and Mauna Loa, giving with considerable detail the recorded history of these volcanoes. Dutton, in his Geological Survey report on the Hawaiian Islands,[1] also quotes extensively from the published records of the principal eruptions of the active volcanoes.

It is clearly desirable that the eruptive history of Kilauea and Mauna Loa should be made as complete as possible, so that the student of present and future conditions at

[1] Fourth Ann. Rept. U. S. Geol. Survey, 1882–3.