THE MEANING OF NATURAL SELECTION

IN the issue of SCIENCE for October 24 is an article on "The Organic World and the Causal Principle" in which the question of natural selection as a cause is discussed, and the fact is entirely overlooked that natural selection in the minds of most men has come to mean something different from what it did to Darwin.

The authors of the article appreciate that to Darwin it meant a rule or method according to which true causes acted, but like so many other terms, this one, according to the genius of our language, has unfortunately acquired a derivative meaning, and most people now mean by it those true causes which act according to this rule or method. It was Hobbes, I think, who stated that most discussions end where they should have begun, namely, in defining the meanings of the words used.

FRANCIS RALSTON WELSH

A CORRECTION

DR. CALMAN has called my attention to the identity of *Cancer luederwaldti*,[1] recently described from the coast of Brazil, with *C. pagurus*, the European edible crab. Its occurrence in Brazil needs confirmation. The error but emphasizes the desirability of world monographs rather than local faunas, a subject referred to by Dr. Calman in his recent address on the taxonomic outlook in zoology.[2]

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SPECIAL CORRESPONDENCE

PROGRESS OF THE GEOLOGICAL SURVEY OF CALIFORNIA

A YEAR ago last July a geologic branch was established[1] as part of the California State Division of Mines, and $20,000 for the biennium was set aside for its work. With the many facilities of the division at hand and with the cordial support of various institutions in the state it has been possible to make a broad step in advance towards fulfilling the future plan of the work.

A ten-year program has been favored by the State Mining Board and arranged for by the state mineralogist, Walter W. Bradley, during which time it is planned that the general state geologic map, now in preparation, should be finished. The base of this map has already been issued by the U. S. Geological Survey, and the compilation of geologic data is well under way, both federal and state officials cooperating in the task.

The state geologic map will serve as a general clearing place for as many data as can be secured. It has been found that about 26 per cent. of the state is covered by published detailed and semi-detailed geologic maps, 32 per cent. by unpublished material, while 42 per cent. remains practically blank, and a large portion of the blank area has no satisfactory base maps for the field geologist to use.

Most of the area covered by unpublished data has much material sufficient for a map of this scale (eight miles to the inch) but not complete enough for publication as detailed sheets. Many areas have been worked over, and the manuscripts laid aside, never to be completed by the original authors. A large part of California has been geologically mapped through the work of the geological department of the Southern Pacific Company. Large tracts of country covered especially by Tertiary sediments have been worked intensively by various oil companies, and though the details of their findings may not be at present available for publication the general areal geology suitable for the state map will be in most cases readily available as soon as the compilation of other data has been completed.

The state geologic map is to be issued in three separate sheets, covering southern, central and northern California, respectively, each published as it is completed. The two dividing lines will probably be through the thirty-sixth and thirty-ninth parallels. It is thought that the southern sheet will probably be first to get into publication, owing to the greater percentage of work covering it, and for the reason that the mapping of blank areas in the south can be completed more rapidly than in the more mountainous and wooded northern country.

Though the preparation of the state geologic map is an important item in the work of the state survey, it is by no means to be the extent of its endeavor. Its function includes the study of the problems of ore-genesis, underground water, non-metallics, geology related to engineering problems, geology of the oil fields, stratigraphy and many other phases of this great applied science. At a recent meeting of the State Mining Board the name Geological and Economic Mineral Survey was adopted as the most suitable name for this new geologic branch of the Division of Mines.

[1] SCIENCE, 70: 554, December 6, 1929.

[1] *Bull.* U. S. Nat. Mus. 152: 200, pls. 86–89, 1930.

[2] SCIENCE, 72: 279, September 19, 1930.

Thus far the work undertaken by this new survey has been cooperative, especially with geologists associated with universities. The first work to be published will be a very comprehensive bibliography of the geology of California, prepared by Dr. Solon Shedd, of Stanford University. This is now in the hands of the state printer.

By giving some financial assistance to certain worthy research workers, the geological survey of the Division of Mines has been able to foster a number of extensive field investigations this summer. The Weaverville quadrangle in northern California is being completed by Dr. N. E. A. Hinds, while in southern California Dr. C. D. Hulin has been mapping the Searles Lake quadrangle, a work which supplements his bulletin on the geology and ore-deposits of the Randsburg quadrangle. The results of the work of these geologists (both members of the faculty of the University of California) will be issued as separate bulletins covering in detail the problems of their respective areas.

The Division of Mines is making it financially possible for eight graduate students to carry on the necessary field work for their advanced degrees, with the result that several important areas in the state are being mapped. These are as follows: Elizabeth Lake quadrangle, by Edward C. Simpson; Sebastopol and Duncans Mills quadrangles, by F. S. Johnson; two areas in San Bernardino County, one by John C. Hazzard and the other by Dion Gardner, and a portion of northeastern Madera County by Homer D. Erwin, all of the University of California. The geology of the southern and western part of Mono County is being mapped by Evans B. Mayo, formerly of Stanford, but now of Cornell. A large part of the San Jacinto quadrangle has just been finished by Donald Fraser, of Columbia University. Underground mining geology in Grass Valley is being carried on by Robert L. Loofbourow, of Stanford University, working under the direction of the U. S. Geological Survey in cooperation with the Division of Mines. Mr. George Green, of Stanford University, is just beginning a study of the underground geology of the coast tunnels of the Hetch Hetchy aqueduct. In addition to these special studies, Mr. Charles V. Averill, district mining engineer of the Division of Mines in northern California, is making a study of the geology of the mines of the Shasta quadrangle, correlating his work with that secured from the Southern Pacific Company. Besides these projects there are many other new plans under consideration, such as cooperation with the U. S. Geological Survey in the publication of many data already in manuscript form.

The work of the new survey is, therefore, well under way. Cataloguing of data is well in hand, the bibliography is completed and the state map is in preparation. Altogether twelve field men, together with several assistants, are contributing new data to the geology of California.

Enthusiasm for the undertaking has been met on all sides, and cooperation of all sorts has been more than cordial. We now hope that the State of California will favor the continuance of the geological study and will encourage the building up of a strong geological survey by granting in the future liberal appropriations for the work.

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SCIENTIFIC BOOKS

A History of Experimental Psychology. By EDWIN G. BORING. New York; The Century Company, 1929, pp. xvi, 699.

IT is extraordinary that there should have appeared within a single year two such important histories of psychology as Gardner Murphy's "Historical Introduction to Modern Psychology" and the present work.

In contrast with most earlier treatments of this subject, both these books are the productions of men who are intimately in touch with the enterprises of present-day psychology. As a consequence, they supply a background which the active investigator can hardly afford to neglect. And the expert in another science who would cultivate a serious acquaintance with psychology could adopt no more profitable means than that of reading either or both of these historical works.

Although the present review is of Professor Boring's book, it is not entirely outside that purpose to make a distinction between it and the Murphy history. If one is interested in obtaining information in regard to the development of some special topic of modern psychology, Dr. Murphy's book will probably offer prompter service. If, on the other hand, one is interested in the present science of psychology as the outcome of a large and intricate adventure of the human mind, then one would better turn to Boring.

Histories of psychology have been in the habit of starting out with a discussion of ancient conceptions of soul or mind. When treated in detail this is an elaborate subject and one which, unfortunately, bears no obvious relation to modern psychological research. Histories which begin with such minor issues have seldom given understanding treatment to the impor-