family. The Chondrophora (*Velella, Porpita,* and *Porpema*) are not included, as they are not considered to be siphonophores. Totton's genus *Lensia* (1932) has flourished, and 22 species are listed under it. (Two more have since appeared.)

According to Totton the polyp was originally a "juvenile" form, growing into an "adult" medusa. Although I do not object to this view, I feel that it is misleading to call present-day polypoids "juveniles." Other criticisms can be made. It is regrettable that a section on distribution was not included. Totton is no histologist, as Fig. 43 shows, and one may wonder if histological criteria, such as the forms and dimensions of nematocysts, have not been unjustly neglected. The treatment of *Pterophysa* on pages 14 and 43 seems to be contradictory. Complete synonymies are not given, and this increases the user's dependence on certain earlier works. Finally, I would have preferred fewer illustrations of crumpled, preserved nectophores and more comparative drawings (diagrams if necessary) showing key species differences as they appear in the living animals.

But these are small criticisms seen in relation to the magnitude of the achievement which this book represents.

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Neuropsychology

W. T. Liberson has performed a service to neuropsychology in translating and editing J. S. Beritoff's **Neural Mechanisms of Higher Vertebrate Behavior** (Little, Brown, Boston, 1965. xvi + 384 pp., $15). Although I cannot judge the accuracy of the translation, the text is idiomatic and, despite the intricacy of some of the arguments, generally clear.

The values of the book are two. First, it provides a summary of four decades of Russian neuropsychology which is not readily available to most English-speaking persons. Second, Beritoff's theoretical synthesis of data from conditioned reflex experiments, neurophysiology, and neuroanatomy merits serious consideration even though his terminology may grate on some American ears. We are not used, for example, to the idea of "image-driven behavior" which depends not only upon internal and external stimuli but also upon "an emergence of concrete images of vitally important objectives which originated this behavior."

Beritoff retains the Pavlovian concepts of cortical inhibition and facilitation, but he differs with his predecessor on a number of points, particularly in his localization of "external inhibition" in subcortical centers and of "internal inhibition" in the cerebral cortex. Stellate cells of the third and fourth cortical layers are stated to be particularly important in coordinating complex patterns of behavior through feedback of axonic collaterals on cell bodies and dendrites.

Beritoff discusses the formation of temporary neural connections, primarily in terms of Kapper's principle of neurobiotaxis. He seems to believe that memories are encoded by a pattern of functional connections between neurons at synapses. The currently popular ideas of a molecular coding mechanism for memory is not mentioned in the book.

Beritoff's approach to the study of behavior is completely alien to the black-box orientation, and one can argue that his neurological theorizing is premature. For example, his ideas on image formation should certainly be modified by the work of Hubel and Wiesel on response of single neurons to specific aspects of visual stimuli. His schematic diagrams of cerebral organization are ingenious, but the evidence for their validity is highly indirect.

But, though it is unlikely that Beritoff's theory will survive as a detailed blueprint, his book will interest many who are trying to understand the mechanisms of information-processing in the mammalian brain.

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The New Plant Morphology

In recent years, so-called "classical plant morphology" has been widely criticized for its overly strict adherence to concepts of homology derived largely from the study of living angiosperms and for its reluctance to consider the organography and relationships of vascular plants as a whole. The most recent and certainly the most comprehensive critique of generally accepted morphological ideas is the highly original and spirited book **Fundamentals of Phytomorphology** (Ronald, New York, 1966. 243 pp., $10) by A. D. J. Meeuse of the University of Amsterdam. Although the author obviously hopes that his treatise will aid University students to become acquainted with the ideas of the "New Morphology," the book is certainly not written for the beginner but demands for its understanding a comprehensive background in comparative morphology, anatomy, taxonomy, and paleobotany. Even then, sophisticated readers will find Professor Meeuse's style rather turgid and very often excessively prolix and argumentative. These difficulties are increased by the fact that each of the 20 chapters in the book is a more or less "independent" essay which results in considerable and needless repetition of subject matter and arguments.

The first nine chapters deal with a series of rather broad topics such as a contrast between the "Old" and "New" morphology, phytomorphological "schools" and traditions, the concept of homology, and the problem of distinguishing between "lines and levels" in phylogenetic discussions. The remainder of the volume is largely concerned with a critical comparison between the classical and the "New" interpretations of ovules, carpels, and stamens. The final chapter includes a useful summary of the author's view of the phylogenetic relations between cycadopsid gymnosperms and angiosperms. The latter are considered to have arisen polyphyletically "by way of a number of parallel evolutionary lines which were most probably already separated in early Mesozoic epochs and, in the initial phases of their independent evolution, still at the 'gymnospermous' (i.e. chlamydospermous-Bennettitalean) level of organization." The volume concludes with a useful bibliography and with well-prepared author, subject, and plant-name indexes.

Although the strict limitations of this brief review preclude any detailed analysis of Meeuse's rather iconoclastic views on morphology, it should be emphasized that his rejection of the widely held interpretation of stamens and carpels as "sporophylls" is perhaps the dominant theme throughout his book. In his own words "the villain of the piece is the 'sporophyll' concept" and the "wild goose chase for angiosperm ancestors with the postulated sporophylls" has impeded progress in all aspects of phylogenetic morphology.

Meeuse wryly complains that the originators of novel concepts for the "New Morphology" have been treated

"as mad bulls in Ye Olde Morphological China Shoppe." In my opinion, the sound of breaking chinaware is loud enough in this stimulating book to irritate many a "classical morphologist"! But perhaps, as the author claims, we need a very different approach to fundamental morphological and taxonomic problems, and this may result in "a satisfactory answer in cases where the Old Morphology has failed."

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The Domestic Pigeon

This remarkable volume, **Encyclopedia of Pigeon Breeds** (T.F.H. Publications, Jersey City, N.J., 1965. 790 pp., $30), presents what is certainly the most complete coverage ever assembled of the breeds of the domestic pigeon; it was written by Wendell M. Levi, an acknowledged expert in the field. Levi describes and illustrates in color (768 color photographs from life of the best typical specimens) all of the breeds and "sub-breeds," or color varieties of breeds, of domestic pigeons. The illustrations maintain a higher level of excellence than one usually finds in reproductions made from color photographs. For each breed the text provides the country of origin and, where known, the genetics of origin as well; the common name in English, German, and French as well as in the language of the region in which the breed originated; a description—"ornaments," which apparently refers to crests, feathers on toes, and the like, and colors or color varieties; and comments on rarity or abundance. In many cases, notes on propagation and commercial value are included.

The bulk of the volume is taken up with this illustrated catalog, but there are also some 16 preliminary, short chapters which treat the needs and care of pigeons and tell how to build their "houses," flypens, and coops; these chapters also consider the ailments to which these birds are subject and provide a general account of pigeon genetics, a classification of hereditary characters, both morphological and behavioral, and even a list of "mysteries," chiefly color patterns still awaiting analysis.

The author sticks strictly to his subject, the breeds of domestic pigeons, and does not even discuss the species of wild pigeons. Within the limits of its subject matter, this volume will certainly be the leading reference work for years to come.

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PHYSICS, MATHEMATICS, AND ENGINEERING

Continental Drift: A Reconsideration

James Gilluly

A Symposium on Continental Drift (Royal Society, London, 1965. 333 pp., $25), a large quarto volume reprinted from the *Philosophical Transactions of the Royal Society*, is the record of a symposium held in London on 19 and 20 March 1964. Approximately 50 geologists and geophysicists contributed to the symposium in person or by correspondence. Many papers are only slightly reworked from previously published versions; others are new and present novel arguments. Despite the repetition of old ideas, the book is useful in that it brings together much widely scattered material. The symposium was organized by P. M. S. Blackett, Sir Edward Bullard, and S. K. Runcorn.

Continental drift has been the subject of lively, often vitriolic, debate for half a century. In this introduction, Blackett traces the idea back to von Humboldt, about 1800, who was much impressed by the complementary patterns of the Atlantic coasts of Africa and South America. The evidence of glacial deposits on the equator and evaporites in the Arctic forces us to choose between tremendous climatic fluctuations (if the continents have remained fixed) and continental drift (if climatic zonation has been stable). Since we know from the great transcurrent faults and the crustal shortening recorded in the folds and thrusts of the great mountain chains that parts, at least, of the continents have moved considerable distances, and from the records of the drastic climatic modifications of the Pleistocene that climatic factors have ranged widely, there can have been no absolute fixity either of continents or of climatic zones. Blackett regards the recent advances in paleomagnetism and oceanography as grounds for a review of the problem.

The symposium embraced four main topics: continental reconstructions, horizontal displacements of the crust, convection currents and the evidence for their existence, and the physics of convection in the earth's mantle.

Continental Reconstructions

S. K. Runcorn, starting from the assumption that the earth's magnetic field, when averaged over a considerable but unspecified time, is that of an axial dipole, traces the pole positions inferred from European and North American rocks back into Precambrian time. Few geologists will feel that the Precambrian correlations are firm enough to base convincing arguments upon. Although the scatter diagrams of pole positions are commonly diffuse, they are nevertheless persuasive of systematic change during the Phanerozoic, with the poles inferred from North American data falling systematically farther west than those inferred from European data, at least from Cambrian through Triassic time. The differences increase with time—a surprising result, for one would expect the difference to have remained constant prior to the start of the drifting, presumably in the Mesozoic.

T. S. Westoll reviews the arguments from approximate potential fit of continental margins around the Atlantic, the rias coasts of Europe, Newfound-

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