Book Reviews

Developmental Abnormalities

Teratology of the Central Nervous System. Induced and Spontaneous Malformations of Laboratory, Agricultural, and Domestic Mammals. HAROLD KALTER. University of Chicago Press, Chicago, 1968. xvi + 481 pp., illus. $17.50.

Teratology means the science of the marvelous, the wondrous, the monstrous, and commonly connotes the study of abnormal anatomic development. To developmental biologists, however, wondrous anatomic malformations, aberrant metabolic pathways, and some monstrous behavior and other functions are only different manifestations of the phenomenon of development. In this broad view teratology of the nervous system might embrace all of abnormal developmental neurobiology. Considering the problems of scope that this presents, Kalter has elected to tell about gross anatomic malformations of the central nervous system in a variety of mammals, though not including man. What could justifiably have been an annotated bibliography has been enlivened and made readable by the author's comments about many of the huge number of experiments and observations that make up this field. The first part of the book considers environmental factors that initiate abnormalities generally, and the second describes malformations that arise spontaneously in particular groups, such as mice, cattle, or subhuman primates.

Some interesting things emerge. One is the imagination of experimental teratologists who think up ways to alter the young carried by pregnant mammals. These range from administering all sorts of drugs, hormones, dyes, anticancer agents, and deficient diets to freezing and then thawing the mother-to-be. Another is the frequency with which seemingly similar types of malformation occur again and again in different species when different injuries—and sometimes genes—are at work. Disorders of closure of the early spinal nervous system or the brain, for example, are surprisingly common occurrences when environmental agents act at appropriately early periods. I don't suggest resurrecting the old notion that any agent at a given time in embryonic life will induce the same anomaly, because different agents act through different mechanisms. That the outcomes are often similar is partly due to the nature of the abnormalities that Kalter has selected; being grossly recognizable they tend to be of the kind originating in earlier developmental stages. Some of the grossest deviations from normal form would be expected to occur when "the construction of the house was disturbed as the foundations were being laid."

In spite of the differences in causal mechanisms, there could be a benefit to man in studying intensively how the various disorders of closure—the so-called dysraphias—come about. Man and other mammals share a substantial fraction of their DNA segments, and they may have more normal and abnormal developmental mechanisms in common than we have thought. The commonest major congenital anomaly in man, according to C. O. Carter (1965), is the anencephaly–spina bifida cystica syndrome, that is, a complex of various failures of closure and malformation of the spinal nervous system and brain. In some populations the incidence of this syndrome approaches 8 in 1000 births, exceeding that of serious heart anomalies and mongolism. Recent neurosurgical techniques have greatly increased the survival of some of the children so incapacitated, creating a new aspect of the problem. Should the animal models help in understanding the disease and lessening its incidence, their value would be incalculable.

The state of the art of experimental teratology is still very much that of empirical exploration, but mechanisms are being studied. Though each aspect is of necessity treated briefly, Kalter's book will be valuable not only to those in the cognate neural sciences but to anyone planning experiments in abnormal development and to those who are charged with assessing the safety of drugs and other agents during human pregnancy.

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Space Facts and Figures

The McGraw-Hill Encyclopedia of Space. McGraw-Hill, New York, 1968. xii + 831 pp., illus. Through 31 Dec. 1968, $23.95; thereafter, $27.50.

Above and Beyond. The Encyclopedia of Aviation and Space Sciences. Wallace B. Black, publisher; Jean F. Blashfield, editor-in-chief; Raymond J. Johnson, editor. New Horizons, Chicago, 1968. 14 vols. xii + 2677 pp., illus. $79.95.

These works fill a need for a single-point, up-to-date reference in their field. Cutoff dates on content appear to be late 1967 for the *McGraw-Hill Encylopedia of Space*, and 1966–67 for *Above and Beyond*. The reviewer has leafed through both encyclopedias and read carefully and selectively comparable sections.

McGraw-Hill's one-volume work weighs 6¾ pounds and averages two or more black-and-white or color photographs or diagrams to each of its 817 pages. The quality of paper and color reproduction is excellent. About half the content is text, the remainder photos, tables, and diagrams. The list of contributors—25 U.S., 37 Soviet, 44 other European, and 1 Japanese—is most impressive. The articles are not signed, however, and all were "rewritten by an international board of distinguished journalists so that every word . . . is now understandable to the general reader." There is no indication that the rewritten articles were ever reviewed by the original authors. Coverage is excellent, and most of the photographs are dramatic and show careful selection.

The section on rocket history contains a number of minor errors, such as that the Bachem BA-349 was "in service" in World War II (it was not) and that Robert Goddard worked on missiles for the "American Navy" (he worked on JATO's). There are numerous strange spellings of names which suggest transliteration by a non-U.S. writer (Wan Pou for Wan Hu, G.U.I.R.D. for G.I.R.D.). Terms like "lamp oil" for kerosene, "petrol" for gasoline, and "fixed-aim" for fin-stabilized suggest that no American rocket historian reviewed galleys. The section dealing with rocket principles contains much convoluted writing, again indicating foreign translation. Under the heading of propellants there is the strange statement that "To provide a take-off acceleration of 4*g* a liquid-propellant rocket would require an enormous motor, which would constitute a technological absurdity." This is nonsense. Reference