

sion of their motivation or accomplishments. Were these men and women of any commitment? Did they have compelling interests in children or in certain psychopathologies? In Horn's hands, the Commonwealth Fund ultimately emerges as a self-aggrandizing organization dominated by concerns for psychiatric authority and anxious to serve a "gate-keeping" function. The reader is left wondering: Why did middle-class parents turn to such a self-interested group? And what good (if any) was achieved by child guidance? A fully developed social and cultural history of the child guidance movement, as well as the families and children it served, remains to be written.

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Steroid Biology

Ecdysone. From Chemistry to Mode of Action. JAN KOOLMAN, Ed. Thieme, New York, 1989. xiv, 482 pp., illus. \$160.

Popeye was on steroids. This would be the result of physicochemical and radioimmunological tests for detection of ecdysone and related steroids—the ecdysteroids. It is doubtful that the strength derived from a can of spinach can be attributed to steroids, because ecdysone is not an anabolic steroid in vertebrates (though instantaneous effects on the brachioradialis muscle have not been measured). There is no doubt, however, that the insect molting hormone 20-hydroxyecdysone and several other steroids are found in spinach leaves at concentrations commonly a thousandfold higher than are found in insects. The presence of polyhydroxylated steroids of the ecdysteroid family throughout the plant kingdom is interpreted as an ancient defense strategy against non-adapted insects or nematodes. Indeed, ingestion of ecdysteroids can disrupt insect growth and development, usually by promoting the synthesis of new cuticle at inopportune times in the molt cycle. Adapted insects, which are not affected by the high ecdysteroid content of their diet, have evolved gut detoxification enzymes that attack the molecule at the 3-hydroxyl position. That hydroxyl group, derived from the 2,3-epoxide of squalene epoxide, is common to a hundred or so phytoecdysteroids.

Ecdysone: From Chemistry to Mode of Action is a collection of 48 chapters by 77 contributors from around the world covering these and many other aspects of ecdysone biology. The volume was assembled to honor Peter Karlson, a pioneer in the field. Each chapter

is a short review rather than a research contribution, and thus the collection serves as a convenient introduction to the field. The book has extensive illustrations, complete references (current through 1988), a useful collection of structural formulas for all ecdysteroids of plant and animal origin, and a comprehensive index. Overall, the scientific content is excellent and well balanced, and the book conveys the dynamism of an interdisciplinary field in full growth.

The book presents challenging ideas about the evolution of the ecdysone hormonal system, relating to the origin and widespread occurrence of ecdysteroids in invertebrates (Bückmann, Käuser) and to the primitive and derived functions of ecdysteroids (Hagedorn). Useful reviews of various model systems such as cell lines, imaginal disks, salivary glands, and epidermis give a coherent overview of what can be done and what remains to be done.

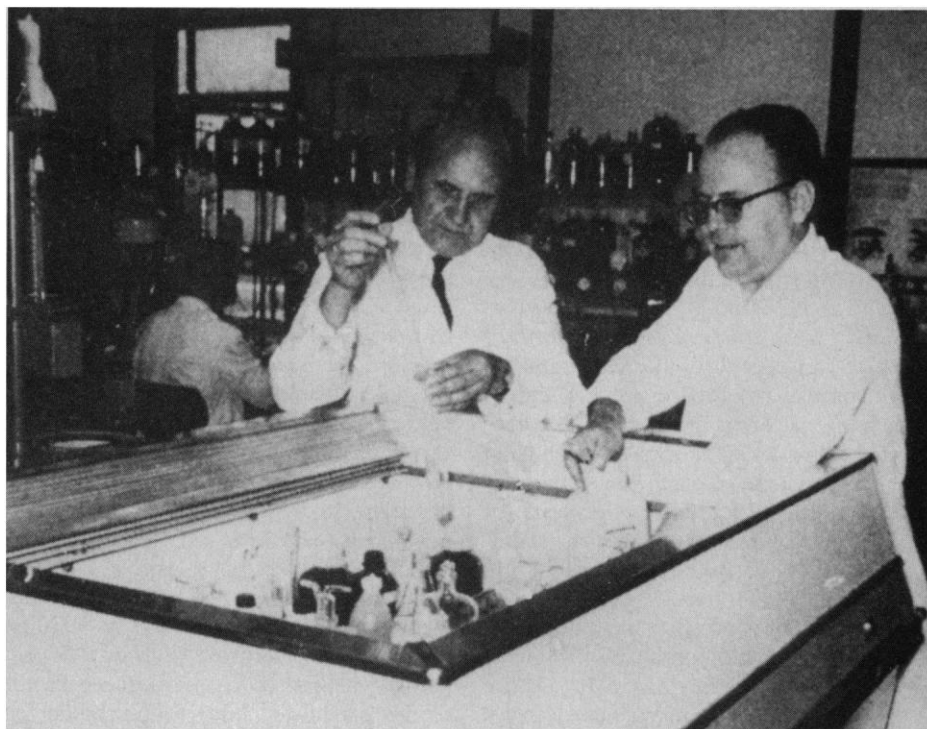
The book reflects the relatively small part played by molecular biology in ecdysteroid research. Molecular studies on the ecdysteroid receptor have been slow in coming (Pongs), and if we consider the total number of genes likely to be regulated by ecdysteroids in arthropods, it is clear that the analysis has only just begun (Lepesant). The insect model for steroid hormone action, launched in 1960 by Clever and Karlson's discovery of puff induction by ecdysone in *Chironomus tentans* polytene chromosomes, may now be overshadowed by the detailed

description of vertebrate steroid hormone receptor interactions with specific DNA sequences. Help is on the way with the recent cloning of a *Drosophila* ecdysteroid receptor.

But ecdysone is a steroid that deserves attention beyond its value as a "model steroid." For instance, the discovery of ecdysteroids associated with parasitic helminthes (Simon and Koolman) may lead to new epidemiological monitoring tools and raises the question whether ecdysteroids are hormones in all protostomes (Franke and Käuser). The evolution of steroids must result from changes in their biosynthetic enzymes. The cholesterol side-chain cleavage enzyme or cytochrome P450 XIA is an ancient enzyme that commits the product pregnenolone to the known steroid hormone pathway of vertebrates. It is tempting to suggest that the ancestor of cytochrome P450 XIA was a sterol side-chain hydroxylase that evolved into an enzyme such as ecdysone 20-monooxygenase in today's arthropods and that side-chain cleavage of 20R, 22R-dihydroxycholesterol was a catalytic specialization derived in chordates. A concerted search for the presence of the steroids and their biosynthetic enzymes in obscure animal phyla is as challenging if not as fashionable as the study of peptide hormone evolution and diversity.

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Peter Karlson and C. E. Sekeris at the cold box in Karlson's laboratory in Marburg. "The cold box . . . was the analogue of the Pnyx, the Athenian parliament. Most of the major decisions and planning of the experiments were taken there." [From *Ecdysone*]