of science: It was after all Alfredo Rocco, said to be Mussolini's favorite philosopher, who defined fascism as "feeling translated into action." American society will be rejuvenated by people who deal with its complexities by summoning every rational as well as moral resource. Every man is entitled to seek his refuge and to find comfort where he may, but he must not confuse retreat with revolution.

In the short run the system may actually be strengthened if the defection of enough upper-middle-class young people creates more room at the top for the sons and daughters of workers and the poor. The American corporate state will not collapse if those who are most offended by its evils desert it for dead. In the long run the nation may be obliged to support a sizable parasitic class which grows larger as it perceives that the self-righteous symbols of revolution are compatible with the behavior of impotent men. If enough pilgrims journey to Walden they will pollute the pond; but no matter, it is not these waters that can green America.

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Hormone Metabolism

Conjugates of Steroid Hormones. HARRY E. HADD and ROBERT T. BLICKENSTAFF. Academic Press, New York, 1969. xviii, 366 pp., illus. $18.50.

It was not so long ago that steroid biochemists and endocrinologists regarded steroid conjugates with great hostility. The reason for this is that efforts to isolate pure steroids were often frustrated by the difficulty of releasing the free steroid from its conjugated forms, which were usually a mixture of glucuronides and sulfates. The "enemy" conjugates were attacked with hot boiling acid to release the steroid, and when this approach was abandoned because much of the steroid was destroyed in the process, they were subjected to incubation with crude hydrolase preparations for days. A further deterrent to working with conjugates was the fact that owing to their greater polarity their purification was far more difficult than was the isolation of the nonpolar steroids. Also, conjugates were universally regarded as detoxication products lacking in biological significance and so became unworthy of serious attention.

Today the situation is completely reversed. Steroid conjugates are accorded lavish affection; there is no compulsion to hydrolyze them, techniques for their isolation and identification have been greatly improved, and their significance is clearly in the realm of metabolic conjugation and not detoxication. This remarkable transition was not made overnight but by dint of the accumulated hard work of a number of pioneers who now, no doubt, are blinking in amazement at the current popularity of steroid conjugates. In this connection, the eyes of S. L. Cohen, E.-E. Baulieu, S. Lieberman, E. Diczfalusy, A. E. Kellie, J. Schneider, and M. F. Jayle bear watching.

The steroid conjugates represent a challenge to the endocrinologist because, first, they can be the primary hormone product of an endocrine gland, for example dehydroisoandrosterone sulfate from the adrenal; second, they can be substrates for specific hydrolases which endow them with a role in the enterohepatic and in the feto-placental circulations; and third, they can be substrates for specific enzymes which transform the steroid moiety into metabolic products which, in turn, are the precursors of important steroid hormones.

Of late, an effort has been initiated to organize this wealth of knowledge. S. Bernstein and S. Solomon have edited a volume on *Chemical and Biological Aspects of Steroid Conjugation* which follows Bernstein, Dusza, and Joseph's compilation *Physical Properties of Steroid Conjugates.* Also, the treatise *Metabolic Conjugation and Metabolic Hydrolysis* edited by Fishman includes discussions of steroid conjugation.

The publication now of Hadd and Blickenstaff's *Conjugates of Steroid Hormones* provides a concise introduction to this field as seen by a single author-pair. The authors have succeeded in writing an interesting book for the investigator who is about to start working with conjugates of steroid hormones and who needs to know where and how to begin. One learns about isolating steroid conjugates from natural sources, separating sulfates from glucuronides, and the advantages and disadvantages of various techniques in the literature. Sulfates of steroid hormones are discussed in a chapter devoted to their enzymic and chemical synthesis, as are the glucuronides in a separate chapter. The treatment of the Koenigs-Knorr synthesis of glucuronides is especially good. Steroid hormone glucosides and phosphates are reviewed before the metabolism of steroid conjugates is discussed. In the appendix, a system of nomenclature is proposed for steroid glucosides which deals specifically with the naming of steroid compounds with more than one glycosidic link.

The authors have compiled useful and complete (to 1968) tables of the various steroid conjugates, numbering over 370, as a mini-laboratory Handbook of Steroid Conjugates. Inasmuch as these tables and others constitute more than half of the book, its ultimate value will be a function of the frequency with which it is consulted for specific information. On this basis alone one can expect it to occupy a position on the shelves of investigators interested in steroids and their conjugates.

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Neural Patterns

The Innervation of the Vertebrate Heart. EDWIN F. HIRSCH, Ed. Thomas, Springfield, Ill., 1970. xiv, 210 pp., illus. $16.50.

There are few anatomists who would deny the morphologic complexity of the intrinsic cardiac innervation and the incomplete state of our information about the subject. There are fewer, however, who would attempt to add to our knowledge by applying the difficult, tedious silver staining and degeneration techniques to the problem. This monograph reports on such efforts and is thus worthy of recognition.

For the past decade, Hirsch and his colleagues have studied the innervation of the heart in a variety of animal forms from fish to man. The approach has been simple and classical. Serial sections of whole hearts or, in the case of larger forms, selected regions of hearts, have been stained with one or more silver reduction methods. The pattern of innervation has thus been laboriously traced from section to section and region to region. In some forms, these same procedures have been done following bilateral vagectomy, bilateral thoracic sympathectomy, and total denervation, some degree of verification of the normal anatomical findings being thus provided. In this specific objective, the work has achieved some success. It has affirmed the common