

much needed. Thirty-nine authors, 14 from France, 13 from Germany, three each from Switzerland and the United States, two from England, and one each from Austria, Hungary, Israel, and the Soviet Union, have contributed chapters. The five volumes are well organized and for the most part well written. There are unfortunately no indices, but the detailed tables of contents, repeated for the entire series in each volume, and the prominent page headings make searching fairly easy. The breadth and thoroughness of coverage are quite impressive. There is, for example, an entire chapter devoted to the ovaries of workers, one to the oenocytes, one to the microclimate of plants visited by worker bees, and one to the place of the honeybee in Babylonian literature—although the last admittedly consists of only ten paragraphs. Added to von Frisch's *The Dance Language and Orientation of Bees*, the *Traité de Biologie de l'Abeille* makes as complete a library as the zoologist could want on *Apis mellifera*. Clearly what is needed now is a general comparative treatment of the 20,000 or so remaining bee species, and in particular those presocial and social species whose comparative study has shed so much light in recent years on the origin of social behavior in insects.

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Biological Compounds

Prostaglandins. Proceedings of the Second Nobel Symposium, Stockholm, June 1966. SUNE BERGSTRÖM and BENGT SAMUELSSON, Eds. Interscience (Wiley), New York; Almquist and Wiksell, Stockholm, 1967. 299 pp., illus. \$18.50.

The burgeoning of knowledge of the chemistry, physiology, and pharmacology of the prostaglandins in the relatively brief period since their isolation made it possible to hold the first symposium exclusively devoted to these substances in the summer of 1966. In the 35 papers which make up this volume, most of the central issues associated with research on the prostaglandins are comprehensively and critically reviewed.

Although the basic observation that semen was endowed with powerful pharmacological properties must have been made many times, it is perhaps not surprising that little excitement was

generated by this finding, since extracts of most organs contain histamine, acetylcholine, catecholamines, and other compounds that may mimic almost any effect on smooth muscle and blood pressure. Special recognition must therefore be given to M. W. Goldblatt and U. S. von Euler, who independently in the 1930's pointed out that the pharmacological properties associated with semen and extracts of seminal vesicles could not be accounted for by known substances. From these careful observations, Sune Bergström and his colleagues, Bengt Samuelsson and J. Sjövall, were led to the discovery of the existence of a unique family of physiologically highly active substances of widespread occurrence in mammalian tissues. The somewhat misleading but firmly established name "prostaglandin(s)" had been proposed by von Euler in 1935.

The history of the discovery and isolation of the prostaglandins is well told in this volume by those intimately involved. It was, of course, a somewhat surprising finding that the elusive substances were all 20-carbon-atom fatty acids, variously oxygenated and unsaturated, and with carbons 8 to 12 involved in a cyclopentane ring structure. At the symposium no fewer than 13 closely related prostaglandins in human seminal fluid were described. Since only minute quantities of these compounds are present in most tissues, the great sensitivity and analytical power of the mass spectrometer played a decisive role in the structural and biosynthetic studies on prostaglandins.

In contrast to the great elegance of the chemical and biochemical work on the prostaglandins, the elucidation of the functional role of these substances has proved a far more involved task. Since the prostaglandins are clearly synthesized from the nutritionally essential polyunsaturated fatty acids, it was a matter of interest whether the symptoms of unsaturated-fatty-acid deficiency could be corrected by the administration of prostaglandins. Although the experiments have limitations in design, no evidence favoring this view has been obtained.

The speculation that prostaglandins play a role in reproductive processes by virtue of their capacity for stimulation and inhibition of myometrial activity has attracted considerable interest, but this highly important question remains unresolved.

The participants in the symposium

described many other facets of the action of the prostaglandins. Special interest was generated by the finding that certain prostaglandins could counteract the effects of epinephrine and other hormones in evoking lipolysis in the epididymal fat pad and that they could block the ion-moving action of vasopressin on the toad bladder. Since both of these phenomena appear to involve the participation of cyclic adenylic acid, it seems reassuring to learn that prostaglandins block the intracellular accumulation of this nucleotide induced by epinephrine in the appropriate tissues.

Four chapters are devoted to a description of the effects of the prostaglandins on the cardiovascular system. The complexities of these effects are highlighted by the finding that at least one prostaglandin exerts a unique pressor effect independent of sympathetic innervation or catecholamine release, but apparently mediated primarily through peripheral venoconstriction. In contrast, evidence is provided that the antihypertensive action of lipids of the renal medulla can be accounted for at least in part by prostaglandins.

In other chapters, approaches to the synthesis of prostaglandins and their analogues are described. Dissociation of the effects on blood pressure, on smooth muscle, and on epinephrine-induced lipolysis in rat adipose tissue has been achieved. The prostaglandins have not escaped the attention of workers on the nervous system, who have observed effects of these compounds on the electrical activity. Efflux of prostaglandins occurs upon stimulation of the nervous tissues by a variety of agents.

It is a pleasure to read this well-produced and lucid book. Each chapter is succinct and informative and conveys some of the flavor of excitement that was generated at the Nobel Symposium. Readers who have not followed prostaglandin research in detail may acquire, with pleasure and economy of time, a balanced and panoramic view of this scientific area as it existed in the summer of 1966. The field is growing rapidly, and in a few years a comprehensive and condensed review will not be possible. This book will therefore serve as an important chronicle for an area of high scientific adventure.

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