and will be worthwhile, scientifically as well as technically.

Part of the money has gone into theoretical studies, and theories have made substantial progress during the last ten years. Part of it has gone into the development of superconductors for application and technology. The progress has been remarkable but, as Schmitt and Morrison point out, this development in no way approaches that of the transistor. One therefore asks, why not? Once again, the answer can be found with closer reading—this time in Berlincourt's contribution on superconducting materials. This article is the lengthiest and also the least satisfactory of the whole book. It starts with a rather sketchy review of the theories of Ginzburg and Landau and of Abrikosov and Gor'kov, a review which in no way equals the originals. The actual account of materials is again a review—a rather superficial and somewhat facetious condensation of Ben Roberts' excellent compilation for superconducting materials. This chapter evidences no coherence. Not once in this article on materials is a crystal structure mentioned. This kind of haphazard approach is symptomatic of what afflicts most efforts in the materials field and gives a clue to why the higher transition temperatures necessary for large-scale applications of superconductivity have not been reached. This, of course, is also the answer to why the economic development of superconductivity has not equaled that of the transistor. In contrast to the work that led to the transistor, research on the materials aspect of superconductivity has been mismanaged for a rather long time and the money, by and large, has not been spent wisely. Only a small and ever decreasing percentage of all this support has gone toward the discovery and development of those superconducting materials which dominate present-day technological use of superconductivity. A profound reassessment of the support in the materials field is necessary in order to achieve the higher transition temperatures which are undoubtedly possible. Only then will the intriguing technological developments envisaged in parts of this book, and by Garwin and Matisoo in particular, become realities.

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## View from the Pier

**Natural History of Marine Animals.** G. E. MACGINITIE and NETTIE MACGINITIE. Second edition. McGraw-Hill, New York, 1968. xiv + 523 pp., illus. $10.75.

For those lacking a formal introduction to the seashore and the animals that inhabit it, this book could be a useful companion on the next jaunt to the coast, preferably the west coast of North America, whence most of the sketches were derived. Freed from the strictures of integrating form, function, and phylogeny, the authors supply glimpses of the lives and habits of animals living between the tides. The book is for the amateur enthusiast, although anyone interested in animal behavior and natural history will find a wealth of anecdotes for the next beach gathering.

Each phylum of animals is glimpsed through its more abundant or unusual species. Structural peculiarities serve as a focal point around which is woven an account of foods and food acquisition, reproductive behavior, and symbiotic and predatory relationships with other animals. Respiration, locomotion, molting, and regeneration of lost parts are treated either systematically or as otherwise appropriate. A final chapter treats the vertebrates which the land-bound enthusiast is likely to encounter, and these range from the small fishes living in tide pools, or commensally in the burrows of invertebrates, to the big mammals seen in the distance or along some remote rockbound coast.

An introductory section of 12 chapters sets the stage for the accounts of species. The interactions of marine invertebrates with their environment are only touched upon, but an attempt is made to sketch the diversity of environments, both physical and biological. Adaptations to the environment, including the acuity of sensory perception, are treated briefly.

The book, an apparent outgrowth of lectures delivered at the shore or beside an aquarium, loses some of its excitement away from its natural setting. There are moments, however, when a vivid sketch of behavioral patterns portrays the enthusiasm and patience of the authors. The tolerance of the innkeeper (*Urechis*) for its commensals and the homing instincts of the seaweed limpet are so deftly described that the reader becomes engrossed with the lives of these little creatures by the sea. He is assured of the individuality of the subjects at the climax of the story which describes the strong maternal possessiveness of the octopus toward its yet unhatched offspring. It is these little sketches that commit the uncommitted and save the book from the usual aridity of natural history aimed, all too often in this instance, at dispelling once popular myths.

The second edition includes 40 pages of additional descriptions which have all been tucked into the back of the book. Except for the addenda, little has been changed since the book's first appearance nearly 20 years ago.

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## On the Honeybee

**Traité de Biologie de l'Abeille.** RÉMY CHAUVIN, Ed. Vol. 1, Biologie et Physiologie Générales, xvi + 548 pp., illus., 150 F.; vol. 2, Système Nerveux, Comportement et Régulations Sociales, viii + 566 pp., illus., 150 F.; vol. 3, Les Produits de la Ruche, viii + 400 pp., illus., 116 F.; vol. 4, Biologie Appliquée, viii + 434 pp., illus., 116 F.; vol. 5, Histoire, Ethnographie et Folklore, viii + 152 pp., illus., 46 F. The set, 578 F. Masson, Paris, 1968.

The honeybee has always seemed the special benefactor of man, an insect "of mysterious origin," as William Morton Wheeler once put it, "a divine being, a prime favorite of the gods, that somehow survived the golden age or had voluntarily escaped from the garden of Eden with poor fallen man for the purpose of sweetening his bitter lot." Whole libraries have been devoted to bees and beekeeping since antiquity. Aristotle is credited with the discovery of the principle that individual worker bees stick to one kind of flower in their foraging trips and of the fact that they communicate (by means unknown) the location of food discoveries. Pliny invented an observation nest with windows of transparent horn to watch the emergence of bees from brood cells. In the past hundred years tens of thousands of technical articles have been written on the honeybee, most of them on applied aspects, and no fewer than 20 periodicals, and scores of books, have been devoted exclusively to the subject. The information is generally very scattered and poorly organized.

An encyclopedia of the honeybee of the kind prepared under the direction of Rémy Chauvin is therefore very

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; Almqvist 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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