Tropical Horticulture

Many books on tropical horticulture have been written by authors of little experience who repeat errors already in the literature. Arthur Thomas, the author of **Gardening in Hot Countries** (Faber and Faber, London, 1965. 207 pp., 30s.), avoids these pitfalls by discussing plants and methods that he has used and found successful.

Thomas received his early horticultural training in Britain and then went to tropical Africa where he made his career in tropical horticulture. For many years he was in charge of the Botanic Garden at Entebbe, Uganda. His book is thus slanted toward African conditions and plant materials. However, owing to the great uniformity in the plant materials used for landscaping purposes all over the tropics, any gardener in the tropics will find that most of the plants mentioned in the book are grown in his own area.

Throughout the book Thomas recommends following local methods and using local plant material as much as possible. He wisely advises the gardener not to attempt to make a temperate climate garden in the tropics. In hot climates, orchids are much easier to grow and will give the gardener more satisfaction than roses. Where the climate is warm and sunny a northern type of floral display is not needed in the garden, and lush green foliage and shade trees will be more satisfying in the long run.

The book covers the whole range of activities from preparing soils, plant propagation, the control of insects and pests, to selecting the right plant for a certain spot in the garden. Many species of plants are briefly described. The wealth of plant materials in the tropics is so great that a good sized encyclopedia would be required to give much detail about the plants found even in one locality!

Some of the taxonomy in the book is outdated, but this will not disturb gardeners. More disturbing is the omission of a description of the side-veneer graft in the chapter on propagation. This method is now the most common one used in many tropical countries.

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An Explanation of Life Based on the Laws of Physics

In this concise, lucid treatise, **The Machinery of Life** (McGraw-Hill, New York, 1966. 222 pp., $7.95), Dean Wooldridge has set out to prove that everything about life, from its chemical beginnings to consciousness in man, is explainable through the laws of physics. Where a physical explanation is not possible this is due to ignorance, remediable in time, he maintains, and not to supernatural involvement. One could not agree more with this view.

In a remarkably short space Wooldridge traces the abiogenic transition of simple inorganic substances through the formation of simple and complex organic compounds, precellular structures (coacervates), and cells to higher forms, in a logical and narrative style. The clarity achieved is all the more remarkable in view of the paucity of illustrations (only six original drawings in the nucleic acid chapters). This brevity and clarity were made possible, in part, by avoiding the controversies that today characterize this subject. The physical explanations of the stages through the formation of simple coacervates, where experimental documentation abounds, are compelling. Each successive level of organization of matter is easily seen to be the almost inexorable outcome of the conditions of the preceding level. As his narrative unfolds, Wooldridge calls attention, at every turn, to the fact that no supernatural forces had to be invoked.

A wide gap exists between coacervates and the most primitive "living" thing toward which Wooldridge is driving. This is a critical part of the story. Much rests on a convincing explanation of the transition based on physical laws. Experimental evidence is lacking here and henceforth the explanations are based on premise built on premise, all mechanistically sound to be sure, but the inexorability of the argument is gone. One can make other premises based on other models, and this is one point at which the Vitalist can take his departure and press his own case. This departure could have been delayed, I believe, had Wooldridge chosen Fox's proteinoid microspheres for his precellular models, in view of the recent advances reported in the construction, properties, and maintenance of microspheres.

Wooldridge next sets out to derive functional nucleic acids from first principles, but it is clear that he has taken his cues from our present knowledge of the physics, chemistry, and hereditary role of modern nucleic acids, and has woven a story ad hoc. The five chapters on nucleic acid are based on too many unrelated, purely chance events leading to an advanced mechanism for polymer synthesis which only by chance finds usefulness in some fortunate coacervate. This strains credulity. The chemistry of the coacervates, on the other hand, remains nebulous, and one has the picture of a rather precise mechanism operating almost *in vacuo*. This is a natural outcome of the present-day excessive preoccupation with the concept that DNA is the secret of life. As Commoner has argued in several perceptive articles, the reverse may be the case: Life is the secret of DNA. It is more likely that nucleotides, singly and as polymers of various lengths, played an early part in precells and developed in complexity with the developing complexity of the rest of the chemistry and that they were at all times an integral part of that chemistry.

Another point at which the Vitalist can take his leave from the Mechanist's explanations is at the level of the "mind." At this level the arguments of each at the present time must rest on the faith each has in his own view.

I should imagine that most scientists have outgrown the vitalism-mechanism controversy. However, the layman and the student should find this book a very stimulating and fascinating exercise.

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Astronomy for the Layman

The earth has not always been here. When and how did it come into existence? The solar system *is* a system, not a random collection of objects. When and how was it born? These are heady questions, inviting both the wildest speculations and the most serious scientific investigations. Very substantial progress has been made during the last 35 years, and new evidence in this intriguing and continuing mystery story —and new questions—have come from such diverse sources as nuclear reactions in the sun and stars, the chemistry of meteorites, Martian craters, red shifts in distant galaxies, earthquakes, astrometric binaries, the eccentricities