knowledge on lignin and lignin utilization. As the editors point out, lignin is second only to cellulose in ubiquity among natural products. They also rightly stress that lignins do not merely act as "encrusting materials" but also perform multiple functions essential to plant life, such as decreasing the permeability of cell walls and thereby affecting water relations, importing structural rigidity that enables plants to exploit the vertical ecospace, acting as a bonding agent between plant cells, and impeding microbial attack.

The book is divided into nine parts: (1) an introduction, including definition nomenclature; (2) lignins in the plant kingdom, covering occurrence, formation, and classification; (3) dehydrogenative polymerization and structure of lignins, encompassing percursors, isolation and structural studies; (4) spectroscopic characterization of lignins containing UV, IR, and magnetic resonance spectra; (5) reactions of lignin, dealing with solvolysis by acids and bases, halogenation and nitration, oxidation, reduction and hydrogenolysis, modification reactions, and high energy degradation; (6) delignification in pulping processes, considering reactions in sulfite and alkaline pulping; (7) macromolecular aspects, dealing with polymer properties of lignin and lignin derivatives; (8) biological transformations limited to degradation and humus formation; and (9) utilization of lignins concerned with low molecular weight chemicals (such as vanillin, organic sulfur chemicals, dimethyl sulfoxide, phenolic products, etc.) and polymeric products (e.g. lignin sulfonates, kraft lignins, and hydrolysis lignin).

The faults in this work are essentially minor, and the positive features legion. Like many multiauthored volumes, there is some duplication and unevenness, but in many cases the duplications result in the presentation of different points of view on the same topic. Indeed, the editors are to be complimented on producing a considerable contribution to the literature of plant science and a fitting tribute to the man whose picture appears on the frontispiece—K. Freudenberg.—*Graeme Berlyn, School of Forestry, Yale University*

SCHNEIRLA, T. C. *Army Ants: A Study in Social Organization*. Ed. by Howard A. Topoff. 349 pp. W. H. Freeman, 1971. $12.

This book is a posthumously published summary of what is known about the behavior of those "Huns and Tartars of the Insect World," as Wheeler termed the army ants. Schneirla stresses what I would call the "social physiology" of the nomadic-statary cycle and of colony reproduction, and shows how these functions differ in genera with prevailingly "group A" (epigaeic) and "group B" (subterranean) lifeways. His own massive contributions by themselves almost completely define and largely document this entire field, so that it is only fitting that accounts of his own research dominate the book. He has condensed his tremendous accumulation of published and unpublished data into a story that retains much of the immediacy and flavor of events witnessed during long hours in rain forest and desert canyon, though the focus never wavers from the ants themselves.

Schneirla has almost single-handedly brought the study of army ant colony behavior to about the level occupied by mammalian organismal physiology before the application of modern chemistry. One obvious direction that army ant research will now take is the intensive investigation of the all-important pheromones that mediate much of the ants' behavior and individual physiology.

In reading about the army ants, it is hard to avoid thinking in terms of organism and supraorganism, despite the repeated strictures of Schneirla and others against the pitfalls of holistic analogy. Schneirla shows, for example, that in colony division in *Eciton*, one major segment of the colony normally follows the old queen, and the other a new callow queen, while the three, four, or more extra callow queens are detained and sealed off by small groups of workers. Removal and replacement experiments with these sequestered queens, which are normally left to die alone, seemed to show that they had some "stabilizing influence" on the course of colony division. An analogy is suggested with polar bodies in female meiosis at the organismal level. Would it then be in order to ask whether polar bodies are really "nonfunctional," as is usually claimed? Even more generally, might not Schneirla's analysis of the nomadic-statary cycle and attendant subcycles in *Eciton* colonies instruct us in the theory of biological clocks in individual plants and animals?

Schneirla ended his book with an outlined phylogeny of all the army ants (Dorylinae) that presents them as descending from one common ancestor. This reviewer strongly doubts the monophyletic hypothesis, even though it has been standard for years. Uncomfortable with the various obviously convergent "evolutionary experiments" towards army ant lifeways that have been discovered over the years among different genera of the Ponerinae, Schneirla segregated these in a "legionary" category, distinguished from "true" army ants mainly by smaller colony population size. When some legionary species of *Leptogenys* (particularly of the Asian *processionalis* group of termite-raiders) are properly studied, this distinction will disappear. The question even arises whether some species of *Pheidologeton* (Myrmicinae) do not qualify as army ants.—*W. L. Brown, Jr., Entomology, Cornell University*

SMITH, Richard T. and Maurice Landy, eds. *Immune Surveillance*. Proceedings of an International Conference, Augusta, Mich., May 1970. Perspectives in Immunology. 536 pp. Academic Press, 1970. $12.

Surveillance, in the terms of this book, means the detection and elimination of cells with membrane structural features that differ from those of the cells of their vertebrate host. Possible surveillance mechanisms could involve the presence or absence of hormone receptor sites, contact inhibition, and allogeneic inhibition. If surveillance is mediated by antibody molecules or by immunocytes, then the adjective, immune, is used to describe the surveillance phenomenon.

Immune surveillance is of obvious importance in the rejection of tissue and organ transplants and may also play a role in control and elimination of potentially malignant cells. Indeed, Lewis Thomas, in 1959, presented the hypothesis that the raison d'etre for the immunological system is the detection and elimination of neoplastic cells. Shortly thereafter, Sir MacFarlane Burnet coined the phrase "immune surveillance" for this immunological police function. This volume is an edited transcript of an international conference held eleven years after Thomas's original hypothesis. From the great quantity of experimental data amassed in testing the validity of the immune surveillance concept, there can be no question but that the original hypothesis has been heuristic and, furthermore, is probably valid.

The content and format of the book make for informative and exciting reading. Stenographic transcripts of the original presentations and discussions are supported with subsequent discussions, afterthoughts, comments, notes, and footnotes. The different points of view are clearly expressed, and the reasoning is tight.

It was ironic to read R. T. Prehn's incisive critique in which he faults the surveillance hypothesis, since his own work with Main on tumor specific transplantation antigens of methylcholanthrene-induced mouse sarcomas was so important in establishing the surveillance concept. Prehn's exception to immune surveillance is based, in part, on the apparent lack of immunogenicity of many tumors, as determined from *in vivo* tumor growth. As noted by Hellström, however, results of the colony inhibition assay establish that virtually all of the many and varied tumors that have been tested are potentially antigenic. It appears, however, that some "successful" tumors survive in spite of, or even because of, their antigenicity due to the presence of blocking or enhancing antibodies. The volume ends with comments and conclusions by Sir MacFarlane Burnet.

Since a major editorial aim was rapid publication, it is possible, of course, to find imperfections in the book. Definitions