ists tell me that certain of them are also factually unreliable.) There are papers on South America as a source of economic plants (50 pp.), on cultural anthropology (58 pp.), and on poisonous arthropods (27 pp.). It is possible to grant the general interest of these topics without seeing their relevance to volumes in which space is already a difficulty. In contrast, the obviously pertinent biogeographic discussions have page counts such as the following: Coleoptera (13 pp.); Arachnida (16 pp.); mollusks (33 pp.); fishes (19 pp.); birds (25 pp.); mammals (28 pp.). Some topics—fossil pollen, for example—that are of crucial importance for at least the more recent history of South America are ignored. Still others—palms, bromeliads, Lepidoptera, Reptilia, marsupials—are expressly left out because it was "not possible to find a ready and experienced worker" to deal with them.

Unhappily, especially for novices, many of the bibliographies are very short (that for mollusks cites only authors' names, not specific references, that for birds only general works). In addition, there has obviously been delay in publication; rarely is a paper cited later than 1965, and most are far earlier.

The editors have correctly allowed the authors to assert their own opinions on controversial topics, but this again has its disadvantages for the novice. In the case of continental drift, except for the chapter by Martin (verdict: not proven), the authors are very positive either for or against, but merely by assertion, not discussion.

These are clearly badly edited volumes, bungled both in concept and execution. They can only be contrasted unfavorably with the *Handbook of Middle American Indians*, vol. 1, "Natural Environment and Early Cultures," which covers many of the same topics. Some of the difference may indeed be ascribed to the greater maturity of study of the Central American region, which is also a much smaller area. But the ambition that tackles a difficult task can reasonably be called to account for failure in the level of effort put forward. The effort to achieve a synthesis or even an intelligible confrontation of views has not been made.

The article by Fittkau, the senior editor, which endeavors to summarize the South American fauna as a whole, typifies this failure. Presumably here, with the specialists' papers before him, the editor might be expected to harmonize their views or point out significant divergences or offer new points of view. Unhappily the paper is eclectic without being synthetic. Dunn, Darlington and Jeannel, Mayr, Simpson, Hershkowitz, and Brundin are all at various times cited without much admission of the divergence of their views and with a level of zoogeographic information (and generic nomenclature) which for at least vertebrates is far below that of Darlington's *Zoogeography*, now more than ten years old.

Quite beyond deficiencies of performance, it is necessary to ask whether, as pedagogic tactic, summaries that have little novelty and are both simple and dogmatic genuinely have the capacity to capture or instruct the novice. It may be that only reviews with both depth and freshness of viewpoint catch the attention or stir the mind even of the novice.

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Germanium and Silicon

Physicochemical Principles of Semiconductor Doping. V. M. GLAZOV and V. S. ZEMSKOV. Translated from the Russian edition (Moscow, 1967) by Ch. Nisenbaum and B. Benny. D. Slutzkin, Transl. Ed. Israel Program for Scientific Translations, Jerusalem; Davey, Hartford, Conn., 1968. xii + 380 pp., illus. $16.

Although the fundamentals of semiconductor doping are discussed thoroughly, the value of this work lies mainly in the compilation and critical evaluation of available phase equilibria and other data for binary and ternary germanium and silicon systems, together with a detailed treatment of impurity incorporation and interactions in these elemental semiconductors.

In the first chapter the reader is led from elementary semiconductor theory into the familiar mass-action and ion-pairing work of Reiss and co-workers. The second, and longest, chapter deals with experimental methods for the determination of liquidus and solidus curves and then with the "best" phase diagrams for binary systems (diffusion data are also included); also included are treatments of both liquid and solid solution behavior, with emphasis on the factors affecting the distribution coefficient and its temperature dependence. There follows a similar chapter on multiply doped germanium and silicon which even includes some results on the viscosity of ternary liquid solutions. The final chapter treats methods of obtaining doped crystals, including the various crystal growth techniques and related problems such as constitutional supercooling, striations, and the facet effect (translated as "plane effect").

There is one criticism, not of the authors but of the state of the theory of impurities in germanium and silicon at the time the book was published (1967). This deals with the definition of a "neutral" impurity in a semiconductor. For example, for lightly doped germanium one can calculate the occupation probability for an electron on a donor level, thus obtaining the fraction of donor atoms which are neutral, that is, not ionized. However, for heavily doped germanium the shallow donor levels merge into the conduction band and simple Fermi-Dirac statistics lead to high occupation probabilities of the donor levels and hence give an apparent large fraction of neutral impurities. Yet Hall measurements clearly indicate 100-percent ionization of these impurities in heavily doped samples; that is, there is one free electron per donor atom. The "semantic" difficulty of talking about neutral impurities in such cases, though recognized, was conveniently ignored (I helped ignore it!), and the introduction of "neutral" impurities into Reiss's theory resulted in surprisingly good agreement with the experimental temperature dependences of the distribution coefficients for a large number of impurities, even at high doping levels. In 1967, however, Panish, Casey, and Chang showed for zinc in gallium arsenide that it is not necessary to preserve the fiction of neutral impurities in heavily doped materials if one properly considers the activity coefficient of holes and the effect of "band tails" at high impurity concentrations. To the best of my knowledge, similar calculations have not been made for germanium or silicon.

One might hope for a revised edition of this book incorporating the results of such calculations. Until that time, this book should still be of considerable value, especially to those who are concerned with the growth of germanium and silicon crystals.

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