core of any book on evolution. In view of this, the final chapter (39 pages) on philosophical issues seems an unwarranted luxury. Indeed, I question its suitability for inclusion in such a book as this.

Most advanced texts have not tried to put technical accounts of paleontology and genetics under one cover; students who have the background for one science often lack it for the other. Valentine plunges straight into a review of the geological record and the evolution of the metazoa. As with most other such nonspecialist treatments of paleontology, the reader is left with no feel for the basic data of the science. For example, we are led through the evolution of triploblasty and the coelom and from there directly into inferences of complex phylogenies. All these ideas, valuable as they are, are synthesized and inferred from data invisible to us.

Both Valentine and Stebbins become involved in difficult and often esoteric problems of systematics at the higher taxonomic levels. Although these matters are interesting it is clear that evolutionary mechanisms at the population level can never be integrated with the ideas, for example, that suggest the subdivision of life into five rather than two kingdoms. In fact, very little of the phylogenetic material is articulated in any way with population studies. Perhaps I hope for too much; nevertheless, some opportunities have been lost. For example, I was unhappy to find such a small amount of attention devoted to the evolution of the vertebrates. More than with most fossils, their skeletons are clues to food habits and locomotion, two characteristics we have no trouble in understanding. In turn, this permits ancient ecologies to be inferred. Where the material is abundant, as in the case of the horse, a modern population biologist can almost apply his "population thinking" to these ancient animals. When Simpson writes about this, he seems to be talking my language. Valentine's examples and discussions seem lost in a mass of statistics on such things as number of families evolving per million years. Macroevolution can and should be brought closer to microevolution.

Multiple authorship has produced some annoying repetitions. For example, parallel evolution is didactically italicized and defined both on p. 265 and on p. 326. The two chapters on speciation are not well dovetailed. The authors quote their own work rather too liberally, and this tendency is not very defensible when we find, for example, that selection is treated with no mention at all of the work of Sheppard, A. Robertson, Cain, B. Clarke, Lamotte, or Mather. Surprisingly, neither the classical work on *Cepaea* snails nor that on mimicry has found a place in the book. Although examples from *Drosophila* abound, the student will find no reference to Patterson, Stone, Hardy, Stalker, Spiess, Parsons, or Spieth, to mention only a few.

From the "committee of authors" approach, we now turn to the work of one man. Verne Grant's text for senior undergraduates is called *Organismic Evolution*. This somewhat clumsy title is contrived so as to allow the author to omit "molecular evolution, primitive organic evolution and mathematical models." Within its chosen framework, the book has both consistency and style. Grant sees the subject in a certain way and does not hesitate to voice his own opinions on controversial subjects.

Like that by Dobzhansky *et al.* this book attempts a joining of genetics and paleontology. The task here is less difficult, because it is a smaller book and is intended for a less sophisticated audience. The organization is impeccable, but the book unfortunately reads like a slightly expanded course outline. The style is terse and didactic; furthermore, the treatment of most topics is rather sketchy.

Grant is quite hostile to what he considers unnecessary synonyms. He has drawn on his experience in writing earlier books to treat difficult subjects with simplified statements rather than genuine exposition. Shades of meaning are accordingly sometimes lost. While making it easy for students, Grant has put some constraints on the capacity of hypotheses to blur and grow.

Grant has also seen the need to introduce macroevolution to his students. Thus, about half the book is devoted to brief chapters on paleontological topics. The examples are well chosen, but the chapters read like what they are, namely well-prepared lectures on paleontology by a geneticist. It would be better to send the students off to the library to read Simpson and Colbert directly.

Of the two books, the first makes the greater departure from tradition and is indeed a much more ambitious project. Thus, it has been afforded more space in this review. Both books, however, are a signal to evolutionists that they can no longer afford the luxury of retiring into their own specialty. The field badly needs books that can show the student the breadth and depth of this topic.

Perhaps the greatest effect these books will have is to stimulate others to try to do better. Both have made very good starts on a laborious undertaking. Indeed, the publication of textbooks, like the sciences they reflect, is an exercise in the evolution of ideas. The new mutations and recombinations exposed here for the first time will now be subject to natural selection. The success they are sure to enjoy will serve as an important challenge to others in this fast-developing field. Descent with change is sure to follow.

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Childbearing and Health Risk

Family Formation Patterns and Health. An International Collaborative Study in India, Iran, Lebanon, Philippines, and Turkey. A. R. OMRAN and C. C. STANDLEY, Eds. World Health Organization, Geneva, 1976 (U.S. distributor, WHO Publications Center U.S.A., Albany, N.Y.). 564 pp., illus. Paper, $20.

This volume presents the first empirical results of a large international collaborative study of the effects of family formation patterns on maternal and child health. Its focus can be indicated by explicating key phrases in the title. "Family formation patterns" refers to a limited set of fertility-related variables: family size (defined as the number of children still alive at the time of interview); age of mother; parity; gravidity; birth order; pregnancy order; birth interval; age at marriage; interval between marriage and first birth; marriage duration; ideal family size. "Health" refers to pregnancy outcome (abortion, stillbirth, or live birth), child health and development (infant and early childhood mortality, morbidity, physical and intellectual development), and maternal health (body size, blood pressure, gynecological condition, hemoglobin level, self-reports of health). The study also considers the effects of infant and early child mortality on subsequent fertility and on family planning attitudes and behavior.

The study was planned and coordinated by the World Health Organization International Reference Centre for Epidemiological Studies of Human Reproduction and by WHO (Geneva) and was supported in part by the United Nations Fund for Population Activities and by the Swedish International Development Agency. Studies in the individual countries were carried out by interdisciplinary teams consisting largely of medical or public health professionals. In addition to the five nations mentioned in the subtitle, similar studies were un-

dertaken in Colombia, Egypt, Pakistan, Syria, and Taiwan, but Taiwan withdrew in 1972 to complete its study on its own and the other four studies were not finished in time for the present report.

The study centered on two broad hypotheses: "Health risks for mothers and children increase with high frequency of pregnancies, large family size, short birth intervals, and too young or too old age of mother at the time of pregnancy" and "Experience of child loss raises subsequent fertility" (p. 53). It was motivated partly by the desire to provide data from developing countries bearing on the first hypothesis, which has been researched primarily in developed countries, and partly by the wish to demonstrate the direct health benefits of family planning in developing country settings.

The study design called for sample surveys of women of reproductive age, with interviewing, physical examination of respondent and children under five, and standard intelligence testing of the children. Samples were chosen from local areas, with no intent that they be nationally representative. Samples were stratified to represent different cultural or residential groups. For example, in India the sample consisted of Muslims, Scheduled Caste Hindus, Vellala Hindus, and other Hindus, chosen from 34 villages in two districts of Tamil Nadu State; in the Philippines the sample consisted of rural respondents from Rizal Province and urban respondents from metropolitan Manila. Total sample sizes for the nations represented ranged from 3004 to 6541. The surveys were one-shot cross-sectional, with pregnancy histories, except in India, where longitudinal features were added (although they are not reported on in this volume). Fieldwork was carried out in the early 1970's.

This report consists of a literature review by Omran (16 pages with a bibliography of more than 125 entries), a brief statement of the overall research design, a concluding "overview," also by Omran, and in between, constituting the major part of the report, detailed results from each of the five countries, organized in eight topical chapters. Individual country reports within each chapter are presented in strictly uniform format, as regards text, tables, and charts. For example, table 3.A.2 deals with "pregnancy outcome by culture, social status, and maternal age" in India; table 3.B.2 presents the same data in the same form for Iran; and so forth. Consequently it is easy to locate comparable information for all five studies. And the level of detail is high.

Indeed, the main use of the volume may be as a compendium of detailed data from developing nations collected through the use of comparable concepts and techniques and analyzed and presented in comparable form. The prevailing tone is descriptive. No attempt is made to develop new techniques or methods. There is little if any explicit theorizing—only three pages in the introductory chapters are devoted to a statement of research objectives, questions, or hypotheses. The aim is not so much to improve on previous research on the health consequences of fertility behavior as to replicate it in developing countries. Explanations and interpretations tend toward the casual and the ad hoc. Probably the full value of the studies will be realized only later, with deeper analyses of the data from individual countries and more searching syntheses of results from all the participating countries. It is hoped that publications providing such analyses are planned.

Even future analyses will be constrained, however, by a lack of social and behavioral data. Apart from some attitudinal items having to do with family planning, the "sociocultural variables" included are limited to social class, occupation, education, rural-urban residence, and religion or caste. The lack of richer data already has hampered analysis in the present report: "Certain environmental factors strongly related to mortality may have distorted the relationship of child mortality to family formation variables. While social status could be controlled, other cultural, social and environmental factors could not" (p. 523). Elsewhere it is noted that most of the variation in pregnancy wastage by area, culture, residence, and social status probably was due to induced abortion rather than to the nonvoluntary factors of spontaneous abortion and stillbirth (pp. 514–515). Yet data bearing on attitudes and behavior in regard to induced abortion are entirely lacking.

Valuable as the present study is as a major source of new empirical data, it is a striking reminder of the need in epidemiology for a broader view of biology (an infusion of some of the insights of the new discipline of sociobiology would help) or, even better, for fuller collaboration of biomedical and social scientists on topics where the dividing lines between the biological and the behavioral are thoroughly blurred.

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Equity, Income, and Policy. Comparative Studies in Three Worlds of Development. Irving Louis Horowitz, Ed. Praeger, New York, 1977, xviii, 300 pp. $25. Praeger Special Studies in International Politics and Government.

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The Fetus and Birth. Proceedings of a symposium, London, May 1976. Elsevier/Excerpta Medica/North-Holland, New York, 1977. viii, 482 pp., illus. $39.95. Ciba Foundation Symposium 47 (new series).

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