From the welter of studies on sensory units Somjen has probably selected the most important. His choices are up to date. He describes currently unsolved problems and possible approaches to them. A fatal weakness in the book, however, involves the very concept of sensory coding. This concept may denote transformation of physically specified stimuli into neural activity, or it may denote the relationship of psychological events to such activity. Somjen first foreswears the latter interpretation of coding and thereafter continually violates his vows. The result is constant confusion about what belongs to physics and what belongs to psychology. For example, he labels visual neurons "red-green" or "yellow-blue" cells. Red, green, blue, and yellow are psychological experiences quite distinct from sets of physical stimuli on which they are contingent. Somjen's inability to distinguish the two concepts of coding culminates, among other things, in his suggested cure for the uncertainty of psychological measures of sensory magnitude. He proposes (p. 221) to identify "the physical mechanism of the brain corresponding to intensity of feeling and to measure that with physical instruments." Identifying "the mechanism," however, presupposes adequate measurement of psychological intensity. And so the circle closes.

All figures in the book are collected into a single middle section. Coping with numerous and often tangential textual references to the figures requires bimanual acrobatics.

Mature scientists will find some value in this book. Students will be led into bad habits of thought.

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Genetic Machinery

Developmental Studies on Giant Chromosomes. W. BEERMANN, Ed. Springer-Verlag, New York, 1972. xvi, 228 pp., illus. $18.80. Results and Problems in Cell Differentiation, vol. 4.

The title of this volume is somewhat misleading, in that, except for two brief mentions of ciliate Protozoa and a discussion of the amphibian lampbrush chromosome by one of the nine authors, the book deals exclusively with giant polytene chromosomes of flies. The reasons behind this heavy emphasis are to be found on the first page of Beermann's introductory article. He comments on past oversimplification of chromosome structure, and the error of explaining higher (eukaryotic) genetic machinery in terms of simple molecular models. Beermann believes that developmental events can be analyzed only after eukaryotic chromosome organization is understood in terms of structural, functional, and genetic units, and "the only material in which such a combined approach seems to be feasible is the giant polytene chromosome of the Diptera."

Beermann's chapter, entitled "Chromomeres and genes," makes excellent specialized reading, correlating the latest biochemical and genetical findings with electron microscope observations. Beermann introduces the reader to the two structural entities discussed at length in the succeeding chapters: chromomeric regions or "bands," and the genetically very active regions visible as "puffs." The next article, by Lezzi and Robert, takes the reader into the detailed effects of various agents, particularly ions and hormones, on chromosomes that have been isolated from salivary gland cells of midges of the genus *Chironomus*. The review of replication in polytene chromosomes by Rudkin is detailed, concise, and logically presented. Pelling's article on transcription in giant chromosome puffs includes detailed correlations with amphibian lampbrush chromosomes. Puffing patterns in *Drosophila melanogaster* and related species are discussed by Ashburner. He shows, in beautifully illustrated sequences, the value of studying chromosome puffing patterns in a genus in which so much is known of the genetics and in which "genetic engineering" is easily possible. Ribbert considers the available data on the relation between puffing and differentiation in trichogen and pulvillar epidermal cells in the blow fly, *Calliphora*, and the flesh fly, *Sarcophaga*. Here, the electron micrographs are not quite up to the generally high standard of the micrographs in the rest of the book. Berendes's article returns to the subject of salivary gland chromosomes with a discussion of the control of puffing in *Drosophila hydei*. It is well illustrated and reviews specific findings in the light of general problems of the control of chromosome activity. It would have made a good concluding chapter. It is unfortunate that Panitz's short article on Balbiani ring activities in the midge genus *Acricotopus*, because of its terminal position, tends to sound repetitious in places.

On the whole the book is a valuable addition to the series, and achieves the aim of the general editors: "to render a thorough and up-to-date picture of giant polytene chromosomes" and "to discuss all angles of general biological interest."

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General Relativity

Gravitation and Cosmology. Principles and Applications of the General Theory of Relativity. STEVEN WEINBERG. Wiley, New York, 1972. xxx, 658 pp., illus. $18.95.

The discovery in 1965 of the 3°K background blackbody radiation by Penzias and Wilson has provided a powerful stimulus for research in the field of cosmology. Likewise the discovery of quasi-stellar objects and pulsars in the 1960's supplied the impetus for a host of new investigations in the field of relativistic astrophysics. Unfortunately, the rapid growth of papers in these fields, with the sudden appearance (and equally sudden demise) of new theories, has made it extremely difficult for the beginner to find his way through the literature and judge the value of new works in these fields. If nothing more, Weinberg's book will serve as guide through this maze. The author seems to have read just about every paper in these fields that has been written in the past 15 years and has succeeded in presenting the material in an extremely clear manner. In many cases he has succeeded in making understandable what was far from understandable in the original works. In his discussions the author tries to start from the beginning, so that the reader has a clear understanding of the underlying physical principles involved and the assumptions being made. There are very few rabbits pulled from a hat in these discussions. Furthermore, most of the discussions are more or less self-contained, so that the reader who has some background in the subject can read about one or another topic without having to begin on page 1.

As the subtitle of the work announces, the book concerns itself with both the principles and the applications of general relativity. The applications