mation theory is followed by discussions of receiving techniques and devices and modulation techniques. The latter part of the book is devoted to background energy considerations, transmission-medium effects, optical components and concepts, and systems. I shall not attempt to pass on the expertise of the discussion. The book appears to be reasonably well written and to present information useful to those concerned with detecting optical signals.

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Cellular Differentiation

Differentiation and Growth of Hemoglobin- and Immunoglobin-Synthesizing Cells. Proceedings of a symposium held in Gatlinburg, Tennessee, April 1966, sponsored by the Biology Division, Oak Ridge National Laboratory. Wistar Institute Press, Philadelphia, 1966. 234 pp., illus. Paper, $4.

This volume provides an up-to-date review of our understanding of immunoglobulin and hemoglobin structures and of the cellular events which lead to their synthesis. It is particularly fortunate that the experiences of workers with both proteins are juxtaposed, for there are many common problems. Immunoglobulins and hemoglobins are both families of proteins whose constituent polypeptide chains are the products of unlinked genetic loci. Variants of the chains result from a series of homologous (apparently closely linked) loci which can in turn be expressed as two or more allelic forms. Common questions regarding their biosynthesis arise with respect to the sequential expression of homologous loci; the partial (hemoglobin) or complete (immunoglobulin) suppression of allelic expression at any one locus; the coordination of the synthesis of polypeptide chains derived from the unlinked loci; the sequence variations which arise in addition to those accountable to the above-mentioned genetic organizations; the critical steps leading to the conversion of a pluripotential progenitor cell to a precursor and mature cell; and, finally, the extent to which this conversion represents an irrevocable commitment.

G. Braunitzer's and M. Murayama's contributions highlight the structural generalizations that can be derived from the hemoglobin data: the gross conformation and function of the molecule are surprisingly tolerant of multiple amino acid exchanges, but even a single substitution critically located (as in the sickle mutation of the β-chain) can have profound effects. In view of these findings, as well as of the heterogeneity of antibodies, M. Koshland's amino acid composition data on antibody populations of differing specificities must be interpreted with caution, and the question of their relevance to the antibody combining sites provoked vigorous discussion. R. Porter presented new results and reviewed older data on the relative importance of the heavy and light chains to the antibody combining site. It is clear that more direct data than those that can be obtained by chain recombination studies are required. It is unfortunate that the important observations of Grey and Mannik [*J. Exp. Med.* **112**, 619 (1965)], Cohen and Gordon [*Immunology* **10**, 549 (1966)], and Roholt, Radzimski, and Pressman [*Science* **147**, 613 (1965)] were not discussed from the perspective of this symposium and that the participants in the symposium skirted entirely the important genetic and biosynthetic implications of having both chains specifically participate in the antibody combining site.

H. Itano and C. Baglioni discussed several aspects of coordinated hemoglobin chain production and possible mechanisms of allelic suppression. Suppression (as discussed in a masterly review of immunogenetics by J. Oudin) is a constant feature of immunoglobulin synthesis. Baglioni attempted in addition to relate the synthesis of hemoglobin to the ontogeny of the erythrocyte, but it is clear that major pieces in this puzzle are still missing. The papers by G. Sainte-Marie, M. M. Simíc, and L. G. Lajtha (on the kinetics of antibody-forming cell production), D. Metcalf and M. Brumby (on the role of the thymus), and J. F. Albright and T. Makinodan (on the rise and fall of pluripotential and paucipotential cells) serve to underline the relative crudeness of the techniques presently available for studying the differentiation of the immunoblast. The lack of homogeneous cell populations and of a system for studying them in vitro seriously handicaps the analysis of immunological differentiation at the biochemical level. The volume (which has also been published as a supplement to the *Journal of Cellular Physiology*) will be of interest to all those concerned with cellular differentiation as well as to those working in the specific areas discussed.

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Animal Biochemistry

A Molecular Approach to Phylogeny. MARCEL FLORKIN. Elsevier, New York, 1966. 184 pp., illus. $13.

Aspects moléculaires de l'adaptation et de la phylogénie. MARCEL FLORKIN. Masson, Paris, 1966. 266 pp., illus. Paper, F. 50.

Marcel Florkin's expensive little book *A Molecular Approach to Phylogeny* deals with some aspects of the comparative biochemistry of animals. The title notwithstanding, it does not deal with the contributions of comparative biochemistry to our knowledge of animal phylogeny. Most of the chapters are reviews of those areas in which Florkin and some of his Belgian colleagues have been working for more than two decades. Florkin's perspective is much the same as it was in his earlier book (*L'évolution biochimique*, Masson, 1944; augmented and translated as *Biochemical Evolution*, Academic Press, 1949). The topics include chitin breakdown, nitrogenous excretory products, insect hemolymph, and protein remnants in fossil shells. Also included in the book are brief discussions of the concepts of biochemical homology and analogy and of the amino acid sequences of proteins from different species. Surprisingly, for a book with a "molecular approach," there is no discussion of comparative work on DNA.

Aspects moléculaires de l'adaptation et de la phylogénie, although similar in approach, is superior because it covers twice as many topics, has better illustrations, and costs less. Research workers in the field of comparative biochemistry of animals are advised to read the French book.

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Correction: In R. E. Norris's review of *The Diatoms of the United States Exclusive of Alaska and Hawaii*, volume 1, by Ruth Patrick and Charles W. Reimer [**153**, 1369 (16 Sept. 1966)], the Introduction, which was signed only by Patrick, was erroneously attributed to Patrick and Reimer.