With McCamy's plea in "The need for thinkers," with his well-documented efforts to get at the facts about the experience and training of those normally available for career foreign service and State Department posts, even with the "myth" of untrained, noncareer diplomats, one may express sympathy and gratitude for his emphasis. Clear lines of authority are needed. But they are rarely achieved by exhortation, and they are difficult to work out without some machinery for priority in policies applied to interagency programs, which nothing in the present setup of the Bureau of the Budget provides, except by default through the overall method of agency ceilings.

The machinery of the National Security Council could effectively reintroduce the technique of the wartime "requirements committee" by using some experienced high-level advisers, who have time to think. Such advisers, at least the few at the top, should have had enough high-level experience not to meddle, but to give the President a reasoned prebudget review of what interagency programs, or those affecting the whole of national security and foreign policy, need in the way of timing, support, and attention, whether they should be stepped up or phased out.

McCamy is pointing to a need. His direction could use more precise indications of ways, means, and location. No doubt the Bureau of the Budget has a highly competent and informed staff available on assignment to act under such skilled policy direction. But the Bureau itself is not equipped to set the policies that it is to apply, despite the final report of the Jackson Subcommittee of the Senate Government Operations Committee.

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## Biochemistry

**Advances in Lipid Research**. vol. 1. Rodolfo Paoletti and David Kritchevsky, Eds. Academic Press, New York, 1963. xiv + 418 pp. Illus. $14.

The inauguration of still another series of *Advances* has its somber side. Another shelf is to be lined with volumes that will silently reproach those of us who, although we feel that we should, somehow cannot find the time to grapple with even these *condensations* of research areas, which are made so conveniently (tantalizingly?) available to us. Still, if we cannot stop the world of biochemistry, we must do our best to keep up with it, and the review article is currently our best hope. Until the computers begin to exercise more refined judgments and show deeper correlational potentials, we shall continue to rely heavily on adequately motivated flesh-and-blood reviewers for our orientations and briefings. Academic Press continues to be effective in motivating editors, who in turn continue to be effective in motivating authors, who in turn continue to be effective in motivating readers, including this one.

I found many of the articles in this first volume extremely useful and provocative. D. S. Robinson, for example, has written carefully and critically on clearing factor lipase. Instead of simply omitting mention of papers in which questionable results are reported, a tendency among some reviewers, Robinson considers such papers and makes an honest attempt to assess their significance in relation to the available evidence. I. B. Fritz has contributed a comprehensive and provocative review of studies on the role of carnitine in fatty acid metabolism, a field opened up by work in his laboratory. H. Danielsson has written a nicely balanced review that covers mechanisms of cholesterol conversion to bile acids and of sterol excretion per se, together with an extensive discussion of regulatory mechanisms.

Other chapters are "The structural investigation of natural fats" (M. H. Coleman); "Physical structure and behavior of lipids and lipid enzymes" (A. D. Bangham); "Recent developments in the mechanism of fat absorption" (J. M. Johnston); "Vitamin E and lipid metabolism" (R. B. Alfin-Slater and R. S. Morris); "Atherosclerosis—spontaneous and induced" (T. B. Clarkson); "Chromatographic investigations in fatty acid biosynthesis" (M. Pascaud); and "The plant sulfolipid" (A. A. Benson).

Of course, most readers who pick up the volume will expect to get an organized survey of a few selected topics from the mixed menu. From my own experience, I would guess that they will not be disappointed. Certainly those working more or less directly on some aspects of lipid research will welcome the availability of this new series. It is to be hoped, however, that the editors will not feel obligated to produce their volumes with a relentless frequency that might exhaust the supply of more capable reviewers and unnecessarily burden us well-intentioned keeper-uppers with the broad area of lipid research.

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## Survey and Sourcebook

**Primary Embryonic Induction**. Lauri Saxén and Sulo Toivonen. Logos Press, London; Prentice-Hall, Englewood Cliffs, N.J., 1963. xii + 271 pp. Illus. $8.75.

The current explosion of interest in developmental biology has caused many nonembryologists to confront and begin an almost hopeless excursion into the mountains of literature on embryonic induction in the Amphibia. It is fortunate, therefore, that a virtual panacea is now available in this penetrating analysis by Saxén and Toivonen.

The history of work on the primary induction phenomenon, wherein the axial mesoderm of amphibian embryos induces formation of adjacent central nervous system tissue, serves as an introduction to various experimental approaches used in studying the problem. The bulk of the volume is then devoted to a summary of what is known of inducing and responding tissues and of mediating factors in the interaction. The final part is an extensive theoretical section in which the major explanatory theories of the various European and Japanese schools are treated fairly and extensively while they are being compared to the authors' personal hypotheses.

The essential conclusions are that at least two chemical mediators are involved in induction of the brain-spinal cord system, and that complete characterization of the substances is still unfinished. The authors rightfully emphasize the difficulties encountered in interpreting experiments in which a substance is applied to a tissue on one day, the tissue is ignored for a week, and then a questionably accurate (histological) assay is employed in garnering results. Discussion of experiments on secondary (that is, organ) induction and cytodifferentiation in Amphibia and higher vertebrates allows one to see how the primary induction system may be separated into component parts in

future years. In this vein, one might wish that the authors had laid to rest the notion that there is something special or unique about primary induction, other than spatial and temporal complexity involving a series of secondary inductions.

The researcher, the lecturer, and the student will find this volume an invaluable sourcebook. Cross-checking of techniques, embryo stages, and similar details has enabled the authors to offer plausible explanations for apparent contradictions found in the literature. This, plus such complete coverage of the data available up to 1961, allows one to use the book to establish the place of individual research papers in the overall scheme of current knowledge.

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## Histone Chemistry and Biology

**The Nucleohistones**. James Bonner and Paul Ts'o, Eds. Holden-Day, San Francisco, Calif., 1964. xviii + 398 pp. Illus. $12.75.

There is good reason to believe that the histones, a class of basic proteins which occur in the nuclei of animal cells, are chemically combined with the DNA of the nucleus. Since the quantities of histone and DNA present are about the same order of magnitude, it is not surprising that, as the biochemical role of DNA has become understood, many investigators have begun to wonder what the histones might be doing to the biochemical properties of DNA. Impetus was given to the study of this problem by the suggestion, made nearly 15 years ago by Stedman and Stedman, that histones may act as regulators of gene activity, giving rise to differentiation of morphology and function in animal cells, all of which have the same complement of genetic material.

*The Nucleohistones* is a collection of papers presented at a meeting held in April 1963, to review all aspects of histone chemistry and biology. Many of the chemical papers deal with details of preparation and chromatographic fractionation. J. M. Neelin, in his discussion of preparation of histones from chicken erythrocytes, writes that "Either histones have presented chemists with an unprecedented array of precise and reproducible artifacts, or histones examined by current techniques exhibit an imposing heterogeneity." Under these circumstances, it is difficult to carry out physicochemical analysis of the histones either free or in combination with nucleic acids. Some attempts have been made by means of infrared spectroscopy and optical rotatory dispersion to determine the secondary structure of histones combined with DNA. Tentative models have also been proposed for a regularly ordered histone-nucleic acid structure, based upon x-ray diffraction studies.

The majority of papers are concerned with the biochemistry of the histones, and with their possible regulatory role. Although no conclusive demonstration of this role has yet been presented, a number of experiments discussed by Allfrey and Mirsky, and by Bonner and Huang, show that histones are capable of inhibiting DNA-primed synthesis of RNA, and, through it, synthesis of polypeptides in vitro. Furthermore, different histone fractions are not equally effective inhibitors, although there does not yet appear to be any simple correlation between the chemical properties of the fraction and its effect. A number of excellent and relevant papers are devoted to such diverse topics as the control mechanism of puffing in giant chromosomes, the effect of polyamines on DNA-dependent RNA synthesis, and the electrical properties of DNA in solution.

The questions raised by the presence of the histones have not been completely answered. It appears likely that histones exhibit some regulatory role; but their mechanism and scope of action are not understood, nor is it at all clear that they are the sole regulatory substance. Histones are held to the DNA helix by strong electrostatic interactions, but the overall strength of the interactions does not appear to be determined solely by the charge on the protein, depending apparently on details of amino acid sequence and local configuration which remain to be elucidated. The contributors to this book are aware of these problems. It is probable that the most revealing experiments will be carried out during the next few years; this book is a useful record of the discussion of an important scientific problem at a crucial moment in its development.

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## Astronomy

**Star Evolution**. Course 28, International School of Physics, "Enrico Fermi," 1962. L. Gratton, Ed. Academic Press, New York, 1964. x + 488 pp. Illus. $18.50.

This volume contains the text of lectures given at a summer course in Varenna, Italy, in 1962. The level is suitable for research workers and advanced graduate students in astronomy. Seventeen papers cover various subjects relating to the evolution of stars, ranging widely both in stellar types considered and in theoretical techniques employed. About a third of the papers relate to specialized pieces of research, but the remaining majority attempt to survey parts of the area from some general point of view. The editor, who also directed the course, succeeded in assembling an outstanding group of lecturers, many of whom had made major contributions in the areas that they cover.

Among the papers are several of particular interest. A. R. Sandage and L. Gratton survey the empirical approach to evolution, including a thorough discussion of the use of homology arguments. G. Burbidge covers nuclear astrophysics quite thoroughly in a paper reprinted from *Annual Review of Nuclear Science*, (1962). E. Schatzman discusses the pre-main-sequence stages in great theoretical detail, culminating in a presentation of his theory of the origin of stellar rotations and magnetic fields. R. Kippenhahn surveys progress on post-main-sequence models with inhomogeneous composition, including some excellent visual presentations of this complex material. N. Baker summarizes recent work on pulsating models for cepheids, and P. Ledoux discusses the general theory of stability. Other general papers cover stellar-model calculation (M. Wrubel), very young groups (L. Gratton), nebular variables (L. Rosino), evolution of galaxies (E. M. Burbidge), stellar hydromagnetics (I. W. Roxburgh), and close binaries (M. Hack).

The papers are for the most part quite clearly written, although it is unfortunate that the manuscript was not subjected to a final editing by someone whose native language is English. The price of the volume is regrettably high.

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