of ovulation. Although it is possible to demonstrate that ovulation has occurred and the approximate time of its occurrence, one has to conclude from Hartman's comprehensive review that it is impossible to pinpoint the exact time.

The author has reviewed more than 2000 articles concerned with mammalian reproduction, and he discusses the pertinent information. He has also selected informative illustrations to clarify his discussions—numerous charts help correlate the various ovulation criteria so that their clinical application will be more useful.

This book will find an important place in the library of every student of mammalian reproductive physiology.

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Image of a Scientist

The Scientific Life. Theodore Berland. Coward-McCann, New York, 1962. viii + 308 pp. $5.75.

This book describes the lives and times of nine active scientists in the United States. Written for the general public, the book is based on a week's observation of and conversations with each man, much of which was tape recorded and is quoted at length. The intent is to present an accurate picture of what scientists are like, what they do with their time, and why they do it, in the hope that their fellow citizens will have a better understanding and appreciation of them, and that more young people will be attracted to the life.

The author has succeeded very well in giving a picture of the intensity of the good scientist's involvement with his work and the singlemindedness with which he pursues it. He may, indeed, have succeeded almost too well for his second purpose, that of attracting students to science. The reader may find himself exhausted by the indicated intensity of scientific devotion.

While more on the early histories of these men would be not only of considerable interest but also useful in discussions of education, there is enough to show how they got started, and certainly there is much evidence that, once started on a research career, no other activity could give these men as much satisfaction.

Emphasis on the individuality of the creative process is always a helpful reminder in these times of team research. Even more important is the description of the teaching function and of the importance of the apprenticeship role for the student scientist. But apprenticeship roles can only be arranged when the ratio of students to teachers is not too large. There is no suggestion of how this can be managed with the increase in the numbers of students to be expected without apparently a correspondingly rapid increase in the number of teachers. This is admittedly beyond the scope of Berland's book, but it is highlighted by the importance these men place on the close association of teacher and student.

It is not appropriate for a reviewer to comment on the opinions expressed by the individual scientists represented, but it is appropriate to discuss the author's selection of scientists as representative of the group. Berland defends his selection with some persuasiveness. My complaint is that it does reflect the narrow public image of what science is when he might have helped to broaden this by a different selection. I refer to the balance of fields rather than to the individual scientists. The individuals had to be selected in part for their willingness to be interviewed and quoted so extensively. The author characterizes them as ". . . in one generation range [age 33–56], actively at work, still creative, and steeped not only in the affairs of their careers, but of our world. Each is a man of accomplishment, well known in the scientific community, and holds promise of accomplishing still more. By training, four are physicists [Willard Libby, Murray Gell-Mann, Charles Townes, and James Van Allen], three are physicians [Albert Sabin, Chester Southam, and Jeremiah Stamler], one is a physical chemist [Dean Wooldridge, now an engineer-executive], and one is a social scientist [Philip Hauser]. By practice, one was the head of a large corporation, two have had high government offices, three are part-time university administrators."

His selection, then, comprises five physical scientists, three physicians whom he classes as biologists but none of whom is a biologist, strictly speaking, and one social scientist who is a demographer. Physics and medical research are probably what most people think of as science, and it seems a pity that Berland did not make some effort to broaden that concept. He says rather disingenuously that his subjects had to be doing something that could be explained effectively, but surely there are scientists in such fields as genetics, evolutionary biology, and psychology, to mention only a few, whose work can be as easily explained as research in nuclear particles or the role of viruses in cancer.

Errors, typographical and otherwise, seem very minor, but certainly Otto Klineberg would be startled to see himself as Kleinberg.

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Compton Lectures

Biological Order. André Lwoff. Massachusetts Institute of Technology Press, Cambridge, 1962. x + 101 pp. Illus. $4.50.

André Lwoff addressed the Compton Lectures that he delivered at Massachusetts Institute of Technology in 1960 to "the young physicists and chemists, with a very specific goal, namely to interest them in biological problems." This meaty little book, which contains those lectures, gives every indication that he attained his goal, for it is engagingly written, although here and there the author lapses into a telegraphic style in perhaps some of the more difficult passages. Nevertheless, while assuming that his audience knew nothing about biology, Lwoff apparently also presupposed a high degree of sophistication in certain domains coupled with an equal degree of intellectual curiosity among his listeners.

In six chapters and a brief conclusion, he discusses life (unpretentiously defined "either as a *property*, or as a *manifestation*, or as a *state* of organisms"), the organism and the cell, and "the problem of Biological order posed in its generality." To encompass the task in so brief a volume (or time) obviously imposed a high order of selection. His discussion of hereditary order as the nature, structure, reproduction, and variation of the genetic material reflects his own richly productive contributions as a practising researcher, as do the succeeding chapters. Under the heading "Functional order," he considers the control of enzyme synthesis and heredity-environment interactions; then in "Viral function" that topic is considered as an example of specific order-disorder.

Molecular biology is the theme presented to stimulate the appetites of the intended audience of this little opus, though one wonders how young physicists oriented to the nuclear age may respond to a statement that refers to the cell as the "critical living mass." In spite of an occasional phrase following an equation, such as "$AH_2 + 1/2\ O_2$ $A + H_2O$. This is respiration," Lwoff manages to avoid leaving the "all else is stamp-collecting" impression usually ascribed to the New Biologist. In his next-to-last chapter, "Biological order and entropy," the author considers both static and dynamic aspects of the biological machine at the molecular level, and stresses the fact that, for the biologist, "information" may have different significance from the usual mechanical connotations; when the organism burns fuel, it is not merely sucking orderliness from the environment, it is producing work at the expense of the energy of the chemical bonds. "If fed with pellets of negative entropy . . . even a physicist would succumb." The concluding chapter deals, in summary form, with the material that preceded it, the interdependence of the macromolecules and macromolecular groups, and the reader is further admonished that, as such, "living substance or living matter does not exist. . . . Separated from its context . . . any structure, either a nucleic acid or a protein is just an organic molecule." Although this consideration of biological order, a fascinating presentation of a fascinating subject, is directed to the young physicist and chemist, the biologist would also do well to heed Lwoff's rejoinder that "Life can only be the appanage of the organism as a whole."

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Notes

Glossary of Drugs

The **International Dictionary of Drugs Used in Neurology and Psychiatry** (Thomas, Springfield, Ill., 1962. 168 pp. $7.50), compiled by Charles M. Poser and V. Osbourn, is a list of approximately 375 drugs that are used in psychiatry, neurology, and clinical treatment. The drugs cover 28 classes of actions, ranging from drugs used in the treatment of alcoholism, analgesics, and curare antagonists, to sedatives, thymoleptics, and tranquilizers. The generic names proposed or recommended by the World Health Organization as well as the chemical names, trade names, and other synonyms that have been used are given in the main alphabetical list. The country in which the name is used is also indicated. For example, a full page of synonyms is given for acetylsalicylic acid, with the country in which the synonyms are used listed for about half the names. There are also alphabetical lists, with references to the generic name, for trade names and other synonyms (3500), chemical names, and experimental numbers. The concluding list is of the experimental numbers and names of chemicals that have not yet been given generic names.

The authors were somewhat arbitrary in their choice of the drugs listed. For example, although many anesthetic and analgesic agents are listed, acetanilide, cincophen, neocincophen, ether, paraldehyde, and chloroform are not listed. Another example is the inclusion of approximately 12 atropine-like compounds that are used in the treatment of Parkinson's disease, whereas at least 19 other compounds that have similar chemical structures are not included.

Despite these deficiencies, the book furnishes a great number of names in these specialized fields, and, in addition, a bibliography of 31 sources.

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Mathematics

Integrals of Bessel Functions by Yudell L. Luke (McGraw-Hill, New York, 1962. 434 pp. $12.50) is a compendium of material related to Bessel functions and it is also a very timely companion to the Bateman manuscript project (two volumes of integral transforms and three volumes on higher transcendental functions).

The chapter headings are as follows: "Basic formulas including requisite materials on hypergeometric and Bessel functions," "Indefinite integrals involving products of powers of t and Bessel functions," "Representations of the preceding integrals in terms of Lommel functions," "Indefinite integrals of products of exp $(-t)$, t^a, and $K_\nu(t)$ and associated representations," "Reduction formulas for indefinite integrals of products of exp $(-tp)$, t^a, and W_ν (λt)," "Airy functions," "Incomplete gamma function and related functions," "Repeated integrals of Bessel functions," "Integrals involving Struve functions," "Schwarz functions and generalizations," "Integrals involving products of Bessel functions and Struve functions," "Miscellaneous indefinite integrals involving Bessel functions," "Definite integrals," and "Tables of Bessel functions and integrals of Bessel functions." Emphasis is on tables of indefinite integrals. There is an extensive bibliography related to both theoretical source materials and detailed references for numerical tables of Bessel and related functions.

The book, like the Bateman volumes, is clearly printed by a photo-offset process; thus, errors in printing are minimized. As a reference text this book should prove exceedingly useful to applied mathematicians, scientists, and technologists who require ready access to extensive relations involving integrals of Bessel and related functions.

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New Books

Mathematics, Physical Sciences, and Engineering

Rudiments of Algebraic Geometry. W. E. Jenner. Oxford Univ. Press, New York, 1963. 116 pp. Illus. Paper, $2.95.

Six-Language Dictionary of Electronics, Automation, and Scientific Instruments. A comprehensive dictionary in English, French, German, Italian, Spanish, and Russian. Compiled by A. F. Dorian. Iliffe Books, London, 1962; Prentice-Hall, Englewood Cliffs, N.J., 1963. 732 pp. $16.95.

Spectroscopy. vol. 1, *Atomic, Microwave, and Radio-frequency Spectroscopy* (© 1962. 287 pp. $9); vol. 2, *Ultra-violet, Visible, Infra-red, and Raman Spectroscopy* © 1961. 412 pp. $12). S. Walker and H. Straw. Macmillan, New York, 1963. Illus.

Tables of Normalized Associated Legendre Polynomials. S. L. Belousov. Translated from the Russian edition (Moscow, 1956) by D. E. Brown. Pergamon, London; Macmillan, New York, 1962. 383 pp. Illus. $20.

Topics in Engineering Logic. Morton Nadler. Pergamon, London; Macmillan, New York, 1962. 247 pp. Illus. $9.50.

Transistors. Dennis Le Croissette. Prentice-Hall, Englewood Cliffs, N.J., 1963. 288 pp. Illus. Trade ed., $9; text ed., $6.75.

Ultrasonic Technology. Richard Goldman. Reinhold, New York; Chapman and Hall, London, 1962. 318 pp. Illus. $11.

University Calculus. Howard E. Taylor and Thomas L. Wade. Wiley, New York, 1962. 787 pp. Illus. $9.95.