higher energies (up to 590 Mev) in lecture 3. The structure of light nuclei, in terms of the shell model, occupies lectures 4 and 5, and that of heavy nuclei, in terms of rotational states, is treated in 6. Lecture 7 is devoted to the statistical theory of nuclear reactions, and 8, to the optical model of (high-energy neutron) nuclear reactions and to deuteron reactions. Lecture 9, entitled "π-Mesons," deals largely with invariance principles, and 10 concludes the series with a discussion of pion-nucleon interactions and multiple meson production.

There is no index or bibliography, and references to the literature are rare. The format is agreeably uncrowded; the translation is clear and, although not entirely free of errors, is generally of good quality. It is unfortunate that this survey, which is of great value not primarily to the specialists but rather to graduate students, is priced prohibitively ($15 for 77 text pages) beyond their reach.

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Physico-Chemical Effects of Pressure. S. D. Hamann. Academic Press, New York; Butterworth, London, 1957. ix + 246 pp. Illus. $8.50.

The author states in the preface: "There are a number of books and reviews dealing with the physics of high pressures and there are several concerned with the practical use of pressure in the chemical industry, but it seems there has been no serious attempt to bridge the gap between physics and applied chemistry. The present book is intended to remedy this situation by presenting a survey of the effects of pressure in the field of physical chemistry." The author is well qualified by his experience to make this attempt, and it seems to me that he has been eminently successful.

There is and can be no sharp dividing line between physics and physical chemistry. Some of the topics treated here—for example, viscosity and optical absorption—have a strong physical component and are included here because certain of their aspects have, by tradition, been treated by physical chemists; this, in turn, is explained by the participation of these phenomena in topics of primary chemical interest. For example, viscosity is an important factor in determining the rate of many chemical reactions, and optical absorption can be used as a tool in determining the degree of progress of a reaction. The only topics not treated in this book to which a physicist might lay exclusive claim are electrical phenomena in metals—resistance and thermoelectricity and also various magnetic effects.

It appears that the primary and ultimate interest of the physical chemist is in reactions, and the discussion is, throughout, slanted in this direction. This discussion strikes me as most illuminating—the author has succeeded in directing attention to the underlying mechanisms in such a way as to give real understanding of many of the complicated effects of pressure on chemical equilibrium and kinetics and to give an insight into the most promising field for future exploration.

On one minor point I permit myself to disagree with the author. On page 62 he states that "first order transitions greatly outnumber second order transitions." It is my opinion that this is only apparently the case, and that when experimental accuracy has been sufficiently improved, second and higher order transitions will be found to greatly preponderate.

There is an impressive bibliography of 582 items. A hasty scanning of this bibliography leaves the impression that industry in England has been much more active in the investigation of high-pressure chemistry than industry in this country. This impression is by no means correct but is the result of a less liberal policy of publication in the United States. "Secrecy" was not invented in this country to protect our priority with the atomic bomb; the impulse to seek protection through secrecy is much older. It appears that this is, in a certain sense, a national trait.

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Infrared Absorption Spectra of Steroids. An atlas. vol. II. Glyn Roberts, Beatrice S. Gallagher, R. Norman Jones. Interscience, New York, 1958. viii + 95 pp. + charts No. 309 to 760. $20.

This volume from the National Research Council of Canada in Ottawa and the Sloan-Kettering Institute for Cancer Research in New York contains charts showing the infrared absorption spectra of 362 steroids, recorded on the same format as those reproduced in volume I [see *Science* **120**, 339 (1954)], and supplementary curves for 90 steroids described in volume I. The compounds examined include steroids needed to complete series of related isomers, new steroids of special clinical and biochemical importance, and a useful collection of D-homosteroids. With the exception of potassium bromide disc spectra for 50 less-soluble specimens, all the spectra are for solutions. The quality and standard of reproduction of the spectra are of the same high order as in volume I, but unfortunately no physical data that might indicate the purity of the samples examined are given.

The charts are preceded by a valuable introduction containing a section on the analysis and interpretation of steroid spectra, a set of 17 tables listing characteristic group frequencies for steroids, and a comprehensive bibliography. The tables are the most complete yet published and will be welcomed by all laboratories concerned with the isolation, synthesis, and structural identification of steroids and related substances.

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The Growth of Logical Thinking from Childhood to Adolescence. An essay on the construction of formal operational structures. Bärbel Inhelder and Jean Piaget. Translated by Anne Parsons and Stanley Milgram. Basic Books, New York, 1958. xxiv + 356 pp. $6.75.

Every parent who has attempted to fix the mind of a young child attentively upon an intellectual problem for more than ten seconds will read of the accomplishments of Bärbel Inhelder with mixed admiration and disbelief. Perhaps Swiss children are different, but it is more likely that Inhelder has a rare and sensitive skill for finding problems, devising situations, and asking questions that permit her young friends to show to best advantage. How else could she explore with children (ages 5 to 15) such problems as angles of incidence and reflection, density and specific gravity, flexibility of rods, the pendulum, falling bodies on inclined planes, effects of hidden magnets, chemical reactions, conservation of motion, hydraulic equilibria, the law of the balance, projection of shadows, centrifugal force, probability, and statistical correlation?

Inhelder's collaborator in this remarkable book is none other than Jean Piaget, the most imaginative and prolific child psychologist alive today. Piaget assumes the task of isolating and analyzing the formal or propositional structures underlying the children's attempts at understanding. Consequently, there are 15 chapters which conform to the same pattern: first, Inhelder's data; second, Piaget's analysis. The book ends with 100 pages on the structural integration of formal thought, where Piaget has a chance to develop his ideas more systematically.

The focus is on changes in the structure of thought processes which seem to occur at the age of 11 to 12 years. Much has been written about emotional adjustments necessary at this age, but cognitive changes have received far less attention. The authors argue that at this age a child becomes capable of certain *formal* or abstract operations of thought which before were possible only as *concrete* operations on properties of the immediately present object world. This provides the last of three mental revolutions during development: the first occurs at two years when sensorimotor schemata are supplemented by symbols for representing the environment; the second, at 7 to 8 years, when it becomes possible for the child to foresee the results of concrete operations. Thus the present book takes its place in the larger design of Piaget's description of mental development.

The reader can be grateful to Anne Parsons and Stanley Milgram for an excellent translation and for a brief, helpful introduction to Piaget's psychology.

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New Books

Earth's Shifting Crust. A key to some basic problems of earth science. Charles H. Hapgood. Pantheon Books, New York, 1958. 438 pp. $6.50.

A List of Zoological and Botanical Types Preserved in Collections in Southern and East Africa. vol. I, pt. 1, *Zoology.* South African Council for Scientific and Industrial Research, Pretoria, South Africa, 1958. 147 pp. Paper, 7s. 6d.

Physics and Philosophy. The revolution in modern science. Werner Heisenberg. Harper, New York, 1958. 221 pp. $4.

Anatomist at Large. An autobiography and selected essays. George W. Corner. Basic Books, New York, 1958. 220 pp. $4.

Human Infertility. C. Lee Buxton and Anna L. Southam. Harper, New York, 1958. 239 pp. $7.50.

Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death. Based on the recommendations of the seventh revision conference, 1955, and adopted by the ninth WHO Assembly under the WHO nomenclature regulations. vol. 1. World Health Organization, Geneva, 1957 (order from Columbia Univ. Press, New York). 444 pp. $6.75 (price includes vol. 2, in press).

The UFAW Handbook on the Care and Management of Laboratory Animals. Alastair N. Worden and W. Lane-Petters. Universities Federation for Animal Welfare, London, ed. 2, 1957. 951 pp. 70s.

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The Theory of Functions of a Real Variable and the Theory of Fourier's Series. vols. I and II. E. W. Hobson. Dover, New York, 1958 (republication of vol. 1, ed. 3, 1927 and vol. 2, ed. 2, 1926). 736 pp.; 780 pp. $3 per volume.

Thermodynamics. Enrico Fermi. Dover, New York, 1958 (republication of ed. 1, 1937). 160 pp. $1.75.

Foundations of Physics. Robert Bruce Lindsay and Henry Margenau. Dover, New York, 1958 (republication of ed. 1, 1936). 542 pp. $2.45.

Elements of Mathematical Biology. Alfred J. Lotka. Dover, New York, 1958 (formerly published as *Elements of Physical Biology*). 465 pp. $2.45.

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(Inquiries concerning these publications should be addressed, not to Science, *but to the publisher or agency sponsoring the publication.)*

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