of product functions of given symmetry from elementary functions of fixed symmetry." Well, now his prayers have been answered. John S. Griffith has admirably outlined the theory of coupling and recoupling coefficients for groups of finite symmetry and tabulated their values in his handsomely bound book on "The Irreducible Tensor Method for Molecular Symmetry Groups."

During the past few years a number of books have appeared on the market dealing with irreducible tensorial methods in quantum mechanics from one viewpoint or another.[1-3] These have been a welcome addition to the literature as they have given substance to the older matrix manipulation treatments of tensorial operators.[4,5] However, all these books have dealt with systems of spherical symmetry solely, and thus the adoption by molecular quantum mechanicians of the elegant mathematical techniques advocated by these texts has been delayed. Griffith's book should remove this delay with its excellent transcription and exposition of the method of irreducible tensorial sets for nonspherical geometries. It is to be cautioned though that his book is definitely not for beginners: it is addressed to the advanced worker in the field of quantum chemical physics and should be read in conjunction with his fine book on the theory of transition metal ions[6] for greatest gain.

It is a pity that Griffith did not expand his brief treatment of the irreducible tensor method for molecular symmetry groups. Because of its brevity, the book is extremely difficult to follow in a number of places. A more detailed and extensive list of applications is also sorely missed. On the brighter side of things, there are given a number of delightfully elegant derivations of familiar quantities which should please most readers (*e.g.*, the derivation of the spin Hamiltonian for paramagnetic systems) and the organization of the book is wondrous. (The publishers are to be warmly congratulated for the attractive appearance of the book. Their forethought as to its paginal pattern makes the book easy on the eye and a ready reference text. The book's price is a little steep, though.) All in all, J. S. Griffith's book is well worth buying and reading.

(1) M. E. Rose, "Multipole Fields," John Wiley & Sons, Inc., New York, N. Y., 1955; "Elementary Theory of Angular Momentum," John Wiley & Sons, Inc., New York, N. Y., 1957.

(2) A. R. Edmonds, "Angular Momentum in Quantum Mechanics," Princeton University Press, Princeton, N. J., 1957.

(3) U. Fano and G. Racah, "Irreducible Tensorial Sets," Academic Press, Inc., New York, N. Y., 1959.

(4) E. U. Condon and G. H. Shortley, "The Theory of Atomic Spectra," Cambridge University Press, Cambridge, Eng., 1953.

(5) E. Feenberg and G. E. Pake, "Notes on the Quantum Theory of Angular Momentum," Addison-Wesley, Cambridge, Mass., 1953.

(6) J. S. Griffith, "The Theory of Transition-Metal Ions," Cambridge University Press, Cambridge, Eng., 1961.

THEORETICAL CHEMISTRY
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Experimental Cryophysics. Edited by F. E. HOARE, Reader in Physics, University of Leeds; L. C. JACKSON, Professor of Physics, Royal Military College, Kingston, Ontario, Canada; and N. KURTI, Reader in Physics, University of Oxford, Senior Research Fellow, Brasenose College, Oxford. Butterworth Inc., 7235 Wisconsin Avenue, Washington 14, D. C. 1961. xv + 388 pp. 16 × 25 cm. Price, $14.00.

In three hundred and seventy-four pages this coöperative treatise contains an excellent summary of low temperature techniques including the liquefaction of air, hydrogen and helium. It is therefore, natural that there should have been some omissions. Notable among these is the absence of *any* discussion of the theory of the liquid air fractionating column although there is a brief description of fractionating columns for liquid air including the Linde double column (without discussions of tray design or packing materials).

There is no special section on cryostats which this reviewer thinks regrettable, although several types of cryostats are discussed in the different chapters.

The ten chapters along with their authors are listed below: (1) Low Temperature Laboratories and (2) The Mathematics of Gas Liquefaction and Liquefier Design, both by F. E. Hoare; (3) Liquid Air Production and (4) The Production of Liquid Hydrogen and Helium, both by D. H. Parkinson; (5) Ancillary Equipment for the Production of Liquid Hydrogen and Liquid Helium (the dictionary reveals that the leading adjective means subordinate, subservient, auxilliary) and (6) Materials and Methods for the Construction of Low Temperature Apparatus, A. J. Croft; (7) Storage and Transfer of Liquefied Gases by the late A. Wexler; (8) Magnetic Cooling by E. Mendoza; (9) Low Temperature Thermometry by R. P. Hudson; (10) Cryogenic Techniques and Miscellaneous Applications by E. R. Dobbs, L. W. Alvarez, R. W. Hill T. H. Blewitt, R. R. Coltman, Darrell W. Osborne, L. C. Jackson, D. M. S. Bagguley, J. Given, L. Couture, K. V. Osborne, R. Berman, E. R. Dobbs, H. M. Rosenberg.

There are twenty-five appendices including data on thermal conductivities, densities, viscosities, enthalpies and entropies of oxygen, nitrogen, hydrogen and helium as well as a table of Debye heat capacities and energies and some heat capacities of selected elements. That the appendix includes the 1958 Helium (vapor pressure) Temperature Scale (seven pages) will recommend the book to many. In addition there are vapor pressure-temperature tables for helium 3 (^{3}He), hydrogen (normal and equilibrium, liquid and solid), nitrogen and oxygen.

The chapters by F. E. Hoare (liquefier design), the late A. Wexler (storage and transfer), R. P. Hudson (thermometry) and E. Mendoza (magnetic cooling) are outstanding. There is an interesting section on the use of ^{3}He (Darrell W. Osborne) and useful information on construction and silvering of dewars and on vacuum tight seals, etc., by Croft, who wrong lyimplies that the Schriver electrolytic cells for hydrogen require a low voltage. These cells are of the filter press type in series so that they operate on 120 volts.

The editors of this volume are to be congratulated on the results of their efforts to produce an integrated and modern treatise.

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Mechanism of Action of Steroid Hormones. Proceedings of the Conference held at Endicott House, Dedham, Massachusetts. Edited by CLAUDE A. VILLEE and LEWIS L. ENGEL, Harvard Medical School, Boston, Massachusetts. Pergamon Press Ltd., Headington Hill Hall, Oxford, England. 1961. xi + 263 pp. 16 × 23.5 cm. Price, $10.00.

Presently, there is a great deal of interest among biologists and biochemists in the problem of the regulation and integration of biochemical processes. Originally, ideas about biological regulation came from physiological studies on higher organisms which indicated the necessity for the maintenance of a constant internal environment. More recently, the behavior of microörganisms has provided relatively simpler systems for the study of the molecular basis of such regulatory phenomena. At the present time, however, even in bacteria, the mechanism of the most basic of such processes, enzyme induction, is barely understood.

The steroid hormones are a diverse group of molecules that influence a number of biological processes in higher organisms. It is, therefore, not surprising that the molecular bases for their actions are at the moment almost totally mysterious.

The readers of the volume reviewed herewith will therefore find only how a number of experienced investigators are attempting to deal with the problem, rather than, as suggested by the title, a final answer.

The two introductory chapters, the first by Engel and the second by Villee, discuss some general problems involved in studying hormone action. Each author indicated that steroids may be thought of as interacting with protein molecules, or as altering the physical state of cell membranes or intercellular boundaries or in a combination of such ways. Villee also adds the possiblity that steroids act by regulating rates of protein synthesis.

In the article by Topper on the effects of progesterone on the enzymic oxidation of galactose, there are several very interesting points. For example, it is shown that the *inhibition* of a particular enzyme (an aldehyde dehydrogenase) results in *stimulation* of another metabolic process, galactose oxidation, because a product of the former reaction inhibits the latter. Studies on the aldehyde dehydrogenase itself indicate that certain hormones stimulate the enzyme while others inhibit its action which illustrates a kind of specificity not previously demonstrated in *in vitro* systems.

The article by Csapo on *in vivo* and *in vitro* effects of estrogen and progesterone on the myometrium clearly illustrates the difficulties in trying to explain physiological phenomena in terms of the effects of hormones on isolated enzymes. In his presentation, the author compares the actions of steroids on uterine contractility when the hormones are applied locally and when they are injected into the animals prior to removal of the organ. That there are significant differences depending on how the hormones are administered indicates very well how the final total action of a hormone must, in fact, reflect its distribution and metabolism as well as its specific local effect.

The paper by Dorfman on androgen action reviews a number of cases where steroid hormones have acted as enzyme inducers and the author proposes that hormones may operate at the level of enzyme induction or repression. These generalizations are documented in the report by Fishman, who discusses the increase in renal β-glucuronidase concentration after administration of testosterone to animals.