Stevenson—MULTIPLI TF STRU C TURE of ATOMS and MOLECULES

By RICHARD STEVENSON, McGill University, Montreal

NEW! This first book in the new Saunders series, Studies in Physics and Chemistry, gives concrete aid to the experimental physicist, theoretical chemist, and electronics engineer in understanding calculation of various properties of atoms and molecules.

Theoretical techniques are expressed in their most concise forms—concentrating on calculations allowing quick understanding of the subject, particularly in group theory. The author outlines the use of symmetry considerations to obtain maximum information about multiplet structure.

The calculation of parameters is figured in terms of the radial part of the wave function. Projection operator techniques are heavily drawn upon with considerable attention to use of tensor operator methods. Previously unpublished tables and substantial new material on Ligand field theory are included in this work. Worked-out examples are placed throughout the text.

190 pages • illustrated • $5.75 • New! October, 1965

Smart—EFFECTIVE FIELD THEORIES of MAGNETISM

By J. SAMUEL SMART, IBM Watson Research Center

NEW! This monograph offers a closer and more searching look into magnetically ordered phenomena than is afforded in the usual solid state physics text. The discussions are at a level ready comprehensible to the reader with grounding in elementary quantum theory. Coverage ranges from introductory material on the simple paramagnet to such specific subjects as the application of the Néel theory to ferrites and garnets.

The author builds his discussions around insulating magnetic materials, rather than metals and alloys. He uses the Heisenberg model of magnetic interactions in solids to develop the descriptions of the several “effective field theories” referred to in the title. These theories have simple physical interpretations and can be used successfully to calculate the properties of real magnetic materials. Physicists, metallurgists, electrical engineers, and graduate students in the physical sciences will find real value in this book.

188 pages • illustrated • About $5.50 • Ready January, 1966

SAUNDERS PHYSICS BOOKS

Chisholm & Morris—MATHEMATICAl METHODS in PHYSICS

By J. S. R. CHISHOLM, Trinity College, Ireland, and ROSA M. MORRIS, University College, Cardiff, Wales

NEW! This extraordinary text thoroughly describes the techniques used in applying “pure” mathematics to physical problems—techniques that must be mastered by the student of engineering or physics. Wherever possible, the authors have linked abstract mathematical statements with allied physical, or possibly geometrical conditions they simulate. For example, the discussion of vectors is amplified by material on force and velocity vectors—differential coefficients are associated with rates of change—integrals are associated with areas.

Extended treatment is given to matrices, statistics, and probability. A number of exercises accompany each chapter, providing the student with the practice essential for mastery of the mathematical technique under discussion. Answers for all problems are provided at the end of the book, giving the student an accurate check of his progress.

720 pages • illustrated • $10.00 • New! April, 1965

W. B. SAUNDERS COMPANY/West Washington Square, Philadelphia, Pa., 19105

Please send and bill me:

☐ Stevenson—MULTIPLI TF STRU C TURE OF ATOMS & MOLECULES ................................................................. $5.75
☐ Smart—EFFECTIVE FIELD THEORIES OF MAGNETISM .................................................................................... About $5.50
☐ Chisholm & Morris—MATHEMATICAl METHODS in PHYSICS .......................................................... $10.00
☐ Roberts & Kaufman—TABLE of LaPLACE TRANSFORMS ........................................................................ $7.75
☐ Teaching Position ................................................................................................................................. (Discount accorded full-time teachers listing affiliation)

Name ________________________________________
Address _______________________________________
City __________________________________________
State __________________ Zip ________________

SC 11-17-65
We've already run your new B-20 high speed refrigerated centrifuge harder than you ever will.

Hope you don't mind.

It's for your own good.

This way we know your B-20 will do everything we say it will and in addition, give you a built-in reserve that means low maintenance and long service.

At $2950 the B-20 is an incomparable bargain.

It offers you up to 46,300 g, a new Turbo Cover* that generates a whirling vortex of air pressure which stabilizes the head; and provides uniform temperature control; a new, belt-type flexible drive system; 4 x 250 ml capacity in a swinging bucket head; 1½ liters at 28,850 g in an angle head; a smooth-walled stainless steel chamber; remarkably low noise level; and programmed, one-knob automation that means more cycles per day.

The B-20 represents the most advanced state of the art in high speed refrigerated centrifuges. It is the product of IEC's Quality Assurance Program and ultracentrifuge research designed to bring you new capabilities in centrifugation.

Now that we've brought it to your attention, why not ask for complete data? Write:

INTERNATIONAL IEC EQUIPMENT CO.
300 Second Avenue • Needham Heights, Mass. 02194
This looks like most other electrodes you've seen

It isn't!

It's a Specific Ion Electrode. It's fast, precise. It's one of two for sodium ion or monovalent cation measurements. And without elaborate sample preparation. For precision readings it's ideally matched with the Beckman Expandomatic® or the Beckman Research pH Meters. It's just one of 121 different pH and Specific Ion Electrodes you can order right from stock. Call your local Beckman Sales Engineer or write for Data File LpH-365.

Beckman® INSTRUMENTS, INC.
SCIENTIFIC AND PROCESS INSTRUMENTS DIVISION
FULLERTON, CALIFORNIA - 92634

...My experience as a librarian has been that engineers in particular will photocopy anything and everything without much regard for copyright or other restrictions. I worked in an industrial library, measuring 25 by 25 feet, we averaged over 3000 pages of reproduction each month serving a fairly small staff.

...I have doubts about the value of Lodwick's proposal that a "code of ethics" be established regarding photocopying. Although the rules and laws governing reproduction leave much to be desired in helping the librarian decide what should be copied and when, in my experience no restrictions could be applied intelligently, because alternative methods could be, and were, found to circumvent them.

ROBERT G. CESHIER
Chicago Medical School,
711 South Wolcott Avenue,
Chicago, Illinois

Half-Truth and Consequences

In his editorial "The profits and risks of simplification" (22 Oct., p. 439), Henry Eyring remarks that "one of the greatest hindrances to scientific discovery is the necessary preliminary uprooting of the hallowed simplifications that everyone knows but that just happen to be untrue." It is likely that many oversimplifications that deter scientific progress linger on in lectures and texts. A young graduate is in no position to choose what precepts to question, and it would be most unwise for him to doubt them all. The capability for competent criticism should lie in the older and presumably wiser members of the scientific community.

I propose a permanent committee under the auspices of the AAAS which
The shots you goof.
The best reason for 10-second photography.

Everybody makes mistakes. But when you're using Polaroid Land photography you don't suffer for them.

Say you're shooting a photomicrograph and the exposure is off. Or the filtration. Or the position of the slide. You'll know it 10 seconds after you snap the shutter—when you see your Polaroid print. You can then make your correction and take a perfect picture right away. While everything is still set up.

This nice advantage comes with all Polaroid Land films. And there are quite a few to choose from. There are black-and-white emulsions rated at A.S.A. 3000, 400, and 200. They're the ones that develop in 10 seconds. There's also a black-and-white film that gives you a positive and a true film negative outside the darkroom in 20 seconds. And, of course, there's Polacolor film which gives you a full-color recording in 60 seconds.

Sorry we can't make you infallible. We can only offer you the next best thing.

Why buy a new Esterline Angus Servo Recorder instead of brand A, B, C or D?

for 12 good reasons*

<table>
<thead>
<tr>
<th>X's indicate standard features at no extra cost</th>
<th>Esterline Angus</th>
<th>Brands (names available on request)</th>
</tr>
</thead>
<tbody>
<tr>
<td>List price, $975 or lower</td>
<td>X</td>
<td>A</td>
</tr>
<tr>
<td>Solid state amplifier</td>
<td>X</td>
<td>B</td>
</tr>
<tr>
<td>50,000 ohm off balance input impedance or better</td>
<td>X</td>
<td>C</td>
</tr>
<tr>
<td>Response as fast as ½ second even at a 1 MV range</td>
<td>X</td>
<td>D</td>
</tr>
<tr>
<td>Accuracy ± ¼% span or ± 3½ microvolts</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Dead band 0.1% of span or less</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Stray rejection: longitudinal 60 cycle AC, 1,000 times span or 120 volts</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Permanently sealed slidewire requires no cleaning</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>5 chart speeds</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Chart tear off</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Tilt writing platen</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Pen lifter</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Discover additional reasons for buying Esterline Angus Single and Two-channel Wide Chart (10") Servo Recorders. Write for Series "E" Catalog.

Excellence in instrumentation for over 60 years

Esterline Angus Instrument Company, Inc.
Box 24000L • Indianapolis, Indiana 46224
Here's the quality pipet that doesn't require kid glove treatment. It stands up under rough, daily use. It's the reliable pipet ... in accuracy, readability and handling. Easy-to-read liquid levels because there is no meniscus—thanks to the non-adherent surface of chemically-resistant polypropylene.

Transfer, serological and measuring models in 1, 2, 5 and 10 ml capacities. May be assorted with other Nalgene Labware for maximum discount. Ask your lab supply dealer, or write Dept. 21241, The Nalge Co., Inc., 75 Panorama Creek Drive, Rochester, New York 14625.

Association for Computing Machinery. (H. D. Huskey, Univ. of California, Berkeley)
National Council of Teachers of Mathematics. (J. D. Gates, 1201 16 St., NW, Washington, D.C.)
Society for Industrial and Applied Mathematics. (J. H. Griesemer, IBM, Yorktown Heights, N.Y.)

Physics
American Astronautical Soc. (P. B. Richards, General Precision, Little Falls, N.J.)

Chemistry
American Chemical Soc., California Section. (R. L. LeTourneau, Chevron Research Co., Richmond, Calif.)

Astronomy
American Astronomical Soc. (G. C. McVittie, Univ. of Illinois, Urbana)

Geology and Geography
Association of American Geographers. (M. Mikesell, Univ. of Chicago, Chicago, Ill.)

Zoological Sciences
American Fisheries Soc. (H. K. Chadwick, California Dept. of Fish and Game, Sacramento)
American Soc. of Zoologists. (A. G. Richards, Univ. of Minnesota, St. Paul)
Animal Behavior Soc. (E. M. Banks, Univ. of Illinois, Urbana)
Herpetologists' League. (F. B. Turner, Univ. of California, Los Angeles)

Zoological and Botanical Sciences
American Soc. of Naturalists. (C. Hubbs, Scripps Inst. of Oceanography, La Jolla, Calif.)
Ecological Soc. of America. (G. M. Woodwell, Brookhaven Natl. Laboratory, Upton, L.I., N.Y.)
Western Soc. of Naturalists. (J. M. Craig, San Jose State College, San Jose, Calif.)

Psychology
Western Psychological Assoc. (G. A. Mendelsohn, Univ. of California, Berkeley)

Social and Economic Sciences
American Economic Assoc. (R. R. Nelson, RAND Corp., Santa Monica, Calif.)
American Political Science Assoc. (J. F. Triska, Stanford Univ., Stanford, Calif.)
American Soc. of Criminology. (C. Newman, Univ. of Louisville, Louisville, Ky.)
American Sociological Assoc. (W. Form, Michigan State Univ., East Lansing)
Metric Assoc. (R. Fischelis, Ohio Northern Univ., Ada)
Portable laser makes light work of observatory's alignment tasks

Riding the solar flare patrol can be an exciting job, particularly if you're working in the clear, crisp air of a place like the Climax, Colorado observing station of the High Altitude Observatory. From there you get to see some really spectacular solar scenery. But the work can be tedious, too, when you have to forego your observation for long periods of time while you painstakingly align your optical equipment. And sometimes that's just when you miss the best shows.

But the work of aligning the complex optical equipment has now become easier. Procedures that once took days are now accomplished in hours, thanks to a new laser-saving device called the Spectra-Physics Model 130 gas laser. With their portable Model 130, observatory scientists align the optics of coronagraphs and spectrographs, in bright daylight if desired, with none of the focusing or other problems experienced using a point source of light.

Whether you're working in an observatory, a laboratory, or a classroom, you'll find the Model 130 cw gas laser offers you far more in precision and performance than any other laser at anywhere near the price. May we send you literature, and put your name on the mailing list to receive Spectra-Physics Laser Technical Bulletins? Write us at 1255 Terra Bella Avenue, Mountain View, Calif.

―――――――――――――
Spectra-Physics, S.A., Chemin de Somais 14, Fully, Switzerland

PHYSICS, S.A., Chemin de Somais 14, Fully, Switzerland
1633

POPULAR ASSOC. OF AMERICA, (E. S. Lee, Univ. of Pennsylvania, Philadelphia) Society for the Scientific, Study of Religion, (C. Y. Glock, Univ. of California, Berkeley)

History and Philosophy of Science
Philosophy of Science Assoc. (C. W. Churchman, Univ. of California, Berkeley)
Society for General Systems Research (H. Thal-Larsen, Univ. of California, Berkeley)
Science Courses for Baccalaureate Education Project. (V. L. Parsegian, Rensselaer Polytechnic Inst., Troy, N.Y.)

Medical Sciences
Alpha Epsilon Delta. (M. L. Moore, 7 Brookside Circle, Bronxville, N.Y.)
American Assoc. of Bioanalysts, Western Region. (M. Menesini, 1287 Rudgear Rd., Walnut Creek, Calif.)
American Physiological Soc. (R. M. Iverson, Univ. of Miami, Coral Gables, Fla.)
American Soc. for Microbiology, Northern California-Hawaiian Branch. (K. J. Taylor, Cutter Laboratories, Berkeley, Calif.)
California Veterinary Medical Assoc. (A. G. Edward, Univ. of California, Davis)
Society for Experimental Biology and Medicine, Pacific Coast Section. (E. I. Dobson, Donner Laboratories, Univ. of California, Berkeley)

Education
Commission on Science Education. (J. R. Mayo, AAAS, 1515 Massachusetts Ave., NW, Washington, D.C. 20005)
American Nature Study Soc. (H. E. Weaver, Univ. of Illinois, Urbana)
National Assoc. of Biology Teachers. (H. K. Wong, Menlo-Atherton High School, Atherton, Calif.)
National Science Teachers Assoc. (A. F. Eiss, 1201 16 St., NW, Washington, D.C.)

Information and Communication
National Assoc. of Science Writers. (L. S. Zahn, Hill and Knowlton Inc., 150 E. 42 St., New York, N.Y.)

Statistics
BIO: Biomedical Information-Processing Organization. (M. Woodbury, New York Univ. Medical Center, New York, N.Y.)
Biometric Soc., ENAR. (D. S. Robson, Cornell Univ., Ithaca, N.Y.)
Biometric Soc., WNAR. (S. W. Nash, Univ. of British Columbia, Vancouver, Canada)
Mathematical Statistics and Probability, 5th Berkeley symp. (J. Neyman, Statistical Laboratory, Univ. of California, Berkeley)

Science in General
Academy Conf. (J. T. Selw, Univ. of Oklahoma, Norman)
Scientific Research Soc. of America. (D. B. Prentice, 51 Prospect St., New Haven, Conn.)
There it goes...

another radiochemical shipment from Tracerlab

Our records show that our current speed record from receipt of order in Waltham, Mass., to delivery in Berkeley, Calif., now stands at 19 hours. The way we're going, it isn't going to stand very long. Speed is just naturally part of the Tracerlab radiochemicals service — along with superbative purity, widest range (more than 900 stock compounds at last count), and friendly, personal attention to your every need.

Prove it to yourself. Call Dr. John Leak at TW 4-6600, area code 617... and help us break a new record in speed and service.

There it goes...

another radiochemical shipment from Tracerlab
 Sigma Delta Epsilon. (Miss A. Hanson, Univ. of Minnesota, Minneapolis) Society of the Sigma Xi. (T. T. Holme, 51 Prospect St., New Haven, Conn.)

27–29, Academy of Management, New York, N.Y. (P. P. LeBreton, College of Business Administration, Univ. of Washington, Seattle)

27–30, Differential Equations and Dynamical Systems, Univ. of Puerto Rico, Mayaguez. (Center for Dynamical Systems, Brown Univ., Providence, R.I.)

27–30, Phi Delta Kappa, Professional Education Fraternity, Univ. of Oklahoma. (M. Bemis, Phi Delta Kappa, 8th and Union, Bloomington, Ind. 47402)


29–4, Pugwash Conf. on Science and World Affairs, Addis Ababa, Ethiopia. (J. Rotblat, Pugwash Continuing Committee.


January

4–7, Solid State Physics, conf., Manchester College of Science and Technology, Manchester, England. (S. F. Edwards, Dept. of Physics, Victoria Univ. of Manchester, Manchester 13)

5–8, National Soc. of Professional Engineers, winter mtg., Bal Harbour, Fla. (NSPE, 2029 K St., NW, Washington, D.C. 20006)


10–13, Radioactive Isotopes in Clinical Medicine and Research, 7th intern. symp., Bad Gastein, Austria. (R. Hofer, Second Medical Univ. Clinic, Garsungsasse 13, Vienna 9)

11–12, Man's Extension into the Sea, symp. on SEALAB II, Washington, D.C. (R. Evans, Conference Management Organizer, Colonial Bldg., 105 N. Virginia Ave., Falls Church, Va. 22046)

12–14, Medicinal and Aromatic Plants in India, symp., Central Indian Medicinal Plants Organization, Lucknow, India. (S. C. Datta, CIMPO, 4 Sapur Marg, Lucknow)


13–14, Institute of Mathematical Sciences, 4th Matscience anniversary symp., Madras, India. (C. P. Ramaswami Aiyer, Inst. of Mathematical Sciences, Madras)

13–16, Indian Institute of Metals, 19th annual mtg., Hyderabad. (The Institute, 31 Chowringhee Road, Calcutta 16)

16–21, American Chemical Soc., winter mtg., Phoenix, Ariz. (ACS, 1155 16th St., NW, Washington, D.C. 20036)


19–21, Instrumentation for the Process Industries, Texas A&M symp., College Station. (P. T. Eubank, Dept. of Chemical Engineering, Texas A&M Univ., College Station)


20–22, Regulation of Antibody Response, intern. symp., Toronto, Ont., Canada. (B. Cirauer, Subdivision of Immunology, Univ. of Toronto, Toronto, Ont.)

20–22, Diabetes in the Tropics, world congr., Bombay, India. (Organizing Secretary, Diabetic Assoc. of India, Maneckji Wadia Bldg., Mahatma Gandhi Rd., Bombay 2)


21–22, Physiology of Hemostasis and Thrombosis, 14th annual Wayne State Univ. symp. on blood, Detroit, Mich. (W. H. Seegers, Dept. of Physiology and Pharmacology, Wayne State Univ., Detroit)


23–28, American Library Assoc., midwinter mtg., Chicago, Ill. (D. H. Clift, ALA, 50 E. Huron St., Chicago 60611)


24–30, CNS-Drugs, symp., Regional Research Laboratory, Hyderabad, India. (P. B. Sattur, Regional Research Laboratory, Hyderabad 9)


---

**New COMBINATION Phase Contrast & Anoptral Contrast Microscopy with Laboratory Microscope “BIOZET”**

A new dual purpose turret condenser of high resolution and a sextuple nosepiece accommodating any combination of six Phase and Anoptral objectives, enables convenient observation and comparison of Phase and Anoptral* contrast images. The Reichert “BIOZET” with centerable condenser holder and built-in low voltage illumination is ideally suited for this and all other investigations in transmitted light and for photomicrography.

*Anoptral contrast is negative phase contrast with colored background added to enhance contrast.


26–28. Mathematical Assoc. of America, 49th annual mtg., Chicago, Ill. (H. M. Gehman, State Univ. of New York, Buffalo 14214)


26–29. American Assoc. of Physics Teachers, annual mtg., New York, N.Y. (M. Phillips, Ryerson Physical Laboratory, Univ. of Chicago, Chicago, Ill. 60637)


31–2. Information Theory, intern. symp., Inst. of Electrical and Electronics Engineers, Univ. of California, Los Angeles. (A. V. Balakrishnan, Dept. of Engineering, Univ. of California, Los Angeles 90024)


February


2–6. American College of Cardiology, Chicago, Ill. (W. D. Nelligan, 9650 Rockville Pike, Bethesda, Md. 20014)


6–9. American Inst. of Chemical Engineers, Dallas, Tex. (The Institute, 345 E. 47 St., New York 10017)

7–8. Perspectives in Virology, 5th mtg., New York, N.Y. (M. Pollard, Lobun Laboratory, Notre Dame, Ind.)

7–9. Reactor Physics in the Resonance and Thermal Regions, mtg., San Diego, Calif. (G. Joanou, General Atomic Corp., P.O. Box 1111, San Diego, 92112)

7–18. World Meteorological Organization, regional assoc., 5th, 4th session, Wellington, New Zealand (WMO, 4 Avenue, Giuseppa Motto, Geneva, Switzerland)

8–9. Cost Aspects of Water Supply, 8th sanitary engineering conf., Urbana, Ill. (J. H. Austin, 203 Civil Engineering Hall, Univ. of Illinois, Urbana 61803)


10–11. Snow, eastern conf., Hartford, Conn. (G. Ayer, P.O. Box 948, Albany 1, N.Y.)


16–18. Practical Space Applications, symp., San Diego, Calif. (C. Tross, Box 931, Rancho Santa Fe, Calif.)

16–19. National Soc. of College Teachers of Education, Chicago, Ill. (E. H. Goldenstein, Administration Bldg., 413, Univ. of Nebraska, Lincoln 68508)

16–19. Institute of Management Sciences annual mtg., Dallas, Tex. (W. M. Campbell, Atlantic Refining Co., P.O. Box 2819, Dallas 75221)


50TH ANNIVERSARY 1915-1965

THE KLETT FLUORIMETER

No. 2070

Designed for the rapid and accurate determination of thiamin, riboflavin, and other substances which fluoresce in solution. The sensitivity and stability are such that it has been found particularly useful in determining very small amounts of these substances.

KLETT SCIENTIFIC PRODUCTS—
PHOTOELECTRIC COLORIMETERS • BIO-COLORIMETERS
GLASS ABSORPTION CELLS • COLORIMETER NEPHELOMETERS • KLETT REAGENTS • COLONY MARKER AND TALLY

Klett Manufacturing Co., Inc.
179 EAST 87TH STREET, NEW YORK, N. Y.

P. O. Box 1024 Ann Arbor, Mich. 48106

SMALL TABLE TOP RECIPROCATING SHAKER

This exceptionally wide speed range readily adapts this Shaker to low speed motion studies, as well as violent agitation. Stroke can be adjusted to ⅛", 1" or 1½". 115 volt, 50/60 cycle. Shaker Power Unit with platform, Catalog No. 5850 ........................................ $195.00
Write for Bulletin No. 750