15¢
$5.50 A YEAR

October 26, 1957

VOL. 72, NO. 17 PAGES 257-272

SCIENCE NEWS LETTER

®

THE WEEKLY SUMMARY OF CURRENT SCIENCE

Flashing Rocket

See Page 259

A SCIENCE SERVICE PUBLICATION

Science Service, Inc. is collaborating with JSTOR to digitize, preserve, and extend access to *The Science News-Letter.* www.jstor.org

ENTERTAINMENTS, PUZZLES . . .

T167. THE COMPLETE NONSENSE OF EDWARD LEAR. All original text, illustrations of all nonsense books Lear ever wrote, 5 books in 1. Dong with a Luminous Nose, Owl & Pussycat—hundreds of others. 546 illustrations. 320 pp. Paperbound **$1.00**

T1. FLATLAND, E. A. Abbott. Fictionalized life in 2 dimensions, offers techniques for visualizing multi-dimensional forms, etc., clearer than most texts. "Delightful." SCIENCE NEWS LETTER. 128 pp. Paperbound **$1.00**

T97. CRYPTANALYSIS, H. F. Gaines. Best intermediate text for serious student; modern techniques, much not usually known except to experts. 236 pp. Paperbound **$1.95**

T362. LEARN CHESS FROM THE MASTERS, F. Reinfeld. Play 10 games against masters and grade every move you make! 152 pp. Paperbd. **$1.00**

T162. MATHEMATICAL RECREATIONS, M. Kraitchik. Moderately advanced problems based on theory of numbers, topology, etc. Unequalled for easily assimilated insights. 330 pp. Paperbound **$1.75**

T295. HOW TO CALCULATE QUICKLY, H. Sticker. Tried & true method, over 9000 problems, to develop your number sense; techniques not taught in schools: division, multiplication, etc. 256 pp. Paperbound **$1.00**

T417. REINFELD ON THE ENDGAME IN CHESS, F. Reinfeld. Extremely easily followed presentation, stresses enormous range of wrong play, telling exactly what is wrong. Recommended. 183 pp. Pap'bd. **$1.25**

T337. PUZZLE QUIZ STUNT FUN, Jerome Meyer. Mathematical puzzles, deductions, observations, etc. 238 in all. Entirely new. 256 pp. Paperbd. **$1.00**

T344. NEW WORD PUZZLES, G. L. Kaufman. 100 entirely new puzzles for enthusiasts of word games: chesswords, designonyms, addle letter anagrams, lapwords, acrostigrams, etc. 196 figures. 128 pp. Paperbd. **$1.00**

T110. MATHEMAGIC, MAGIC PUZZLES, GAMES WITH NUMBERS, R. V. Heath. One of most famous books in recreational math. 128 pp. Paperbd. **$1.00**

T384. HOUDINI ON MAGIC. Houdini's own account of magic tricks, picking locks, exposes of spiritualism, how stage magic works, etc. Incredible feats of greatest magician of modern times. 155 photos. 295 pp. Paperbd. **$1.00**

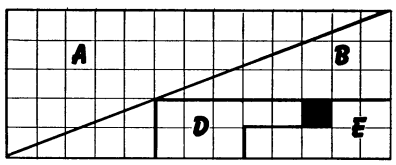
T198. MATHEMATICAL PUZZLES FOR BEGINNERS & ENTHUSIASTS, G. Mott-Smith. 188 mathematical puzzles of most delightful sort, detailed solutions. 248 pp. Paperbd. **$1.00**

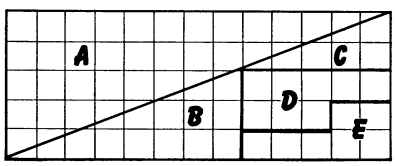
T143. BOOK OF MODERN PUZZLES, G. L. Kaufman. More than 150 word and logic puzzles, unusual types, highly original; no old chestnuts. 192 pp. Paperbd. **$1.00**

T264. 7 SCIENCE FICTION NOVELS, H. G. Wells. Time Machine, Island of Dr. Moreau, 1st Men in Moon, Invisible Man, War of Worlds, etc. Full texts. 1015 pp. Clothbound **$3.95**

T265. 28 SCIENCE FICTION STORIES, H. G. Wells. 2 novels (Men Like Gods, Star Begotten), plus 26 of best short stories: Empire of Ants, Crystal Egg, Man Who Could Work Miracles, etc. 915 pp. Clothbound **$3.95**

Can you explain this?





Rearrange the parts of the top figure into the bottom one, and you lose one square of area. Mysterious, isn't it?

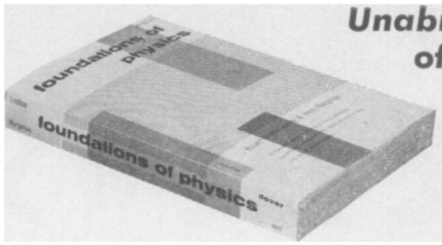
Let MARTIN GARDNER explain this and hundreds of other elements of mathematical magic!

T335. MATHEMATICS, MAGIC AND MYSTERY
by Martin Gardner

How do geometrical vanishing tricks work? Why are card tricks possible? How can magicians do astonishing feats of mathematics mentally? As a rule, we accept these tricks as "magic," and do not recognize that they are demonstrations of probability, theory of numbers, topology, and other mathematics.

This is the first book-length study of this fascinating branch of mathematics. Written in the same delightful manner as Gardner's Fads and Fallacies, it summarizes all previous work in this field. It offers scores of new tricks, insights, puzzles, and aligns many effects with law for the first time. It discusses tricks with cards, coins, topological tricks, geometric vanish effects, etc. You will see how Sam Loyd could make a Chinaman vanish, how a Curry square "proves" that the whole is more than its parts.

135 illustrations. xii + 174 pp. 5⅜ x 8.
T335 Paperbound **$1.00**



Unabridged, corrected edition of a well-known first-rate modern coverage of the ideas and methodology behind theoretical physics . . .

NOW only $2.45!

FOUNDATIONS OF PHYSICS
by R. B. Lindsay and H. Margenau

PARTIAL CONTENTS

I. MEANING OF PHYSICAL THEORY. Data, experiment, measurement, symbolism, laws, theory, math., abstraction, boundary conditions, integral, differential equations, etc. II. SPACE, TIME. Psychology vs. physics, geometry, etc. III. FOUNDATIONS, MECHANICS. Kinematics, position, displacement, velocity, acceleration, dynamical concepts, Newton, mass, force, motion, d'Alembert, Gauss, Hertzian mechanics, energy, canonical equations of Hamilton, etc. IV. PROBABILITY, APPLICATION. Probab. aggregates, Bernouilli's problem, emission of rays, Laplace's formula, density fluctuations, etc. V. STATISTICAL PT. OF VIEW. Dynamical, statistical theories, electric current, thermodynamics, statistical mechanics, Gibbs, Darwin, Fowler, etc. VI. PHYSICS OF CONTINUA. Continuum, scalar, vector fields, deformable media, tensor fields, electromagnetic fields, etc. VII. ELECTRON THEORY, SPECIAL RELATIVITY. Invariance of field equations, special theory, etc. VIII. GENERAL THEORY. Ideas, motion of particle in gravitational field, etc. IX. QUANTUM MECHANICS. Uncertainty, Hermitean operators, Schroedinger's equation, eigenvalues, matrices, spin, quantum statistics, Dirac, etc. X. CAUSALITY.

A bridge between semipopular works and technical treatises, this book analyzes foundation ideas and methods of modern theoretical physics. It is not a textbook, but a discussion of methods of physical description and construction of theory, with full cognizance of logic of science, physical data and their measurement, construction of experiment, and symbolic representation.

Intended for the intermediate or advanced reader who has some background in the sciences and some knowledge of calculus, it covers both classical and modern physics, contrasting their positions, and telling why transitions were made from classical to modern. It gives meaning to the bare data and tools of physics.

Reviews of the first edition. "A most unusual book [the reader] to discover that there is much more to . . . an interestingly fresh approach . . . will help his subject than is involved in adroit manipulation of differential equations, etc.," **E. U. Condon, REVIEW OF SCIENTIFIC INSTRUMENTS.** "At once thorough and yet not overdetailed; it may be unreservedly recommended," **NATURE** [London].

Index. Reading lists. 35 illustrations. xi + 537 pp. 5⅜ x 8. **S377** Paperbound **$2.45**

S366. APPLIED OPTICS AND OPTICAL DESIGN, A. Conrady. Full unabridged inexpensive reissue of standard modern treatise. 528 pp. Paperbound **$2.95**

T203. ANIMALS IN MOTION, Eadweard Muybridge. Largest collection (over 4000 photos) ever made from famous Muybridge collection of high speed stopped action photos of animals in motion. Horses, cats, lions, guanacos, camels, sloths, elephants, 27 other animals, birds, 123 different types of action. Invaluable for biologists, zoologists, naturalists. New introduction by L. S. Brown, Am. Mus. Nat. Hist. Over 410 pp. 7⅞ x 10⅝. Deluxe edition. Clothbound **$10.00**

S289. MONOGRAPHS ON TOPICS OF MODERN MATHEMATICS, ed. W. Young. Foundations of geometry, non-Euclidean geometry, theory of numbers, calculus, for persons who have forgotten or never finished elementary college math. 432 pp. Paperbound **$2.00**

S109. VECTOR AND TENSOR ANALYSIS, G. E. Hay. Start with simple definitions, finish understanding vectors and tensors. 201 pp. Paperbd. **$1.75**

S168. NUMERICAL SOLUTIONS OF DIFFERENTIAL EQUATIONS, Levy & Baggott. Unequalled time saver. Graphic, numerical methods. "Should be in hands of all in research in applied math," NATURE. 246 pp. Paperbd. **$1.75**

S164. INTRO. TO SYMBOLIC LOGIC, Susanne Langer. Even if you never finished high school algebra you can learn modern Russell-Whitehead logic. 368 pp. Paperbd. **$1.75**

S27. NON-EUCLIDEAN GEOMETRY, R. Bonola. Standard coverage, history, exposition, with complete texts of Bolvai & Lobatchevsky included. 180 diagrams. 431 pp. Paperbd. **$1.95**

S182. GEOMETRY OF FOUR DIMENSIONS, H. P. Manning. Unique in English, simple, easily followed account. 76 figures. 357 pp. Paperbound **$1.95**

S81. PRINCIPLE OF RELATIVITY, Einstein, Lorentz, Weyl, Minkowski. 11 papers founding relativity. Unabridged translations. "Indispensable," NATURE. 224 pp. Paperbound **$1.75**

S193. HIGHER MATH. FOR STUDENTS OF CHEMISTRY & PHYSICS, J. Mellor. Class favorite, unequalled review, practical rather than theoretical, on lab situations; integral, differential calculus, theory of errors, etc. 662 pp. Paperbound **$2.00**

S346. ELEMENTS OF MATHEMATICAL BIOLOGY, A. Lotka. Classic application of math to biological sciences. "Vast amt. of facts unattainable within same compass elsewhere," NATURE. 72 figures. 490 pp. Paperbound **$2.45**

S361. THERMODYNAMICS, Enrico Fermi. Clear elementary; "May be recommended as clear, very accurate introduction," J of Phys. Chem. 170 pp. Paperbound **$1.75**

S298. FAMOUS PROBLEMS OF ELEMENTARY GEOMETRY, F. Klein. Squaring circle, doubling cube, pi, in terms of rigorous modern math. 103 pp. Paperbound **$1.00**

S342. INTRO. TO THEORY OF NUMBERS, L. Dickson. Nontechnical, wide coverage. 239 problems. 191 pp. Paperbound **$1.65**

T371. TRIGONOMETRY REFRESHER FOR TECHNICAL MEN, A. Klaf. 913 detailed questions, answers brush up for you. 1738 problems. 436 pp. Paperbound **$2.00**

T370. CALCULUS REFRESHER FOR TECHNICAL MEN, A. Klaf. 756 detailed questions, answers, in unique practical refresher. 566 problems. 436 pp. Paperbound **$2.00**

T394. FADS AND FALLACIES IN THE NAME OF SCIENCE, Martin Gardner. Enlarged, revised edition of IN THE NAME OF SCIENCE, the standard coverage of cults, fallacies, fads masquerading as science: Atlantis, flying saucers, General Semantics, dianetics, orgone energy, Bridey Murphy, psionics, etc. Covers astronomy, physics, geology, medicine, philosophy, etc. **"Should be ready by everyone, scientist and non-scientist alike," R. T. Birge,** Prof. Emeritus, U. of California, former President, American Physical Society. x + 365 pp. 5⅜ x 8. Paperbound **$1.50**

T416. SPINNING TOPS AND GYROSCOPIC MOTION, J. Perry. Outstanding classic, dynamics of rotation on popular level. Precession, axes of rotating body, similar topics. Model clarity. 62 figures. 128 pp. 5⅜ x 8. Paperbound **$1.00**

T425. THE NATURE OF ELECTRICITY, P. Dunsheath. Practical, physical treatment for the layman; nature & production, transfer, uses, AC, DC. Royal Institute Christmas lectures. 130 illustrations. 231 pp. 5⅜ x 8. Paperbound **$1.95**

T350. MATHEMATICAL EXCURSIONS, H. A. Merrill. Entertaining bypaths not generally taught, 90 stimulating puzzlers. 50 illustrations. 145 pp. 5⅜ x 8. Paperbound **$1.00**

T400. INTRO. TO STUDY OF EXPERIMENTAL MEDICINE, Claude Bernard. Great classic of biology; principles of research, chance, error, experiment, etc. 291 pp. 5⅜ x 8. Paperbound **$1.50**

All books standard 5⅜" x 8" unless otherwise indicated.

Dept. 127, Dover Publications,
920 Broadway, N. Y. 10, N. Y.

Please send me the books encircled below: please print

Name .....

Address .....

City ..... Zone.... State.....

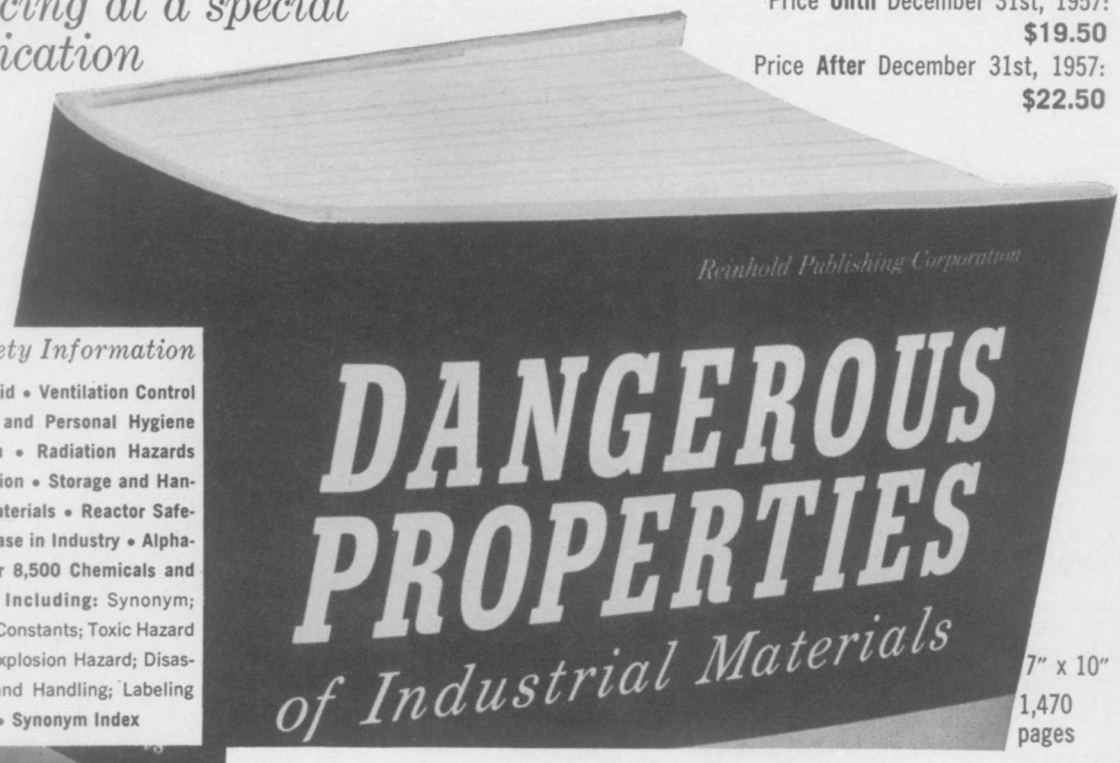
I am enclosing $..... in full payment. (Payment in full must accompany all orders except those from libraries and public institutions, who may be billed.) Please add 10¢ postage per book to your remittance for postage, handling charges on orders less than $5.00. Dover pays postage on orders of $5 or more.

T1	T162	T203	T337	S366	T416
S27	S164	T264	S342	T370	T417
S81	T167	T265	T344	T371	T425
T97	S168	S289	S346	S377	
S109	S182	T295	T350	T384	
T110	S193	S298	S361	T394	
T143	T198	T335	T362	T400	

SATISFACTION GUARANTEED. All books returnable within 10 days for full refund if unsatisfactory in any respect whatever.

Announcing at a special pre-publication price . . .

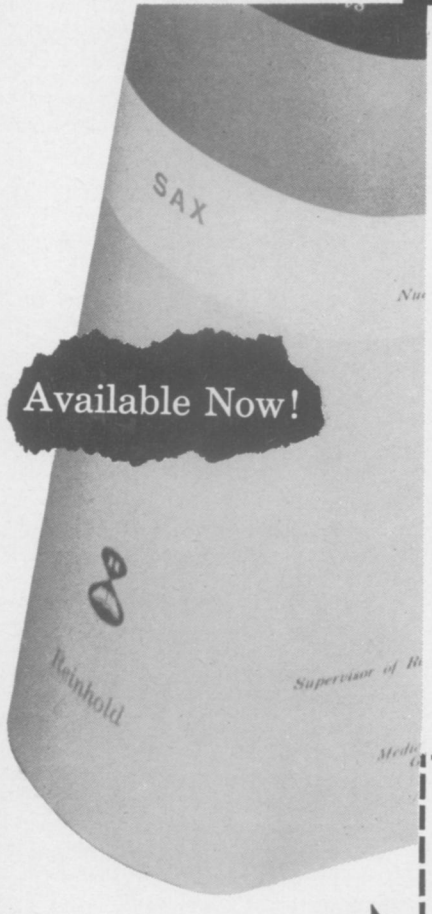
Price **Until** December 31st, 1957:
$19.50
Price **After** December 31st, 1957:
$22.50



7" x 10"
1,470 pages

A Bible of Safety Information

Toxicology and First Aid • Ventilation Control Personnel Protection and Personal Hygiene Atmospheric Pollution • Radiation Hazards Industrial Fire Protection • Storage and Handling of Hazardous Materials • Reactor Safeguards • Allergic Disease in Industry • Alphabetical Listing of Over 8,500 Chemicals and Industrial Materials Including: Synonym; Description; Formula; Constants; Toxic Hazard Rating; Fire Hazard; Explosion Hazard; Disaster Control; Storage and Handling; Labeling **Shipping Regulations • Synonym Index**



Available Now!

Edited by **N. IRVING SAX**

Consultant on Industrial Safety, Nuclear Development Corp. of America

Assisted By: LEONARD GOLDWATER, M.D., Professor of Occupational Medicine, Columbia University; WILLIAM B. HARRIS, Chief, Industrial Hygiene Branch, Health and Safety Laboratory, U.S. Atomic Energy Commission; JOHN B. HARLEY, Chief of the Analytical Branch, Health and Safety Laboratory, U.S. Atomic Energy Commission; JOSEPH J. FITZGERALD, Supervisor of Radiological Chemistry and Physics, Knolls Atomic Power Laboratory, General Electric Co.; and MILTON S. DUNN, M.S., M.D., Medical Director, Rensselaer Division, General Aniline and Film Corp.

One of the Most Valuable Technical Books Ever Published

This monumental volume is the eagerly awaited successor to Sax's "Handbook of Dangerous Materials." The immediate success of the original book was due to the need for a convenient reference work on the hazardous properties of chemical compounds and other industrial materials. It enabled chemists, engineers or non-technical personnel to find quickly whether a given compound or material is potentially dangerous and what precautionary measures must be taken.

This new volume now fills this need to perfection. It is an entirely rewritten and greatly expanded version of the original work. "Dangerous Properties" is truly a bible of safety information. Every aspect of industrial safety is included, and arranged for practical use. In addition to encyclopedic information on the hazards of over 8,500 general chemicals and industrial materials, it also contains vital safety information in comprehensive sections. A glance at the contents will indicate the book's invaluable subject matter. The objective of providing a quick, single SAFETY reference for those involved in the manufacture, use, handling, storing or shipping of hazardous materials is fulfilled.

Here is undoubtedly the most useful and complete book on industrial safety ever published.

Take Advantage of This Special Pre-Publication Offer!
ORDER NOW AND SAVE $3.00.
Send No Money! Examine This Fabulous Work ON APPROVAL!

Fill out the coupon below and your copy of DANGEROUS PROPERTIES OF INDUSTRIAL MATERIALS *will be sent to you promptly.*

MAIL THIS COUPON TODAY

REINHOLD PUBLISHING CORP., Dept. M-197
430 Park Avenue, New York 22, N. Y.

Please send me DANGEROUS PROPERTIES OF INDUSTRIAL MATERIALS to read and examine. In 10 days I will return the book and owe nothing, or I will remit $19.50, plus postage. I understand that the special pre-pub offer expires December 31st, 1957.

NAME_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

☐ **SAVE MONEY!** Check here if you ENCLOSE payment, in which case we pay all shipping charges. Same return privilege. Refund guaranteed. Please add 3% sales tax on N.Y.C. orders. Send check or money-order only. Do not enclose cash!