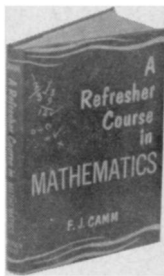


## A REFRESHER COURSE IN MATHEMATICS

By F. J. Camm



Basic course, from arithmetic to the calculus, in order of difficulty. Explanations of principles followed by worked examples.

Includes: treatment of fractions, decimals, square root and cube root, logarithms, interest, algebra, equations, graphs, plane and solid geometry, trigonometry, differential and integral calculus; summary of mathematical formulas; etc., etc.

Will be of enormous help to those who have forgotten their math; also to those now acquiring it. 195 illustrations.

\$2.95 Postfree • 10-Day Money-Back Guarantee  
EMERSON BOOKS, Inc., Dept. 151-P  
251 West 19th Street, New York 11

### MICRO-ADS

Equipment, supplies and services of special interest to scientists, science teachers and students, science-minded laymen and lobbyists. 25¢ per word, payable in advance. Closing date 3 weeks prior to publication (Saturday).

SNL, 1719 N St., N.W., Washington, D.C. 20036

**BINDERS FOR SNL—BUFF-COLORED BUCKRAM.** Snap-in metal strips hold 52 copies. \$4.00 pp. Send order with remittance to Science News Letter, 1719 N Street, N.W., Washington, D. C. 20036.

**BOOKS ON FUNGI. COMPREHENSIVE LIST.** Lew's, 2510 Van Ness Avenue, San Francisco, Calif.

**FREE CATALOGUE, PAPERBACKS, ETC.** Substantial savings. New York Book and Record Club, 4-H West 43rd Street, New York City 10036.

**SURPLUS WIRED IBM MEMORY PLANES SOLD** for pennies on the dollar. Inquiries invited. Meshna, Lynn, Mass.

## FREE

THE NEXT ISSUE of  
**SCIENCE NEWS LETTER**  
to one of your friends

SCIENCE NEWS LETTER  
1719 N Street, N.W.  
Washington, D. C. 20036.

Please send the next issue  
of SCIENCE NEWS LETTER, FREE,  
as a sample, to:

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip Code \_\_\_\_\_

8-22-64

### PHYSICS

## Laser Light Focused Using Gas as Lens

See Front Cover

➤ GAS IS BEING USED as a new kind of lens to focus the intense light of a laser beam for communication over long distances in experiments at Bell Telephone Laboratories, New York.

Such lenses use variations in the angle at which light travels through the gas to guide the laser light beam. They do not reflect or absorb light nearly as much as conventional lenses.

On this week's front cover, an experimental helical gas convection lens that guides light by using temperature-produced variations in the refractive index of a gas is shown being tested by Dwight W. Barreman and Andrew R. Hutson of Bell Telephone Laboratories. They developed this method which continuously focuses light by controlling variations in the refractive index of transparent gases through thermal expansion, flow and diffusion.

A long gas lens, or a series of lenses, can confine a laser beam to a path near the center of a pipe. Only a very weak lens is needed when the pipe is straight. However, in curved sections of the pipe the beam encounters gas of decreasing refractive index when it tries to follow the straight line in which light usually travels.

This region acts like a prism, deflecting the light beam in the direction of the pipe's curvature.

• Science News Letter, 86:116 Aug. 22, 1964

### TECHNOLOGY

## 'Laser Eraser' Future Boon for Secretaries

➤ A TYPEWRITER KEY that erases—the dream of all secretaries—will be available in the future if Dr. Arthur L. Schawlow of Stanford University, Stanford, Calif., has his way in developing a "laser eraser."

The highly amplified light of the laser, thousands of times more intense than sunlight, has been used to bore holes through diamonds and to make delicate repairs on the retina of the human eye. Possible other uses for intense laser light are being investigated in laboratories around the world.

Dr. Schawlow decided to find out what laser light would do to ordinary typewritten characters on white paper. The pulsed light beam, he found, removed individual letters as if they had never been typed, vaporizing the typewriter ink without marking the paper.

Dr. Schawlow asks, "Why not a laser eraser key on electric typewriters? All it requires is some engineering development that would bring the cost down."

Lasers are much too expensive now, Dr. Schawlow believes. He and Dr. Charles H. Townes, now provost at Massachusetts Institute of Technology, in 1958 first suggested the possibility of lasers, then called optical masers.

• Science News Letter, 86:116 Aug. 22, 1964

## Questions

**BIOPHYSICS**—How does the action of a photoelectric cell correspond to that of the human eye? p. 117.

**CHEMISTRY**—In what food has a new form of vitamin K been located? p. 119.

**ENGINEERING**—What device has been proposed as a method of refrigerating summer clothing? p. 121.

**HERPETOLOGY**—How many deaths are caused by snake bites in the United States each year? p. 120.

**MEDICINE**—What is the greatest danger to kidney-transplant patients? p. 124.

**METEOROLOGY**—What effect did experimental seeding with silver iodide have on tropical cumulus clouds? p. 115.

### SCIENCE NEWS LETTER

VOL. 86 AUGUST 22, 1964 NO. 8

Edited by WATSON DAVIS

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N.W., Washington, D. C. 20036. NORTH 7-2255. Cable Address: SCIENSERVC.

Subscription rates: 1 yr., \$5.50; 2 yrs., \$10.00; 3 yrs., \$14.50; ten or more copies in one package to one address, 7½ cents per copy per week; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage. Change of address: Three weeks notice is required. Please state exactly how magazine is addressed. Include zip code.

Copyright © 1964 by Science Service, Inc. Reproduction of any portion of SCIENCE NEWS LETTER is strictly prohibited. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicated services issued by Science Service. Science Service also produces and distributes THINGS of science (monthly), produces and publishes books, and conducts the National Science Youth Program.

Printed in U.S.A. Second class postage paid at Washington, D. C. Established in mimeograph form March 13, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Reader's Guide to Periodical Literature, Abridged Guide, and the Engineering Index. Member of Audit Bureau of Circulation.



### SCIENCE SERVICE

The Institution for the Popularization of Science organized 1921 as a non-profit corporation.

Board of Trustees—Nominated by the American Association for the Advancement of Science: Athelstan F. Spilhaus, University of Minnesota; Wallace R. Brode,\*\*\* Washington, D. C.; Bowen C. Dees, National Science Foundation. Nominated by the National Academy of Sciences: Henry Allen Moe, The Clark Foundation; Harlow Shapley, Harvard College Observatory; Detlev W. Bronk, Rockefeller Institute. Nominated by National Research Council: Leonard Carmichael,\* National Geographic Society; Benjamin H. Wallier, Johns Hopkins University; Eric A. Walker, Pennsylvania State University. Nominated by Journalistic Profession: O. W. Riegel, Washington and Lee University; Gordon B. Fister, Allentown (Pa.) Call-Chronicle; Ralph B. Curry, Flint Journal. Nominated by the Scripps Estate: Edward J. Meeman, Memphis Press-Scimitar; Ludwell Denny, Scripps-Howard Newspapers; Edward W. Scripps II,\*\* Edward W. Scripps Trust. \*President; \*\*Vice-President; \*\*\*Treasurer.

Staff—Director: Watson Davis. Assistant Director: Dorothy Schriver. Writers: Ann Ewing, Susan Fehar, William MacLaurin, Faye Marley, William McCann, Barbara Tufty, Judith Viorst, Walter Wingo, Ruby Yoshioka. Science Youth Division: Joseph H. Kraus. Photography: Fremont Davis. Production: Marcia Nelson. Syndicate Sales: Forrest L. Snakenberg. Librarian: Margit Friedrich. Interlingua Division in New York: Alexander Gode, 80 E. 11th St., GRamercy 3-5410. Advertising Manager: Fred A. Moulton, METropolitan 8-2562, Washington, D. C.