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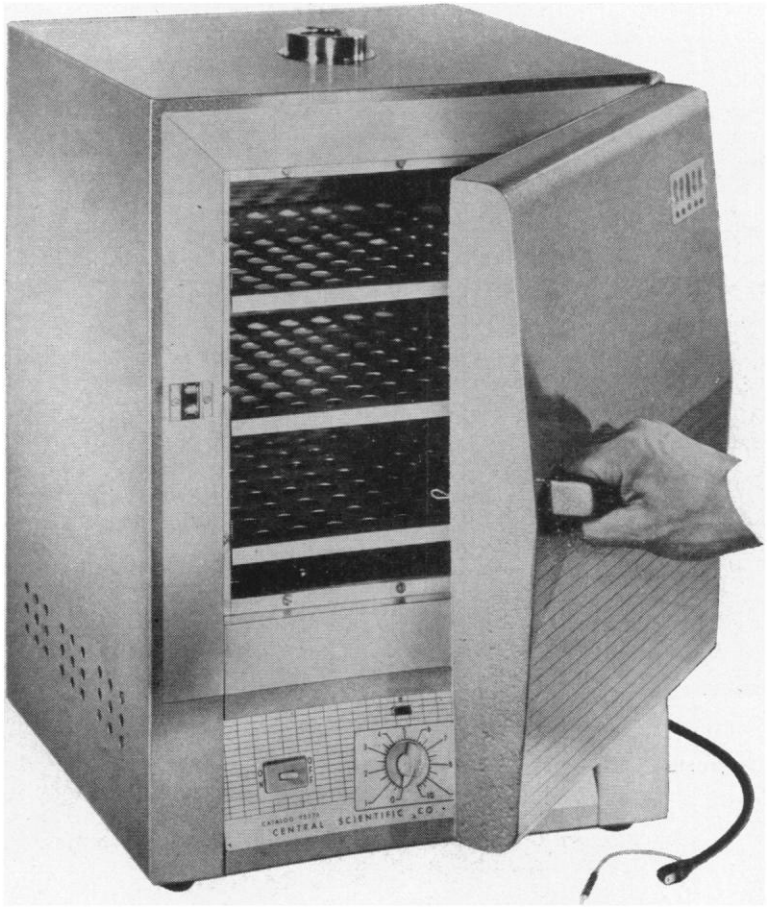

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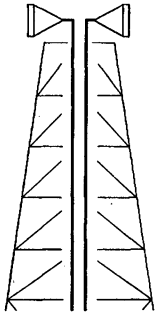
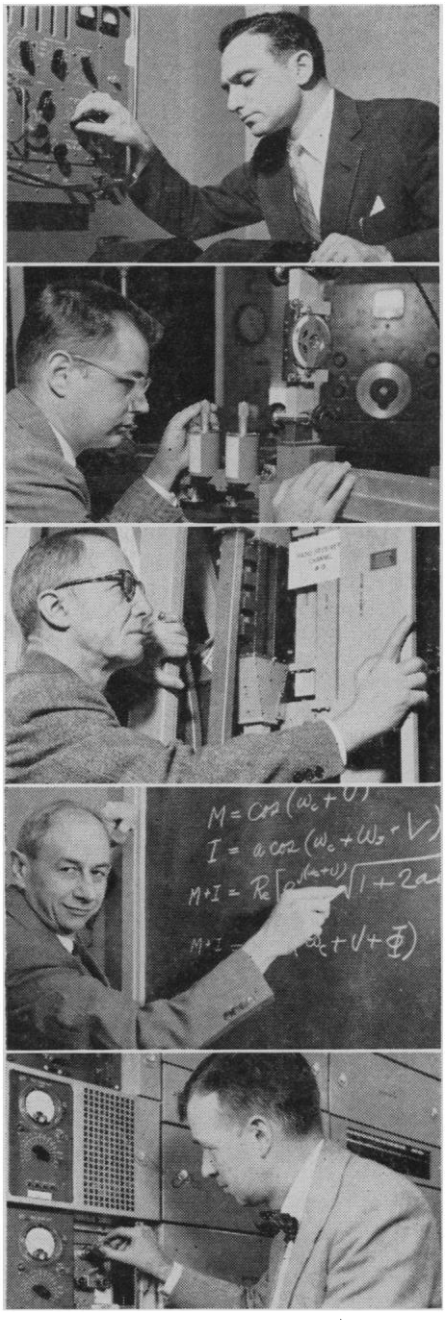
What kind of men develop microwave highways?



The great microwave systems that relay telephone conversations along with television programs from coast to coast will have to work harder than ever to meet growing demands for service. But at Bell Laboratories scientists have been making important advances in the art of microwave communication. These advances are being applied in the development of a new and more efficient system in which single beams of microwaves will carry simultaneously many more telephone conversations and television programs than is now possible.

The development of the new system demands the varied skills of men in many fields of science and engineering. Just a few of the specialists necessary are . . .



PHYSICISTS like J. A. Weiss, Ph.D. in Physics, Ohio State, to harness the properties of ferrites in new ways for better control of the transmission of microwaves.

MICROWAVE ENGINEERS like P. R. Wickliffe, M.S. in E.E., M.I.T., to design new circuitry. Microwaves must be conducted, controlled and amplified through waveguides which resemble pipes.

MECHANICAL ENGINEERS like W. O. Fullerton, B.S. in E.E., Iowa State, to embody new principles in designing the many structures and devices used in microwave telephony—with all parts feasible to manufacture, practical to install and easy to maintain.

SYSTEMS ANALYSTS like J. P. Kinzer, M.E., Stevens Institute, for over-all system planning and prediction. Mr. Kinzer works with numerical quantities and characteristics to predict on paper the performance of an operating system. What will it do? How must it perform to meet the needs?

ELECTRONIC ENGINEERS like B. C. Bellows, B.S. in Engineering, Cornell, for the development of "watch-dog" equipment to protect against failure. Protective devices must operate automatically in split seconds to maintain uninterrupted service.

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applications. To what extent breadth of knowledge can be achieved in an introductory physics course without sacrificing depth of insight into the fundamental physical principles and an appreciation of the logical coherence of the subject is debatable. Certain it is, however, that when, as in this textbook, the emphasis on various topics is not a particularly happy balance, the results are unfortunate. Chapters are devoted to such topics as the special theory of relativity, the wave-particle duality of wave mechanics, and nuclear physics. Yet one finds a very abbreviated section on electrostatics which contains no mention of Gauss' theorem and very little explanation of the behavior of a dielectric. As a result, the text is forced merely to state the capacitance of a parallel plate capacitator, prefaced only with the remark, "It can be shown that . . . ." This is hardly adequate for a text which is described in the preface as containing sufficient material for a 2-year course.

Viewed as a textbook for a 1-year course, the book has many commendable features. The method of presentation is conversational, often humorous, with many clear and simple figures and graphs to illustrate the text material. A few topics are treated in a refreshingly direct and detailed way that is unusual for a textbook at this level. For example, the relationship between torque and angular acceleration is proved for a rigid body by a direct application of Newton's second law, rather than from conservation of energy. The section on heat, similarly, uses detailed yet clearly presented approaches to the kinetic theory of ideal gases, the Carnot cycle, the thermodynamic definition of temperature, irreversibility, and so forth.

The only mathematics required to read the book are algebra and trigonometry, although at the end of each chapter is a section which gives the derivation by calculus of some of the principal results. However, this method of presenting applications of calculus is scarcely likely to impress the reader with the advantages of knowing and using this tool. Vectors are also discussed at the beginning of the book in order to make such concepts as force and velocity clear. Unfortunately, the discussion of a vector is completely at variance with the definition to be found in all other physics and mathematics texts with which I am familiar. Vectors are said to have direction and magnitude, but it is stated that the method of addition for specific vectors can only be determined by experiment.

In my opinion, however, these advantages are more than offset by the superficial treatment of most other basic topics. The use of a very informal but uneconomical style makes it impossible for the authors to provide adequate background for the large number of topics and applications introduced in the book. In the chapter on angular motion, for example, the vector character of angular velocity is introduced without any attempt to give either a logical or an intuitive justification for the choice. The rate of precession of a gyroscope is then "derived," and a section follows on applications of the gyroscope in various aircraft instruments. Again, in the chapter on fluid mechanics, one finds a page on the air-speed indicator for aircraft. Yet Bernoulli's principle merely is given as a statement that "In a streamline flow, the pressure is greatest where the velocity is least." There is no attempt at a derivation, or even an explicit formula. The whole discussion of the principle is limited to a remark on the lift on an aircraft wing and a paragraph on the motion of a golf ball. This approach to introductory physics is likely to encourage the tendency of students to acquire a glib familiarity with the facts rather than an appreciation of their significance and a real understanding of the physical principles.

WILLIAM M. MACDONALD
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New Books

Wind and Solar Energy. Proceedings of the New Delhi Symposium. vol. VII of *Arid Zone Research.* 1956. 238 pp. $8. *Human and Animal Ecology.* Reviews of research. vol. VIII of *Arid Zone Research.* 1957. 244 pp. $5. UNESCO, Paris.

Le Ciel et la Terre. vol. III of *Encyclopédie Francaise.* André Danjon, Pierre Pruvost, Jules Blache, Directeurs. Société Nouvelle de l'Encyclopédie Francaise, Paris, 1956.

The People of Puerto Rico. A study in social anthropology. Julian H. Steward, Robert A. Manners, Eric R. Wolf, Elena P. Seda, Sidney W. Mintz, Raymond L. Scheele. University of Illinois Press, Urbana, 1956. 540 pp. $10.

Principles of Engineering Geology and Geotechnics. Geology, soil and rock mechanics, and other earth sciences as used in civil engineering. Dimitri P. Krynine and William R. Judd. McGraw-Hill, New York, 1957. 730 pp. $10.

Allgemeine Meereskunde. Eine einführung in die ozeanographie. Günter Dietrich. Gebrüder Borntraeger, Berlin, 1957. 492 pp. DM. 56.

The Species Concept in Palaeontology. A symposium. Publ. No. 2. P. C. Sylvester-Bradley, Ed. Systematics Assoc., London, 1956. 145 pp. $2.

How to Know Western Australian Wildflowers. pt. II, *A Key to the Flora of the Temperate Regions of Western Australia.* William E. Blackall and Brian J. Grieve. University of Western Australia Press, Nedlands, 1956. 138 pp. 30s.

Analog Computers, Their Industrial Applications. Proceedings of a Symposium for Management. Midwest Research Institute, Kansas City, Mo. 1957. 210 pp. $5.

Man and Society. The basic teachings of sociology. Samuel Koenig. Barnes & Noble, New York, 1957. 399 pp. Paper, $1.45.

Botany. A laboratory manual. T. E. Weier, C. R. Stocking, J. M. Tucker. Wiley, New York; Chapman & Hall, London, ed. 2, 1957. 175 pp. $2.95.

Heat and Thermodynamics. An intermediate textbook for students of physics, chemistry, and engineering. Mark W. Zemansky. McGraw-Hill, New York, ed. 4, 1957. 484 pp. $7.50.

About Mice and Man. An introduction to mammalian biology. Frederick R. Avis. J. Weston Walch, Box 1075, Portland, Maine, 1957. 194 pp. $3.

Elements of Engineering Thermodynamics. Rolf H. Sabersky, McGraw-Hill, New York, 1957. 318 pp. $7.50.

Dynamic Meteorology and Weather Forecasting. C. L. Godske, T. Bergeron, J. Bjerknes, R. C. Bundgaard. American Meteorological Society, Boston; Carnegie Institution, Washington, 1957. 800 pp.

Die Saftstrome der Pflanzen. Bruno Huber. Springer, Berlin, 1956. 126 pp. DM. 7.80.

Optics. Bruno Rossi. Addison-Wesley, Reading, Mass., 1957. 510 pp. $8.50.

Stress and Strain in Bones. Their relation to fractures and osteogenesis. F. Gaynor Evans. Thomas, Springfield, Ill., 1957. 245 pp. $6.50.

Pica. A survey of the historical literature as well as reports from the fields of veterinary medicine and anthropology, the present study of pica in young children, and a discussion of its pediatric and psychological implications. Marcia Cooper. Thomas, Springfield, Ill., 1957. 114 pp. $3.75.

Experiments with a Microscope. Nelson F. Beeler and Franklyn M. Branley. Crowell, New York, 1957. 154 pp. $2.75.

Directory of Institutions Engaged in Arid Zone Research. UNESCO, Paris, 1953. 110 pp. $1.50.

Discoveries and Opinions of Galileo. Translated by Stillman Drake. Doubleday, Garden City, N.Y., 1957. 302 pp. $1.25.

Communism on the Decline. George C. Guins. Philosophical Library, New York, 1956. 287 pp. $7.50.

Techniques of Organic Chemistry. vol. III, pt. II, *Laboratory Engineering,* Arnold Weissberger, Ed. Interscience, New York, ed. 2, 1957. 391 pp. $8.

Epidemiology. Bull. World Health Organization, vol. 15, No. 1–2. 359 pp. $4.

Malaria. Eradication, insecticide resistance, entomological investigations, epidemiology, control prophylaxis. Bull. World Health Organization, vol. 15, No. 3–5, 502 pp. $6. World Health Organization, Geneva, 1956.

Annotated Bibliography of Works in Latin Alphabet Languages on Biological Microtechnique. Freda Gray and Peter Gray. Brown, Dubuque, Iowa, 1956. 116 pp. $3.

Christian Theology and Natural Science. Some questions on their relations. E. L. Mascall. Ronald Press, New York, 328 pp. $4.50.

The Negro in the United States. E. Franklin Frazier. Macmillan, New York, rev. ed., 1957. 769 pp. $6.40.