SCIENCE

13 December 1957

Volume 126, Number 3285

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

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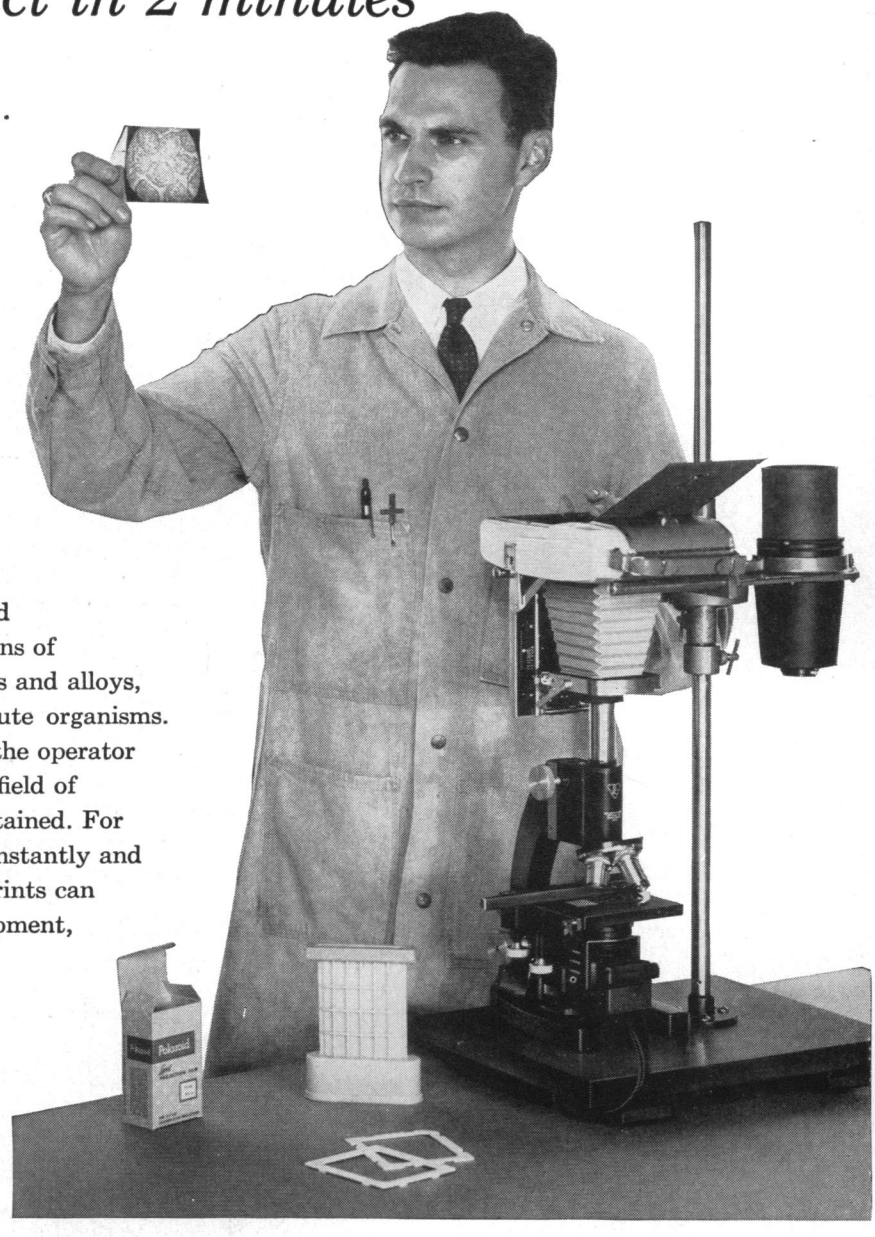

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Atlantic effort," apparently, is meant to include pure science—that is, scientific investigations that have no objective other than increasing the fund of general knowledge. This aspect of exchange faces no hard problems, but it does pose something of a puzzle. Since new findings ordinarily are published in scientific journals, and since scientists in all countries, including the Soviet Union, ordinarily have access to these journals, what is to be NATO's special contribution? Perhaps communication among countries can be improved, perhaps more scientific papers should be translated, perhaps some duplication of effort can be avoided, but the primary need in pooling results in pure research is more results to pool.

Difficulties exist to be overcome, and whatever success in pooling past results and future tasks the NATO conference achieves will be that much to the good. But, in pursuing togetherness with other nations, we should not lose sight of another, and perhaps more important, pooling problem, one that is closer to home. The largest buyer of military research and development is the U.S. Department of Defense. As the Department is now organized, it is possible for the Army, the Navy, and the Air Force, each, in seeking its own advantage, to work against the advantage of the country as a whole. A second point, less often stressed, is that the intense competition among the various industrial companies carrying out defense projects may likewise work against the larger interests of the country. To answer the scientific aspects of the Soviet threat, what we must also find are more effective ways to pool our own research and development efforts.—J. T.

For Adults Only

If, as almost everyone who considers the question agrees, improvement in scientific education and strengthening of the support of basic research are desirable goals in this country, then all avenues leading to this goal should be explored. Any lasting improvements must be based upon an increase in public understanding of what science is about and why basic research, which promises no immediate practical results, is the lifeblood of scientific advance.

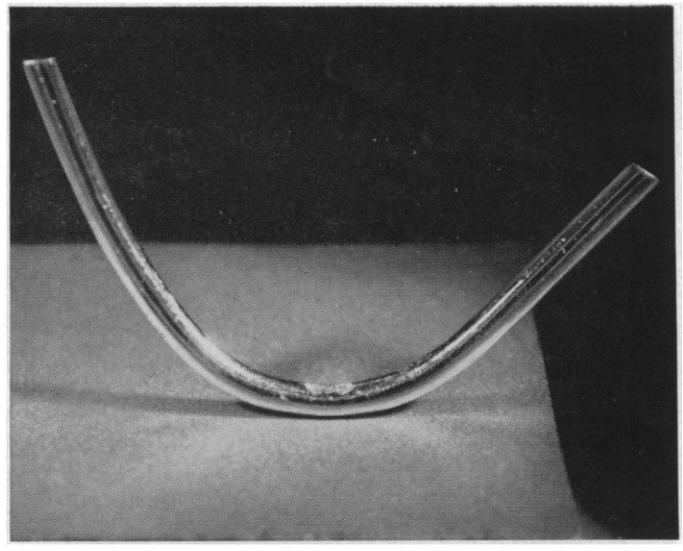
The public is probably better informed about science and more alert to its needs than at any time in the past: press reports of science are, if not ideal, much better than they were a few years ago; Congressional hearings about science receive wide publicity; and books about science are abundant and on the whole good, although some fail to convey the spirit behind basic research. Among recent books that do convey this spirit we should mention Alan T. Waterman's *Basic Research—A National Resource* [*Science* **126**, 835 (25 October 1957)], which considers in a highly readable style the justification for the support of basic research.

But there is another approach to public understanding that has received almost no attention. This is the approach through adult education. Although millions of adults take academic courses, few have an opportunity to learn anything about science except incidentally in technical and vocational courses. An adult student will find available courses in general academic subjects, the fine arts, agriculture, arts and crafts, homemaking, and recreational skills, to mention only a few, but typically no courses about developments in science.

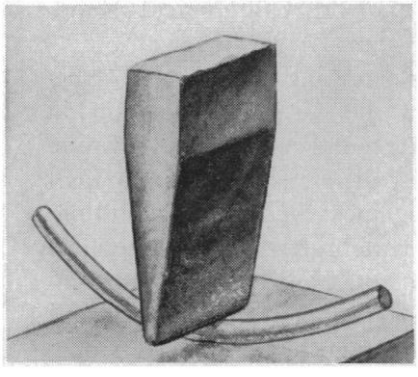
The Scarsdale, New York, public school system is an exception: this fall, in addition to the usual subjects, its Adult School offered a course of ten lectures under the title, "Science and the Citizen." Warren Weaver's opening lecture in the course appears in this issue of *Science*. Lectures by other distinguished scientists dealt with the relations of science to health, security, food supply, industry, the atom, the nuclear future, the cell, radiation, and the stars.

Perhaps the Scarsdale experiment will point the way for scientists in other communities to contribute directly to a better understanding of what science means to our society.—G. DuS.

Thermo-compression bonding—



Wire bonded to germanium by thermo-compression technique (enlarged). Wires only 1/10 the breadth of a human hair have been successfully anchored to germanium wafers only three hairs thick. The bond may be an ohmic contact or rectifying contact by adding suitable impurities to the wire and the semiconductor.



One method of thermo-compression bonding. A heated wedge presses a wire against a heated semiconductor with enough force to deform the wire. Adhesion occurs in seconds.

new way to join metal to semiconductors

Thermo-compression bonding provides a new way to attach a wire to a semiconductor. It calls for heat and pressure—nothing else. The wire and the semiconductor are moderately heated, then pressed together under moderate pressure. The resulting bond is very strong—stronger actually than the wire. No chemical flux or molten metal is required.

Eliminating molten metal provides an enormous advantage in fixing electrical connections to transistors. That's because molten metal tends to spatter and spread uncontrollably over the surface of a semiconductor. And it may alloy with the semiconductor to alter its all-important crystalline structure and chemical purity. Thermo-compression bonding easily and quickly makes a strong permanent electrical connection without damaging the semiconductor. Furthermore, the lead may be attached to microscopic areas and precisely positioned, a most valuable aid in the construction of high-frequency transistors.

Thermo-compression bonding will speed the production of transistors . . . the transistors needed to fill all the new jobs Bell Laboratories finds for them in the quest to provide still better telephone service to our growing country.

At Bell Labs Howard Christensen and Orson Anderson discuss their discovery of new bonding principle with Peter Andreatch, Jr., who collaborated in the studies.

BELL TELEPHONE LABORATORIES

WORLD CENTER OF COMMUNICATIONS RESEARCH AND DEVELOPMENT

But as matters stand, the chapter on relations and the chapters on "predicate logic" are treatments of what is, in one sense, the same theory from two different viewpoints, without adequate explanation of the relationship between the two.

ALONZO CHURCH
Princeton University

Radioactivity and Nuclear Physics. James M. Cork. Van Nostrand, New York, ed. 3, 1957. xii + 415 pp. Illus. $7.75.

Radioactivity and Nuclear Physics, now in its third edition (the second edition was published in 1950) is still the readable introductory text it was when it first appeared, in 1947. In the new edition the emphasis is on the descriptive side, and any theoretical questions are treated at a very elementary level. A particular characteristic of this book is its concern with questions of historical interest. In the chapter on accelerators, for example, a full page is devoted to an unsuccessful experiment, performed in 1928, to use atmospheric electricity. As compensation for such digressions, not only the bevatron, the cosmotron, and alternate gradient strong focusing accelerators but even the fixed field alternating gradient principle is described.

In the section on detection devices one becomes familiar with point counters, crystal counters, and naphthalene scintillation counters but not with liquid and plastic scintillators, which are much more important today. The author's love of historical facts also shows up in the parts dealing with nuclear phenomena. Only if one keeps this in mind is it understandable why the discussion of the Konopinski-Uhlenbeck theory of beta decay and its experimental aspects has not been eliminated or at least appreciably condensed. The chapter on cosmic radiation does not quite reflect today's situation in this field, in spite of the presentation of some new material.

A comparison with the second edition shows that the number of pages remains the same despite the addition of a completely new and good chapter on the nucleus. This chapter contains, among other things, a discussion of nuclear moments, of the different nuclear models (including the collective model), and even (in a footnote added in proof) of the nonconservation of parity. Eliminations and additions have been made throughout the book, and many data have been brought up to date. It goes without saying that several errors which marred the second edition are now corrected.

HEINRICH MEDICUS
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New Books

The Articulates. John M. Henry. Bobbs-Merrill, Indianapolis and New York, 1957. 254 pp. $4.

Eels, a Biological Study. Léon Bertin. Philosophical Library, New York, 1957. 200 pp. $7.50.

Biochemical Cytology. Jean Brachet. Academic Press, New York, 1957. 527 pp. $8.80.

The American Economy. Alvin H. Hansen. McGraw-Hill, New York, 1957. 214 pp. $5.

The Admirable Discourses of Bernard Palissy. Translated by Aurèle La Rocque. University of Illinois Press, Urbana, 1957. 272 pp. $5.50.

The Creative Power of Mind. Willis H. Kinnear. Prentice-Hall, Englewood Cliffs, N.J., 1957. 270 pp. $4.95.

Advances in Electronics and Electron Physics. vol. IX. L. Marton, Ed. Academic Press, New York, 1957. 357 pp. $9.

Occupational Information. Where to get it and how to use it in counseling and teaching. Including a revised and enlarged edition of the author's group guidance. Robert Hoppock. McGraw-Hill, New York, 1957. 544 pp. $6.75.

Microtechniques of Clinical Chemistry for the Routine Laboratory. Samuel Natelson. Thomas, Springfield, Ill., 1957. 499 pp. $11.

An Introduction to Algebraic Topology. Andrew H. Wallace. Pergamon Press, New York, 1957. 205 pp. $6.50.

The Scientific Study of Social Behaviour. Michael Argyle. Philosophical Library, New York, 1957. 251 pp. $6.

Physical Chemistry. E. A. Moelwyn-Hughes. Pergamon Press, New York, 1957. 1302 pp. $15.

Introduction to the Mechanics of Stellar Systems. Rudolf Kurth. Pergamon Press, New York, 1957. 183 pp. $9.

The Planet Venus. Patrick Moore. Macmillan, New York, 1957. 132 pp. $3.

Selected Writings of Walter E. Dandy. Compiled by Charles E. Troland and Frank J. Otenasek. Thomas, Springfield, Ill., 1957. 796 pp. $15.

Dynamic Psychopathology. An introduction. Thomas F. Graham. Christopher Publishing House, Boston, 1957. 251 pp. $5.

Complexometric Titrations. Gerold Schwarzenbach. Translated and revised with the author by Harry Irving. Methuen, London; Interscience, New York, 1957. 150 pp.

Reptiles Round the World. Clifford H. Pope. A simplified natural history of the snakes, lizards, turtles, and crocodilians. Clifford H. Pope. Knopf, New York, 1957. 219 pp. $3.50.

An Educational History of the American People. Adolphe E. Meyer. McGraw-Hill, New York, 1957. 464 pp.

Bergey's Manual of Determinative Bacteriology. Robert S. Breed, E. G. D. Murray, Nathan R. Smith. Williams & Wilkins, Baltimore, ed. 7, 1957. 1112 pp. $15.

Job Attitudes: Review of Research and Opinion. Frederick Herzberg, Bernard Mausner, Richard O. Peterson, Dora F. Capwell. Psychological Service of Pittsburgh, Pittsburgh, 1957. 291 pp. $7.50.

Brainpower Quest. Andrew A. Freeman, Ed. Macmillan, New York, 1957. 253 pp. $4.75.

Methods in Enzymology. vol. IV. Sidney P. Colowick and Nathan O. Kaplan. Academy Press, New York, 1957. 991 pp. $24.

Dynamic Programming. Richard Bellman. Princeton University Press, Princeton, N.J., 1957. 367 pp. $6.75.

On Nuclear Energy. Its potential for peacetime uses. Donald J. Hughes. Harvard University Press, Cambridge, Mass., 1957. 274 pp. $4.75.

Games and Decisions. Introduction and critical survey. A study of the behavioral models project, Bureau of Applied Social Research, Columbia University. R. Duncan Luce and Howard Raiffa. Wiley, New York; Chapman & Hall, London, 1957. 518 pp. $8.75.

The Epileptic Seizure. Its functional morphology and diagnostic significance. A clinical-electrographic analysis of metrazol-induced attacks. Cosimo Ajmone-Marsan and Bruce L. Ralston. Thomas, Springfield, Ill., 1957. 263 pp. $6.

Clinical Pathology Data. Compiled by C. J. Dickinson. Thomas, Springfield, ed. 2, 1957. 109 pp. $4.

The Alkaloids. K. W. Bentley. Interscience, New York, 1957. 244 pp. $4.

A Treatise on Limnology. vol. 1, *Geography, Physics and Chemistry.* G. Evelyn Hutchinson. Wiley, New York; Chapman & Hall, London, 1957. 1029 pp. $19.50.

Sixth Symposium (International) on Combustion. At Yale University, New Haven, Conn., 19–24 Aug. 1956. Reinhold (for the Combustion Institute), New York; Chapman & Hall, London, 1957. 968 pp. $28.

The Space Encyclopaedia. A guide to astronomy and space research. Dutton, New York, 1957. 287 pp. $6.95.

Other Men's Skies. Robert Bunker, Indiana University Press, Bloomington, 1956. 256 pp. $4.50.

Selected Speeches, 1948–1955, by His Royal Highness The Prince Philip, Duke of Edinburgh. Oxford University Press, London, 1957. 166 pp. $3.

Recovery from Schizophrenia. The Roland method. John Eisele Davis. Thomas, Springfield, Ill., 1957. 173 pp. $4.75.

Anatomies of Pain. K. D. Keele. Thomas, Springfield, Ill., 1957. 216 pp. $5.50.

Introduction to Protein Chemistry. Sidney W. Fox and Joseph F. Foster. Wiley, New York; Chapman & Hall, London, 1957. 467 pp. $9.50.

Changing Values in College. An exploratory study of the impact of college teaching. Philip E. Jacob. Harper, New York, 1957. 174 pp. $3.50.

Metabolic Aspects of Transport Across Cell Membranes. Q. R. Murphy. University of Wisconsin Press, Madison, 1957. 403 pp. $7.50.

International and Interregional Economics. Seymour E. Harris. McGraw-Hill, New York, 1957. 578 pp.

Pioneering in Industrial Research. The story of the General Electric Research Laboratory. Kendall Birr. Public Affairs Press, Washington, D.C., 1957. 211 pp. $4.50.