

SCIENCE

10 May 1974

Vol. 184, No. 4137

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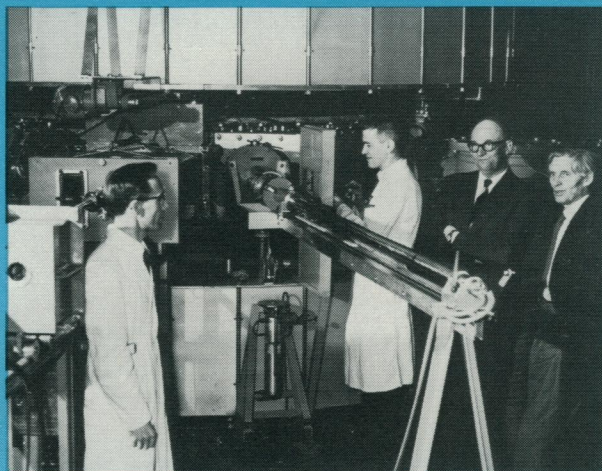
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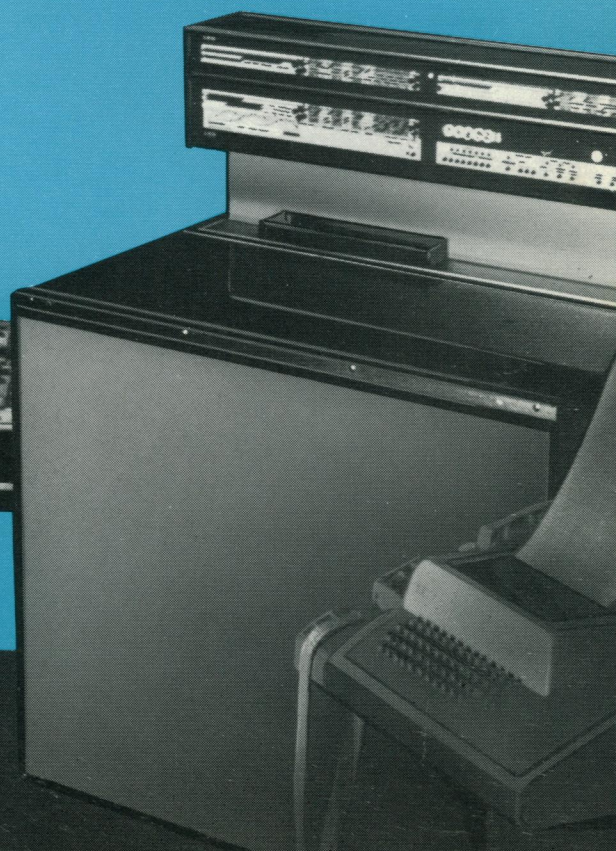
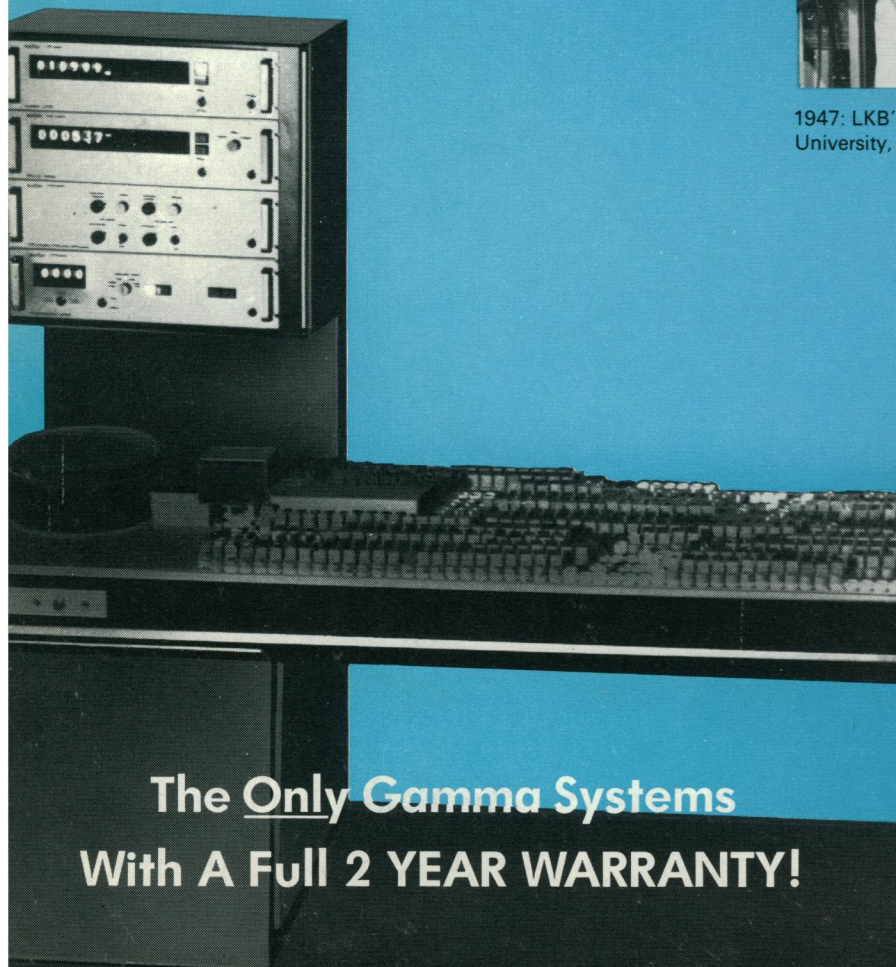
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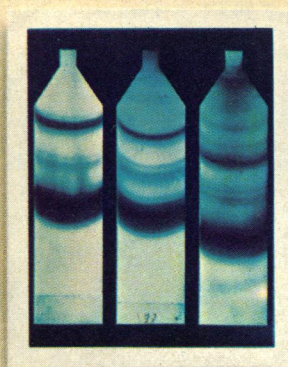
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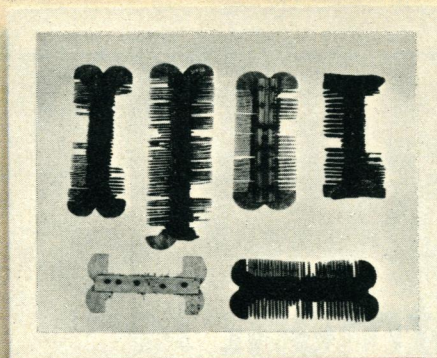
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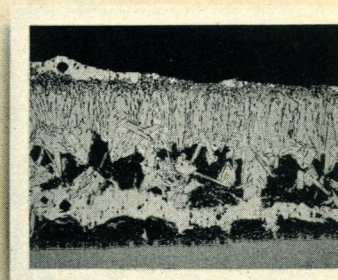
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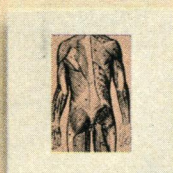
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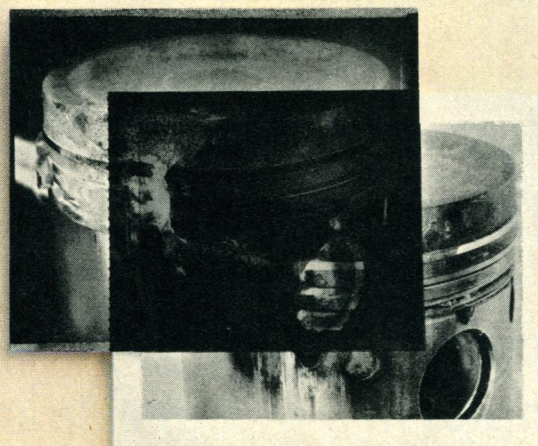
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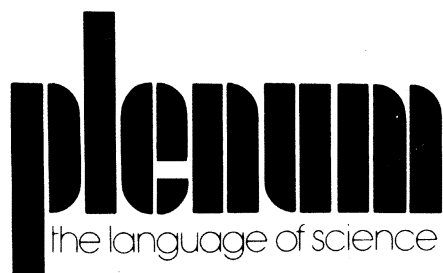
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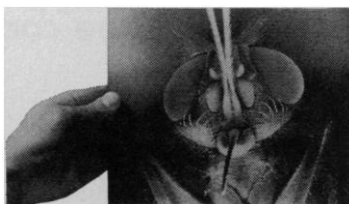


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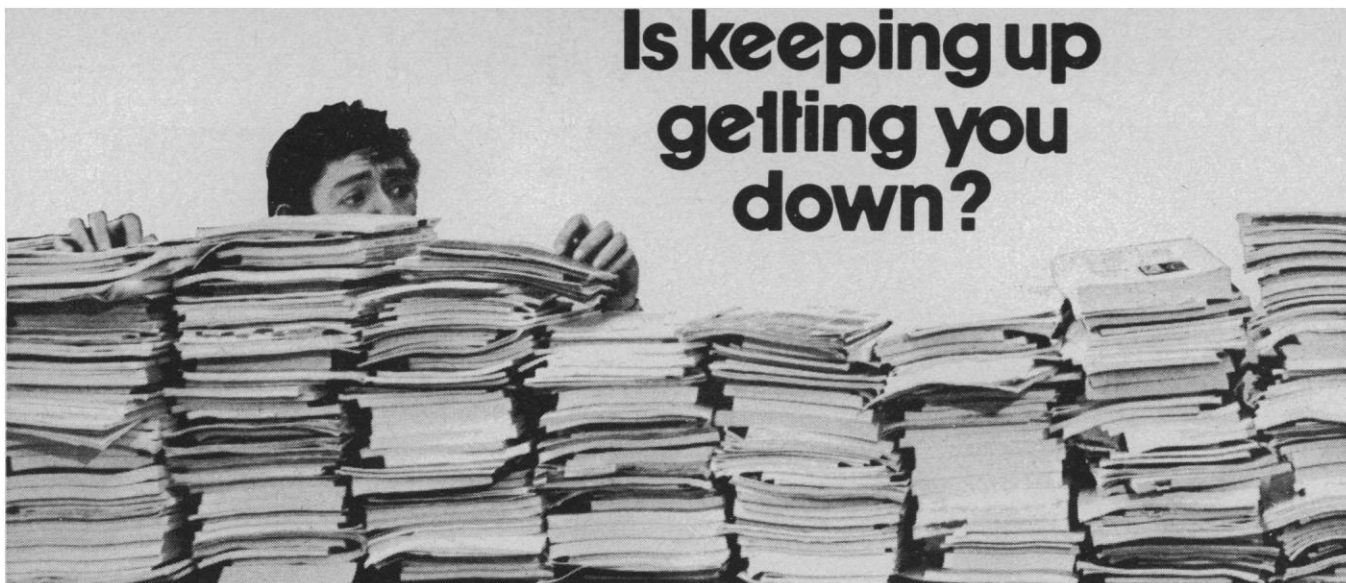
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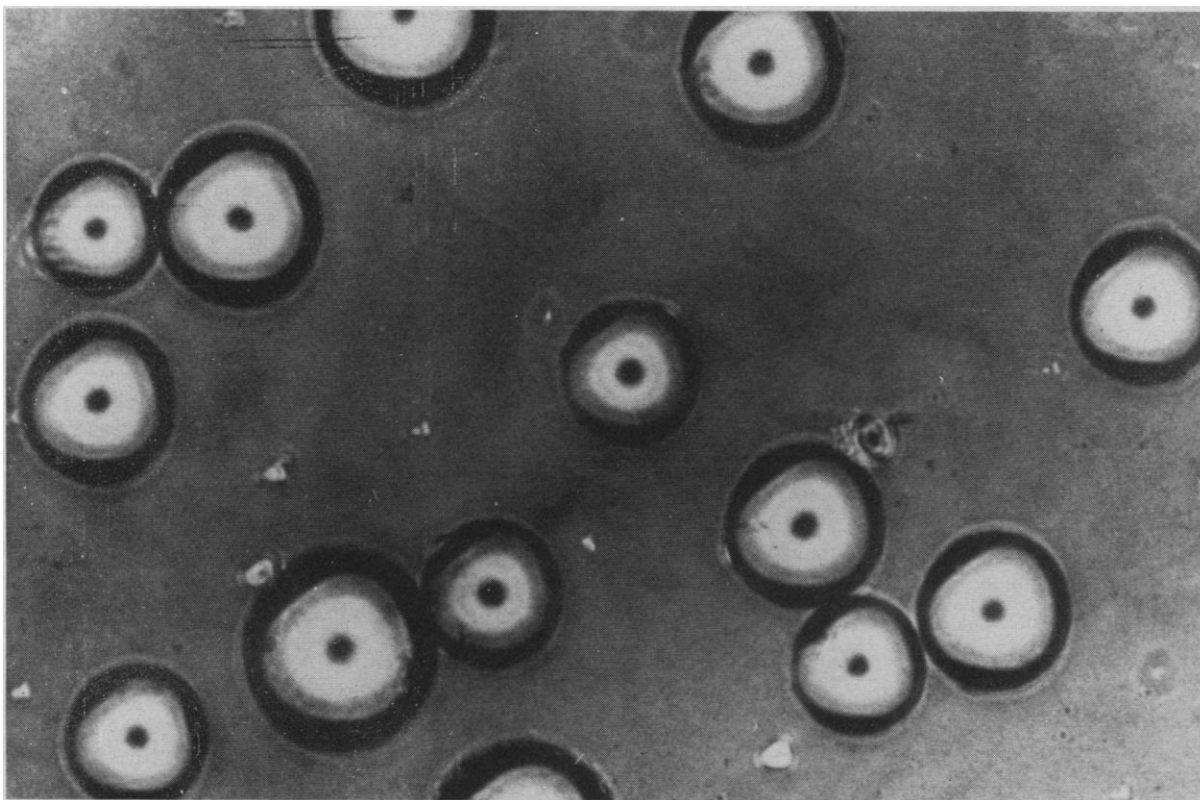
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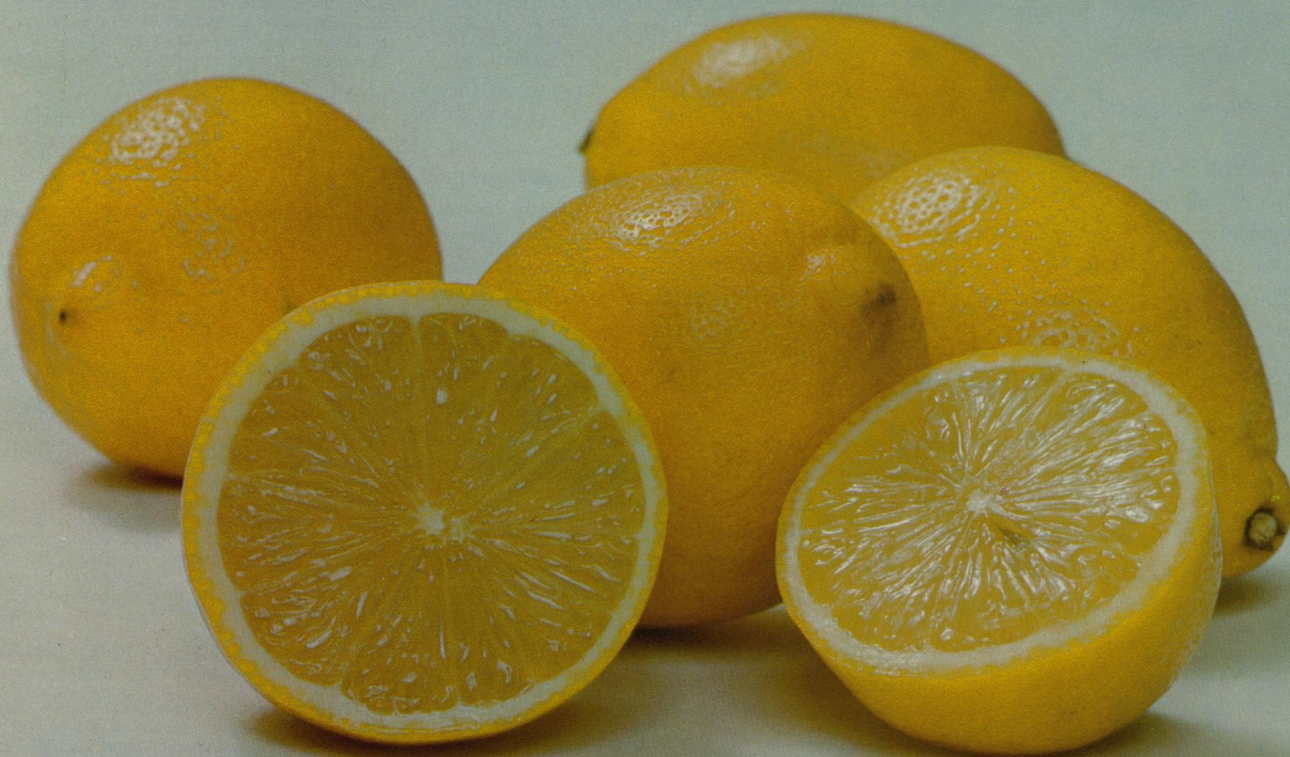
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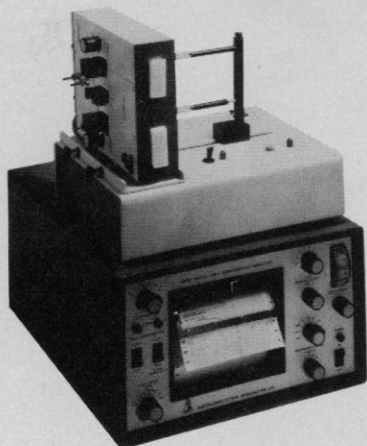


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Reducing the indoor temperature for a long period of time saves heating fuel because of the direct dependence on the temperature difference; as long as the outdoor temperature does not exceed the indoor temperature, the saving is independent of the outdoor temperature (1). Thus, an indoor temperature reduction from 70°F (21.1°C) to a minimum of 55°F (12.8°C) will always accrue the same saving when the outdoor temperature is below 55°F. The most important consequence of this is that arguments based on heating fuel savings which would trade deep winter days for days requiring heating later on are, for all outdoor temperatures below the minimum thermostat settings, wrong (2).

Further, two types of fuel saving can be distinguished: those with constant minimum thermostat settings, and those during which higher temperatures are reestablished (warm-ups). Warm-up periods clearly subtract from the reduced-temperature savings, and their number should be minimized (3). Thus, as long as the temperatures and total times remain the same, restructuring holiday periods will only result in a net saving of heating fuel if the total number of warm-ups is reduced. Thus, consolidation of holiday periods to reduce the number of warm-ups will effect net heating fuel savings (4).

Finally, heating fuel savings will be effected by lowering thermostat settings wherever possible, consistent with human needs and the prevention of damage to physical plant through freezing (5). This implies rescheduling holidays to take advantage of safe periods for complete shutdown. Such opportunities for major savings occur in the late fall and early spring in most regions where minimum temperatures above 32°F (0°C) are expected and there is no danger of very low temperatures which would result in freezing conditions in service areas carrying water (6). Thus, the greatest heating fuel savings may accrue in facilities which are in continuous operation during the coldest

portion of the year (7)—when heating to a relatively high temperature is necessary in any case to avoid damage through freezing—and which are completely shut down in fall and spring periods that are very cold, but above freezing.

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References and Notes

1. Heat loss from buildings by infiltration of outside air is also directly proportional to the temperature difference, and can be treated in the same way with the same result; see C. MacPhee, Ed., *Handbook of Fundamentals* (American Society of Heating, Refrigeration and Airconditioning Engineers, New York, 1972), p. 452, table 16.
2. This analysis is invalidated for periods during which the outdoor temperature exceeds the indoor temperature. Trading heated days for days in the later spring when heating plants would normally be shut down will, of course, effect net heating fuel savings. Also, the risks involved in running out of fuel in cool but not cold seasons are considerably lower, and minimizing risk may still call for the exchange indicated if fuel supplies are low enough.
3. Every warm-up period is paired with a cool-down period during which the extra heat stored in the structure and contents reduces the heating requirement as cooling to the new, lower temperature takes place. We have assumed that thermostat settings are reduced so that no further heat is called for until the lower temperature is reached, and that the facility is not in use during the cool-down period. In a zero order approximation, warm-up and cool-down are irrelevant to heating fuel costs.
4. As a specific illustration, distributing the customary 5 days of school spring recess among 5 midwinter weekends serves to create an additional warm-up period. For climates in which heating during the spring holiday period is necessary, this calendar shift will result in a net heating fuel loss.
5. The determining temperature is, of course, that measured in service areas containing water pipes.
6. Building surveys indicate that under some conditions freezing temperatures can be reached in service areas even when working areas are at 55°F (12.8°C). Our treatment ignores heating by sunshine, which may make significant contributions in some areas during the fall and spring.
7. Heating equipment is typically more efficient when run at full load rather than intermittently [C. A. Berg, *Science* 181, 128 (1973)].
8. We thank H. L. Frisch and R. MacCrone for helpful discussions.

The Density Concept

The article by Day and Day "Cross-national comparison of population density" (14 Sept. 1973, p. 1016) is a commendable challenge to those who oversimplify issues of population pressure, but the conclusion that density figures are frequently misleading and often useless has been stated many times before in scholarly work. The authors obviously consulted a variety of

literature, but they overlooked geographic literature. Geography as a discipline has been traditionally and centrally concerned with "spatial arrangement" and "spatial distribution." The first geographer to grapple with the problems of density data for mapping purposes was working for a commission on railways in Ireland in 1837 (1). It is surprising to us that some sociologists are only recently coming to discover the limitations of density data and of conclusions based upon them. Geographers for decades have been discussing such things as "misuses of the [density] concept" and the "inadequacies" of using the man: land ratio as a measure of population pressure.

A cursory review of literature in general geography, in population geography, and in cartography reveals that geographers have long given attention to the difficulties of using population density as an indicator of (to use the terms of Day and Day) "comparative conditions of life" or to make "inference about physical and social conditions."

In 1937, Wright applied the Lorenz curve to international comparisons of "degrees of evenness of different distributions," including that of population density (2). The meaninglessness of arithmetic population density is well documented in geographic literature. James noted in 1954 that, "where total numbers of people are enumerated within large expanses of national territory, much of which is unoccupied, the resulting figure is not only meaningless, but is sometimes dangerously misleading as to the true situation" (3). Furthermore, it is obvious to Murphey that "measures of population density or of overpopulation mean nothing unless they can be related to usable resources" (4). Smythe, Brown, and Fors cautioned that "people who are unaware of geographical controls are prone to misuse such information [statistics of population density]" (5), and Clarke outlined the difficulties he encountered when he used density indices (1, pp. 28-29).

The questionable relationship of population density to economic well-being is the central theme of Broek's idea that, once the role of cultural achievements in creating natural resources through new technology or altered economic system is understood, it is wrong "to link population density directly with economic well-

being" (6). A few years later, Carey and Schwartzberg also warned that "students should not infer facts about economic well-being from population density alone, for it is only through an understanding of the dynamic interrelationship of all the ecological factors that we can understand the nature of a region" (7). The need for other indices to accompany that of arithmetic density is possibly the oldest issue concerning the value of density indices. Over 50 years ago, Auroousseau decided that "our representations of density . . . are somewhat artificial methods of expressing the variation of grouping" (8). Broek and Webb recently have stressed the importance of adding the study of dispersion and pattern to density in order to give a complete description of the distribution of population in an area (9). As well as Monkhouse and Wilkinson (10), to whom Day and Day refer, other cartographer-geographers have commented on the misleading use of density data in population mapping. Among these are Robinson and Sale, who point out the frequently inadequate and deceptive nature of the density map (11).

These examples are representative of a body of work that has existed and been augmented over the years in the field of geography. It is disappointing to realize that these contributions by geographers have been ignored by other scholars.

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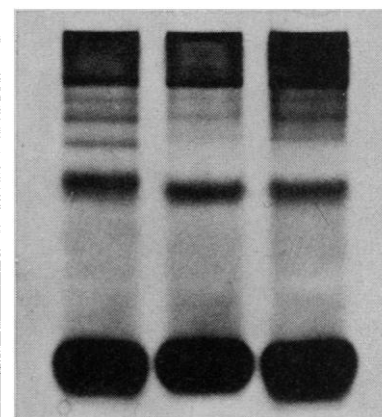
References

1. J. I. Clarke, *Population Geography* (Pergamon, London, 1965), p. 28.
2. J. K. Wright, *Ann. Assoc. Am. Geogr.* 27, 177 (1937).
3. P. E. James, in *American Geography: Inventory and Prospect*, P. E. James and C. F. Jones, Eds. (Syracuse Univ. Press, Syracuse, N.Y., 1954), p. 117.
4. R. Murphey, *An Introduction to Geography* (Rand McNally, Chicago, ed. 3, 1971), p. 61.
5. J. M. Smythe, C. G. Brown, E. H. Fors, *Elements of Geography* (St. Martins, New York, 1966), p. 444.
6. J. O. M. Broek, *Geography, Its Scope and Spirit* (Merrill, Columbus, Ohio, 1965), pp. 41-42.
7. G. W. Carey and J. Schwartzberg, *Teaching Population Geography* (Teachers College Press, New York, 1969), p. 113.
8. M. Auroousseau, *Geogr. Rev.* 11, 567 (1921).
9. J. O. M. Broek and J. W. Webb, *A Geography of Mankind* (McGraw-Hill, New York, 1968), pp. 10-12.
10. F. J. Monkhouse and H. R. Wilkinson, *Maps and Diagrams: Their Compilation and Construction* (Methuen, London, ed. 3, 1971), p. 321.
11. A. H. Robinson and R. D. Sale, *Elements of Cartography* (Wiley, New York, ed. 3, 1969), p. 147.

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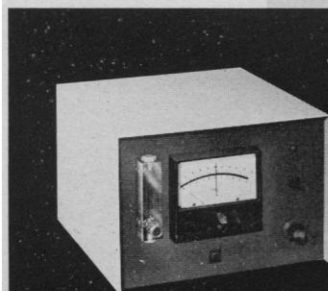
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At the February meeting of the AAAS, a recurring theme was the need to improve the mechanisms by which science advice is made available to state and local governments. These governments face an increasing number of problems with heavy scientific and technological content in the areas of land management, pollution, nuclear plant siting, river basin management, waste management, and social issues in an urban setting. Federal grant-in-aid programs, revenue sharing, and the "new federalism" have pushed greater technical and scientific responsibilities on local and state governments. With these developments has come the realization that scientific advice to state and local governments may be as important in the decades ahead as scientific and technical advice has been to the federal government in the decades just concluded. In the 1950's we had the science adviser to the White House and to the Pentagon. In the 1970's, we see increasingly the science adviser to the state house, the courthouse, city hall, and the department of sanitation.

At San Francisco, several serious scholars of American science identified in varying ways the urgent need for assuring the capacity of local and state governments to deal with present or soon-to-be-immediate problems. A common theme was that the mechanisms for obtaining and using science advice were weak but that the wells of advice were overflowing. How, pleaded the eloquent and talented at San Francisco, can we get good advice to the decision-makers so that knowledge can be translated into decisions and actions?

While few argued that the problem was this simple, the simplistic equation of a bag of resources on the one hand and a desperate need on the other to seek a broker, a middleman, or an organizational device or gimmick recurred constantly. One speaker even stated that "the purpose of a science advisory mechanism for local and state government is to relieve decision-makers of the responsibility of evaluating technical competence." Here is, of course, the argument in its simplest form. Assemble the best minds, ask the most careful and thoughtful questions, reach solid conclusions, resolve the conflicts between conflicting technical views, and the public decision-maker can confidently adopt as policy the wisdom thus served to him.

It won't work that way and it never has. Governors, mayors, councilmen, and legislators are responsible for excruciating decisions in the face of conflicting technical advice just as Truman, Kennedy, and Nixon and their congresses had to make difficult decisions on the hydrogen bomb, nuclear testing, and the ABM. In making these decisions they had to consider tough technical issues and needed to know whom to believe. Similarly, state and local officials, their staffs, the continuing civil service bureaucracies which serve them, and citizens will simply have to be brought up to a level of understanding at which decisions involving technical issues can be made through the political process. While the search for useful devices is not wholly futile and may well produce assistance on the critical problems, the governments themselves at local and state levels, just as in the past decades at the federal level, will have to meet the test. Local and state government structures and staffs largely designed to meet 19th-century problems will have to be brought up to speed to meet this century's challenges and those of the century almost upon us. Scientists, engineers, and thoughtful citizens must turn their attention to the very quality of local and state government itself, as well as to advice and advisory mechanisms.—BREWSTER C. DENNY, *Dean, Graduate School of Public Affairs, University of Washington, Seattle 98195*



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
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
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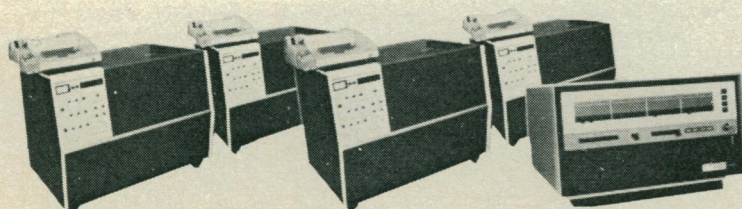
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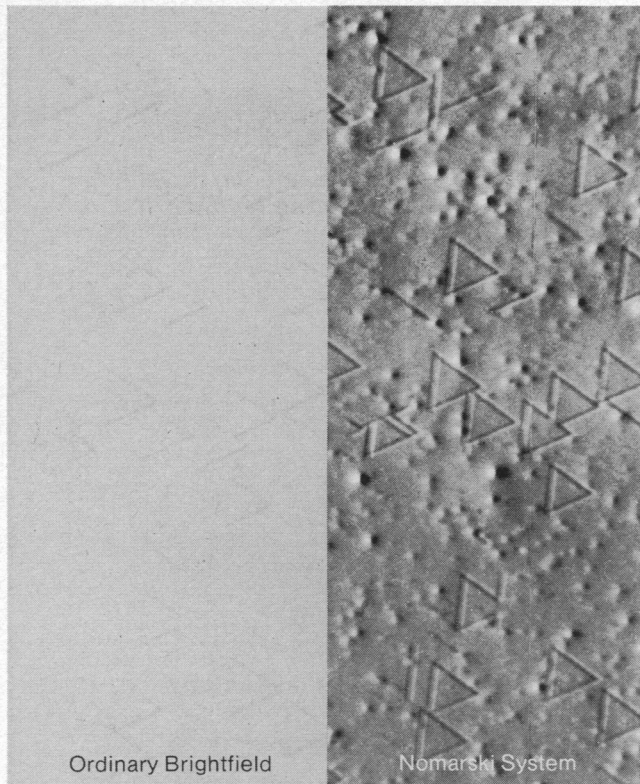
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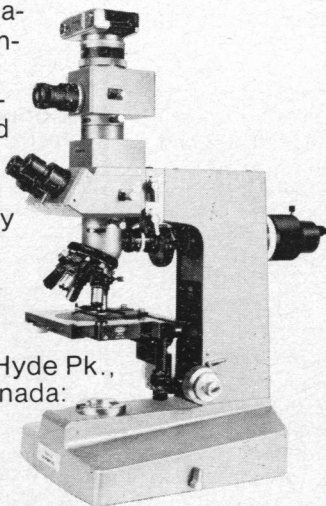


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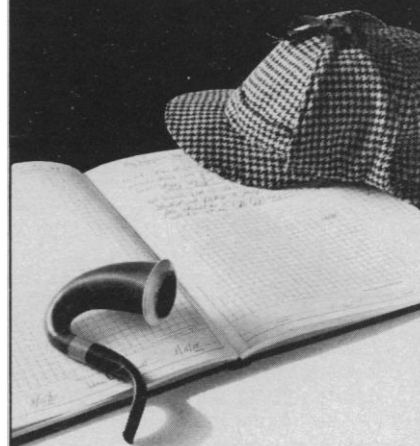
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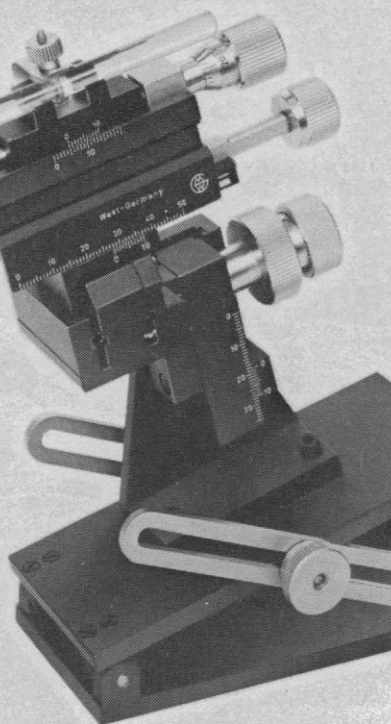


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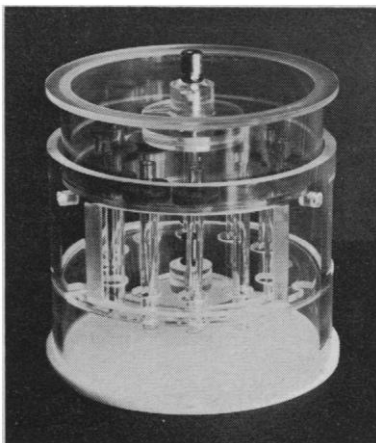


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Papers of the Peabody Museum, Harvard University, vols. 62-64 (reports on the ruins of Altar de Sacrificios, Department of Peten, Guatemala), 25 Jan. 1974, 297

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- Neymann, and E. L. Scott, Eds., 11 May 1973, 600
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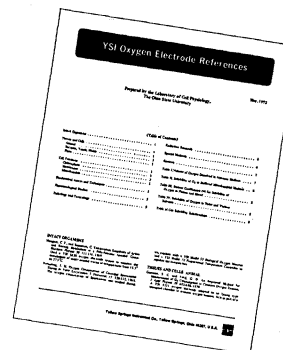


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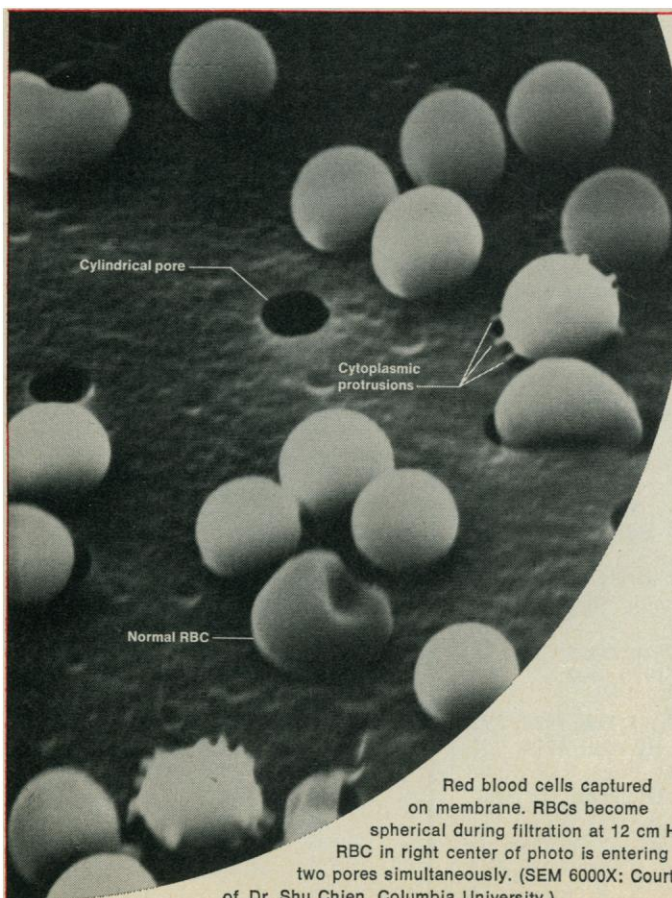


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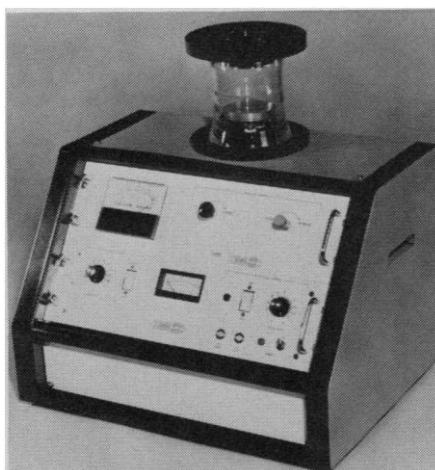


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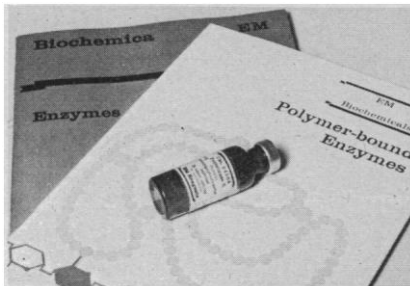
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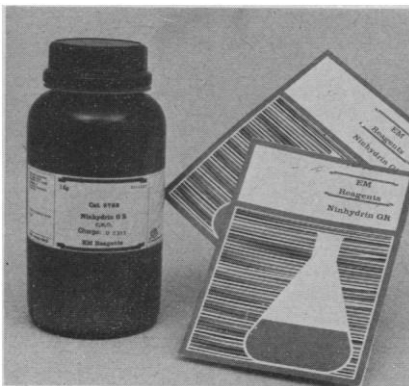
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1. D. Gillespie, S. Marshall, and R.C. Gallo, *Nature*, **236**, 227 (1972).
2. J. Schlom, D. Colcher, S. Spiegelman, S. Gillespie and D. Gillespie, *Science*, **179**, 697 (1973).



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BOOKS RECEIVED

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ker, New York, 1973. xvi, 496 pp., illus. \$60; by subscription, \$50.

Energy Principles in Theory of Structures. T. M. Charlton. Published for the University of Aberdeen by Oxford University Press, New York, 1973. viii, 118 pp., illus. \$8.

The Explanation of Culture Change. Models in Prehistory. Proceedings of a meeting, Sheffield, England, Dec. 1971. Colin Renfrew, Ed. Duckworth, London, and University of Pittsburgh Press, Pittsburgh, 1973. xvi, 788 pp., illus. \$29.95.

The Families of Flowering Plants. J. Hutchinson. Clarendon (Oxford University Press), New York, ed. 3, 1973. xx, 968 pp., illus. \$62.50.

Feeling Alive After 65. The Complete Medical Guide for Senior Citizens and Their Families. Robert B. Taylor. Arlington, New Rochelle, N.Y., 1973. xviii, 232 pp., illus. \$7.95.

Fluorine in Organic Chemistry. R. D. Chambers. Wiley-Interscience, New York, 1973. xviii, 392 pp., illus. \$19.50.

Fortran Codes for Mathematical Programming. Linear, Quadratic and Discrete. A. H. Land and S. Powell. Wiley-Interscience, New York, 1973. xvi, 250 pp., illus. \$14.95.

From Red to Black? The Financial Status of Private Colleges and Universities. William W. Jellema. Jossey-Bass, San Francisco, 1973. xviii, 174 pp., illus. \$8.75. Jossey-Bass Series in Higher Education.

Fundamentals of Mechanics and Heat. Hugh D. Young. McGraw-Hill, New York, ed. 2, 1973. xviii, 654 pp., illus. \$11.95. McGraw-Hill Series in Fundamentals of Physics.

Gas Analysis Instrumentation. A. Verdin. Halsted (Wiley), New York, 1973. xvi, 392 pp., illus. + appendices. \$26.

Green Algae. Vol. 1, Molecular Biology. MSS Information, New York, 1973. 194 pp., illus. \$15. MSS Topics in Ecology Series.

Grzimek's Animal Life Encyclopedia. Bernhard Grzimek, Ed. Vol. 9, Birds III. Bernhard Grzimek, Wilhelm Meise, Günther Niethammer, and Joachim Steinbacher, Eds. Van Nostrand Reinhold, New York, 1973. iv, 648 pp., illus. Each volume, \$29.95; 13-volume set, \$325.

A Guide to Air Quality Monitoring with Lichens. William C. Denison. Illustrated by Sue M. Carpenter. Lichen Technology, Corvallis, Ore., 1973. viii, 40 pp., illus. Paper, \$3.

A Guide to Molecular Pharmacology-Toxicology. Part 2. R. M. Featherstone, Ed. Dekker, New York, 1973. xx + pp. 427-812, illus. \$27.75.

Handbook of Sensory Physiology. Vol. 2, Somatosensory System. Ainsley Iggo, Ed. Springer-Verlag, New York, 1973. xii, 852 pp., illus. \$107.50.

The Hope of Progress. A Scientist Looks at Problems in Philosophy, Literature and Science. Peter B. Medawar. Anchor (Doubleday), Garden City, N.Y., 1973. x, 146 pp. Paper, \$1.95.

Hormones. Chemical Communicators. Roger Lewin. Anchor (Doubleday), Garden City, N.Y., 1973. vi, 114 pp., illus. Paper, \$1.95.

Identification of Plant Viruses. Methods and Experiments. D. Noordam. Center for Agricultural Publishing and Documentation, Wageningen, the Netherlands, 1973. 208 pp., illus. + plates. Paper, Dfl. 35.

Illustrations in Applied Network Theory. F. E. Rogers. Crane, Russak, New York, and Butterworth, London, 1973. x, 228 pp., illus. \$11.75.

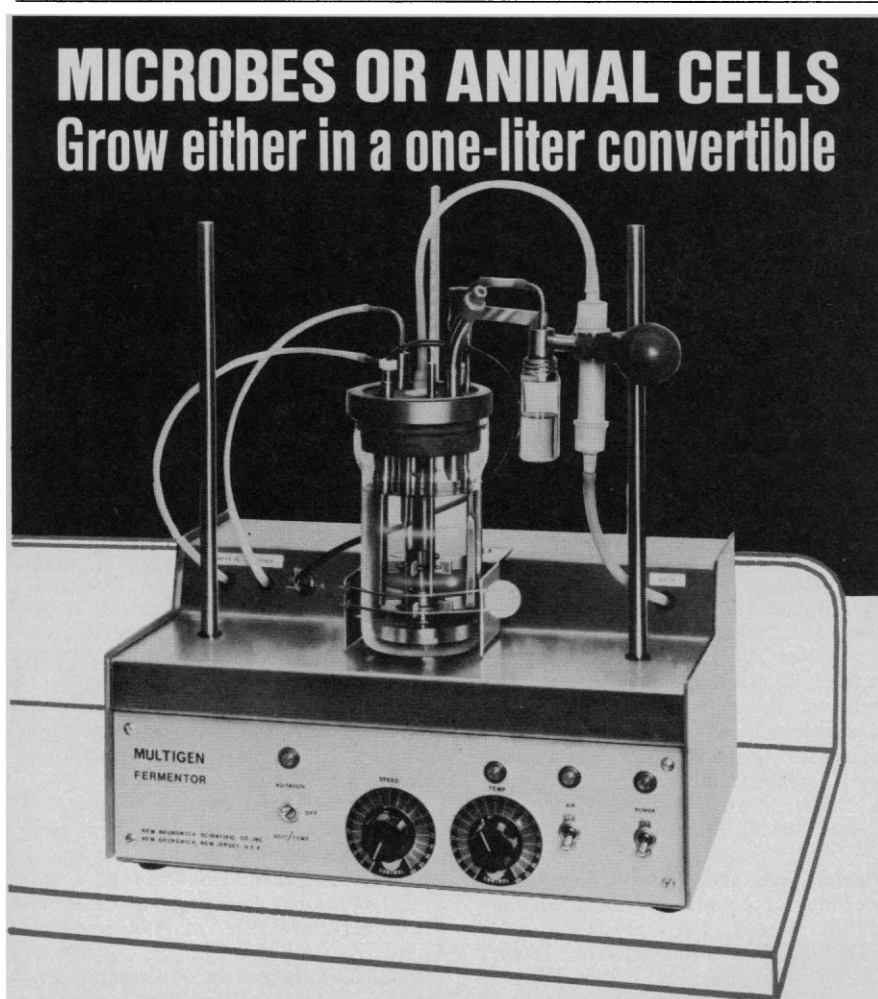
Infinite Linear Groups. An Account of the Group-theoretic Properties of Infinite Groups of Matrices. B. A. F. Wehrfritz. Springer-Verlag, New York, 1973. xiv, 230 pp. \$21.90. Ergebnisse der Mathematik und ihrer Grenzgebiete, Band 76.

Inorganic Biochemistry. Gunther L. Eichhorn, Ed. Elsevier, New York, 1973. 2 vols., illus. Vol. 1. xxvi + pp. 1-608. Vol. 2. xii + pp. 609-1264. \$110.

Integral Equations and Stability of Feedback Systems. Constantin Corduneanu. Academic Press, New York, 1973. x, 238 pp. \$19.50. Mathematics in Science and Engineering, vol. 104.

International Publications. An Annual Annotated Subject Bibliography. International Publications Service, New York, ed. 2, 1973. iv, 274 pp. Paper, \$7.50.

Introduction to Modern Organic Chemistry. Carl H. Snyder. Harper and Row, New York, 1973. xiv, 530 pp., illus. \$11.95. Harper's Chemistry Series.



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GORDON M. SHEPHERD, M.D./D. Phil., Ph.D., Yale University School of Medicine.

By describing the principles by which nerve cells are organized in different parts of the brain, this book helps readers cope with the vast amount of information that has accumulated in neuroanatomy and neurophysiology. Modern studies of structure as revealed by whole neuron stains and electron microscopy and of functional properties as revealed by microelectrode recordings are systematically reviewed. The organization of the following regions is examined: spinal cord (ventral horn), olfactory bulb, retina, cerebellum, thalamus, olfactory cortex, hippocampus, and neocortex.

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