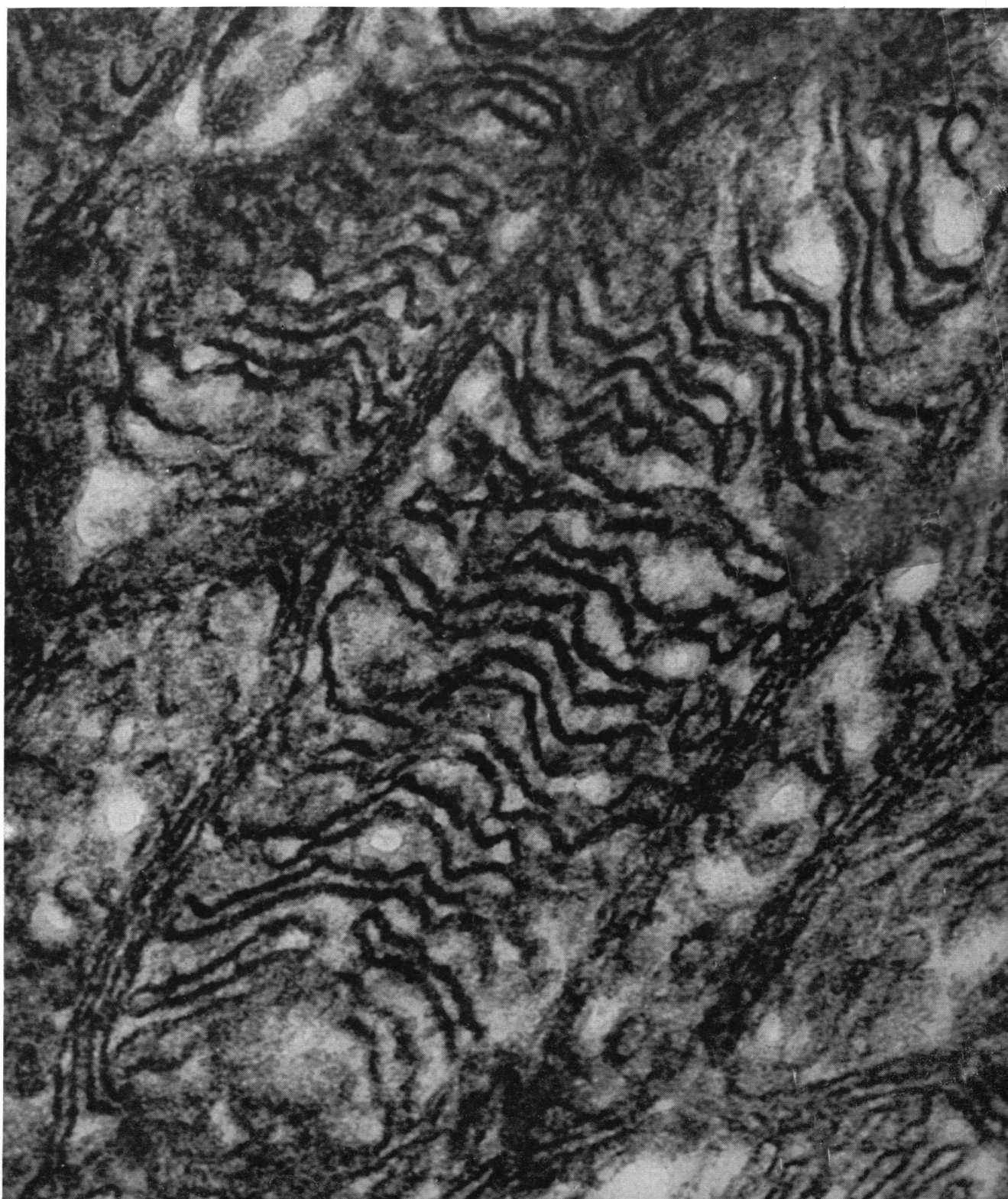


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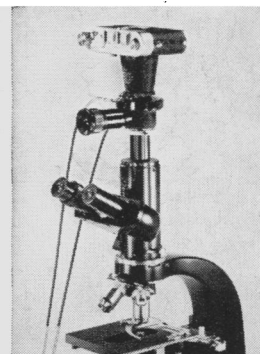
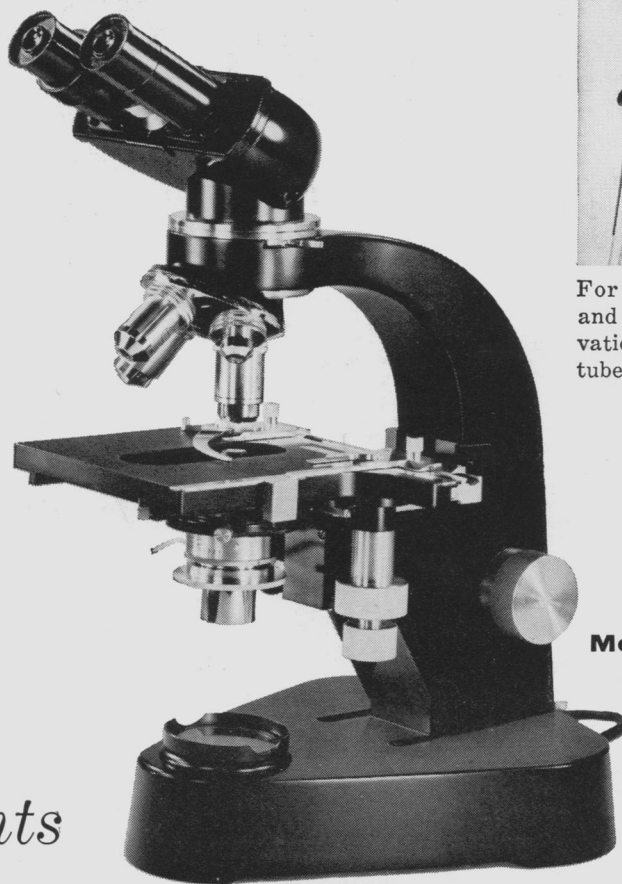
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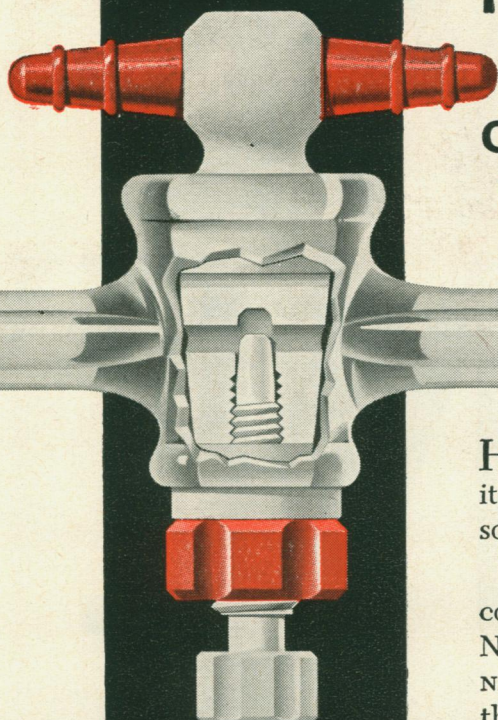
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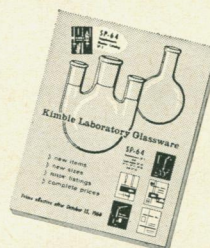


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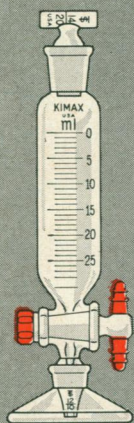
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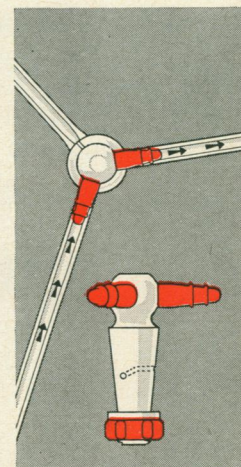
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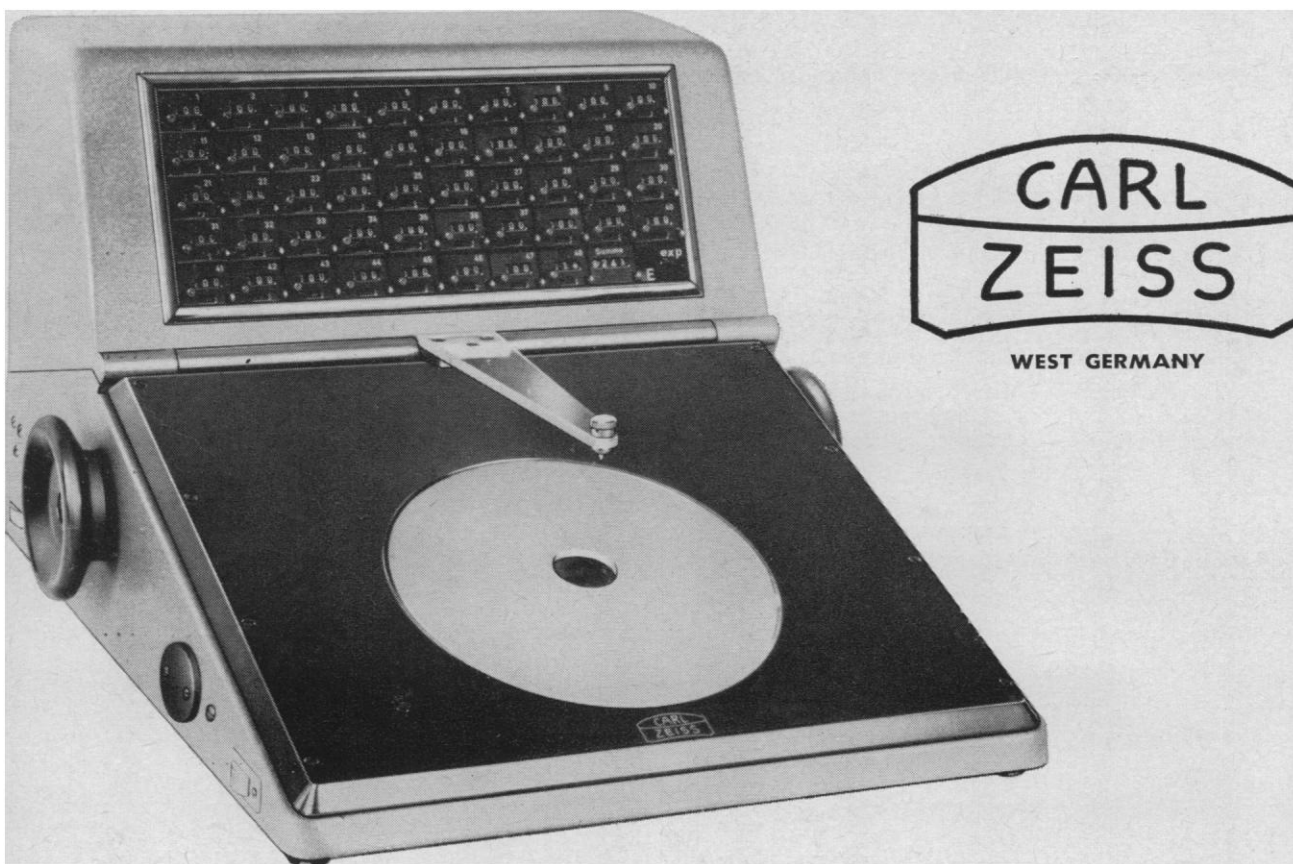


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Editorial	A Distinction That Needs Elaborating	11
Articles	The Mitochondrion and Biochemical Machines: <i>D. E. Green</i> and <i>Y. Hatefi</i>	13
	Mitochondria or their equivalents are the principal energy transducers in all aerobic organisms.	
	An Experiment in the History of Science: <i>T. B. Settle</i>	19
	With a simple but ingenious device Galileo could obtain relatively precise time measurements.	
Science in the News	Making Science a Vital Force in Foreign Policy	24
Book Reviews	<i>The Eskimos, The Story of a Tlingit Community, and An Eskimo Village in the Modern World</i> , reviewed by <i>W. S. Laughlin</i> ; other reviews	30
Reports	Identification of the Volatile Factor Involved in Spermatocyte Differentiation in vitro: <i>H. Laufer</i> and <i>R. H. Berman</i>	34
	Punishment in the Squirrel Monkey <i>Saimiri sciurea</i> : <i>J. B. Appel</i>	36
	Behavioral Method for Study of Pain in the Monkey: <i>E. D. Weitzman</i> et al.	37
	Early Pleistocene Paleoclimatic Record from Sonoran Desert, Arizona: <i>J. Gray</i>	38
	Alteration of Mutation Frequency by Treatment with Actinomycin D: <i>W. J. Burdette</i> ..	40
	Modification of Cortically Induced Responses in Brain Stem by Shift of Attention in Monkeys: <i>J. A. Wada</i>	40
	Volatile Factor in Culture of Insect Spermatocytes: <i>B. Bowers</i>	42
	Changes in Incidence of Sex Chromatin in Subcultured Cells: <i>E. V. Orsi, R. E. Wallace, H. B. Ritter</i>	43
	Excessive Stimulation of Salivary Gland Growth by Isoproterenol: <i>H. Selye, R. Veilleux, M. Cantin</i>	44
Departments	Organization of Scientific Research in Latin America; Forthcoming Events; New Products	46
	Letters from <i>D. A. Ramsay</i> and <i>A. D. Hasler</i> ; <i>L. Lorch</i>	56
Cover	Thin (200 angstroms) longitudinal section through closely packed mitochondria from the inner segment of a retinal rod, showing the characteristic arrangement of the constituent membranes with indications of regular internal fine structure. See page 13. (Low-temperature specimen preparation, electron microscope, about $\times 245,000$.) [Humberto Fernández-Morán, Massachusetts General Hospital]	



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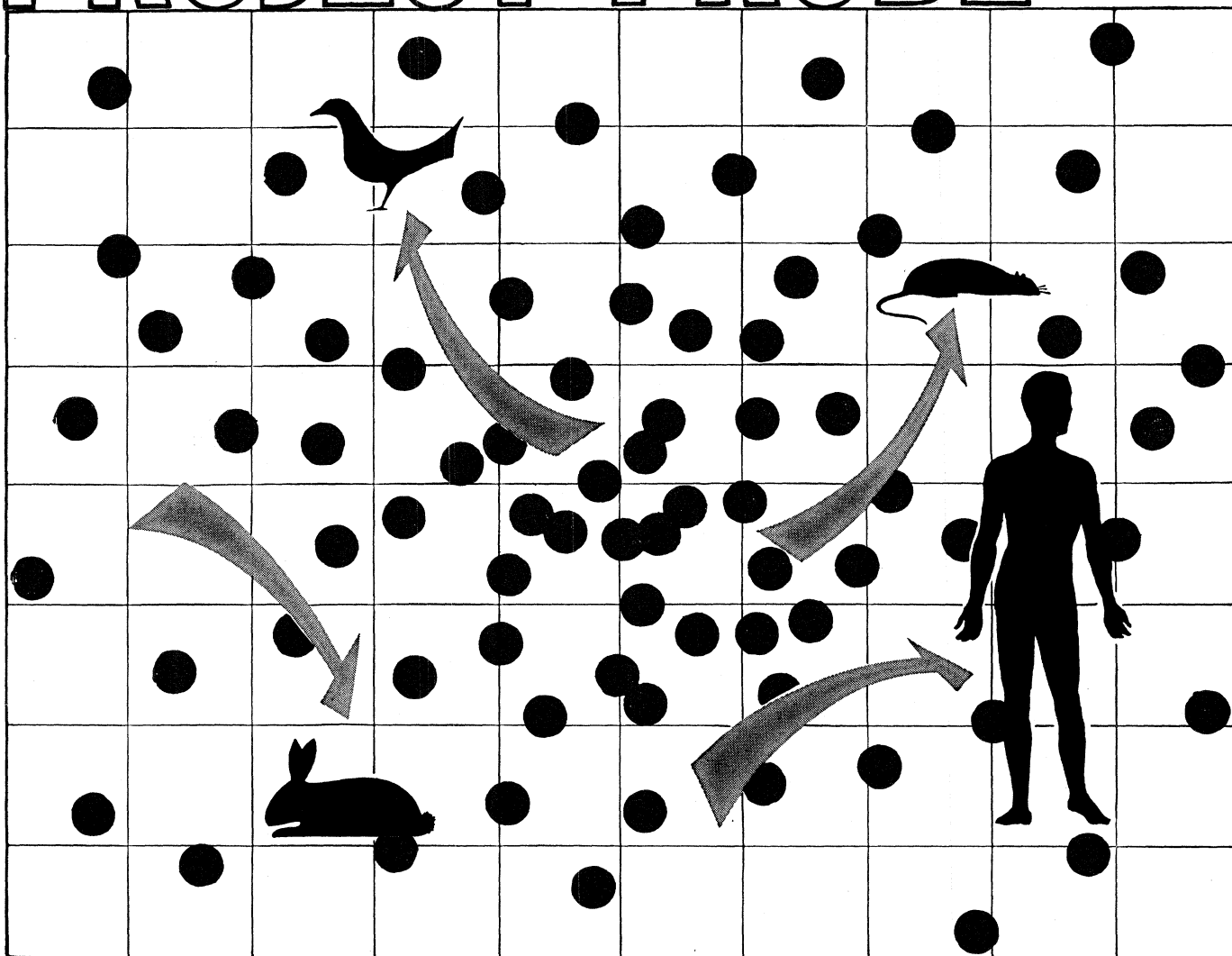
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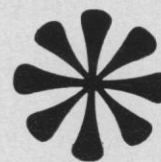
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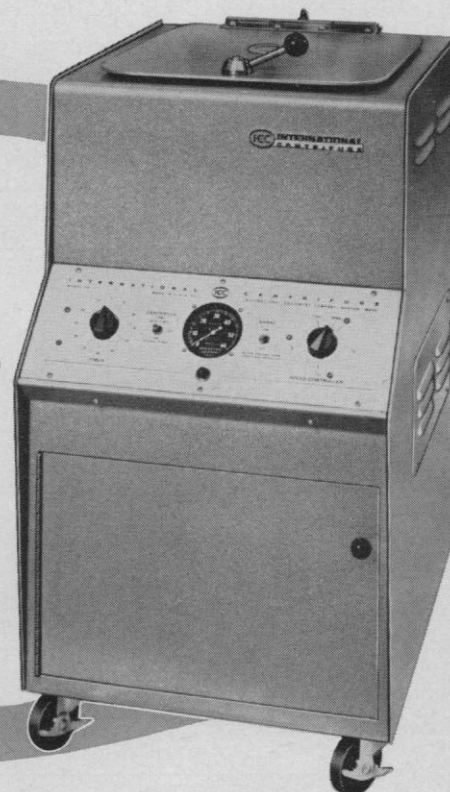
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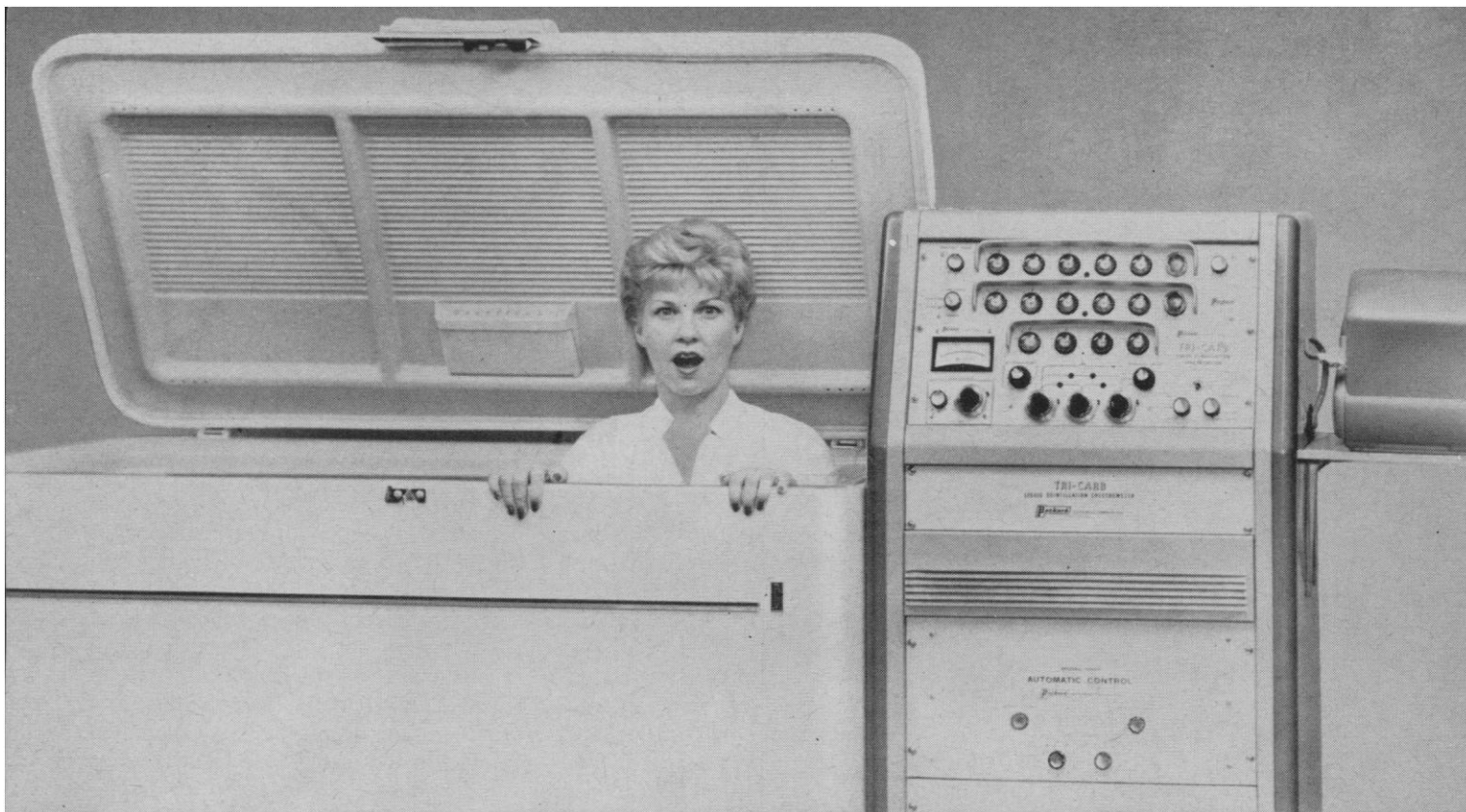
A Distinction That Needs Elaborating

A popular thesis is that a scientific belief, like "The earth is pear-shaped," may be distinguished from an ethical attitude, like "Do not steal another person's ideas," in that the belief is readily open to justification, while the attitude is not. A belief, so the argument runs, may be either true or false, with the question a matter of experiment and reason, while an attitude may be judged only right or wrong, with the question resting ultimately on private conscience. This distinction would not be so widely accepted if it were not supported by much in daily and professional life. It is also supported by a good deal of recent philosophical analysis, but such analysis also shows that without some important qualifications, the distinction can be misleading. Agreement about beliefs is not so easily achieved as the distinction would suggest, nor is the disputing of tastes as impossible.

It is easy to forget, in the glory of those moments when a scientist abandons his own beliefs to adopt those of his colleague, that new scientific ideas do not always compel instant acceptance. One obstacle to agreement over beliefs is that such agreement is not independent of common acceptance of certain attitudes. Just to hold a scientific discussion requires prior acceptance of what might be called the rules of the game. At the simplest level, this means that *A* must not only have the wit to follow *B*'s reasoning, but that *A* must be willing to listen to *B* in the first place. Some of the difficulties, for example, that have plagued the East-West talks about the technical feasibility of monitoring a nuclear test ban have been the difficulties of securing an attentive audience. The Soviets have not always been eager to listen to the scientific arguments offered by the Americans, claiming that these arguments were being offered to forestall signing a treaty.

On the other hand, in those lonely moments when we attempt to isolate and justify our most fundamental attitudes, it is easy to forget that in the ordinary course of events people often do adopt new attitudes, and that nothing can be so relevant to a change of heart as a little bit of factual knowledge. Agreement over beliefs depends, in part, on sharing attitudes, but attitudes, in turn, are a function of beliefs. In disputing attitudes, *B* may succeed in changing *A*'s attitudes by the simple expedient of correcting *A*'s beliefs. Such beliefs may range from the findings of systematic science to conclusions drawn from personal experience. It seems safe to assume, for example, that the push this country is now experiencing from segregation of the races to integration is, in part, the result of better distribution of knowledge about the qualities of the persons being discriminated against and about the consequences of discrimination to everyone concerned.

These few examples suggest that, taken without further elaboration, the popular view concerning the distinction between beliefs and attitudes can misrepresent the actual process by which men deal with one another, and so mislead us in our expectations. Perhaps we should be a little less ready to assume that when scientific experts are brought together they will iron out their differences as a matter of course, especially when the time is short and the stakes are high. Perhaps also we should be prepared to grant that attitudes are not merely matters of personal idiosyncrasy, but are, in a perfectly legitimate sense, open to justification.—J.T.



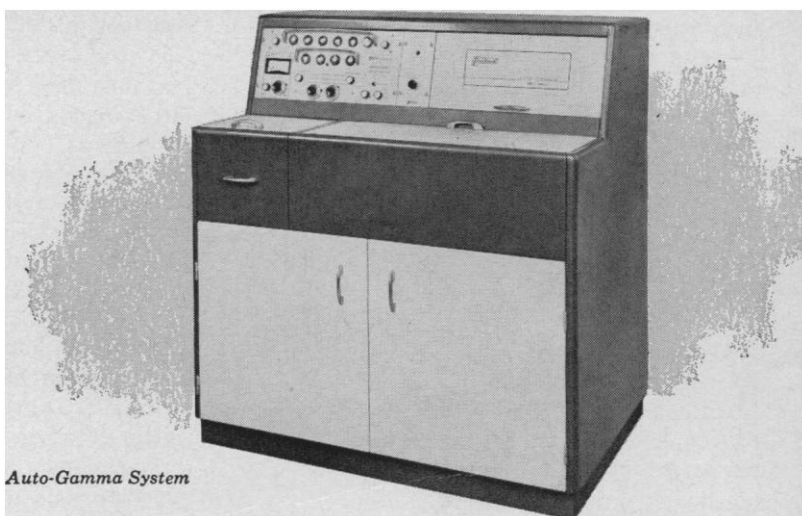
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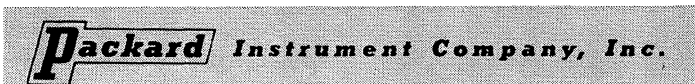
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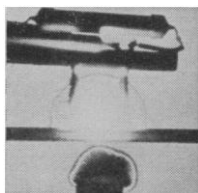
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Time after time we have visited a customer proud of some accomplishment with high-speed movies. He is willing to show us—eager, delighted to show us. The projector is started and we watch. We see a collection of strange objects. We don't know for sure what they are. Little seems to be happening. After quite a while, a new object enters the scene from the left. Shortly another new object comes up from the bottom. The two dance around each other, touch, and exit from the top of the frame. All is again static on the screen. After another while the reel comes to its end and we jump to our feet exclaiming hearty congratulations.

He deserves congratulations, probably. If we had lived with the problem as he has, the objects in the picture might have seemed no stranger than the face in the bathroom mirror; the dance might have been the triumphant, forceful, sudden, undisputed clincher to a vexatious problem; the all-purpose enthusiasm of the born salesman might have meant more.

Nevertheless, we need not be ashamed. We help scientists and engineers use high-speed photography by manufacturing a group of films to the stringent mechanical requirements of high-speed cameras. *Kodak Plus-X Reversal Film* we make for reversal processing to a fine-grain positive. *Kodak Tri-X Reversal Film* is four times as fast. *Kodak Double-X Panchromatic Negative Film*, which is a bit faster yet and very sharp, is picked when a quick negative will suffice or when several prints may be wanted later. *Kodak Royal-X Pan Recording Film* is picked only when light is very limited indeed; *Kodak Linagraph Ortho Film*, for accentuated sensitivity to green light; *Kodak High Speed Infrared Film*, for sensitivity to 9000A, with a maximum from 7700A to 8400A; *Kodachrome*

Film, for color, with low-cost commercial processing widely available; *Ektachrome ER Film*, for color at exposure index of 160 or higher.

Another thing. A bibliography on high-speed photography. Every item our library knows. Forty-six pages of items like the specimens at the immediate left. No pictures, though. No charge either. Coverage extends into 1960. Got it ready to distribute to the Fifth International Congress on High-Speed Photography in Washington in October.

Eastman Kodak Company, Photorecording Methods Division, Rochester 4, N. Y., would be glad to send the bibliography or answer questions about the above-named films.

Try these paragraphs:

Routine commercial news item: *Kodak Phototypesetting Film* and *Kodak Phototypesetting Paper* are now sold by your* Kodak dealer.

Deeper historical significance: Gutenberg did a fine thing by inventing movable type. The fellows who improved on his idea with hot-lead-casting typesetting machines also did their bit for civilization. Now, however, too many authors want to convey too many complicated thoughts to too many splinter groups of readers. The hot-lead machines are at their best with neat paragraphs of well-carpentered prose. Well-carpentered prose has its place, but for expressing the more severely logical varieties of thought it is limiting, imprecise, unclear, windy, and cumbersome. A more agile symbolism is needed at popular prices. Alert printing houses are trying to provide this symbolism through photographic methods rather than through the brutish hewing of lead. Give them time and encouragement. We have added our little touch of encouragement by having these two paragraphs phototypeset. Whether severely logical or not, they look all right, don't they?

Creatine dissembled

Eastman 7911 N-Amidinoalanine 10 g. ..\$4.80

Also known as dl- α -guanidinopropionic acid. Physiologists call it alacreatine. Physiologists want to know

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it better. Some physiologists, anyway. Particularly those interested in vitamin E. Nobody—absolutely nobody—is more interested in vitamin E than we are. Matter of business.

Deplete an animal of vitamin E and creatine shows up in urine. Creatine is $\text{NH}_2\text{-C-N-CH}_2\text{-COH}$. Normally

$\begin{array}{c} \text{NHCH}_3 \\ \parallel \\ \text{O} \end{array}$ creatine is used by combining with adenosine triphosphate to make phosphocreatine. After phosphocreatine yields up its energy, creatinine is left. Creatinine is anhydride of creatine. Vitamin E somehow mixed up in this. Creatine-to-creatinine ratio in urine is therefore good index of vitamin E status. OK.

Alacreatine is $\text{NH}_2\text{-C-N-CH-COH}$.
 $\begin{array}{c} \text{NH} \quad \text{CH}_3 \\ \parallel \quad \parallel \\ \text{O} \quad \text{O} \end{array}$

Note that difference from creatine is position of methyl group. Feed alacreatine to rats and what happens in 6 weeks? They become very weak, as in nutritional muscular dystrophy from lack of vitamin E (*Nature*, 187, 421). (Different etiology from human muscular dystrophy.)

Does alacreatine take place of genuine creatine in combining with ATP? Good question. Good answer could come from someone who buys our alacreatine for further studies. Might beat us in learning new fact about behavior of vitamin E. Would be consolation to know he at least used our alacreatine.

We make alacreatine by reacting thiourea with ethyl bromide to yield ethyl isothiourea hydrobromide, then add this with alkali to alanine. Product splits out with ethyl mercaptan. Ethyl mercaptan stench pretty well worn out as subject for levity.

Nature makes creatine by two-step method also. In kidney an amidine group from arginine transfers to glycine to make glycoylamine. In liver the glycoylamine takes on methyl group from methionine, becomes creatine. It's all done with enzymes. Nature neater, cheaper, makes more useful product.

If inconvenient to get from nature, get Creatine from us also as Eastman 951. Also offer Creatinine as Eastman 918. Creatinine Hydrochloride as Eastman 7642, Creatinine Zinc Chloride as Eastman 1272, and some 3800 other Eastman Organic Chemicals. Complete catalog from Distillation Products Industries, Rochester 3, N. Y. (Division of Eastman Kodak Company).

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tionalizing them; that the Mexican Scientific Documentation Center should make its services more easily available to scientists in other countries; that more national scientific documentation centers should be established; that governments should grant free postal services to scientific journals; and that financial help be given to a select number of journals.

The final subject on the agenda was a review of UNESCO's science programs, particularly that of the Latin American Science Cooperation Office in Montevideo. Establier described proposals which will be debated at the general conference of the organization to be held in Paris in November, and also outlined a series of long-term projects which might be undertaken by the Montevideo office. Among these was one for an International Andean Year, during which teams of specialists in different fields would attack the problems of this vast mountain chain which so profoundly affects living conditions in the countries through whose territories it runs. Another proposal was for a full-scale operation directed toward rationalizing scientific journals. A third would deal with the problems of the unproductive areas of the seas, lakes, and rivers of the continent. At the end of this discussion, Establier received the warm congratulations of the meeting, both for the way he has directed UNESCO's science activities in Latin America and for the organization of the Caracas meeting.

The final act of the meeting was the approval of a statement which it was hoped would come to be known as the "Caracas Charter," in which the delegates summed up their views on science organization in Latin America. The text is as follows.

The delegates attending the Seminar on the Organization of Scientific Research in Latin America, held in the City of Caracas from 3 to 7 October 1960, on the initiative of UNESCO and the Central University of Venezuela:

Considering:

That although considerable progress has been achieved in the field of scientific organization in some countries of Latin America, nevertheless they are not on the same level as the most advanced countries, nor is there a sufficient number of research teams to cover the needs of Latin America;

That the experience of highly developed countries demonstrates that the most remunerative investment that can be made is in scientific and technical research;

That in order to overcome the situation of insufficient economic and cultural development, the encouragement of research, especially in the basic sciences, is indispensable;

That knowledge of science and its applications should be introduced and devel-

oped at all levels of education, and that it is at the secondary level that scientific vocations and talents can be detected;

That public opinion should be aware of the role and importance of science and of the achievements of Latin American research workers;

Declare:

That a reevaluation of the organization of scientific research is indispensable, according to it due priority among the problems and prospects of Latin America:

That in order to carry out effective scientific activities not less than 2 percent of the national budget is required;

That special attention should be given to the achievement of high-level efficiency in the teaching of the basic sciences;

That encouragement should be given to research workers by means of the full-time system, with a salary able to provide a decent standard of living;

That many young students and graduates with gifts for research should be able to obtain fellowships, tenable within or outside of their countries, and working conditions which will allow them to develop their capabilities;

That the establishment of national scientific and technical research councils should be encouraged, in view of the success which these have had in the more developed countries and in several Latin American states;

That, similarly, assistance by the more advanced universities of Latin America to those less well developed should be encouraged;

That newspapers, and radio and television stations should give special attention to the diffusion of scientific knowledge and of information about scientific work in each country, for which purpose the training of specialized journalists, capable of informing the masses as part of their important mission, about the discoveries and the benefits obtained from high-level scientific and cultural activity should be encouraged;

That governments, members of parliament, business men and in general all citizens should, in one way or another, seek the opinion of scientists and technologists of good standing before they take fundamental decisions affecting the destinies of the countries of Latin America.

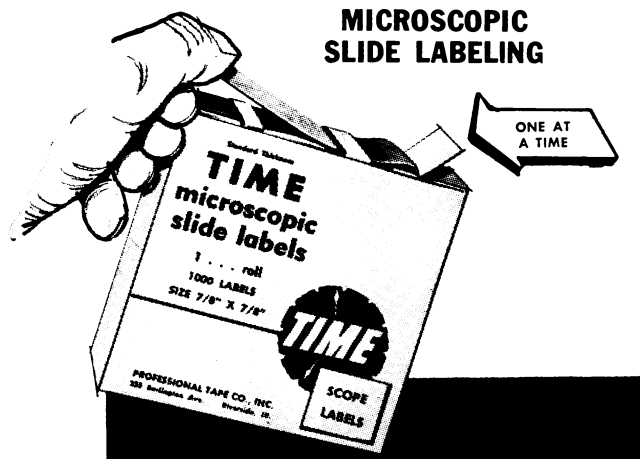
The hospitality shown by the Government and Central University of Venezuela was on a princely scale. The President of the Republic took a close personal interest in the meeting and accorded the members an audience in Miraflores Palace. We were given an opportunity to see the different departments of the university and the laboratories of the Venezuelan Institute of Scientific Research, magnificently installed at La Pipe near Caracas. We left Caracas firmly convinced that scientific research in Venezuela is at the dawn of a glorious future.

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Council of Scientific and Technical Research of Argentina, Buenos Aires

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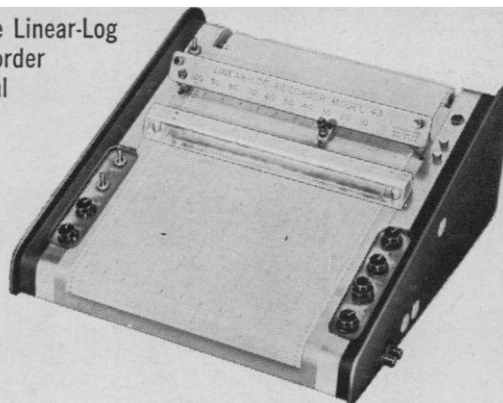


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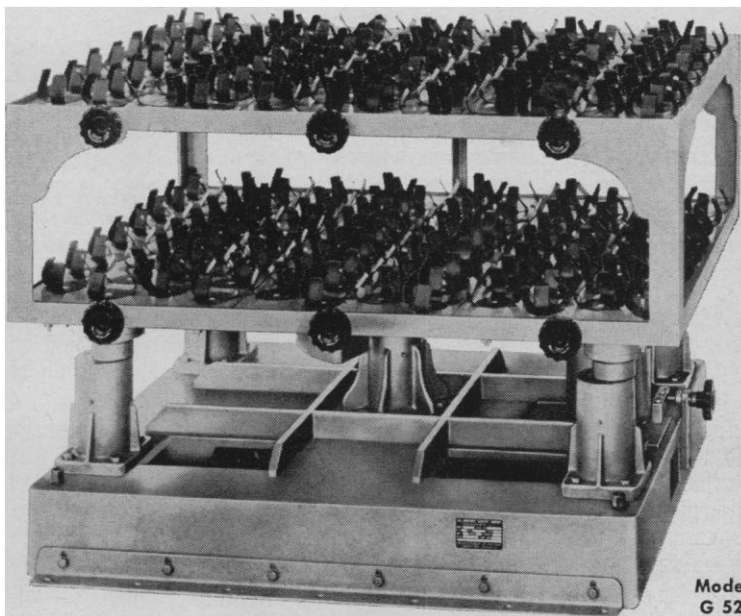
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Forthcoming Events

January

25-27. Mathematical Assoc. of America, annual, Washington, D.C. (H. L. Alder, Dept. of Mathematics, Univ. of California, Davis)

26-27. Western Spectroscopy Conf., 8th annual, Pacific Grove, Calif. (R. C. Hawes, Applied Physics Corp., 2724 S. Peck Rd., Monrovia, Calif.)

27-28. Royal College of Physicians and Surgeons, annual, Ottawa, Ontario, Canada. (T. J. Giles, 150 Metcalfe St., Ottawa)

28-30. Control of the Mind, symp., San Francisco, Calif. (Dept. of Continuing Education in Medicine, Univ. of Califor-

nia Medical Center, San Francisco 22)
28-31. Infertility, sectional meeting, Intern. Fertility Assoc., Acapulco, Mexico. (M. L. Brodny, 4646 Marine Dr., Chicago 40, Ill.)

29-3. American Inst. of Electrical Engineers, winter meeting, New York, N.Y. (E. C. Day, AIEE, Technical Operations Dept., 33 W. 39 St., New York 18)

30-3. Clinical Cong. of Abdominal Surgeons, Miami Beach, Fla. (B. F. Alfano, 663 Main St., Melrose 76, Mass.)

30-4. American Library Assoc., mid-winter meeting. (Mrs. F. L. Spain, New York Public Library, 20 W. 53 St., New York, N.Y.)

31-4. American Assoc. of Physic Teachers, New York, N.Y. (F. Verbrugge, 135

Main Engineering, Univ. of Minnesota, Minneapolis)

31-4. American Physical Soc., annual, New York, N.Y. (K. Darrow, APS, Columbia Univ., 116th St. and Broadway, New York)

February

1-3. Solid Propellant Rocket Conf., American Rocket Soc., Salt Lake City, Utah. (R. D. Geckler, Aerojet-General Corp., P.O. Box 1947, Sacramento, Calif.)

1-3. Winter Military Electronics Conv., 2nd, Inst. of Radio Engineers, Los Angeles, Calif. (A. N. Curtiss, IRE Business Office, 1435 S. La Cienega Blvd., Los Angeles 35)

1-4. American Physical Soc., annual, New York, N.Y. (K. K. Darrow, APS, 538 W. 120 St., New York 27)

2-4. Congress on Administration, 4th annual, Chicago, Ill. (R. E. Brown, American College of Hospital Administrators, 840 N. Lake Shore Dr., Chicago 11)

6-8. American Acad. of Allergy, 17th annual, Washington, D.C. (J. O. Kelly, 756 N. Milwaukee St., Milwaukee 2, Wis.)

6-8. Geodesy in the Space Age, symp., Ohio State Univ., Columbus. (W. A. Heiskanen, Ohio State Univ., 1314 Kinnear Road, Columbus 12)

6-10. British Medical Assoc., annual, Auckland, New Zealand (E. Grey-Turner, B.M.A., Tavistock Sq., London, W.C.1)

9-15. Second Allergy Conf., Nassau, Bahamas. (I. M. Wechsler, P.O. Box 1454, Nassau)

13-16. American Soc. of Heating, Refrigerating and Air-Conditioning Engineers, Chicago, Ill. (R. C. Cross, 234 Fifth Ave., New York 1)

14-15. Conference on Microdosimetry, 2nd, Rochester, N.Y. (N. Kreidl, Bausch & Lomb Optical Co., Inc., Rochester 2)

15-17. International Solid-State Circuits Conf., Philadelphia, Pa. (J. J. Suran, Bldg. 3, Room 115, General Electric Co., Electronics Park, Syracuse, N.Y.)

16-18. Biophysical Soc., annual, St. Louis, Mo. (W. Sleator, Dept. of Physiology, Washington Univ., St. Louis 10)

22-25. American Educational Research Assoc., annual, Chicago, Ill. (G. T. Buswell, 1201 16th St., NW, Washington 6)

23-25. American Orthopsychiatric Assoc., annual, New York, N.Y. (Miss M. F. Langer, 1790 Broadway, New York 19)

23-25. Fifteenth Annual Symp. on Fundamental Cancer Research, Houston, Tex. (Publications Dept., Univ. of Texas M.D. Anderson Hospital and Tumor Inst., Texas Medical Center, Houston 25)

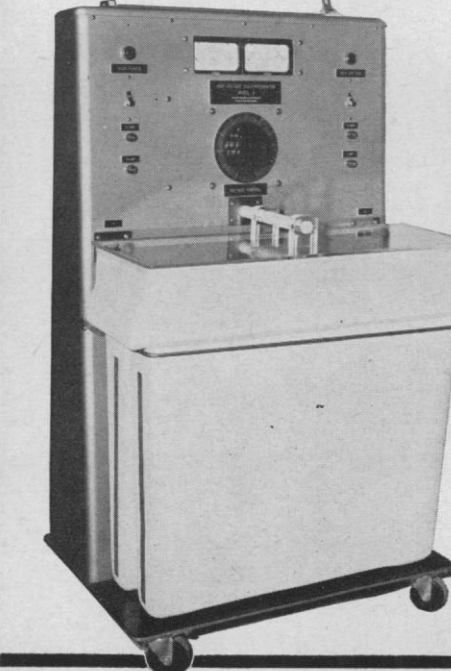
23-25. Symposium on Molecular Basis of Neoplasia, Houston, Tex. (Publications Dept., Texas Medical Center, Houston 25)

26-1. American Inst. of Chemical Engineers, natl., New Orleans, La. (F. J. Van Antwerpen, AIChE, 25 W. 45 St., New York 36)

26-2. American Inst. of Mining, Metallurgical, and Petroleum Engineers, annual, St. Louis, Mo. (AIME, 29 W. 39 St., New York 18)

27-3. Conference on Analytical Chemistry and Applied Spectroscopy, 12th, Pittsburgh, Pa. (L. P. Melnich, U.S. Steel Corp., Monroeville, Pa.)

(See 16 December issue for comprehensive list)



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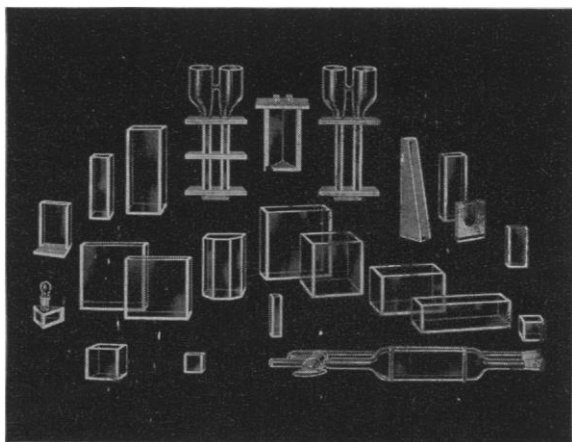
The high voltage is connected to the inside of the tank by means of two nylon and stainless steel plugs attached directly to the edge of the tank. A highly reliable interlock is provided by an extension of the handle for the cover. This stainless steel extension is the conductor which completes the primary circuit of the high-voltage transformer. Thus when the cover is removed the high voltage is turned off. There are no capacitors in the apparatus.

Developed in the Laboratory of Cellular Physiology and Metabolism, National Heart Institute, National Institutes of Health, United States Public Health Service, Bethesda, Maryland. Special thanks are due to Dr. William J. Dreyer, whose co-operation and suggestions are gratefully acknowledged by Gilson Medical Electronics. Ref.—Peptide Separation by Two-Dimensional Chromatography and Electrophoresis, Arnold M. Katz, William J. Dreyer, and Christian B. Anfinsen—The Journal of Biological Chemistry, Vol. 234, No. 11, November, 1959.

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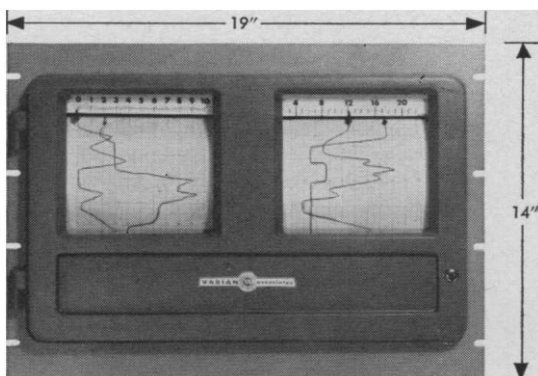
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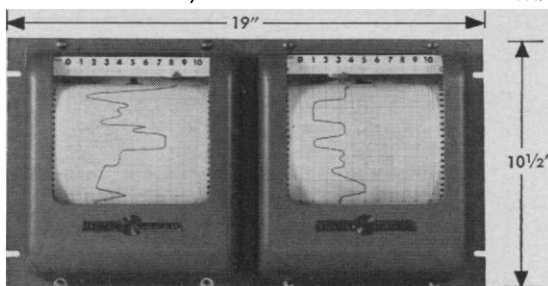


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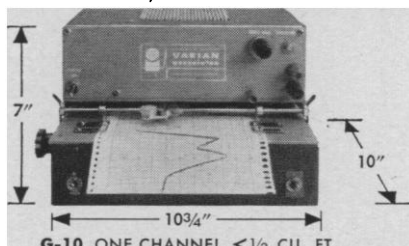
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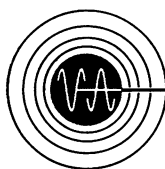


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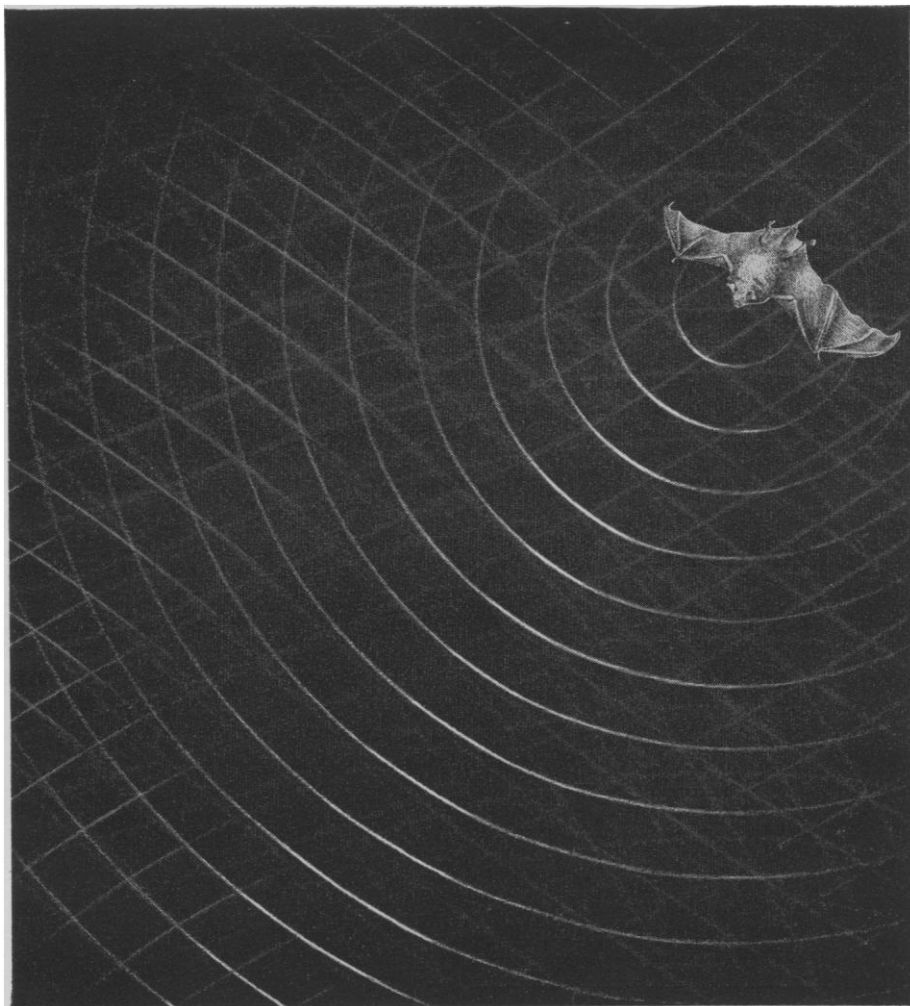
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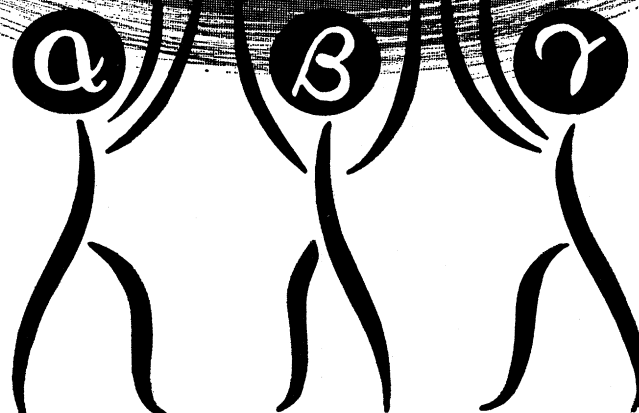
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Letters

Olfactory Cues in Migrating Salmon

1) Arthur D. Hasler's recent article, "Guideposts of migrating fishes" [*Science* 132, 785 (1960)] raises some fascinating questions. I agree with him, however, when he says he "may have overstressed the olfactory sense and its importance in migration," in discussing the cues utilized by migrating adult Pacific salmon on their trip upstream to spawning beds.

2) Reference is made in Hasler's article to a study by Wisby and Hasler in which these workers plugged the nasal sacs of migrating salmon and returned them to below a fork in the Issaquah River in Washington. When I first read the article I was struck by the fact that animals with plugged olfactory openings still "preferred" one branch over the other. The change brought about by the operation was not radical—did not reduce the choice to, say, the level of chance. It did not rule out the possibility of other controlling factors.

3) This result, I believe, is not the dramatic demonstration it should be if olfactory cues, in fact, are of primary importance in "guiding" salmon back to the "parent stream." The quotation marks in the foregoing sentence are there because the parent-stream theory is by no means as well demonstrated as Hasler leads one to believe. In addition, if one starts from this theory and accepts the implications, then one is forced to look for "cues" and stimuli which this animal can utilize in "identifying" its "own" stream and in differentiating it from other spawning streams in the Pacific Northwest. In short, the problem may be stated incorrectly.

4) H. B. Wood [*Publ. Am. Assoc. Advance. Sci. No. 8* (1939)] reports observations, for example, which led him to suspect that the temperature of the water at a fork in upstream migration governed the choice in Pacific salmon, and he points out that as the temperature differential reversed itself, salmon reversed their choice of stream. The fact that many fish are found in the parent stream could be the result of temporal relations of their life cycles which would bring them back to the area when the temperature of the parent stream favored a choice in that direction.

5) Further doubt is shed on the importance of olfactory cues in salmon migration by the lack of confirmation of conditionability of spawning adult salmon. Although the case for imprinting is not clear, the question of condition-

ing is difficult to support in view of the fact that Pacific salmon are generally believed to migrate (certainly by the time they have entered the fresh-water system) on empty stomachs. Furthermore, it is believed that they do not eat during migration and that the stomach itself is contracted. In the absence of evidence to the contrary it is hard to understand why salmon in this condition would respond to olfactory cues.

6) Intriguing as it is, the odor theory should be tested by direct observations on sexually mature and spawning salmon. The fact that salmon fingerlings can utilize olfactory cues does not mean that the migrating adult does, in fact, react to them.

DOUGLAS A. RAMSAY
308 West 109 Street,
New York, New York

Concerning the points raised in Ramsay's letter I have the following comments (numbered to correspond with the numbering of paragraphs in his letter).

1) Odors have a distinctiveness which permits multifold differences. Because of the infinite combinations of plant communities and soil types in a river system, no two tributaries will have identical organic content; hence the seepage will have odors of never-to-be-duplicated distinctiveness. Recently J. P. Heath [*Ecology* 41, 381 (1960)] presented evidence that substances seeping through two stream bars induce salmon to congregate at the river mouth even though the sand bar blocks their entry.

2) The statistical analysis with the chi-square test does not support the criticism. Even though the Issaquah River carried 8 to 10 times as much water as the East Fork, the displaced and recaptured nose-plugged salmon returned at random ($p < 0.001$).

3, 4) Salmon in the Columbia River by-pass a stream in the coastal range to swim hundreds of miles upstream to enter and spawn in their home stream, which is identical in temperature to the one nearer the mouth [see B. T. Scheer, *Quart. Rev. Biol.* 14, 408 (1939)]. The temperature hypothesis has the same weakness as the carbon dioxide hypothesis cited in my article. The cues are not unique. While some homing salmon are known to stray, the issue here is to explain the precision of homing in the great majority.

5, 6) White salmon inherit the ability to return home, early conditioning or imprinting can alter their choice of place of return. Fingerlings transferred to a stream other than the home stream return there and not to the ancestral home stream. Some species of salmon

spend 1 to 3 years in fresh water before swimming to sea. It is the conditioning of the young and retention of this "memory" to adulthood that is important. That the adults do not feed in the later stages of stream migration is beside the point. Fish become conditioned to many scents other than food odors, notably to odors which induce alarm, schooling, and recognition of sex and to the body odor of their school mates [see A. D. Hasler, *J. Fisheries Research Board, Can.* **11**, 107 (1954)].

ARTHUR D. HASLER
Department of Zoology,
University of Wisconsin, Madison

Real Professionalism

There is grave danger to an already badly mangled academic freedom in one of the recommendations you cite as emanating from a report of an agency of the influential National Education Association [*Science* **132**, 439 (1960)]. I refer to the suggestion that college faculty members be required to hold state licenses.

Implementation would be greeted with loud cheers from state legislators from the rock-ribbed coast of New York's Feinberg Law to the sun-kissed shores of California's Levering Act. The most approving chorus would be the rebel yells of southern politicians.

An instructive example in point is found in South Carolina [*A.A.U.P. Bulletin* **46**, 87 (1960)]. There the governor succeeded in forcing two private colleges to dismiss professors he didn't like. This was achieved by having the State Board of Education refuse to allow any students of those colleges to qualify for licenses as public school teachers.

It is well known that teachers in the public schools and publicly supported colleges of the American South are afraid to take stands in favor of local compliance with Supreme Court desegregation decisions. Any state licensing of college teachers would intensify this fear at the college level and spread it systematically into the private colleges. It is not hard to anticipate the creation of the analog for college teachers of the literacy tests for southern voters which well-educated men and women fail consistently if they are colored.

Thus, the state licensing of college teachers would be, in the present atmosphere, an additional and effective weapon in the hands of the violators of academic freedom.

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