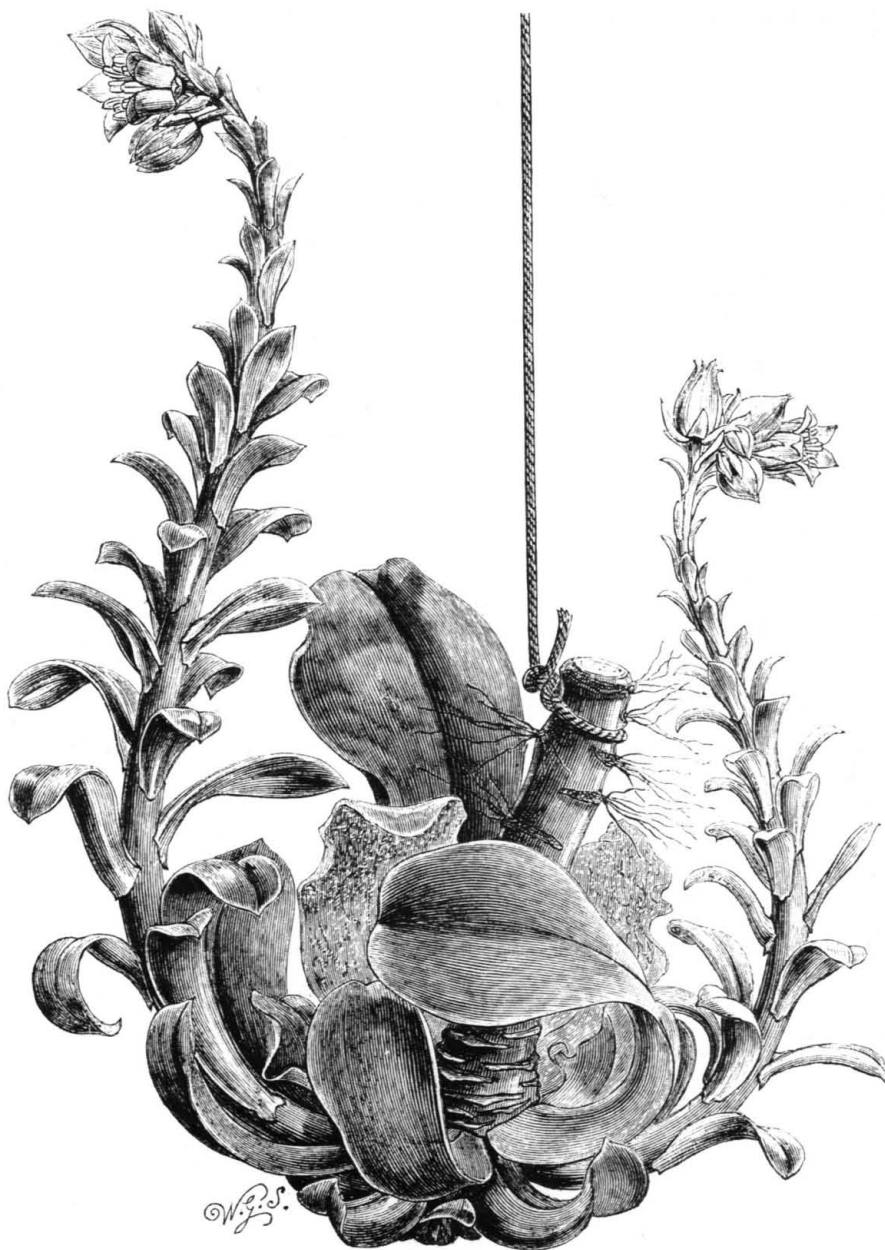


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13 May 1977, Volume 196, No. 4291



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## COVER

An example of "growth under difficulties," from a communication by Charles Darwin published in the *Gardener's Chronicle*, 29 December 1877. Darwin wrote, "The enclosed branch of *Cotyledon (Echeveria stolonifera)* was cut from a plant growing in my greenhouse, and was suspended on August 10 in my study. . . . It has sent out two fine flowering stems which . . . have bent upwards . . . . They have now (December 6) begun to flower. . . . [T]he specimen weighed on September 1 45.46 grammes, on December 6 36.94 grammes, so that its growth has continued in spite of a considerable loss of water." [From *The Collected Papers of Charles Darwin*, reviewed on page 784]

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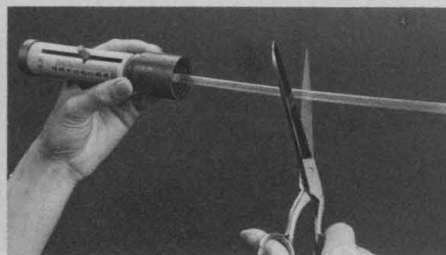
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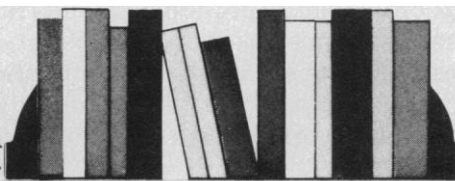
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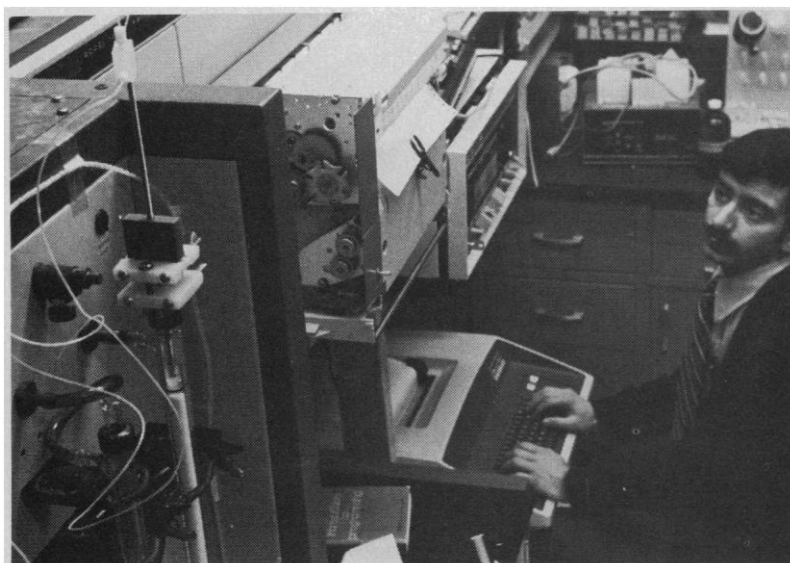
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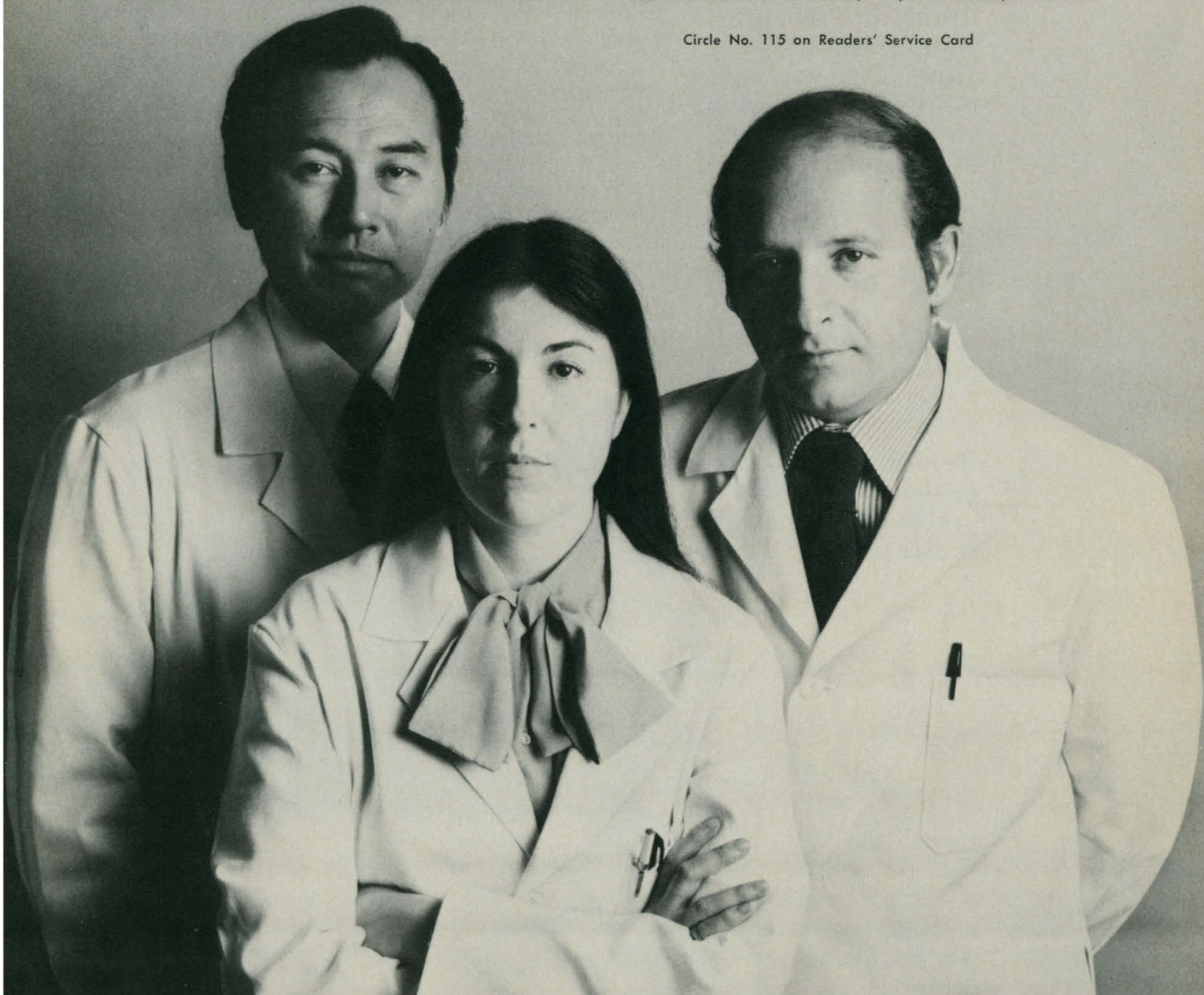
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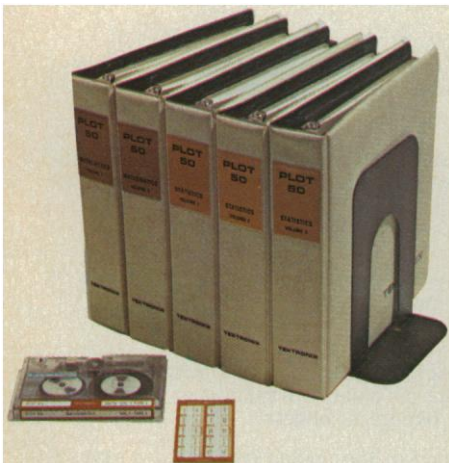


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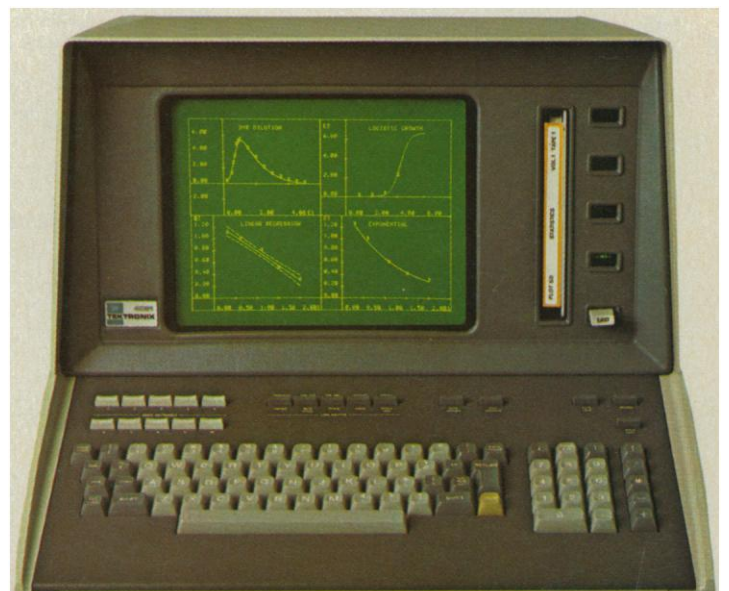
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## PROGRAMME FOR 1977

### ENDOCRINOLOGY - November 7-10 - Jacques Hanoune, chairman; Etienne Baulieu, vice-chairman

7 November. Morning session: Recent methodological advances (J. NUNEZ, discussion leader)

**F. Morel:** Cellular heterogeneity and micromethods of adenylate cyclase assay: an experimental study in kidney; **W.H. Evans:** Characterization of plasma membrane from liver; **A. Helenius:** Solubilization and reconstitution of membranes.

Evening session: Prostaglandins (J. DUMONT, discussion leader)

**B. Samuelson:** Prostaglandins, endoperoxides and thromboxanes, unstable regulators; **R. Flower:** Interaction of drugs with arachidonic metabolism.

8 November. Morning session: Adenylate cyclase system (M. SCHRAMM, discussion leader)

**T. Pfeuffer:** Guanine nucleotides binding proteins and adenylate cyclase activity; **J. Holmgren:** Cholera toxin and its interaction with ganglioside receptors and adenylate cyclase; **H.K. Jakobs:** Inhibition of adenylate cyclase by alpha adrenergic agonists.

Evening session: Adenylate cyclase system (G. SCHULTZ, discussion leader)

**M. Schramm:** Transfer of hormone receptors to adenylate cyclase system of different cells. A study in biochemical compatibility; **J.C. Metcalfe:** Mechanism of coupling of hormone receptors to adenylate cyclase; **G. Rousseau:** Glucocorticoids and cyclic AMP.

9 November. Morning session: Intermediary metabolism (H. CLAUSER, discussion leader)

**J. Girard:** Evidence that free fatty acids stimulate gluconeogenesis in newborn rats; **R.M. Denton:** The hormonal regulation of pyruvate dehydrogenase activity; **H. de Wulf:** Role of calcium in hepatic glucogenolysis; **J. Exton:** Cyclic AMP and non-cyclic AMP mechanisms of hormone action.

Evening session. Non-mammalian systems (E.E. BAULIEU, discussion leader)

**P. Brachet:** Involvement of cyclic AMP signals in cell differentiation of Dictyostelium; **M. Ashburne:** Recent studies in the mode of action of Ecdysone; **M. Berridge:** The insect salivary gland, a model system for studying hormone action.

10 November. Morning session: Insulin action (F. MOREL, discussion leader)

**P. de Meyts:** The structural and thermodynamic basis of negative cooperativity in insulin-receptor interaction; **T. Clausen:** Calcium ions, glucose transport and insulin action; **J. Gliemann:** Insulin binding, degradation and effect on glucose transport in adipocytes; **P. Freychet:** Receptors for insulin and glucagon: relationship between hormone binding and biological effects.

Participants who would like to present microcommunications (up to three slides) in fields related to the invited lectures are requested to get in touch with the discussion leader of the session during the meeting.

### IMMUNOLOGY - November 14-17 - François Kourilsky, chairman; Jean-François Bach, vice-chairman

14 November. Morning session: Nature of T cell receptors (K. EICHMANN, discussion leader)

T cell idiotypes; Approaches to biochemical definition; Relationship to I region products, allotypes and immunoglobulin V genes; Effect of antiidiotypic reagents...

Main speakers: **H. Binz, P.A. Cazenave, H. Cosenza, K. Eichmann.**

Evening session: Specificity of T cell receptors (D.B. WILSON discussion leader)

Range of specificity; Mono-or polyspecificity per cell; Restricted repertoire(s) as a function of T cell subclasses...

Main speakers: **C. Carnaud, M. Nabholz, D.B. Wilson.**

----- ✂ -----  
**Scientists wishing to attend one of these three conferences, -according to the practical arrangements already published in Nature February 17, 1977, in Science February 25, 1977 and in La Recherche n° 76 mars 1977 - have to submit this application form BEFORE JUNE 6th to INSERM Conferences, 101, rue de Tolbiac - 75645 PARIS CEDEX 13, France - Telephone : 584-14-41.**

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Necessary corecognition of H-2 region determinants by precursor or effector T-cells recognizing non H-2 products; Altered-self versus dual recognition...

*Evening session: T-cell mediated cytotoxicity (P. GOLSTEIN, discussion leader)*

**Mechanisms: Cytolysis and cytostasis: One or several subclasses of T killers ?...**

Main speakers: **A.C. Allison, G. Berke, P. Golstein.**

**16 November. Morning session: Differentiation from resting to effector T cells (V. EIJSVOOGEL, discussion leader)**

T-cell subclasses: The LD-SD problem: Specific reactivation of primed cells by non specific stimuli...

**Main speakers: J.C. Cerottini, V. Eijssvoegel, H. Festenstein, C. Mawas.**

*Evening session: Regulation of T cell differentiation - T cell subclasses (E. SIMPSON, discussion leader)*

Differentiation markers on T-cell subclasses and their possible functional role; Direct or factor-mediated regulatory interactions between differentiating cells. . .

Main speakers: **M.A. Bach, M. Feldmann, J.C. Leclerc, M. Röllinghoff, E. Simpson.**

*17 November. Morning session: Open discussion*

**Jacques Glowinski, chairman; Jean-Pierre Changeux, vice-chairman**

**21 November. Morning session: Neurotransmitters (Identification) - E. FONNUM, discussion leader**

**L. Descarries:** Synaptic and non-synaptic relationships of central monoaminergic neurons; **T. Hökfelt:** Peptidergic neurons; **J. Hughes:** Enkephalins; **A.C. Cuellar:** Substance P on neuronal pathways.

*Evening session: Neurotransmitters (Synthesis-Release) - H. THOENEN, discussion leader*

**F. Fonnum:** Glutaminergic neurons; **H. Zimmermann:** Turnover of ACh and synaptic vesicles in the nerve terminals of the Torpedo electric organ; **Y. Dunant-M. Israël:** Processes involved in the release of ACh.

22 November. Morning session: Neurotransmitters (Synthesis-Release) - T. HÖKFELT, discussion leader

**H. Winkler:** Biogenesis of catecholamine-storing organelles: Uptake of small molecules; **S. Langer:** Presynaptic receptors on noradrenergic terminals; **N. Weiner:** Regulation of tyrosine hydroxylase in peripheral non-adrenergic neurons; **M.F. Giorguleff:** Role of autoreceptors and cholinergic receptors on DA release in central DA neurons.

*Evening session. Receptors (Cholinergic) - J. HUGHES, discussion leader*

**A. Sobel:** Purification and characterization of the acetylcholine receptor protein in its membrane bound and detergent solubilized forms from *Torpedo marmorata* electric organ; **T. Jovin:** Dynamic studies of ligand interaction with the ACh receptor; **S. Fuchs:** Immunological properties of the ACh receptor and their relevance to Myasthenia gravis.

23 November. Morning session: Receptors (Cholinergic) - T. LOMO, discussion leader

**N. Birdsall:** Biochemical properties of muscarinic receptors; **B. Sackmann:** Kinetic properties of ion-channel in frog end-plate membranes derived from noise measurement; **D. Colquhoun:** The use of  $\alpha$ -bungarotoxin and end-plate current fluctuations to investigate the effect of agonists and false transmitters on cholinergic receptors; **P. Ascher:** Effects of ACh on molluscan neurons.

*Evening session: Receptors (opiate, adrenergic) - N. WEINER, discussion leader*

**B. Hamprecht:** Opioid receptors in neuroblastoma x glioma hybrid cells; **A. Levitsky:** The properties of the  $\beta$ -adrenergic receptor and its mechanism of coupling to adenylate cyclase; **J. Bockaert:**  $\beta$ -adrenergic receptors of glioma cells.

24 November. Morning session: Receptors (Modulation, transynaptic effects) - S. FUCHS, discussion leader

**T. Lomo:** Modulation of extrasynaptic cholinergic receptor population; **J.C. Schwartz:** Modulation of central catecholaminergic receptors mechanisms; **H. Thoenen:** Transynaptic effects of ACh.

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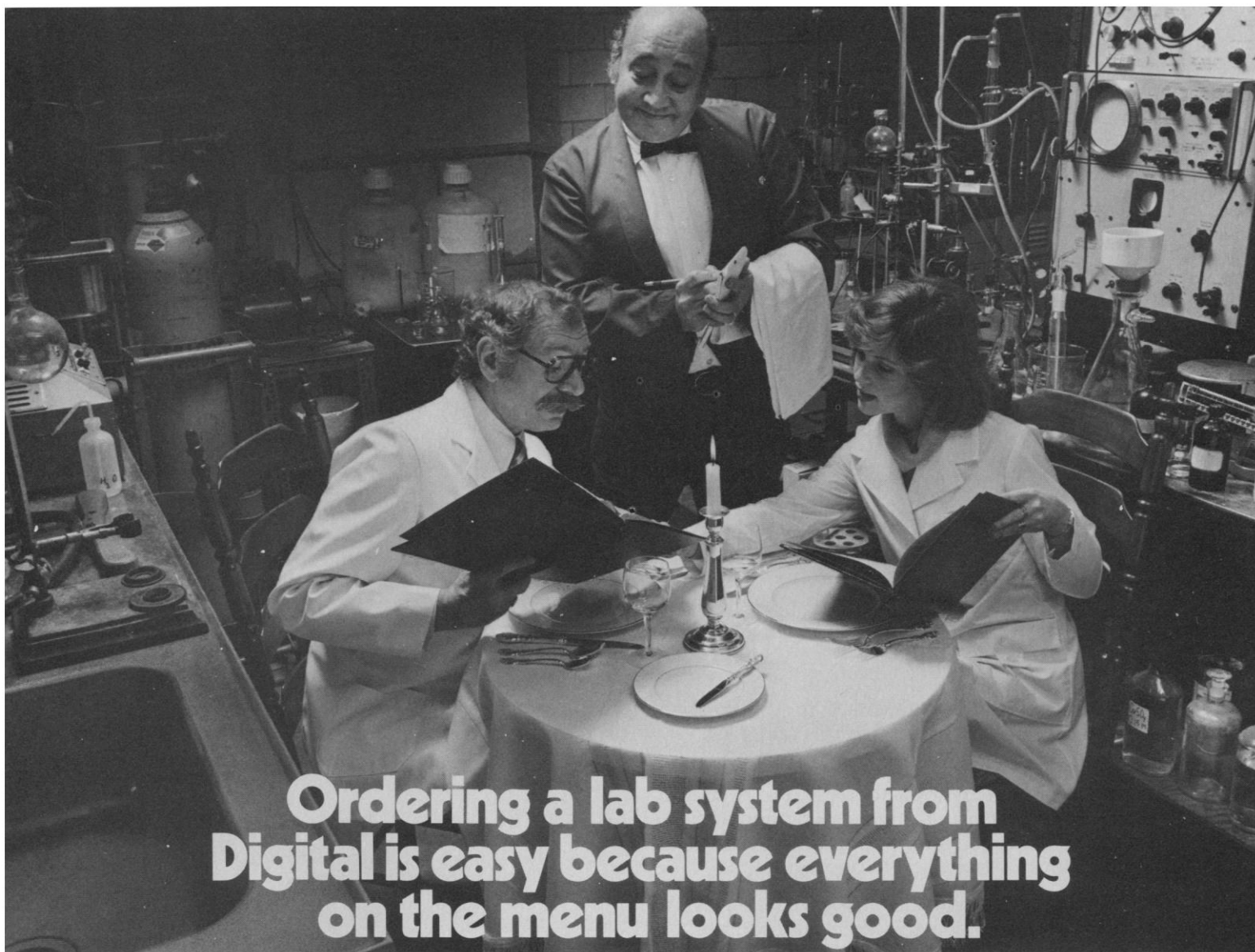
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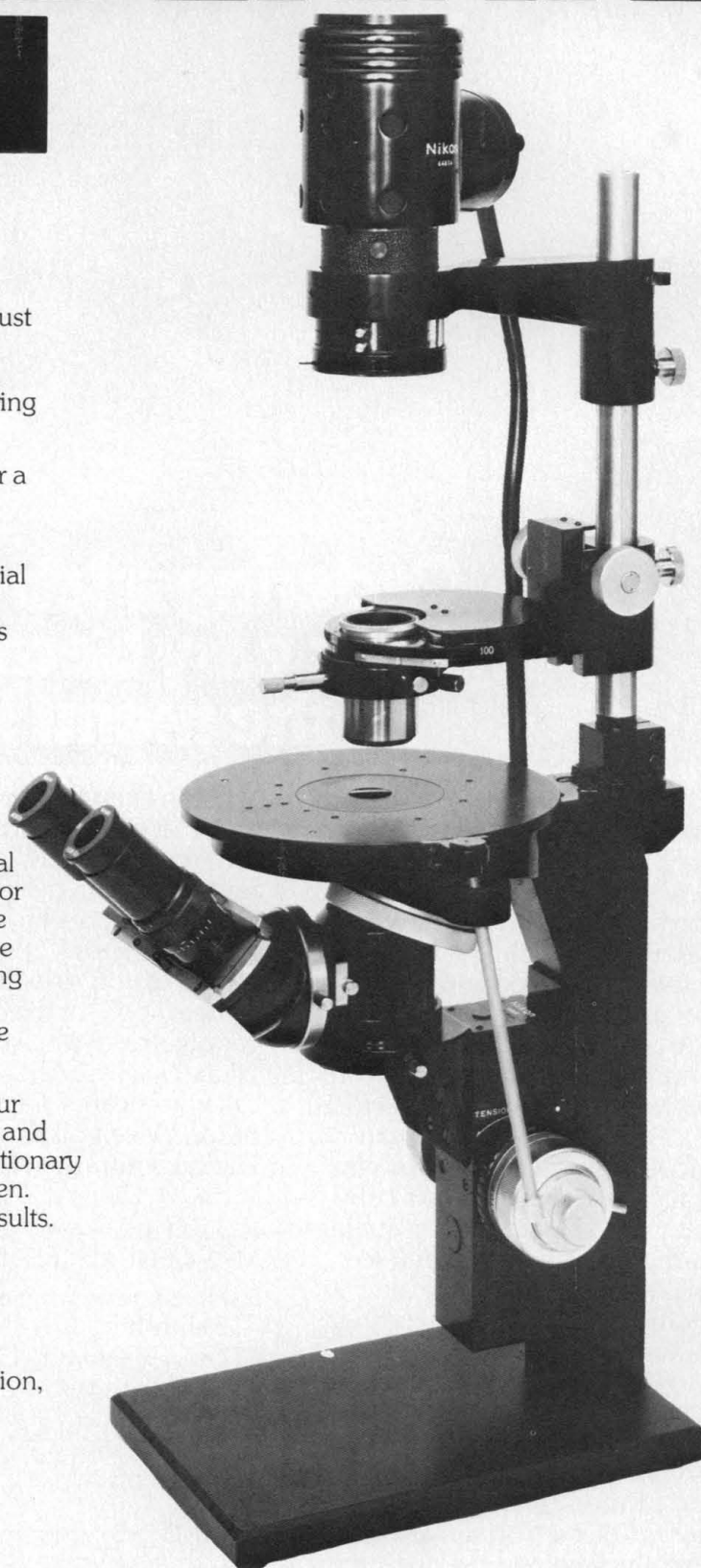
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Featured speakers and panelists will include appropriate officials from the Executive Branch, Members of Congress, and leading figures in the scientific, technical, and public policy communities.

### PRELIMINARY AGENDA

#### Wednesday, 15 June

10:00 a.m. Opening session; opening address.

12:30 p.m. Lunch; major address.

2:30 p.m. *R&D Budgets and Future Outlook.* This session will consider current budgets and future outlook for R&D. Selected speakers, panelists, and participants will address major issues in the FY 1978 budget; the trends and 5-year outlooks for federal R&D; and their implications for national needs, scientific progress, and R&D institutions.

5:30 p.m. Reception and buffet dinner; major address.

7:30 p.m. *Congressional Role in R&D Budgeting.* This session will address questions of current interest regarding the role of Congress, its committees, and associated agencies in R&D budgeting. Discussion will focus on the congressional vs. the executive role; the proper balance and degree of control over R&D programs; problems and limitations; and effective interaction between scientific and technical communities and the Congress.

#### Thursday, 16 June

10:00 a.m. *How Should R&D Decisions Be Made?* This session will attempt to develop a consensus among representatives of the scientific and technical community, the Executive Branch, and the Congress on how R&D budget decisions should be made. Issues to be addressed will include conditions to be met and avoided, a "straw man" conceptual system of processes, criteria for R&D budget decisions, and unresolved questions that require attention.

1:00 p.m. Lunch; major address; closing of program.

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- ☐ \$40 Single Registration (includes FY78 report and Proceedings of Colloquium)
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- ☐ \$11 Buffet Dinner on Wednesday, 15 June
- ☐ \$7 Lunch on Thursday, 16 June
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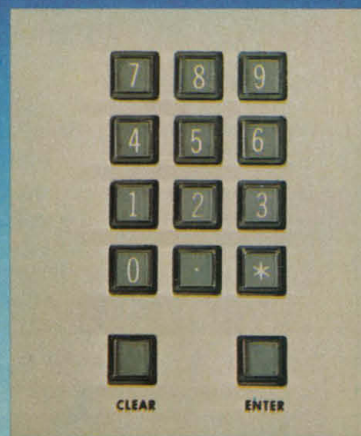
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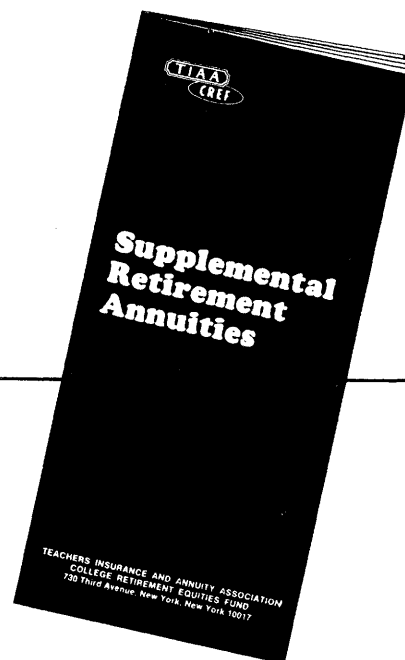
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## LETTERS

### Nuclear Waste Management

The article on radioactive wastes by Luther J. Carter (*News and Comment*, 18 Feb., p. 661) was excellent, but why follow it with the letter from Bernard L. Cohen (25 Mar., p. 1280), who writes about eating a half-pound of 500-year-old, high-level radioactive wastes and storing the 2 cubic meters of high-level wastes generated per year from a nuclear reactor "under a typical dining room table"? If the public is to make a responsible decision concerning radioactive wastes, including mill tailings, then we need responsible information. Cohen, in his letter and his article (1), appears to omit information that is harmful to his case and to uncritically accept information from the nuclear industry.

The facts a responsible scientific journal should carry are these. With present regulations and practices of the industry, calculations show (i) that, using reasonable assumptions, the health effects caused by the nuclear and coal fuel cycles are comparable (2); and (ii) that the total waste volume, including mill tailings, is also comparable to that from coal fuel cycles (2). The only difference in the health effect calculations is that, with coal, the generation that has the benefit takes the risk; but with nuclear power, the burden is passed to future generations.

MARVIN RESNIKOFF

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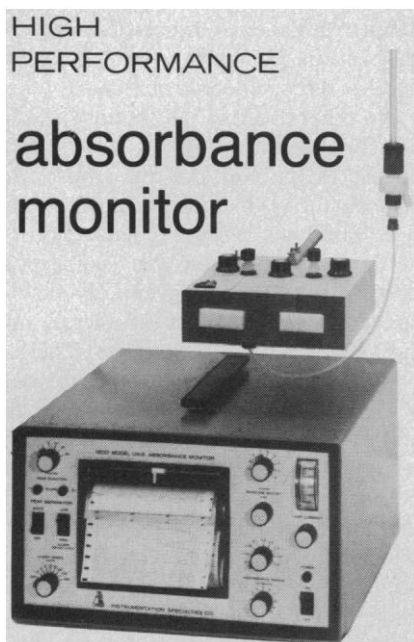
#### References

1. B. Cohen, *Rev. Mod. Phys.* **49**, 1 (1977).
2. R. Pohl, *Search* **7**, 345 (1976).

The well-researched and thoughtful review of the persistently deplorable state of the nuclear waste management by Carter is harshly criticized by Cohen, who claims that Carter, at least by implication, grossly exaggerated the potential health risks posed by this waste. To make his point, Cohen presents some of his own health effect estimates, which are indeed marvelously small. What he does not mention, however, is that these estimates are based on model situations which bear no resemblance whatsoever to the current state of the waste management reviewed by Carter.

For example, in describing what he calls the principal hazard scenario for the waste, Cohen seems to assume that the high-level waste is in a geologic repository deep underground in bedded salt, from where the radioactive releases are

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predictable, delayed, and miniscule. His result, "less than one fatality per year from all the waste accumulated by a million years of all-nuclear power in the United States," has been seriously questioned previously on a number of grounds (1). In the present context, there is no reason why estimates based on Cohen's assumptions should apply to the risks posed by the waste as it is currently managed.

Similarly, for people living close to the burial sites for our major low-level nuclear wastes it must be rather uninteresting to be told what this waste would do to human health if it were distributed uniformly throughout the soil of the United States, as Cohen apparently assumes in estimating the health effects (that is, the absence thereof) caused by this form of nuclear waste. Rather, what these people want to know is whether their land or their rivers may eventually become permanently contaminated by the effluents from the existing burial sites and what should be done to avoid this pollution. The same consideration applies to the waste that leaks from storage tanks. This is precisely what Carter discussed.

Certainly most biologists would discourage anyone from eating fission waste, irrespective of its age, as well as cinnabar (mentioned by Cohen as being more dangerous to eat than fission waste); the difference between the two substances, however, is that nobody has proposed to base our future economy on this compound of mercury. Efforts to belittle the nuclear waste problem with comparisons of this kind are bound to be counterproductive.

ROBERT O. POHL

Department of Physics,  
Cornell University,  
Ithaca, New York 14853

#### References

1. F. von Hippel, *Phys. Today* **29**, 68 (August 1976); R. O. Pohl, *ibid.* (November 1976), p. 13; D. G. Jacobs and J. E. Turner, *ibid.*, p. 15; H. T. O'Keeffe, *ibid.*, p. 86.

#### Solar Eclipses and Ancient Artistic Motifs

John A. Eddy is to be congratulated on his article "The Maunder Minimum" (18 June 1976, p. 1189) showing the distinct changes in the behavior of the sun that have been recorded since the invention of the telescope, and for carrying the record further into the past by using the earlier, naked-eye observations. I would like to propose yet another means to



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deduce the general outlines of solar activity even further back (albeit sketchily), another three millennia or more.

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The most notable example is the sun disk, with wings and tail plumes, which first appeared in Egypt as early as the Old Kingdom and then spread through Syria to Babylonia. In Egypt this symbol is mixed with simple unornamented disks, whereas in Babylonian art after about 1200 B.C. the winged disk is so common and stylized as to be practically a trademark. The transition (at least in the well-dated record of cylinder seals) (1) is relatively sudden. Several authors have suggested that this symbol is eclipse-inspired because of its close resemblance to the corona seen at sunspot minimum (2).

To use such a record, we would first have to correlate the appearance of the corona to the naked eye with the underlying solar activity, using the detailed sketches of prephotographic eclipse observations (3). The photographic recording of eclipses must be modified because of the eye's greater dynamic range than that of film: a simple photograph of an eclipse never conveys the full extent or impact of the corona. A certain amount of radial-gradient filtering is necessary in photography to reproduce what the eye alone saw, to emphasize the outer portions; after the correct prescription has been determined by comparison of visual and photographic records of the same eclipse, the compilation of eclipse photographs can be used to extend the visual record.

Once this is done, it remains to corre-

late closely the calculated record of ancient eclipses (which at present extends back to 1200 B.C.) (4) with stylistic changes and reinforcements in the archeological record. Although at any one spot on the earth a total eclipse is experienced only once every 360 years or so on the average, the eclipses so visible tend to bunch in time (5). The artistic record, particularly of Babylonia, can be surprisingly realistic in recording astronomical phenomena (even to the extent of apparently recording partial eclipses) [for example, seals XXV e, XXVI e, and XXVII b, K in (1)] and we can assume for a first trial that the corona was recorded factually and use it to infer the corresponding solar activity.

This line of reasoning would have two benefits:

1) It would give us information on solar activity (or at least set bounds on it) up to the time the solar symbols became conventionalized in each culture.

2) It would give us a new point of view in reading the record of the past and help us deduce the reasons for its origins, changes, and maintenance. There is the distinct possibility that the challenge of coming to grips with the enormity of total eclipses—which occurred so rarely as to be of tremendous and unexpected impact, yet just often enough to stay in legend and history and have their effect reinforced—gave rise to concepts of religion and science that altered the course of civilization irrevocably, and raised it to new levels. We already know that recording the frustrating details of the moon's motion became an organizing theme for the people of the British Isles in the second and first millennia B.C. (6). And the solution of the apparent motions of the planets—seemingly so regular, and yet irregular enough to be a just-solvable problem—triggered modern science.

ROLF M. SINCLAIR

National Science Foundation,  
Washington, D.C. 20550

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## International Conferences and Tax Reform

A provision of the Tax Reform Act of 1976 inflicts an unfair penalty on self-employed inventors, consulting engineers, and scholars without government grants or travel support from tax-exempt organizations. It may also severely limit the willingness of some industrial employers of scientists and engineers to sponsor their attendance at international scientific conferences.

The new provision seeks to close a "loophole"; it prevents deducting as a business expense the costs of travel to more than two foreign "conventions" per year. When a purely U.S. organization holds a convention in one of the spas of Europe or the Caribbean, and serious business is restricted to an hour or two of frivolous programming each day, there is no reason why the taxpayers of America should share the conventioneer's expense. But the language of the new law, and the interpretation of it provided by the congressional staff report, fails to distinguish such a tax-subsidized vacation from an international conference on arid zone agriculture, a general assembly of the International Union of Pure and Applied Chemistry, a seminar at Trieste on many-body theory, or a conference on tropical medicine sponsored by the World Health Organization. The rules apply equally to foreign "conventions or seminars" attended by people from many nations and to those attended exclusively by Americans. Sales conventions, trade association conventions, professional society meetings, and internationally sponsored scientific meetings are caught in the same act.

Even for the two conferences per year that can be treated as a business expense, only deductions for tourist class travel and daily total costs not exceeding the allowances of U.S. government civil servants are permitted. Paper documents must be obtained to verify that the conference met at least six hours per day and that the individual was in his seat at least four of these hours. Even so, industrial employers' tax departments may have reason to worry about how narrow a test of relevance to business success the Internal Revenue Service may demand, when a scientist or engineer from the company's research laboratory has been authorized to attend an international conference.

Well-managed companies will continue to send their scientists to the meetings they need to attend, even if it means paying a tax premium for the privilege. But we all know how inexorable are the pressures of a congressional determination that more than a minimum of trafficking in international science is not a legitimate activity for businesses. Some business people may respond to the government's new rules by turning off conference participation by their people altogether.

Who will be the loser? The U.S. economy may be affected, as American companies find it harder to keep up with the scientific base on which their overseas competitors are building. (Can you imagine the Japanese government discouraging companies from learning about foreign technical advances?) Industries will be just a little less sensitive to nature's warnings about environmental, health, and resource implications as corporate awareness of world science contracts. For the poor nations of the world, international scientific activity represents a thin thread of access to the industrial world's technical knowledge. They are unlikely to look on new governmental restraints in sharing that knowledge as compatible with the high ideals of global development often espoused in this country.

The damage could easily be repaired; for example, by excluding from the restrictive provision foreign conferences where the location is reasonable in light of the number of foreign participants and their geographical dispersion. Some kind of change is needed, as Congress examines repair of technical defects in the new law this spring. We should make every effort to see that Congress acts. A good start would be to notify our congressmen, and I urge those of us who have a stake in this to do so.—LEWIS M. BRANSCOMB, *Vice President, Office of the Chief Scientist, IBM Corporation, Armonk, New York 10504*

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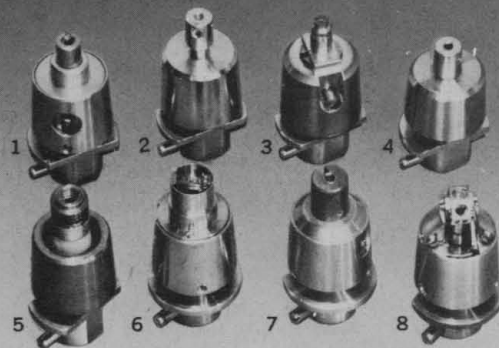
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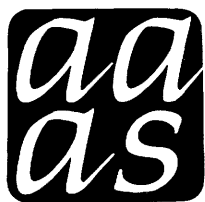
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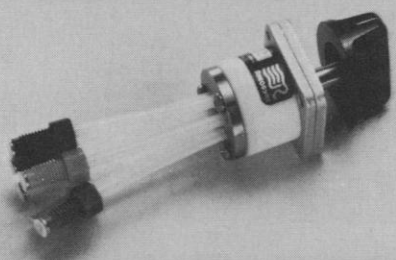
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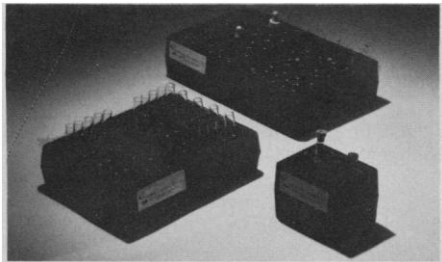
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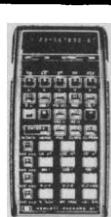
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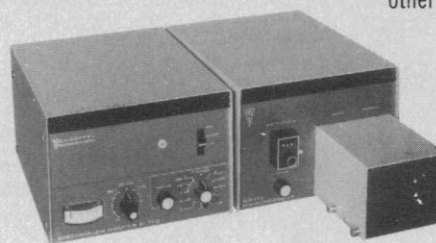
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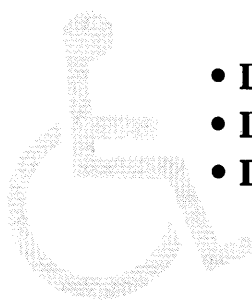
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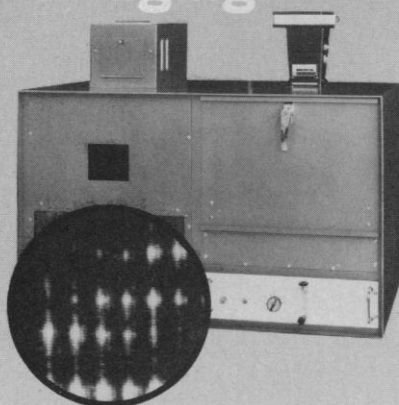
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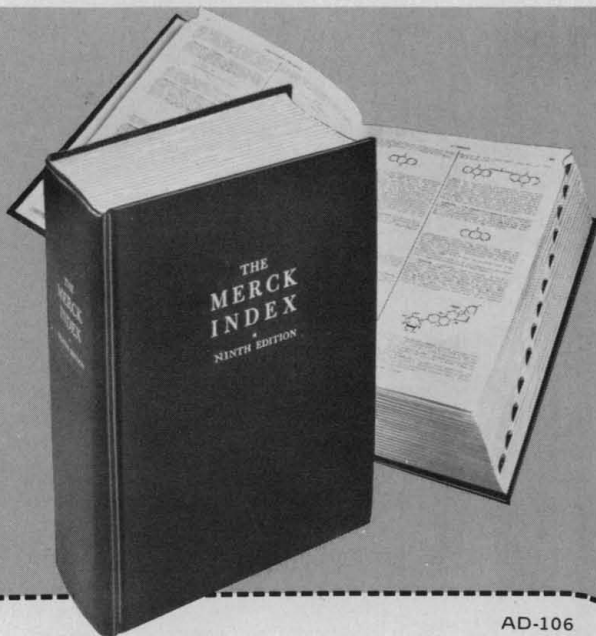
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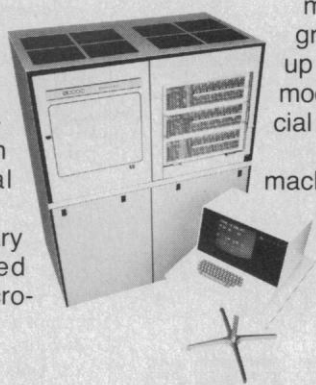
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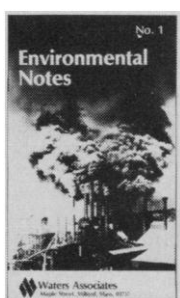


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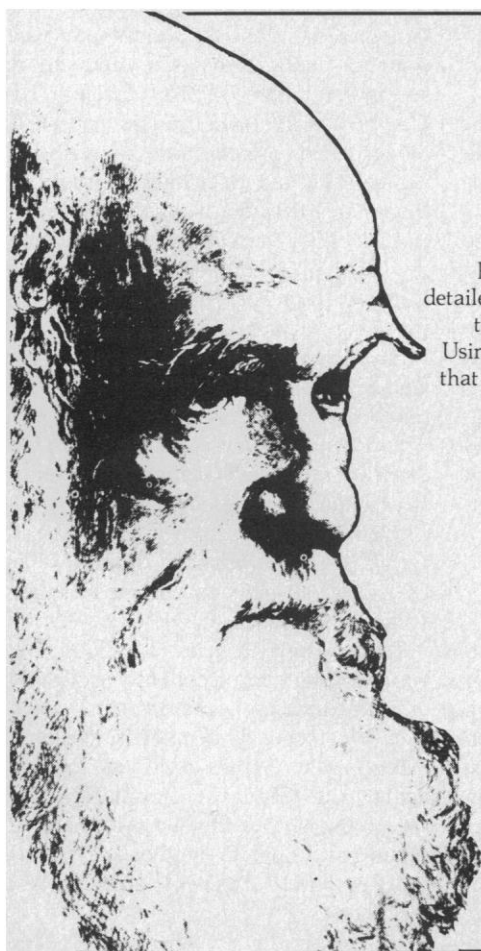
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#### Literature

*FASEB Publications Catalog* includes biological handbooks, journals, service-oriented publications, scientific reports and monographs. FASEB. Circle 673.

*Amino Acid Analyzer* describes the model 121M microcolumn analyzer and its features and operating instructions. Beckman Instruments. Circle 674.

*Laser Trim System* describes the model 1080, a microprocessor-controlled YAG system for thick- and thin-film trimming. Quantrad. Circle 675.

*Fluorometric Drug Analysis* treats analysis in biological and pharmaceutical samples. Turner Associates. Circle 676.

*Spectrochemistry* is a catalog of standards for atomic absorption and other instrumental analyses. Spex Industries. Circle 677.

*Cell Cycle Analyzers* describes the CCA-2000 suspension culture analyzer. Talandic Research. Circle 678.

*Temperature Measurement* is an idea booklet devoted to frequently requested, difficult-to-make measurements. Nationwide Electronic Systems. Circle 679.

*Biochemicals* lists products for gas, liquid, and thin-layer chromatography; standards; isotope-labeled chemicals; reagents; and custom-synthesized materials. Applied Science Laboratories. Circle 680.



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