Instructions for Contributors

The Editors of *Science*

Manuscripts submitted to *Science* for consideration for publication can be handled expeditiously if they are prepared in the form described in these instructions.

Submit an original and two duplicates of each manuscript. With the manuscript send a letter of transmittal giving (i) the name(s) of the author(s); (ii) the title of the paper and a one- or two-sentence statement of its main point; (iii) the name, address, and field of interest of four to six persons in North America but outside your institution who you think are qualified to act as referees for your paper; (iv) the names of colleagues who have reviewed your paper for you; (v) the field(s) of interest of readers who you anticipate will wish to read your paper.

Editorial Policies

All papers submitted are considered for publication. The author's membership or lack of membership in the AAAS is not a factor in selection. Papers are accepted with the understanding that they have not been published, submitted, or accepted for publication elsewhere. Authors will usually be notified of acceptance, rejection, or need for revision in 4 to 6 weeks (Reports) or 6 to 10 weeks (Articles).

Types of papers. Five types of signed papers are published: Articles, Reports, Letters, Technical Comments, and Book Reviews. Familiarize yourself with the general form of the type of paper you wish to submit by looking over a recent issue of the journal, and then follow the instructions for that type of paper.

Reviews. Almost all Articles, Reports, and Technical Comments, whether solicited or not, are sent to two or more outside referees for evaluation of their significance and soundness. Forms showing some of the criteria reviewers are expected to consider are available on request.

Editing. Papers are edited to improve the effectiveness of communication between the author and his readers. The most important goal is to eliminate ambiguities. In addition, improvement of sentence structure often permits readers to absorb salient ideas quickly. When editing is extensive, with consequent danger of altered meanings, papers are returned to the author for correction and approval before type is set. Authors are free to make additional changes at this stage.

Proofs. One set of galley proofs or an equivalent is provided for each paper. Keep alterations to a minimum, and mark them only on the galley, not on the manuscript. Extensive alterations may delay publication by 2 to 4 weeks.

Reprints. An order blank for reprints accompanies proofs.

Writing Papers

Organize your material carefully, putting the news of your finding or a statement of the problem first, supporting details and arguments second. Make sure that the significance of your work will be apparent to readers outside your field, even if you feel you are explaining too much to your colleagues. Present each step in terms of the purpose it serves in supporting your finding or solving the problem. Avoid chronological steps, for the purpose of the steps may not be clear to the reader until he finishes reading the paper.

Provide enough details of method and equipment so that another worker can repeat your work, but omit minute and comprehensive details which are generally known or which can be covered by citation of another paper. Use metric units of measure. If measurements were made in English units, give metric equivalents.

Avoid specialized laboratory jargon and abbreviations, but use technical terms as necessary, defining those likely to be known only in your field. Readers will skip a paper they do not understand. They should not be expected to consult a technical dictionary.

Choose the active voice more often than you choose the passive, for the passive voice usually requires more words and often obscures the agent of action. Use first person, not third; do not use first person plural when singular is appropriate. Use a good general style manual, not a specialty style manual. The University of Chicago style manual, the style manual of the American Institute of Physics, and the *Style Manual for Biological Journals*, among others, are appropriate.

Manuscripts

Prepare your manuscript in the form used by *Science*. Use bond paper for the first copy. Submit two duplicates. Double-space title, abstracts, text, signature, address, references (including the lines of a single reference), figure legends, and tables (including titles, columns, headings, body, and footnotes). Do not use single spacing anywhere. Put the name of the first author and the page number in the upper right-hand corner of every page.

Paging. Use a separate page for the title; number it page 1. Begin each major section—text, references and notes, and figure legends—on a new sheet. Put each table on a separate sheet. Place figure legends and tables after the references.

Title. Begin the title with a word useful in indexing and information retrieval (not "Effect" or "New").

References and Notes. Number all references to the literature, footnotes, and acknowledgments in a single sequence in the order in which they are cited in the text. Gather all acknowledgments into a single citation, and keep them short ("I thank," not "I wish to thank"). Cite all references and notes but do not cite them in titles or abstracts. Cite several under one number when feasible. Use *Chemical Abstracts List of Periodicals* for abbreviations of journal names. If the journal is not listed there, provide the full name. Use the following forms:

Journal: H. Smith, *Amer. J. Physiol.* **98**, 279 (1931).

Book: F. Dachille and R. Roy, *Modern Very High Pressure Techniques* (Butterworth, London, 1961), pp. 163–180.

Chapter: F. Dachille and R. Roy, in *Reactivity of Solids*, J. H. De Boer, Ed. (Elsevier, Amsterdam, 1960), p. 502.

Illustrations. Submit three copies of each diagram, graph, map, or photograph. Cite all illustrations in the text and provide a brief legend, to be set in type, for each. Do not combine line

drawings and photographs in one illustration. Do not incorporate the legend in the figure itself. Use India ink and heavy white paper or blue-lined coordinate paper for line drawings and graphs. Use heavier lines for curves than you use for the axes. Place labels parallel to the axes, using capital and lower-case letters; put units of measurement in parentheses after the label—for example, Time (sec). Plan your figures for the smallest possible printed size consistent with clarity.

Photographs should have a glossy finish, with sharp contrast between black and white areas. Indicate magnification with a scale line on the photograph.

Tables. Type each table on a separate sheet, number it with an arabic numeral, give it a title, and cite it in the text. Double space throughout. Give each column a heading. Indicate units of measure in parentheses in the heading for each column. Do not change the unit of measure within a column. Do not use vertical rules. Do not use horizontal rules other than those in the heading and at the bottom. A column containing data readily calculated from data given in other columns can usually be omitted; if such a column provides essential data, the columns containing the other data can usually be omitted.

Plan your table for small size. A one-column table may be up to 42 characters wide. Count characters by counting the widest entry in each table column (whether in the body or the heading) and allow three characters for spaces between table columns. A two-column table may be 90 characters wide.

Equations and formulas. Use quadruple spacing around all equations and formulas that are to be set off from the text. Most should be set off. Start them at the left margin. Use the solidus for simple fractions, adding the necessary parentheses. But if braces and brackets are required, use built-up fractions. Identify handwritten symbols in the margin, and give the meanings of all symbols and variables in the text immediately after the equation.

Articles

Articles, both solicited and unsolicited, may range in length from 2000 to 5000 words (up to 20 manuscript pages). Write them clearly in reasonably nontechnical language. Provide a title of one or two lines of up to 26 characters per line and a subtitle consisting of a complete sentence in two lines with a character count between 95 and 105 for the sentence (spaces between words count as one character each). Do not break words at the ends of lines. Write a brief author note, giving your position and address. Do not include acknowledgments. Place title, subtitle, and author note on page 1. Begin the text on page 2.

Insert subheads at appropriate places in the text to mark your main ideas. The set of subheads should show that your ideas are presented in a logical order. Keep subheads short—up to 35 characters and spaces.

Provide a summary at the end.

Do not submit more than one illustration (table or figure) for each 4 manuscript pages unless you have planned carefully for grouping. With such planning many illustrations can be accommodated in the article. Consult the editorial office for help in planning.

Reports

Short reports of current research results may vary in length from one to six double-spaced manuscript pages of text. The shorter papers receive preferred treatment. Limit illustrative material (both tables and figures) to one item for each three manuscript pages. Three items is the maximum. A research report should have news value for the scientific community or be of unusual interest to the specialist or of broad interest because of its interdisciplinary nature. It should contain solid research results or reliable theoretical calculations. Speculations should be limited and is permissible only when accompanied by solid work.

Title. Begin the title with an important word (preferably a noun) that is likely to be useful to indexers. The title may be a conventional one (composed primarily of nouns and adjectives), a sentence (containing a verb) or a structure with a colon (Nictitating Membrane: Classical Conditioning and Extinction in the Albino Rabbit). Limit it to three lines of complete words of no more than 32 characters per line (spaces between words count as one character each). Do not use abbreviations. Type the title in the middle of page 1.

Abstract. Provide an abstract of 45 to 55 words on page 2. The abstract should amplify the title but should not repeat it or phrases in it. Qualifying words for terms used in the title may be used. Tell the results of the work, but not in terms such as "——— was found," "is described," or "is presented."

Text. Begin the text on page 3. Put the news first. Do not refer to unpublished work or discuss your plans for further work. If your paper is a short report of work covered in a longer paper to be published in a specialty journal, you may refer to this paper if it has been accepted. Name the journal. If the manuscript has not been accepted, refer to it as "in preparation." Omit references to private communications. Do not use subheads.

Signature. List the authors on the last page of the text and give a simple mailing address.

Received dates. Each report will be dated the day an acceptable version is received in the editorial office.

Letters

The Letters section provides a forum for discussion of matters of general interest to scientists. Letters are judged only on clarity of expression and interest. Keep them short and to the point; the preferred length is 250 words. The editors frequently shorten letters.

Technical Comments

Letters concerning technical papers in *Science* are published as Technical Comments at the end of the Reports section. They may add information or point out deficiencies. Reviews are obtained before acceptance.

Book Reviews

The selection of books to be reviewed is made by the editors with the help of advisers in the various specialties; arrangements are then made with reviewers. A sheet of instructions accompanies each book when it is sent to the reviewer.

Cover Photographs

Particularly good photographs suitable for use on the cover are desired.

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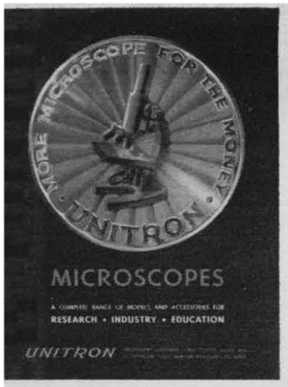
COVER

Dormant sycamore tree. See page 29. [Michael F. MacLeod, Baltimore, Maryland]



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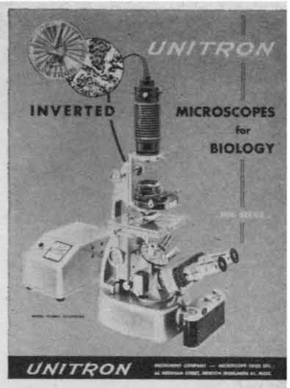

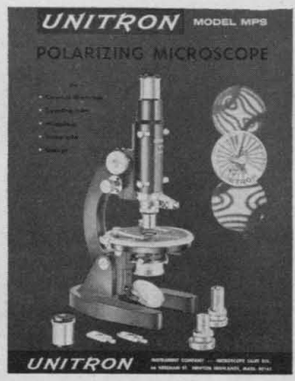

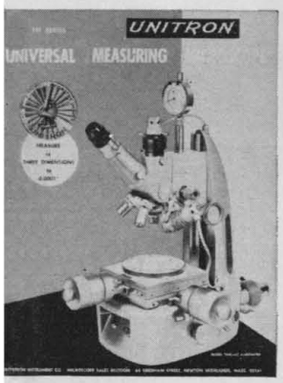

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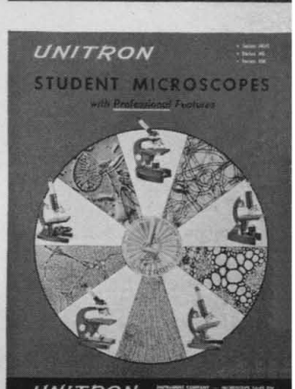

Most dispensers are gadgets. This one is an instrument.

It's accuracy (±.005ml) makes the difference.

There are numerous liquid dispensers on the market today, but unfortunately, most of them are gadgets. The new Brinkmann Dispenser, on the other hand, is an instrument, and it sets entirely new standards for performance and convenience in liquid handling systems.

Consider the accuracy: from ±.005 ml (for the 2 ml model) to ±.02 ml (for the 15 ml model). This accuracy is nearly 100 times greater than that of conventional systems. Standard deviation is equally phenomenal: ±.0025 ml at 2 ml and ±.0035 ml at 15 ml. Next, consider its unique design. It converts from a hand-held pipettor to a flask-mounted dispenser simply by interchanging two valves to reverse liquid flow. All parts touched by liquid are either glass, Teflon*, or platinum-iridium. Lastly, consider ease of operation and repair. Its push-button action is simple and foolproof, and volume is easy to adjust.

To minimize breakage, there is no exposed glass; also any working part can be replaced by the user without special tools.

A complete line of accessories, including dispenser bottles, Teflon stoppers and Teflon hose connectors, is available. Our literature describes it all. For your free copy, just write: Brinkmann Instruments, Cantiague Rd., Westbury, N.Y. 11590. In Canada write: Brinkmann Instruments (Canada) Ltd., 50 Galaxy Boulevard, Rexdale (Toronto), Ont.

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What's amphibious, thinks for itself, rocks and rolls tubes, and won't scare a goldfish?

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The L/I LABQUAKE is an amazing creature. A true amphibian, it functions equally well in or out of the water. Rock and roll your tubes at room temperature, or submersed in any water bath at depressed or elevated temperatures. A bracket mounting keeps the motor safely out of the water.

The LABQUAKE *thinks* about what it's doing—so you don't have to watch over it. For instance, the LABQUAKE has the magical ability to reverse direction without being told. If it can't go one way, it will go another, and it can't be overloaded.

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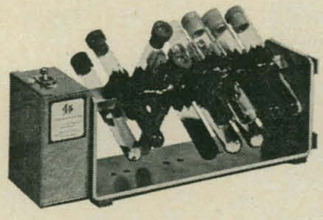

Applications? They include mixing blood without cell damage • dialysis under agitation • preparing homogeneous dispersions of particulates • agitating tissue and bacterial growth at controlled temperature • antigen-antibody reactions, and all at ambient or controlled temperature.

Ordering information: L/I LABQUAKE, Cat. #400-110, for 110-120 VAC, complete with (14) 13 mm and (14) 16 mm clips, $59.50. Other size clips may be substituted at no charge. Max. capacity 250 ml. *Order from Labindustries or your distributor.*

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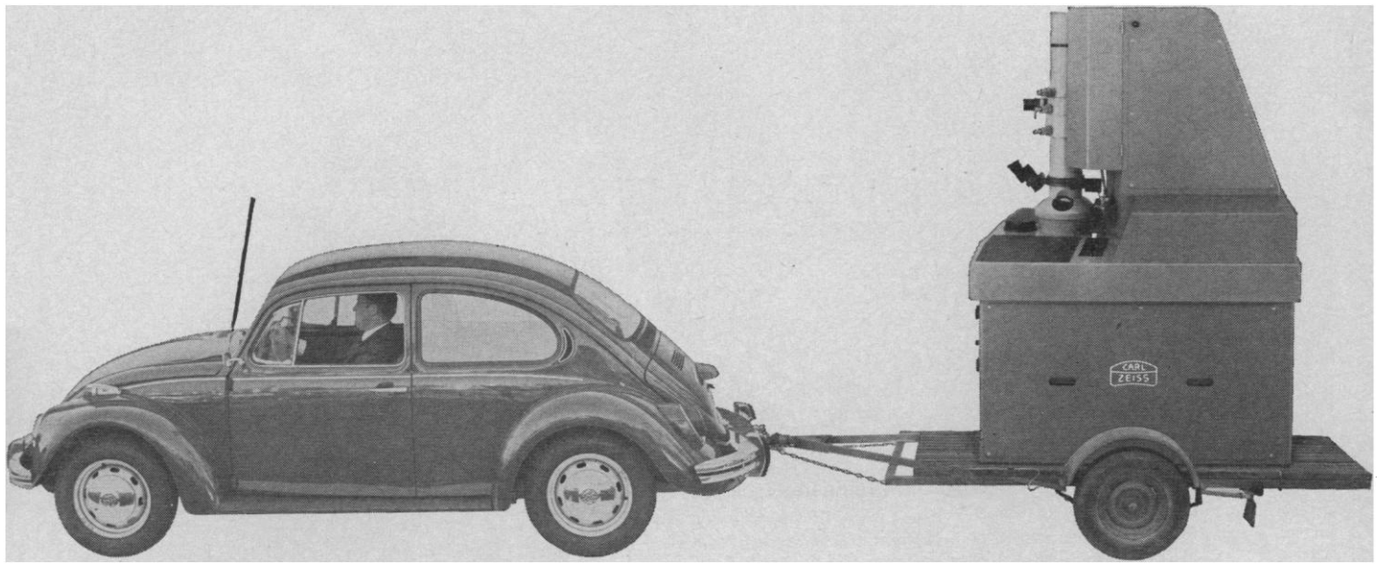

There are a few people who need more resolution than the 7Å they can get from the world's easiest-to-operate electron microscope.

But they pay for it.

They pay for it in inconvenience, in lost time, and in money. But for most researchers and teachers there's no need to pay this kind of toll. The capability of the new Zeiss EM9S-2 to distinguish fine structures, and the distortion-free magnification range of 700X to 60,000X, are more than is required. And, if you're a member of this majority, you can earn perpetual dividends in time and convenience from the EM9S-2. Look at some of its features:

(1) The unequalled fully automatic camera system.

No other electron microscope, even very complicated ones costing over twice as much, can match it. Everything is automatic . . . from the selected area electron densitometer all the way through to the negative numbering and changing system . . . and it all works at the touch of just one lever.

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(3) The small size.

It's compact, takes up little room, and has all controls at your fingertips.

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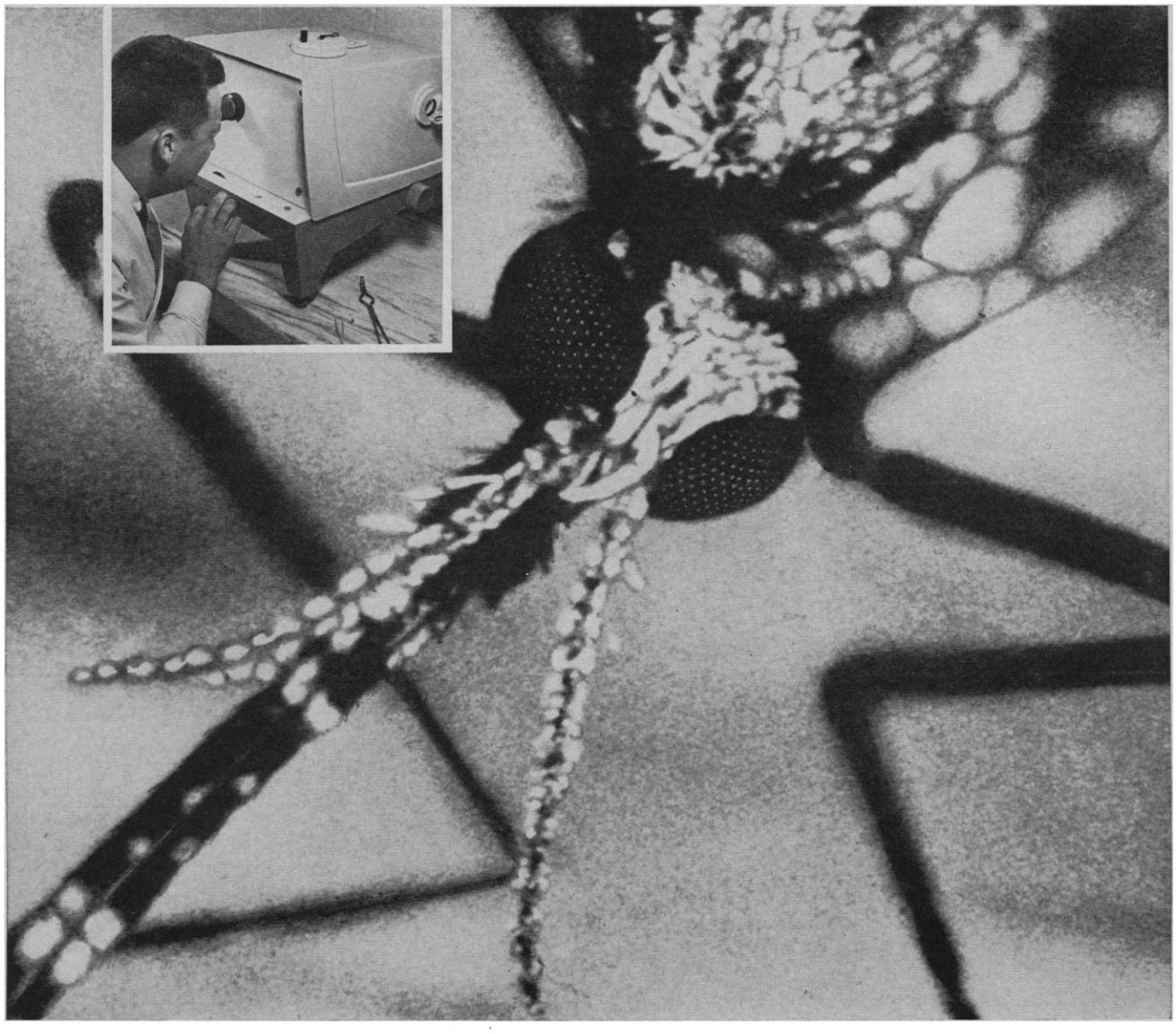

We're not weighing the mosquito. We're weighing its lunch.

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If you're in the market for a new balance, chances are your weighing requirements don't call for the UM-7's ten-millionth of a gram accuracy. So Mettler offers 21 other analytical balances for you to choose from. Some have many features in common with the UM-7. Others are unique unto themselves. And collectively, they share the capability of handling any weighing in the analytical spectrum. From 2 mg to 1,000 grams. With precisions from ±0.3 mg to ±0.0001 mg.

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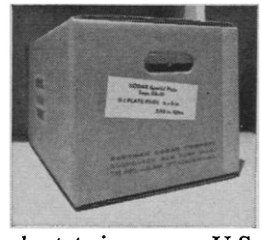
Kodak

Avoid fog

When traveling by air in these uptight times, don't leave unprocessed film in your checked luggage. It may be fluoroscoped. Carry the film in your pocket or a flight bag. Magnetic flux won't fog it (but could affect a sound stripe or other magnetic recording). If you are carrying a quantity of film, it might be well to mention your concern to the gate agent and work out ways of proving your peaceful intentions.

Flying your stack, instead of blowing it



To lead off a long parade of new Kodak products for 1971, here is KODAK Special Plate 114-01. Many of the products to follow will be much more widely appreciated, lower in price, and more attractively packaged. For the price of the short dozen of 6" x 4" plates in this package you could buy the same number of pleasant acres of real estate in many a U.S. county. Even so, the purchaser furnishes the glass himself, having first engraved fiducial marks on it. On both sides we proceed to coat 100μm of an emulsion that responds to "minimum ionization"* but is not particularly sensitive to light.

One suggested use, as proposed by the customer who convinced us this product ought to be made and who has pretested it in Palestine, Tex. and Parana, Argentina:

Send a stack of these plates outside as much of the atmosphere as you can manage, accompanied by a magnetic field. A superconducting magnet is recommended unless you can think of a more convenient way to wrap the package in a dozen kilogauss or so. With the fine grain of our emulsion despite its high sensitivity, that much field should suffice to put a measurable curvature in most tracks you will find upon recovering the plates and processing them. A couple of days at 130,000 feet should yield about 100,000 tracks. If you are pointing your stack right, the more interesting of these tracks will continue through several of the plates, perhaps all of them. Those will be from cosmic ray particles of the highest energy, galactic or extra-galactic in origin. They will be nuclei as heavy as iron, moving with energies as much as 200 Gev per nucleon. With the help of the fiducial marks and whatever other arrangements you have worked out to keep from getting mixed up by 100,000 tracks, pick out these interesting ones.

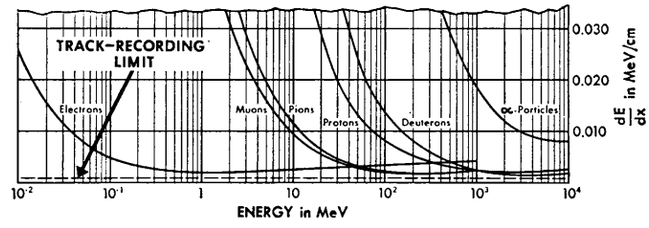
If you can raise your proportion of interesting tracks, you'll want to stay up longer before running out of room on the plates. Here's a helpful hint for that: fly your stack near the earth's magnetic equator. There you won't pick up so many particles of energy low enough to be following the earth's lines of force much.

Your vehicle may happen to be an orbital one rather than a balloon. Then, of course, you are rid of the clutter of cosmic ray cascades and can stay up for weeks instead of hours, unless you pick up too big a dose of Van Allen belt protons over the mid-South Atlantic. It is simply unfortunate that the earth's geomagnetic center is shifted some 436 km toward the Marianas to bring the Van Allen belt lower by the same amount on the opposite side of the globe.

Anyway, this sort of activity keeps your mind from dwelling continually on evils that stir your choler dangerously. We wish it would regain some of its lost appeal.

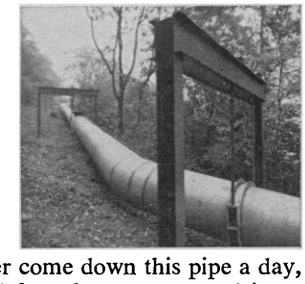
*This term pertains to the rate at which an electron, proton, meson, stripped nucleus, etc. gives up kinetic energy as ionization while slowing down in the emulsion. The rate passes through a minimum on a plot of dE/dx *vs.* E ▶

From the very slow ascent of these curves past their minima, it is apparent that only an emulsion capable of accepting an ionization trail as weak as 440 electron volts/μm can show tracks for charged particles of very high energy. Such an emulsion therefore records the path of *any* charged particle possessing enough energy to get through more than two or three grains.



These are theoretical rates in air. They must be multiplied by the "stopping-power" factor for a photographic emulsion, which is about 1800. This high factor is one of the advantages of using photographic techniques.

The power of used water



Permit us to brag a bit about the engineering behind this pipe.

We're looking up here from the Genesee River gorge in Rochester, some 150 feet below our largest plant and some three miles from the river's mouth on Lake Ontario. Some 36 million gallons of used water come down this pipe a day, bearing kinetic energy we paid for when we pumped it up from Lake Ontario. It is on its way to a primary settling tank and thence through trickling filters, where dwell organisms that break down waste compounds, to an activated sludge tank where other microorganisms continue the oxidation. The activation could be accomplished by surface aeration. Instead, at the expense of doubling the electrical power requirement, we quietly inject the oxygen 20 feet beneath the surface. Surface aeration, we estimate, would bring forth a sound "about equivalent to a medium surf." Rochester is too far from the ocean for the neighbors to be fooled into accepting noise pollution as a tradeoff for water pollution.

So, instead of letting the kinetic energy generate a 6-inch froth on the primary tank, it's merely smart engineering to use it hydroelectrically in the interests of tranquillity for the neighborhood and the health of fish.

For a mere $10 million investment in this new secondary treatment plant, we remove 95% of the 5-Day Biochemical Oxygen Demand from our effluent. That's not the last word, merely a good beginning.

a personal letter objecting to the statement that "it does not pay to recycle these minerals," pointing out that when the price of virgin metals rises, there is a well-known tendency for scrap to appear in abundant quantity at the furnaces. A doubling of the average cost of raw materials would make feasible forms of recycling that are now too expensive to consider; yet a doubled price of raw materials would not raise their share of the total cost of the national product to as much as 10 percent.

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Princeton, New Jersey 08540

Hydra-Headed Pesticides

In his presentation of the rationale for pest control by the Agricultural Research Service (19 June, p. 1419), George W. Irving, Jr., capsulizes the many alternatives or complements to the use of the synthetic organic pesticides. . . . [He] states that American agriculture has evolved a monoculture system and that the use of persistent pesticides has been an essential element in the successful production of the cheapest, highest quality food with only 5 percent of the labor force. One would infer that our monoculture system and its results are good and provide the only viable pattern for the world in the future. But the burgeoning degradation of our natural and social environment indicates that perhaps we are paying too little for food that is unnecessarily free of blemishes, that we have driven more people off the land than our cities can support, and that we have an unrealistic standard of living which the environment cannot sustain and the rest of the world can never achieve. Neither the world's fossil fuel and mineral reserves nor the capital resources of the developing nations can long support any major expansion of modern agriculture or U.S. life-styles. Serious doubt exists as to whether the quality and essential diversity of the environment can be maintained either.

The reasoning of the pest control specialist seems to be that man must "fight" so-called pests to survive and that the "balance of nature is not an achievable ideal, if it is an ideal at all." Man creates pests when he so simplifies an ecosystem that a particular insect group experiences a massive population increase. His repeated retaliation with chemical pesticides further unbalances the ecology by stimulating the development of resistant pests and eliminating effective natural controls. Man must achieve a viable, dynamic balance within the global biosphere of which he is a part. The alternatives are frightening.

Alternatives do exist to the inexorable increase in use of pesticides, fertilizers, and machinery. Irving mentions several innovative plant protection systems being investigated by ARS. Unfortunately these techniques are not always economical in a monocultural system, particularly in the absence of long-term environmental cost accounting.

Extensive research, education, and incentives will be required to develop practical, ecologically sound systems of agriculture in which truly integrated insect control can function. Less conventional practices which tap the productivity of an agriculture modeled after natural ecosystems must replace the forcing of output through heavy energy and chemical subsidies. Such systems are particularly suited to the developing nations where capital inputs are scarce and conventional monoculture has had limited success.

We should question the assumption that agriculture has the responsibility to raise agricultural productivity to feed unlimited numbers of people. To irreparably damage the earth's life support system in an effort to extend conventional agriculture would be technologically difficult, economically unsound, and poor ecology.

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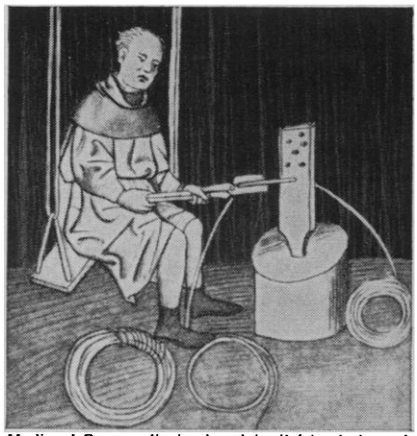
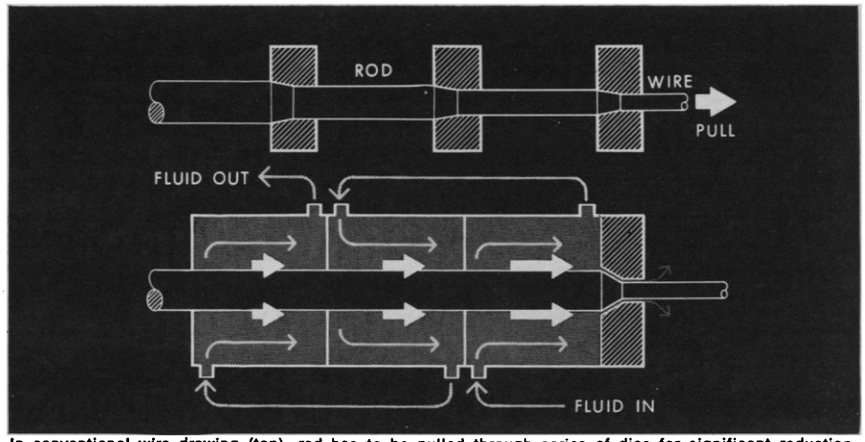
Rachel Carson (*1*) emphasized the importance of thoroughly testing all pesticides under controlled laboratory and *field* conditions before introduction of any chemical into the marketplace. The broadcast application of mirex is contrary to these scientific principles (*2*); for example, studies on mammalian systems are practically nonexistent (*3*).

Mirex, included with aldrin, dieldrin, and heptachlor in the same chemical family, may degrade into intermediates with a similar or higher level of general toxicity. I am not aware that such tests have been made or whether medical procedures exist to diagnose acute or chronic mirex poisoning. Human fetuses contain dieldrin and hepta-

The big push to replace the long pull



Medieval German "schockenzieher" (shock drawer) pulled wire through die by swinging back and forth.

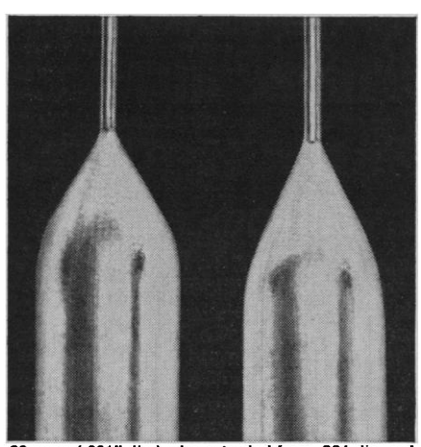


In conventional wire drawing (top), rod has to be pulled through series of dies for significant reduction. Hydro-dynamic extrusion (bottom) achieves the same reduction in one operation.

For at least 2000 years people have been making wire by pulling thin rods through small holes. The pulling force has been progressively human, animal, water, steam, and electricity, but the essentials remain.

But the process has limitations. You can get just so much reduction on one draw, so fine wire requires a series of draws. High speeds (modern wire drawing goes at speeds up to 12,000 feet per minute) wear out even diamond dies. And severe working and high tension drawing cause metal to become brittle, requiring annealing.

At Western Electric we probably make more wire than anyone else in the world. So we've been looking for a method that doesn't have these drawbacks, and a group at our Engineering Research Center in Princeton, N.J., has found one. This group has been working with metal under enormous hydraulic pressures—thousands of pounds per square inch—that enable it to flow like taffy into otherwise impossible shapes without getting brittle.



20 gage (.031" dia.) wire extruded from .364 dia. rod —a 99.2% reduction.

How could such enormous pressures be used to form wire? The simplest way would be to put a pointed rod in a chamber with a hole at one end that tapered down to a size just a shade larger than the wire you want; fill the chamber with liquid; raise the pressure. Two things would happen: pressure against the flat end of the rod would push the point against the hole; and pressure inside the hole would squeeze the rod as much as 24 successive draws did by the old method. Since it was the liquid that did the squeezing, rather than the material of the die, there would be virtually no wear on the die. And the wire would be soft and pliable, requiring no heat treatment.

So far so good. But the process would not be continuous. The rod would have to fit inside the chamber.

However: suppose the liquid were forced into an opening at one end of the chamber, and out of an opening at the other. It would then be moving continuously through the chamber, and would push the rod along. The rod could be continuously fed into one end of the chamber; and wire would be extruded continuously from the other.

Actually our engineers found that three successive chambers, with liquid flowing into and out of each (as in the above diagram) helps the wire move along better. And incidentally, while they are still searching for the right liquid, they have found that beeswax is close to ideal.

A prototype continuous hydrodynamic extrusion machine is now being built in Atlanta, Georgia. It is expected to produce aluminum wire, at a rate of 4000 feet per minute, at considerably less investment and operating costs than conventional wire-drawing machines.

Western Electric

chlor epoxide in their tissues; placental transfer studies using mirex would be of significant value. It is important to know if this chemical is incorporated into plant tissues or whether, by prolonged vaporization, mirex is released into the atmosphere (*3*).

. . . George Irving, responding to Ferguson's criticism of the Agricultural Research Service's fire ant eradication program (Letters, 14 Aug.), admitted that this insect predator is more significant as a "people pest." This statement can be applied to beneficial hymenopterans, spiders, or venomous reptiles. In these cases, however, action is restricted with the purpose of limiting the population to a reasonable level.

Ferguson objected with good reasons to the broadcast application of mirex for fire ant control. There are alternative procedures to combat *Solenopsis* which will eliminate the queen ant and reproductive capacity of the colony (*2*): place the mirex bait around the nest sites (close proximity of the fire ant may discourage consumption by nontarget animals); or burn the mounds during the seeding or harvesting seasons or in the winter when the fields lie barren and the colonies are inactivated by cold weather (avoid soil contamination due to leeching of mirex from the bait). These methods could be executed during low night temperatures and would present a minimal danger to farm workers and to the quality of the rural environment. The project would be under local or district control, the reaction to infestation would be precise and, most likely, less expensive than the $200 million now allocated for control by the ARS.

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References

1. R. Carson, *Silent Spring* (Houghton Mifflin, Boston, 1962).
2. D. Ferguson, *Environ. Action* **2**, 11 (1970).
3. *Biological Effects of Pesticides in Mammalian Systems*, H. Kraybill, Ed. (New York Academy of Sciences, New York, 1969), vol. 160 of *Ann. N.Y. Acad. Sci.* **1** (1969).

Cancer Research: Once-Over-Lightly

I believe Robert J. Bazell's commentary on "Cancer research" (16 Oct., p. 304) was based on several rather brief and superficial discussions with some of the people mentioned in his article, rather than on any real comprehension of the very exciting new discoveries

which have provided the impetus for the new research programs now proposed in the cancer virus field. The $5 million purported to be administered by me impressed Bazell, but as former chief of the Laboratory of Infectious Diseases of the National Institute of Allergy and Infectious Diseases for 13 years, I was responsible for influencing expenditures many times greater than this amount, expenditures that were regarded by many as well worth the effort; at least no one has questioned the value received.

Many new discoveries concerning the natural behavior of RNA and DNA tumor viruses in natural species and ecologies as well as in laboratory systems are entirely responsible for the new excitement that has been generated among virologists, cancerologists, immunologists, and molecular biologists in all parts of the world. Thus the recent breakthroughs on the cancer virus front are mainly responsible for the new research proposals and the additional appropriations for cancer research. . . .

It will come as no surprise to the numerous virus and cancer investigators serving as expert reviewers for the National Cancer Institute research contracts (research contracts, like grants, must go through a series of peer reviews) to learn that I am not the director of NCI's virus program but one of several branch chiefs in NCI's Special Virus Cancer Program, which is currently administered by Frank Rauscher and John Moloney. This error compounds some of Bazell's other conclusions concerning NCI's Special Virus Cancer Program (it is no longer the Special Virus Leukemia Program).

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Walter Reed Papers

I am editing the works, papers, and letters of Walter Reed (1851–1902), known for his contributions to the suppression of yellow fever. I would appreciate learning of original documentary material, letters, papers, and other primary source material related to Dr. Reed.

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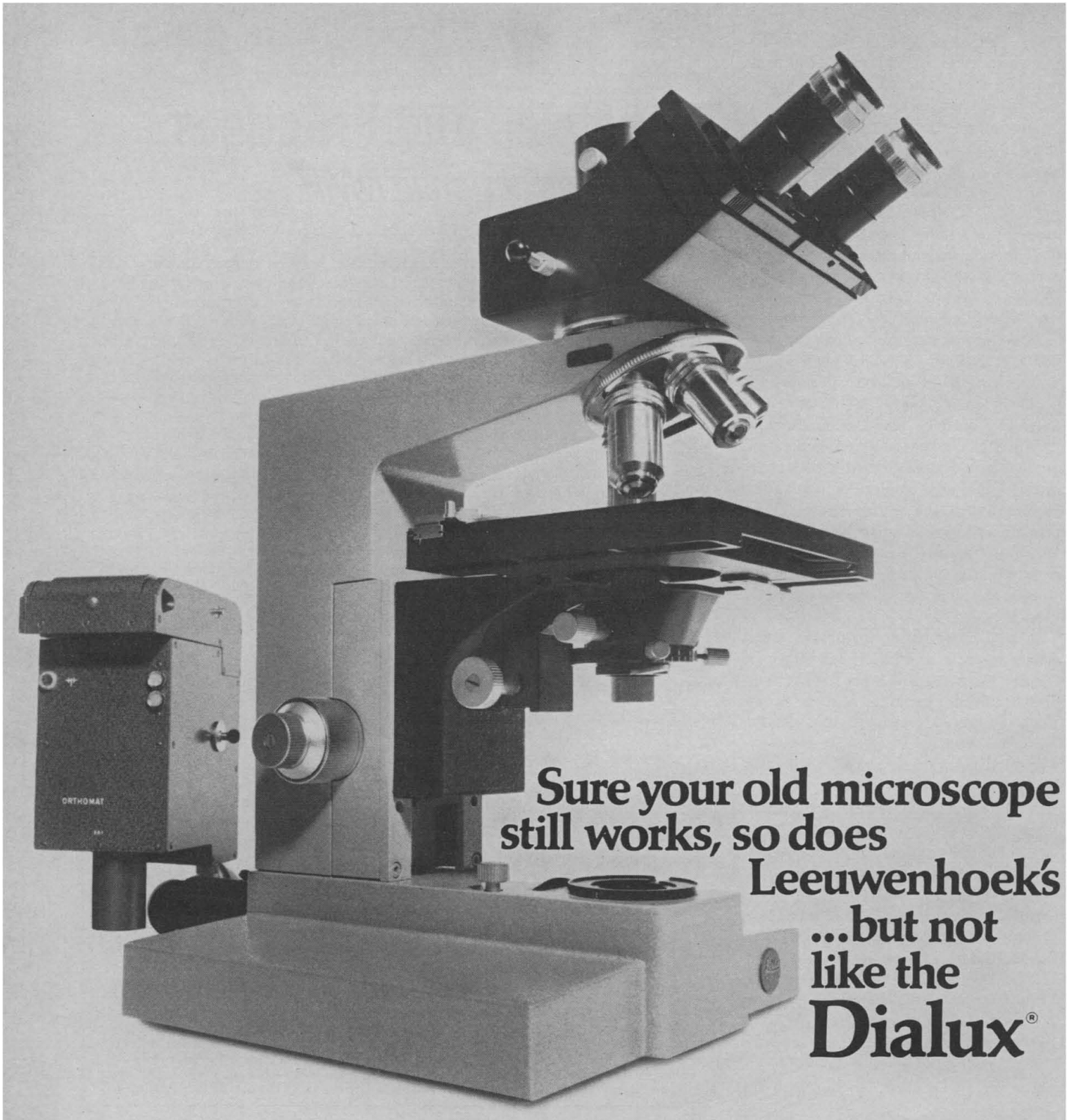

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8 January 1971, Volume 171, Number 3966

SCIENCE

Marine Pollution

Until recently the oceans with their vast area and volume have seemed a safe site for the disposal of wastes. Recent events are causing second thoughts. Over half the population of this country is crowded close to the shores, partly because of recreational and esthetic considerations. Increasingly, however, the nearshore ocean is the receiver of a multitude of toxic or offensive materials. We must exercise better stewardship if we are to enjoy our heritage.

The oceans contain 13×10^{23} grams of water. They receive from natural processes each year about 10^{16} grams of materials—mainly silicates but also substantial amounts of trace elements. In comparison to quantities of this size the contributions of man might seem small. However, mixing in the ocean is slow; surface waters are relatively isolated from the deeps. Man's wastes are dumped near shore and physical chemical and biological mechanisms act to produce substantial concentrating effects. Typical values of the concentration of mercury in the ocean range from 0.03 to 2.0 parts per billion. In contrast, the values found in tuna are in the neighborhood of 0.5×10^{-6} part per billion. The amounts of DDT found in commercial fishes testify even more convincingly to extremely effective concentrating processes. Similar processes are known to occur with other toxic heavy elements, but the extent of detrimental concentrations of organic substances in marine biota is less well established. We know that petroleum on the beach is offensive but have little information on the extent to which some of its constituents are concentrated in marine animals to their detriment.

Insufficiently treated human wastes are another source of damage to marine ecosystems. Lifeless zones have been created in the marine environment; there have been heavy kills of fish and other organisms. Shellfish have been found to contain hepatitis, polio virus, and other pathogens.

The coastlines of the United States with their associated estuaries and salt marshes are highly productive biologically. Many animals live their entire lives in that environment. Others must dwell there during crucial periods in their development. Marine pollution of various kinds has already seriously damaged the environment in some areas. The full extent of this damage is probably not known. Population studies are useful, but the population of a given species is influenced by many factors. Commercial fishes may be scarce because of disease, overfishing, or failure of a food supply. When it is discovered that a species is disappearing, the time is late.

Earlier warning could be provided by more intensive monitoring of chemical constituents of key members of the food chain, especially algae and fish. The items checked should include heavy metals, chlorinated organic compounds, and possible carcinogenic components of petroleum. Beyond monitoring we need far better knowledge of the extent to which potentially harmful molecules are concentrated or eliminated from various animals. In addition to chemical examination, searches for incipient pathological abnormalities should be conducted.

The recent measurements of mercury in tuna and of DDT in other fishes should warn us that we cannot count on the ocean as an almost infinite sink. We have awakened to the fact of very large concentrating effects, and we shall probably find more examples. Having been warned, we would be imprudent not to take action against heavy metal pollution. It would also be imprudent not to expand greatly a search for man-made and petroleum-derived chemicals in marine biota. At the same time, we should do whatever is necessary to decrease the amount of petroleum released to the environment and to regulate the discharge of raw sewage into the oceans.—PHILIP H. ABELSON

Sources used include *Ocean Dumping—A National Policy* (Government Printing Office, Washington, D.C., 1970) and *Waste Management Concepts for the Coastal Zone* (National Academy of Sciences and National Academy of Engineering, Washington, D.C., 1970).

that deposits of potential economic value be earmarked as such.

In the study of the mechanism and course of genetic and diagenetic changes, it was recommended that model reactions be studied in the laboratory; the investigator should start with pure, well-defined, simple systems and gradually increase the complexity of the system by adding more components. It was stressed that more laboratory work will be needed on synthesis at low temperatures and pressures.

Soils

The presence of amorphous materials in soils creates several problems. Because of the high reactivity of these materials and their large specific surface area, the chemisorption of inorganic fertilizers often makes large fractions of the added fertilizers unavailable to the plants. Furthermore, the adsorption of pollutants from streams and from the atmosphere often causes considerable soil pollution. The large and strong adsorption capacity of the amorphous materials may well upset biological activity and balance in soils. It was emphasized that much fundamental and applied work would be needed in these highly important areas.

The permeability of volcanic soils is often high, thus causing excessive drainage which poses problems in rice growing. Measures to remedy this situation, such as the addition of bentonites, require more study of the factors governing colloidal stability to which the problem is directly related.

The colloidal properties of soils are also directly related to properties such as strength, swelling, and shrinking, which are of importance for foundation engineering and road building.

Industrial Applications

Industrially, the use of the amorphous materials should be explored for those applications where small particle size and high adsorption capacity and large surface area are important. On the basis of knowledge of the structure and chemistry of the surface, it will be possible to chemically modify the surface to tailor the colloidal system to suit a particular application. Potential fields of application are in ceramics, paints, fillers, drilling fluids, lubricating greases, defoaming, ion exchange, heterogeneous catalysis, and adsorbents.

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Forthcoming Events

February

9–11. **Aerospace and Electronic Systems**, 12th annual winter conv., Los Angeles, Calif. (W. H. Herrman, Inst. of Electrical and Electronics Engineers, Inc., Los Angeles Council Office, 3600 Wilshire Blvd., Los Angeles 90005)

9–11. Advanced Planning for Industry on **Ships and Marine Systems**, Washington, D.C. (National Security Industrial Assoc., Dept. NM, Suite 700, Union Trust Bldg., 15th and H Sts., NW, Washington, D.C. 20005)

9–11. **Weed Science** Soc. of America, Dallas, Tex. (D. L. Klingman, Agricultural Research Service, U.S. Dept. of Agriculture, Beltsville, Md. 20705)

9–12. Conference of the **Reinforced Plasticts/Composites** Div., 26th, Washington, D.C. (C. Condit, Soc. of the Plastics Industry, Inc., 250 Park Ave., New York 10017)

10–11. **Vinyl Plastics** II—Fundamentals of Processing Techniques, Atlanta, Ga. (J. Seay, School of Architecture, Georgia Inst. of Technology, 225 North Ave., NW, Atlanta 30332)

11–13. Society of **University Surgeons**, New Haven, Conn. (T. Drapanas, Tulane Univ., New Orleans, La. 70112)

12. Society of **Teachers of Family Medicine**, Chicago, Ill. (Miss G. Gillespie, Div. of Family Medicine, Box 875, Biscayne Ave., Miami, Fla. 33152)

14–15. American Medical Assoc., **Medcal Education**, 67th annual congr., Chicago, Ill. (C. H. W. Ruhe, AMA Council on Medical Education, 535 N. Dearborn St., Chicago 60610)

14–18. American Soc. of **Abdominal Surgeons**, New Orleans, La. (B. F. Alfano, ASAS, 675 Main St., Melrose, Mass. 02176)

14–18. American Soc. of **Range Management**, 24th annual, Reno, Nev. (F. T. Colbert, ASRM, 2120 S. Birch St., Denver, Colo. 80222)

15–16. **Virus and Water Quality**: Occurrence and Control, 13th annual, Urbana, Ill. (V. L. Snoeyink, Dept. of Civil Engineering, Univ. of Illinois, Urbana 61801)

17–18. Conference on **Integrated Information Systems**, Palo Alto, Calif. (R. W. Rector, Cognitive Systems, 319 S. Robertson Blvd., Beverly Hills, Calif. 90211)

17–19. **Solid State Circuits**, intern. conf., Philadelphia, Pa. (R. W. Webster, Texas Instruments, P.O. Box 5012, Dallas, Tex. 75222)

17–24. **Therapeutic Use of Dreams**, New York, N.Y. (H. Gershman, American Inst. for Psychoanalysis, 329 E. 62 St., New York 10021)

18–19. **Theoretical Chemistry and Sulfur Chemistry**, 3rd annual symp., New Orleans, La. (L. P. Gary, Jr., Loyola Univ., New Orleans 70118)

18–20. **Experimental Nuclear Magnetic Resonance**, 12th annual conf., Gainesville, Fla. (J. M. Anderson, Bryn Mawr College, Bryn Mawr, Pa. 19010)

18–21. Western **Electroencephalography** Soc., Honolulu, Hawaii. (D. Crowell, Pacific Biochemical Research Center, Univ. of Hawaii, Honolulu 96822)

19–20. **Immune Complexes and Disease,** 12th annual symp., New York, N.Y. (I. Saulpaugh, New York Heart Assoc., 2 E. 64 St., New York 10021)

20–24. American Acad. of **Allergy,** Chicago, Ill. (J. O. Kelley, 756 N. Milwaukee St., Milwaukee, Wis. 53202)

20–27. American Soc. of **Clinical Pathologists** and College of American Pathologists, Las Vegas, Nev. (A. G. Boeck, 710 S. Wolcott Ave., Chicago, Ill. 60612)

21–22. National Assoc. of **Medical Examiners,** Phoenix, Ariz. (A. Z. Hemeli, 3300 Kirkwood Hwy., Wilmington, Del. 19808)

21–26. Engineering Foundation Research Conf. on **Environmental Engineering in the Food Industry,** Pacific Grove, Calif. (R. Lachman, Environmental Resources Program, Cornell Univ., Ithaca, N.Y.)

21–26. **Stack Gas Emissions and Measurements,** Pacific Grove, Calif. (W. T. Ingram, New York Univ., New York)

22. **Efferent Organization and Integrative Behavior,** New Orleans, La. (J. D. Maser, Dept. of Psychology, Tulane Univ., New Orleans 70118)

22–24. National Federation of **Science Abstracting and Indexing Services,** Washington, D.C. (NFSAIS, 2102 Arch St., Philadelphia, Pa. 19103)

23. Source Sampling of **Atmospheric Contaminants,** Toronto, Ont., Canada. (H. G. McAdie, Chemical Inst. of Canada, c/o Ontario Research Foundation, Sheridan Park, Ont.)

22–26. **Plastic and Reconstructive Surgery,** 5th annual intern. congr., Melbourne, Australia. (J. Snell, Royal Australian College of Surgeons, Spring St., Melbourne 3000)

23–24. **Scope of Thermosets,** Chicago, Ill. (P. E. Fina, Box P, Riverdale, Ill.)

23–25. **Chemical Marketing Research** Assoc., Chicago, Ill. (C. W. Slade, Jr., CMRA, 100 Church St., New York 10007)

24–27. American Acad. of **Forensic Sciences,** Phoenix, Ariz. (A. H. Schatz, 750 Main St., Hartford, Conn. 06103)

24–27. Society of **Professors of Education,** Chicago, Ill. (R. Reilly, Shippensburg State College, Shippensburg, Pa. 17257)

24–28. American College of **Angiology,** 17th annual, New Orleans, La. (A. Halpern, 381 Park Ave., S., New York 10016)

26–5. International Acad. of **Proctology,** Mexico City, Mexico. (A. J. Cantor, 147-41 Sanford Ave., Flushing, N.Y. 11355)

27. Oregon Acad. of **Science,** Monmouth. (C. L. Smith, Dept. of Anthropology, Oregon State Univ., Corvallis, 97331)

28–4. Symposium of the Pan-American Assoc. of **Biochemical Societies,** Banff, Alberta, Canada. (W. J. Whelan, Dept. of Biochemistry, Univ. of Miami School of Medicine, P.O. Box 875, Biscayne Ave., Miami, Fla. 33152)

28–4. American Inst. of **Chemical Engineers,** 6th annual, Houston, Tex. (E. L. Ekholm, Bechtel Corp., P.O. Box 2166, Houston 77001)

28–5. **Analytical Chemistry and Applied Spectroscopy,** 22nd annual, Cleveland, Ohio. (W. G. Fateley, Carnegie-Mellon Univ., 4400 Fifth Ave., Pittsburgh, Pa. 15213)

28–5. American Assoc. of **Junior Colleges**, 51st annual, Washington, D.C. (W. A. Harper, AAJC, 1 Dupont Circle, NW, Washington, D.C. 20036)

28–6. Florida Midwinter Seminar in **Ophthalmology and Otolaryngology**, Miami Beach, Fla. (K. S. Whitmer, 550 Brickell Ave., Miami, Fla. 33131)

March

1–3. Symposium on **Antibiotics**, Ste. Marguerite, P.Q., Canada. (S. Rakhit, Ayerst Laboratories, P.O. Box 6115, Montreal, P.Q., Canada)

1–3. **Particle Accelerator** Conf., Chicago, Ill. (D. A. Carlson, Argonne National Lab., Argonne, Ill. 60439)

1–3. American College of **Surgeons**, Phoenix, Ariz. (Communications Div., ACS, 55 E. Erie St., Chicago, Ill. 60611)

1–6. Society for **Cryosurgery**, Hollywood, Fla. (M. Trueblood, SC, 30 N. Michigan Ave., Chicago, Ill. 60602)

3–5. **Fundamental Cancer Research**, 25th annual symp., Houston, Tex. (F. Goff, Anderson Hospital and Tumor Institute, Univ. of Texas, Houston 77025)

3–6. Midwest **Clinical** Conf., Chicago, Ill. (G. F. Lull, 310 S. Michigan Ave., Chicago 60604)

3–6. American **Educational Research** Assoc., New York, N.Y. (R. A. Dershimer, AERA, 1126 16th St., NW, Washington, D.C. 20036)

3–10. Clinical Conf. on the **Treatment of Emotional Problems in Medical Practice, Case Studies in Child Therapy**, New York, N.Y. (H. Gershman, American Inst. for Psychoanalysis, 329 E. 62 St., New York 10021)

4–6. Southern Society of **Anesthesiologists**, Houston, Tex. (R. G. Zepernick, Mercy Hospital, New Orleans, La. 70119)

4–6. Society for **Contemporary Ophthalmology**, Hollywood, Fla. (SCO, Room 1629, 30 N. Michigan Ave., Chicago, Ill. 60602)

4–6. German **Endocrinological** Soc. 17th annual, Hamburg. (J. Kracht, Pathologisches Institut der Universitat Klinikstrasse 32g, 6300 Gieben, Germany)

4–6. Central **Surgical** Assoc., Minneapolis, Minn. (W. J. Fry, Univ. of Michigan Medical School, Ann Arbor 48104)

5–6. American Soc. for **Surgery of the Hand**, Los Angeles, Calif. (L. Milford, ASSH, 869 Madison Ave., Memphis, Tenn. 08104)

5–7. National **Wildlife** Federation, Portland, Ore. (T. L. Kimball, NWF, 1412 16th St., NW, Washington, D.C. 20036)

6–11. American Acad. of **Orthopedic Surgeons**, San Francisco, Calif. (C. V. Heck, AAOS, 430 N. Michigan Ave., Chicago, Ill. 60611)

6–12. American **Concrete** Inst., 67th annual, Denver, Colo. (Secretary, Box 4754, Redford Sta., 22400 West Seven Mile Rd., Detroit, Mich. 48219)

7–9. American Assoc. of **Pathologists and Bacteriologists**, Montreal, Canada. (K. M. Brinkhous, Dept. of Pathology, Univ. of North Carolina, Chapel Hill)

7–11. Society of **Toxicology**, Washington, D.C. (J. F. Borzelleca, Dept. of Pharmacology, Medical College of Virginia, Richmond 23219)

7–12. American Soc. of **Photogrammetry**, Washington, D.C. (L. P. Jacobs, 105 N. Virginia Ave., Falls Church, Va. 22046)

8–10. **Aerodynamic Testing**, 6th annual conf., Albuquerque, N.M. [J. L. Jones, Aeronautics Div. (227-4), NASA Ames Research Center, Moffett Field, Calif. 94035]

8–10. The How-to-Year—The Year for **Continued Professional Development**, New York, N.Y. (R. E. Eddy, Commercial Development Dept., Nalco Chemical Co., 180 N. Michigan Ave., Chicago, Ill. 60601)

8–12. Symposium on **Biophysical Aspects of Radiation Quality**, Lucas Heights, N.S.W., Australia. (J. H. Kane, Div. of Technical Information, U.S. Atomic Energy Commission, Washington, D.C. 20545)

8–12. Western **Metal and Tool** Exposition Conf., Design and Scientific/Precision Instruments Exhibit (WESTEC), Los Angeles, Calif. (American Soc. for Metals, Metals Park, Ohio)

8–12. American Soc. for **Nondestructive Testing**, spring conf., Los Angeles, Calif. (R. E. Turner, Eastman Kodak Co., Rochester, N.Y.)

9–12. International Colloquium on the **Exploitation of the Oceans**, Bordeaux, France. (M. M. Vigneaux, c/o CNEXO, Boite Postale 107, Paris 16e, France)

9–13. International Exhibitions and Technical Meetings for **Medical Electronics and Bio-Engineering**, Basel, Switzerland. (Sekretariat, MEDEX 72, CH-4000 Basel 21, Schweiz Bankverein, Basel)

9–13. International Acad. of **Pathology**, Montreal, Canada. (L. D. Stoddard, Dept. of Pathology, Medical College of Georgia, Augusta 30902)

10–12. Society of **Photographic Scientists and Engineers**, Toronto, Ont., Canada. (H. J. Hall, 10 Maguire Rd., Lexington, Mass. 02173)

10–13. Latin American Congr. of **Neurosurgery**, 14th annual, Punta del Este, Uruguay. (Secretary, Instituto de Neurologia, Hopital de Clinicas, Montevideo, Uruguay)

10–13. **Quality Engineering**, Pacific Grove, Calif. (H. D. Greiner, Engineering Foundation, United Engineering Center, 345 E. 47 St., New York 10017)

12–19. Marquette **Medical** Alumni Assoc., clinical conf., Maui, Hawaii. (R. H. Herzog, MMAA, 561 N. 15 St., Milwaukee, Wis. 53233)

13–17. California **Medical** Assoc., Anaheim, Calif. (R. L. Thomas, CMA, 693 Sutter St., San Francisco, Calif. 94102)

14–17. International **Anesthesia Research** Soc., 45th, Bal Harbour, Fla. (B. B. Sankey, 3645 Warrenville Center Rd., Cleveland, Ohio 44122)

14–17. American Assoc. of **Dental Schools**, Chicago, Ill. (B. F. Miller, III, AADS, Room 1610, 211 E. Chicago Ave., Chicago 60611)

14–17. National Conf. on **Higher Education**, 26th annual, Chicago, Ill. (K. Smith, American Assoc. for Higher Education, 1 Dupont Circle, NW, Washington, D.C. 20036)

15–16. **Aerospace Electronics** Symp., Canadian Aeronautics and Space Inst., Toronto, Ont. (The Secretary, CASI, 77 Metcalfe St. Ottawa 4, Ont.)

15–17. **Neutron Cross Sections and Technology**, 3rd annual, Knoxville, Tenn. (J. A. Harvey, Oak Ridge National Lab., P.O. Box X, Oak Ridge, Tenn. 37830)

15–17. American College of **Surgeons** (sectional) joint mtg. for doctors and nurses, New Orleans, La. (Communications Div., ACS, 55 E. Erie St., Chicago, Ill. 60611)

15–18. American **Radium** Soc., Mexico City, Mexico. (J. M. Vaeth, 1600 Divisadero St., San Francisco, Calif. 94115)

15–19. **Reprography**, 3rd annual intern. congr., London, England. (T. Hampshire, Inst. of Reprographic Technology, c/o IEL, Argyll St., London, W.1)

16–17. Conference on the **Effectiveness of On-Line Biomedical Computing**, Los Angeles, Calif. (M. J. Miller, Assoc. for the Advancement of Medical Instrumentation, 9650 Rockville Pike, Bethesda, Md. 20014)

16–17. **Plastics in Appliances**, Louisville, Ky. (J. L. Isaacs, Plastics Lab., General Electric Co., Appliance Park, 5-249, Louisville 40225)

17–24. Clinical Conf. on the **Treatment of Emotional Problems in Medical Practice, Family Therapy**, New York, N.Y. (H. Gershman, American Inst. for Psychoanalysis, 329 E. 62 St., New York 10021)

18–20. National Council of **Teachers of Mathematics**, Wichita, Kan. (NCTM, 1201 16th St., NW, Washington, D.C. 20036)

18–21. **Clinical Pharmacology**, 2nd annual intern. symp., Regensburg, Germany. (U. Smahel, P.O. Box 345, D-84 Regensburg 1)

18–21. International Assoc. for **Dental Research**, 49th annual, Chicago, Ill. (A. R. Frechette, 211 E. Chicago Ave., Chicago 60611)

18–21. Association for the Advancement of **Medical Instrumentation**, 6th annual, Los Angeles, Calif. (M. J. Miller, AAMI, 9650 Rockville Pike, Bethesda, Md. 20014)

19–20. **Brief Psychotherapy, "Behavior Therapy,"** 3rd annual, Chicago, Ill. (J. Cowen, Dept. of Psychiatry and Behavioral Sciences, Chicago Medical School, 2020 W. Ogden Ave., Chicago 60612)

19–22. Association of University of **Anesthetists**, Miami, Fla. (R. M. Epstein, 622 W. 168 St., New York 10021)

21–24. American **Orthopsychiatric** Assoc., 48th annual, Washington, D.C. (M. F. Langer, AOA, 1790 Broadway, New York 10019)

21–26. National Assoc. of **Corrosion Engineers**, Chicago, Ill. (D. Miller, 2400 W. Loop South, Houston, Tex. 77027)

22–24. Institute of **Management Sciences**, Washington, D.C. (S. W. Hess, Wharton School, Univ. of Pennsylvania, Philadelphia 19104)

22–25. Intsitute of **Electrical and Electronics Engineers**, Inc., New York, N.Y. (J. M. Kinn, IEEE, 345 E. 47 St., New York 10017)

22–26. Australian Institution of **Engineers**, Adelaide. (Secretary, Institution of Engineers, Australia Science House, Gloucester and Essex Sts., Sydney, NSW 2000)

23–24. **Combustion** Inst. Central States section, Ann Arbor, Mich. (D. J. Patterson, Automotive Engineering Lab. 309, Dept.

of Mechanical Engineering, Univ. of Michigan, North Campus, Ann Arbor 48104)

23–25. **Symbolic and Algebraic Manipulation,** 2nd annual symp., Los Angeles, Calif. (J. Moses, Project MAC, Massachusetts Inst. of Technology, 545 Technology Sq., Cambridge 02139)

23–26. **Information Industry** Assoc., 3rd annual, Lancaster, Pa. (P. G. Zurkowski, IIA Washington, 1025 15th St., NW, Washington, D.C. 20005)

23–26. **Negative Ions,** Liverpool, England. (Meetings Officer, Inst. of Physics and the Physical Society, 47 Belgrave Sq., London, S.W.1, England)

24. Association for the Advancement of **Psychoanalysis,** New York, N.Y. (A. Apolito, 80 Undercliff Rd., Montclair, N.J. 07042)

24–26. American **Surgical** Assoc., Boca Raton, Fla. (G. T. Shires, ASA, 5323 Harry Hines Blvd., Dallas, Tex. 75235)

24–26. Midwest **Benthological** Soc., 19th annual, Notre Dame, Ind. (C. I. Weber, FWQA, 1014 Broadway, Cincinnati, Ohio 45202)

24–27. American **Fertility** Soc., New Orleans, La. (H. H. Thomas, 944 S. 18 St., Birmingham, Ala. 35205)

25–26. National Conf. on **Rural Health,** 24th, Atlanta, Ga. (B. L. Bible, American Medical Assoc., 535 N. Dearborn St., Chicago, Ill. 60610)

25–27. American Soc. for **Engineering Education,** Gulf Southwest section, Ruston, La. (Mrs. L. Hitch, ASEE, Suite 400, 1 Dupont Circle, Washington, D.C. 20036)

25–27. American Assoc. of Colleges of **Pharmacy,** San Francisco, Calif. (C. W. Bliven, AACP, 850 Sligo Ave., Silver Spring, Md. 20910)

25–27. **Seismological** Soc. of America, Riverside, Calif. (D. Tocher, P.O. Box 826, Berkeley, Calif. 94701)

26–27. South Carolina **Acad. of Science,** Charleston. (L. H. Stevenson, Univ. of South Carolina, Columbia, S.C.)

26–28. American Soc. of **Internal Medicine,** Denver, Colo. (W. R. Ramsey, Third at Market, San Francisco, Calif. 94103)

26–29. National Assoc. of **Boards of Pharmacy,** San Francisco, Calif. (F. T. Mahaffey, NABP, 77 W. Washington, Chicago, Ill. 60602)

26–30. National **Science Teachers** Assoc., Washington, D.C. (R. H. Carleton, NSTA, 1201 16th St., NW, Washington, D.C. 20036)

27–1. American College of **Allergists,** San Francisco, Calif. (E. Bauers, 2100 Dain Tower, Minneapolis, Minn. 35402)

27–2. American **Pharmaceutical** Assoc., San Francisco, Calif. (W. S. Apple, APA, 2215 Constitution Ave., NW, Washington, D.C. 20037)

28. American Soc. of **Hospital Pharmacists,** San Francisco, Calif. (J. A. Oddis, ASHP, 4630 Montgomery Ave., Bethesda, Md. 20014)

28–1. American Soc. of **Maxillofacial Surgeons,** Miami Beach, Fla. (D. Goulian, Jr., 116 E. 68 St., New York 10021)

28–1. American Soc. of **Mechanical Engineers,** Gas Turbine Conf. and Products Show, Houston, Tex. (A. B. Conlin, 345 E. 47 St., New York 10017)

28–2. Engineering Foundation Conf. on **Building Systems,** Pacific Grove, Calif. (H.

D. Greiner, Engineering Foundation, United Engineering Center, 345 E. 47 St., New York 10017)

28–2. American **Chemical** Soc., Los Angeles, Calif. (F. T. Wall, ACS, 1155 16th St., NW, Washington, D.C. 20036)

28–2. American College of **Physicians**, Denver, Colo. (E. C. Rosenow, ACP, 4200 Pine St., Philadelphia, Pa. 19104)

29–31. Society of **Economic Paleontologists and Mineralogists**, Houston, Tex. (Mrs. R. Tener, Box 979, Tulsa, Okla. 74101)

29–31. International Conf. on **Non-Ionizing Radiation Safety**, Cincinnati, Ohio. (P. Dehner, Children's Hospital Research Foundation, Elland and Bethesda, Cincinnati 45229)

29–31. American Assoc. of **Petroleum Geologists** and Soc. of **Economic Paleontologists and Mineralogists**, Houston, Tex. (E. W. Ellsworth, AAPG, Box 979, 144 S. Boulder, Tulsa, Okla. 74101)

29–31. New Development in **Reactor Mathematics and Applications**, Idaho Falls, Idaho. (J. C. Haire, Idaho Nuclear Corp. P.O. Box 1845, Idaho Falls 83401)

29–2. **Psychosomatic Medicine in Obstetrics and Gynecology**, 3rd annual intern. congr., London, England. (Intern. Congr. Coordinator Center, Travel Dept., 9 E. 38 St., New York 10016)

29–2. Symposium on the Use of **Radiation and Radioisotopes for Genetic Improvement of Industrial Microorganisms**, Vienna, Austria. (J. H. Kane, Div. of Technical Information, U.S. Atomic Energy Commission, Washington, D.C. 20545)

29–2. International Conf. on **Space and Communications**, Paris, France. (M. Bignier, 16, rue de Presles, Paris, France)

29–2. International Union of Pure and Applied Physics, Conf. on **Statistical Mechanics**, Chicago, Ill. (S. A. Rice, James Franck Inst., Univ. of Chicago, 5640 Ellis Ave., Chicago 60637)

29–3. American College of **Radiology**, St. Louis, Mo. (W. C. Stronach, ACR, 20 N. Wacker Dr., Chicago, Ill. 60606)

30. **External Non-Prescription Products**, San Francisco, Calif. (D. E. Prescott, American Pharmaceutical Assoc., 2215 Constitution Ave., NW, Washington, D.C. 20037)

31–2. **Reliability Physics** Symp., Las Vegas, Nev. (O. D. Trapp, Fairchild Semiconductor, 313 Fairchild Dr., Mountain View, Calif. 94040)

April

1–2. American Soc. for **Engineering Education**, Midwest section, Rolla, Mo. (Mrs. L. Hitch, ASEE, Suite 400, 1 Dupont Circle, NW, Washington, D.C. 20036)

1–2. Southern **Water Resources and Pollution Control** Conf., 20th annual, Chapel Hill, N.C. (C. M. Weiss, Dept. of Environmental Sciences and Engineering, Univ. of North Carolina, Chapel Hill 27514)

1–3. Alabama **Acad. of Science**, University. (T. Denton, Samford Univ., Birmingham, Ala.)

1–4. **British Medical** Assoc., clinical mtg., Aberystwyth, England. (BMA, BMA

House, Tavistock Sq., London, W.C.1, England)

1–4. American Soc. of **Group Psychotherapy and Psychodrama**, 29th annual, New York, N.Y. (R. W. Siroka, 215 Park Ave., South, New York 10003)

2–3. National Congr. on the **Socio-Economics of Health Care**, 5th annual, Las Vegas, Nev. (C. N. Theodore, Div. of Health Services, American Medical Assoc., 535 N. Dearborn St., Chicago, Ill. 60610)

2–4. American **Psychosomatic** Soc., 28th annual, Denver, Colo. (P. H. Knapp, APS, 265 Nassau Rd., Roosevelt, N.Y. 11575)

2–6. American **Pharmaceutical** Assoc., with the Hawaii Pharmaceutical Assoc., Honolulu. (D. E. Prescott, APA, 2215 Constitution Ave., NW, Washington, D.C. 20037)

3. New Jersey **Acad. of Science**, Princeton. (A. Hall, Princeton Univ., 70 Washington Rd., Princeton 18540)

3–5. National Assoc. of **Blue Shield** Plans, San Francisco, Calif. (J. W. Castellucci, 211 E. Chicago Ave., Chicago, Ill. 60611)

4–9. American **Chemical** Soc., 161st annual, Boston, Mass. (Meetings Manager, 1155 16th St., NW, Washington, D.C. 20036)

5–6. American Assoc. of **Planned Parenthood Physicians**, Kansas City, Mo. (W C. Rogers, Planned-Parenthood–World Population, 810 Seventh Ave., New York 10019)

5–6. **System Theory**, 3rd annual symp., Atlanta, Ga. (C. O. Alford, Inst. of Electrical and Electronics Engineers, Inc., 345 E. 47 St., New York 10017)

5–7. Conference on **Developments in Electric and Magnetic Resonance**, Keele, England. (Secretary, Institute of Physics and Physical Soc., 47 Belgrave Sq., London, S.W.1, England)

5–7. Conference on **Elementary Particle Physics**, Lancaster, England. (D. Newton, Dept. of Physics, Nuclear Physics Div., Univ. of Lancaster, Bailrigg, Lancaster)

5–7. **Fabrication of Advanced Materials** Symp., Milwaukee, Wis. (W.G. Gibbons, Sunstrand Aviation, 4747 Harrison Ave., Rockford, Ill. 61101)

5–7. American College of **Surgeons**, Montreal, Canada. (ACS, 55 E. Erie St., Chicago, Ill. 60611)

5–8. National **Atomic and Molecular Physics** Conf., 3rd annual, York, England. (Inst. of Physics and the Physical Soc., 47 Belgrave Sq., London, S.W.1, England)

5–8. National **Educational Technology** Conf., New York, N.Y. (Conference Manager, Educational Technology, Englewood Cliffs, N.J. 07632)

6–7. **Advanced Composites** Symp., 5th annual, St. Louis, Mo. (E. V. N. Schuyler, Washington Univ. School of Continuing Education, Box 1048, St. Louis 63130)

6–8. Methods in **Air Pollution and Industrial Hygiene** Studies, 12th annual, Los Angeles, Calif. (E. Jeung, Air and Industrial Hygiene Lab., California State Dept. of Public Health, 2151 Berkeley Way, Berkeley 94704)

6–9. **Optical** Soc. of America, 55th, Tucson, Ariz. (M. E. Warga, OSA, 2100 Pennsylvania Ave., NW, Washington, D.C. 20037)

7. American Soc. of **Clinical Oncology**,

Chicago, Ill. (R. R. Ellison, Roswell Park Memorial Inst., Buffalo, N.Y. 61420)

7–14. Management of **Acute Psychological Emergency**, New York, N.Y. (H. Gershman, American Inst. for Psychoanalysis, 329 E. 62 St., New York 10021)

8–10. American Assoc. for **Cancer Research**, Inc., 62nd annual, Chicago, Ill. (H. J. Creech, AACR, Inst. for Cancer Research, Fox Chase, Philadelphia, Pa. 19111)

8–10. Southern Soc. for **Philosophy and Psychology**, 63rd annual, Athens, Ga. (D. Browning, Dept. of Philosophy, University of Miami, Coral Gables, Fla.)

8–10. U.S. Natl. Committee/Intern. Union of **Radio Science** and Inst. of **Electric and Electronics Engineers**, spring mtg., Washington, D.C. (J. V. Evans, USNC/URSI, Lincoln Lab., Massachusetts Inst. of Technology, Lexington 02173)

12–14. Symposium on **Nonlinear Functional Analysis**, Chicago, Ill. (G. G. Moran, U.S. Army, Mathematics Research Center, Univ. of Wisconsin, Madison 53706)

12–15. **Air and Stream Improvement**, 6th annual conf., Quebec City, P.Q., Canada. (D. H. Paterson, Canadian Pulp and Paper Assoc., 2300 Sun Life Bldg., Montreal, 110, P.Q., Canada)

12–15. National **Telemetering** Conf. and Exposition, 21st annual, Washington, D.C. (H. B. Riblet, Johns Hopkins Univ., Applied Physics Lab., 8621 Georgia Ave., Silver Spring, Md. 20910)

12–16. Federation of the American Societies for **Experimental Biology**, Chicago, Ill. (J. F. A. McManus, 9650 Rockville Pike, Bethesda, Md. 20014)

12–16. American **Geophysical** Union, 52nd annual, Washington, D.C. (G. D. Mead, Lab. for Space Physics, NASA Goddard Space Flight Center, Greenbelt, Md. 20771)

12–16. American Assoc. of **Immunologists**, Chicago, Ill. (H. Metzger, AAI, 9650 Rockville Pike, Bethesda, Md. 20014)

12–17. American Soc. for **Experimental Pathology**, Chicago, Ill. (R. E. Kuntti, ASEP, 9650 Rockville Pike, Bethesda, Md. 20014)

12–17. American Inst. of **Nutrition**, Chicago, Ill. (J. Waddell, AIN, 9650 Rockville Pike, Bethesda, Md. 20014)

12–17. American Soc. for **Pharmacology and Experimental Therapeutics**, Chicago, Ill. (E. B. Cook, ASPET, 9650 Rockville Pike, Bethesda, Md. 20014)

12–17. American **Physiological** Soc., Chicago, Ill. (R. G. Daggs, APS, 9650 Rockville Pike, Bethesda, Md. 20014)

13–15. **Frontiers in Education**, Atlanta, Ga. (B. J. Dasher, College of Engineering, Georgia Inst. of Technology, Atlanta 30332)

13–15. **Microwave Research** Inst., 21st annual intern. symp., New York, N.Y. (J. Fox, Polytechnic Inst. of Brooklyn, 33 Jay St., Brooklyn, N.Y. 11201)

13–16. International **Magnetics** Conf., 9th annual, Denver, Colo. (G. Bate, IBM Corp., P.O. Box 1900, Boulder, Colo. 80302)

14–16. American Soc. for **Engineering Education**, Southeastern section, Clemson, S.C. (Mrs. L. Hitch, ASEE, Suite 400, 1 Dupont Circle, NW, Washington, D.C. 20036)

14–16. National **Pollution Control** Conf. and Exposition, 4th annual, Detroit, Mich. (B. Reeves, 1107 S. Loop West, Houston, Tex. 77021)

14–16. Symposium on **Prescribed Burning in Forests of the Southeastern Coastal Plain**, Charleston, S.C. (Director, Southeastern Forest Experiment Station, P.O. Box 2570, Asheville, N.C. 28802)

14–17. American **Gynecological** Soc., Phoenix, Ariz. (B. M. Peckham, University Hospital, 1300 University Ave., Madison, Wis. 53706)

15–17. Association of Southeastern **Biologists**, Richmond, Va. (D. C. Bliss, Box 278, Randolph-Macon Woman's College, Lynchburg, Va. 24504)

15–17. American Assoc. of **Physical Anthropologists**, Boston, Mass. (E. L. Fry, Dept. of Anthropology, Southern Methodist University, Dallas, Tex. 75222)

15–17. Eastern **Psychological** Assoc., New York, N.Y. (W. W. Cumming, 353 Schermerhorn Hall, Columbia Univ., New York 10027)

15–17. Joint meeting of Northwest **Scientific** Assoc., Idaho Acad. of **Science**, and Washington State **Entomological** Soc., Moscow, Idaho. (L. W. Roberts, Dept. of Biological Sciences, Univ. of Idaho, Moscow 83843)

15–21. American **Leprosy Missions**, 12th annual, Carville, La. (O. W. Haselblad, 297 Park Ave., South, New York 10010)

16–17. Idaho **Acad. of Science**, Moscow, Idaho. (M. A. Fisher, Dept. of Physics and Mathematics, College of Southern Idaho, Twin Falls)

16–17. Amercian **Burn** Assoc., San Antonio, Tex. (J. A. Bostwick, Jr., 1825 W. Harrison St., Chicago, Ill. 60612)

16–17. American Soc. for **Engineering Education**, North Central section, Pittsburgh, Pa. (L. Hitch, ASEE, Suite 400, 1 Dupont Circle, NW, Washington, D.C. 20036)

16–17. Northwest **Scientific** Assoc., Moscow, Idaho. (G. H. Deitschman, U.S. Forest Service, P.O. Box 469, Moscow 83843)

16–17. American Assoc. of **University Professors**, Philadelphia, Pa. (B. H. Davis, AAUP, 1785 Massachusetts Ave., NW, Washington, D.C. 20036)

18–19. Montana **Acad. of Sciences**, Butte. (R. E. Juday, Univ. of Montana, Missoula 59801)

18–21. Association of American **Geographers**, Boston, Mass. (J. W. Nystrom, AAG, 1146 16th St., NW, Washington, D.C. 20036)

18–21. **Neutron Sources and Application**, Augusta, Ga. (C. Ice, Savannah River Lab., Aiken, S.C. 29801)

18–21. **Off-Shore Technology** Conf. Houston, Tex. (H. S. Field, Geophysical Research Corp., 136 Mohawk Blvd., Tulsa, Okla. 74106)

18–21. International **Systems** Meeting, Chicago, Ill. (R. L. Irwin, Systems and Procedures Assoc., 24587 Bagley Rd., Cleveland, Ohio 44138)

18–22. American Assoc. of **Cereal Chemists**, Dallas, Tex. (R. J. Tarleton, 1821 University Ave., St. Paul, Minn. 55104)

18–22. Illinois Acad. of **General Practice**, 23rd annual, Arlington Park. (H. M. Robinson, 14 E. Jackson Blvd., Chicago, Ill. 60604)