SCIENCE

13 July 1973

Vol. 181, No. 4095

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

Meet the L-5 Preparative Ultracentrifuges
--four superb performers from Beckman

We've taken the best features of our Model L2-65/75B and L3-40/50 preparative ultracentrifuges . . . added the latest in high-speed drive technology . . . built in even more operating conveniences and safeguards . . . to bring you the Model L-5 Series—four advanced instruments from 40,000 to 75,000 rpm that provide whatever you need in the application of high forces to biochemical research.

The L-5's feature rapid acceleration/deceleration, precise speed and temperature control, and the containment capability necessary to run new high energy rotors. They do the large volume work, the delicate density gradient separations, the most advanced continuous-flow and zonal runs.

There are 30 Beckman high-performance rotors to choose from, plus accessories like the new Prep UV Scanner which give a preparative instrument many of the capabilities of an analytical ultracentrifuge.

With Beckman you also get a wealth of applications experience, and prompt service—no matter where you are—from our factory-trained service staff numbering in the hundreds.

Beckman: the confident name in Ultracentrifuges for a quarter century. For the new L-5 Brochure, SB-400, write Beckman Instruments, Inc., Spinco Division, 1117 California Avenue, Palo Alto, Calif. 94304.

Beckman®
INSTRUMENTS, INC.

Circle No. 25 on Readers' Service Card

For the money, you'll never buy a better electron microscope than the Corinth 275.

At around $31,500, the Corinth 275 doesn't come cheap.

But when you consider that it has more innovative features than many electron microscopes costing thousands more, we think you'll give it a careful appraisal.

Corinth 275 is an entirely new electron microscope designed to meet the requirement for a simple, high-performance instrument of compact design.

Developed primarily for the investigation of biological problems, the Corinth 275 is the only $31,500 electron microscope available with full specimen handling facilities.

It allows specimen tilts of up to ±30°—with a guaranteed resolution of 7Å at all angles.

And no other electron microscope in this price range offers both a serial section and a multi-specimen holder. Both specimen holders fit into the same stage without the need for modification.

Specimen loading is the simplest yet devised for an electron microscope. The specimen holder fits loosely over a guide peg in the specimen airlock, and when the airlock is closed it is evacuated automatically.

The dominant feature of the instrument is an extremely large viewing screen measuring 6½ in. square (275 cm^2) and positioned at the correct height and angle for optimum viewing by the operator. This viewing screen is ideal for teaching and demonstration purposes.

Furthermore, there is a full double condensor lens so specimens susceptible to damage by a high intensity beam can be investigated and still provide a bright image on the screen.

The Corinth 275 takes up a minimum of floor space, and offers modular solid-state circuitry to ensure trouble-free operation—an essential requirement of an instrument designed for heavy work loads.

With its high performance, unique viewing screen and compact design, the Corinth 275 is the only instrument in its class that offers many of the same facilities found in the large ultimate-performance electron microscopes.

To learn more about the Corinth 275, just complete the coupon below and mail it today.

AEI Scientific Apparatus Inc.
500 Executive Boulevard
Elmsford, New York 10523

AEI
Corinth 275

Dear AEI
Tell me more about the best electron microscope that sells for less.

Name_____
Title_____
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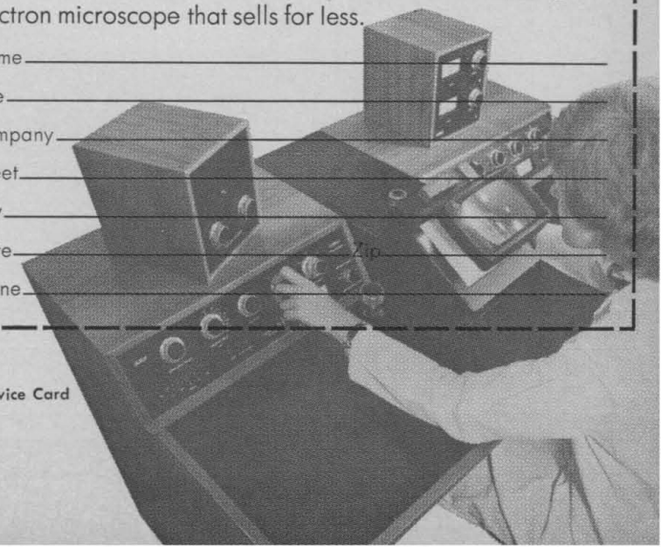

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13 July 1973

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SCIENCE

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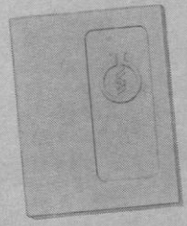
COVER

New lava island emerging in the crater lake on 12 December 1971 during the eruption of Soufrière Volcano, St. Vincent Island, West Indies. See page 117. [Haraldur Sigurdsson, Seismic Research Unit, University of the West Indies, St. Augustine, Trinidad]

We've planned our growth

A Beginning. You've known P-L Biochemicals as the leading specialist in nucleotides and coenzymes. Life researchers have long recognized P-L's special capabilities in these products. But, few realize the growth we have been planning and implementing over the last few years, including our advanced enzyme production. Now we are ready to offer you P-L's fine quality in a broad line of biochemicals.

We Have Grown. We planned our growth specifically to meet the wider range of reagents you need. Expanded enzymes, coenzymes and nucleotides featuring DNA and RNA polymers plus amino acids, antibiotics, buffers, carbohydrates and lipids; with the best in service, research, and consultation. Satisfying your complete requirements is important to us.



To find out how much P-L Biochemicals has grown, send for our new "Biochemicals Reference Guide and Price List" Catalog 103.

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Circle No. 11 on Readers' Service Card

Varian, the optics company, makes NMR, GC, LC, and more!

First, a distinguished family of UV-Vis spectrophotometers

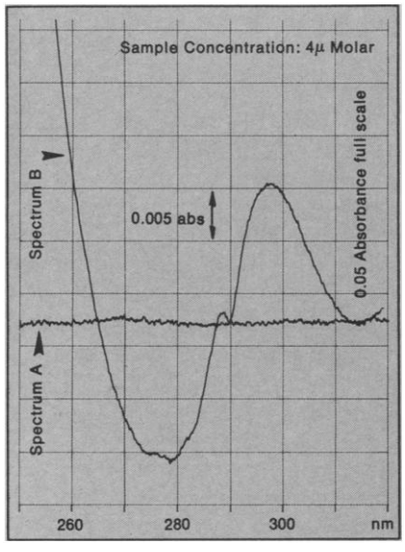
Protein difference spectroscopy needs the Cary 118's accuracy

With difference spectroscopy the life scientist has a valuable probe for investigating the structure of protein macromolecules. It is a very sensitive method for detecting small, discrete changes in a sample which could not be observed with standard absorption procedures, where strong overlapping bands obscure many weaker peaks.

To measure these small absorbance changes, the scientist must have a good spectrophotometer.

Because of its unmatched photometric accuracy, the Cary 118 Spectrophotometer is the ideal instrument for difference measurements (at 0.1 abs the accuracy is 0.00035 abs). Such performance is necessary, since even very small errors can sometimes lead to incorrect interpretation of the spectrum.

In practical terms the 118's exceptional performance frees the scientist from concern about the quality of the data. He knows that any peaks recorded on the spectrum result from sample absorption, and not from an instrument artifact.



These spectra of oxidized cytochrome C, recorded on the Cary 118, illustrate one effect of pH on this protein. Spectrum A was recorded with identical sample and reference solutions (both pH 7). For Spectrum B the sample was increased to pH 11, while the reference was unchanged. Perturbation of the tyrosine residues becomes readily apparent.

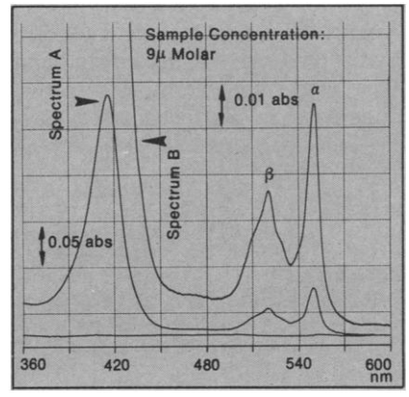
To obtain further information about the Cary 118's capabilities for difference spectroscopy, kinetics, determining concentration in small-volume samples, quantitative analyses, or even recording derivative spectra, circle Reader Service No. **2**.

With the Cary 17 changing absorbance ranges makes a mountain out of a mole hill

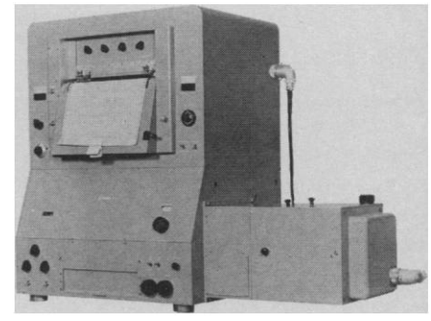
Often when recording a UV-Vis spectrum, a particular wavelength region of interest may produce only a small hump on the spectrum, because the sample's absorption is not very great in that area. In such a situation, changing the absorbance range expands the chart scale and makes it possible to see more spectral detail.

With the Cary 17 Spectrophotometer, switching absorbance ranges is convenient and rapid. The instrument is equipped with a universal absorbance/%T slidewire so that any of eight absorbance ranges or a 0-100 %T range may be selected. This feature, along with the coupled wavelength, scan and chart drive, makes it easy to back up the chart and rescan a particular area using expanded scale to increase the sensitivity of the recording. A small, smooth hump becomes a detailed peak.

A second advantage of the range change capability is that absorbance bands with widely divergent molar absorptivities can be recorded on the same chart, a more convenient presentation for most purposes. Too, it requires less sample preparation because no sample dilution is necessary to bring absorbance values on scale.



To demonstrate the advantages of changing absorbance ranges, these spectra of cytochrome C reduced with ascorbic acid were recorded on the Cary 17. Spectrum A (0-0.5 abs range) fully resolves the Soret band at 415 nm, but shows little detail on the peaks at the longer wavelengths. The expanded presentation in Spectrum B (0-0.1 abs range) gives better detail of the α and β bands at 550 and 520 nm.



Circle Reader Service No. **3** *for more information on the Cary 17.*

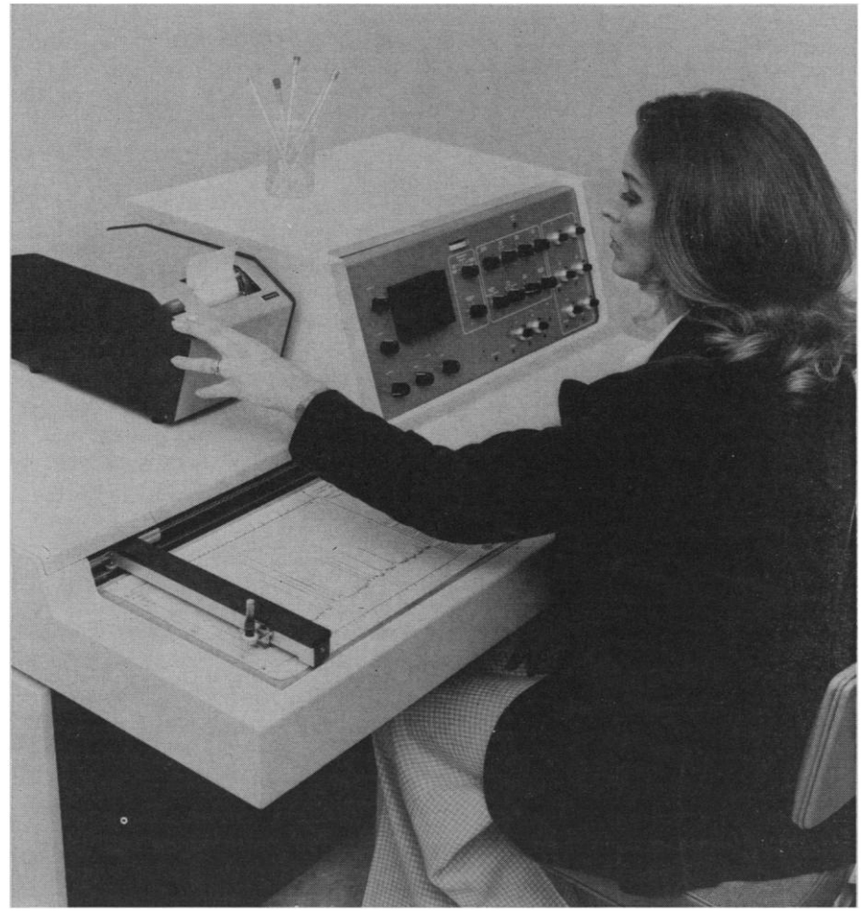
Techtron 635 Spectrophotometer

For life science projects such as gel scanning, kinetics, or thermal denaturation of DNA, the Techtron 635 UV-Vis Spectrophotometer offers exceptional performance at a very low cost. Its ease of operation, large sample compartment, and numerous accessories make it adaptable to almost any routine or research application.

For more information, circle Reader Service No. **4** .

varian instruments

When you need an NMR system, see Varian first



Presenting the routine ^{13}C machine

The CFT-20 NMR Spectrometer has two really revolutionary aspects. First, it makes ^{13}C operation routine. Next, it's inexpensive. And if you're currently running ^{13}C spectra, or want to, you know precisely how revolutionary that makes it. Because ^{13}C NMR has never been particularly easy, or low in cost, before. But it is, now.

Let's start with easy operation.

Controls are conveniently grouped. But you don't have to twiddle a lot of dials or monitor a lot of meters—every function that could possibly be automated, has been. The magnet has a low profile design to provide maximum accessibility to the air gap for rapid sample changing. All of which results in faster, more efficient throughput.

Now, don't get the idea that just because the CFT-20 is easy to operate and not very expensive, that it's a stripped-down system. Quite to the contrary. It features the most up-to-date innovations in NMR technology.

For instance.

The CFT-20 comes with a built-in 8K 620L-100 central processing unit. While you can't see it, you'll know it's there because it's loaded with the most straightforward, easy-to-use software you've ever encountered.

You interface with the instrument through use of a built-in teletype equivalent keyboard and an alpha-numeric oscilloscope display. Simply type out a command, and away you go. Oh, and the oscilloscope will also show you the free induction decay, Fourier transformed spectra, and your pulsed lock signal, as well.

The magnet is double-thermally-insulated for long-term stability. And the air gap is wide enough to handle a 10 mm sample at room temperature, or an 8 mm sample at variable temperature.

There's a built-in magnetic tape cassette for rapid program loading.

And those are only a few examples of the CFT-20's many innovative standard features.

Finally, the price. It's incredibly low. Far less than you'd expect to have to pay for a spectrometer that makes ^{13}C NMR analysis an everyday operation.

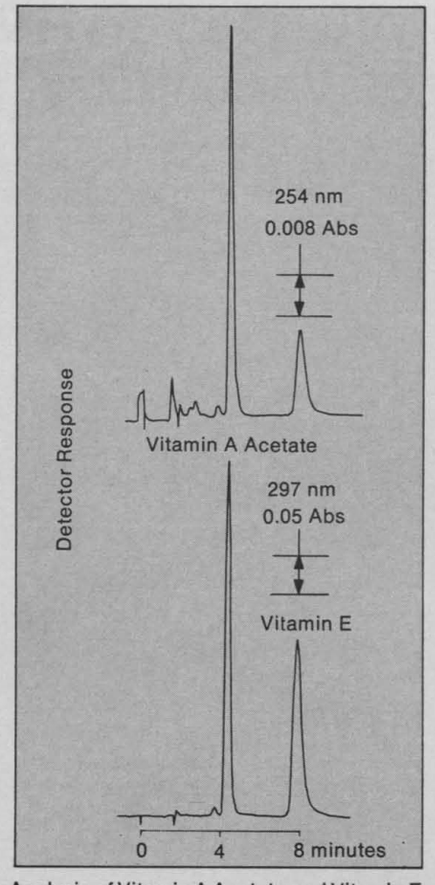
For more information, including a brochure and price list, see your local Varian representative, or circle Reader Service No. 5 .

The latest in liquid and gas chromatography

New LC/UV chromatograph features selectable detector wavelength

Now you can make LC measurements at the maximum absorption wavelength of virtually any compound, because the detector on this new system operates between 210-780 nm with no sacrifice in efficiency. Versatile, it is almost a universal detector that can be used with gradient elution. Minimum detectable quantities are nanogram amounts as shown in the adjacent chromatogram. Cell volume is small, only 8 microliters, so that peak spreading is minimized.

Two well proven instruments are combined in this LC-UV system. The liquid chromatograph may be one of Varian's high performance models such as the 4200, 4100, or 4000. The spectrophotometer portion of the system is a Varian Techtron 635 fitted with special thermostatted flow cells for HPLC. These cells are actually a matched pair, one containing the sample solution, the other the reference solution.



Analysis of Vitamin A Acetate and Vitamin E: Sample, vitamin A 1.5 x 10^{-6} gm; vitamin E 17.3 x 10^{-6} gm; MicroPak® column 0.24 x 50 cm; eluent, hexanes (98.8), CH_2Cl_2 (1.1), isopropanol (0.1); upper record detector, Varian 254 nm, 0.08 Abs; lower record detector, Techtron 635 at 297 nm, 0.5 Abs.

The Techtron 635 has a carefully matched optical path with a common plane focal point in both sample and reference beams. In addition to helping minimize noise and drift, this also allows wavelength scanning. Precise thermostatting with the water-jacketed cell is also important in decreasing noise and drift. Overall system noise is less than ±5 x 10^{-4} absorbance unit from 210 to 780 nm. Drift is lower than 10^{-2} absorbance unit/hour, highly respectable performance for any LC detector!

Wavelength scanning. An additional capability of the LC-UV system is the wavelength scanning provided by the Techtron 635. A chromatographic analysis can be stopped at a peak by placing the pump in idle without shutting off the system. The Techtron 635 can then be used as a scanning spectrophotometer to obtain an absorption spectrum which is adequate for positive qualitative analysis. When the scan is completed, the separation can be instantaneously started up as if there had been no interruption.

Systems synergism. This new LC-UV system is analogous to GC-MS (gas chromatography-mass spectrometry) where the sample separating ability of chromatography is supplemented by the higher sensitivity, flexibility and qualitative ability of the spectrometer.

Details, including chromatograms and instrument specifications, are yours for the asking. Just circle Reader Service No. 6.

Make your GC automatic with Varian's NOW generation, multi-mount sampler

... 60-sample capacity

... vertical or horizontal mounting

... mount two samplers on many GCs

Actually, we call this a second generation automatic sampler because the first generation died before it reached our drawing boards. Euthanasia. We knew scientists didn't need another "me-to" product, so we leap-frogged into the future.

Now, with this new automatic sampler, you can run your gas chromatograph overnight, unattended, and have chromatograms from 60 samples (contained in four 15-vial quadrant holders which fit into a carrousel unit) by morning. Or, if you'd like to run it continuously for longer periods, each 15-vial holder can be easily removed after its samples are analyzed and replaced with new samples—all while the unit is operating!

Reproducibility is excellent. For example, on the raw peak areas of a paraffin sample, percent standard deviations of 0.42% have been obtained. On normalized areas, percent standard deviations of better than 0.18% have been achieved. Precision which not even a skilled operator can attain.

Here are other reasons why the Aerograph sampler becomes the new standard:

Versatile mounting. Use the same unit for horizontal or vertical injection, right- or left-hand carrousel. Many GCs can accommodate two of these compact samplers (see photo).

Choice of sample sizes. You can inject either of two adjustable sample sizes.

Repetitive injections. Make 1, 2, or 3 injections from each sample vial.

The latest in electronics. Using second generation electronics for autosampling gives total automation capability, including external commands from computers or other sources.

And this new Autosampler fits the standard injector inlet of virtually all Aerograph gas chromatographs and many others also.

For details on this versatile new automatic sampler, circle Reader Service No. 7.

New, easiest-to-use digital integrator... Aerograph Model 485

With only four controls to adjust, the new Model 485 Integrator is the easiest one yet to use. It produces accurate and reliable peak area and retention time measurements with minimum set-up time and is designed for liquid as well as gas chromatography and for unattended automated analyses.

A built-in printer and extensive use of integrated circuits and state-of-the-art design combine reliability with convenience. Key features include: continuously variable filtering, 0.1 μV/sec slope sensitivity, 20mV (±10mV) baseline correction range, 4 digits of retention time, 8 digits of peak area, and 10 digits of total area for large peaks. Automatic separation of small peaks high on a solvent peak tail, area reject and integrate delays, and peak start and stop marks round out the 485's capability.

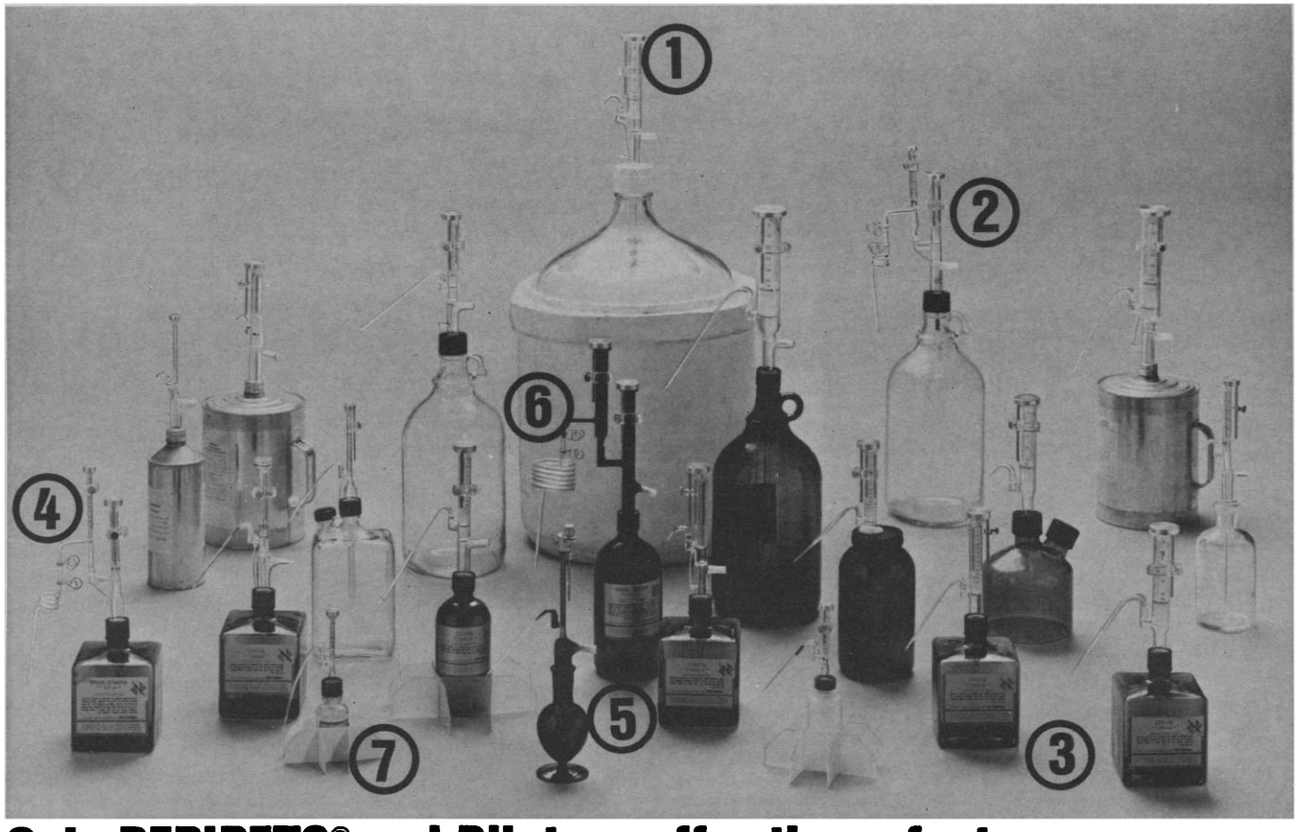
Analyze the easy way with the new Model 485. For details, circle Reader Service No. 8.

Additional Varian instruments include atomic absorption spectrophotometers, EPR spectrometers, laboratory research electromagnets, laser Raman spectrophotometers, spectropolarimeters, and accessories for major instruments. Write for more information.

Varian Associates, Instrument Division
611 Hansen Way
Palo Alto, Ca 94303

varian instruments

L/I dispenses and dilutes <u>any</u> reagent from <u>any</u> container normally found in your lab.



Only REPIPETS® and Dilutors offer these features: ■ dispense and dilute **any** reagent except HF, including chlorinated hydrocarbons, concentrated acids and alkalies. ■ direct fit to almost any container in your lab. ■ Guaranteed accuracy 1%, reproducibility 0.1%. ■ air filters to protect reagent purity.

1&2
Universal REPIPETS and Dilutors

Universal REPIPETS and Dilutors fit almost any container you have on hand (with an opening greater than 19 mm I.D.) Just trim the Teflon® tubing to fit into the bottom extremity of the bottle. Each instrument includes tubing, Magnifying Indicator, and an assortment of screw caps so you can transfer the same instrument from one type of bottle to another. REPIPET prices start at $75, Dilutors at $129.50.

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3&4
Low Silhouette REPIPETS and Dilutors

They're still the same REPIPETS and Dilutors so far as performance goes. The difference is the stable square bottle, which provides a firm base and a much lower profile. Low silhouette REPIPETS (12" high) and Dilutors (14" high) fit easily on or under shelves, and in the refrigerator. Bottle holds 1,000 ml. REPIPETS start at $59.50, Dilutors $109.50.

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5&6
Standard REPIPETS and Dilutors

Our old standbys. More than 150,000 in use, including the first one we made over 10 years ago! Standard REPIPETS and Dilutors are supplied with a 950 ml round amber bottle, a 1,000 ml square amber bottle, or a ground glass joint. Use with any reagent except HF. Instruments include air intake tube with filter. Dilutors are self-cleaning, include a variety of tips supplied at no extra charge. REPIPETS start at $59.50, Dilutors $109.50.

Circle No. 15 on Readers' Service Card

L/I's policy is to satisfy as many customer needs as possible. If we don't have a REPIPET or Dilutor already on hand that suits you, we'll make one that's tailored to your needs.

L/I stocks REPIPETS and Dilutors in 1, 5, 10, 20 and 50 ml sizes. Order from Labindustries or your distributor.

7
MINI-REPIPETS

For dispensing directly from any reagent bottle ½ ounce or larger. Miniature Dilutors also available. MINI-REPIPETS $59.50, MINI-Dilutors $109.50.

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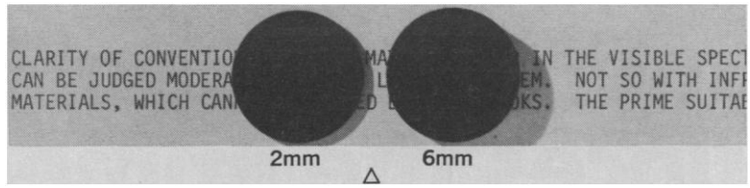
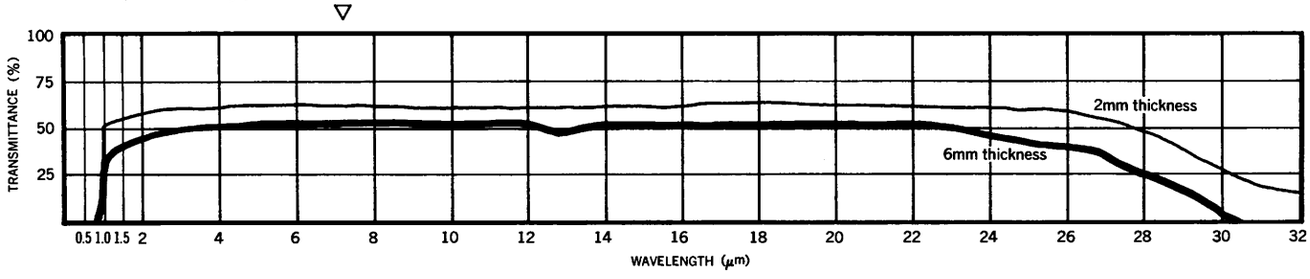
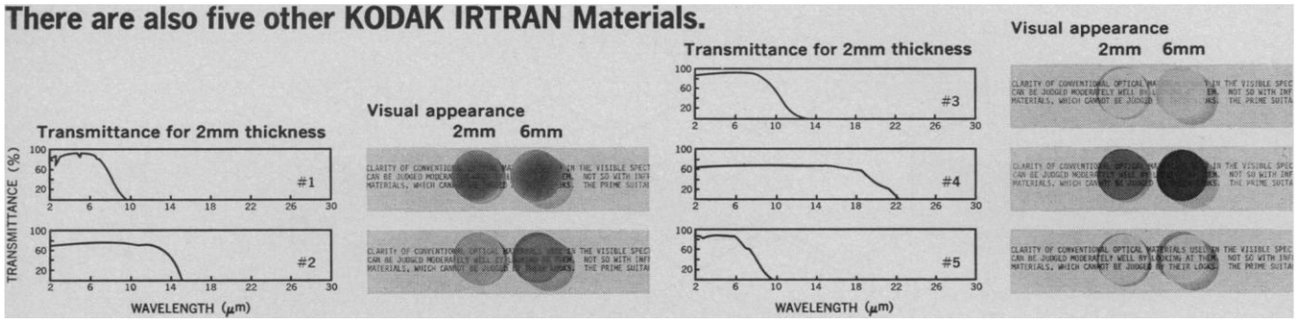
LABINDUSTRIES 1802 Second Street/Berkeley, CA 94710



KODAK IRTRAN 6 Optical Material looks like this.

More importantly, like this.





Transmittance as measured through polished, uncoated surfaces.

A little frankness, because there is too much to lose when people come to distrust advertising:

The IRTRAN Optical Materials are no longer the latest thing in infrared-transmitting optical materials. But when the latest thing does come along, it usually gets compared in one aspect or another with the IRTRAN Materials. Favorably and proudly, of course. We, in turn, are proud to report that the IRTRAN Materials are still growing healthily in demand for an apparently widening variety of applications, most of which we know little about.

We do know quite a bit about the properties of these materials. The information has been packed into a 52-page brochure available as Kodak Publication U-72 on request from **Kodak Apparatus Division, Rochester, N.Y. 14650,** or through the Reader Service Number indicated below. The brochure is full of tables, graphs, and such prose as this:

Usually a little guidance will enable an optical shop technician (with the help of the inestimable wisdom of optical experience) to achieve the kind of polish he'd like to get. If he can supply the experience, we'd be glad to contribute the guidance. In addition to Table 24 on page 49, the following comments are applicable to specific IRTRAN Materials:

IRTRAN 1—Technique similar to glass-working, but use diamond powder for polishing.

IRTRAN 2—Technique similar to glass-working, but use Linde powders for polishing.

IRTRAN 3—Thermal coefficient of expansion is moderately high, so it is best not to cause excessive thermal shock. Should preferably preheat to 100-125 F before blocking to heated wax. Polishing with Linde C powder, then Linde A, then finishing with ½-micron diamond powder has been found to be preferable to any polishing shortcuts.

IRTRAN 4—Of all the IRTRAN Materials, this is the most difficult one to polish well. Back in the old days, an old-time optical shop worker would rely on a slug of tobacco juice now and then to keep this one polishing well. IRTRAN 4 has the coarsest grain structure of all IRTRAN Materials; occasionally a grain will "pull out" while polishing. There's no recourse except to continue polishing below the grain pull-out.

IRTRAN 5—The chief requirement in finishing this material is *patience*. As hard as it is, many, many hours, sometimes days, may be necessary to achieve a satisfactory polish.

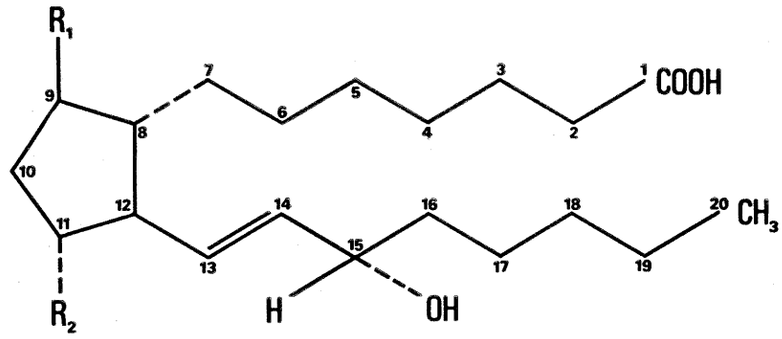
IRTRAN 6—This material is capable of a beautiful polish when handled appropriately in the polishing and cleaning sequence. Using Linde A polishing compound all the way through, polish until an original gray sheen is reached. Then discard the working lap and complete the polish with a fresh polishing lap and polishing compound. When cleaning the final surface, always use fresh, clean solvent that has never been used before. Xylol or trichlorethylene can be used first, followed by alcohol. Pat dry with fluffy diaper cloth; *never* rub dry.

Circle No. 24 on Readers' Service Card

Kodak

For warmth beyond photography

Amersham/Searle announces the immediate availability of four tritium labelled prostaglandins at High Specific Activity.



Prostaglandin-E_1,[5,6-^{3}H(n)]-	40-60 curies/mmol TRK.426
Prostaglandin-E_2-5,6,8,11,12,14,15-^{3}H(n)	>100 curies/mmol TRK.431
Prostaglandin-$F_{1\alpha}$,[5,6-^{3}H(n)]-	40-60 curies/mmol TRK.430
Prostaglandin-$F_{2\alpha}$,[9-^{3}H(n)]-	10-20 curies/mmol TRK.427

Supplied in ethanol water (7:3), and sealed under nitrogen in glass vials.
In process: Tritium labelled prostaglandins A_2 and B_2.

Amersham/Searle
AMERSHAM / SEARLE CORPORATION
An Activity of G. D. Searle & Co. and the Radiochemical Centre

2636 S. Clearbrook Drive/Arlington Heights, Illinois 60005
Telephone: (312) 593-6300—Telex: 28-2452

In Canada:
400 Iroquois Shore Road/Oakville, Ontario
Telephone: (416) 364-2183—Telex: 069-82216

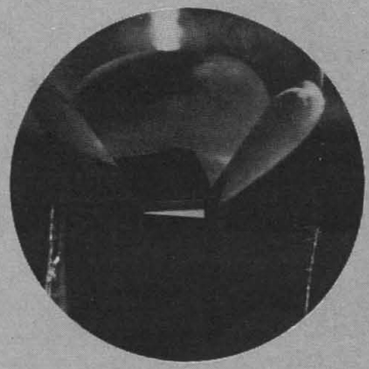
Contact our technical service department for detailed information.
If you would like us to notify you when our prostaglandins that are in process become available, please write.

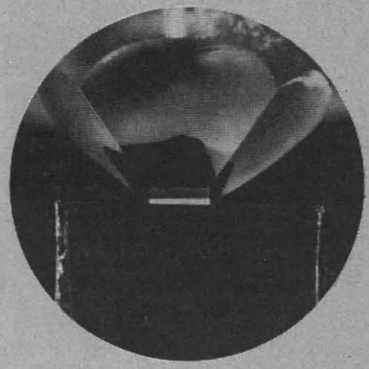
Our specific activity is service.

Circle No. 1 on Readers' Service Card

The new Reichert OmU3 Ultramicrotome:

exclusive darkfield alignment permits fast, one-pass positioning.





Through the microscope, the illuminated gap between specimen and knife is seen as a brilliant slit.

The new OmU3's unique darkfield alignment system enables the operator to position the knife in one pass, quickly and positively, without damaging specimen or knife. Its simple operation makes technician training easier, saves sectioning time, and greatly reduces the chance for error.

Another exclusive feature is instant start/stop thermal feed. Sectioning can be stopped and a section removed. Without delay or readjustment, sectioning may be resumed at the originally set thickness. Cutting and recycling speeds are controlled independently. Sections can be cut at slow speeds and recycled at a faster speed. The integral Reflexomat water pump allows filling the knife boat remotely to eliminate interruption of serial sections. For a convincing demonstration of the new Reichert OmU3, contact your American Optical representative and send for our new, detailed booklet.

AMERICAN OPTICAL
CORPORATION
SCIENTIFIC INSTRUMENT DIVISION • BUFFALO, N.Y. 14215

Circle No. 18 on Readers' Service Card

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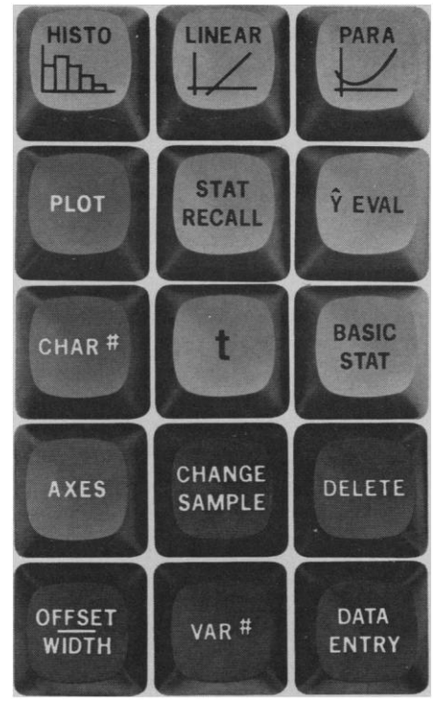

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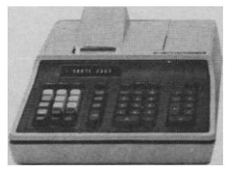

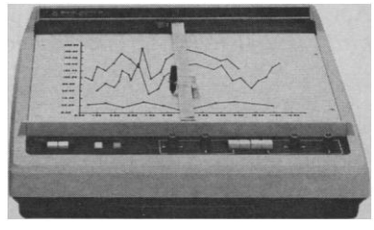

Approval of New Drugs

In his report on drug regulation (News and Comment, 23 Feb., p. 777), Nicholas Wade says that the Food and Drug Administration (FDA) was saved "from having to answer on possibly embarrassing points of detail" because my paper is unpublished, but that its answer to "the general thesis" was "quite effective." This comment deserves a reply.

First, the ground rules for the FDA's answer were their own; they have had copies of my paper since late last year. More important, the "embarrassing points of detail" include every substantive point of my analysis. It was not my purpose to malign the FDA for perversely holding good drugs from the market, or to claim that the 1962 Kefauver amendments have never benefited consumers. Thus, much of the FDA's testimony was irrelevant. I attempted an *overall* assessment of the working of the 1962 amendments, and my finding that, taken as a whole, the amendments have produced fewer benefits than costs was never rebutted by the FDA. Specifically, among the results of my research that still await rebuttal are:

1) The pre-1962 decline in drug innovation has a perfectly sensible economic explanation (a decline in drug market growth in the mid-1950's) that fails to rationalize the low post-1962 innovation rate.

2) The decline in innovation since 1962 has been too substantial to attribute all or even any great part of it to preemption of ineffective drugs. Many effective drugs are not marketed, not because the FDA is perverse, but because the cost burden of the amendments on the process of drug development makes their development unprofitable.

3) When conservative estimates of the value forgone because potentially effective drugs are not developed is set off against estimates of the consumer savings attributable to the amendments, the net balance is decidedly unfavorable to the consumer.

4) The probable costs of delayed introduction of unusually effective drugs, an inevitable result of the added testing required to satisfy the amendments, exceed manyfold a generous estimate of the value of improved drug safety that the amendments are likely to produce.

These points cannot be rebutted by simple extrapolation of trends, selected examples of the FDA's competence, or contrary assertions. Quite apart from the shortcomings of the FDA's testimony, I regret that the FDA chose to view my research as a specific critique of that agency. The FDA happens to be the instrument Congress chose for administering the amendments. However, the inherent defect is in Congress's mandate to the FDA, and it would be unreasonable to look to the FDA rather than to Congress for repair of that defect.

SAM PELTZMAN
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Nicholas Wade quotes Henry E. Simmons as stating that every year, between 3 and 5 percent of those hospitalized, or 1.5 million people, are admitted primarily because of drug reactions. Strongly implicated as causes are the risky nature of prescription drugs and the lack of skill and discrimination in their use by physicians.

These ominous figures are shocking and hard to believe, as no doubt they were intended to be. However, serious inflation has occurred between the original work and final citation.

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The Simmons data derive from a review paper by K. L. Melmon (*1*), who cites five research studies to substantiate his figures (*2–5*). The first of these, the work of Seidl *et al.* at the Johns Hopkins Hospital, has been cited elsewhere (*7*) as the basis for a national projection of 1.5 million drug-caused admissions. Seidl *et al.* had reported that 5 percent of patients were admitted *with* a drug reaction; a later study by the same group showed 1.7 percent of admissions *because* of a drug reaction (*8*).

In the Johns Hopkins studies (*2*, *8*), these percentages represent admissions to medical wards. Since 20 percent of admissions to Johns Hopkins are to medical services, about 0.4 percent of all patients are admitted to that hospital primarily because of drug reactions. It is unlikely that the experience of a major teaching hospital and referral center like Johns Hopkins can be extrapolated to all hospitals. But doing so would give a figure closer to 150,000 than 1.5 million. The inflationary factor thus appears to be at least 10.

There are similar problems with Simmons' claim that "once in hospital, between 18 and 30 percent of all patients have a drug reaction." Melmon cites two sources for such an estimate: Seidl *et al.* (*2*) report that 13 percent had drug reactions while hospitalized to which Melmon adds the 5 percent with reactions present on admission to get 18 percent. Hoddinott *et al.* (*3*) report that 15 percent of patients had probable drug reactions to which Melmon adds another 15 percent with forgotten doses and other errors in drug administration to get 30 percent.

Again, both these studies were done on *medical* wards. It is as wrong to say that 13 or 15 percent of *all* hospitalized patients have a drug reaction (although this may be true for one ward) as it would be to say that 100 percent of all hospital patients are pregnant, because this may be true for one ward. Perhaps it is more important to note that no reaction-incidence study has yet screened out those minor symptoms which are known to occur as "adverse nondrug reactions" (*9*) in people who take no medication. A placebo-controlled study might yield more realistic figures.

The source material also fails to support the estimate that, for patients with drug reactions, "the length of their stay is about doubled as a result." The authors cited by Melmon to back up this claim (*2–5*) all agree that there is a positive correlation between length of hospital stay and number of drug reactions observed; but all also agree that very likely "the long hospital stay was the factor predisposing to the occurrence of adverse episodes" (*4*) and not the other way around.

Finally, these excessive estimates tend to link the adverse reaction problem with the introduction of new drugs. Actually, surveys of drug reactions show that it is the older drugs, such as quinidine, digitalis, and insulin, used in medical practice for over 30 years, which are most often found at fault (*5*). Advances in drug technology may thus help reduce the real incidence of undesired side effects from medical treatment.

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Another Scientist in Congress

Constance Holden (News and Comment, 18 May, p. 720) writes that there is only one scientist in Congress—Mike McCormack (D–Wash.). Another scientist in Congress is James G. Martin (R–N.C.), who was, until his election to the House of Representatives last fall, associate professor of chemistry at Davidson College.

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Taxation and Energy Conservation

The letter from P. de Haen concerning conservation of gasoline (13 Apr., p. 137) deserves comment. European governments tax automobiles on the basis of *taxable* horsepower, which is a meaningless number calculated from

piston displacement. The tax was designed (at the beginning of the century), and works in practice, as essentially a property tax, and I would therefore dispute any claim that European governments have superior wisdom in matters of energy conservation.

The *actual* horsepower that can be obtained from a given piston displacement can be anywhere between 30 and 150 horsepower per liter of displacement (and even more for motorcycle engines), depending on the sophistication of design, and therefore taxable horsepower bears no relation to actual horsepower. In addition, gasoline mileage obtained on the road depends very little on engine horsepower (actual or taxable), but on factors such as gross vehicle weight, overall thermal efficiency of the engine with all accessories (for example, power steering or air conditioning), efficiency of power transmission to the driving wheels (which is noticeably less with automatic transmission than with manual), average speed, and, last but not least, presence or absence of smog controls, and driving habits (the proverbial "lead foot").

In this connection, crash-safety standards increase vehicle gross weight, and smog controls reduce the thermal efficiency of the engine; thus both factors tend to increase gasoline consumption per mile traveled. In this way energy conservation comes into direct conflict with safety and environmental considerations, and we are no longer faced with an either-or proposition, but with a much more difficult question of trade-off: How much increased energy consumption is the crash-safety and smog control worth?

On the whole, taxation calculated from piston displacement has had an inhibiting influence on engine design, and for this reason the Europeans have not been too keen on smog control (not to mention the noise factor) at home, for it is difficult to put effective smog (and noise) controls on a small-displacement engine and still have some power left (for example, I understand that Renault is pulling out of the North American market after 1975 largely for this reason).

If we have to tax automobiles in order to conserve fuel, let us avoid dictating design criteria (piston displacement, horsepower, number of wheels) and simply tax by vehicle weight, or tax fuel directly; in the latter case we probably cut down on unnecessary travel as well. If we tax fuel directly or tax by vehicle weight, we will likely end up with smaller cars using less gasoline, but if we insist on "zero pollution" and "total safety," we will end up driving 5-ton battering rams getting 1 mile to the gallon.

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Highway Salting

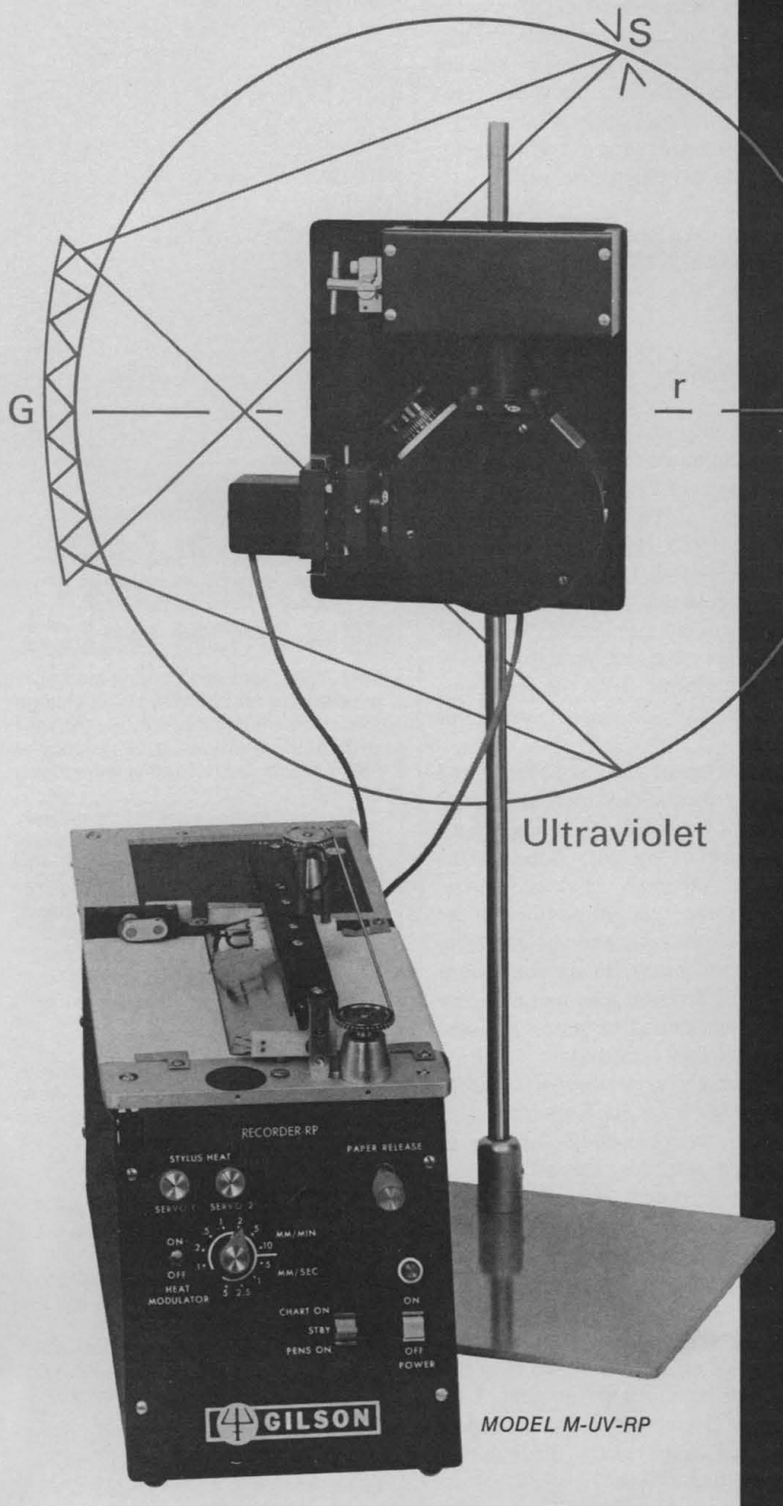
A report entitled "Release of mercury from contaminated freshwater sediment by the runoff of road deicing salt" of which I was a coauthor, appeared in *Science* in 1972 (10 Mar., p. 1142). The results showed that the addition of sodium or calcium chloride to artificially contaminated sediments increased the relative amount of mercury in the water in equilibrium with the sediments by two to five or more orders of magnitude.

Since that report was published, I and others have shown that increasing concentrations of chloride do indeed result in the release of mercury but that the amount of mercury released is dependent on the type of sediment, the *p*H, redox conditions, and the chemical form of the mercury. In naturally contaminated sediments, the mercury has generally been bound very strongly, and little release has occurred.

Unfortunately a number of environmental groups have cited the report as a strong argument against the use of road deicing salt. In view of the fact that mercury, except when associated with an unusual industrial pollution activity, is not present in significant amounts in most sediments, and because the amount of mercury that might be released by chlorides depends on a specific set of conditions which may not occur in the natural environment, I do not believe the contents of the report can be used as a reason for banning highway salting.

More comprehensive studies under realistic field conditions are needed in research involving the environmental sciences. Extrapolation of laboratory data to field conditions can often lead to inaccurate conclusions.

DONALD S. YEAPLE
JBF Scientific Corporation, 2 Ray Avenue, Burlington, Massachusetts 01803



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13 July 1973, Volume 181, Number 4095 **SCIENCE**

Research Impact Statements

There is little question that environmental impact statements should play an important role in technology assessment and social control. Would it not also be reasonable to ask that research impact statements be prepared by regulatory agencies? During the last few years, the Food and Drug Administration (FDA) and, more recently, the Environmental Protection Agency (EPA) have assumed—either indirectly or by actual legal mandate—in certain fields the dominant role in deciding what research could or could not be done and especially how long it would take to bring such work to a decision point. Should the effect of such actions on research also be evaluated? Research impact statements could be prepared either as internal agency documents or as part of an open dossier. My own recommendation is that these documents be used primarily within the agency at first, in order to permit it to determine for itself what information and policies could be derived from such statements. Even such limited use would impose upon the staffs of regulatory agencies a mental discipline that is sometimes lacking in the current decision-making process. Eventually, depending on the experience gained, the statements could become a regular feature, generally available and subject to refutation.

A typical research impact statement ought to include an evaluation (even if only a subjective one) of the research area that would be affected by given regulatory requirements. Major items that should be taken into consideration are the novelty of the research, the effects of the regulatory requirement on other areas, and, most important, a cost-benefit determination. For example, a given regulatory requirement might achieve a relatively minor gain in safety information at the expense of an important line of research. If so, what alternatives might provide such safety information without a substantial negative impact on research? What is the price in lost benefits that the public will pay through a considerable delay in the completion or total abandonment of a given project? The pharmaceutical field appears to be replete with such examples, and various people have claimed that the drastic reduction in the introduction of significant new drugs during the last decade is associated to a considerable extent with FDA-imposed requirements. If research impact statements had been required of the FDA during that decade, their review at this time and comparison with the actual research conducted would have been very useful in confirming or rejecting such claims.

Research impact statements would also be useful in the field of new insecticides. Before substantial field trials with new insecticides can be undertaken, the sponsor of such trials must receive from the EPA an "experimental permit." Refusal of such permits usually prevents further development and presumably is based on real or hypothetical environmental considerations. Would it not also be desirable for these considerations to be accompanied by a statement that would evaluate the potential damage (that is, failure to replace presently used, persistent insecticides) if such research were *not* done?

The impact of regulatory agencies on research is now so enormous that they should bear some of the responsibility for *prospective* research planning—especially if the effect can be felt on a national scale. The research impact statement may be a useful device in calling attention at an early stage to the need for modification or even elimination of counterproductive regulatory practices.—CARL DJERASSI, *Professor of Chemistry, Stanford University, Stanford, California 94305*

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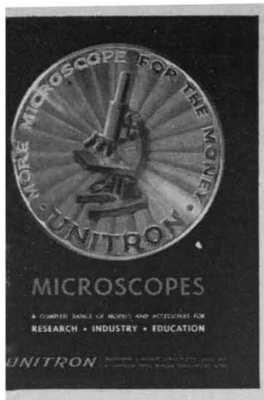

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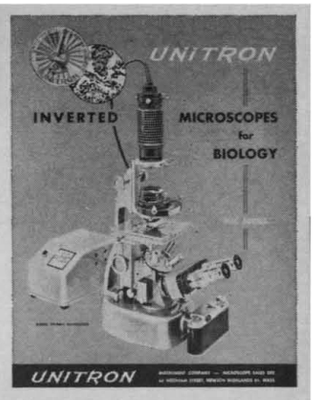

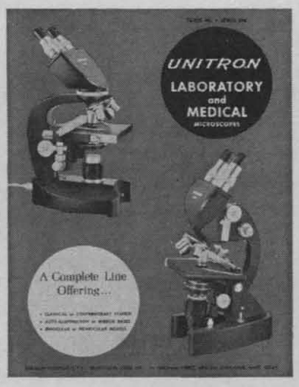

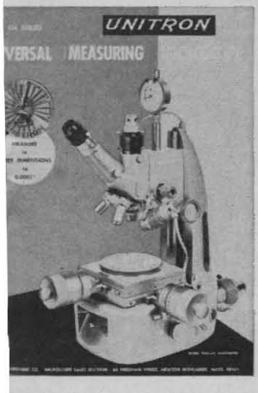

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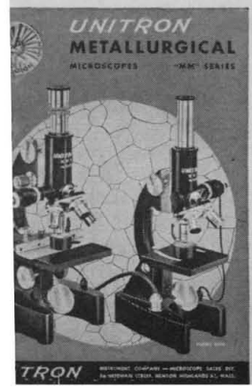

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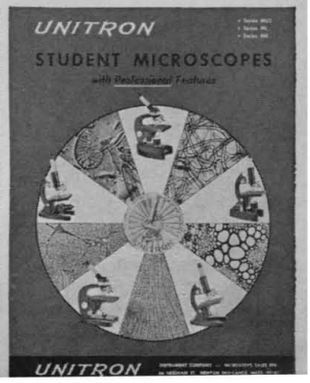

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20–26. **Leprosy** Congr., 10th intern., Bergen, Norway. (S. G. Browne, 16 Bridgefield Rd., Sutton, Surrey, England)

20–29. **Genetics,** 13th intern. congr., Berkeley, Calif. (S. W. Brown, Dept. of Genetics, 345 Mulford Hall, Univ. of California, Berkeley 94720)

21–22. Society of **Logistics Engineers,** Hunt Valley, Md. (R. R. Harvey, SOLE, P.O. Box 164, Hunt Valley)

21–24. International **Chemistry Teachers** Conf., Chemical Education Divs. of the Chemical Inst. of Canada and the American Chemical Soc., Waterloo, Ont. (L. H. Sibley, St. Catharines Collegiate Inst. and Vocational School, 34 Catherine St., St. Catharines, Ontario, Canada)

21–24. Symposium on **Zirconium in**

Nuclear Applications, American Soc. for Testing and Materials and American Inst. of Mining, Metallurgical and Petroleum Engineers, Portland, Ore. (Meetings Officer, ASTM, 1916 Race St., Philadelphia, Pa. 19103)

21–25. International Soc. for the **Study of Behavioral Development**, 2nd biennial mtg., Ann Arbor, Mich. (T. Yarian, Center for Human Growth and Development, 1111 E. Catherine, Univ. of Michigan, Ann Arbor 48104)

22–24. **Applications of X-ray Analysis**, 22nd annual conf., Denver, Colo. (C. O. Rudd, Metallurgy and Materials Science Div., Denver Research Inst., Univ. of Denver, Denver 80210)

22–25. National Council of **Teachers of Mathematics**, Fort Worth, Texas. (NCTM, 1201 16th St., NW, Washington, D.C. 20036)

25–26. **Mathematical Psychologists**, 6th annual, Montreal, Canada. (A. A. J. Marley, Dept. of Psychology, P.O. Box 6070, Montreal 101, P.Q.)

25–28. American **Astronomical** Soc., Columbus, Ohio. (H. M. Gurin, AAS, 211 FitzRandolph Rd., Princeton, N.J. 08540)

26–29. American Soc. of **Association Executives**, New Orleans, La. (R. W. Taylor, ASAE, 1101 16th St., NW, Washington, D.C. 20036)

26–31. American **Chemical** Soc., 166th natl. mtg., Chicago, Ill. (Meetings Manager, ACS, 1155 16th St., NW, Washington, D.C. 20036)

26–31. International Soc. of **Neurochemistry**, 4th intern., Tokyo, Japan. (Y. Tsukada, Dept. of Psychology, School of Medicine, Keio Univ., Shinjuku, Tokyo)

27–29. **Comparative Virology**, 2nd intern. conf., Mont Gabriel, P.Q., Canada. (E. Kurstak, Univ. of Montreal, P.O. Box 6128, Montreal 101, P.Q., Canada)

27–30. American **Sociological** Assoc., New York, N.Y. (N. J. Demerath, ASA, 1001 Connecticut Ave., NW, Washington, D.C. 20036)

27–30. International Congr. on **Suicide Prevention**, 7th, Amsterdam, Netherlands. (H. J. van der Leek, Free Univ., Postbox 7161, Amsterdam)

27–31. NATO Conf. on **Cybernetic Modeling of Adaptive Organizations**, Porto, Portugal. (D. Howland, College of Administrative Science, Ohio State Univ., 1775 S. College Rd., Columbus 43210)

27–31. American **Psychological** Assoc., 81st annual, Montreal, P.Q., Canada. (J. Warren, APA, 1200 17th St., NW, Washington, D.C. 20036)

27–1. **Leucocyte Culture** Conf., 8th, Uppsala, Sweden. (K. Lindahl-Kiessling, Inst. for Medical Genetics, Univ. of Uppsala, V. Agatan 24, S-752-20 Uppsala)

28–30. Association for **Computing Machinery**, Atlanta, Ga. (G. Smith, ACM, 1133 Ave. of the Americas, New York 10036)

28–30. International Conf. on **Radiation and Remote Probing of the Atmosphere**, Univ. of California, Los Angeles. (J. G. Kuriyan, Dept. of Meteorology, Univ. of California, Los Angeles 90024)

28–31. International Colloquium on **Empirical Aesthetics**, 5th, Leuven, Belgium. (G. Smets, Psychologisch Instituut, Tiensestraat 100, 3000 Leuven)

28–31. International Assoc. of **Human Biologists** and Soc. for the Study of Human Biology, Detroit, Mich. (E. B. Watts, Dept. of Anthropology, Tulane Univ., New Orleans, La. 70018)

29–31. Conference and Workshop on **Primate Karyology**, Wayne State Univ., Detroit, Mich. (A. L. Koen, Mott Center, 275 E. Hancock, Detroit 48201)

September

1–3. **International University of the World**, Rome, Italy. (J. J. Lynch, IUW, 16 Westview Rd., Spring Valley, N.Y. 10977)

1–7. **Electroencephalography and Clinical Neurophysiology**, 8th intern. congr., Marseille, France. (G.-C. Lairy, Laboratoire d'EEG, Hôpital Henri Rousselle, 1, rue Cabanis, Paris 14e France)

2–6. **Victimology**, intern. symp., World Psychiatric Assoc., Jerusalem, Israel. (I. Drapkin, Organizing Committee of Criminology, Faculty of Law, Hebrew Univ. of Jerusalem, P.O. Box 4051, Jerusalem)

2–7. **Bacteriology**, intern. congr., American Soc. for Microbiology, Jerusalem, Israel. (A. F. Langlykke, ASM, 1913 I St., NW, Washington, D.C. 20006)

2–7. International Congr. on **Mercury**, sponsored by the Inst. Tecnologico Metalurgico Emilio Jimeno–Univ. of Barcelona, and the Consejo de Administracion de las Minas de Almaden y Arrayanes, Barcelona, Spain. [Secretaria del Congreso, Facultad de Ciencias (Pedralbes), Univ. of Barcelona, Barcelona-14]

2–8. **Birth Defects**, 4th intern. conf., National Foundation–March of Dimes, Vienna, Austria. (Intern. Medical Congr., Ltd., c/o National Foundation, 1275 Mamaroneck Ave., White Plains, N.Y. 10605)

2–10. Society of **Protozoologists**, Clermont-Ferrand, France. (D. M. Hammond, Dept. of Zoology, Utah State Univ., Logan 84321)

2–14. **Tropical Medicine and Malaria**, 9th intern. congr., Athens, Greece. (E. M. H. Mofidi, School of Public Health, Univ. of Tehran, Tehran, Iran)

3–6. **Chemical Thermodynamics**, 3rd intern. conf., Intern. Union of Pure and Applied Chemistry, Baden, Vienna, Austria. (F. Kohler, Inst. of Physical Chemistry, Univ. of Vienna, Wahringerstr. 42, A-1090 Vienna)

3–6. **Stress Analysis** Group, annual conf., Inst. of Physics, Bath, England. (Meetings Officer, IP, 47 Belgrave Sq., London, SWIX 8QX, England)

3–7. Symposium on **Isotopes and Radiation Techniques in Studies of Soil Physics, Irrigation and Drainage in Relation to Crop Production**, Intern. Atomic Energy Agency, Nicosia, Cyprus. (J. H. Kane, Office of Information Services, U.S. Atomic Energy Commission, Washington, D.C. 20545)

3–7. **Molecular Sieves**, 3rd intern. conf., Eidgenossische Technische Hochschule and the Swiss Chemical Soc., Zurich, Switzerland. (W. M. Meier, Inst. für Kristallographie der ETH, Sonneggstr. 5. 8006 Zurich)

3–7. **Pharmaceutical Sciences**, 33rd intern. congr., Stockholm, Sweden. (FIP-Congr. 1973, Box 1142, S-111 81 Stockholm)

3–7. International Union of **Pure and Applied Chemistry**, 24th intern. congr.,

Hamburg, Germany. (Secretariat, 7 Via Cornelio Celso, 00161 Rome, Italy)

3–9. Symposium on **Photoelastic Effects and Its Applications**, Intern. Union of Theoretical and Applied Mechanics, Brussels, Belgium. (J. Kestens, Laboratoire d'Analyse des Contraintes, Universite Libre de Bruxelles 87, Avenue Ad. Buyl, Brussels 5)

4–8. American **Political Science** Assoc., New Orleans, La. (E. M. Kirkpatrick, APSA, 1527 New Hampshire Ave., NW, Washington, D.C. 20036)

4–12. International Assoc. for the **Scientific Study of Mental Deficiency**, 3rd congr., The Hague, Netherlands. (M. I. I. Goldberg, Box 83, Teachers College, Columbia Univ., New York 10027)

4–14. International **Radiation Protection** Assoc., 3rd intern. congr., Washington, D.C. (R. J. Catlin, U.S. Atomic Energy Commission, Washington, D.C. 20545)

4–14. International Organization for **Standardization**, 9th triennial mtg., American Natl. Standards Inst., Inc., Washington, D.C. (D. Maskevich, ANSI, 1430 Broadway, New York 10018)

5–7. **Nuclear Structure: Heavy Ions** Conf., Inst. of Physics, Manchester, England. (Meetings Officer, IP, 47 Belgrave Sq., London, SWIX 8QX, England)

5–8. Society of **General Physiologists**, Woods Hole, Mass. (C. Edwards, Dept. of Biological Sciences, State Univ. of New York, Albany 12222)

5–8. International Conf. on **Magnetic Structures in Superconductors**, American Physical Soc., Argonne Natl. Lab., Intern. Inst. of Refrigeration, Intern. Union of Pure and Applied Physics, and Natl. Science Foundation, Argonne, Ill. (R. P. Huebener, Solid State Science Div., Argonne Natl. Lab., Argonne 60439)

5–12. American **Phytopathological** Soc., 65th mtg., Minneapolis, Minn. (R. J. Green, Jr., Dept. of Botany and Plant Pathology, Purdue Univ., Lafayette, Ind. 47907)

5–12. **Plant Pathology**, 2nd intern. congr., Intern. Soc. for Plant Pathology, Minneapolis, Minn. (J. E. Mitchell, Dept. of Plant Pathology, Univ. of Wisconsin, Madison 53706)

6–8. **Parapsychological** Assoc., 16th mtg., Charlottesville, Va. (R. L. Morris, Psychical Research Foundation, Duke Station, Durham, N.C. 27706)

6–8. **Pittsburgh Diffraction Soc.**, 31st annual, Pittsburgh. Pa. (R. J. Kadlec, Dept. of Biochemistry, Univ. of Pittsburgh, Pittsburgh 15213)

6–10. **Plasma Chemistry** Symp., Intern. Union of Pure and Applied Chemistry, Kiel, Germany. (J. R. Hollahan, NASA-Ames Research Center, M/S 239-4 Moffett Field, Calif. 94035)

7–9. **More Learning: Less Teaching** Conf., Inst. of Physics, Guildford, England. (Meetings Officer, IP, 47 Belgrave Sq., London, SWIX 8QX, England)

8–11. American **Fisheries** Soc., Orlando, Fla. (R. A. Wade, AFS, 1319 18th St., NW, Washington, D.C. 20036)

8–15. **Chemotherapy**, 8th intern. congr., Athens, Greece. (P. Kontomichalou, P.O. Box 1554, Athens)

8–15. **Neurology**, 10th intern. congr., Barcelona, Spain. (J. M. Espadaler, Consejo de Ciento, 318, Barcelona-7)

9–12. American **Ceramic** Soc. (Elec-

tronics Div.), Atlanta, Ga. (F. P. Reid, ACS, 4055 North High St., Columbus, Ohio 43214)

9–13. **Marine Plankton and Sediments,** 3rd planktonic conf., Intern. Council of Scientific Unions, Scientific Committee on Oceanic Research, Working Group 37, Kiel, Germany. (E. Seibold, Geologisches Institut der Universitat, Olshausenstr. 40/60, 23 Kiel)

9–13. International Assoc. on **Water Pollution Research,** 7th, Paris, France. (B. B. Berger, Room 211, Graduate Research Center, Water Resources Research Center, Univ. of Massachusetts, Amherst 01002)

9–14. International **Radiation Protection** Assoc., 3rd intern. congr., Washington, D.C. (R. J. Catlin, U.S. Atomic Energy Commission, Washington, D.C. 20545)

9–21. International Assoc. of **Geomagnetism and Aeronomy,** Kyoto, Japan. (Prof. Rikitake, Earthquake Research Inst., Univ. of Tokyo, 2-11-16, Yayoi, Bunkyo-ku, Tokyo, Japan)

10–11. **Turbulence in Liquids,** 3rd symp., Univ. of Missouri–Rolla, Rolla. (J. L. Zakin, Dept. of Chemical Engineering, Univ. of Missouri–Rolla, Rolla 65401)

10–12. **Exploration of the Planetary System,** Copernicus conf., Intern. Astronomical Union, Torun, Poland. (P. Swings, Inst. of Astrophysics, Univ. of Liége, Leon Souguenet Ave., 23, B-4050, Esneux, Belgium)

10–12. **Irradiation Experimentation in Fast Reactors,** American Nuclear Soc., Jackson Hole, Wyo. (J. G. Crocker, 2309 Arctic Ave., Idaho Falls, Idaho 83401)

10–12. **Marine Technology** Soc., 9th annual conf., Washington, D.C. (R. W. Niblock, MTS, 1730 M St., NW, Washington, D.C. 20036)

10–13. European Conf. on **Pediatric Nephrology,** Strbske Pleso, Czechoslovakia. (F. Demant, Clinic of Pediatrics of the Faculty Hospital, Kosice, Czechoslovakia)

10–14. International Symp. on **Macromolecules,** Intern. Union of Pure and Applied Chemistry, Aberdeen, England. (J. R. Keene, Chemical Soc., Burlington House, Piccadilly, London, England)

10–14. **Mass Spectrometry** Conf., 6th intern. conf., Intern. Union of Pure and Applied Chemistry, Edinburgh, Scotland. (C. H. Maynard, Inst. of Petroleum, 61 New Cavendish St., London, W1M 8AR, England)

10–14. Symposium on **Radioimmunoassay and Related Procedures in Clinical Medicine and Research,** Intern. Atomic Energy Agency, Istanbul, Turkey. (E. J. Garcia, IAEA, Karntner Ring 11-13, A-1010 Vienna, Austria)

10–15. International Assoc. for **Cybernetics,** 7th, Namur, Belgium. (J. Lemaire, Place Andre Ryckmans, Palais des Expositions, B-5000, Namur)

12–14. American **Ceramic** Soc. (Electronics Div.), Atlanta, Ga. (F. P. Reid, ACS, 4055 North High St., Columbus, Ohio 43214)

12–14. **Physics of Semimetals and Narrow-Gap Semiconductors,** Univ. of Wales and Inst. of Science and Technology, Cardiff, Wales. (J. E. Aubrey, Dept. of Applied Physics, UW and IST, King Edward VII Ave., Cardiff CF1 3NU)

12–17. American **Medical Writers** Assoc.,

Bethesda, Md. (E. Stahl, Ayerst Labs., Montreal, P.Q., Canada)

13–14. Society for **Management Information Systems**, 5th annual conf., Chicago, Ill. (A. Suter, SMIS, 221 North La Salle St., Chicago 60601)

13–15. International Congr. on the **Knee Joint**, 75th, Dutch Orthopaedic Assoc., Rotterdam, Netherlands. (Secretariat, Holland Organizing Centre, 16 Lange Voorhout, The Hague, Netherlands)

14–15. **West Coast Cancer Foundation**, 9th symp., San Francisco, Calif. (J. M. Vaeth, WCCF, Suite 615, 2155 Webster St., San Francisco 94115)

16–20. American **Oil Chemists** Soc., Chicago, Ill. (J. Lyon, AOCS, 508 S. Sixth St., Champaign, Ill. 61820)

16–20. American Acad. of **Ophthalmology and Otolaryngology**, Dallas, Texas. (C. M. Kos, 15 Second St., SW, Rochester, Minn. 55901)

23–26. National Forum on **Growth with Environmental Quality**, jointly by the Natl. Science Foundation, Metropolitan Tulsa Chamber of Commerce, and the Midcontinent Environmental Center Assoc., Tulsa, Okla. (B. Carnett, Metropolitan Tulsa Chamber of Commerce, Tulsa 74119)

24–28. **Noble Gases** Symp., jointly by U.S. Environmental Protection Agency, Natl. Environmental Research Center, and Univ. of Nevada, Las Vegas. (D. S. Barth, NERC, P.O. Box 15027, Las Vegas 89114)

October

1–3. Hanford **Biology** Symp., 13th, sponsored by U.S. Atomic Energy Commission and Battelle Memorial Inst., Richland, Wash. (J. A. Harrison, Biology Dept., Battelle Pacific Northwest Labs., Richland 99352)

1–3. International Conf. on **Land for Waste Management**, Canadian Soc. of Soil Science, Ottawa, Ont. (M. K. Ward, Natl. Research Council, Ottawa, Ont. K1A OR6)

1–4. American Acad. of **Family Physicians**, Denver, Colo. (R. Tusken, AAFP, Volker Blvd. at Brookside, Kansas City, Mo. 64112)

1–4. American Soc. for **Metals**, Chicago, Ill. (A. R. Putnam, ASM, Metals Park, Ohio 44073)

1–5. American Assoc. for **Laboratory Animal Science**, 24th annual, Miami Beach, Fla. (Joseph J. Garvey, AALAS, 2317 W. Jefferson St., Joliet, Ill. 60435)

1–5. Symposium on **Remote Sensing in Oceanography**, American Soc. of Photogrammetry, Orlando (Disney World), Fla. (J. S. Beazley, 330 Ponce St., Tallahassee 32303)

1–6. International Congr. of **Rheumatology**, 13th, Kyoto, Japan. (S. Sasaki, Japan Rheumatism Assoc., Shimbunkaikan 63, 3-8-4 Ginza, Chuo-ku, Tokyo, Japan)

3–5. **Clinical Orthopedic** Soc., Cleveland, Ohio. (M. L. Clayton, COS, 2045 Franklin St., Denver 80205)

4–6. Refractories Div., American **Ceramic** Soc., Bedford, Pa. (F. P. Reid, ACS, 4055 N. High St., Columbus, Ohio 43214)

4–10. **Chemistry of Sea/Air Particulate Exchange Processes**, intern. symp., Intern. Assoc. for the Physical Sciences of the Ocean, Intern. Union of Geodesy and Geophysics, Nice, France. (R. A. Duce, Dept. of Oceanography, Univ. of Rhode Island, Kingston 02881)

5–6. **Southeastern Cancer Research** Assoc., Atlanta, Ga. (W. E. Criss, Dept. of Obstetrics and Gynecology, Univ. of Florida College of Medicine, Gainesville 32601)

5–6. **Psychopharmacology** Symp., World Psychiatric Assoc., Wroclaw, Poland. (A. Bukowczyk, Kraszewskiego 25, Wroclaw)

5–9. **Sigma XI**, Fontana, Wis. (T. T. Holme, SX, 345 Whitney Ave., New Haven, Conn. 06510)

6–12. American **Concrete** Inst., Ottawa, Ont., Canada. (ACI, Box 4754, Redford Stat., 22400 W. Seven Mile Rd., Detroit, Mich. 48219)

6–13. World Federation for **Mental Health**, 25th congr., Sydney, Australia. (A. Stoller, Mental Health Authority, 300 Queen St., Melbourne C1, Australia)

7–11. **Clay Minerals** Soc. (10th mtg.) and Clay Minerals Conf. (22nd), Banff, Alta., Canada. (J. E. Gillott, Dept. of Civil Engineering, Univ. of Calgary, Calgary 44, Alberta)

7–11. International **Iron and Steel** Inst., 7th annual conf., Johannesburg, South Africa. (IISI, 5 Place du Champ de Mars, 1050 Brussels, Belgium)

7–11. **Life Assurance Medicine**, 11th intern. congr., Mexico City, Mexico. (J. Rendon, Edificio Bancomer, Aptdo Postal M-7817, Mexico, D.F.)

7–12. **Electrochemical** Soc., 144th natl., Boston, Mass. (E. G. Enck, ES, P.O. Box 2071, Princeton, N.J. 08540)

7–13. **Neurological Surgery**, 8th intern. congr., Tokyo, Japan. (S. Ishii, Dept. of Neurosurgery, Juntendo Univ. Hospital, Hongo, Bunkyi-ku, Tokyo)

7–20. Institute on **Terrestrial and Extraterrestrial Volcanology**, Italian Natl. Research, Regional Sicilian Government, and the Italian Ministry of Public Education, Erice, Trapani, Sicily. (F. Cuttitta, U.S. Geological Survey, Geologic Div., Washington, D.C. 20244), or (M. Carapezza, Istituto di Mineralogia, Via Archirafi 36, 90123 Palermo, Italy)

8–10. National **Electronics** Conf. and Exhibition, 29th, Chicago, Ill. (NEC, Inc., Oakbrook Executive Pl. No. 2, 1211 W. 22 St., Oak Brook, Ill. 60521)

8–10. Society for **Industrial and Applied Mathematics**, Iowa City, Iowa. (J. K. Cullum, IBM-T. J. Watson Research Center, Yorktown Heights, N.Y. 10598)

8–12. International **Drivers' Behaviour Research** Assoc., Zurich, Switzerland. (T. E. A. Benjamin, Room 9C27, 10, quai Paul Doumer, F-92 Courbevoie, France)

8–12. Symposium on **Experience from Operating and Fueling of Nuclear Power Plants**, Intern. Atomic Energy Agency, Vienna, Austria (J. H. Kane, Office of Information Services, U.S. Atomic Energy Commission, Washington, D.C. 20545)

9–12. Association of **Official Analytical Chemists**, 87th, Washington, D.C. (L. G. Ensminger, AOAC, Box 540, Benjamin Franklin Sta., Washington, D.C. 20044)

9–12. **Optical** Soc. of America, 58th annual, Rochester, N.Y. (J. W. Quinn, OSA, 2100 Pennsylvania Ave., NW, Washington, D.C. 20037)

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PRODUCTS and MATERIALS

Frequency Synthesizer

The BFS 100 is useful in applications such as nuclear and electron resonance spectroscopy where frequency stability and range and spectral purity are important. The instrument provides an output from 300 hz to 100 Mhz with selection in 1-hz increments and an option that allows increments of 0.001 hz. The output is selected in eight-decade ranges (11 with the option) and is adjustable manually or by remote control. Continuous frequency adjustment is by means of a ten-turn helipot with 3 percent linearity over the Δf range from $\pm$ 1 hz to $\pm$ 5 Mhz. The reference frequency is provided by an internal 10-Mhz quartz oscillator. Other features include rapid switching speed and synchronization of the reference oscillator with external sources. Bruker Scientific. Circle No. 149 on Readers' Service Card.

Peristaltic Pumps

Motor speeds are stable regardless of fluid viscosity, back pressure, slow operating speed, or fluctuations of line voltage in the Sage 375A peristaltic pumps because of a motor tachometer system. This servo system of speed control enables reproducibility through a flow range of from 1.2 ml per hour to 1000 ml per hour per channel. The pressure plates of the 370 series pumps have been redesigned to increase tubing life and to minimize tubing creep. Interchangeable plates are color coded for use with specific tubing. Orion Research, Inc. Circle No. 148 on Readers' Service Card.

High-Temperature Adhesive

Ceramacoat 512 is useful in attaching thermocouple leads to metal surfaces which can be exposed to temperatures (up to 2500°F) that exceed those (above 600°F) at which epoxy resins fail. The material has inherent resistance to high temperatures, it is adhesive, and it has good dielectric strength. Ceramacoat 512 is available as a paste which is brushed onto the leads and the surface, allowed to dry in air, and then baked at 200°F. It then offers dielectric strength of 40 volts per mil at 400°F and good resistance to oil, solvents, and acids, except for hydrofluoric. Aremco Products, Inc. Circle No. 140 on Readers' Service Card.

High-Contrast Hand Refractometer

The model 6 detects concentration of diluent from 0 to 32 percent in solutions and reads directly to 0.2 percent. The boundary line between the bright and dark portions of the scale is sharp, which makes the instrument easy to read. The model 6 (Fig. 1) is operated by placing one or two drops of test solution on the prism surface, closing the cover, and pointing the instrument toward a light source. Concentrations of solutions such as battery electrolytes, cutting oil, beverages, and many others may be rapidly assayed in the field or laboratory. National Instrument Company. Circle No. 139 on Readers' Service Card.

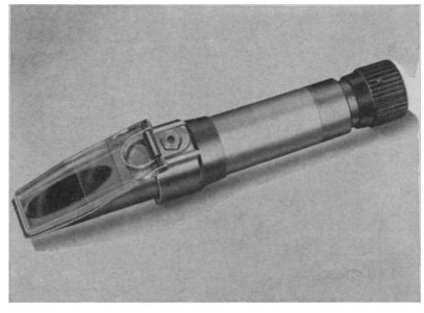

Fig. 1. National Instrument Company's model 6 hand refractometer provides high-contrast reading of concentrations from 0 to 32 percent and reads directly to 0.2 percent.

Multichannel Analyzer

Pulse-height analysis and scaling are simplified in the model 8100. The device consists of sections for signal conversion, control, and display. The signal conversion section comprises an amplifier with Gaussian pulse shaping, a gain range of 16 to 2000, and noise of less than 9 μv r.m.s.; a single-channel analyzer for line scanning which can be used in the pulse-height analysis mode to improve dead time in analog-digital conversion; a Wilkinson-type analog-digital converter with a 50-Mhz clock rate and 8192 channels of resolution; and a digital offset that eliminates the need for a biased amplifier because it can be varied from 0 to 7936 channels in 256-channel increments. Coincidence or anticoincidence gating may be selected also. The control section allows the operator to choose conditions such as count and live or true time as preset functions. There are controls for collect, display, and input/output cycles. In the collect mode, the operator specifies pulse-height analysis (events versus amplitude), multichannel scaling (events versus time), multiple-input multichannel scaling (up to four inputs), or list (digital words in order of occurrence). Input/output can utilize tape, teletypewriter, printer, or plotter. The display section offers many options. The cathode-ray tube features a 5-inch rectangular display with adjustments for vertical range, gain, and bias. There is a character generator to display simultaneously the energy where the cursor (an intensified vertical line) is located, total counts in the cursor channel, start and stop channels of region of interest, total counts in region of interest, and elapsed time in pulse-height analysis mode or sweeps in multichannel scanning mode. A pushbutton matrix is used to select from a variety of display or analysis functions. These include the cursor mentioned above, an intensifier, an index, an integrator, a calibrator, and seven others. The device and its features are well described in a 16-page product bulletin. Canberra Industries. Circle No. 146 on Readers' Service Card.

Newly offered instrumentation, apparatus, and laboratory materials of interest to researchers in all disciplines in academic, industrial, and government organizations are featured in this space. Emphasis is given to purpose, chief characteristics, and availability of products and materials. Endorsement by *Science* or AAAS is not implied. Additional information may be obtained from the manufacturers or suppliers named by circling the appropriate number on the Readers' Service Card (see pages 110A and 190C) and placing it in the mailbox. Postage is free.—RICHARD G. SOMMER

Televised Microsurgery

The MV9800 Color Operating Micro-Video System is a closed-circuit color television system designed for microsurgery. It may be adapted to any operating microscope. The system consists of a color camera, a color control unit, a color monitor, a flexible fiber optic image guide, a fiber optic auxilliary illumination system, and a color video tape recorder. The system is adaptable for use in endoscopy and ophthalmology as well as in surgery. Circon Corporation. Circle No. 147 on Readers' Service Card.

Interferometer Spectrometer

The EOCOM system analyzes radiation in the range of visible light from 0.65 μm through infrared and into the microwave region above 1000 μm. The aperture accommodates a beam diameter up to 10 cm. The maximum resolution is 0.07 cm^{-1} and there are eight discrete steps from 8.0 cm^{-1} to the maximum. The detection capability is from 1 part per million to better than 1 part per billion, depending upon the application. The system is designed so that tilt and irregularity are eliminated from the mirror in the interferometer; thus, it can negotiate a long stroke without perceptible motion at the center of the interference pattern. To take advantage of the full range, combinations of any of four beam splitters with any of nine detectors may be used. The optical system is interfaced to a computer which plots the data obtained and/or stores it in either disk or tape. The analog-to-digital converter provides a resolution of 15 bits at greater than 100-khz word rate. The computer and disk memory and the optional tape system have similarly high capacities. Eocom Corporation. Circle No. 150 on Readers' Service Card.

Literature

Fiber Optics Catalog offers a line of products and material available from stock and details capability in design to customer specifications. Featured are tools for inspection in areas difficult to view otherwise, flexible light guides, illuminators, image conduit, and clad rod. American Optical. Circle No. 144 on Readers' Service Card.

The Lab Mart is a catalog supplement that describes plastic ware, circulators, melting point apparatus, laboratory jacks, timers, reagent chemicals, and other general scientific supplies. J. & H. Berge. Circle No. 145 on Readers' Service Card.

High-Sensitivity Sampling Systems for Atomic Absorption is an 8-page brochure that describes apparatus for detecting lead in blood, chromium in water, and other research, industrial, and clinical procedures. Perkin-Elmer Corporation. Circle No. 131 on Readers' Service Card.

Instrumentor announces availability of more than 100 refurbished instruments for the scientific laboratory. The catalog includes spectrophotometers, chromatographs, *p*H meters, power supplies, and others. Beckman Instruments. Circle No. 132 on Readers' Service Card.

Laboratory Animal Care Products gives information regarding housing of laboratory animals by type of animal, by size or number of animals to be housed, or by type of housing. Maryland Plastics, Incorporated. Circle No. 133 on Readers' Service Card.

Chromatography Catalog is a 68-page booklet that lists gas and liquid chromatographs, accessories, and supplies and includes a guide to selection of columns. Varian Associates. Circle No. 134 on Readers' Service Card.

1973 Nalgene Labware describes a complete line of plastic items for the laboratory and offers 14 new products, including plastic sieves, laboratory safety shields, and field and laboratory notebooks with polyethylene covers and pages that are waterproof and resist chemicals and tearing. Nalge Company. Circle No. 135 on Readers' Service Card.

The Orion Expanded Analytical Methods Guide explains analytical procedures and applications and stresses the use of specific sensing electrodes. Orion Research, Inc., Circle No. 136 on Readers' Service Card.

Reagents, Equipment, and Supplies for Histology Lab offers a line of materials for the study of tissues and includes stain sets, preparations, microtomes, tissue embedders, and slides. Fisher Scientific Company. Circle No. 137 on Readers' Service Card.

Nutran User and Programmers Guide is a self-teaching text to enable readers to use NUTRAN, a conversational language similar in concept to FORTRAN. The language is geared to scientific and medical applications. Nuclear Data, Incorporated. Circle No. 138 on Readers' Service Card.