

24 April 1987 • Vol. 212 • No. 493

\$2.00

SCIENCE

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



New Microfuge 11 & 12 The Little Centrifuges with Big Centrifuge Features.

Everyone's familiar with Beckman Microfuge™ centrifuges. They're indispensable in research, clinical, and industrial labs for spinning down small samples fast.

Now Beckman offers two advanced Microfuge models with features you'd expect only in larger centrifuges, plus higher speeds, forces, and increased capacity.

The Microfuge 11 holds tubes in slides, like the Microfuge B. But it generates much higher centrifugal forces—up to 11,600 g with a full load of 18 1.5/1.8 mL tubes.

The Microfuge 12 holds even more tubes—up to 60 of the 1.5/1.8 mL size—and spins them at even higher forces—up to 12,200 g. Its color-coded tube holders are also tube racks, and there is a clever holder/rack for decanting 1.5-mL tubes for such applications as RIA: you simply squeeze the sides of the holder together while inverting the tubes.

Both Microfuge 11 & 12 offer variable speed settings with precise speed control: you set the speed you want, and the 11 & 12 run at that speed no matter what the tube load. Both 11 & 12 have imbalance

detection: the motor shuts off if the rotor has been seriously misloaded. And both models have automatic reset timers, a convenience for repetitive runs.

If you're in the market for a microcentrifuge, get one with big centrifuge features. Write for brochure SB-570 to Beckman Instruments, Inc., Spingo Division, 1117 California Avenue, Palo Alto, CA 94304.



Special Offer: As an introductory offer, we'll give you \$200 off the price of a new Microfuge 11 or 12 with trade-in of any Beckman, Eppendorf, or Fisher microcentrifuge, regardless of its condition. Offer limited to one trade-in per new Microfuge 11/12, valid in the U.S. and Canada only; expires June 30, 1981.

BECKMAN

Circle No. 96 on Readers' Service Card



News from inner space:
We've added over an acre
of new laboratories.

NEWEST LIGANDS

Call or write for our complete list of over 100.

Adenosine receptor agonist

Cyclohexyladenosine, N⁶-[adenine-2,8-³H]-

Adenosine receptor antagonist

Diethyl-8-phenylxanthine, 1,3-[phenyl-4-³H]-

Serotonin-2 antagonist

Mianserin hydrochloride, [N-methyl-³H]-

GABA agonist

Piperidine-4-sulfonic acid, [ring-³H]-

Irreversible cholinergic antagonist

Propylbenzylcholine mustard hydrochloride, [propyl-2,3-³H]-

Histamine-2 antagonist

Tiotidine, [methyl-³H]- (ICI 125,211)

Potential barbiturate receptor ligand

(1,3-Dimethylbutyl)-5-ethylbarbituric acid, (-)-5, [butyl-2,3,4-³H (N)]-

Circle No. 243 on Readers' Service Card

Highest specific activity

CATECHOLAMINES

Epinephrine, levo-[N-methyl, ring-2,5,6-³H]-
95-145Ci/mmol

0.2N Acetic acid:ethanol, 9:1, under nitrogen,
foil-wrapped vial, dry ice

NET-696 250 μ Ci 1mCi

Norepinephrine, levo-[ring-2,5,6-³H]-

40-60Ci/mmol

0.2N Acetic acid:ethanol, 9:1, under nitrogen,
foil-wrapped vial, dry ice

NET-678 250 μ Ci 1mCi 5mCi

Dihydroxyphenylethylamine hydrochloride, 3,4-
[ring-2,5,6-³H(N)]-

40-60Ci/mmol

Ethanol:0.2N Acetic acid, 1:9, under argon,
foil-wrapped vial, dry ice

NET-673 250 μ Ci 1mCi

Circle No. 244 on Readers' Service Card

Custom design and synthesis of PHOTOAFFINITY PROBES

Labeled in alanine-1 position to prevent possible loss
of label by hydrolysis

Azido-2-nitrophenyl- β -alanine, N-4-[alanine-1-¹⁴C]-
40-60mCi/mmol

Ethanol:water, 7:3, foil-wrapped vial, dry ice

NEC-769 50 μ Ci 250 μ Ci

Circle No. 245 on Readers' Service Card

Immunological Screening Reagents [¹²⁵I]

Monoclonal antibody screening

Specific IgG labeling

Tested for binding

Four-week high binding retention

NEX-159 Goat-anti-mouse Ig's, [¹²⁵I]-

NEX-155 Goat-anti-rabbit IgG, [¹²⁵I]-

NEX-158 Sheep-anti-mouse Ig's, [¹²⁵I]-

NEX-162 Sheep-anti-mouse Ig's, [¹²⁵I] labeled F(ab')₂
fragment

NEX-161 Rabbit-anti-mouse IgG, [¹²⁵I]-

All supplied 2-10 μ Ci/ μ g, frozen in sodium phosphate
buffer, pH 7.4.

A complete listing of NEN's monoclonal antibodies
and products for immunology is available on request.

Circle No. 246 on Readers' Service Card

For Monoclonal Antibody screening and immunoassay PROTEIN A [¹²⁵I]

70-100 μ Ci/ μ g, ~100 μ Ci/ml

Each lot biologically tested

Protein A, [¹²⁵I]-

70-100 μ Ci/ μ g

0.03M phosphate buffer containing 40% ethanol and
acetic acid (pH 4.0)

NEX-146 10 μ Ci 2x10 μ Ci 25 μ Ci 2x25 μ Ci

Prepared fresh for stock on first Monday each month

Circle No. 247 on Readers' Service Card

Not for use in humans or clinical diagnosis.



New England Nuclear

549 Albany Street, Boston, Mass. 02118

Call toll-free: 800-225-1572 Telex: 94-0996

(In Massachusetts and International: 617-482-9595)

NEN Chemicals GmbH: D-6072 Dreieich, W. Germany
Postfach 401240, Tel. (06103) 85034, Telex 4-17993 NEN D

NEN Canada: 2453 46th Avenue, Lachine, Que. H8T 3C9
Tel. 514-636-4971, Telex 05-821808

SCIENCE

LETTERS	Problems of Publishing: <i>E. Roe</i> ; Social Science Budget Cuts: <i>R. B. Zajonc</i> ; <i>J. Barchilon</i>	396
EDITORIAL	Gordon Research Conferences	401
ARTICLES	Secondary Structure of 16S Ribosomal RNA: <i>H. F. Noller</i> and <i>C. R. Woese</i>	403
	Indirect Costs of Federally Supported Research: <i>K. T. Brown</i>	411
NEWS AND COMMENT	Back into Space with Columbia	419
	Congress Told Fraud Issue "Exaggerated"	421
	<i>Briefing</i> : Koop as Surgeon General: To Be or Not to Be?; Public's Fear of Watt Is Environmentalists' Gain; CC43.7, Sec. C-1 Is Answer, Schweiker Says; Afghan Casualties; Ancient Artworks; Congressional Confusion over "Conception"	422
	Energy Conservation: The Debate Begins	424
	SERI's Low Energy Future	425
RESEARCH NEWS	How Much Oil? It Depends on Whom You Ask	427
	<i>Meeting Highlights</i> : Starving in the Midst of Plenty; New Ways to Use Metals for Arthritis; On the Trail of a Fire Ant Remedy; Another Potential Problem in Drinking Water; Analgesic from Mushrooms Begins Clinical Trials	430
	Clinical Trial of Psychotherapies Is Under Way	432
BOOK REVIEWS	Exploring the City, reviewed by <i>G. D. Suttles</i> ; Noguchi and His Patrons, <i>H. H. Smith</i> ; Pre-Columbian Metallurgy of South America, <i>D. M. Pendergast</i> ; Echinoderms: Present and Past, <i>D. L. Meyer</i> ; Books Received	434

BOARD OF DIRECTORS

FREDERICK MOSTELLER Retiring President, Chairman	D. ALLAN BROMLEY President	E. MARGARET BURBIDGE President-Elect	ELOISE E. CLARK EDWARD E. DAVID, JR.	NANCIE L. GONZALEZ DAVID A. HAMBURG
---	-------------------------------	---	---	--

CHAIRMEN AND SECRETARIES OF AAAS SECTIONS

MATHEMATICS (A) Ralph P. Boas Ronald Graham	PHYSICS (B) Maurice Goldhaber Rolf M. Sinclair	CHEMISTRY (C) Robert W. Parry William L. Jolly	ASTRONOMY (D) Owen Gingerich Donat G. Wentzel
PSYCHOLOGY (J) George A. Miller Meredith P. Crawford	SOCIAL, ECONOMIC, AND POLITICAL SCIENCES (K) James G. March Gillian Lindt	HISTORY AND PHILOSOPHY OF SCIENCE (L) Harry Woolf Diana L. Hall	ENGINEERING (M) Michael Michaelis Donald E. Marlowe
EDUCATION (Q) Ann C. Howe Roger G. Olstad	DENTISTRY (R) Maynard K. Hine Harold M. Fullmer	PHARMACEUTICAL SCIENCES (S) Anthony P. Simonelli Robert A. Wiley	INFORMATION, COMPUTING, AND COMMUNICATION (T) George W. Tressel Madeline M. Henderson

DIVISIONS

ALASKA DIVISION	PACIFIC DIVISION	SOUTHWESTERN AND ROCKY MOUNTAIN DIVISION
John Bligh President	T. Neil Davis Executive Secretary	Beatrice M. Sweeney President
		Alan E. Leviton Executive Director
		Sam Shushan President
		M. Michelle Balcom Executive Officer

SCIENCE is published weekly on Friday, except the last week in December, by the American Association for the Advancement of Science, 1515 Massachusetts Avenue, NW, Washington, D.C. 20005. Second-class postage (publication No. 484460) paid at Washington, D.C., and at an additional entry. Now combined with *The Science Monthly*. Copyright © 1981 by the American Association for the Advancement of Science. Domestic individual membership and subscription (51 issues): \$43. Domestic institutional subscription (51 issues): \$80. Foreign postage extra: Canada \$24, other (surface mail) \$27, air-surface via Amsterdam \$55. First class, airmail, school-year, and student rates on request. Single copies \$2 (\$2.50 by mail); back issues \$3 (\$3.50 by mail); classroom rates on request. **Change of address:** allow 6 weeks, giving old and new addresses and seven-digit account number. **Postmaster:** Send Form 3579 to *Science*, 1515 Massachusetts Avenue, NW, Washington, D.C. 20005. *Science* is indexed in the *Reader's Guide to Periodical Literature* and in several specialized indexes.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

REPORTS	<p>The Ginsberg Experiment: Modern and Prehistoric Evidence of a Bone-Flaking Technology: <i>D. Stanford, R. Bonnicksen, R. E. Morlan</i> 438</p> <p>First Radioisotope (Potassium-Argon) Age of Marine Neogene Rionegro Beds in Northeastern Patagonia, Argentina: <i>W. J. Zinsmeister et al.</i> 440</p> <p>Giant Polytene Chromosomes from the Ovaries of a <i>Drosophila</i> Mutant: <i>R. C. King et al.</i> 441</p> <p>Adenosine 3',5'-Monophosphate Waves in <i>Dictyostelium discoideum</i>: A Demonstration by Isotope Dilution-Fluorography: <i>K. J. Tomchik and P. N. Devreotes</i> 443</p> <p>Cross-Contamination of Cells in Culture: <i>W. A. Nelson-Rees, D. W. Daniels, R. R. Flandermeyer</i> 446</p> <p>Epstein-Barr Viral DNA: Infectivity for Human Placental Cells: <i>G. Miller et al.</i> 452</p> <p>Suppressible Four-Base Glycine and Proline Codons in Yeast: <i>T. F. Donahue, P. J. Farabaugh, G. R. Fink</i> 455</p> <p>Influence of Calcium Ion on the Binding of Fibrin Amino Terminal Peptides to Fibrinogen: <i>A. P. Laudano and R. F. Doolittle</i> 457</p> <p>Induction of Hemoglobin Accumulation in Human K562 Cells by Hemin Is Reversible: <i>A. Dean et al.</i> 459</p> <p>Outward Currents in Developing <i>Drosophila</i> Flight Muscle: <i>L. Salkoff and R. Wyman</i> 461</p> <p>Carbamoyl Phosphate Synthetase (Glutamine-Hydrolyzing): Increased Activity in Cancer Cells: <i>T. Aoki and G. Weber</i> 463</p> <p>Electroreception in Lampreys: Evidence That the Earliest Vertebrates Were Electroreceptive: <i>D. Bodznick and R. G. Northcutt</i> 465</p> <p>Insects as Selective Agents on Plant Vegetative Morphology: Egg Mimicry Reduces Egg Laying by Butterflies: <i>K. S. Williams and L. E. Gilbert</i> 467</p> <p>Internal Fertilization in an Oviparous Frog: <i>D. S. Townsend et al.</i> 469</p> <p>Intestinal M Cells: A Pathway for Entry of Reovirus into the Host: <i>J. L. Wolf et al.</i> 471</p>	475
PRODUCTS AND MATERIALS	<p>Power Supplies for Electrophoresis; Microscope; Chromatography Software; Affinity Purified Antibodies; Vibratome; Fluorometer; Superconducting Gravity Meter; Tandem Mass Spectrometer; Literature 475</p>	

ANNA J. HARRISON
WALTER E. MASSEY

RUSSELL W. PETERSON
HARRIET ZUCKERMAN

WILLIAM T. GOLDEN
Treasurer

WILLIAM D. CAREY
Executive Officer

GEOLOGY AND GEOGRAPHY (E)
Jack A. Simon
J. Thomas Dutro, Jr.

MEDICAL SCIENCES (N)
Morton D. Bogdonoff
Leah M. Lowenstein

STATISTICS (U)
Stephen E. Fienberg
Ezra Glaser

BIOLOGICAL SCIENCES (G)
John A. Moore
Walter Chavin

AGRICULTURE (O)
Martin A. Massengale
Coyt T. Wilson

ATMOSPHERIC AND HYDROSPHERIC SCIENCES (W)
Julius London
Glenn R. Hilst

ANTHROPOLOGY (H)
Alan R. Beals
Priscilla Reining

INDUSTRIAL SCIENCE (P)
John Diebold
Robert L. Stern

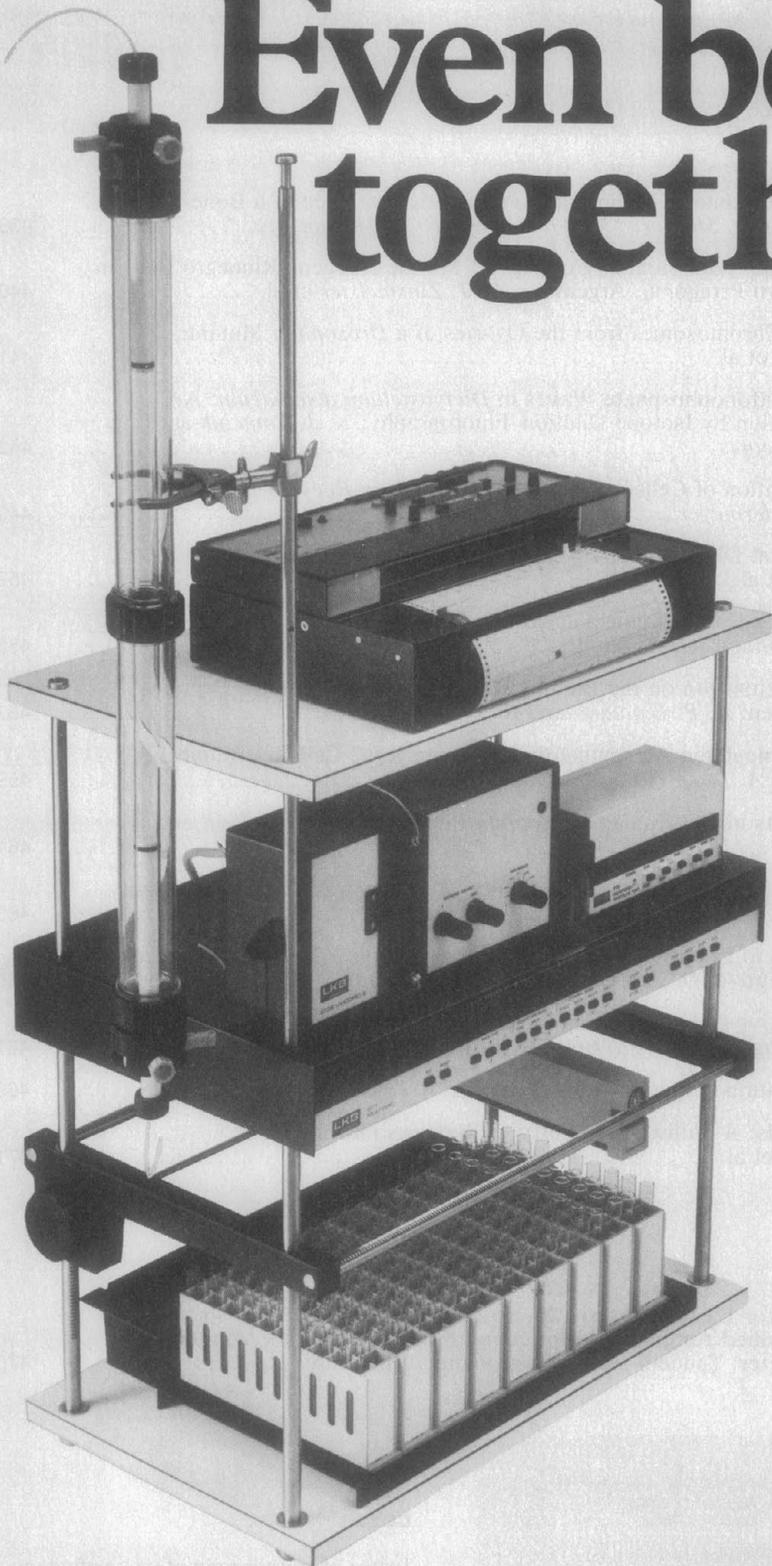
GENERAL (X)
Herman Pollack
S. Fred Singer

COVER

Image of spiral origin of wave of adenosine 3',5'-monophosphate (cyclic AMP) being propagated within a monolayer of aggregating *Dictyostelium discoideum* amoebae. Rotation period is about 7 minutes; wave velocity about 300 micrometers per minute; highest cyclic AMP concentrations are about $10^{-6}M$. Area represented in this image is about 0.3 square centimeter and contains about 150,000 amoebae. See page 443. [Computer image processing by M. J. Patel, Department of Biophysics and Theoretical Biology, University of California]

The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objects are to further the work of scientists, to facilitate cooperation among them, to foster scientific freedom and responsibility, to improve the effectiveness of science in the promotion of human welfare, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.

Even better together.



Individually, LKB chromatography instruments provide outstanding reliability and consistently accurate results.

But together, they form total, integrated systems that are unequalled in their ease of use and dependability. The LKB 2111 MultiRac® Fraction Collector is the core of just such a system.

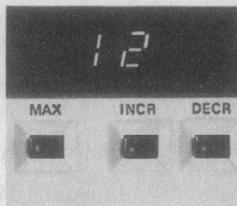
LKB excellence in design

The LKB 2111-MultiRac® system combines the ultra-reliable 2111 Fraction Collector with the new MicroPerpex® peristaltic pump, 2210 dual channel recorder and high sensitivity 2138 Uvicord®S UV monitor in one compact package. This entire system takes up less than 2 square feet of bench or cold room space. Yet, every instrument is easy to reach and adjust.

Integrated ease of operation

With the programmable 2111 MultiRac controlling the run, you're assured of accurate, no waste, no problem collections. And with precise pump control of fraction volumes,

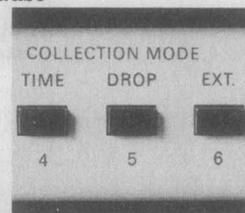
automatic flow stop function during tube changes and continuous display of flow rate on the MicroPerpex pump, the system needs minimal interaction time with laboratory personnel.



Versatile and reliable

This new LKB collector draws on years of design experience and incorporates the most advanced circuitry. Because the MultiRac precisely shifts the drop head, it can accommodate a large variety of collection vessels.

The sophisticated microprocessor controller of the collector lets you select time, drop or precise volume modes, diverts void volumes to waste and can be programmed to save tubes by collecting valleys in large volumes, peaks in small.



See it all together

Ask your LKB representative for more information on LKB complete chromatography systems. See how they work even better together.

LKB

Head office:
LKB Produkter AB
Box 305
S-161 26 Bromma, Sweden
Tel. 08/98 00 40, telex 10492

Main US sales office:
LKB Instruments, Inc.
12221 Parklawn Drive
Rockville, Md 20852
Tel. 301-881 2510
telex 230 89 682

Other sales offices in:
Athens (for the Middle East),
Copenhagen, Ghent,
The Hague, Hong Kong,
London, Munich, Paris,
Rome, Turku, Vienna

Circle No. 107 on Reader's Service Card

SCIENCE VOL. 212



The French Institute of Health and Medical Research (Institut National de la Santé et de la Recherche Médicale) is organizing a series of meetings on advanced research topics in various biomedical fields. The meetings which started four years ago, are known as the INSERM CONFERENCES.

The aims of the conferences are :

- to foster the exchange of ideas, to evaluate new methods and new lines of investigation ;
 - to bring together scientists, mostly from European countries, working in universities and public or private research institutions.
- The meetings will be held under the direct responsibility of a chairman and a co-chairman.

The INSERM CONFERENCES have the following special features :

- only highly topical subjects are dealt with ;
- if possible, the data presented should not have been the subject of any earlier complete publication, a condition which therefore excludes general reviews ;
- the Conferences do not publish proceedings or any other material, even in a summarized form.

The chairman of each INSERM Conference will invite 15 to 20 scientists to give a report in line with the above conditions. The number of contributions will be limited to three or four per session and, at the discretion of the chairman, at least one third of the time will be given over to discussion and brief informal communications.

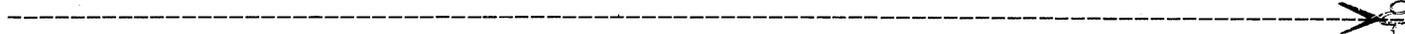
In addition to the invited speakers, at least fifty participants will attend the meeting, and efforts will be made to select young scientists. Experienced research workers from fields other than those relating to the Conference will also be welcome to attend. Participants will be chosen in such a way as to enable those engaged in all types of scientific research to establish personal contacts, exchange information and find new ways of working together.

PRACTICAL ARRANGEMENTS

The INSERM CONFERENCES 1981 will be held at the Domaine de Seillac, near Blois (180 km from Paris), during the months of September and October (full address : Domaine de Seillac, 41150 Seillac, France). Each conference will last three and a half days, from Sunday evening (departure from Paris) to Thursday afternoon. Working sessions will be held from 9 a.m. to 12.30 p.m. and from 5.30 p.m. to 8 p.m. On free afternoons, participants will have a wide choice of leisure activities at the Domaine de Seillac and in the surrounding area (Tennis, Table-tennis, bicycling, visit to the Castles of the Loire).

REGISTRATION FEE

Participants whose applications are accepted but who are not invited speakers, will be asked to pay their registration fee and board (1200 FF).



Scientists wishing to attend this conference have to submit this application form BEFORE JUNE 4th to INSERM Conferences, 101, rue de Tolbiac - 75654 PARIS CEDEX 13, France - Telephone : 584-14-41 - extension 258

APPLICATION FORM

CONFERENCE ON :
(Name-Date)

NAME, TITLE and POSITION :
.....

INSTITUTION (with address and phone number) :
.....
.....

See overleaf...

PRELIMINARY PROGRAM FOR 1981

BASEMENT MEMBRANE AND GROWTH FACTORS IN THE CONTROL OF CELLULAR PROLIFERATION AND DIFFERENTIATION - September 20-24, 1981

D. GOSPODAROWICZ, Chairman ; D. BARRITAU, Y. COURTOIS, N. LE DOUARIN and J. POUYSSEGUR, co-chairmen

The list of speakers will include :

C. ARRUTI	(Montevideo)	J. POUYSSEGUR	(Nice)
D. BARRITAU	(Paris)	M. PRUNIERAS	(Paris)
M. BERNFIELD	(Stanford)	T. REID	(New Haven)
P. CALISSANO	(Rome)	E. ROZENGURT	(London)
M.T. CORVOL	(Paris)	L. SAXEN	(Helsinki)
Y. COURTOIS	(Paris)	C. SCHER	(Boston)
M. DARMON	(Paris)	Y. SCHLESSINGER	(Rehovot)
S. DELAAT	(Utrecht)	G. SERRERO	(Nice)
N. LE DOUARIN	(Nogent)	J.P. TAUBER	(Toulouse)
J. FEUNTEN	(Paris)	J.P. THIERRY	(Nogent)
M. FIZMAN	(Paris)	R. TIMPL	(Martinsried)
D. GOSPODAROWICZ	(San Francisco)	O. TODARO	(Bethesda)
E. HAY	(Boston)	B. TOOLE	(Boston)
R. LADDA	(Hershey)	P. VIGIER	(Orsay)
D. PAULIN	(Paris)	V. VRACKO	(Seattle)



SCIENTIFIC INTEREST to be used for consideration of your request by the Scientific Conference Committee

.....
.....
.....
.....
.....
.....
.....

DO NOT ENCLOSE PRE-PAYMENT WITH THIS APPLICATION FORM

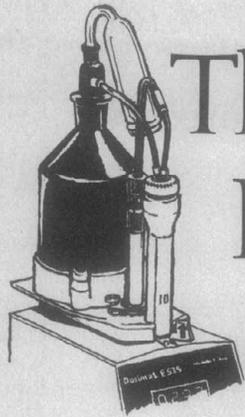
PRELIMINARY PROGRAM FOR 1981

VIRAL GENES AND LEUKEMOGENESIS : MOLECULAR, CELLULAR, PHYSIOLOGICAL APPROACHES - October 11-15, 1981

Pierre TAMBOURIN, Chairman ; Claude JASMIN, co-chairman

The list of speakers will include :

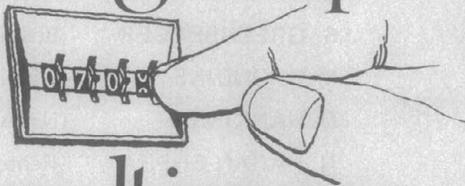
A. AXELRAD	(Toronto)	H. KAPLAN	(Stanford)
A. BERNSTEIN	(Toronto)	C. LARSEN	(Paris)
B. CHESEBRO	(Hamilton)	J. LEVY	(San Francisco)
M. DEXTER	(Manchester)	S. LEVY	(Boston)
H. EISEN	(Paris)	F. LILLY	(New York)
C. FRIEND	(New York)	T. MAK	(Toronto)
R. GALLO	(Bethesda)	M. MOORE	(New York)
T. GRAF	(Heidelberg)	W. OSTERTAG	(Glasgow)
J.S. GREENBERGER	(Boston)	J. PAUL	(Glasgow)
M. GROUDINE	(Washington)	I. PRAGNELL	(Glasgow)
D. HANKINS	(Nashville)	G. ROSSI	(Rome)
N. HARAN-GHERA	(Rehovot)	E.E. SCOLNICK	(Bethesda)
P. HARRISON	(Glasgow)	D. STEHELIN	(Lille)
R. JAENISCH	(Hambourg)	B. VARET	(Paris)



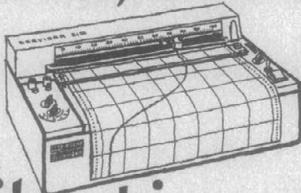
The Metrohm pH Stat Titrator.

It gives you self-refilling
burets, a removable digital

pH Meter,  quick-release
titration vessels, finger tip

setting of stat point 

or end point, and a multirange

recorder,  all in the same

pH stat titrating system.

Our catalog illustrates ten different systems incorporating Metrohm pH Stat Titrators, and a wide selection of available accessories. For your copy, please write: Metrohm Division, Brinkmann Instruments, Inc., Cantiague Road, Westbury, N.Y. 11590. In Canada: Brinkmann Instruments (Canada), Ltd.



For information circle No. 106 on Readers' Service Card
For a demonstration circle No. 107 on Readers' Service Card



Metrohm pH Stat Titrators



CORNING

WE DARE YOU TO COMPARE CYLINDERS

FIRST, COMPARE PERFORMANCE.

There's not a single solvent that will damage a PYREX® cylinder. Our lasting clarity and crisp graduations always keep it readable.

The plastic people list over 150 common chemicals that might craze, cloud, stain, melt or dissolve their plastics. That means real trouble in measuring and reading.

NOW COMPARE ACCURACY. Porous plastic can absorb trace materials. It can contaminate later samples. Invalidate your results. Some plastic cylinders can be autoclaved, but their accuracy can be decreased by up to 2%.

Except for HF, hot phosphoric acid or hot strong alkali, PYREX cylinders won't react with any common reagents or solvents. The clarity and chemical durability of borosilicate glass maintain the integrity of your work. Autoclave it over and over and you still have a cylinder that's as accurate as the first time you used it. That's why you bought it.

COMPARE QUALITY. Total value combined with performance is the reason PYREX labware outsells any other brand, glass or plastic. Many have imitated us, but there really is no comparison. It's been that way since we originated PYREX labware in 1915.

PYREX® is a registered trademark. Corning Glass Works, Corning, NY.

PYREX®

LABWARE

ONLY FROM CORNING

DARE TO COMPARE?

Discover for yourself why we've been the leader in the lab for sixty-six years. We'll send you a handy wall chart to help you in your labware comparisons. Attach this to your letterhead. Send with your name and address to: Corning Medical and Scientific, Attn: WTJ, MS-21510, Corning Glass Works, Corning, NY 14831.



SE-04-81-CY



We interrupt our program for this brief announcement:

Monoclonal Anti-human Lyt 3, an authentic Pan-T cell antibody, is now available. It reacts with all human T cells (but not with B cells) and recognizes the sheep red blood cell receptor.

Also new: Anti-mouse Lyt 1.2 for helper T cell studies.

Now back to our program. It is going so well that new monoclonal antibodies are being developed faster than we can advertise them. Here is our current list:

HUMAN	MOUSE	MOUSE
Anti-human Lyt 1*	Anti-mouse Thy 1.2	Anti-mouse Lyt 2.2
Anti-human Lyt 2*	Anti-mouse Thy 1.2,	Anti-mouse Lyb 2.1
Anti-human Lyt 3*	biotin labeled	Sheep anti-mouse Ig,
Anti-human Ia	Anti-mouse Thy 1.2,	alkaline phosphatase
	fluorescein labeled	labeled
VIRAL	Anti-mouse Thy 1.1	Anti-mouse Lyb 2.3
Anti-murine	Anti-mouse Lyt 1.2	Anti-mouse TL
leukemia virus gp70	Anti-mouse Lyt 1.1	
Anti-murine	Anti-mouse Lyt 2.1	
leukemia virus p15 (E)		

*Indicates order of clone isolation, not target cell function

And several others are to be announced shortly. So let us put your name on our special mail list for news of the latest additions and send you a comprehensive product line brochure.

Meanwhile, be assured that all of our monoclonal antibody products are made to the highest standards of quality. Our objective is not just the broadest line of products, but the finest as well.

Not for use in humans or clinical diagnosis

NEN New England Nuclear

549 Albany Street, Boston, Massachusetts 02118
Call toll free: 800-225-1572
(In Massachusetts and International: 617-482-9595)

NEN Chemicals GmbH: D-6072 Dreieich, W. Germany, Postfach 401240, Tel. (06103) 85034, Telex 4-17993 NEN D
NEN Canada: 2453 46th Avenue, Lachine, Que. H8T 3C9, Tel., 514-636-4971, Telex 05-821808

Worth a second look

Improving with time— the Zeiss Standard.

A Zeiss Standard is one thing you can buy that will always get better. It's proven, and has constantly been improved, for thirty years. You can trust the machinery to work, to stand up, even to take abuse. It's been simplified and strengthened, so that there's little to go wrong, and a lot that can't ever be topped—such as the optics!

Compact and small— the most versatile

You can do more with a Standard, because the accessories you need exist *now*; they're not "in preparation." And it accepts the full line of great Zeiss interchangeable optics: put a Planapo on a Standard and it works just as well as when it's on a Universal. Don't take chances—get proven optics, proven engineering, proven worth.

Quality service—Expert dealers.

The great name in optics

ZEISS

West Germany

First look.

Right from the start you'll be impressed with the time-proven design, the look of quality. Compact. Small. Strong and simple. Constantly improved, proven in use.

Second look.

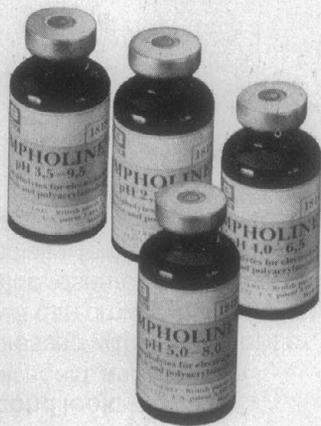
Look again, and you'll be impressed with its possibilities, how it can grow into a sophisticated research tool with many specially items and accessories for all known applications.

Carl Zeiss, Inc., 444 5th Avenue, New York, N.Y. 10018 (212) 730-4400. Branches: Atlanta, Boston, Chicago, Houston, Los Angeles, San Francisco, Washington, D.C. In Canada: 45 Valleybrook Drive, Don Mills, Ontario, M3B 2S6. Or call (416) 449-4660.

LKB ANNOUNCES MORE.

MORE CONVENIENCE

New pre-blended Ampholine® carrier ampholytes for electrofocusing are available in three narrow and one wide pH range. Now there's no need to spend time mixing to achieve these specific ranges. Just select the pre-blended Ampholine you need (pH 2.5 to 4.5, 4.0 to 6.5, 5.0 to 8.0 and 3.5 to 9.5). They're designed to give the same linear, virtually drift-free pH gradient achieved using standard Ampholine with LKB Agarose-EF or acrylamide gels.

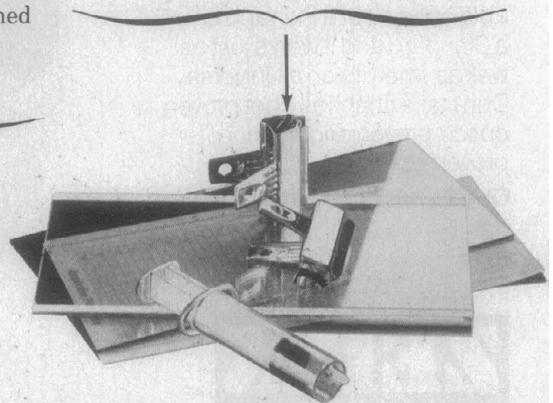


MORE POWER

The new Model 2197 Power Supply for electrofocusing and electrophoresis offers top-of-the-line features at a very affordable price. The Model 2197 delivers up to 2500V for high-resolution electrofocusing and its 250mA output makes it useful for other electrophoretic techniques. Choose constant power/constant voltage/constant current/time control modes to suit your application. Automatic crossover between running modes compensates for varying gel conditions. Built-in timer with alarm and automatic shutoff allows for time control. With accurate control of four parameters, you can achieve maximum resolution and reproducibility in all your electrofocusing and electrophoresis experiments. Bright LED display lets you monitor performance easily and the Model 2197 is designed to comply with all relevant safety standards.

MORE ECONOMY

LKB's new capillary gel casting system easily produces gels only one quarter the thickness of standard ones. You save substantially on reagent use and you'll be able to employ higher voltage for decreased run times because the new thinner gels dissipate heat more efficiently. The capillary gel casting kit works with agarose and acrylamide gels. Combine it with the new pre-blended Ampholine and the 2500 volt power supply to significantly reduce your run times while cutting costs. Ask your local LKB representative for more information on these new products and the complete line of LKB instruments and consumables. Depend on the leader in electrofocusing to give you more.



LKB

Head office:
LKB Produkter AB
Box 305
S-161 26 Bromma, Sweden
Tel. 08/98 00 40, telex 10492

Main US sales office:
LKB Instruments, Inc.
12221 Parklawn Drive
Rockville, Md 20852
Tel. 301-881 2510
telex 230 89 682

Other sales offices in:
Athens (for the Middle East),
Copenhagen, Ghent,
The Hague, Hong Kong,
London, Munich, Paris,
Rome, Turku, Vienna

Circle No. 15 on Readers' Service Card

Leitz Laborlux 12. The clinical lab microscope with research capabilities.

Leitz® has expanded the limits of microscopy for 125 years. Now this expertise has produced the Laborlux® 12 microscope, designed for the pathologist and the clinical laboratory.

New Flatfield Achromats.

Flatfield EF Achromats at a price only fractionally higher than standard achromats are the result of new optical glasses developed by Leitz.

Performance Engineered.

The objectives face away from the observer. This gives the pathologist free access to the specimen. The condenser is centerable, focusable and interchangeable

for phase contrast. The controls are positioned for optimum anatomical comfort. There are no compromises in quality. Therefore service requirements and projectable "downtime" are virtually insignificant.

Leitz Service.

The expertise and experience of the well-established network of dealers specializing in microscopy and the professional know-how of Leitz representatives are now standing by, ready to serve the clinical lab.

Accessories.

The modular Laborlux 12 accepts the complete line of Leitz objectives, eighteen filter systems and light sources of incident light fluorescence, phase contrast and darkfield. There are also two and three head discussion tubes and the Combiphot II automatic camera that turns the Laborlux 12 into a low cost/high performance photomicroscope.

Laborlux 11.

For a considerably lower cost, but still providing Leitz quality for the clinical lab, the new Laborlux 11 is recommended.



Leitz
means precision.
Worldwide.

E. Leitz, Inc. S-4/24
Rockleigh, New Jersey 07647
Please tell me more:
Laborlux 12 Laborlux 11

NAME _____

ADDRESS _____

CITY _____

STATE _____

ZIP _____



Napco[®] announces: the years-ahead incubator system that won't be matched.

The new Napco water jacketed 6000 series embodies more important benefits and features than any incubator ever marketed.

Here are some of over 15 advances in incubator design.

1. More accurate control of chamber temperature.

By positioning sensors not only in the water jacket, *but also in the chamber itself*, Napco permits more precise chamber monitoring than other water jacketed incubators.

2. New electronic controls, digital display.

New solid state control system reduces chamber variances, and scanning digital displays monitor chamber parameters.



3. The first modular design.

All control elements can be unplugged from the chamber module for quick service.



4. Unique wet-jet air flow system.

The exclusive wet-jet air flow system provides maximum chamber uniformity and assures

the highest relative humidity available in any incubator.

5. More secure chamber uniformity.

Superior new Napco door closure systems ensure integrity of inner chamber.



6. The only water jacketed CO₂ incubator you can get really clean.

Shelf standards and plenums can be easily removed for cleaning in five minutes. This leaves an empty, perfectly smooth chamber that can be swabbed for easy management of spores and contaminating organisms.



7. The best service in the industry.

If you should ever have an equipment breakdown, a *Heinicke-Napco Minute Man will be on his way to you in 48 hours*. You'll seldom need the Minute Man service because Heinicke and Napco instruments are built to work. But if you do, dial toll free 800-327-9783.

Introducing a new constant flow incubator~ the 4000 series.

The new modular Napco constant flow system embodies a unique principle that offers superior results in tissue culture and related disciplines. Each of the modular chambers has its own individual controls and separate metering system, to accommodate specific environments in each module.

National 
Appliance Company

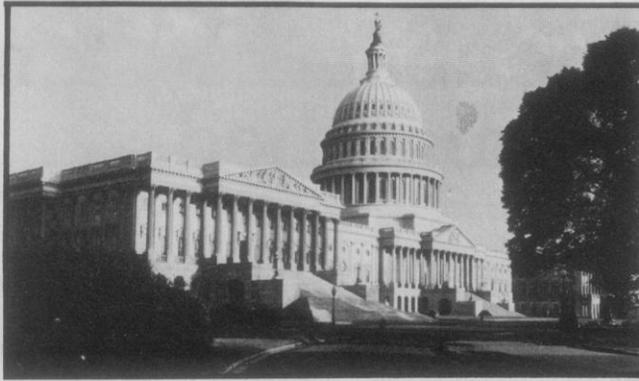
A Heinicke Company
3000 Taft Street
Hollywood, Fl. 33021
800-327-9783 or
(305) 987-6101
Telex: 512610

Available at the following dealers:
Curtin-Matheson, Fisher Scientific Co.,
Preiser, Sargent-Welch, S.G.A. Scientific,
Scientific Products, Arthur H. Thomas Co.,
In Canada: Canlab, Fisher Scientific
Co. Ltd., Sargent-Welch of Canada Ltd.



All Napco water-jacket incubators are available in three space saving models.

Circle No. 14 on Readers' Service Card



R&D and the New National Agenda

**Announcing the 6th Annual
Colloquium on R&D Policy**
25-26 June 1981
The Shoreham Hotel
2500 Calvert Street, NW
Washington, DC



The 6th Annual AAAS Colloquium on R&D and Public Policy, sponsored by the AAAS Committee on Science, Engineering, and Public Policy, will convene 25-26 June 1981 in Washington, D. C.

You are invited to participate in this Colloquium and in discussions with leaders in government, industry, and the scientific and technical communities on issues of current concern relating to R&D and public policy-making in the new administration.

Colloquium Topics

What will be the focus of federal R&D funding? Which programs are being cut back and which increased? What philosophical tenets underlie this set of policies? How is Congress reacting to the new administration's budget recommendations for R&D? What impacts will the new budgets have on the R&D community? Speakers and panelists will provide answers and highlight problems as they address the following topics:

- *Federal R&D* • R&D issues in the FY 1982 budget • Outlook for FY 1983 and the future • R&D policies and budgets of federal agencies
- *Defense R&D* • R&D issues in the defense budget • Current policies and program content • Trends and future projections • Alternative perspectives on defense R&D
- *Agency Perspectives* • Question and answer sessions on R&D programs and policies with officials of key federal agencies
- *R&D Outlook in the Scientific and Engineering Community* • Impacts of new R&D budgets and policies on engineering; physical, social, and biomedical sciences; science and engineering education • Short- and long-range outlook for health of U. S. science and technology

Research and Development: AAAS Report VI, by Willis H. Shapley, Albert H. Teich, and Gail J. Breslow, will be provided in advance to colloquium registrants. The *Report* covers R&D in the federal budget for FY 1982, and other topics on R&D and public policy. Registrants will also receive the published proceedings of the conference.

For further details, write: R&D Colloquium, AAAS Office of Public Sector Programs, 1776 Massachusetts Avenue, NW, 8th Floor, Washington, DC 20036, or call (202) 467-4310



6th R&D Colloquium

Washington, 25-26 June 1981

The sixth AAAS R&D Policy Colloquium will be held on Thursday and Friday, 25 and 26 June 1981, at the SHOREHAM HOTEL, 2500 Calvert St., NW, Washington, DC 20008.

Registrant's Name _____
(last name) (first and initial)

Affiliation _____

Address _____
(street and number)

_____ (city) (state and zip) (telephone number)

Please check here if you need special services due to handicap. We will contact you prior to the meeting.

AAAS Colloquium Advance Registration—enclosed is check or purchase order for:

- \$110** Full Registration (includes lunch on both days, dinner on Thursday, the R&D: FY 82 Report, and the Colloquium Proceedings)
- \$65** Partial Registration (includes Report and Proceedings only)
- \$30** Student Registration (includes Report and Proceedings only; available to full-time graduate or undergraduate students only)

Separate Meal Tickets (lunches at \$15 and dinner at \$22):

- Lunch on Thursday, 25th; Dinner on Thursday, 25th; Lunch on Friday, 26th

Previous Reports and Proceedings (at \$5 each):

- R&D: FY 81 R&D: FY 80 R&D: FY 79 R&D: FY 78 R&D: FY 77
- Proc. 80 Col. Proc. 79 Col. Proc. 78 Col. Proc. 77 Col. Proc. 76 Col.

Program, badge, meal tickets, and R&D: FY 82 Report will be sent about 12 June. Registrations received after 12 June will be held at the AAAS Registration Desk at The Shoreham Hotel. Previous reports ordered will be sent as soon as possible. Proceedings of 81 Colloquium will be sent as soon as available.

Mail to: AAAS Meetings R&D, 1776 Massachusetts Ave., NW, Washington, DC 20036

Shoreham Hotel Reservation—AAAS Colloquium (25-26 June)

(Reservations received after 24 May cannot be guaranteed)

Names and Addresses of All Occupants of Room:

Name _____ Name _____

Address _____ Address _____

City _____ State _____ Zip _____ City _____ State _____ Zip _____

Room: Single (\$63*) Double (\$77*) Twin (\$77*) (*Plus 10% D.C. sales tax and 80¢ occupancy tax.)

Arrival: Date _____ Time _____

Be sure to list definite arrival and departure date and time. Hotel reservations will be held only until 6 p.m. unless otherwise specified. Check out time is 1:00 p.m.

Departure: Date _____ Time _____

Please indicate any special housing needs due to a handicap _____

Please enclose separate check, made out to **Shoreham Hotel**, for first night's room charge *or* indicate major credit card No.:

Card name _____ Number _____ Expires _____

Cardholder's signature _____

Mail to: AAAS Meetings R&D, 1776 Massachusetts Ave., NW, Washington, DC 20036

Our pH meters put you out front. extensive than you can get anywhere else. Our services back you up.

Introducing our new line of pHI-series meters. With advanced technology that's right on the button.

Like the micro-processor that handles the whole analysis. You don't even have to know the temperature, buffer value or when to take a reading—it's all done automatically. And done faster and less expensively with no sacrifice in precision.

Our pHI-series meters also have a built-in self-diagnostic function that tells you if there is a problem

in the procedure, the electrode, or the instrument itself.



There are four meters in the line: the pHI 30, the pHI 60, the pHI 70 and the pHI 71. Each has its own unique features.

And each is backed up by Beckman's unique brand of sales and service. Which is to say, more

For openers, there's the Hotline which you can use 24 hours a day to get an answer to your question. And there are applications chemists to help you get more out of your meter.

For closers, there are sales-people who know their business and yours so they can serve you better.

And our extensive experience in pH is behind you all the way. With all this advanced technology and backup going for you, it's no wonder that you're way ahead when you choose a Beckman pHI-series meter.

For more information, contact your local Beckman representative. Or write: Scientific Instruments Division, Beckman Instruments, Inc., Box C-19600, Irvine, CA 92713.



BECKMAN

Circle No. 161 on Readers' Service Card

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

Science serves its readers as a forum for the presentation and discussion of important issues related to the advancement of science, including the presentation of minority or conflicting points of view, rather than by publishing only material on which a consensus has been reached. Accordingly, all articles published in *Science*—including editorials, news and comment, and book reviews—are signed and reflect the individual views of the authors and not official points of view adopted by the AAAS or the institutions with which the authors are affiliated.

Editorial Board

1981: PETER BELL, BRYCE CRAWFORD, JR., E. PETER GEIDUSCHEK, EMIL W. HAURY, SALLY GREGORY KOHLSTEDT, MANCUR OLSON, PETER H. RAVEN, WILLIAM P. SLICHTER, FREDERIC G. WORDEN

1982: WILLIAM ESTES, CLEMENT L. MARKERT, JOHN R. PIERCE, BRYANT W. ROSSITER, VERA C. RUBIN, MAXINE F. SINGER, PAUL E. WAGGONER, ALEXANDER ZUCKER

Publisher

WILLIAM D. CAREY

Editor

PHILIP H. ABELSON

Editorial Staff

Managing Editor
ROBERT V. ORMES
Assistant Managing Editor
JOHN E. RINGLE

Business Manager
HANS NUSSBAUM
Production Editor
ELLEN E. MURPHY

News Editor: BARBARA J. CULLITON
News and Comment: WILLIAM J. BROAD, LUTHER J. CARTER, CONSTANCE HOLDEN, ELIOT MARSHALL, COLIN NORMAN, R. JEFFREY SMITH, MARJORIE SUN, NICHOLAS WADE, JOHN WALSH

Research News: RICHARD A. KERR, GINA BARI KOLATA, ROGER LEWIN, JEAN L. MARX, THOMAS H. MAUGH II, ARTHUR L. ROBINSON, M. MITCHELL WALDROP

Administrative Assistant, News: SCHERRAINE MACK;
Editorial Assistants, News: FANNIE GROOM, CASSANDRA WATTS

Senior Editors: ELEANORE BUTZ, MARY DORFMAN, RUTH KULSTAD

Associate Editors: SYLVIA EBERHART, CAITILIN GORDON, LOIS SCHMITT

Assistant Editors: MARTHA COLLINS, STEPHEN KEPPEL, EDITH MEYERS

Book Reviews: KATHERINE LIVINGSTON, *Editor:* LINDA HEISERMAN, JANET KEGG

Letters: CHRISTINE GILBERT
Copy Editor: ISABELLA BOULDIN

Production: NANCY HARTNAGEL, JOHN BAKER; ROSE LOWERY; HOLLY BISHOP, ELEANOR WARNER; MARY MCDANIEL, JEAN ROCKWOOD, LEAH RYAN, SHARON RYAN

Covers, Reprints, and Permissions: GRAYCE FINGER, *Editor:* GERALDINE CRUMP, CORRINE HARRIS

Guide to Scientific Instruments: RICHARD G. SOMMER
Assistants to the Editors: SUSAN ELLIOTT, DIANE HOLLAND

Membership Recruitment: GWENDOLYN HUDDLE
Member and Subscription Records: ANN RAGLAND

EDITORIAL CORRESPONDENCE: 1515 Massachusetts Ave., NW, Washington, D.C. 20005. Area code 202. General Editorial Office, 467-4350; Book Reviews, 467-4367; Guide to Scientific Instruments, 467-4480; News and Comment, 467-4430; Reprints and Permissions, 467-4483; Research News, 467-4321. Cable: Advancesci, Washington. For "Information for Contributors," write to the editorial office or see page xi, *Science*, 27 March 1981.

BUSINESS CORRESPONDENCE: Area Code 202. Membership and Subscriptions: 467-4417.

Advertising Representatives

Director: EARL J. SCHERAGO
Production Manager: GINA REILLY
Advertising Sales Manager: RICHARD L. CHARLES
Marketing Manager: HERBERT L. BURKLUND
Sales: New York, N.Y. 10036: Steve Hamburger, 1515 Broadway (212-730-1050); SCOTCH PLAINS, N.J. 07076: C. Richard Callis, 12 Unami Lane (201-889-4873); CHICAGO, ILL. 60611: Jack Ryan, Room 2107, 919 N. Michigan Ave. (312-337-4973); BEVERLY HILLS, CALIF. 90211: Winn Nance, 111 N. La Cienega Blvd. (213-657-2772); DORSET, VT. 05251: Fred W. Dieffenbach, Kent Hill Rd. (802-867-5581).

ADVERTISING CORRESPONDENCE: Tenth floor, 1515 Broadway, New York, N.Y. 10036. Phone: 212-730-1050.

Gordon Research Conferences

Most of the scientists who have attended Gordon Research Conferences give them highest marks. An indicator of the usefulness of the conferences is their survival for 50 years and growth in number from 1 in 1931 to 115 this year. Each brings together about 100 researchers for 5 days under circumstances that favor maximum interaction. Conferees include persons from academia, industry, and government who are active at the frontiers of a moving field. They range in status from Nobel laureates to graduate students. Most of the conferences are held during the summer on campuses of private schools in rural New Hampshire. Conferees sleep in the school dormitories and have their meals together. Sessions are held in the mornings and evenings with afternoons free for conversations. A limited number of talks are given and ample time is allowed for discussion. This is fostered by the rule that the talks and the comments on them are off the record. Topics for the conferences (*Science*, 13 March) are drawn from most of the natural sciences, including chemistry, physics, geochemistry, biochemistry, biophysics, physiology, neurochemistry, and medicine.

Holding more than 100 conferences with more than 10,000 participants involves a major exercise in logistics. These are managed by Alexander Cruickshank of the University of Rhode Island, who is director of the Gordon Research Conferences. Overall policies are set by a ten-person board of trustees, who are in effect the executive committee of a council that includes about 180 persons. Detailed scientific management rests with the chairpersons of the various conferences, who have authority to fix the agenda, choose and invite speakers, and select the conferees. This authority lasts for 1 year. Near the conclusion of a conference, a new person is elected to organize the next meeting.

Scientific research areas have a life of their own—birth, youthful exuberance, maturity, and senescence. It is a principal concern of the trustees and council to recognize new fields and to diminish or phase out holding of conferences in areas that are no longer yielding exciting new knowledge. Quality of conferences is assessed by monitors and by use of questionnaires distributed to all participants.

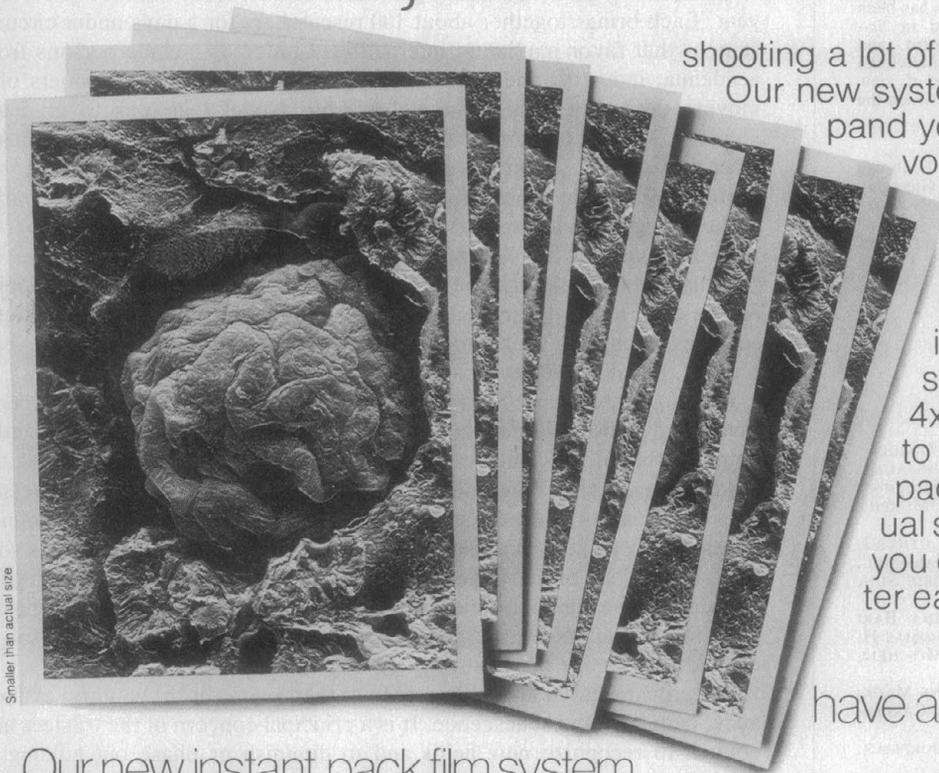
In 1930 Neil Gordon, then a professor of chemistry at Johns Hopkins University, recognized the need for better, more intense communication among research scientists. He envisioned most of the principles that now guide the conferences. The first implementation was modest. It took the form of a seminar at Johns Hopkins in 1931, which was attended by faculty members, students, and others. In 1932 and 1933 seminars organized by Gordon were again held at the university. In 1934 he arranged four conferences that were held at Gibson Island, on Chesapeake Bay near Baltimore. By 1935 the conferences had essentially taken their present form and had the following titles and chairpersons: "The chemistry of aliphatic free radicals," Francis O. Rice; "Long chain molecules," Thomas Midgley, Jr.; and "Vitamins," E. V. McCollum.

In 1938 Gordon was successful in negotiating a formal relationship with the AAAS; since then, programs of the conferences have been printed in *Science*. Gordon continued as director until ill health interfered. In appreciation for his wisdom and efforts, the conferences were named for him in 1948, a year before his death. The move to New Hampshire occurred in 1947 and W. George Parks became director. He was succeeded in 1968 by Alexander Cruickshank. During their combined tenure, the number of conferences expanded from 10 in 1947 to the present 115. In 1956 the Gordon Research Conferences were incorporated in New Hampshire, and since then the relationship with AAAS has been nominal.

Neil Gordon was a research scientist working in chemistry who perceived a need and had the energy, adroitness, and wisdom to meet the need. The product of his thought and initiative has become a unique and important series of conferences, and their name is a fitting recognition of his efforts.

—PHILIP H. ABELSON

Polaroid now gives you loads of instant 4x5 pictures with just one loading.



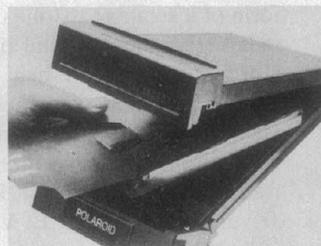
Smaller than actual size

shooting a lot of sequential exposures. Our new system enables you to expand your capabilities in high volume applications such as scanning electron microscopy, and where minimum time between exposures is important. Besides saving time, our new 4x5 system is a lot easier to use. The film comes in packs instead of individual sheets. And that means you don't have to reload after each exposure.

Now you have a choice of sheet or pack film.

Our new instant pack film system gives you 8 shots in black and white or color. Without reloading.

Polaroid just made instant 4x5 photography even more instant. And less expensive at the same time. With our new Polacolor 2 Type 558 pack film, our new Type 552 fine grain black and white pack film and our new Model 550 film holder, you can now take 8 shots in rapid succession without reloading.



Save 7% on new Polaroid instant 4x5 pack film.

Besides being more convenient, our new pack films cost about 7% less to use than our individual film sheets.* And the savings can really add up when you're

*At suggested retail price

So the choice is yours. Our original Type 58 or Type 52 sheet film when you only have a few shots to take, or our new Type 558 or Type 552 pack film when you have a lot of shots to take.

When you think about it, shouldn't you have both systems?

To find out more about our new instant 4x5 pack film system, see a Polaroid professional film dealer or call our

Technical Assistance hot line. The toll-free number in the continental U.S. is 800-225-1618. (In Massachusetts, call collect: 617-547-5177.)

We'll be happy to tell you even more ways our new system can help you.

Polaroid

© 1981 Polaroid Corporation "Polaroid" and "Polacolor"®

