FOR ANY TYPE OF GRADIENT — that is all you have to do when you program the LKB ULTRO-GRAD® gradient mixer. A pair of scissors is all you need to cut the gradient profile for exactly the type of gradient you require. Our technician has just cut three, and he now indicates that he will use the one in the scanning window. When he has set the scanning rate and the duration of the run, he will switch on and the ULTROGRAD will take over—automatically producing the gradient. He can program any type of gradient you like to name, from as many as three liquids at once. With an optional level sensor, you can also monitor absorbance levels in an eluate and automatically vary the gradient, to provide greater separation of eluted components.
Power, Peripherals, Price/Performance
...All At Your Fingertips.

Problem solving was never so cost effective, never so convenient. Because Hewlett-Packard's 9830 Calculator System now puts the computational power you need, where you need it most—right on your desk. It's always at your fingertips to give you immediate solutions to your most complex problems...and you don't have to be a computer expert to use it. Enter your data in any format you please—through the calculator keyboard or through a card reader, paper tape reader or digitizer. And get fast, precise answers any way you want them, from fully formatted text to graphs, pie charts, and histograms. Best of all, you communicate with the HP 9830 on your terms.

HP BASIC Plus, coupled with the alphanumeric display and typewriter-like keyboard, lets you operate and program the system in a relaxed, almost conversational manner.

But along with the calculator simplicity and a calculator price—as low as $300* per month—you get big-machine power: 2k words of user memory, a high-performance cassette, and a 7.5k word, built-in operating system ROM. Add plug-in ROM's and user memory modules and you triple that power. Add one or more cassettes—or Mass Memories with up to 4.8M words—and your problem-solving capability becomes almost dimensionless. Just as important, this power is so easy to use. With the 9830's unique, programmable cassette, you can program keys to do what you want them to do. Or you can add programs from HP's extensive software library to automatically execute the functions you need. Either way, a single keystroke then commands the 9830 to perform a complete series of steps.

For a closer look at the HP 9830, just return the coupon. We'll send complete details—or arrange a hands-on demonstration at your convenience.

*Domestic U.S.A. price only. Leases, where available, include service contracts.
Is an ultra-violet spectrophotometer really beyond your reach?

...Not the Spectronic® 700

The Spectronic 700 is the right choice whether you’re doing research, process or routine analytical spectrophotometry—in clinical, biochemical, pharmaceutical, food, environmental, rubber, plating, steel, geology, aquatic biology and many other fields. It permits you to use less cumbersome chemistries with greater total reliability and perform all key analyses for today’s requirements, while providing the sensitivity to meet the new low concentration guidelines you’ll be facing in the future. And the price is just a little higher than most visible only spectrophotometers.

The Spectronic 700 eliminates wavelength restrictions, enabling you to select procedures in the UV, near IR or anywhere in between. It covers the entire 200-950nm range—without manual changing of detectors or filters, so that you can switch from one test to another in seconds. You also get the high resolution of a 2nm bandpass and the sensitivity to measure minute differences in concentration—with an expansion/suppression feature that permits you to read these differences full scale. Operation of the instrument is so easy, it can be learned in a matter of minutes.

If you need help at any time, our Applications Laboratory has the ability, know how, and desire to help you before you buy and long after, so that you can always be sure you’re using your instrument at its full potential.

We’ll be happy to send you complete details. Write Bausch & Lomb, Analytical Systems Division, 60-04-44 Linden Avenue, Rochester, New York 14625.

LETTERS

A Scientific Idealist

Edward Uhler Condon, lover of peace, science, and people, nemesis of UFO’s, stuffed shirts, the House Un-American Activities Committee, and bureaucracy, died on 26 March 1974.

He was fond of pointing out that the sign at the city limits of Alamogordo, New Mexico, proclaiming it “Home of the Atomic Bomb,” should have read, “Home of the Atomic Bomb and of Edward U. Condon.” The Trinity explosion made Alamogordo a monument to man’s fear of his own intelligence—ironically at the birthplace of a man completely devoted to peace, individualism, faith in humanity, rationalism, and freedom of thought. Thus passes one of the few remaining scientific idealists, who persisted in rejecting cynicism in the face of personal experiences of abuse from those who feared truth or controversy.

He will be remembered for his extraordinary contributions to physics, particularly in the early application of quantum theory to the physics of atoms, molecules, and the solid state. He was honored in his time as president of the AAAS and of the American Physical Society. He directed research at the National Bureau of Standards, Westinghouse Electric Corporation, and Corning Glass Works. He lent his name to countless good causes. And he was misunderstood. To set the record straight, let the following be remembered.

Equally at home in industry, government, and university, Condon even undertook a campaign to improve the military service academies. He was, above all, a rational humanist who did not make the sharp distinctions others draw between basic science and industrial science, who did not believe you could measure a man’s morals by asking where he worked. He made moral judgments, to be sure, and many felt the ire of his tongue or pen. But he was never underhanded or devious.

UFO buffs accused him of prejudice, of conducting his investigation with a closed mind. But Condon confided to his friends that the attraction of the project lay in the possibility—however small—that a real discovery might be there for him to make. He believed that those too easily convinced might be blinded to the shreds of real evidence about new phenomena. The mystics who challenge science do not understand
that skepticism is not intolerance—it is the discipline of an open mind.

Those who first accused him of potential disloyalty went to prison. Condon was exonerated of “security risk” charges on every appeal save one, when a political decision overturned a recommendation favorable to him. During his tenure as a Fellow of the Joint Institute for Laboratory Astrophysics, he received again a Secret clearance which permitted him to advise a government he honored as the servant, not master, of the people. He served his country loyally and well with his mind, his leadership, and his criticism, and the record proves it.

LEWIS M. BRANSCOMB
International Business Machines
Corporation, Old Orchard Road,
Armonk, New York 10504

Schizophrenia Exchange Program

The report by Deborah Shapley (News and Comment, 8 Mar., p. 932) on the U.S.–U.S.S.R. schizophrenia research exchange program raises some serious questions about the attitudes of the Americans involved.

The American participants are concerned about the alleged misuse of psychiatry in the U.S.S.R., and especially about the possible misdiagnosis of political dissidents. Szasz (1) has noted that psychiatric justice is not altogether just in the United States and that it is often used to deny citizens their constitutional right to trial. We might also recall that, in October 1964, the magazine Fact published a poll of 12,356 psychiatrists registered with the American Medical Association about the fitness of Senator Goldwater to run for the presidency and 2417 responded; 1189 thought that Senator Goldwater was not psychologically fit to run, 657 felt that he was fit, and 571 decided that they did not have enough information to judge (2). Neither those who judged Goldwater fit nor those who judged him unfit had enough information on which to base a judgment. Thus, the concerns of the Americans participating in the exchange program hardly justify ending the exchange any more than the alleged misuse of psychiatry in the United States should justify the Russians’ pulling out of the program.

The differences between the criteria for diagnosing schizophrenia in the U.S.S.R. and those used in the United
Multi-Mat is the world leader in computerized beta and gamma counting. You have as many as four counters—simultaneously—on-line to a central processor. You can use any combination of Intertechnique liquid scintillation or gamma counters.

**Multi-Mat gives you:**
- More programs
- More flexible programming
- More flexible configurations

**More Programs**... Multi-Mat users get LEM, the only high-level computer language developed expressly for bio-medical use. LEM is simple, straightforward, easily learned. It allows any user to write programs to meet your own specific requirements. No more waiting for someone else to get around to doing what you want done. No more being forced to accept compromises! With LEM, you can make yourself independent of a programmer because LEM is the language that can make everyone a programmer.

**Flexible System Configurations**... Multi-Mat systems can have from 1 to 4 counters... 200 sample or 300 sample... liquid scintillation or gamma... in any combination! Each counter may have a different operating program while all of them are on-line at the same time to a single Multi-20 central processor. That kind of flexibility is exclusive to Intertechnique... and there's even more. Each of several users of a single counter can have his own program which is automatically called into use only when his samples are in place and counting. And all of this programming is stored in core and called out as programs should be—electronically—and in microseconds. You won't find an equivalent elsewhere, because there is none.

That's why there are more Intertechnique computerized counting systems in the field than those of all other manufacturers combined.

Write or call today for more facts:
- Multi-Mat brochure
- LEM Makes You the Boss booklet
- Simplified Computer Programming for Liquid Scintillation Programming.
States are reported to be causing the American participants some concern. However, differences between U.S. and British diagnostic criteria have been thought to be of sufficient interest to merit a cross-cultural study (3).

The American participants fear that certain Russian dissidents have been misdiagnosed. It is interesting that the American psychiatrists have not had an opportunity to interview and examine these dissidents. They seem, therefore, as ready to diagnose Russian citizens without data as psychiatrists were to diagnose Senator Goldwater in 1964 without data. Has psychiatry advanced so little in 10 years?

A final reason the American participants give for possible withdrawal is that they think they may learn little from the exchange. This raises the question of why the exchange was initiated. Its purpose was surely more political than educational. I doubt that its aim was to provide immediate data to American psychiatrists on fast-breaking research developments in schizophrenia research in the U.S.S.R.

Luckily, European psychologists such as Lynn (4) continue to review Russian research on schizophrenia, so the results of that research are being disseminated to interested Americans.

David Lester

Psychology Program,
Stockton State College,
Pomona, New Jersey 08240

References

Equal Opportunity in Biomedical Research

The major reason given by the Nixon Administration for abolishing NIH (National Institutes of Health) predoctoral fellowships and training grants was that we already have sufficient numbers of trained investigators. This is certainly not true with respect to trained biomedical researchers from minority groups such as blacks, Mexican-Americans, and American Indians. The present policies of the NIH will actually result in a reduction in the numbers of such individuals because access to training for careers in research will primarily be limited to individuals with affluent par-
ents who can afford the expense of college and graduate school. The percentage of minority applicants to graduate schools whose parents can afford to finance graduate education is far less than that of white applicants. While there are some loan programs, they are particularly unattractive to members of minority groups from impoverished backgrounds. The more attractive financial prospects of a career in medicine mean that if the same debts must be incurred in training for a career as a physician or as a biomedical researcher, the former will more often be the preferred choice.

Currently the major support for access to research careers by minority students in graduate school is being provided by private foundations. We find it hard to understand why the Department of Health, Education, and Welfare is doing so little to support graduate training of minority applicants when everyone agrees that there is a shortage of such individuals.

**John N. Fain**
**R. H. Pointer**

_Division of Biological and Medical Sciences, Brown University, Providence, Rhode Island 02912_

**Labor-Intensive Production**

In his editorial "Corporations and the less developed countries" (30 Nov. 1973, p. 873), Philip H. Abelson mentions an IBM typewriter plant in Bogotá, Columbia, that relies on labor-intensive production techniques as an example of increased corporate responsiveness to the desires of the host countries. I suggest that an additional, more telling, incentive is at play—corporate self-interest.

This conclusion comes from my observation of a similar project under development in Bombay, India—an industrial estate near the international airport that will deal exclusively with the assembly of electronic equipment. Sponsored by the semigovernmental Trade Development Authority, the estate will house predominantly non-Indian concerns. It is to be a free trade zone, devoted exclusively to export production. Components will be flown in and assembled at the estate, and the finished product will be flown out again. The production process is highly labor-intensive. The value added in India will amount to more than 50 percent of the product's final cost. The project will provide employment for some 45,000 people.

In this case, labor-intensive techniques are being developed, not because of any benevolent feelings on the part of employers, but because labor-intensive techniques are profitable. Because the wage rates in India are low, it is more profitable to have the electronic equipment assembled by hand in India than to use a capital-intensive (or labor-intensive) technology in a developed country. The companies get a cheaper product; India gets the employment.

Such mutual benefit is likely to provide a more reliable and significant binding cement between the multinational corporations and the less developed countries than is corporate benevolence.

_Davidson R. Gwatkin_
_55 Lodi Estate, New Delhi 11003, India_

**Virus Research**

The provocative report "Microbiology: Hazardous profession faces new uncertainties" by Nicholas Wade (News and Comment, 9 Nov. 1973, p. 566) raises important questions, all of which deserve consideration and discussion. In general, a distinction should be made between the primary hazards to which the scientist is exposed and the potential of secondary hazards to the public at large. Most discussions of the latter tend to ignore the biologic constraints by which infectious disease patterns are stabilized by a kind of "environmental homeostasis." Sulkin and Pike's extensive reviews of laboratory-acquired infection (1) fail to document the secondary spread of agents initially alien to man (for example, louping ill and Newcastle disease viruses) or intrinsically pathogenic for man, but acquired by an unnatural route in the absence of the natural vector (for example, Venezuelan equine encephalitis virus).

Wade attributes to those in virologic circles a concern that "the ability to genetically manipulate flu viruses could lead to a new combination that might escape from the laboratory, by infecting an employee, say, and spread to the population at large." He then quotes Wallace Rowe of the National Institute of Allergy and Infectious Diseases as saying, "This could recreate the conditions for an influenza pandemic like that of 1918." Rowe voices
This free book...

50 questions you should ask about Videocassette Systems

will help you make an informed decision when buying a videocassette system.

Sony Corporation of America Video Products Dept. SCI-054
9 West 57th Street, N.Y., N.Y. 10019

Gentlemen: I want to know more about Videocassette Systems.

☐ Please send the Questions Booklet.
☐ Please arrange a demonstration.

<table>
<thead>
<tr>
<th>NAME:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TITLE</td>
<td></td>
</tr>
<tr>
<td>COMPANY/INSTITUTION</td>
<td></td>
</tr>
<tr>
<td>ADDRESS</td>
<td></td>
</tr>
<tr>
<td>CITY</td>
<td>STATE</td>
</tr>
<tr>
<td>PHONE [AREA CODE]</td>
<td></td>
</tr>
</tbody>
</table>

Sony

Circle No. 324 on Readers' Service Cord
The ISCO Model UA-5 absorbance monitor gives you the high sensitivity, stability, and response speed required for high speed, high pressure chromatography — plus the wide absorbance ranges and specialized flow cells required for conventional chromatography, density gradient fractionation, electrofocusing, and gel scanning. Stationary cuvettes allow recording of enzyme and other reactions.

**High sensitivity.** 8 full scale absorbance ranges from .01 to 2.0A, plus %T. 13 wavelengths include 254 and 280nm supplied in the basic instrument; 310nm, 340nm, and 9 other wavelengths to 660nm are available at low cost. Options include a built-in 10cm recorder, a Peak Separator to automatically deposit different absorbance peaks into different tubes, and a multiplexer-expander which allows monitoring of two separate columns or one column at any two wavelengths. Automatic 4X scale expansion prevents oversized peaks from going off scale.

The current ISCO catalog describes the Model UA-5 as well as ISCO fraction collectors, metering and gradient pumps, and additional instruments for chromatography and other scientific research. Your copy is waiting.

a concern that I have also heard expressed by others. While there is a growing acceptance of my suggestion (2) of the possible role of genetic recombination of influenza viruses in nature in the genesis of pandemic influenza, re-creation of "the conditions for an influenza pandemic like that of 1918," would require not only a new virus but a world war and the subtraction of a half century of progress in the health sciences, including the elimination of most antibacterial drugs in present use. (Most deaths in 1918 were the result of secondary bacterial pneumonia.) What about the possibility of a pandemic, not like that of 1918, but like those of 1957 or 1968? How can possibility be refuted in biologic science? Of course it is possible that hybrid viruses of laboratory origin may "escape" despite past evidence to the contrary. However, do we then cease our "genetic manipulations" of the viruses at a time when we are just beginning to appreciate their implications? Is it generally appreciated that contemporary influenza vaccines are made from recombinant or hybrid viruses deliberately designed in the laboratory for optimal production characteristics (a prime requirement for vaccines which have to be redesigned every few years to match mutations of the virus in nature)? More important, the segregation of influenza virus genes by genetic recombination (reassortment) has, in recent years, accelerated our understanding of viral replication, the biologic function of the viral proteins, and the nature of antigenic variation. Is the abandonment of this method of genetic analysis being implicitly proposed?

The question is not "Could it happen?" but rather "Is it likely to happen?" If it does, does the risk exceed the real and present danger that is constantly posed by mutation or recombination in nature of wild type viruses?

A pandemic of influenza apparently requires: (i) the appearance of an influenza A virus, the hemagglutinin antigen of which differs markedly from that of the preceding virus; (ii) a population that has no antibody to the new virus but high levels to the old one; and (iii) probably as a consequence of (ii), the disappearance of the old virus to provide an ecologic niche for the transmission and circulation of the new strain.

How is an antigenically novel virus produced? Certainly not by genetic recombination, which adds nothing new, but rather reassorts the old (that is, the antigens of the input parental viruses).

Certain of these "old" antigens now present in animal influenza viruses have not yet seen the human host; their recombination with human viruses could create hybrids endowed with genes necessary for their replication in man. Clearly, such viruses, one of which I am guilty of "creating" (2), should not be considered as candidates for live virus vaccines in man. It is not likely that they will "escape from the laboratory, by infecting an employee." Laboratory-acquired infection by an influenza virus is a rarity even with wild type strains recently isolated from man. Almost all strains of influenza virus, upon their isolation in alien laboratory hosts (principally the chick embryo), lose their virulence for man. Indeed, a problem with experimental live-virus vaccines is the maintenance of sufficient human virulence to allow infection to occur. Furthermore, secondary spread from vaccinated subjects seldom has been observed. To add to this, the indolent progress of a wild type virus in the early stages of a pandemic has been frequently observed and suggests the need for a concatenation of factors, including optimal population density, environment, and season for a successful pathogen to emerge. Finally, because influenza virus virulence is clearly polygenic, the crossing of domesticated viruses will usually lead to the production of progeny of intermediate virulence (that is, less virulent than the most virulent parent) as "virulence genes" are redistributed. I submit that all present viral vaccines have been obtained by "genetic manipulations"—largely empirical.

It is time to capitalize on the legacy of modern molecular biology in the deliberate design and choice of the viruses with which we shall live and which shall defend us. Certainly, as his power in the laboratory increases, the biological scientist must couple his enthusiasm with sobriety and caution. His colleagues and critics owe him similar restraint in our present climate of research pragmatism.

**Edwin D. Kilbourne**

Department of Microbiology,
Mount Sinai School of Medicine,
City University of New York,
New York 10029

**References**


In the 7Å, 30x-60,000x, 60kv range, when Rudolf Partsch talks about the world's easiest-to-operate electron microscope, he talks about the Zeiss EM9S-2.

In the 3.5Å, 100x-200,000x, 40-60-80-100kv range, when Rudolf Partsch talks about the world's easiest-to-operate high-resolution electron microscope, he talks about the new Zeiss EM-10.

For complete details on the versatile Zeiss EM9S-2 and EM-10 electron microscopes write or phone Rudolf Partsch at Carl Zeiss, Inc., 444 5th Ave., New York, N.Y. 10018. (212) 736-6070.
In Canada: 45 Valleybrook Dr., Don Mills, Ont., M3B 2S6. (416) 449-4660.

NATIONWIDE SERVICE FROM OFFICES IN:
BOSTON, CHICAGO, COLUMBUS, HOUSTON, LOS ANGELES, NEW YORK, SAN FRANCISCO, WASHINGTON, D.C.