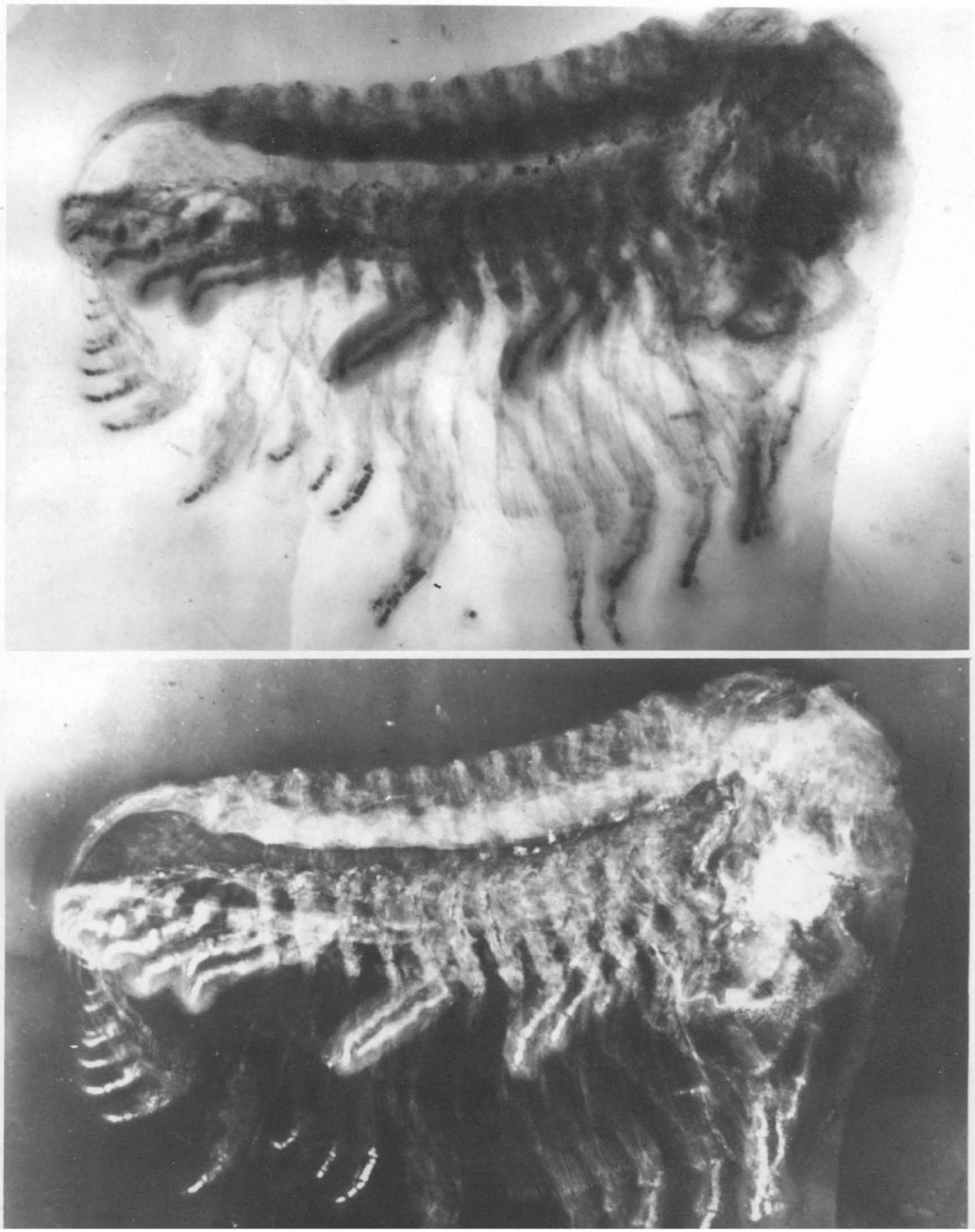
SCIENCE 18 December 1970
Vol. 170, No. 3964
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



SORVALL—The Modern Conservatives!

the table-top swingers

Swing with the SORVALL Table-Top Conservatives! SS-1, SS-3, SS-4 Superspeed Centrifuges. Conserve your time, conserve your effort, conserve your samples. The SS-1 offers eight 50 ml compartments in an angle rotor that reaches up to 31,000 x G. The SS-3 is an automatic powerhouse with "set-it/forget-it" controls. The SS-4 gives you most of the SS-3 features, but with the economy of manual control and the added convenience of a remote snap-out panel. Both the SS-3 and SS-4 accept seven angle and horizontal rotors, including the new SZ-14 Zonal, produce research forces up to 34,800 x G, incorporate unmatched Gyro-Action Direct Drive, and provide a "Noi-suppressor" system for operating comfort. When you want to "conserve" the modern way, it's SORVALL *all the way.* Ask for four-color detailed brochure. IVAN SORVALL, INC., Norwalk. Connecticut 06856

Write for Bulletin SC-12 MC-SS

SORVALL®

Circle No. 7 on Readers' Service Card

18 December 1970
Vol. 170, No. 3964

SCIENCE

SCIENCE is published weekly, except the last week in December, but with an extra issue on the fourth Tuesday in September, by the American Association for the Advancement of Science, 1515 Massachusetts Ave., NW, Washington, D.C. 20005. Now combined with **The Scientific Monthly®**. Second-class postage paid at Washington, D.C. Annual subscription $12; foreign postage: Americas $3; overseas $5; single copies, $1 (back issues, $2) except **Guide to Scientific Instruments** which is $4. School year subscription: 9 months, $9; 10 months, $10. Provide 4 weeks notice for change of address, giving new and old address and zip codes. Send a recent address label. SCIENCE is indexed in the **Reader's Guide to Periodical Literature.**

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

COVER

X-ray photograph of *Phacops* sp. shows details, such as intestinal tract and the appendages with gill filaments. Such organs are not visible in mechanical preparations (about ×3). See page 1300. [W. Stuermer, Erlangen, West Germany]

Some things are changing for the better.

A practical way to automate a GC lab . . . one step at a time

Although gas chromatographs (GC's) are designed and built for around-the-clock operation, the majority of them are used only a few hours each day . . . and never on Sunday. There are always good reasons for such under-utilization of expensive equipment. In this case, it's a matter of manpower: some one has to be present to inject a new sample into the GC; and every time an analysis is completed, some one has to spend about a half-hour translating the analog data of the recorded chromatogram into a meaningful quantitative analysis. Since most GC laboratories operate on a 40-hour week, it simply has not made good economic sense to add a second and third shift simply to realize a fuller utilization of the GC's.

But that's no longer the only solution. Some new instruments have recently appeared on the scene that allow you to triple the analytical output of your GC lab without increasing your staff or number of GC's. And you can do it a step at a time, as your budget allows, each step fully compatible with the next one.

First there's the 7670A Automatic Sampler. It measures and injects samples into your GC, completely unattended. The impact of the 7670A on the productivity of your lab can be dramatic: a single chromatographer can prepare samples and load them into the 7670A thirty six at a time, keeping the GC productive around the clock, even over weekends. Assuming a half-hour cycle per sample, he can produce well over 200 analytical runs a week, easily three times his best output with manual injections. If you're wondering about the reliability of the 7670A, don't. We have repeatedly performed 24,000 continuous automatic injection cycles with it in our laboratories—the equivalent of more than two years of unattended operation—without a failure. As an unexpected bonus, you'll also improve the quality of your laboratory's output because the 7670A's machine-reproducibility is consistently more precise than a skilled technician. Cost is $2850.

Then there's the 3370A Integrator. It automatically quantitates the GC analysis, prints an area count for each peak on the chromatogram and a total area count for the analysis, if desired. This cuts the chromatographer's computational load by about 10 minutes per sample (the time that it takes him to make area measurements manually). Apply this to a 7670A-equipped GC capable of producing 200 analyses a week, and you eliminate more than 30 hours of computation time . . . enough to pay for the 3370A, which costs $4950, in about four months. And you'll enjoy a further marked improvement in the precision of your GC analyses.

Next step in this modular approach to automation is the 3360A GC Data Processing System, an on-line data handling system whose HP 2114B Computer is fully programmed for GC. It processes data simultaneously from up to eight GC's equipped with 3370A integrators and automatically prepares a typewritten report of each analysis, including the name, retention time and % concentration of each component. The 3360A thus completely eliminates manual computation, cutting an additional 20 minutes per sample from the chromatographer's load (the time that it takes him to compute component concentrations manually and prepare a final report). To understand the potential impact of the 3360A on your GC lab, two additional facts must be kept in mind: the cost of the 3360A to a laboratory that has eight GC's already equipped with 3370A integrators is not $100,000 or $50,000, but less than $20,000 installed; and the 3360A is theoretically capable of processing more than 6000 analyses per month. Even if we assume that it will be used for as few as 1000 samples monthly, the 3360A will eliminate more than 300 hours of computation time from your manpower budget, enough to pay

for the entire cost of the system in little more than 6 months.

Finally, for laboratories whose sample load does not exceed 500 per month, there's an even more economical way to automate data handling. By adding a hardware-plus-software option to your 3370A Integrator, you can automatically produce a computer-compatible punched paper tape record of integration data. You then feed the punched paper tape off-line to any of the principal time-share computers, using the BASIC language program provided, and automatically receive a complete report of the analysis, as with the 3360A. This cuts some 17 minutes of computation time per sample (in addition to the 10-minute reduction from the 3370A proper) . . . or a savings of some $1400 monthly based on a 500-sample load. Considering all costs—the $1550 cost for the 3370A option and the variable costs of the time-share computer lease—payout takes less than six months.

If you care to study in more detail the economics of HP's step-by-step automation for your GC lab, write for the Fall 1970 issue of *Analytical Advances,* a 32-page study of the subject.

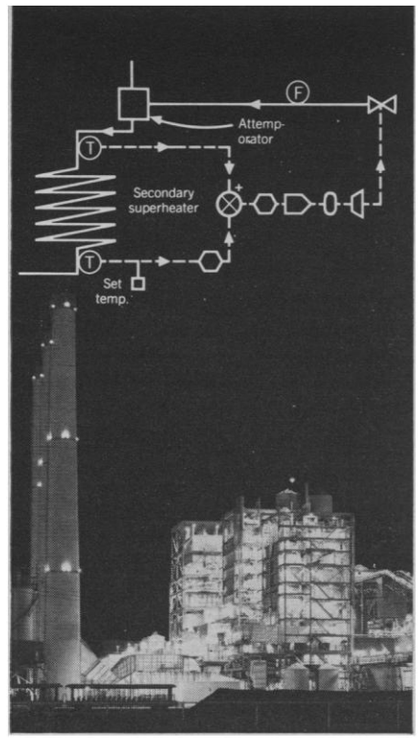
New tool for on-line control system analysis

(Note: To our Scientist Readers: The subject of the following article is a new instrument for continuous signal analysis that is useful in medical research, acoustics, radio astronomy and many other scientific measurements as well as in the process control application described.)

Very recently at a large power station in England, a system analysis of an attemperator (temperature control) loop was completed on-line, without disturbing plant output in any way. As the control characteristic of the loop was displayed on a screen during the experiment, adjustments were made to optimize control system response and the results were displayed immediately.

The job of the control system engineer—to predict how the system will react to a given input pulse—has not always been so easy. If he tested the system with a large enough impulse to produce a measurable response, plant output was changed in a way that could not be tolerated.

Some progress was made when control system analysts discovered the power of cross-correlation. With this mathematical technique, a test noise signal is applied to system input at such a low level that system output is not changed beyond normal background disturbances. Yet by cross-correlating



the test noise with system output over a relatively short period, the engineer is able to extract the impulse response of the system; background disturbances do not interfere because they are uncorrelated with the test noise. At first, cross-correlation did not help because it could only be accomplished after the fact, through off-line digital computation. What made the difference in the English experiment was the availability of two new HP instruments: a Model 3721A on-line correlator that's about as easy to use as an oscilloscope, and a Model 3722A precision noise generator that synthesizes repeatable pseudo-random noise, ideally suited to system analysis.

Correlation is fundamentally an averaging technique that is a powerful tool in recovering all kinds of periodic signals that are buried in noise, and in establishing a relationship between apparently unrelated signals. With the 3721A, the technique is easily applied *on-line* for continuous signal analysis in many kinds of scientific measurements. It might be useful in your work too. The Correlator costs $8325 and the Noise Generator $2650. On request, we'll be glad to send you a packet of information on these two instruments and a 96-page booklet on Discrete Signal Analysis.

Acquire and reduce scientific measurements automatically . . . without a computer

If you're a typical scientist, you spend a lot of time on the bench making measurements . . . and you don't object to that at all. What you do mind is the ever-increasing amount of time that you must spend at the desk making the calculations that turn raw measurements into useful information. Some scientists still rely on slide rule and adding machine for this work; some have acquired a 9100 Computing Calculator and, in one economical stroke, cut their computational load by half or more.

If you're in the second group, we'd like to tell you of a new way to liberate even more of your time for scientific investigation, by letting your data gathering instruments communicate directly with a data processing system. You might think that this will necessarily involve you in the cost and complexity of a computer.

Not so. With the new HP 2570 Coupler/Controller, you can now tie many measuring instruments to the 9100 and get reduced data directly . . . from more than 40 HP digital instruments including voltmeters, frequency and time counters, nuclear scalers, quartz thermometers and GC integrators.

You can even connect a teleprinter to the 2570 and get a complete report

of your experiment, formatted as you like it and prepared automatically on a typewritten sheet, punched paper tape or even on the calculator's X-Y plotter.

We'd be happy to send you a 24-page bulletin that explains how the 2570 can expand the capabilities of your 9100 for on-line data handling and even for automatic test systems. Write for "Calculator-Based Instrumentation Systems." Price of the Coupler is only $1625. Interfaces cost $450—$1775 per device. Hewlett-Packard, 1507 Page Mill Road, Palo Alto, California 94304. In Europe: 1217 Meyrin-Geneva, Switzerland.

HEWLETT hp PACKARD

Measurement, Analysis, Computation

00071

At the Annual Meetings of the American Association for the Advancement of Science, many of the more thoughtful and concerned scientists and their counterparts in other areas of creative endeavor come together to explore, in public, advances in science and their consequences. With the permission of the speakers, a wide selection of their discussions are recorded. It represents an extraordinarily rich collection of views, commentaries, analyses, and critiques.

Listed below are 11 diverse topics, typical of several score of others that are available for sale. Persons interested in the issues of the day of the future, often exhilarating or profoundly troubling, will profit from their study.

HUNGER AND MALNUTRITION (in 7 parts) — 1/69, I,II,III,IV,V,VI,VII

A review of the whole range of problems related to nutrition in a large and diversified country like the United States.

Jean Mayer (Harvard School of Public Health), Joaquin Gravioto (Hospital de los Enfermatos de la Nutricion, Mexico City), Roger Revelle (Harvard School of Public Health), Mark Hegsted (Harvard School of Public Health), Ancel Keys (University of Minnesota), Nevin S. Scrimshaw (M.I.T.), Jack Geiger (Tufts University School of Medicine), Margaret Mead (American Museum of Natural History), Robert Choate (National Institute of Public Affairs), and others.

EFFECTS OF NUTRITION ON BEHAVIOR—STUDIES IN ANIMALS AND MAN (in 2 parts) — 3/69 I,II

The discussion centers on the different kinds of malnutrition, the effects on different species, and the effect on human children in different countries.

Joseph J. Vitale (Boston City Hospital), Harry F. and Margaret K. Harlow (University of Wisconsin), Herbert G. Birch (Albert Einstein College of Medicine), and others.

HUMAN SETTLEMENTS AND ENVIRONMENTAL DESIGN (in 6 parts) — 4/69, I,II,III,IV,V,VI

A discussion of the planned and unplanned interactions of man and his environment.

Clarence J. Glacken (University of California, Berkeley), Leo Marx (Amherst College), Hugh A. Prince (University College, London), T. Kevin Lynch (M.I.T.), Hassan Fathy (United Arab Republic), Donald A. Schon (M.I.T.), John McHale (State University of New York, Binghamton), Gyorgy Kepes (M.I.T.), and others.

IS THERE AN OPTIMUM LEVEL OF POPULATION? (in 4 parts) — 10/69 I,II,III,IV

Is there an optimum level of population for the United States? What do we mean by "optimum" and how does it depend not only on the level but also on the concentration and rate of growth?

Preston E. Cloud (University of California at Santa Barbara), Harrison Brown (Foreign Secretary, National Academy of Sciences), Alvin M. Weinberg (Oak Ridge National Laboratory), John H. Knowles (Massachusetts General Hospital), Bernard Berelson (Population Council), Garrett Hardin (University of California at Santa Barbara), Margaret Mead, and others.

THE IDENTITY AND DIGNITY OF MAN: A SCIENTIFIC AND THEOLOGICAL DIALOGUE ON ISSUES EMERGING FROM BEHAVIORAL, SURGICAL, AND GENETIC INTERVENTION (in 8 parts) — 11/69 I,II,III,IV,V,VI,VII,VIII

Leading life scientists, theologians, and social ethicists are engaged in a dialogue on issues related to the ethical problems emerging from the biotechnical revolution and the heightened concern for the preservation and enhancement of human identity and dignity.

Hudson Hoagland (Worcester Foundation for Experimental Biology), Roger L. Shinn (Union Theological Seminary), Francis D. Moore (Harvard Medical School), L. Harold DeWolf (Wesley Theological Seminary), Bernard D. Davis (Harvard Medical School), James M. Gustafson (Yale University Divinity School), Ernst Mayr (Harvard), G. Evelyn Hutchinson (Yale), Helen B. Taussig (Johns Hopkins Medical School), Alan F. Guttmacher (New York), Kenneth E. Moyer (Carnegie-Mellon University), Hans Jonas (New School of Social Research), Isaac Asimov (Boston University), John R. Platt (University of Michigan), Paul M. Doty (Harvard), Philip Morrison (M.I.T.), and others.

CLIMATE AND MAN (in 2 parts) — 19/69, I,II

Questions about the degree to which man is modifying the climate and the result of such modification on life on earth.

Walter Orr Roberts (University Corporation for Atmospheric Research), J. Murray Mitchell, Jr. (ESSA), Edward N. Lorenz (M.I.T.), Erik Eriksson (University of Stockholm), Thomas F. Malone (Travelers Insurance Company), Gordon J. F. MacDonald, Helmut E. Landsberg (University of Maryland), Robert M. White (ESSA), and others.

BIOLOGY AND SOCIOLOGY OF VIOLENCE (in 2 parts) 24/69 I,II

Aspects of violence are reviewed from the vantage points of the life and social sciences.

Frank Ervin (Harvard Medical School), Lawrence Rasavi (Stanford), John Spiegel (Brandeis University), and others.

SCIENCE AND THE FUTURE OF MAN (in 3 parts) 35/69 I,II,III

How can the scientist as an individual and as a member of a scientific community become a more effective and constructive force in society? How can society be made aware of scientific developments directly affecting its future?

J. Tuzo Wilson (University of Toronto), Franklin A. Long (Cornell), Lewis Mumford, John Platt (University of Michigan), George Wald (Harvard), Victor F. Weisskopf (M.I.T.), Senator Edmund S. Muskie, Philip H. Abelson (Carnegie Institution), and others.

PHYSICS AND THE EXPLANATION OF LIFE 40/69

Is it possible and sufficient to seek explanations of life by calling on the insights of the physical sciences alone?

George Wald (Harvard), Eugene P. Wigner (Princeton), J. Bronowski (Salk Institute), Isaac Asimov (Boston University).

POWER GENERATION AND ENVIRONMENTAL CHANGE: RECONCILING MAN'S DESIRE FOR POWER WITH THE NEEDS OF HIS ENVIRONMENT (in 2 parts) 41/69, I,II

A consideration of the three primary means of generating power—nuclear, hydroelectric, and fuel combustion. What the environmental effects of each are, and what can be done to suppress or control them.

James A. Fay (M.I.T.), Merrill Eisenbud (Environmental Protection Administration, New York City), Arthur Tamplin (Lawrence Radiation Laboratory), Jack P. Ruina (M.I.T.), Gordon J. F. MacDonald, Erik Eriksson, Arthur M. Squires (City College of the City University of New York), and others.

BRAIN AND LANGUAGE 44/69

The acquisition (and loss) of language skills, the common threads of grammar, and design of word sequences are analyzed.

Jerome Y. Lettvin (M.I.T.), Noam Chomsky (M.I.T.), Norman Geschwind (Harvard Medical School), Eric Lenneberg (Cornell), and Stephen Toulmin (Michigan State).

INNOVATION 45/69

Our understanding of the innovation process is, at best, imperfect. Can engineers be taught to utilize existing scientific knowledge more imaginatively? What are the special characteristics of the technological entrepreneur? How does one redirect groups of people toward new goals?

Myron Tribus (Assistant Secretary of Commerce), Edward B. Roberts (M.I.T.), Alvin M. Weinberg (Oak Ridge National Laboratory), Donald A. Schon (Organization for Social and Technical Innovation).

Please refer to SCIENCE, 31 July 1970 (pages 422–424) for a complete listing of all available tapes.

The cost of the tapes may be calculated as follows: single-session symposium, $11 per session; multi-session, $11 for the first session ordered of each symposium; $9 for each additional session ordered of the same symposium. There is a handling and postage charge of 75¢ per session for foreign orders. AAAS members enclosing payment with their orders will receive a discount of 10 percent of their total order. Use form below to order reels, cassettes, or a free catalog. Please print. If payment enclosed, use check or money order.

DO NOT SEND CASH.

AAAS Audiotape Program, American Association for the Advancement of Science,
1515 Massachusetts Avenue, NW, Washington, D.C. 20005

Name_____ _____I wish to order only a free catalog.

Street_____ _____I wish to order a free catalog and the tapes whose numbers are circled below.

City_____ State_____ Zip_____

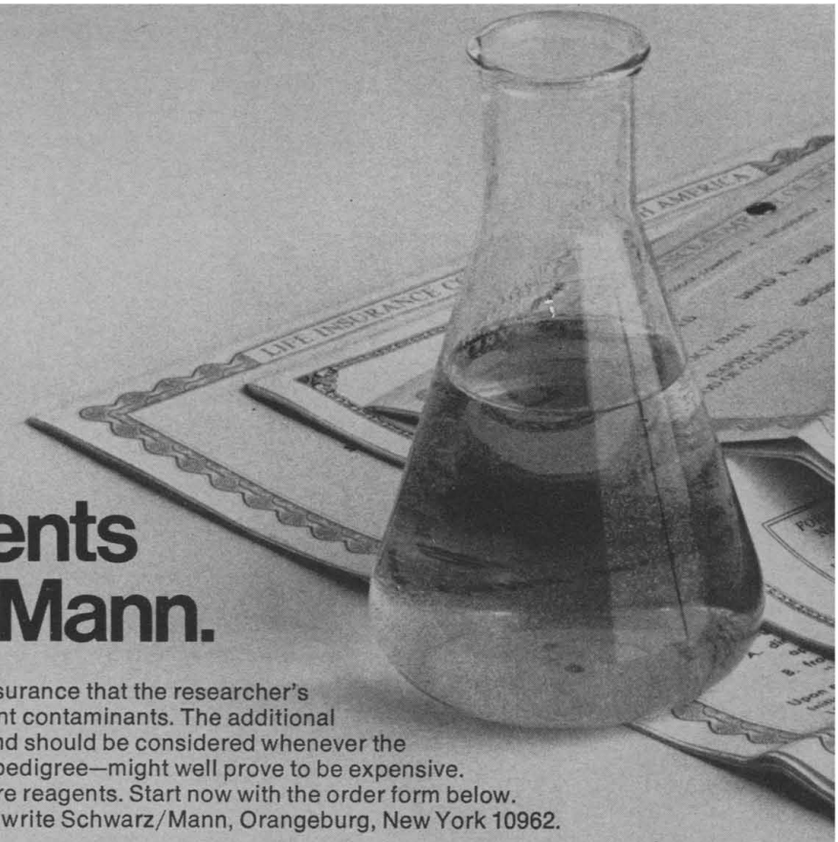
AAAS Member?_____ $_____Payment enclosed. _____Please bill me.

Circle the Roman numeral corresponding to the **session** you wish to order: Please check: __Reel __Cassette.

1/69 I II III IV V VI VII	10/69 I II III IV	24/69 I II	41/69 I II
3/69 I II	11/69 I II III IV V VI VII VIII	35/69 I II III	44/69
4/69 I II III IV V VI	19/69 I II	40/69	45/69

First, we give you a better amino acid analyzer. Then we give you a better price. ☐ When you're ready for a totally automated, tabletop amino acid analyzer system, you're ready for Jeolco's JLC-5AH. ☐ The price is right: for $27,350 you get our analyzer, plus our integrator, at less than the cost of a competitive analyzer alone. ☐ And you get more for your money. Take performance. Our unique detection system delivers 10^{-9} mol—4 times the sensitivity of competition. And you can easily adjust the sensitivity during analysis to suit your sample. No other instrument gives you such flexibility. ☐ Or take versatility. You can separate samples for accelerated analysis and physiological fluids with up to 8 programmed buffer changes. Do peptide, nucleotide, or sugar analysis with push-button ease. Run the same program 12 cycles, or vary your program 12 different ways automatically. And in every case, you can clearly pinpoint each stage in the analysis on our lighted indicator panel. No other instrument can do all this, either. To make things even easier, you can order our 36-sampler applicator. And we have a new automated sequenator, as well. ☐ There's more. Our integrator is the only two-channel unit on the market. We design and build it, just as we do all components. That way operation and service are simplified—and you have a better investment for your lab. ☐ At $27,350, you might even call it a bargain. Because it is.

Circle No. 2 on Readers' Service Card



The cheapest insurance: Ultra Pure reagents from Schwarz/Mann.

The Schwarz/Mann Ultra Pure reagents provide assurance that the researcher's endeavors are not needlessly jeopardized by reagent contaminants. The additional cost for such exceptional purity is modest indeed and should be considered whenever the use of "cheap" reagents—or those of questionable pedigree—might well prove to be expensive. Protect your research with Schwarz/Mann Ultra Pure reagents. Start now with the order form below. (Very cheap insurance.) For additional information: write Schwarz/Mann, Orangeburg, New York 10962.

Order Form

Number	Compound	Specifications	Price	Quantity Desired
9624	**Ammonium Acetate, Ultra Pure**	Heavy metals (as Pb)<0.0001%, Fe<0.00005%, Ca<0.00004%, Mg<0.00005%, As not detectable	1 kg. $ 11.00 5 kg. $ 40.65	
9627	**Ammonium Fluoride, Ultra Pure**	Heavy metals (as Pb)<0.0001%, Fe<0.00005%, Cl<0.0005%, SO_4<0.0005%, As not detectable	1 kg. $ 18.25 5 kg. $ 72.00	
1946	**Ammonium Sulfate, Ultra Pure**	Maximum limits of impurities: Pb not detectable to 0.00003%, Ca 0.000022%, Mg 0.000013%, Zn 0.00014%, Mn not detectable to 0.000006%, Fe not detectable to 0.00005%, Cu not detectable to 0.000021%	1 kg. $ 5.00 5 kg. $ 22.00 25 kg. $ 69.00 50 kg. $110.00	
7801	**Guanidine Hydrochloride, Ultra Pure**	Exceptional care in preparation reduces the content of all eight major interfering impurities. UV spectra run on all batches prove conclusively that the total amount of all these impurities combined is reduced to 10^{-7}M or even less.	100 g. $ 12.00 500 g. $ 48.00 1 kg. $ 96.00 10 kg. $ 92.20/kg.	
9530	**Sucrose, Density gradient, Crystalline, Ultra Pure**	Special grade of sucrose, free of ribonuclease activity, for use in sucrose density-gradient centrifugation of RNA preparations. Each lot is especially purified and assayed for ribonuclease activity. The assay procedure calls for 18 hours of incubation with RNA at 37° C and measurement of the production of acid-soluble ultraviolet absorbing material. A lot is considered to be satisfactory if no acid-soluble utraviolet material is released. Maximum Limits of Impurities: Heavy metals<5 ppm, As<0.0001 ppm, RNase Activity none	1 kg. $ 9.00 5 kg. $ 30.00	
6593	**Tris, Hydrochloride, Ultra Pure**	Atomic absorbance tests reflect the following results as run on a Beckman DB.G (Acetylene Air System): maximum limits of impurities: Pb 0.000022%, Mn 0.0000021%, Cu 0.00004%, Fe 0.000031%, Ca 0.000016%, Mg 0.000013%	100 g. $ 6.50 500 g. $ 28.00 1 kg. $ 39.50	
7438	**Tris, Ultra Pure**	Trihydroxymethylaminomethane for buffer and enzyme use. Maximum limits of impurities: Pb 0.001% max., Fe 0.00005% max., Ca 0.0001% max., Mg 0.0001% max., B no traces, As no traces	100 g. $ 4.25 500 g. $ 12.25 10x 500 g. $ 9.75/500 g.	
9200	**Urea, Ultra Pure**	Maximum limits of impurities: heavy metals 0.01 ppm, Fe not detectable, Cu not detectable, Pb not detectable, CN not detectable. Ammonia has been added to shift the equilibrium toward urea formation, thus preventing decomposition as well as cyanate formation. However, the ammonia has been removed in last step of purification making this material ammonia free.	1 lb. $ 10.00 5 lb. $ 40.00	

PRICES AND SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

Name_____ Title_____

Department_____ Institution_____

Address_____

_____ Zip_____

Purchase Order Number_____

Mail Order To:

Schwarz/Mann
Orangeburg, New York 10962
A Division of Becton, Dickinson and Company

Circle No. 5 on Readers' Service Card

the good of the party" (to maintain the population).

Orwell was aware of the complexities of the population problem and was skeptical of simple projections of trends. "The experts are proving now that our (the British) population will be only a few millions by the end of this century, but they were also proving in 1870 that by 1940 it would be 100 millions" (*1*). But Orwell was even more disturbed by the convenient rearrangement of history and memory to suit occasional demands. National problems, like national enemies, may change abruptly in a generation. Blurring these changes should indeed set Orwell's grave astir.

KARL E. SCHEIBE
Psychological Laboratory,
Wesleyan University,
Middletown, Connecticut 06457

Reference

1. G. Orwell, *Collected Essays, Journalism and Letters of George Orwell*, S. Orwell and I. Angus, Eds. (Harcourt, Brace & World, New York, 1968), vol. 3.

Attitudes toward Women: Flexible or Feudal

"Women in academe" by Patricia Albjerg Graham (25 Sept., p. 1284) was an excellently documented and presented statement, except for two points:

1) I do not believe that a "European" woman exists. Having been born in Europe and having lived in different parts of that small continent, I believe that people in Naples and people in Stockholm or Vienna differ profoundly in their ways of thinking, feeling, and living. This is by no means contradicted by the fact that scientists from all those areas can communicate on a topic of mutual interest when they meet at a conference.

2) If there is a common trait that unites European women and distinguishes them to some extent from those in the United States, it is their flexibility in changing roles, and doing it imperceptibly to others and mostly to themselves. Even after a childhood atmosphere of early suffragettes and blue stockings, they are in most cases quite comfortable in the double role of being a female in relation to a particular male in whom they are interested and switching to being a no-gender professional in a situation that calls for professional performance. . . .

Human behavior has a biological basis and the reproductive functions between male and female differ radically. In this area men and women appear to me like two different species. Nevertheless, men will have to develop greater psychological mobility in this age in which heightened flexibility is called for in numerous respects. They, too, will have to revise gradually some of their feudal attitudes toward women which were bred into them in the course of millenia of simpler technologies and of lower human expectations.

ALMA S. WITTLIN
7023 Draper Avenue,
La Jolla, California 92037

While it is true that internal ambivalences beset us, the tenor of the times is vigorously in favor of women working and having less guilt about either their femininity or their children. As Graham points out, the ages that produce the greatest pressure for scholarly publication or, I may add, development of professional competence coincide with those requiring the most domestic performance. Many women not only are unwilling to leave their family responsibilities for full-time work during this period, but are unable to physically accommodate the strains of both, especially when their children are young. If they remain out of their field during this period, which may be 10 years, they may have considerable difficulty returning. Part-time work, it should be emphasized, is an excellent way for a woman to keep up academic interests and professional skills and for a university to gain additional qualified and diverse staff. Although some university administrators (Mary I. Bunting at Radcliffe) have taken the lead and some university women themselves have recognized the problem, part-time positions on university faculties are still not readily available. Let's hope that universities, even in these less plush times, will consider "the woman question" in terms of restructuring of appointments, allowing more part-time appointments for qualified women, as suggested by Graham.

MYRNA M. WEISSMAN
Department of Psychiatry,
Yale University School of Medicine,
New Haven, Connecticut 06519

Graham's article is about as objective as a paper on biology by Lysenko. Obviously she opts for a weird society such as that of the old Shakers. The complete equality, of course, must be available to everyone. And since few,

WORTHINGTON

Step up to Worthington
premium enzymes

...18 fully characterized enzymes of unsurpassed quality

Carboxypeptidases A and B are typical of the new family of 18 Worthington Premium Enzymes. These are:

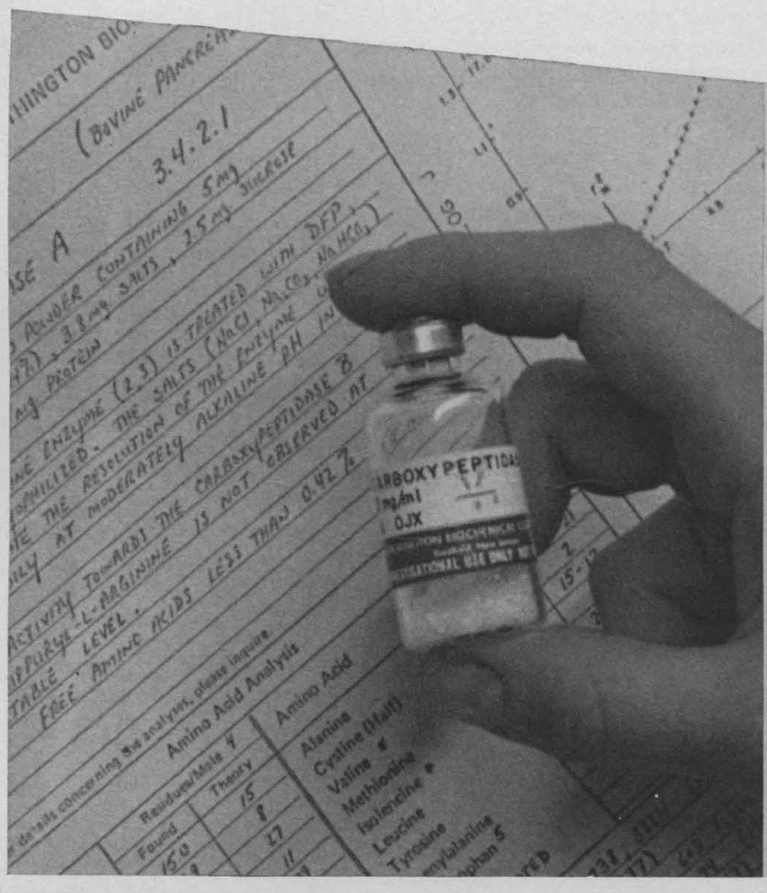
- fully active, essentially pure, lyophilized
- free of cross-contaminating and endopeptidase activities
- less than 0.5% free amino acid content

Like all Worthington Premium Enzymes, they are prepared by some of the most advanced techniques of column chromatography.

All are subjected to enzymatic assay of the principal component and principal possible contaminants. They are further characterized by disc gel electrophoresis, amino acid analysis, and ultracentrifugal analysis. Exact analytical data, generated on an individual basis, are stipulated on a sheet accompanying each enzyme product.

This complete characterization and validation, the key to Worthington Premium Enzymes, sets them above all other commercially available enzymes.

Ask for individual analytical data sheets on the enzymes you use. Step up to Worthington Premium Enzymes.



Worthington Biochemical Corporation
Freehold, New Jersey 07728

Please send Worthington catalog and the following data sheets:

- ☐ Carboxypeptidase A
- ☐ Carboxypeptidase B
- ☐ Catalase
- ☐ Chymotrypsin
- ☐ Chymotrypsinogen
- ☐ Deoxyribonuclease
- ☐ Glucose Oxidase
- ☐ Glycerol Phosphate Dehydrogenase
- ☐ Lactate Dehydrogenase (beef heart)
- ☐ Lactate Dehydrogenase (rabbit muscle)
- ☐ Lysozyme
- ☐ Pepsinogen
- ☐ Peroxidase
- ☐ Alkaline Phosphatase
- ☐ Pyruvic Kinase
- ☐ Ribonuclease
- ☐ Ribonuclease T_1
- ☐ Trypsinogen

Name

Title

Institution

Address

City

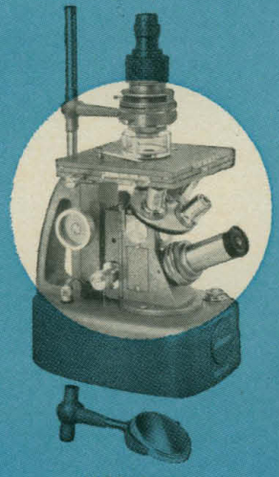
State Zip

THE BIO-LOGICAL BUY IN MICROSCOPES

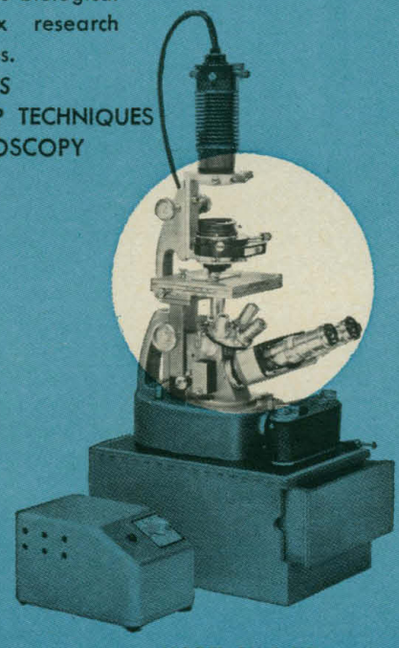
UNITRON INVERTED MODELS...

are proving to be the most logical and versatile design in all fields of the biological sciences, whether for complex research studies or for routine lab analyses.

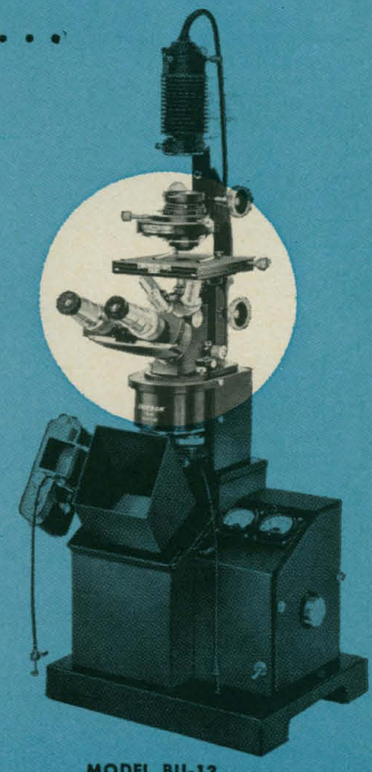
IDEAL FOR
- TISSUE CULTURES
- HANGING-DROP TECHNIQUES
- GENERAL MICROSCOPY



MODEL MIC



MODEL PH-BMIC



MODEL BU-13

INVERTED LABORATORY AND RESEARCH MODELS

Brightfield Laboratory Models:

MONOCULAR MODEL MIC. Four brightfield objectives 5X, 10X, 40X, 100X (oil); eyepieces 5X, 10X, 15X; ample height adjustment of condenser-illuminator for even large culture bottles; built-in base transformer. **$409.**

BINOCULAR MODEL BMIC. Binocular version of Model MIC, with camera mechanism. **$609.**

Brightfield Research Models:

MONOCULAR MODEL BR-MIC. Five brightfield objectives 5X, 10X, 20X, 40X, 100X (oil); eyepieces 5X, 10X, 15X; rack and pinion condenser mechanism with individual centering adjustments for condenser and illuminator; elevating compartment provides handy storage for accessories. **$545.**

BINOCULAR MODEL BR-BMIC. Binocular version of Model BR-MIC, with camera mechanism. **$745.**

Phase Research Models:

MONOCULAR MODEL PH-MIC. Eight phase objectives 10X, 20X, 40X, 100X (oil) in both bright and dark-medium contrast; eyepieces 5X, 10X, 15X; high intensity Koehler-type illuminator; five-choice intensity transformer; phase turret condenser with aperture for brightfield; elevating base. **$812.**

BINOCULAR MODEL PH-BMIC. Binocular version of Model PH-MIC plus built-in camera mechanism. **$1012.**

Prices include optics, cabinets, filters, special slides, petri dishes, and basic accessories. The built-in camera mechanism is standard with binocular models and available as an accessory for monoculars. Accommodates 35mm. camera back or Polaroid Land Camera Attachment. Both available at extra cost.

CAMERA-MICROSCOPES

The all-purpose microscope for visual examination, screen viewing and photomicrography. Built-in 3¼" X 4¼" camera with four flat field photo-eyepieces on revolving turret. Accessory attachments for 35mm., Polaroid, and movie cameras. Low-power (5X-40X) accessories available. Needs only 9" x 12" table space.

Brightfield Research Models:

MONOCULAR MODEL U-12. Same objectives and visual eyepieces as Model BR-MIC. **$1195.**

BINOCULAR MODEL BU-12. Binocular version of Model U-12. **$1379.**

Phase Research Models:

MONOCULAR MODEL U-13. Same phase objectives, turret condenser, and visual eyepieces as Model PH-MIC. **$1390.**

BINOCULAR MODEL BU-13. Binocular version of Model U-13. **$1580.**

Only UNITRON Inverted Microscopes Offer ALL These Advantages

accommodates slides, wet mounts, special glassware, warming chambers and micro-manipulators ● unobstructed stage for easy access ● built-in, correct intensity illumination ● glare-free coated optics ● special petri dishes for observation of cultures even by highest power oil immersion objective ● graduated mechanical stage ● accessory camera attachments ● long working distance 40X objective and other accessories also available

ASK FOR A FREE 10-DAY TRIAL. You be the judge in your own lab. Select the model you want. Then fill out and mail the coupon. Microscopes sent and returned at our expense. You assume no obligation. Or if you want more data on these and other UNITRON microscopes, use coupon to request our complete catalog.

UNITRON

INSTRUMENT COMPANY • MICROSCOPE SALES DIV.
66 NEEDHAM STREET • NEWTON HIGHLANDS 61, MASS.

☐ I'd like to try UNITRON Model ..... absolutely free for ten days with no obligation. Send details.

☐ Send me your complete catalog #A-4

NAME _____

ORGANIZATION _____ DEPT. _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

Emancipate your time

☐ I would like further information on the HP System 9100.

☐ I would like a "hands-on" demonstration at my desk. My phone number is _____.

NAME _____

POSITION _____ FIRM _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

SAMPLE PROBLEM
(Include Sample Data)

(Attach additional sheets if necessary)

Challenge The HP Calculator System 9100 And New HP Stat-PAC With Your Particular Statistical Problems

If you are a "Doubting Thomas" ...if you are sitting on the edge of a decision to buy a calculator and want the inside story, here's your opportunity! Just fill out the coupon, including an example of the statistical problems you face in the course of your work, and we'll send you an example solution. See for yourself how the Hewlett-Packard Calculator System 9100 can free you from the tedium and cost of computations. Or, if you prefer, check the box marked "demonstration" and we'll have an HP representative solve some of your problems right on your desk. You'll find the System 9100 thrives on problems that are too big for pencil and paper, yet too small to run on the big computer. With the 9100 you can compute General Statistics—means, variances, histograms (with plots); Test Statistics—t, F, χ^2; Analysis of Variance; and Curve Fitting—polynomial curve fits (with plots). With power like this on your desk you'll no longer have to spend hours with pencil and paper calculations—or wait in line to get on the big computer. The HP 9100B Programmable Calculator is available for *immediate* delivery. Purchase, lease, and rental options available with costs as low as $1.11 per computing hour. To start your emancipation send the coupon above along with your sample problem to Hewlett-Packard, P.O. Box 301, Loveland, Colorado 80537.

091/7

HEWLETT hp PACKARD

HP CALCULATOR SYSTEM 9100

Circle No. 11 on Readers' Service Card

18 December 1970, Volume 170, Number 3964

SCIENCE

The University and the Modern Condition

The response of universities to the characteristics of our era must take into account the purposes of universities and the kinds of contributions they can make. Universities are among the important institutions in our society, but there are other important institutions. You will recall de Tocqueville's description: "Americans of all ages, all conditions, and all dispositions constantly form associations. They have not only commercial and manufacturing companies, in which all take part, but associations of a thousand other kinds, religious, moral, serious, futile, general or restricted, enormous or diminutive." The fact there is an unmet need does not at all mean that a university is best equipped to take it on. Even if it is, the added function may place such a burden upon an institution as to defeat its basic purposes. Even a welfare-indoctrinated society must make choices. It may be that new types of institutions are required; it does not follow that universities should become these new types. A university which claims to be all things to all people, or as many different things as different groups wish it to be, is deceitful or foolish or both.

The University of Chicago began with and has achieved for itself a unique combination. Its emphasis on research is paramount. It includes within research the understanding of our own and other cultures and the appreciation of the works of the mind. It includes the search for knowledge so basic as to vastly change man's powers and comprehension. And this is not just the goal but in fact the achievement. Whatever the strains, it believes that research and teaching are closely related. Research itself—the restructuring of subject matter, the revelation of insights, new and old—can be the highest form of teaching. The obligation which the university has assumed is not only to give the individual scholar the freedom and intellectual environment required for research but to undertake to transmit the qualities and understanding of research into all of its teaching.

Perhaps, then, one should ask, "What is the service of this university?" The answer is traditional and old-fashioned. Its greatest service is in its commitment to reason, in its search for basic knowledge, in its mission to preserve and to give continuity to the values of mankind's many cultures. In a time when the intellectual values are denigrated, this service was never more required. I realize, of course, that in all this there appears to be a paradox. It is highly probable, although the subject is not a simple one, that given their choice of profession, training at the University of Chicago has increased the earning power of our students. Basic scientific work at the university could not help but have its impact upon industry. Our graduates do hold a variety of important positions in industry, in the professions, in teaching, and in national laboratories. The university has been a center of self-criticism for our society. We did in fact play a major role in restoring and maintaining an integrated community, and the university's work has given leadership through example as well as study in urban affairs. And while our college is surely not free from the pressure of the discipline of learning, the combination of a research-oriented institution with a small undergraduate college has given us the opportunity for many of the qualities sought—and frequently sought in vain—by the small liberal arts institution. But these results are in fact dependent upon the university's self-limiting goals; its recognition that its only uniqueness ultimately arises from the power of thought, the dedication to basic inquiry, the discipline of intellectual training.—EDWARD H. LEVI, *Office of the President, University of Chicago*

Adapted from *Point of View—Talks on Education* (University of Chicago Press, Chicago, 1969).

The precise measurement of Rayleigh fringes or Schlieren patterns is difficult enough without anything less than the finest in optical performance. And for that you need the Nikon 6C Profile Projector.

Our Nikkor lenses, world famous for high resolution and light transmission, give you a bright, clear, crisp image. You get the highest degree of accuracy while minimizing the strain of making thousands of precise measurements.

A convenient 3-lens turret plus the widest assortment of lenses available permits rapid change of magnification. The illumination supplied by the high intensity light source allows you to make readings under normal lighting.

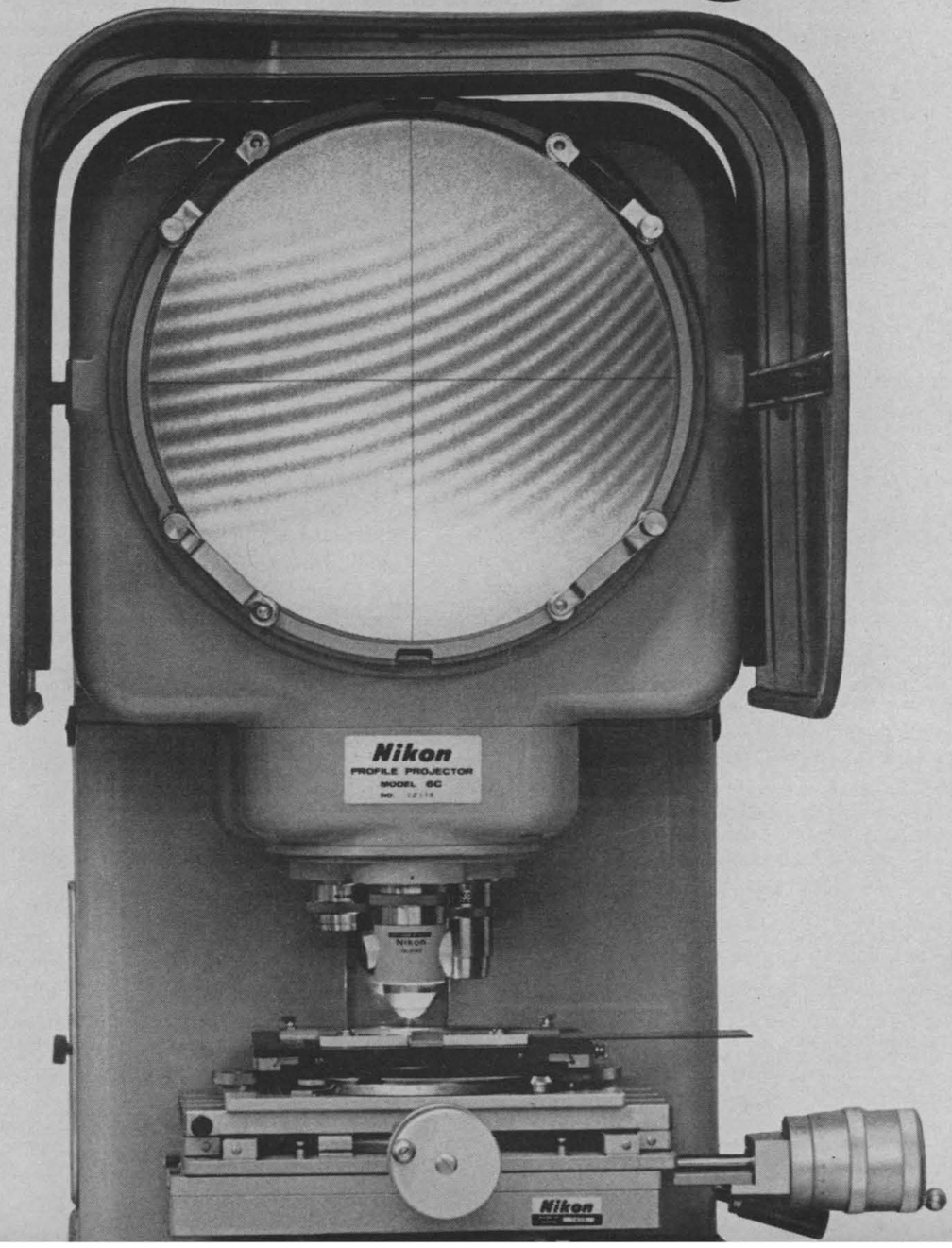
A precision goniometer permits rapid and reproducible plate alignment. And the long working distances possible with Nikkor lenses make it practical to measure centerpieces, counter-balances and other components for critical applications. Digital readout is available for greater speed, ease and precision in measuring.

For more information, write Nikon, Inc., Instrument Division, Ehrenreich Photo-Optical Industries, Inc. Garden City, N.Y. 11530. (In Canada: Anglo-photo Ltd. Ont.)

Nikon 6C Profile Projector

Ultracentrifuge plate-readers:

Relief is in sight.



BOOKS RECEIVED

(*Continued from page 1296*)

Archaeological Fakes. Adolf Rieth. Translated from the German edition (Tübingen, 1967) by Diana Imber. Praeger, New York, 1970. 184 pp., illus. $7.50.

Aspects of Prehistory. Grahame Clark. University of California Press, Berkeley, 1970. xiv, 162 pp., illus. + plates. $5.95.

Assay of Protein and Polypeptide Hormones. H. Van Cauwenberge and P. Franchimont. Pergamon, New York, 1970. vi, 244 pp., illus. + plates. $13.50. International Series of Monographs in Pure and Applied Biology. Modern Trends in Physiological Sciences, vol. 33.

Atoms and Powers. An Essay on Newtonian Matter-Theory and the Development of Chemistry. Arnold Thackray. Harvard University Press, Cambridge, Mass., 1970. xxvi, 326 pp., illus. $12.

Basic Concepts in Anatomy and Physiology. A Programmed Presentation. Catherine Parker Anthony. Mosby, St. Louis, Mo., ed. 2, 1970. vi, 158 pp., illus. Spiral bound, $4.85.

Basic Laser Raman Spectroscopy. Jack Loader. Heyden, New York, 1970 (U.S. distributor, Sadtler Research Lab., Philadelphia, Pa.). x, 106 pp., illus. Paper, $4.50.

Batteries and Energy Systems. C. L. Mantell. McGraw-Hill, New York, 1970. xvi, 222 pp., illus. $14.

The Beagle as an Experimental Dog. Allen C. Andersen and Loraine S. Good, Eds. Iowa State University Press, Ames, 1970. xiv, 616 pp., illus. + plates. $17.50.

Beyond Economics. Essays on Society, Religion and Ethics. Kenneth E. Boulding. University of Michigan Press, Ann Arbor, 1970. xii, 308 pp., illus. Paper, $2.95. Reprint of the 1968 edition.

Black Mesa. Survey and Excavation in Northeastern Arizona, 1968. George J. Gumerman. Prescott College Press, Prescott, Ariz., 1970. xvi, 128 pp., illus. Paper, $4.75. Prescott College Studies in Anthropology No. 2.

Body Fluid Replacement in the Surgical Patient. A symposium in honor of George H. Humphreys, II, New York, May 1969. Grune and Stratton, New York, 1970. xvi, 374 pp., illus. $25.

Brain-Damaged Children. A Modality-Oriented Exploration of Performance. Cynthia P. Deutsch and Florence Schumer. Brunner/Mazel, New York, 1970. x, 162 pp., illus. $7.95.

Carbonate Rocks. Limestones and Dolomites. Lucien Cayeux. Translated from the French edition (Paris, 1935) and updated by Albert V. Carozzi. Hafner, Darien, Conn., 1970. xviii, 506 pp., illus. $37.50. Sedimentary Rocks of France.

Cardiology. Current Topics and Progress. Symposia, Jerusalem and Tel Aviv, September 1968. Marcel Eliakim and Henry N. Neufeld, Eds. Academic Press, New York, 1970. 366 pp., illus. $15.

Carmichael's Manual of Child Psychology. Paul H. Mussen, Ed. Wiley, New York, ed. 3, 1970. Vol. 1 (xiv, 1520 pp., illus.); vol. 2 (xiv, 872 pp., illus.). $40.

Carte pédologique de France à moyenne échelle. Vichy, L-15. J.-C. Favrot. Centre National de Recherches Agronomiques, Versailles, 1969. 158 pp., illus. + map. Paper, 53.75 F.

Case Studies in Experimental Engineering. A Programmed Approach. Hilbert Schenck, Jr. McGraw-Hill, New York, 1970. xii, 172 pp., illus. Spiral bound, $8.95.

Chains of Opportunity. System Models of Mobility in Organizations. Harrison C. White. Harvard University Press, Cambridge, Mass., 1970. xvi, 418 pp., illus. $15.

Chemical Background for the Biological Sciences. Emil H. White. Prentice-Hall, Englewood Cliffs, N.J., ed. 2, 1970. xii, 194 pp., illus. Cloth, $6.95; paper, $3.25. Foundations of Modern Biology Series.

The Chemistry of Alkenes. Vol. 2. Jacob Zabicky, Ed. Interscience (Wiley), New York, 1970. xvi, 670 pp., illus. $31. The Chemistry of Functional Groups.

Children and Science. Lazer Goldberg. Scribner's, New York, 1970. xii, 148 pp. $6.95. Scribner's Guides for Parents and Teachers.

Circuit Theory. An Introduction to the State Variable Approach. Ronald A. Rohrer. McGraw-Hill, New York, 1970. xii, 314 pp., illus. $14.50. Series in Electronic Systems.

Classical Fields, Particles, and the Theory of Relativity. William R. Davis. Gordon and Breach, New York, 1970. xxiv, 396 pp. $12; to libraries, $27.50.

La Climatisation. Marcel Roubinet. Presses Universitaires de France, Paris,

1970. 136 pp., illus. Paper. "Que Sais-Je?," No. 1387.

Clinical Electrocardiogaphy and Computers. Cesar A. Caceres and Leonard S. Dreifus, Eds. Academic Press, New York, 1970. xxxii, 472 pp., illus. $18.50.

Clustering Phenomena in Nuclei. A conference, Bochum, Germany, July 1969. International Atomic Energy Agency, Vienna, 1969. xii, 356 pp., illus. Paper, $10.

Colorimetric Methods of Analysis. Including Photometric Methods. Vol. 4AA. Foster Dee Snell and Cornelia T. Snell. Van Nostrand Reinhold, New York, 1970. xiv, 626 pp., illus. $24.50.

The Comparative Anatomy and Histology of the Cerebellum from Monotremes through Apes. Olof Larsell. Jan Jansen, Ed. University of Minnesota Press, Minneapolis, 1970. viii, 270 pp., illus. $16.

Comparative Physiology of Thermoregulation. Vol. 1, Invertebrates and Nonmammalian Vertebrates. G. Causey Whittow. Academic Press, New York, 1970. x, 334 pp., illus. $17.50.

Computer Processing in Communications. Vol. 19. Proceedings of a symposium, New York, April 1969. Polytechnic Press, Brooklyn, N.Y., 1970. xxii, 850 pp., illus. $20. Polytechnic Institute of Brooklyn Microwave Research Institute Symposia Series.

Computer Programs for Computational Assistance in the Study of Linear Control Theory. James L. Melsa. McGraw-Hill, New York, 1970. iv, 132 pp., illus. Paper, $3.95.

Computer Simulation in Geology. John W. Harbaugh and Graeme Bonham-Carter. Wiley-Interscience, New York, 1970. xiv, 576 pp., illus. $24.95.

Concepts of Pest Management. Proceedings of a conference, Raleigh, N.C., March 1970. R. L. Rabb and F. E. Guthrie, Eds. North Carolina State University, Raleigh, 1970. xii, 242 pp., illus. Paper, $4.

Confessions of an American Scholar. Simon O'Toole. University of Minnesota Press, Minneapolis, 1970. viii, 112 pp. Cloth, $5.95; paper, $1.95.

Contemporary Readings in Sport Psychology. William P. Morgan, Ed. Thomas, Springfield, Ill., 1970. xx, 460 pp., illus. $19.

The Correspondence of Henry Oldenburg. Vol. 7, 1670–1671. Edited and translated by A. Rupert Hall and Marie Boas Hall. University of Wisconsin Press, Madison, 1970. xxx, 600 pp. + plates. $20.

Critical Path Planning. Present and Future Techniques. Paul Barnetson. Brandon/Systems, Princeton, N.J., 1970. 102 pp., illus. $6.

Culture and Biological Man. Explorations in Behavioral Anthropology. Eliot D. Chapple. Holt, Rinehart and Winston, New York, 1970. xxii, 346 pp. $8.95.

Current Topics in Surgical Research. Papers from a meeting, Boston, November 1969. Vol. 2. David B. Skinner and Paul A. Ebert, Eds. Academic Press, New York, 1970. xiv, 568 pp., illus. $24.

Cytology Automation. Proceedings of a symposium, Cardiff, Wales, October 1968. D. M. D. Evans, Ed. Livingstone, Edinburgh, 1970 (U.S. distributor, Williams and Wilkins, Baltimore, Md.). xiv, 276 pp., illus. $12.

Dealing with Data. Arthur J. Lyon. Pergamon, New York, 1970. xviii, 392 pp., illus. Cloth, $8; paper, $5.50. The Commonwealth and International Library, Physics Division.

Decontamination of Nuclear Reactors and Equipment. J. A. Ayres, Ed. Ronald, New York, 1970. xviii, 826 pp., illus. $22.50.

The Dinosaurs. W. E. Swinton. Allen and Unwin, London, 1970. 332 pp., illus. $11.

Direct Nuclear Reaction Theories. Norman Austern. Wiley-Interscience, New York, 1970. x, 390 pp., illus. $19.95. Interscience Monographs and Texts in Physics and Astronomy, vol. 25.

Discrete Markov Chains. V. I. Romanovsky. Translated from the Russian by E. Seneta. Wolters-Noordhoff, Groningen, Netherlands, 1970. xii, 410 pp. $18.65.

Dynamic Hydrology. Peter S. Eagleson. McGraw-Hill, New York, 1970. xviii, 462 pp., illus. $16.

Dynamics of One-Species Populations of Fishes in Ponds Subjected to Cropping and Additional Stocking. D. Homer Buck and Charles F. Thoits III. State of Illinois Department of Registration and Education, Urbana, 1970. Illus. Paper. Natural History Survey Bulletin, vol. 30, article 2, pp. 69–166.

The Earth. An Introduction to Physical Geology. John Verhoogen, Francis J.

Turner, Lionel E. Weiss, Clyde Wahrhaftig, and William S. Fyfe, Eds. Holt, Rinehart and Winston, New York, 1970. x, 748 pp., illus. $13.95.

Ecology of the Subarctic Regions. Ecologie des Regions Subartiques. A symposium, Helsinki, July–August 1966. UNESCO, Paris, 1970. 364 pp., illus. $19. Ecology and Conservation.

Economics as a Science. Kenneth E. Boulding. McGraw-Hill, New York, 1970. viii, 158 pp., illus. Paper, $6.95.

Education in Creative Engineering. Y. T. Li, Ed. M.I.T. Press, Cambridge, Mass., 1970. xxxvi, 386 pp., illus. Paper, $6.95.

Effective Management of Research and Development. Arthur Gerstenfeld. Addison-Wesley, Reading, Mass., 1970. x, 150 pp., illus. $7.95.

Electrical Impedance Plethysmography. The Electrical Resistive Measure of the Blood Pulse Volume, Peripheral and Central Blood Flow. Jan Nyboer. Thomas, Springfield, Ill., ed. 2, 1970. xxviii, 390 pp., illus. $22.

Electrical Probes for Plasma Diagnostics. J. D. Swift and M. J. R. Schwar. Iliffe, London; Elsevier, New York, 1970. x, 334 pp., illus. $19.50.

Electronic Integrated Circuits and Systems. Franklin C. Fitchen. Van Nostrand Reinhold, New York, 1970. xii, 420 pp., illus. $12.95. Microelectronics Series.

Engineering Geology in Southern California. Richard Lung and Richard Proctor, Eds. Association of Engineering Geologists, Arcadia, Calif., 1969. 390 pp., illus. $14. Reprint of the 1966 edition.

Entropy for Biologists. An Introduction to Thermodynamics. Harold J. Morowitz. Academic Press, New York, 1970. xvi, 196 pp., illus. $6.95.

Essays in Toxicology. Vol. 2. Frank R. Blood, Ed. Academic Press, New York, 1970. xii, 218 pp., illus. $9.

Essentials for the Technical Writer. Hardy Hoover. Wiley, New York, 1970. viii, 216 pp. $6.95.

Europeans about Europe. What European Students Know and Expect of the Unification of Europe. A Study in Social Psychology. Petrus-Arsene Cornelis. Swets and Zeitlinger, Amsterdam, 1970. 174 pp., illus. Paper, $8.

Experimental General Chemistry. George G. Hess and Uno Kask. Barnes and Noble, New York, 1970. xx, 262 pp., illus. Paper, $2.95. International Textbook Series.

Experiments in Physiology and Biochemistry. Vol. 3, G. A. Kerkut. Academic Press, New York, 1970. xx, 504 pp., illus. $21.

Family Interaction. Ralph H. Turner. Wiley, New York, 1970. xii, 506 pp., illus. $10.95.

Family Planning and Abortion in the Socialist Countries of Central and Eastern Europe. A Compendium of Observations and Readings. Henry P. David. The Population Council, New York, 1970. xii, 306 pp., illus. Paper.

Farming Systems of the World. A. N. Duckham and G. B. Masefield. Assisted by R. W. Willey and Kathleen Down. Praeger, New York, 1970. xviii, 542 pp., illus. + plates. $21.50.

Fell's United States Coin Book. Charles J. Andrews. Fell, New York, ed. 7, 1970. 156 pp., illus. $3.95.

Flow in Channels. Robert H. J. Sellin. Gordon and Breach, New York, 1970. x, 150 pp., illus. $7.50; to libraries, $16.50. Macmillan Engineering Hydraulics Series.

Free-Radical Chain Reactions. Earl S. Huyser. Wiley-Interscience, New York, 1970. x, 388 pp., illus. $19.95.

From Idea to Working Model. Ira G. Wilson and Marthann E. Wilson. Wiley, New York, 1970. xxiv, 268 pp., illus. $12.95. Wiley Series on Systems Engineering and Analysis.

From Unity to Freedom. Renaldo Cutino. Earthly Brothers, New York, 1970. x, 34 pp., illus. Paper, $2.50.

Fuel Cells. Modern Processes for the Electrochemical Production of Energy. Wolf Vielstich. Translated from the German edition (Weinheim, 1965) by D. J. G. Ives. Wiley-Interscience, New York, 1970. xxii, 502 pp., illus. $25.

Geography, Marketing, and Urban Growth. Donald F. Milvihill and Ruth Cope Mulvihill. Van Nostrand Reinhold, New York, 1970. viii, 190 pp. Paper, $2.95. Searchlight Book No. 46.

The Geological Revolution. Charles L. Drake. Oregon State System of Higher Education, Eugene, 1970. 56 pp., illus. Paper, $2. Condon Lectures.

Global Effects of Environmental Pollution. A symposium, Dallas, December 1968. S. Fred Singer. Springer, New York; Reidel, Dordrecht, Holland, 1970. xii, 218 pp., illus. $12.

Glossary of Words and Phrases Used in Radiology, Nuclear Medicine and Ultrasound. Prepared from Various Sources for Medical Secretaries, X-Ray Technicians, Medical Students and Residents in Radiology. Lewis E. Etter. Thomas, Springfield, Ill., ed. 2, 1970. xxvi, 356 pp., illus. $22.50.

Gondwana Stratigraphy. La Estratigrafia del Gondwana. A symposium, Buenos Aires, October 1967. UNESCO, Paris, 1970. xvi, 1174 pp., illus. Paper, $16. Earth Sciences.

The Great Alaska Earthquake of 1964. Human Ecology. Committee on the Alaska Earthquake of the Division of Earth Sciences National Research Council. National Academy of Sciences, Washington, D.C., 1970. xviii, 510 pp., illus. $29.50.

Green's Functions. Introductory Theory with Applications. G. F. Roach. Van Nostrand Reinhold, New York, 1970. xii, 280 pp. $16.95. New University Mathematics Series.

Guide to Uncommon Metals. Eric N. Simons. Hart, New York, 1970. x, 246 pp. Paper, $3.95.

A Guidebook to Mechanism in Organic Chemistry. Peter Sykes. Wiley, New York, ed. 3, 1970. xii, 302 pp. Paper, $5.50.

Hallucinogenic Drug Research. Impact on Science and Society. Proceedings of a symposium, Beloit, Wis., October 1969. James R. Gamage and Edmund L. Zerkin, Eds. Stash Press, Beloit, 1970. xvi, 140 pp. Paper, $2.95.

Higher Education in the Fifty States. M. M. Chambers. Interstate, Danville, Ill., 1970. xvi, 452 pp., illus. $10.

Hormones and the Environment. Pro-

ceedings of a symposium, Sheffield, September 1969. G. K. Benson and J. G. Phillips, Eds. Cambridge University Press, New York, 1970. xvi, 630 pp., illus. + plates. $22.50. Memoirs of the Society for Endocrinology, No. 18.

How to Know the Freshwater Algae. G. W. Prescott. Brown, Dubuque, Iowa, 1970. viii, 348 pp., illus. Spiral bound, $4.50. Pictured-Key Nature Series. Reprint of the 1954 edition.

The Human Body and the Law. A Medico-Legal Study. David W. Meyers. Aldine, Chicago, 1970. xii, 204 pp. $7.95.

The Hydrated Electron. Edwin J. Hart and Michael Anbar. Wiley-Interscience, New York, 1970. xiv, 268 pp., illus. $12.95.

Indicators of Social Change. Concepts and Measurements. Eleanor Bernert Sheldon and Wilbert E. Moore, Eds. Russell Sage Foundation, New York, 1968. x, 822 pp., illus. $15.

Inelastic Behavior of Solids. Battelle Institute Materials Science Colloquia, Columbus and Atwood Lake, Ohio, September 1969. Melvin F. Kanninen, William F. Adler, Alan R. Rosenfield, and Robert I. Jaffee, Eds. McGraw-Hill, New York, 1970. xx, 744 pp., illus. $44.50. Series in Materials Science and Engineering.

The Innervation of the Vertebrate Heart. Edwin F. Hirsch, Ed. Thomas, Springfield, Ill., 1970. xiv, 210 pp., illus. $16.50.

Integrated Principles of Zoology. Cleveland P. Hickman. Mosby, St. Louis, Mo., ed. 4, 1970. x, 976 pp., illus. $10.95.

Interacting Systems in Development. James D. Ebert and Ian M. Sussex. Holt, Rinehart and Winston, New York, ed. 2, 1970. xii, 338 pp., illus. Paper, $4.95. Modern Biology Series.

Interpretation of Spectra and Atmospheric Structure in Cool Stars. Yoshio Fujita. University of Tokyo Press, Tokyo; University Park Press, Baltimore, Md., 1970. viii, 146 pp., illus. $10.

An Introduction to the Biology of the Skin. R. H. Champion, T. Gillman, A. J. Rook, and R. T. Sims, Eds. Davis, Philadelphia, 1970. x, 450 pp., illus. + plates. $15.

Introduction to Contemporary Microeconomics. Vivian Charles Walsh. McGraw-Hill, New York, 1970. xxii, 298 pp., illus. Paper, $8.95.

An Introduction to Liquid Helium. J. Wilks. Clarendon (Oxford), New York, 1970. x, 166 pp., illus. Paper, $4.50. Oxford Library of the Physics Sciences.

An Introduction to Metabolic Pathways. S. Dagley and Donald E. Nicholson. Wiley, New York, 1970. xii, 344 pp., illus. $11.95.

Introduction to Research in Psychopathology. Brendan Maher. McGraw-Hill, New York, 1970. xiv, 206 pp., illus. Paper, $3.95. Paperback Series in Psychopathology.

Introduction to the System Life Cycle. Martin L. Rubin. Thomas Harrell, Ed. Brandon/Systems, Princeton, N.J., 1970. xxvi, 228 pp., illus. $17.50.

Introductory Mathematical Statistics. Principles and Methods. Erwin Kreyszig. Wiley, New York, 1970. xviii, 470 pp., illus. $12.50.

John Pecham and the Science of Optics.

Perspectiva communis. Edited and translated by David C. Lindberg. University of Wisconsin Press, Madison, 1970. xviii, 302 pp., illus. $15. Publications in Medieval Science, No. 14.

Kinetic Architecture. William Zuk and Roger H. Clark. Van Nostrand Reinhold, New York, 1970. viii, 164 pp., illus. $14.95

The Lactose Operon. Jonathan R. Beckwith and David Zipser, Eds. Cold Spring Harbor Laboratory, Cold Spring Harbor, N.Y., 1970. x, 438 pp., illus. $12.

Language and Psychology. Historical Aspects of Psycholinguistics. Arthur L. Blumenthal. Wiley, New York, 1970. xiv, 248 pp., illus. Cloth, $7.95; paper, $4.95. Perspectives in Psychology.

Largemouth Bass and Other Fishes in Ridge Lake, Illinois, 1941–1963. George W. Bennett, H. Wickliffe Adkins, and William F. Childers. State of Illinois Department of Registration and Education, Urbana, 1969. Illus. Paper. Natural History Survey Bulletin, vol. 30, article 1, pp. 1–68.

Laser Raman Spectroscopy. A Survey of Interest to Chemists, and Containing a Comprehensive Discussion of Experiments on Crystals. T. R. Gilson and P. J. Hendra. Wiley-Interscience, New York, 1970. xiv, 266 pp., illus. $15.

Learning Foundations of Behavior Therapy. Frederick H. Kanfer and Jeanne S. Phillips. Wiley, New York, 1970. xiv, 642 pp., illus. $10.95. Series in Psychology.

Learning Theory and Mental Development. William K. Estes. Academic Press, New York, 1970. xii, 224 pp. $9.50.

Mammalian Protein Metabolism. Vol. 4. H. N. Munro, Ed. Academic Press, New York, 1970. xviii, 764 pp., illus. $24.

Man and His Culture. Psychoanalytic Anthropology after 'Totem and Taboo.' Warner Muensterberger, Ed. Taplinger, New York, 1970. 412 pp. $10.

Manual de Trabajos Practicos de Embriologia. Ekkehard Kleiss. Universidad de Los Andes, Merida, Venezuela, ed. 2, 1970. xxiv, 396 pp., illus. Paper.

Markovian Decision Processes. Hisashi Mine and Shunji Osaki. Elsevier, New York, 1970. xii, 142 pp., illus. $12.50. Modern Analytic and Computational Methods in Science and Mathematics.

Masking and Demasking of Chemical Reactions. Theoretical Aspects and Practical Applications. D. D. Perrin. Wiley-Interscience, New York, 1970. xii, 212 pp., illus. $12.95. Chemical Analysis: A Series of Monographs on Analytical Chemistry and its Applications, vol. 33.

Measurements of Spectral Irradiance Underwater. John E. Tyler and Raymond C. Smith. Gordon and Breach, New York, 1970. xii, 104 pp., illus. $19.50. Ocean Sciences.

Membranes from Cellulose and Cellulose Derivatives. A symposium, Minneapolis, April 1969. Albin F. Turbak, Ed. Interscience (Wiley), New York, 1970. x, 338 pp., illus. Paper, $17. Applied Polymer Symposia, No. 13.

Mesmerism and the End of the Enlightenment in France. Robert Darnton. Schocken, New York, 1970. xviii, 218 pp., illus. Paper, $2.45. Reprint of the 1968 edition.

Metabolic Conjugation and Metabolic Hydrolysis. Vol. 1. William H. Fishman, Ed. Academic Press, New York, 1970. xvi, 462 pp., illus. $28.

The Microbial World. Roger Y. Stanier, Michael Doudoroff and Edward A. Adelberg. Prentice-Hall, Englewood Cliffs, N.J., ed. 3, 1970. xviii, 874 pp., illus. $15.95.

Modern Chemistry. Selected Readings. J. G. Stark, Ed. Penguin Books, Baltimore, Md., 1970. 318 pp., illus. Paper, $2.45. Advanced Science Readings.

The Monsoon Regime of the Currents in the Indian Ocean. Walter Düing. East-West Center Press, Honolulu, 1970. x, 68 pp., illus. $7.50. International Indian Ocean Expedition Oceanographic Monographs, No. 1.

Moon Rocks. Henry S. F. Cooper, Jr. Dial Press, New York, 1970. x, 198 pp. + plates. $5.95.

Network Theory. J. B. Murdoch. McGraw-Hill, New York, 1970. xviii, 526 pp., illus. $16. Electrical and Electronic Engineering Series.

The Neural Control of Behavior. Richard E. Whalen, Richard F. Thompson, Marcel Verzeano, and Norman M. Weinberger, Eds. Academic Press, New York, 1970. xvi, 302 pp., illus. $12.

Northwest Coast Indian Art. An Analsis of Form. Bill Holm. University of Washington Press, Seattle, 1970. xviii, 116 pp., illus. Paper, $4.95. Thomas Burke Memorial Washington State Museum, Monograph No. 1. Reprint of the 1965 edition.

The Northwest Passage. From the Mathew to the Manhattan: 1497 to 1969. Bern Keating. With exclusive color photography by Dan Guravich. Rand McNally, Chicago, 1970. 160 pp., illus. $9.95.

Nuclear Reactions Induced by Heavy Ions. Proceedings of a conference, Heidelberg, July 1969. R. Bock and W. R. Hering, Eds. North-Holland, Amsterdam; Elsevier, New York, 1970. xx, 822 pp., illus. $34.75.

The Organic Chemistry of Tin. Wilhelm P. Neumann. Translated from the German edition (Stuttgart, 1967) by Wolf Moser. Interscience (Wiley), New York, 1970. xiv, 282 pp., illus. $13.50. The Chemistry of Organometallic Compounds.

Palestine—A Search for Truth. Approaches to the Arab-Israeli Conflict. Alan R. Taylor and Richard N. Tetlie, Eds. Public Affairs Press, Washington, D.C., 1970. xii, 284 pp. $6.

Panel Reports of the Study of Basic Biology in Canada. Biological Council of Canada and the Canadian Federation of Biological Societies. Kenneth C. Fisher, Study Director. Biological Council of Canada, Ottawa, 1970. Unpaged, illus. Paper, $7.

The Participant Observer. Glenn Jacobs, Ed. Braziller, New York, 1970. xii, 302 pp. Cloth, $7.95; paper, $3.95.

Recursiveness. Samuel Eilenberg and Calvin C. Elgot. Academic Press, New York, 1970. x, 90 pp. $6.50.

Struggles in the State. Sources and Patterns of World Revolution. George A. Kelly and Clifford W. Brown, Jr., Eds. Wiley, New York, 1970. xiv, 512 pp., illus. $9.95.

Symposium sur la physiologie de la formation de la coquille de l'oeuf. Symposium on the Physiology of the Egg-Shell Formation. Grignon, France, September 1968. Institute Nationale de la Recherche Agronomique, Paris, 1970. 280 pp., illus. Paper, 70 F. Annales de Biologie Animale, Biochimie, Biophysique, vol. 10.

A Taxonomic Revision of the Weevil Genus Dorytomus in North America (Coleoptera: Curculionidae). Charles William O'Brien. University of California Press, Berkeley, 1970. vi, 80 pp., illus. Paper, $3. University of California Publications in Entomology, vol. 60.

Technology and Humanism. Some Exploratory Essays for Our Time. William G. Carleton. Vanderbilt University Press, Nashville, Tenn., 1970. xiv, 300 pp. $12.50.

The Testis. Vol. 2, Biochemistry. A. D. Johnson, W. R. Gomes, and N. L. VanDemark, Eds. Academic Press, New York, 1970. xvi, 468 pp., illus. $35.

Theory of Optimal Control and Mathematical Programming. Michael D. Canon, Clifton D. Cullum, Jr., and Elijah Polak. McGraw-Hill, New York, 1970. xii, 286 pp. $18.50. Series in Systems Science.

La Thermoélectricité. André Linder. Presses Universitaires de France, Paris, 1970. 136 pp., illus. Paper. "Que Sais-Je?," No. 1381.

Topics in Medicinal Chemistry. Vol. 3. Joseph L. Rabinowitz and Ralph M. Myerson, Eds. Wiley-Interscience, New York, 1970. xiv, 428 pp., illus. $25.