SCIENCE

17 May 1963

Vol. 140, No. 3568

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

STRANGE ECHINODERM

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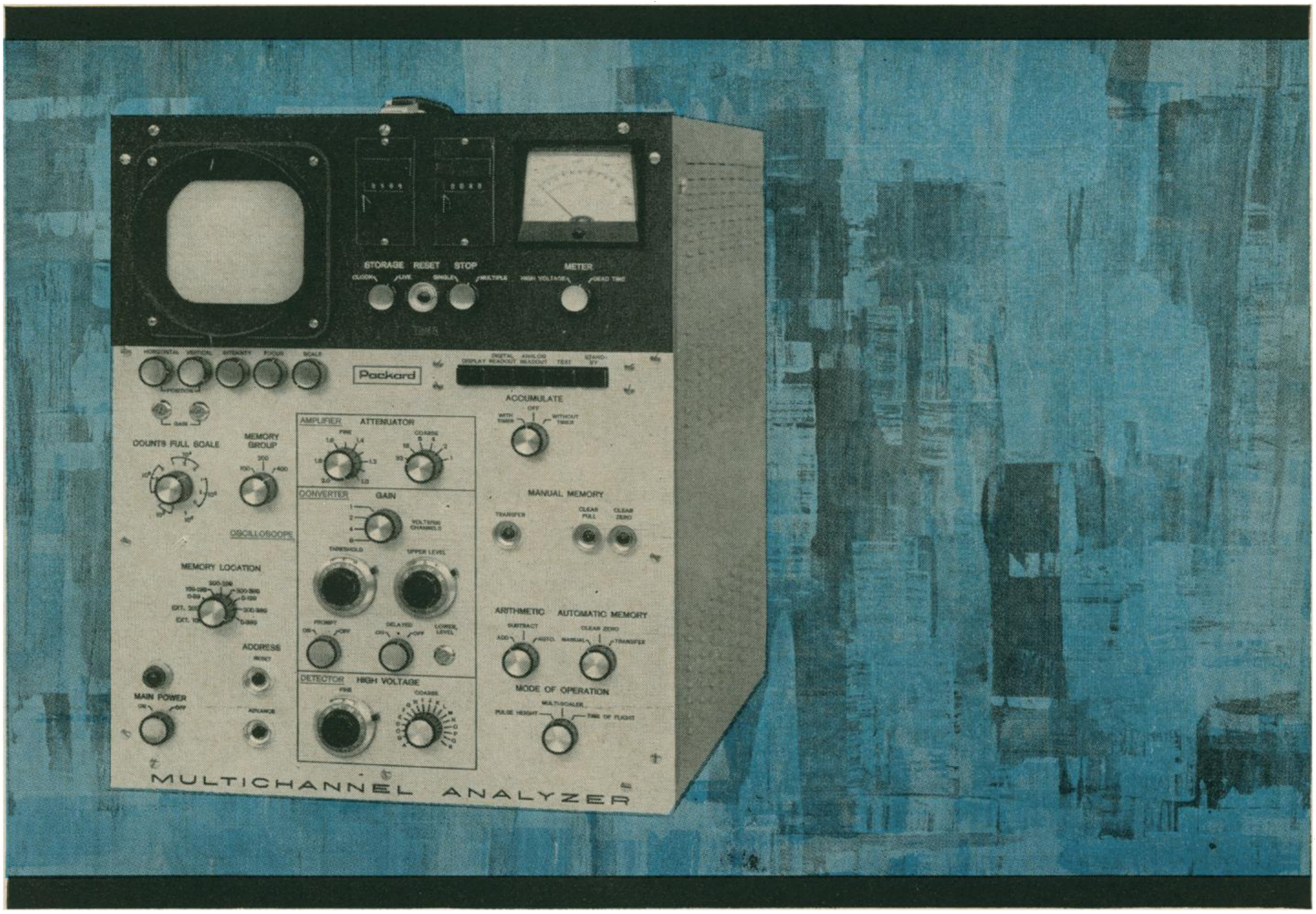
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MEMORY LOCATION
ARITHMETIC AUTOMATIC MEMORY
ADDRESS
DETECTOR HIGH VOLTAGE
MODE OF OPERATION
MAIN POWER
MULTICHANNEL ANALYZER

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SCIENCE

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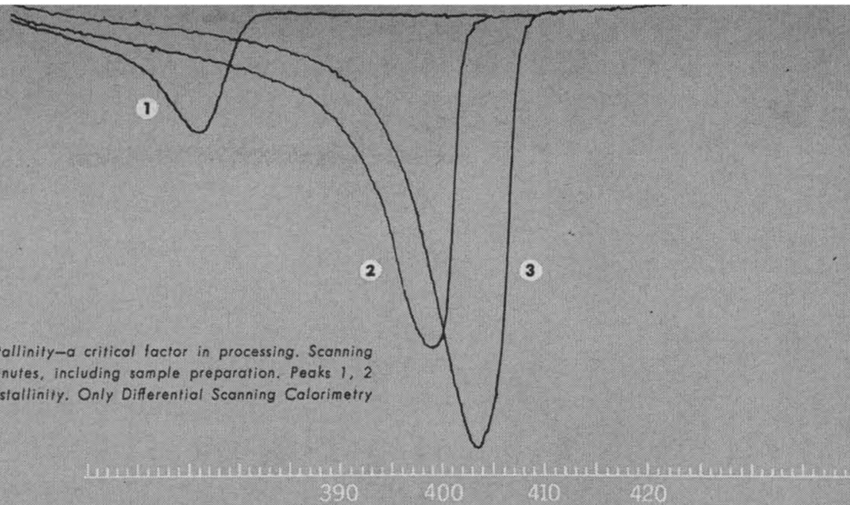
COVER

Incomplete specimen of strange, spirally coiled new echinoderm from Early Cambrian (nearly 600 million years ago) of California. Oral pole is in center of spiral. The animal was capable of expanding like an accordion along an oral-aboral axis. Large plates of "interambulacral" columns, occasionally with prominent spines, form ridges that spiral out from the mouth. This specimen is in expanded state. Plates between rows with spines are parts of columns that fold in when the individual contracts (about ×9). See page 820. [Porter M. Kier, Smithsonian Institution]

performance-proved instruments for
DIFFERENTIAL THERMAL ANALYSIS



Comparison of three 6.7 mg. polyethylene samples for degree of crystallinity—a critical factor in processing. Scanning rate, 10° per minute; chart speed, .75" per minute. Total time, 45 minutes, including sample preparation. Peaks 1, 2 and 3 show respectively low, medium and high degrees of nominal crystallinity. Only Differential Scanning Calorimetry provides such information so rapidly.

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As its name indicates, Perkin-Elmer's new Differential Scanning Calorimeter possesses a unique combination of capabilities for high-speed differential thermal analysis.

Perkin-Elmer's design approach has resulted in a modern instrument with the following desirable qualities:

- high speed (scans up to 80°C/min.)
- sensitivity to minute energy transitions (10^{-4} calories/second)
- small sample size (0.1 mg. to 20 mg.)
- simple, automatic operation

Furthermore, the DSC-1 *directly measures and records the energy* required to effect the transitions associated with polymerization, fusion, crystallization and decomposition. In addition, effluent gases may be analyzed using the integral thermal-conductivity detector.

The DSC-1 instrument measures the actual power required in a transition by maintaining a precise temperature match between sample and reference throughout a programmed temperature scan. The instrument can provide valuable *extra* information for chemists in such fields as polymers, insecticides, fats, greases, explosives, organic chemical research and general chemical analysis.

Get the facts on low cost differential scanning calorimetry—a brand new field of analysis. Write to Instrument Division, Perkin-Elmer Corporation, 910 Main Avenue, Norwalk, Connecticut.

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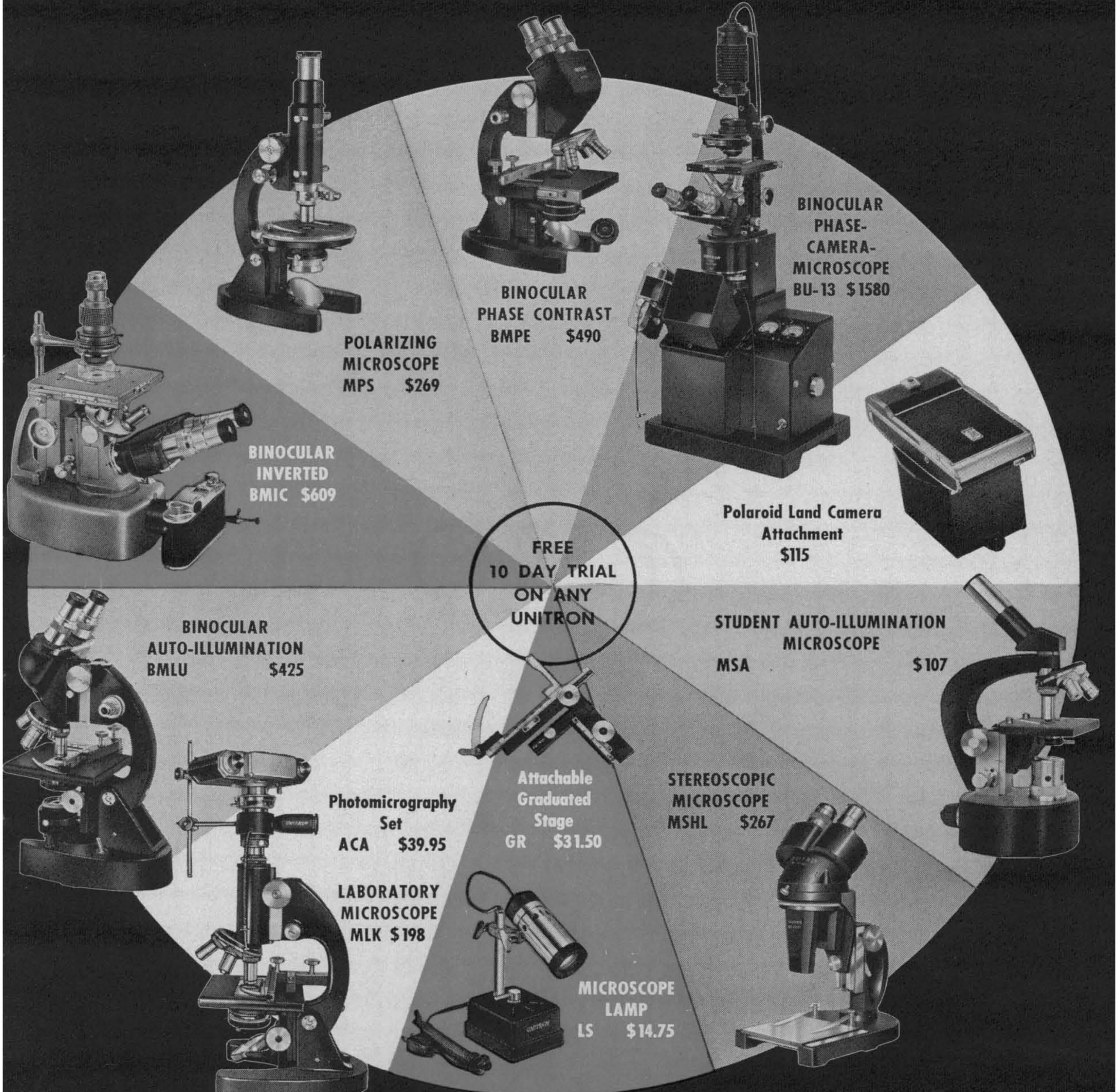

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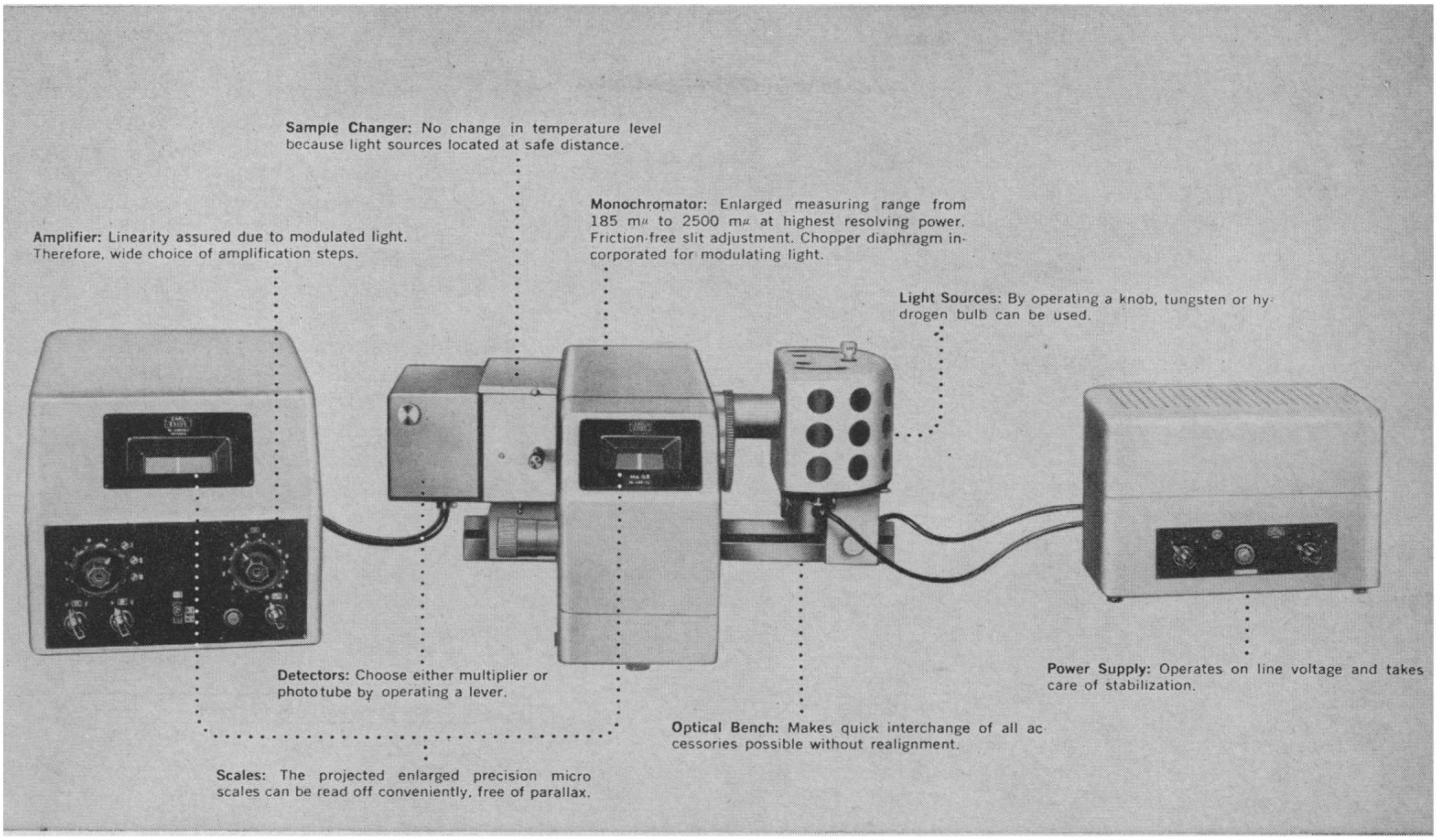

The Carl Zeiss Spectrophotometer PMQ II

The PMQ II is outstanding for rapid measurements of liquids, gases and solids at the highest resolving power of the spectrum. You can make a quick survey of a sample, find out where its absorption bands lie and determine its concentration precisely due to direct indication. The instrument operates on a.c. line voltage and is completely stabilized electronically. Modulation of the measuring light by built-in chopper diaphragm assures linearity of the amplification, constancy of zero point and the elimination of dark current. Sensitivity can be varied as follows:

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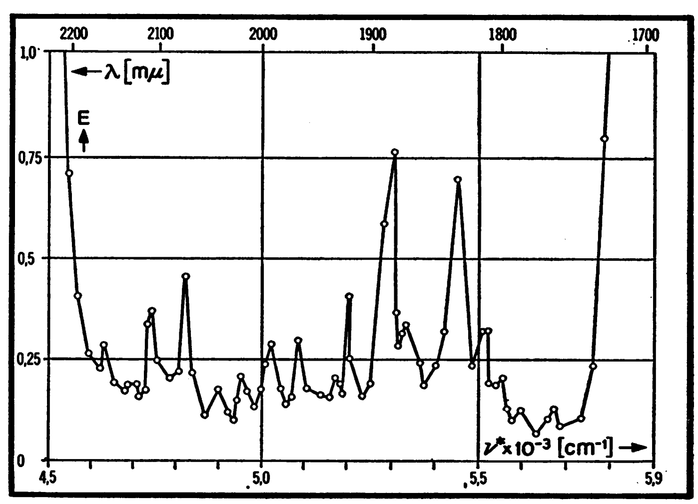
10-100 (calibrated)
100 to approximately 3000

An adjustable damping device for varying the response time results in minimum fluctuations at highest amplification. This is especially useful for Flame Photometry. All important electrical circuits and tubes can be tested by a built-in checking device. Slit width can be set to 0.2 microns. Thanks to frictionless design of the Spectrophotometer PMQ II, no play is possible in slit and wavelength settings. Combined error of wavelength setting and reading, for instance at 250mμ, is ± 0.05mμ.

The PMQ II is extremely accurate and versatile. Accessories available are: servo motor to operate the 100 Point Adjustment Device, attachments for analysis of chromatograms, fluorescence and reflectance measurements, and for flame photometry. Write to us for further details or a demonstration of the Spectrophotometer PMQ II. **Complete service facilities available.**



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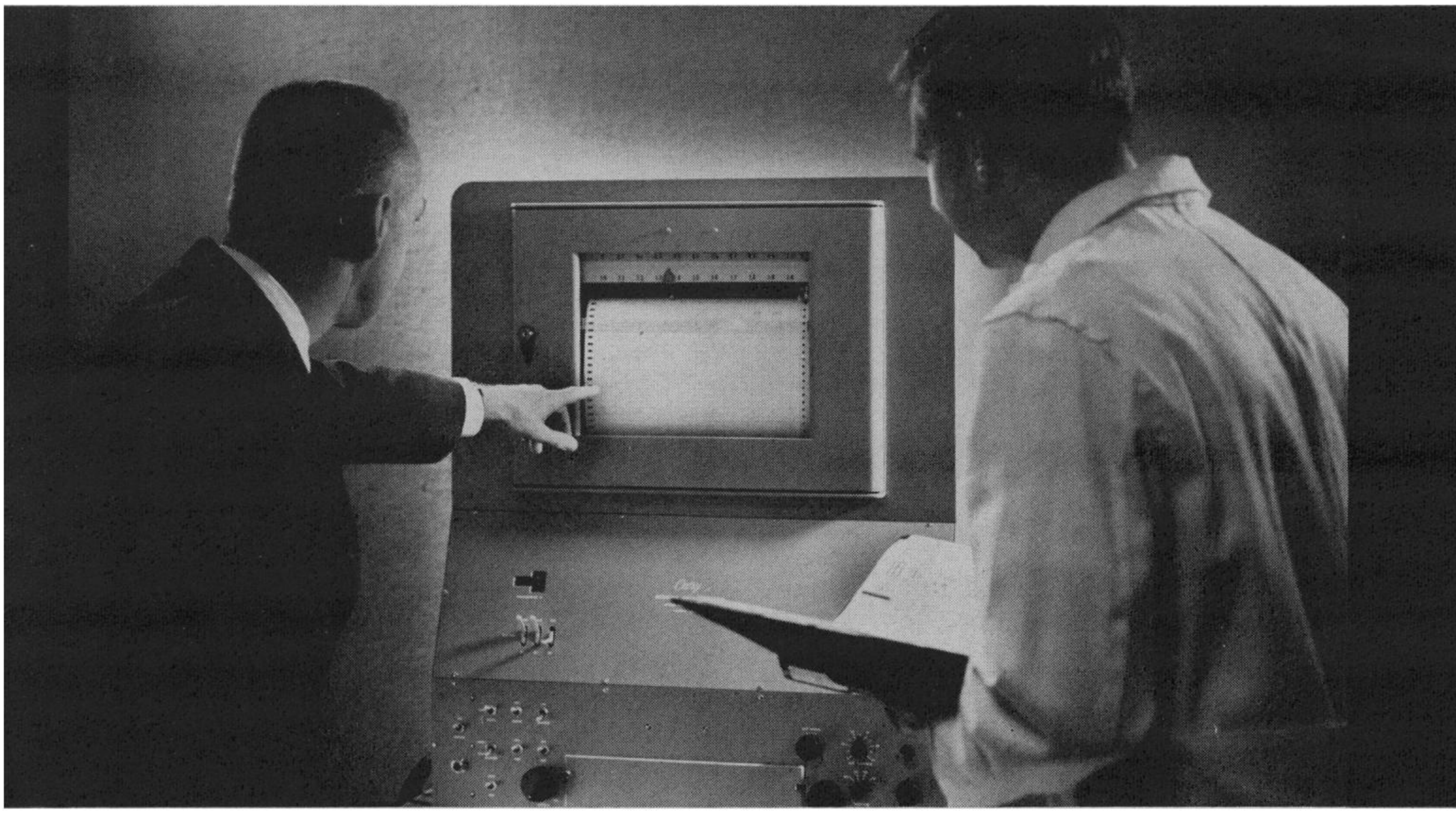

For operation and performance details, ask for Data File E225-53

Model 14 maximizes the value of good technical people. In most laboratories payroll is the largest budget item. For full benefit from this investment, capable men should not be equipment-limited. The Model 14's precision and speed save manhours and allow the scientist to work to his full capability.

Model 14 meets constantly upgraded analytical demands. Advancing technology and increasing competition lead to demands for ever more precise information at faster rates. Instruments that are only adequate today won't stand the pace. The advanced design of the Model 14 assures meeting today's and tomorrow's needs as well.

Model 14 allows greatest return on capital investment. The average analytical instrument is fully depreciated in five years. But in nearly nine years since its introduction, no Cary Model 14 known to us has yet been retired from service. Its field-proved reliability gives valuable data years after the initial investment has been returned. Considered by many as the finest instrument of its kind, the Cary Model 14 Recording Spectrophotometer has ruggedness and reliability for routine laboratory service plus precision and flexibility to handle the varied problems of research.

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Raman/UV/IR Recording Spectrophotometers • Vibrating Reed Electrometers

17 May 1963, Volume 140, Number 3568

SCIENCE

International Competition in Science

The Soviet ability to launch large missiles has been misinterpreted as indicating superiority over the United States in scientific matters. Actually there are few areas of science in which the Russians excel. Despite their ability to place large pieces of hardware in orbit, their contributions to space research have been meager. They have nothing to match our Mariner II results, and their exploration of regions closer to the earth has been less intensive than ours. In high-energy nuclear physics our discoveries are unmatched, as is our progress in maser-laser studies and in semiconductors. In most areas of chemistry the Russians are behind us; plastics and petrochemicals are outstanding examples. In the exploitation of radioactive isotopes much of the Russian work is mere repetition of our research. In biochemistry, biophysics, and molecular biology we are superior. The Russians have achieved nothing like our progress in deciphering the genetic code or in determining amino acid sequences in proteins.

Innumerable examples could be given; we compete on countless frontiers of science which, in sum, are vastly more important than space. On many of these frontiers, such as solid-state physics, advances are crucial to future economic and military strength. Fundamental research is now often quickly followed by practical applications. A substantial fraction of today's commerce is based on discoveries of the last two decades. It is of interest to compare American and Russian competition in world markets in items involving science and technology. By this yardstick the Soviet Union is a third-class power. It is no match for Western Europe, the United Kingdom, or Japan.

The Japanese are competing in technological areas requiring first-class scientific competence. Their electronics products such as transistor radios and television sets are selling for less than ours on our own soil. To a degree this reflects cheaper labor, but only in part. The production of transistors and other solid-state electronic components involves sophisticated technology. Even the cheapest labor is no substitute for scientific ability in this field.

Western Europe is far stronger scientifically and technologically than the U.S.S.R., and the Western Europeans are rapidly closing in on us. If present trends continue, it will be only a matter of a few years before they achieve supremacy.

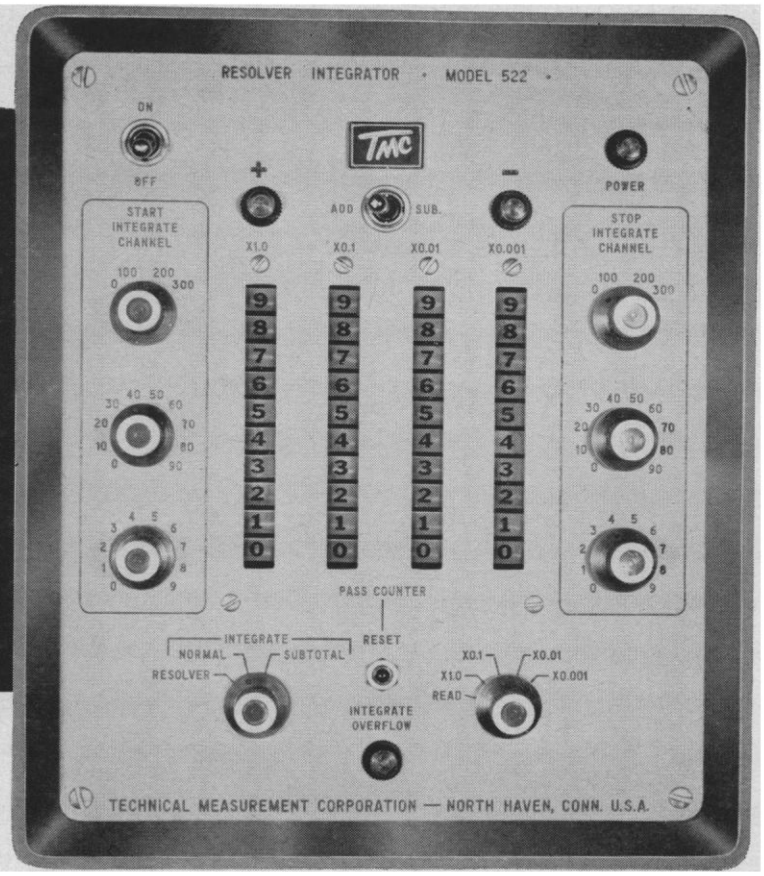
Western Europeans have long proved that they are, individually at least, as competent scientifically as we. They have made a remarkable recovery from the effects of World War II and are again in a position to challenge us. In the contest they have two advantages. Research costs them about one-fourth what it costs us, and proportionately less of their talent is occupied with military and space efforts. Leaders of industrial research in this country are increasingly concerned with the overpowering competition of government-financed programs for first-class scientific talent. One research director told me recently, "We need good people, but my company can't compete with projects paid for by the U.S. treasury."

We have chosen to stake our national prestige in a propaganda contest with the Russians in one of the few major areas of technology where they have an edge over us. In the meantime we fail to note that the Western Europeans are getting ready to walk away with the trophies which really count.—P.H.A.

Push-Button

RESOLVER / INTEGRATOR

integrates any group (0-399) in one step



This new all-electronic Model 522 Spectrum Resolver/Integrator may be used directly with TMC "400 Series" pulse analyzers to perform resolving and integration functions without the necessity of intermediate tape recording equipment.

As a Resolver the Model 522 takes information directly from any selected quarter or half of the analyzer memory and either adds it to or subtracts it from the data stored in an adjacent quarter or half of the memory. It is possible to remove individual components of a spectrum and leave only the desired elements by adding or subtracting 100%, 10%, 1% or 0.1% increments of reference spectra. The operator has precise control of the resolving process, and has an accurate visual record of the exact percentage removed.

As an Integrator, the Model 522 integrates memory-stored information within any band of channels from 0 to 399 *in one operation*. Two modes of integration are available:

> NORMAL mode sums the counts in the preselected band and stores the total in the last channel.
>
> SUBTOTAL mode adds each channel count to the previous one to provide a running subtotal.

With every operation, results are displayed on the analyzer scope and may be printed, recorded or punched out by the readout method of your choice.

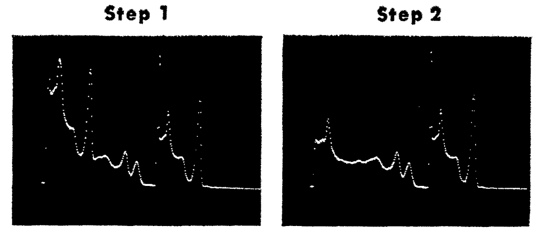
Case design of the Model 522 Resolver/Integrator is identical to that of the compatible "400 Series" fully-portable, 400-channel Pulse Height Analyzers.

SPECIFICATIONS

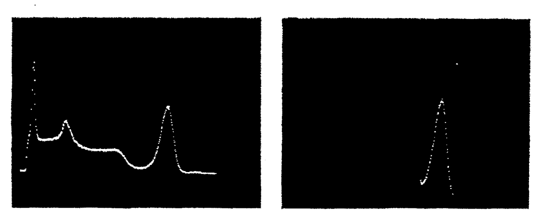
Resolving Rate.........0.5 sec. for one add or subtract operation per 100 channels
% Resolved.......................................100%, 10%, 1% or 0.1%
Integration Rate.................................0.5% sec. per quarter memory
Channel band.................................Continuous 1 — 400 channels
Integrating Modes...Normal, Subtotal
Blanking...... Only channels to be integrated are visible on Analyzers CRT display
Size............................8⅝" w. x 10¼" h. x 21" d., 28 lbs. (approx.)

TYPICAL DISPLAYS

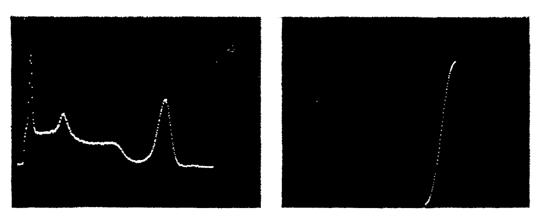
Step 1 **Step 2**



RESOLVING



NORMAL INTEGRATION MODE



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Technical Writers and Publishers

The Society of Technical Writers and Publishers was one of the eight societies to be elected an affiliate of the AAAS at the Philadelphia meeting in December 1962. The society is composed of professional men and women dedicated to furthering the art of communicating technical information and developing the competence of its members.

To achieve these goals, the society sponsors technical-communication research at universities through a program of grants; publishes a professional journal; cooperates with other professional societies and government agencies in the establishment of writing and publishing standards; assists educational institutions in the development of technical communication curricula; and conducts an annual convention to keep members up-to-date on current developments in the profession. Each of its 50 chapters in the United States and Canada conducts monthly meetings and many chapters engage in activities that relate the profession to the community.

The society's nearly 3000 members span a wide range of occupational specialties within the technical communication field. They write, edit, illustrate, and produce reports, catalogs, handbooks, manuals, specifications, proposals, parts documentation, journal articles, technical, popular, and trade magazine articles, news releases and presentations. Other activities include managing publications groups and businesses, teaching, and undertaking research in all aspects of technical communications. The spectrum of subject matter fields spanned by the membership is also broad; it includes the biological, earth, medical, physical, and social sciences; all branches of engineering; and the various communication arts.

The society's officers are: president, H. C. McDaniel, Westinghouse Electric Corporation; first vice president, Robert O. Shockney, Mercury Publications; second vice president, Stello Jordan, Sperry Gyroscope Co.; secretary, Henrietta Tichy, Hunter College; and treasurer, Charles W. Thelen, General Dynamics. The society's representative on the AAAS Council is Dwight E. Gray, National Science Foundation.

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Society of Technical Writers and Publishers, Columbus 14, Ohio

Forthcoming Events

June

14–17. **Instrument** Soc. of America, Los Angeles, Calif. (W. H. Kushnick, 530 William Penn Place, Pittsburgh 19, Pa.)

15–16. Advancement of Private Practice in **Social Work**, 2nd conf., Denver, Colo. (P. Ledbetter, ACSW, Suite 1520, Medical Arts Bldg., Houston 2, Tex.)

16–19. Northeastern Section, **Botanical** Soc. of America, summer field meeting, Pittsburgh, Pa. (L. K. Henry, Section of Plants, Carnegie Museum, Pittsburgh 13, Pa.)

16–20. **American Medical Assoc.**, Atlantic City, N.J. (R. M. McKeown, 510 Hall Bldg., Coos Bay, Ore.)

16–21. American Inst. of **Electrical Engineers**, general meeting, Toronto, Ont., Canada. (R. M. Magee, Bendix Systems Div., Ann Arbor, Mich.)

16–22. **Medical Librarianship**, 2nd intern. congr., Washington, D.C. (R. MacDonald, Natl. Library of Medicine, Bethesda 14, Md.)

17–18. Learning, Adaptation, and Control in **Information Systems**, symp., Evanston, Ill. (J. T. Tou, Computer Sciences Laboratory, Technological Inst., Northwestern Univ., Evanston, Ill.)

17–19. American **Dairy Science** Assoc., Lafayette, Ind. (H. F. Judkins, 32 Ridgeway Circle, White Plains, N.Y.)

17–19. American **Nuclear** Soc., Salt Lake City, Utah. (O. J. DuTemple, 244 E. Ogden Ave., Hinsdale, Ill.)

17–19. Canadian Federation of **Biological Societies**, London, Ont. (A. H. Neufeld, CFBS, Faculty of Medicine, Univ. of Western Ontario, London, Ont., Canada)

17–19. Hanford Symp. on Biology of **Radioiodine**, Richland, Wash. (L. K. Bustad, Biology Laboratory. General Electric Co., Richland)

17–19. Society for the Study of **Development and Growth**, Storrs, Conn. (W. A. Jensen, Dept. of Botany, Univ. of California, Berkeley 4)

17–21. American Soc. for **Engineering Education**, Philadelphia, Pa. (W. L. Collins, American Soc. for Engineering Education, Univ. of Illinois, Urbana)

17–21. **Gas Chromatography**, 4th intern. symp., Ann Arbor, Mich. (Instrument Soc. of America, 530 William Penn Pl., Pittsburgh 19, Pa.)

17–22. **Pacific Division, AAAS**, San Francisco, Calif. (R. C. Miller, California Acad. of Sciences, Golden Gate Park, San Francisco)

17–22. International Congr. of **Engineers**, 4th, Munich, Germany. (Deutscher Verband Technisch-Wirtschaftlicher Vereine, Prinz-Georg-Str. 79, Düsseldorf, Germany)

17–23. Nuclear Energy, 8th intern. congr., Rome, Italy. (Ufficio Congressi e Mostre CNEN, Via Belisario 15, Rome, Italy)

18–20. Chemistry and Biochemistry of **Fungi and Yeasts**, symp., Dublin, Ireland. (T. S. Wheeler, Dept. of Chemistry, University College, Science Bldgs., Upper Merrion St., Dublin)

18–22. American Soc. of **Ichthyologists** and **Herpetologists**, Vancouver, B.C., Canada. (J. A. Peters, Biology Dept., San Fernando Valley State College, Northridge, Calif.)

19–21. Joint **Automatic Control** conf., Minneapolis, Minn. (T. J. Williams, Monsanto Chemical Co., St. Louis, Mo.)

19–21. Metal Chelates in **Chemical Analysis**, natl. symp., Tucson, Ariz. (H. Freiser, Dept. of Chemistry, Univ. of Arizona, Tucson)

19–26. **World Petroleum** Congr., 6th, Frankfurt-am-Main, Germany. (U.S. Natl. Committee, 15 W. 51 St., New York, N.Y.)

20–21. Institute of **Mathematical Statistics**, 96th, Eugene, Ore. (D. G. Chapman, Dept. of Mathematics, Univ. of Washington, Seattle 5)

20–21. **Nutrition** Soc. of Canada, 6th annual, London, Ont. (E. V. Evans, Dept. of Nutrition, Ontario Agricultural College, Guelph, Ont., Canada)

22–23. **Ukrainian Medical** Assoc. of North America, Kerhonkson, N.Y. (R. W. Sochynsky, UMA, 2 E. 79 St., New York 21)

23–26. American Soc. of **Agricultural Engineers**, Miami Beach, Fla. (J. L. Butt, P.O. Box 229, St. Joseph, Mich.)

23–26. American Soc. of **Mechanical Engineers**, Ithaca, N.Y. (A. B. Conlin, Jr., 345 E. 47 St., New York, N.Y.)

23–28. American Soc. for **Testing and Materials**, 66th annual, Atlantic City, N.J. (ASTM, 1916 Race St., Philadelphia 3, Pa.)

23–30. American Soc. for **Horticultural Science**, Caribbean region, 11th annual, Mexico City, Mexico. (E. H. Casseres, Calle Londres 40, México 6, D.F.)

24–26. American Soc. of **Heating, Refrigerating and Air Conditioning** Engineers, Milwaukee, Wis. (R. C. Cross, 345 E. 47 St., New York 17)

24–26. **Colloids**, 37th natl. symp., Ottawa, Ontario, Canada. (B. R. Ray, Dept. of Chemistry, Washington State Univ., Pullman)

24–26. International **Astrophysical** Symp., 12th, Liége, Belgium. (M. Migeotte, Institut d'Astrophysique, Cointe-Sclessin, Belgium)

25–28. American **Home Economics** Assoc., Kansas City, Mo. (D. S. Miller, 3705 Van Buren Ave., Corvallis, Ore.)

26–27. **Computers and Data Processing**, Estes Park, Colo. (W. H. Eichelberger, Denver Research Inst., Univ. of Denver, Denver 10, Colo.)

26–28. **Wind Effects** on Buildings and Structures, Teddington, Middlesex, England. (Mrs. S. M. Russell, Aerodynamics Div., Natl. Physical Laboratory, Teddington)

26–29. American Assoc. of **Bioanalysts**, annual, Chicago, Ill. (R. Thornburg, 720 N. Michigan Ave., Chicago 11)

26–29. Society of **Nuclear Medicine**, Montreal, Quebec, Canada. (S. N. Turiel, SNM, 333 N. Michigan Ave., Chicago 1, Ill.)

26–29. National Soc. of **Professional Engineers**, Cleveland, Ohio. (P. H. Robbins, 2029 K St., NW, Washington, D.C.)

28–1. **Psychosomatic Approach to Chronic Illness**, congr., Chamonix, France. (French Soc. of Psychosomatic Medicine, 15, rue Santerre, Paris 12)

(See issue of 26 April for comprehensive list)

(Continued from page 796)

emphasize biology will earn the M.A. from Clark. Undergraduates will also be eligible to participate in the program.

The University of Maryland will be the site of a **space communications** institute 23–28 June, sponsored by the university and NASA's Goddard Space Flight Center. The course will cover the theory and technology of radio transmission involved in space science and engineering. The registration fee of $115 will include class materials, luncheons, and social programs. Participation will be limited to 80 persons. (C. C. Veri, Div. of Institutes, Univ. of Maryland, College Park)

Publications

The U.S. Atomic Energy Commission has released a third annual report on research activities, entitled **Fundamental Nuclear Energy Research—1962**. The 405-page publication covers advances made on a sampling of projects carried out by the divisions of biology and medicine and of research. It includes descriptions of some unclassified research performed under the jurisdiction of the division of military application and of some work done for the division of reactor development. The appendices list major AEC research and development centers and show the extent of contracts awarded to colleges, universities, medical centers, and industrial organizations. (Superintendent of Documents, GPO, Washington 25)

The 1963 edition of the "**Film Guide on Chemicals, Chemistry and the Chemical Industry**" is available free of charge from the Manufacturing Chemists' Association. The bibliography lists 271 films in 16 categories, and indicates the audience level for which each film is intended. Films are included for elementary through college classes, and for adult groups. (MCA, 1825 Connecticut Ave., Washington 9)

The National Science Foundation has released its final report on the findings of a survey, "**Scientific Research and Development in Colleges and Universities—Expenditures and Manpower, 1958.**" The report emphasizes the concentration of funds in relatively few institutions and the effects of the support

of science on the total educational balance of a college or university. The survey is the second of its type to be carried out by NSF; the first covered 1954. (NSF 62–44, Superintendent of Documents, GPO, Washington 25. 140 pp. 70¢)

Scientists in the News

The American Psychiatric Association has awarded the Hofheimer prize for research to two teams of scientists. **Howard E. Freeman**, associate professor of social research at Brandeis University and **Ozzie G. Simmons**, sociology professor and director of the University of Colorado's institute of behavioral sciences, were cited for their study of mental patients during the first year after hospitalization. The results are published in the book, *The Mental Patient Comes Home* (Wiley, New York, 1963). **Jerome Kagan**, chairman of the psychiatry department at Fels Research Institute and **Howard A. Moss**, research psychologist in the child research branch of the National Institute of Mental Health, were honored for work reported in their book *Birth to Maturity, A Study in Psychological Development* (Wiley, New York, 1962).

At the University of Vermont, **Clinton Cook**, chairman of the chemistry department, has become dean of faculties, and **Warren Essler**, chairman of the electrical engineering department, has been appointed dean of the college of technology.

At last month's meeting of the **National Academy of Sciences** the following scientists received awards:

Maurice Ewing, director of Columbia University's Lamont Geological Observatory, the Carty medal for studies of the geology of the earth.

J. George Harrar, president of the Rockefeller Foundation, the Public Welfare medal for his contributions in the application of science to public welfare.

Matthew Meselson, associate professor of molecular biology at Harvard, the molecular biology award for his work with DNA molecules.

Roger Revelle, director of the Scripps Institution of Oceanography and dean of research at the University of California, the Agassiz medal, for outstanding achievement in oceanography.

Curt Stern, professor of genetics and zoology at the University of California,