

SCIENCE

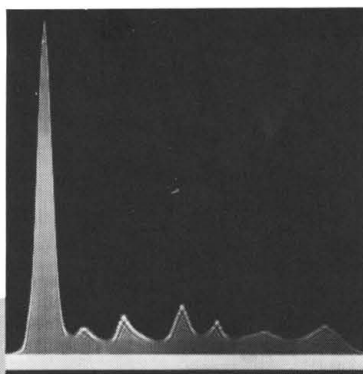
30 November 1962

Vol. 138, No. 3544

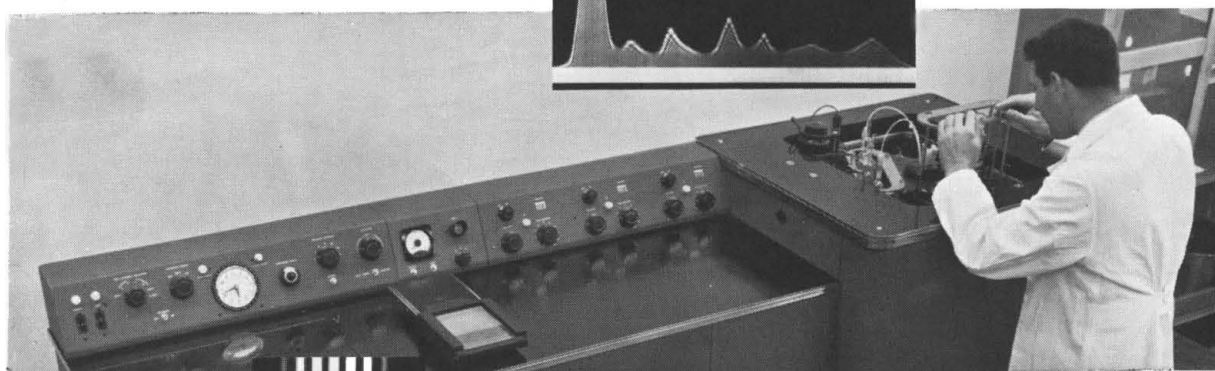
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



SHEPHERD SHEEP DOG



Electrophoresis of human plasma diluted 1:6; ascending boundaries. Inclined knife-edge schlieren.



ELECTROPHORESIS AND DIFFUSION

in one precision instrument

As protein research progresses, biochemists rely more and more upon instruments of high precision for diffusion and electrophoresis studies. Especially critical are the optical measurements needed to obtain accurate diffusion coefficients, absolute electrophoretic mobilities, and information on purity.

An exceptional optical system is one of the outstanding features which have made the Spingo Model H invaluable for exacting work in both electrophoresis and diffusion. Light passes through each operating cell twice, giving double sensitivity. Patterns are sharply defined and peak positions can be precisely determined. Reproducible measurements may be made to better than 1/25 of a fringe, which corresponds to approximately .00025 percent protein.

The optical system is flexible, too. It permits measurements by five different methods — ordinary and cylindrical lens schlieren, Rayleigh and Gouy fringes, and mechanical scanning.

Further versatility is achieved by a rotary cell turret which supports three operating cells. Any combination of diffusion and electrophoresis studies may be performed simultaneously with the three cells.

We'd like to tell you more about the Model H and how it can fit the requirements of your research program. For complete details, please write Spingo Division, Beckman Instruments, Inc., Stanford Industrial Park, Palo Alto, California, for information File H-5.

Portion of typical reference fringe pattern obtained from standard production model, magnified to show straightness and definition of entire pattern.

Sales and service facilities on the Model H are available on the same basis as for Spingo Ultracentrifuges, assuring prompt, efficient service for users here and abroad.

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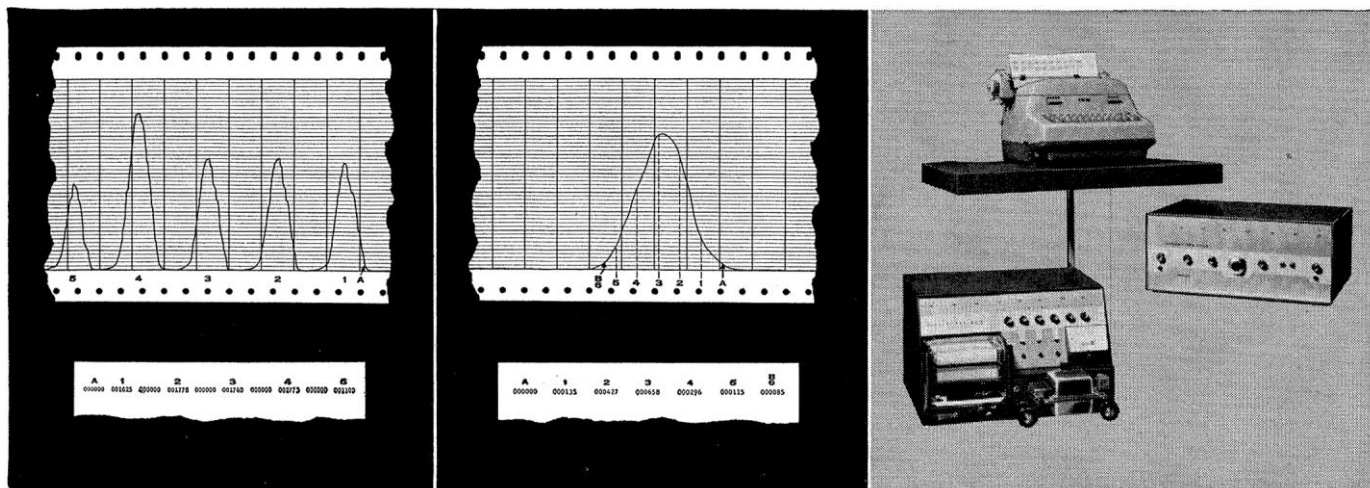
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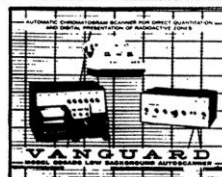
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AUTOSCANNER Detects and Presents
Radioactivity In Direct Digital Form**

Now both qualitative and quantitative assays of chromatograms can be performed automatically *on the intact strip* with greater accuracy and efficiency than ever thought possible. The exclusive, ultra-sensitive Vanguard Model 880ADS Low Background AUTOSCANNER with Automatic Data System scans, detects and presents radioactivity in direct digital form, eliminating the need for mechanical integration, planimetry and triangulation. Designed for scanning of tritium, carbon-14, sulphur-35 and other low-energy, beta-emitting radioisotopes, the AUTOSCANNER features windowless, 4 pi detection with a total background of less than 10 cpm. Two mode Logic Function Control permits programming to present various parameters of entire scan while eliminating unwanted data. Digital information, therefore, may be utilized through all phases of the quantitating procedure.

Investigate today! See how the designed-in versatility of the Model 880ADS can meet your scanning applications with clear, precise data presentations in a minimum of time with little or no operator supervision.



Shown above are the two modes of Data Presentation available with the model 880ADS. Digital information obtained in the Peak Print mode (left) and the Interval Print mode (right) is utilized through all phases of the quantitating procedure.



WRITE FOR THIS BOOK-LET . . . Outlines distinctive features and operational characteristics of the Vanguard Model 880ADS Low Background AUTOSCANNER.

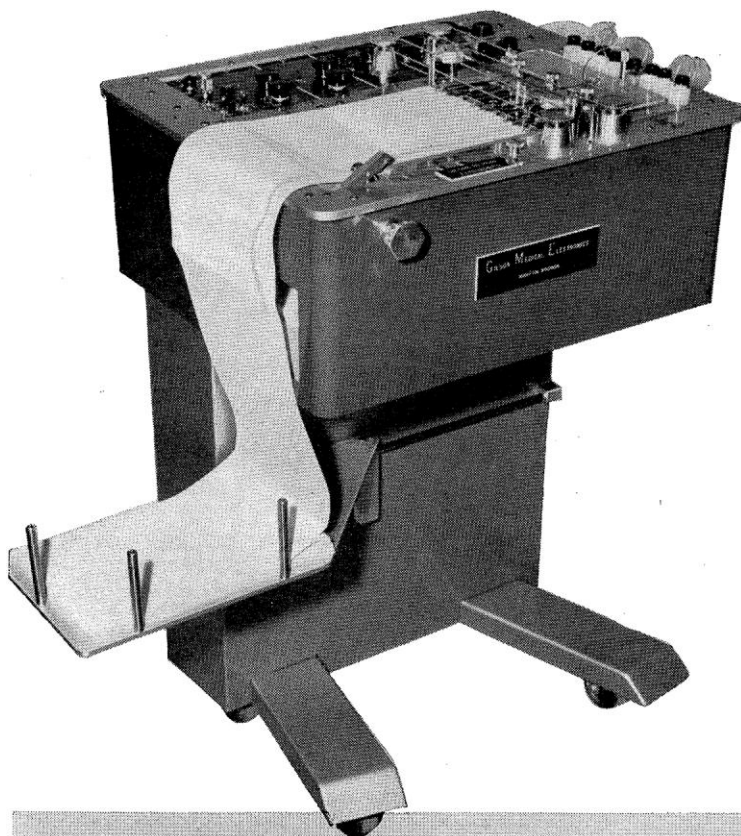


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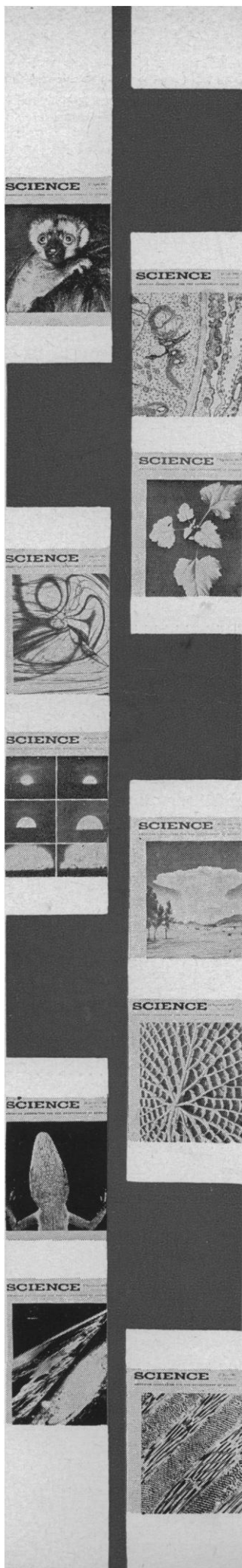
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How To Say Merry Christmas 52 Times a Year

This year, remember friends at home and overseas with the warmest of professional gifts: a year's membership in the American Association for the Advancement of Science.

Think of this for younger colleagues, for your students, your physician . . . as a thank you for hospitality enjoyed on your last trip abroad, as a greeting to the new friends you made at the international congress.

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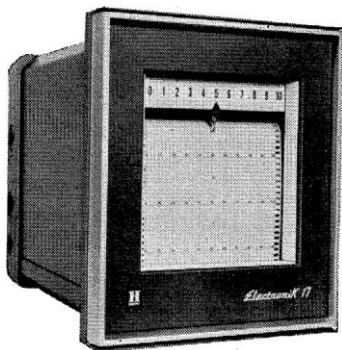


GET SOLID-STATE RELIABILITY WITH HONEYWELL *ELECTRONIK 17* HIGH-SPEED SERVO RECORDERS

Today's modestly-priced one- and two-pen *ElectroniK 17* recorders feature significant design advances in balancing mechanism, compact modular construction, and simplicity of operation and maintenance that enable them to outperform other potentiometers on the market . . . regardless of cost. These high-speed one-second servo recorders are ideal for data acquisition in laboratory, test and process applications. Specifically:

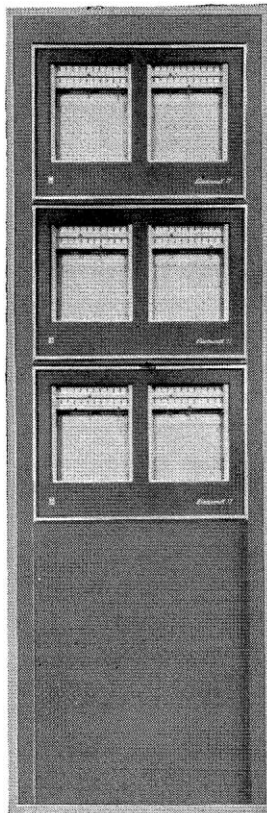
Reliable, retained accuracy: Calibrated accuracy of $\pm 0.25\%$. Solid-state circuitry and exclusive Honeywell infinite-resolution STRANDUCERTM rebalancing element (the successor to slidewires with their fixed convolutions and well-known drawbacks) give these instruments extremely long and accurate life, and allow them to operate over an ambient temperature range of 0—130°F.

Easiest to operate and maintain: Front-set adjustment, ready access to all components, modular construction and interchangeability of parts within modules, easy range and actuation change make this small-case instrument the easiest potentiometer to use and keep in top operating form. Zener diode constant current supply obsoletes batteries and need for standardization.



Single-case *ElectroniK 17* strip chart recorder (above), 6-inch calibrated width. Wide selection of ranges available.

Dual-case mounting of recorders (right) makes it possible to record up to four variables with dual pen option in only 14 inches of vertical space in a standard 19-inch relay rack.



Most economical: Low initial cost, low current consumption, low upkeep and maintenance expense.

Typical installations: • Rocket engine test stands • Blockhouses at missile launch pads • Process plants with dirty, abrasive or corrosive atmospheres • Experimental biology laboratories • Environmental test laboratories.

With its two-pen option, the *ElectroniK 17* can record a large amount of data in limited panel space. During prolonged test holds, pens may jitter because of needed high sensitivity but there are no slidewire convolutions to wear down. Many different electrical ground levels create no problems because of instrument's high stray rejection. Abrasive or corrosive atmospheres can't affect the STRANDUCER rebalancing unit.

Perfect for your special needs: The *ElectroniK 17* offers long-lived accuracy at an economical price, and, for special recorders, the dual-case model can be used with an *ElectroniK 17* recorder on one side, a preamplifier or other special component on the other for a neat, compact assembly. For complete details, write for catalogs and specification data. MINNEAPOLIS-HONEYWELL, Wayne and Windrim Avenues, Philadelphia 44, Pa. In Canada, Honeywell Controls, Ltd., Toronto 17, Ont.

STANDARD SPECIFICATIONS

Calibrated Accuracy: $\pm 0.25\%$ of span; ± 10 microvolts for spans of 4 mv or less.

Dead Band: 0.15%.

High Impedance: Up to 25,000 ohms source.

High-gain, High-torque Servo Drive: 1, 5 or 15 seconds full-scale speed; spans from 1 mv.

High Stray Rejection: Transverse 3000/1; longitudinal, partial floating shield can be converted to full floating shield by simple connection change. (Loop stray 80db, voltage to ground 140db.)

Solid-state Modular Construction: Transistorized drive, Zener stabilized servo modules for independent channels. All parts easily accessible and interchangeable between modules.

Quick Range-Actuation Change: Range and actuation changes are simple screwdriver adjustments. No soldering necessary.

Zero and Span Adjustments: Quickly and easily made with a screwdriver through panel on side of module.

OPTIONAL

One- or two-pen models in either single or dual case • Two operation pens for time correlation or noting significant events • Up to 2 retransmitting slidewires on each servo module. (1 if alarms are used) • Up to 8 alarm switches • Chart speeds up to 1 inch per second.

Honeywell

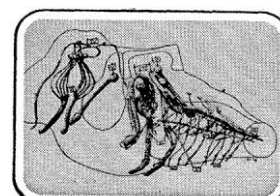
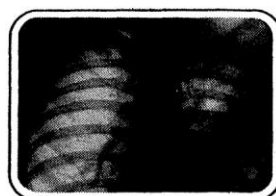
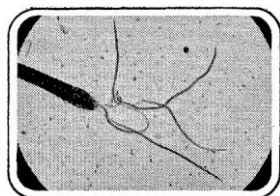
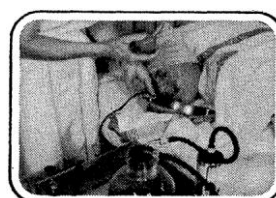
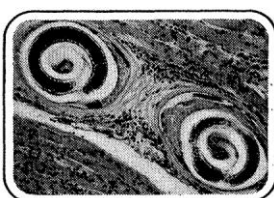
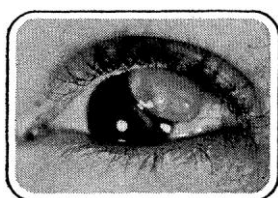


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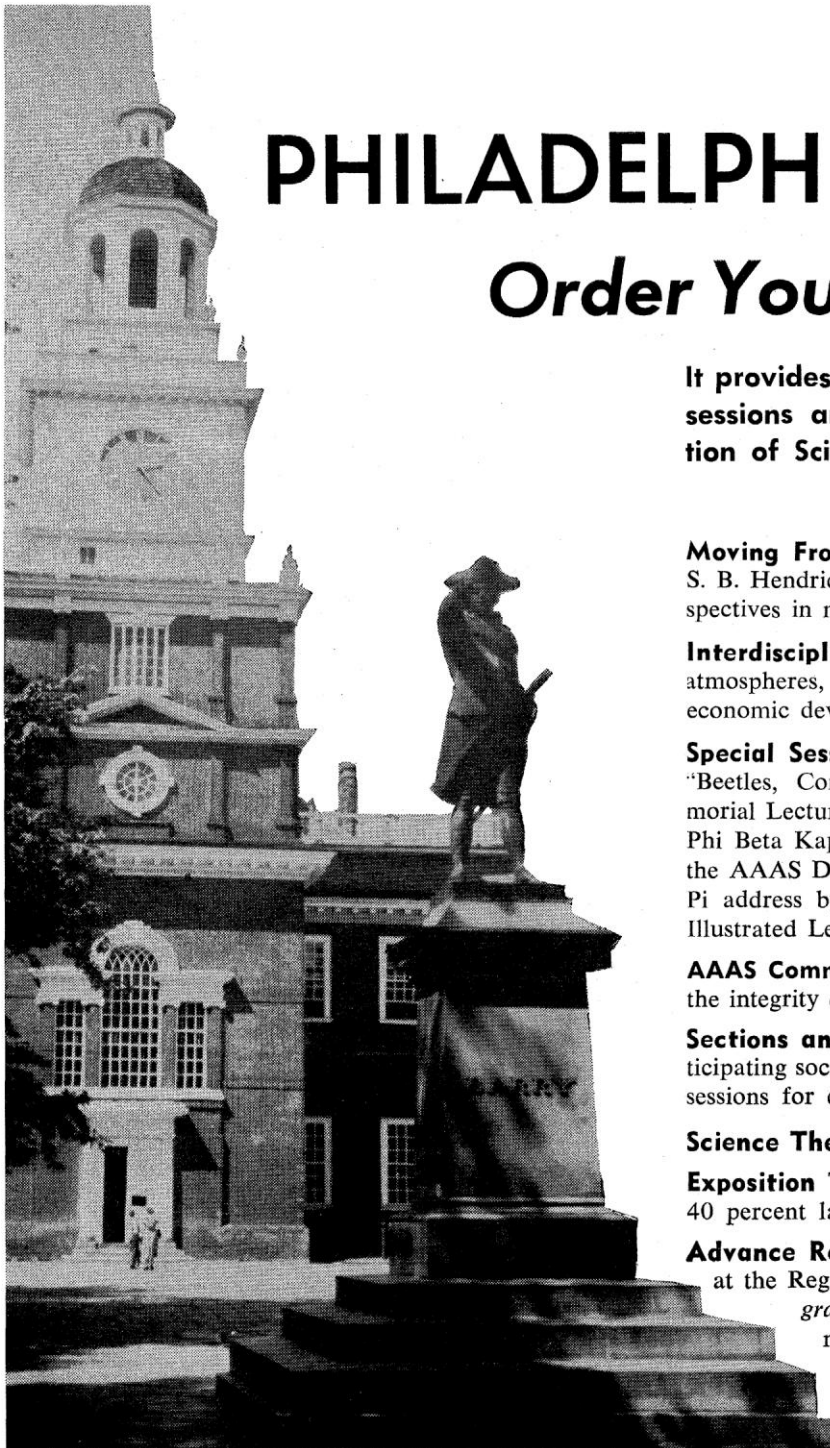
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Program Highlights

Moving Frontiers of Science H. E. Newell on space science, S. B. Hendricks on biological timing mechanisms, S. Brenner on perspectives in molecular biology, W. O. Baker on industrial research.

Interdisciplinary Symposia AAAS day: Dynamics of planetary atmospheres, the diffusion of technical knowledge as an instrument of economic development, the transfer of genetic information.

Special Sessions AAAS Presidential Address by Thomas Park on "Beetles, Competition, and Populations"; the George Sarton Memorial Lecture by Gerald Holton; the Joint Address of Sigma Xi and Phi Beta Kappa by Loren C. Eiseley on "Man: The Lethal Factor"; the AAAS Distinguished Lecture by McGeorge Bundy; the Tau Beta Pi address by C. C. Furnas; and the National Geographic Society Illustrated Lecture by Barry C. Bishop.

AAAS Committees will have programs on late space science and on the integrity of science.

Sections and Societies The 20 AAAS Sections and some 50 participating societies are scheduling specialized symposia, and many have sessions for contributed papers.

Science Theatre The latest foreign and domestic films.

Exposition The Annual Exposition of Science and Industry will be 40 percent larger than it was last year.

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MEETING • 26-30 DECEMBER

Reserve Your Hotel Room

Make sure you have the accommodations you prefer. A list of headquarters hotels of participating societies appears on page 235, *SCIENCE*, 20 July. The AAAS headquarters is the Sheraton.

The hotels for the AAAS Philadelphia meeting have established special, low flat rates and have reserved large blocks of rooms for the meeting.

Use the coupon below to make your hotel reservation in Philadelphia. Send your application to the AAAS Housing Bureau in Philadelphia, not to any hotel. Give a definite date and estimated hour of arrival, and also probable date of departure. The Housing Bureau will make the assignment and send you a confirmation in two weeks or less.

A rollaway bed can be added to any room at \$3.00 per night. Mail your application now to secure your first choice of accommodations.

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For a list of the headquarters of each participating society and section, see page 235, *Science*, 20 July.

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Pontiac Motor Division—Safari Magazine

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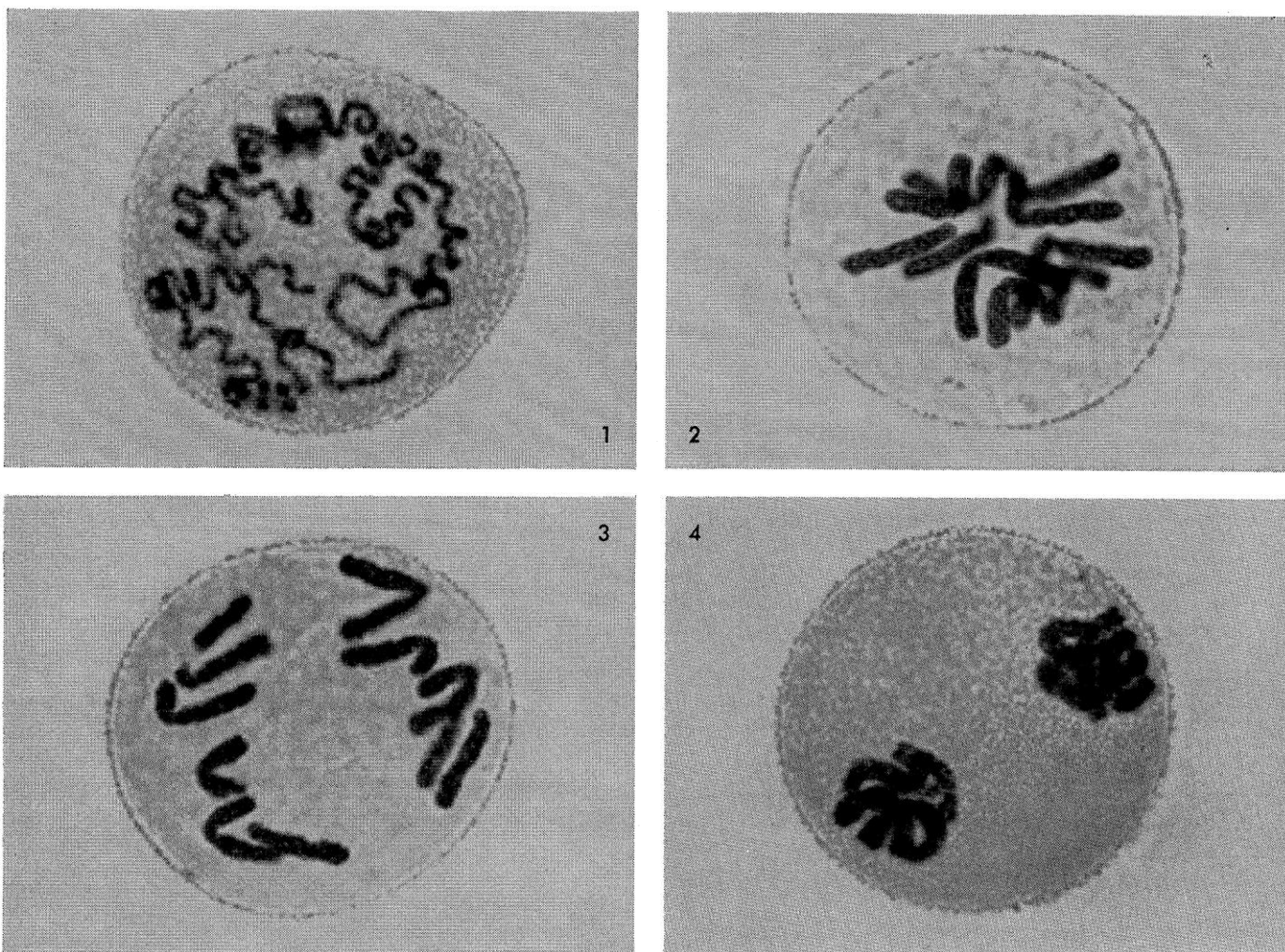
Number in party.....Sharing this room will be:
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DATES: ARRIVAL A.M. P.M. DEPARTURE
(These must be indicated—add approximate hour, A.M. or P.M.)

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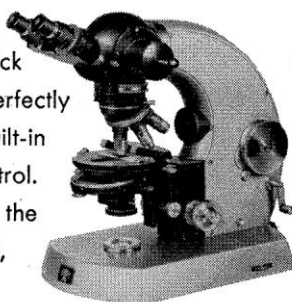


Photomicrographs of mitosis as follows: 1) Pachytene, 2) Metaphase, 3) Late Anaphase, 4) Interphase . . . magnification—1600x. Taken by Robert F. Smith.

Make a sequence like this by touching a button

With the Carl Zeiss Photomicroscope you can click off a whole series of photomicrographs, each perfectly exposed and in focus. The microscope has a built-in automatic camera with photoelectric exposure control. The touch of a button opens the shutter, exposes the film the proper length of time, closes the shutter, transports the film one frame, actuates a film counter . . . ready for the next exposure. You can take an entire series of photomicrographs rapidly in color or black-and-white.

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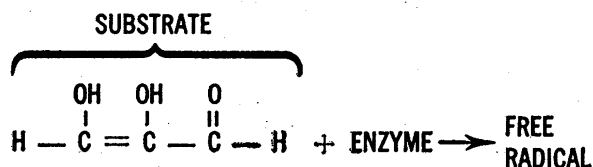
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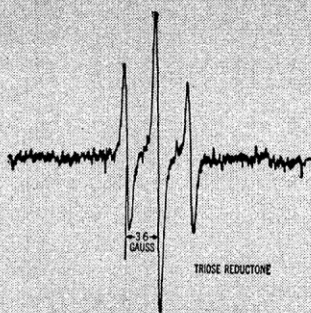
EPR

IN THE WORLD OF CHEMISTRY

FREE RADICAL INTERMEDIATES IN REDOX SYSTEMS



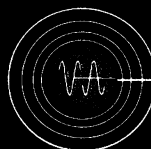
One of the most intriguing areas of investigation in free radical chemistry today is in the area pertaining to the role of "free radicals" in biological redox systems. One of the most important questions asked by investigators in this field is, "Is there a technique that can conclusively determine the presence of free radicals in biological reactions?" The extreme sensitivity and rapid response capabilities of EPR have provided a "yes" answer to this question.



The example at left illustrates one of the first positive demonstrations of the detection of free radical intermediates in an enzymatic oxidation-reduction. The substrate triose reductone was oxidized by a one electron transfer by the enzyme horse-radish peroxidase- H_2O_2 to a free radical. The spectrum for the free radical as illustrated on the left was formed instantly in the steady state during a continuous flow experiment. This spectrum was positively identified as the triose reductate free radical.

Detection and identification of free radicals are not the only results obtainable from the EPR spectrum, however. A measure of the unpaired electron density at various sites within the molecule can be obtained directly from the spectrum. It is also possible to measure the rate of free radical formation for studies of complete reaction kinetics.

Varian EPR Spectrometer systems and accessories are designed for a wide range of applications in the fields of chemistry, biology, medicine and physics. For additional information about the example above, and other chemical applications of EPR, please write: INSTRUMENT DIVISION.



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"CHARGED PARTICLES"

Nanosecond Pulsing

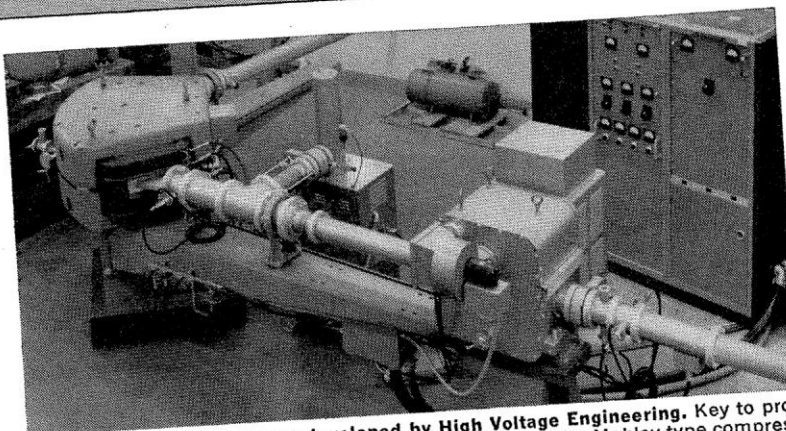
The timing of nuclear events and the discrimination between them continues to be a major hurdle for the experimental physicist.

We don't need a market research program to reveal the need for apparatus which will assist the experimenter to do accurate neutron time-of-flight work or to determine excited state lifetimes in the milli- μ -sec. region. Ultra-short high-intensity pulses of charged particles, and the resulting neutron bursts, provide one of the most promising techniques in these experimental areas.

We have completed the development of a system for producing and measuring pulsed proton beams with an intensity of several milliamperes and a pulse duration of less than one nanosecond (10⁻⁹ seconds). The first research results from this apparatus have been reported.¹

The beam is accelerated to 3-Mev by a Van de Graaff fitted with a terminal pulser of the deflection type, delivering ion pulses of 10 ns duration every 1000 ns at the input end of the acceleration tube. After acceleration, the pulse is compressed by a 90° double-focusing Mobley² magnet whose radius of curvature is 30 inches. The deflection electrodes at the entrance of the magnet are driven by a 10 Mc sinusoidal voltage which is synchronized with the pulse from the accelerator. Observations were made with a time-to-pulse-height-conversion measurement system checked by nuclear methods.

¹ L. Cranberg, et al., presented at Am. Phys. Soc. Meeting, New York (February 1961)
² R. C. Mobley, Phys. Rev. 83, 360 (1952)



Nanosecond pulsing system developed by High Voltage Engineering. Key to producing intense billionth-of-a-second bursts of protons is the Mobley type compression magnet and scan system shown here. Ten nanosecond pulses enter at lower right and converge in less than 2 nanoseconds on the neutron target.

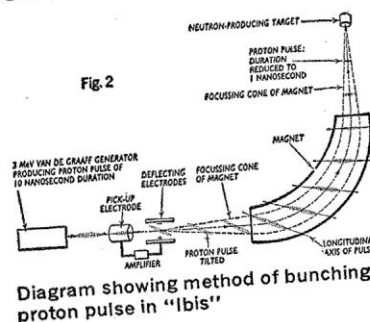


Diagram showing method of bunching proton pulse in "Ibis"

"Ibis" at Harwell

We quote from "The Engineer", July 20, 1962, to describe a neutron time-of-flight program using a Van de Graaff accelerator at Harwell, U.K. Atomic Energy Authority.

"A new accelerator, "Ibis", consists of a 3MV electrostatic generator and auxiliary gear, which produces intense bunches of ions less than 1 nanosecond in duration. These will be used to produce pulses of fast neutrons having an intensity ten to twenty times greater than the best previously available in the energy range covered. The energies of neutrons scattered by a sample are measured by timing their flight electronically, the short pulse making this measurement very precise.

"Ibis" is to be used first to obtain the inelastic scattering cross-section of uranium-238 and other data needed for fast reactor design.

The method of bunching the protons (compressing the duration of each pulse from 10 nanoseconds to 1 nanosecond) is very elegant. The principle is outlined in Figure 2. A 3 Mev Van de Graaff generator produces a proton pulse of 10 ns duration. The deflecting electrodes are swept by a 10 Mc/s signal synchronized with the incoming proton pulse by a signal derived from the pick-up electrodes. The proton pulse is tilted as shown by the action of the deflecting electrodes. One effect of the deflecting magnet is that the protons on the inside of the circuit travel a shorter distance than those on the outer circuit. Accordingly, the former tend to catch up with the latter and the pulse is reoriented so that its longitudinal axis is at right angles to its trajectory. The effect of this reorientation is that the duration of the pulse (its thickness, measured along the trajectory) is reduced from 10 nanoseconds to 1 nanosecond.

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Age and Creativity

Now that the public has at last become interested in science and, incidentally, in scientists, the problem of getting the most out of the latter is occupying much time and attention. Books are being written on "creativity," and, of course, the ubiquitous symposia are being held. Through all these words it is hard to discern any clear patterns. So hard has it become that we have turned to looking around among our friends to see what happens to creativity with the passage of time.

It seems to come quite simply to this: A young scientist's mind is not filled with many facts or responsibilities. He is ignorant enough to undertake the unreasonable and the unlikely and yet come up with a solution, sometimes with a significant discovery that overthrows entrenched ideas.

Once he has made an original discovery he finds it increasingly difficult to make another. He may be busy working out the details of the first, writing about it, or supplying samples of the material and know-how to others. Before he knows it he is overwhelmed by those who rush in to take advantage of the newly created opportunities. He may get lost in the jockeying for position that results.

If he does not quickly carry his discovery further, preferably to the "molecular level," he may well be accused either of resting on his oars or of having lost interest. There are plenty who will take up where they think he has left off.

The significance of all this is that, once he has been creative, the young scientist finds it very difficult to become creative again. Committees, review articles, symposia, and society meetings consume him. He has no time or spirit left for creativity. He loses his willingness to strike out into the wilderness. He begins to follow the safe and well-worn paths. He does not know that he has but a few years to go after the big discoveries, and that, with age, so many things will crowd out his chance to try again.

To discover the really new requires not only an attitude of mind but the ability to keep the roads to the solution of problems clear and, finally, to drive full speed down them. The timorous, insulated mind will not make the grade. Roads will be blocked by too much equipment, too much money, and too much seeking after status and security. The power to drive down the roads must be self-generated—a restless urge satisfied only by movement culminating in achievement. The price is high, the material rewards are minor, and the satisfactions must come chiefly from within. If you willingly pay this price, you have a ticket of admission to the ranks of the creative. However, the society of man is a great leveler; not to be leveled requires singular force of character. From such stuff creativity arises. To keep it alive in the face of the social forces that accompany maturity requires even greater strength. It is more than worth a try.—IRVINE H. PAGE, *Research Division, Cleveland Clinic Foundation, Cleveland, Ohio*



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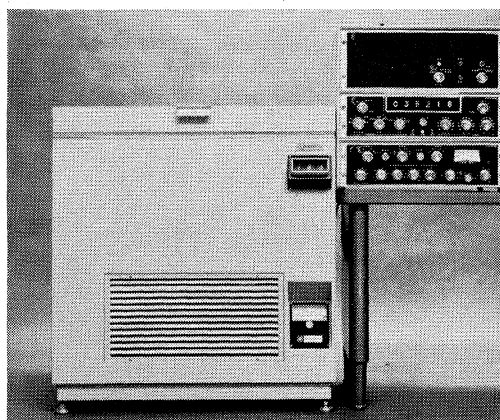
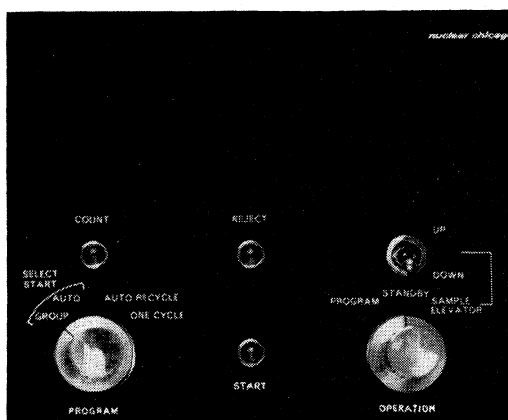
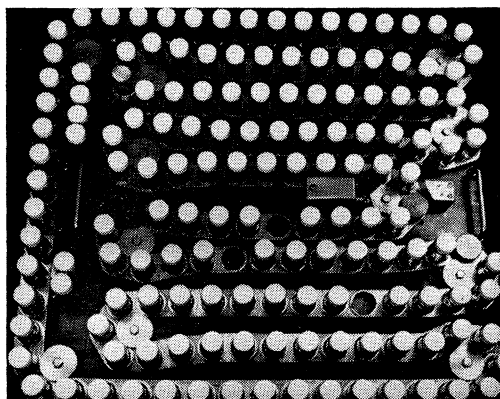
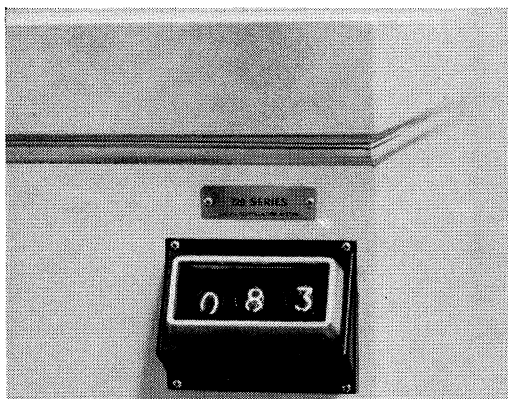
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The automatic sample changer featured with every Nuclear-Chicago 720 Series liquid scintillation system offers unusual flexibility in planning your busy counting schedule. "Select-start" changing programs, for example, allow preferred samples or sample groups to be counted while all others are bypassed. This exclusive feature permits assignment of specific sample numbers to individual personnel and departments who can then program the counting sequence according to their needs. The versatility of selective programming also allows immediate counting of high priority samples regardless of their position in the changer. Stored samples or samples from other projects are never disturbed, and no time is lost in counting low priority samples.

Positive sample-number identification is maintained throughout every changing program. Sample positions are consecutively numbered and are electronically interlocked with both the numerical read-out on the front of the sample changer and the index number printed by the data read-out facility.

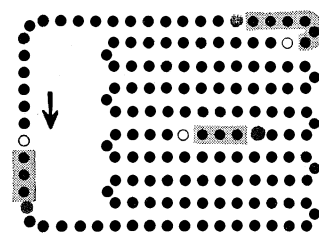
Complementing the selective-start programs are two additional automatic operating modes—"one cycle" for single-run counting of successive samples, and "auto-recycle" for repeat-run counting of all samples.

Manual operating facilities are also incorporated for handling samples on an individual basis or to permit repeat-counting of a single sample. Please send for our comprehensive literature.

New refinements in sample handling and temperature control

150 samples can be handled by a 724, 725 in a single counting run. Changing is performed by an endless conveyor belt and motor driven elevator assembly that utilizes a minimum number of moving parts to insure long life under continuous operating conditions. Among the numerous additional features are an automatic, positive light shutter that prevents light leakage into the detecting chamber, and a special sensing system for rejecting off-size sample bottles which might accidentally jam the changer mechanism.

For those demanding the maximum ratio of efficiency² to background, the automatic sample changer of the 724, 725 systems is housed in a controlled temperature chamber designed exclusively for liquid scintillation counting. The precisely adjustable control of this chamber allows the investigator to select the optimum counting temperature for his sample composition.

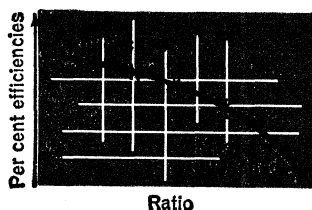


Diagrammatic presentation of selective sample programming. Red circles in the conveyor indicate sensors, white circles are empty bottle receptacles and black circles represent sample bottles. Bottles in the shaded region between sensors and empty receptacles are the "preferred" groups that will be counted when their respective sensors pass the counting station. Sensors may also be used to start the changing cycle at any selected bottle in the conveyor. Samples ahead of the selected point are bypassed.

New systems permit routine application of channels ratio techniques

The channels ratio concept of liquid scintillation counting is a highly reliable, systematic method of obtaining time-saving, valuable information about each sample. With a Nuclear-Chicago 720 Series spectrometer performing in your laboratory, channels ratio techniques can be directly and effortlessly applied to the liquid scintillation counting program.

Channels ratio counting is based on the fact that when quenching occurs, the height of the pulse produced by a beta particle is, on the average, decreased. If the pulse height spectrum of an isotope is then properly divided into two counting channels, the ratio of the count rates in the two channels will change in a unique way with the counting efficiency for the isotope. It is this correlation between the count-rate ratio and counting efficiency that permits construction of a quench correction curve. Through careful settings of the counting channel window widths and detector high voltage, this curve can be made useful over a wide range of efficiencies or sample activities.



A correction curve is established by counting a series of standard samples of known activity and different degrees of quench. The counting efficiency for each standard is plotted as a function of the channels ratio of each, and the counting efficiencies of succeeding unknown samples can then be read directly from the resultant correction curve.

Counts per minute and channels ratio calculated automatically

Nuclear-Chicago's new 720 Series spectrometers with calculation capabilities deliver extra data on each sample automatically, and at a considerable savings in laboratory technician time. The automatic calculator offers the investigator a choice of three read-out modes: 1) A simple listing of the data accumulated in each of the three channels together with sample number and elapsed time. 2) Calculated counts per minute for each channel. 3) Calculated ratios of total counts in one channel to total counts in each of the other two channels.

Automatic calculation is a valuable, time-saving convenience in liquid scintillation counting. It enables efficiency determination and quench correction for isotopes such as carbon-14 and tritium to become a part of every counting run.

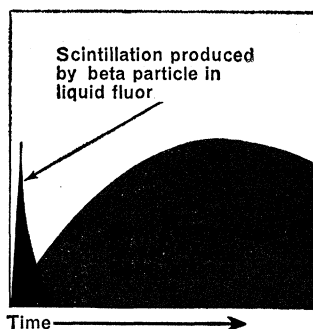
Tritium Sample	
Sample No.	27
Time	13.56
Channel No. 1	14072.00
Channel No. 2	10319.00
Channel No. 3	10000.00
CPM, Channel No. 1	1037.75
CPM, Channel No. 2	760.98
CPM, Channel No. 3	737.46
Ratio No. 1	73.33
Ratio No. 2	96.90

Actual data read-out of the 720 systems. Unshaded area of tape depicts data listing functions of the 722 and 724. The shaded area illustrates the additional calculation capabilities of the 723 and 725. Computed sample data can be accumulated during off-hours. There is often no need to make additional calculations. Technician time and the chance of human error are eliminated.

The advantage of a liquid scintillation spectrometer designed primarily for beta counting

In applications such as dual labelled sample counting and counting of samples with high specific activities, Nuclear-Chicago liquid scintillation systems give more accurate results because the spectrometer is designed specifically to handle fast beta pulses. From the experience gained in the design of gamma-ray analyzers, it was found that beta spectrometry presented substantially different design requirements.

All Nuclear-Chicago systems use a completely transistorized, three-channel analyzer specifically designed for liquid scintillation counting. The fast amplifier recovery time eliminates data losses due to circuit overloading.



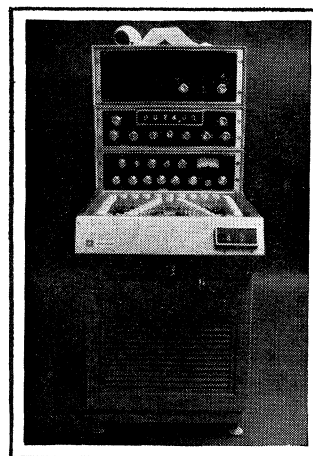
The decay time of a scintillation produced by a beta particle in a liquid scintillator is approximately 1/50 of the decay time of a scintillation produced in a NaI crystal by a gamma ray. If conventional amplifier circuitry as found in gamma-ray analyzers were used for beta spectrometry, the recovery time for high energy betas would be too long. This would result in amplifier overloading and a complete loss of pulses following a high energy beta.

Operation at temperatures above freezing

Samples that undergo phase separation or precipitation at temperatures below freezing are often a deterrent to reproducible measurements. With the 724, 725, these samples can be counted from 10° to 50°F at constant temperature without appreciable loss of counting efficiency.

Research with all types of photomultiplier tubes resulted in the choice of the two 11-stage EMI tubes used in all 720 Series systems. The gain and stability of these tubes are markedly superior, and as a result, less amplification is required. Inherent low noise characteristics along with advanced circuitry permit operation over a wide temperature range.

If small losses in efficiency and reduced sample capacity are acceptable, the 722, 723 room-temperature systems offer significant reductions in cost.



The 722 and 723 are the only commercially available room temperature, automatic liquid scintillation systems. They offer 50 sample capacity, selective sample programming, and three channel operation.

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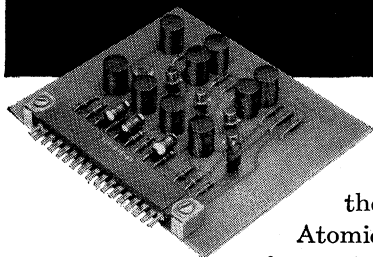
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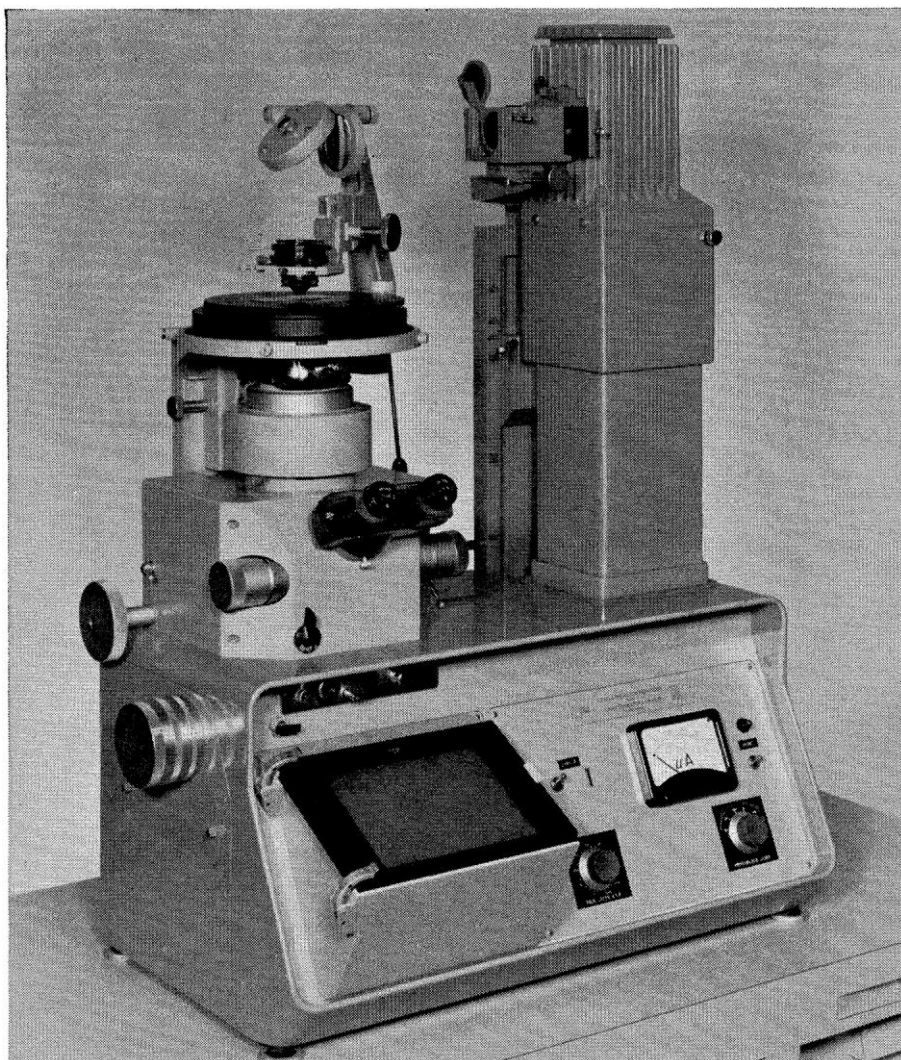
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The inverted microscope has been commonly used only for a restricted range of biological techniques—mostly in tissue culture applications. However, the new Vickers "55" Microscope has been designed on the premise that there are positive advantages in an inverted design of the large universal photomicrographic stands which are used for research and for the rapid accumulation of high quality visual and photographic data.

With the availability of high efficiency projection screens it becomes practical (and most comfortable and convenient) to use the projected image for most routine examinations. This being so, the logical position for the viewing screen is somewhat below

rather than, as in most instruments, quite high above the microscope. In this position both examination and photography are much more easily and conveniently carried out.

The Vickers "55" has been designed to achieve this basic improvement in viewing and photographic technique. An instrument, offering a complete range of optical capabilities, automatic photography and many exclusive operating features has been produced.

Automatic Photography

Built into the body of the instrument is the Automatic Integrating Photographic Timer which actuates a motorized, large aperture, roller-blind focal plane shutter (automatically re-wound upon closure). Plates or film up to 5" x 7" in size, including Polaroid, with film speeds from 5ASA to 3200ASA can be exposed with the Timer.

Fully automatic 35mm photography is obtained by insertion into the optical path of a motorized 35mm cassette, also actuated by the Timer unit. The Light Path Selector Switch allows choice of simultaneous observation and photography or diversion of all light either to the film or the visual eyepieces. A high pressure Xenon light source (6300°K) is supplied as standard, but a mercury vapor lamp can be quickly mounted in its place.

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An Optical Bellows utilizing a pancratic (zoom) eyepiece operates in conjunction with a Magnification Changer to give continuous change of screen magnification from 24X to 2800X without change of eyepieces. The control drum for the Optical Bellows is graduated so as to give automatic indication of total screen magnification. A gliding stage with convenient joystick operating control is supplied. For research applications a unique rotating stage with combination gliding and micrometer-actuated traversing motions can be substituted.

Optical Capability

All techniques of transmitted, normal incident and mixed illumination can be undertaken with the "55". A feature of the instrument is the provision for macro examination and photography of the highest quality at magnifications of 5, 10 and 15.

Special attention has been given to facilities for quantitative determinations in the design of the equipment for polarized light. Built-in analyzer and quartz sensitive tint plate can be separately introduced and withdrawn and simultaneously rotated. Compensators of all types may be used and can be rotated through a full 360°. A Rotary Elliptic Compensator is supplied for measurement of very small retardations.

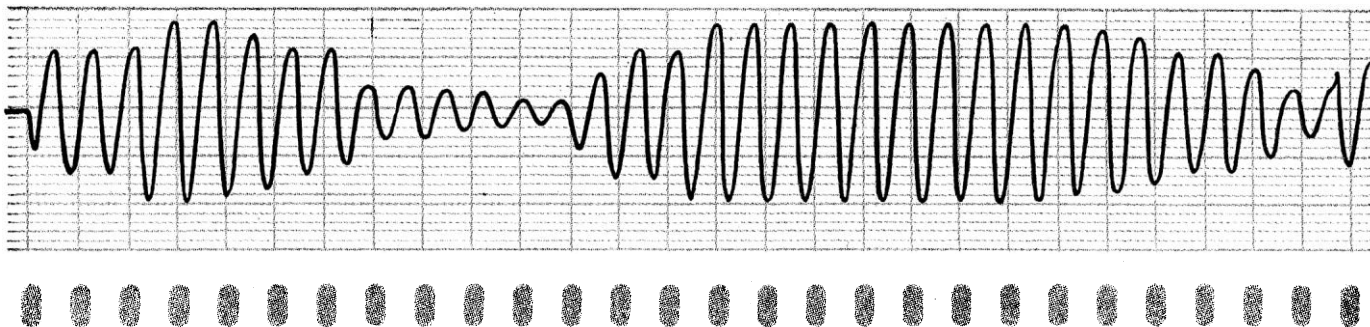
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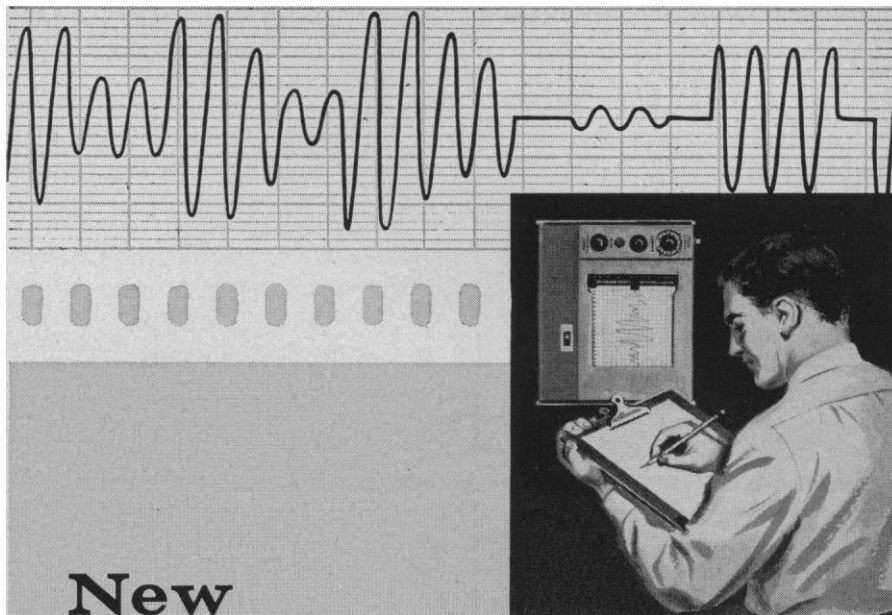
An interesting type of human mutation was reported by C. Baglioni (Naples), as the result of work with hemoglobin Lepore. His evidence indicates that the abnormal peptide chain is the product of a gene which is part delta and part beta. The hybrid is thought to have arisen by non-homologous crossing over.

In a review paper, H. Dintzis (Johns Hopkins) explained why protein biosynthesis can be so well studied in the reticulocyte. From his own work he described the assembly of the hemoglobin peptide chains as a sequential process, proceeding stepwise from the amino group at the end of the chain. In the reticulocyte only 1 to 2 minutes (at 37°C) are required for the synthesis of a whole chain. On the other hand, in cell-free systems prepared from reticulocytes, it appears that peptide chains are merely completed and that the synthesis of few if any new chains is begun. This point was disputed by R. S. Schweet (Kentucky).

A. Rich (M.I.T.) demonstrated that aggregates of reticulocyte ribosomes are needed for the active synthesis of hemoglobin. His electron micrographs do indeed show aggregates of approximately five ribosomes. Rich interprets these as being held together by a strand of messenger RNA. Each ribosome is synthesizing one or more peptide chains as it moves along the messenger RNA—a stimulating idea. The data of P. A. Marks (Columbia) also show that the aggregated ribosomes are those active in hemoglobin synthesis and that information for protein synthesis is contained in a relatively stable form in these particles. The role of soluble RNA as the "adaptor" in placing amino acids in sequence on the messenger RNA template was clearly demonstrated by G. von Ehrenstein (Johns Hopkins).

In another area of study, H. Borsook (California Institute of Technology) related hemoglobin production to the developing red cells (erythroblast series) in the bone marrow. Hemoglobin synthesis normally is completed at the orthochromatic stage. An interesting report was read by L. Bernini (M.I.T.) who showed that human bone marrow cells synthesize carbonic anhydrase in addition to hemoglobin A and A₂.

The three chairmen of the sessions, J. T. Edsall (Harvard), F. Lipmann (Rockefeller), and J. V. Neel (Michigan), were most effective, and much of the success of the workshop was




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due to their guidance. The conference closed with a unique talk by H. Lehmann (London) who connected the ethnological distribution of the abnormal human hemoglobins throughout the world with certain unusual social customs.

The conference was sponsored by the Department of Medicine of Columbia University and generously supported by the National Heart Institute.

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Forthcoming Events

January

7-8. **Ultra-High Energy Nuclear Physics**, conf., Bristol, England. (Administrative Assistant, Inst. of Physics and the Physical Soc., 47 Belgrave Sq., London S.W.1, England)

14-16. **Radiation Research**, intern. conf., Natick, Mass. (Army Quartermaster Research and Engineering Center, Natick)

14-18. Association of **Surgeons** of West Africa, Ibadan, Nigeria. (V. A. Ngu, University College Hospital, Ibadan)

14-19. **Atomic and Molecular Quantum Theory**, symp., Sanibel Island, Fla. (D. W. Smith, Chemistry Dept., Univ. of Florida, Gainesville)

15-15 Feb. **World Meteorological Organization**, Working Group on **Meteorological Transmissions**, Paris, France. (WMO, 41 Avenue Giuseppe Motta, Geneva, Switzerland)

15-17. Association of **American Colleges**, annual, Atlantic City, N.J. (T. A. Distler, AAC, 1818 R St., NW, Washington 9)

15-17. **Sesame**, intern. conf., Maracay, Venezuela. (D. G. Langham, Sesamum Foundation, Milford, Conn.)

15-19. **Immunopathology**, intern. symp., La Jolla, Calif. (by invitation). (Science Information Div., National Foundation, 800 Second Ave., New York 17)

17-19. **Engineers' Training**, conf., Strasbourg, France. (Council of Europe, Avenue de l'Europe, Strasbourg)

17-19. **Royal College of Physicians and Surgeons** of Canada, annual, Edmonton, Alberta. (J. H. Graham, RCPSC, 74 Stanley Ave., Ottawa 2, Ont., Canada)

18-19. **Blood**, annual symp., Detroit, Mich. (G. F. Anderson, Dept. of Physiology and Pharmacology, Wayne State Univ., 1401 Rivard St., Detroit 7)

21-23. **Chemistry and Biochemistry of Seed Proteins**, intern. conf., New Orleans, La. (C. H. Fisher, Southern Utilization Research and Development Div., Agricultural Research Service, U.S. Dept. of Agriculture, P.O. Box 19687, New Orleans 19)

21-23. **Institute of the Aerospace Sciences**, annual, New York, N.Y. (IAS, 2 E. 64 St., New York 21)

21-24. **American Meteorological Soc.**,

annual, New York, N.Y. (R. L. Pfeffer, Lamont Geological Observatory, Columbia Univ., Palisades, N.Y.)

22. **Infectious Diseases of the Heart and Circulation**, conf., New York, N.Y. (C. A. R. Connor, New York Heart Assoc., 10 Columbus Circle, New York 19)

22-24. **Reliability and Quality Control**, natl. symp., San Francisco, Calif. (L. W. Ball, Boeing Co., P.O. Box 3707, Seattle 24, Wash.)

23-25. **Elevated Temperature Mechanics**, intern. conf., 3rd Navy Structural Mechanics Symp., New York, N.Y. (by invitation). (A. M. Freudenthal, 624 Mudd Bldg., Columbia Univ., New York 27)

23-26. **American Assoc. of Physics Teachers**, New York, N.Y. (R. P. Winch, Williams College, Williamstown, Mass.)

23-26. **American Group Psychotherapy Assoc.**, annual, Washington, D.C. (AGPA, 1790 Broadway, New York 19)

24-27. **American Mathematical Soc.**, annual, Berkeley, Calif. (AMS, 190 Hope St., Providence 6, R.I.)

26. Association for **Symbolic Logic**, Berkeley, Calif. (T. Hailperin, Dept. of Mathematics, Lehigh Univ., Bethlehem, Pa.)

26-28. **Mathematical Assoc. of America**, annual, Berkeley, Calif. (H. M. Gehman, Univ. of Buffalo, Buffalo 14, N.Y.)

27-1. **American Inst. of Electrical Engineers**, winter general meeting, New York, N.Y. (R. S. Gardner, AIEE, 33 W. 39 St., New York 18)

28-2. **American Library Assoc.**, Chicago, Ill. (D. H. Clift, ALA, 50 E. Huron St., Chicago 11)

28-2. **Body Composition**, conf., New York, N.Y. (J. Brozek, Dept. of Psychology, Lehigh Univ., Bethlehem, Pa.)

30-1. **Military Electronics**, natl. winter convention, Los Angeles, Calif. (F. P. Adler, Space Systems Div., Hughes Aircraft Co., Culver City, Calif.)

31-1. **American Soc. for Engineering Education**, college-industry conf., Atlanta, Ga. (W. L. Collins, Univ. of Illinois, Urbana)

31-1. **Society of Rheology**, annual western regional meeting, Emeryville, Calif. (T. L. Smith, Stanford Research Inst., Menlo Park, Calif.)

31-2. **Western Soc. for Clinical Research**, annual, Carmel-by-the-Sea, Calif. (H. R. Warner, Latter-day Saints Hospital, Dept. of Physiology, Salt Lake City 3, Utah)

February

4-8. **Rice Genetics and Cytogenetics**, symp., Los Baños, Laguna, Philippines. (Inter. Rice Research Inst., Manila Hotel, Manila, Philippines)

4-9. **Recent Trends in Iron and Steel Technology**, symp., Jamshedpur, India. (Secretary, Indian Inst. of Metals, 31 Chowringhee Rd., Calcutta, India)

4-20. **Application of Science and Technology** for the Benefit of Less Developed Areas, U.N. conference, Geneva, Switzerland. (Science Conference Staff, Agency for International Development, 826 State Dept. Annex 1, Washington 25)

5-14. **International Radio Consultative Committee**, Plan Subcommittee for Asia, New Delhi, India. (V. Barthoni, 128 rue de Lausanne, Geneva, Switzerland)

AGING . . .

Some Social and Biological Aspects

A symposium presented at the AAAS
Chicago Meeting

December 1959. Published November 1960.

Nathan V. Shock, Editor
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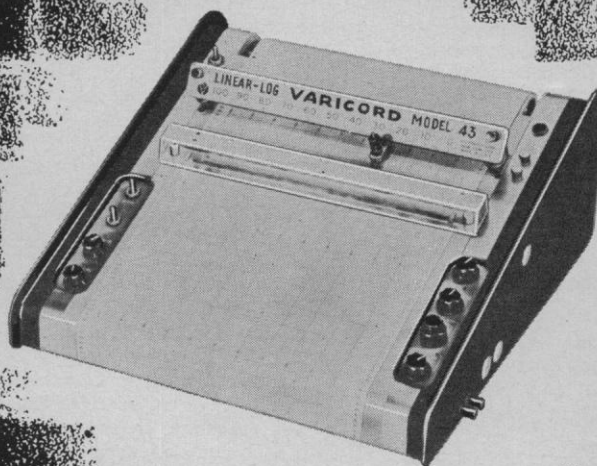
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