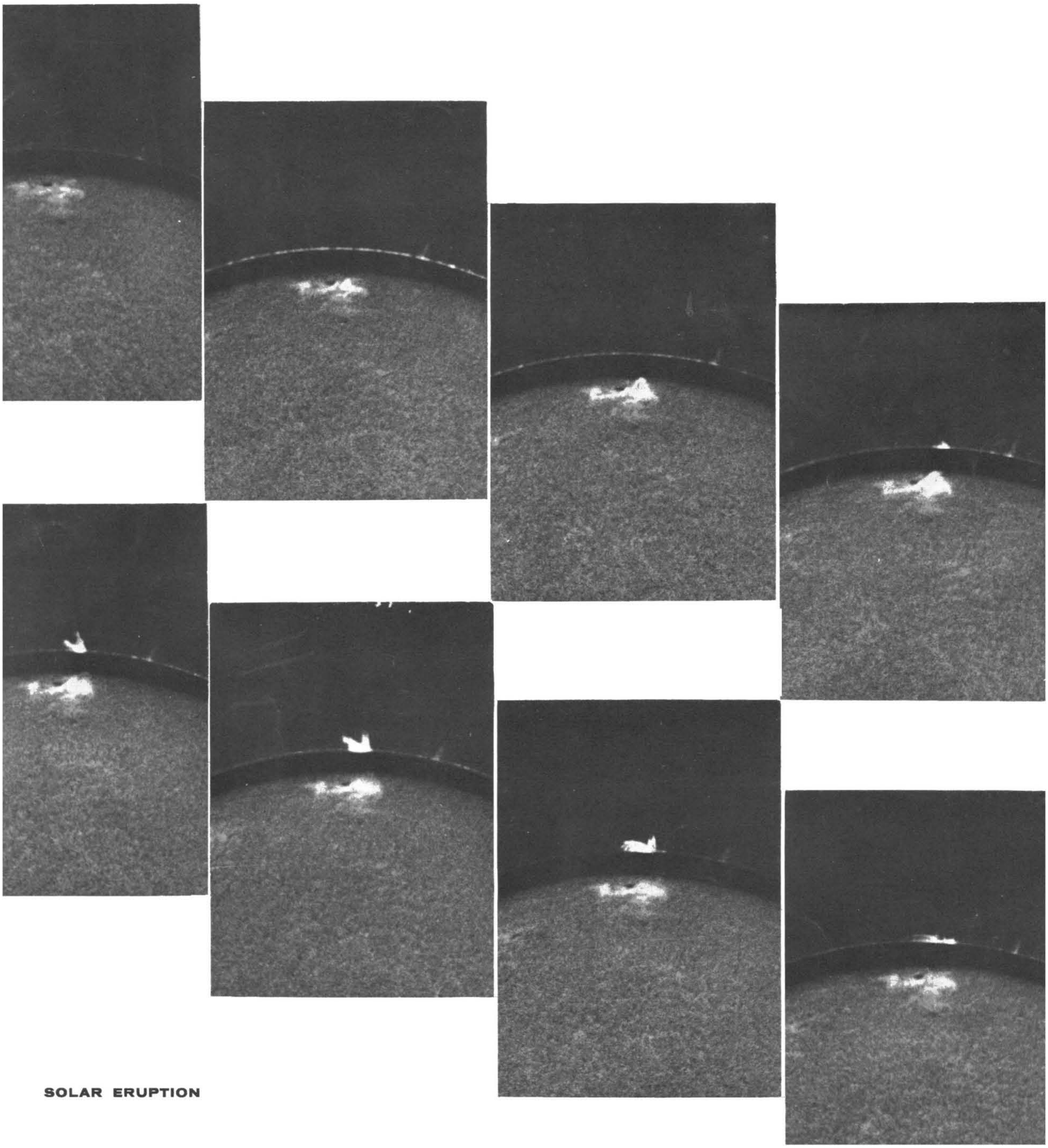
SCIENCE

29 November 1963
Vol. 142, No. 3596

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



SOLAR ERUPTION

This is an incandescent ball of gases, plasmas, magnetic fields, thermonuclear reactions and mysteries.

But NASA has started to throw some light on it.

After all, the sun does sustain life on earth. It disrupts our communications, pours deadly radiation into space and makes our weather do tricks.

So we need to learn the how and why and when of the sun's phenomena. And in the process pick up some basic facts about the whole universe.

So far the trouble has been that our atmosphere acts as a barrier. It makes optical and photographic and spectrographic images shimmer and scatter. In fact it completely *stops* most of the sun's radiation spectrum.

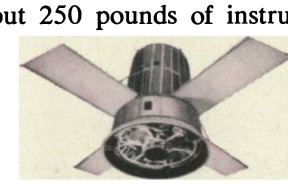
Now . . . if we could only put our instruments *outside* the earth's atmosphere . . . in a new and extremely sophisticated satellite . . . pointed precisely at the sun . . . .

Today, development work for that satellite—the Advanced Orbiting Solar Observatory—is being performed at Republic, under a prime contract to NASA/Goddard.

The AOSO will orbit 300 miles above the earth. In sunlight uninterrupted for months on end. Carrying about 250 pounds of instruments to collect, store and transmit data on the sun's gamma-ray, x-ray and ultraviolet activity.

It will be aimed at the sun with an accuracy of five seconds of arc. That's like shooting at a dime one-half mile away. And hitting it.

NASA's Advanced Orbiting Solar Observatory will look something like the model below. Nobody expects it to find *all* the answers that solar physicists and astronomers have sought for 350 years. But after it has studied that incandescent ball for a while, we'll be a lot less in the dark.



REPUBLIC
AVIATION CORPORATION
FARMINGDALE, LONG ISLAND, NEW YORK

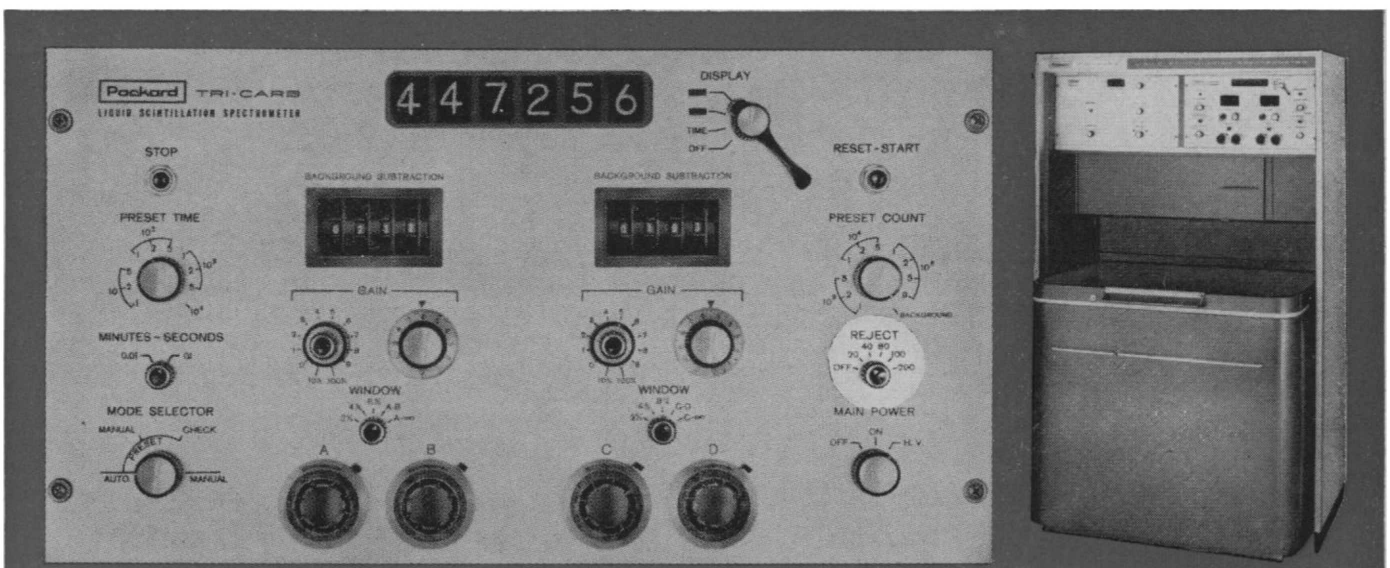
Low-Activity Sample Reject IN NEW TRI-CARB® SPECTROMETERS

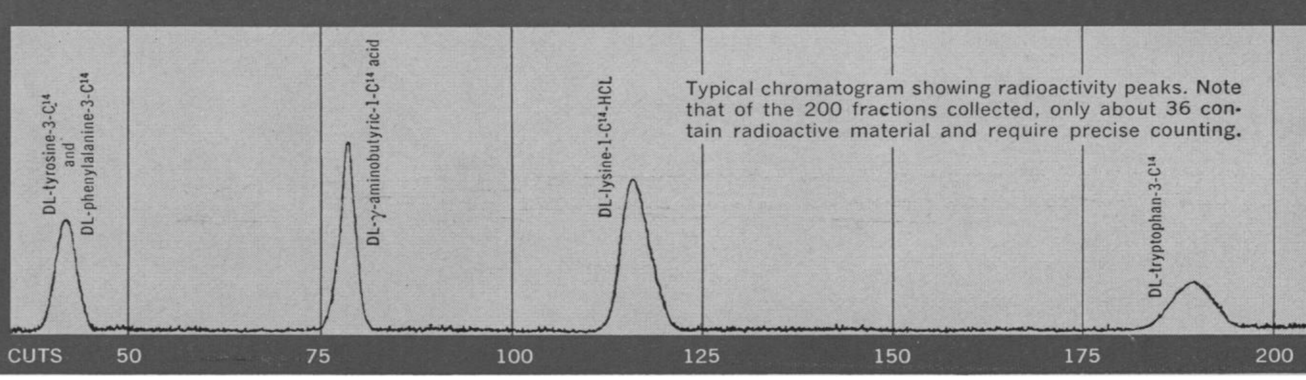
The ability of new Tri-Carb Spectrometers to automatically bypass samples with little or no radioactivity can save hours of valuable counting time. This ability finds application in two commonly-encountered counting situations:

(1) *Identifying and counting only those chromatographic samples which contain material of interest while bypassing those which have little or no activity.* Since a typical chromatographic analysis (see curve below) may be represented by several hundred cuts, of which only a few will contain radioactivity, savings in counting time are substantial.

(2) *Separating samples of low activity from those containing higher levels to ensure allocation of optimum counting time for each.* For example: most of the samples from an experiment may require a 10 minute count to achieve the desired statistical accuracy, but a few low-activity samples need a 100 minute count to achieve the same statistics. These low-activity samples can be screened out (and identified) during the short counts on the majority, and then grouped together for automatic counting to the desired statistical accuracy. Again, important savings in counting time are achieved.

Low-activity Sample Reject increases the utility of new Tri-Carb Spectrometers because it places more instrument counting hours at the disposal of the researcher. It is just one of the many significant new features now available in 3000 and 4000 Series Tri-Carb Spectrometers. Ask your Packard Sales Engineer for complete details, or write for Bulletin 1030.





Typical chromatogram showing radioactivity peaks. Note that of the 200 fractions collected, only about 36 contain radioactive material and require precise counting.

Packard

PACKARD INSTRUMENT COMPANY, INC.

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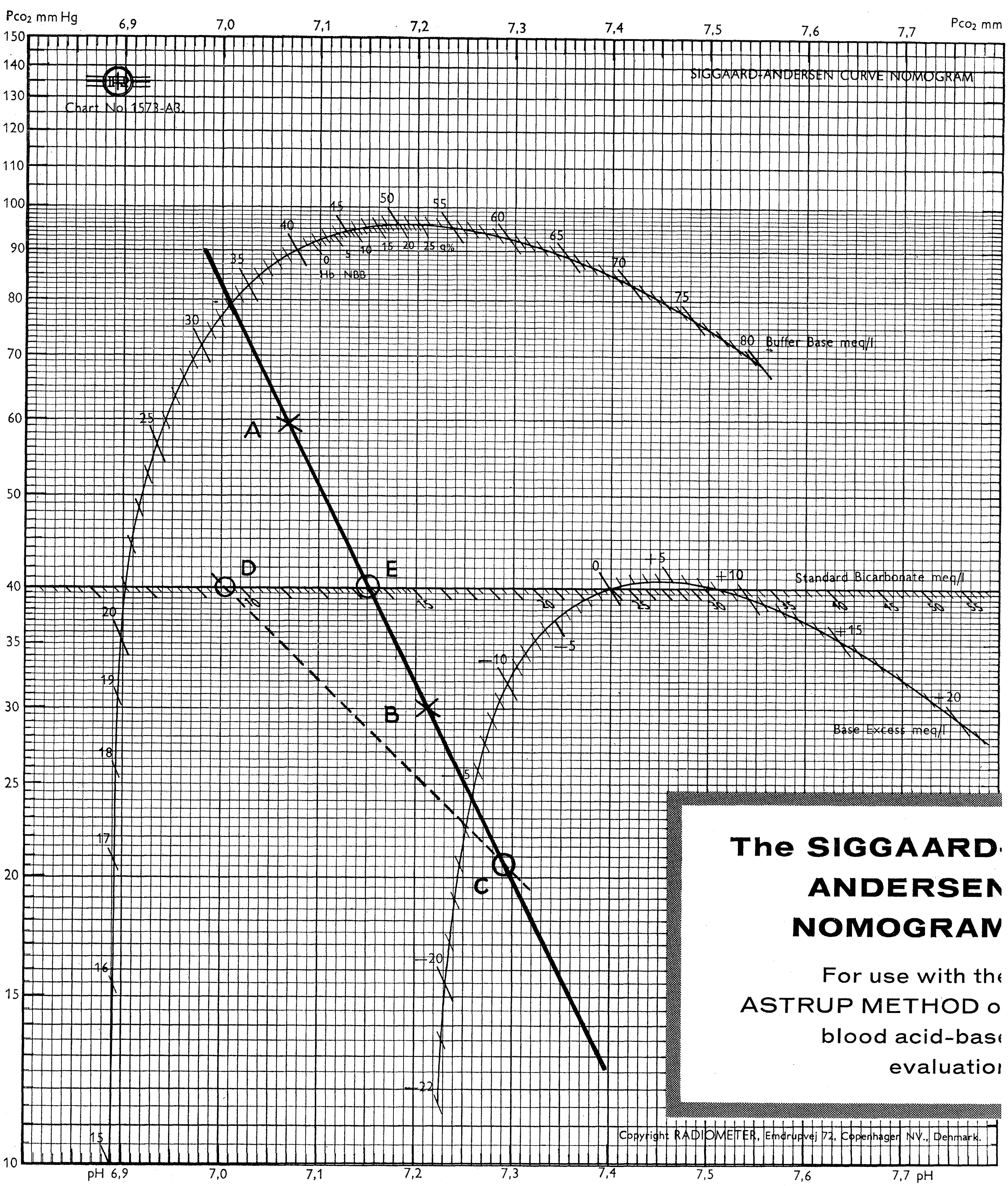
COVER

Rapid sequence photographs, in Hα light, showing development of a solar flare over an active sunspot (5 July 1962). Separate telescopes simultaneously produce images of the disk and of the extensions of the flare above the artificially eclipsed sun. Faint limb features, otherwise invisible, are detected by this technique. See page 1136. [G. E. Moreton, Lockheed Solar Observatory]



Patient's name: John. W. Smith		Barometric pressure	764 mm Hg	READINGS		RESULTS	
Dept: LAB.	Sample No.: 4	CO_2 percentage	Cylinder No 1: 8.25 %	Before equilibration	Actual pH: 7.293	Actual Pco_2	20.5 mm Hg
			Cylinder No 2: 4.20 %			Base Excess	−15 meq/l blood
Date: 28/10/63		CO_2 partial pressure	Cylinder No 1: 58.9 mm Hg	After equilibration	high Pco_2 pH: 7.066	Buffer Base	33 meq/l blood
Hour of Sampling: 8⁰⁰ A.M			Cylinder No 2: 30 mm Hg		low Pco_2 pH: 7.212	Standard Bicarb.	13.4 meq/l plasma
Remarks: NONE —		Hemoglobin:	15 g/100 ml	Readings made by: L. N. M.		Actual Bicarb.	9.6 meq/l plasma
		Oxygen Saturation:	100 percent	Signature: [signature]		Total CO_2	10.2 meq/l plasma

THE ASTRUP METHOD

FOR BLOOD ACID-BASE EVALUATION

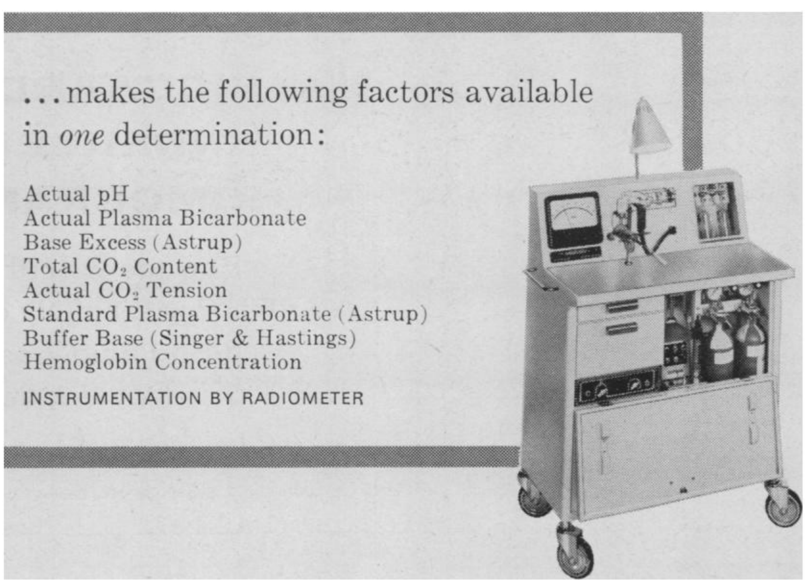
If one of your laboratory or research problems is the evaluation of the acid-base status of blood samples—the Astrup Method has much to offer. Not just a measurement of blood gas tensions, it is a complete system for clinical blood sampling, storage, and measurement on an ultra-micro basis. With instrumentation by RADIOMETER—3 simple pH values plotted on the Siggaard-Andersen nomogram expose instantly all the acid-base values—both respiratory and metabolic.

A few drops of capillary blood from an ear lobe puncture—a few moments of a technicians time and you have the actual blood pH, the respiratory CO_2 tension, and if you wish, the oxygen tension. On the metabolic side you have the choice of the value best suited to your diagnostic technique—Actual Plasma Bicarbonate Concentration, Standard Bicarbonate (at 40 mm Hg CO_2), Base Excess (Astrup), Buffer Base (Singer & Hastings), or Total CO_2 Content—*all on less than 150 ul of blood.*

Illustrated is a typical determination. The actual pH is read directly from an anaerobic blood sample. The sample is then equilibrated in a micro-tonometer to two artificial levels of P_{CO_2} derived from calibrated gas sources—and the resultant pH values measured. On the nomogram these pH values are plotted against their corresponding CO_2 tank tensions, points (A) and (B), and a line drawn between these points. Using the *actual* anaerobic pH value as an entry, the *actual* value of CO_2 tension can be read out from the line just drawn, at point (C).

From the same line the values of Buffer Base, *Standard* Bicarbonate, and Base Excess (the actual net accumulation of fixed acids or bases in the system) are noted from the intersection with their respective scales. *Actual* Bicarbonate Concentration is revealed by drawing a -45° line from point (C) to intersect the bicarbonate scale—and Total CO_2 Content by adding the value of Actual Bicarbonate to P_{CO_2} x 0.03.

Try it yourself on the nomogram illustrated and note the results obtained. Also note the ease with which one can anticipate new levels of pH should P_{CO_2} change. Fixed acid changes move the line to the right or left in equal increments on both Base Excess and Buffer Base scales—establishing new relative values of pH and P_{CO_2}.



If you'd like a glossy finished — full size (17" x 21") copy of this nomogram in a wall hanger form, complete with illustrations of typical acid-base determinations and a host of other useful laboratory data relating to blood chemistry, standard terminology, sampling & storage data, blood value certified buffers etc., just write the factory representative closest to you. You'll find it useful.

Please refer to this publication, using your professional letterhead.

MODEL AME-1

Radiometer manufactures a complete range of instruments adapted to the Astrup techniques — their reliability amply proven in clinical service.

For those interested only in the respiratory parameters, blood gas monitors and electrodes are also available.

RADIOMETER
OF COPENHAGEN

MANUFACTURERS OF FINE ELECTROCHEMICAL AND ELECTROMEDICAL INSTRUMENTS

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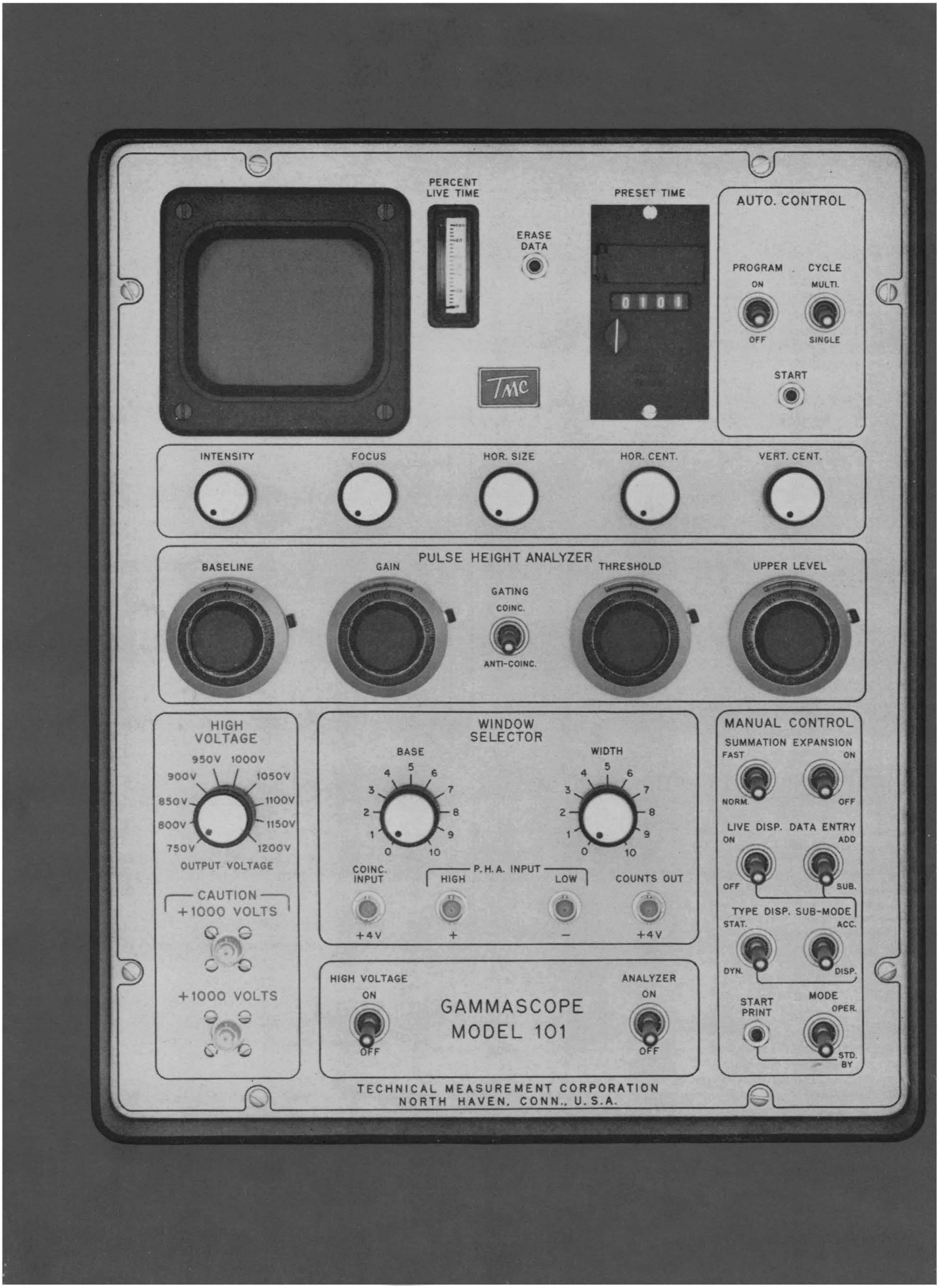
PERCENT LIVE TIME
ERASE DATA
PRESET TIME
AUTO. CONTROL
PROGRAM
ON
OFF
CYCLE
MULTI.
SINGLE
START
TMC
INTENSITY
FOCUS
HOR. SIZE
HOR. CENT.
VERT. CENT.
PULSE HEIGHT ANALYZER
BASELINE
GAIN
GATING
COINC.
ANTI-COINC.
THRESHOLD
UPPER LEVEL
HIGH VOLTAGE
750V 800V 850V 900V 950V 1000V 1050V 1100V 1150V 1200V
OUTPUT VOLTAGE
CAUTION
+1000 VOLTS
+1000 VOLTS
WINDOW SELECTOR
BASE
WIDTH
0 1 2 3 4 5 6 7 8 9 10
COINC. INPUT
+4V
P. H. A. INPUT
HIGH
+
LOW
−
COUNTS OUT
+4V
MANUAL CONTROL
SUMMATION
FAST
NORM.
EXPANSION
ON
OFF
LIVE DISP.
ON
OFF
DATA ENTRY
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TYPE DISP.
STAT.
DYN.
SUB-MODE
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OPER.
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ON
OFF
GAMMASCOPE
MODEL 101
ANALYZER
ON
OFF
TECHNICAL MEASUREMENT CORPORATION
NORTH HAVEN, CONN., U.S.A.

HIGH VOLTAGE ENGINEERING CORPORATION . . .
"CHARGED PARTICLES"

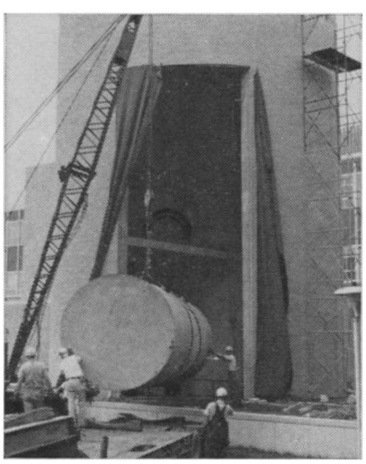
State Sponsored Nuclear Research

State governments are rapidly expanding their financial sponsorship of nuclear research and training programs, thus moving into an area traditionally supported by federal or national agencies.

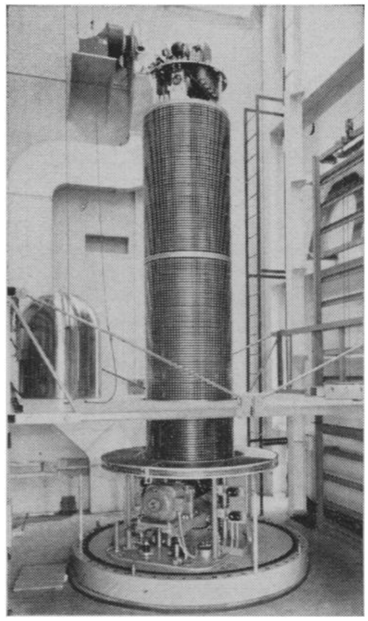
Modern experimental facilities create an atmosphere that attracts, and holds, the scientists and engineers needed to sustain academic excellence. Such technical leadership also provides a firm base for new industrial enterprise.

State of Kentucky Pledged $100,000 for Accelerator

At the University of Kentucky a Van de Graaff 5.5-million-volt Model CN particle accelerator was purchased after the Governor of Kentucky pledged $100,000 from his capital building fund and the Kentucky Research Foundation made $75,000 available. The balance of the expenditure came from other resources available to the university.



The University of Kentucky Van de Graaff will be housed in a special cylindrical structure — part of the university's impressive new Chemistry-Physics building.



New 5.5-million-volt Model CN particle accelerator was purchased by the University of Kentucky with the help of state agencies.

Most Widely Used Accelerator Type

The 5.5-MeV Van de Graaff now is the university's and the state's largest and most powerful physics research tool. It can produce intense monoenergetic beams of both electrons and positive ions, as well as neutrons and x-rays in a continuous beam or in bursts as short as four nanoseconds.

At first, the accelerator will be used by the university to accelerate protons, deuterons, or Alpha particles. With pulsed beam, the physics department will carry out time-of-flight measurements and study neutron-induced reactions.

Facility Expected To Attract More Research Grants

While the Van de Graaff will be used mainly for investigation of nuclear structure physics, it will also be at the disposal of all the university's departments engaged in scientific studies under research grants or contracts from federal and industrial agencies. It will be operated by the faculty and graduate students on an estimated yearly budget of $150,000 when at full capacity.

New Product Line Available from ARCO

High Voltage Engineering's ARCO Division, Walnut Creek, Calif., has introduced a new line of products designed for use in the high vacuum, microwave, and particle accelerator industries.

The products, which are being offered as standard items, have been developed and tested by ARCO during the past ten years, and are a direct result of extensive effort associated with advanced high power accelerators. Included in this group are:

- 1½" all-metal straight-through or right-angle high vacuum valves
- An oil diffusion pump system for high vacuums rated at 40 liters/sec. The package includes a roughing pump, traps, valves, and electrical control. (Base vacuum rating 10^{-8} Torr.)
- X-ray and neutron producing tungsten and uranium-clad targets for use with 5-150 MeV high power electron beams
- Pulsed 200 kV electron guns
- 10-100 MeV electron beam analyzing and deflecting systems for use with high power accelerators

For further information, write **Manager, Special Products, ARCO Division, High Voltage Engineering Corporation, Walnut Creek, Calif.**

HIGH VOLTAGE ENGINEERING

29 November 1963, Volume 142, Number 3596

SCIENCE

President Kennedy on Science

Excerpts from an address by President John F. Kennedy at the presidential convocation on 22 October 1963 honoring the centennial of the National Academy of Sciences.

. . . If science is to press ahead . . . if it is to continue to grow in effectiveness and productivity, our society must provide scientific inquiry the necessary means of sustenance. We must, in short, support it. Military and space needs, for example, offer little justification for much work in what Joseph Henry called abstract science. Though such fundamental inquiry is essential to the future technological vitality of industry and government alike, it is usually more difficult to comprehend than applied activity, and, as a consequence, often seems harder to justify to the Congress, to the Executive Branch, and to the people.

But if basic research is to be properly regarded, it must be better understood. I ask you to reflect on this problem and on the means by which, in the years to come, our society can assure continuing backing to fundamental research in the life sciences, the physical sciences, the social sciences, on natural resources, on agriculture, on protection against pollution and erosion. Together, the scientific community, the government, industry, and education must work out the way to nourish American science in all its power and vitality. . . .

I would not close, however, on a gloomy note, for ours is a century of scientific conquest and scientific triumph. If scientific discovery has not been an unalloyed blessing, if it has conferred on mankind the power not only to create, but also to annihilate, it has at the same time provided humanity with a supreme challenge and a supreme testing. If the challenge and the testing are too much for humanity, then we are all doomed, but I believe that the future can be bright, and I believe it can be certain. Man is still the master of his own fate, and I believe that the power of science and the responsibility of science have offered mankind a new opportunity not only for intellectual growth, but for moral discipline, not only for the acquisition of knowledge but for the strengthening of our nerve and our will.

We are bound to grope for a time as we grapple with problems without precedent in human history, but wisdom is the child of experience. In the years since man unlocked the power stored within the atom, the world has made progress, halting but effective, toward bringing that power under human control. The challenge, in short, may be our salvation. As we begin to master the potentialities of modern science we move toward a new era in which science can fulfill its creative promise and help bring into existence the happiest society the world has ever known. . . .

. . . I think that never in the . . . history of science has the time been brighter, the need been greater, for cooperation between those of us who work in government and those of you who work in far distant laboratories on subjects almost wholly unrelated to the problems we now face. . . .

. . . I hope that the people of the United States will continue to sustain all of you in your work and make it possible for us to encourage other gifted young men and women to move into these high fields which require so much from them and which have so much to give to all of our people. . . .

PERKIN-ELMER GAS CHROMATOGRAPHS THE BROADEST SELECTION—WITH THE MOST ADVANCED FEATURES—OFFERED BY ANY MANUFACTURER

PERKIN-ELMER GAS CHROMATOGRAPHS

DESIGNED AND BUILT–SOLD AND SERVICED–BY THE WORLD'S LARGEST PRODUCERS OF GAS CHROMATOGRAPHIC EQUIPMENT

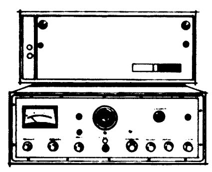
MODEL
226

BASIC UNIT $4500

This sophisticated gas chromatograph combines the most modern advances in instrument design and performance with utmost simplicity of operation. Whether you use it in the research laboratory for precise · lution time measurements, or in the routine control laboratory for dozens of daily automatic analyses, its unmatched speed, resolution, reliability and precision open new areas of information on virtually any organic mixture amenable to gas chromatographic separation. It adds automatic reset and programming features to an unparalleled accuracy of temperature control, to provide—for the first time—dependable unattended operation.

MODEL
800
SERIES

BASIC UNIT $3195



800 DIFFERENTIAL FLAME. The basic instrument in this series features the Dynathermal oven design with fully proportional temperature control and Perkin-Elmer's exclusive Differential Flame Ionization Detector. For dual or single column, packed or capillary operation, precise linear temperature programming, sample collection—*the ultimate in versatility.*

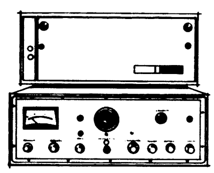
800 DIFFERENTIAL FLAME/HOT WIRE. The Hot Wire Detector in this combination is installed in a separate temperature-controlled oven, and may be used independently of, or in parallel with, the basic Differential Flame Ionization Detector.

800 DIFFERENTIAL FLAME/ELECTRON CAPTURE. In this version, both the basic Differential Flame Ionization Detector and the Electron Capture Detector—in its separate thermostatted oven—are mounted at the same time. Pulser power supply is optional.

800 DIFFERENTIAL FLAME/MICRO CROSS-SECTION. The newest Perkin-Elmer detector system, the Micro Cross-Section Detector, is mounted in a separate thermostatted oven, in addition to the Differential Flame Detector. It may be interchanged with either the Hot Wire or the Electron Capture Detector described above.

MODEL
801
SERIES

BASIC UNIT $3195



801 DIFFERENTIAL FLAME. Designed to meet the needs of *medical, biomedical and pesticide residue applications,* this instrument retains all the control advantages of the Model 800, but features an *all-glass system,* including "on column" injection in either of the dual columns. A major breakthrough is the new all-glass removable injection block, which permits the analysis of "dirty" samples: i.e., anaesthesia gases in blood, pesticide residue extracts.

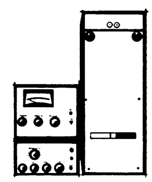
801 DIFFERENTIAL FLAME/HOT WIRE. As with the standard Model 800, the Model 801 can be equipped with an accessory Hot Wire Detector installed in a separate temperature-controlled oven, to permit dual-column thermal conductivity operation.

801 DIFFERENTIAL FLAME/ELECTRON CAPTURE. Particularly useful for pesticide residue analysis and silyl ether derivatives of steroids. The Electron Capture Detector can be installed at the same time as the dual Flame Ionization Detector. Again, pulser power supply is optional.

801 DIFFERENTIAL FLAME/MICRO CROSS-SECTION. Also available with this version is our newest detector system, the Micro Cross-Section Detector, mounted in a separate thermostatted oven.

MODEL
810
SERIES

BASIC UNIT $1695



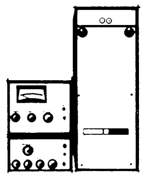
810 DIFFERENTIAL FLAME. This new series, of *modular design,* offers—for the first time—dual column operation, with the high-sensitivity Differential Flame Ionization Detector, at an *extremely low price.* Included in the basic instrument, in addition to the Flame Detector, are the "ballistic" temperature programmer, and separate temperature control for the dual injection blocks, with the proven Dynathermal oven concept.

810 DIFFERENTIAL FLAME/HOT WIRE. The Hot Wire Detector in this combination is installed in a separate temperature-controlled oven, and may be used independently of, or in parallel with, the Differential Flame Ionization Detector.

810 DIFFERENTIAL FLAME/ELECTRON CAPTURE. In this version, both the additional Electron Capture Detector—in its separate thermostatted oven—and the Differential Flame Detector of the basic instrument are mounted at the same time. A pulser power supply is optional.

810 DIFFERENTIAL FLAME/MICRO CROSS-SECTION. The Micro Cross-Section Detector is mounted in a separate modular thermostatted oven, and is installed at the same time as the Differential Flame Ionization Detector which is basic to the instrument. It may be readily interchanged with the Electron Capture and Hot Wire Detectors described above.

MODEL
811
SERIES BASIC UNIT $1695



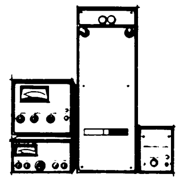
811 DIFFERENTIAL FLAME. The *low-cost* way to achieve outstanding performance in *medical, biomedical and pesticide residue studies* where glass columns are specified. As in the Model 801, this unit features an all-glass injection and column system, coupled with modular design and Differential Flame Ionization Detector in the basic instrument.

811 DIFFERENTIAL FLAME/HOT WIRE. Like the Model 810, the Model 811 permits the attachment of a modular, accessory Hot Wire Detector, complete in its own separate temperature-controlled oven, permitting dual-column thermal conductivity operation.

811 DIFFERENTIAL FLAME/ELECTRON CAPTURE. In critical pesticide residue analyses, as well as bio-medical determinations of the silyl ether derivatives of steroids, the Model 811 provides low-cost proficiency. The Electron Capture Detector can be installed at the same time as the basic Differential Flame Ionization Detector.

811 DIFFERENTIAL FLAME/MICRO CROSS-SECTION. Also available with this version is our newest detector system, the Micro Cross-Section Detector, mounted in a separate thermostatted oven. It is interchangeable with the Hot Wire and Electron Capture Detectors described in the two paragraphs above.

MODEL
820
SERIES BASIC UNIT $1495

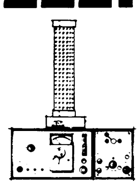


820 HOT WIRE. This instrument has the same features as the Model 810. The principal difference is that the Model 820 is equipped with the Dual Hot Wire Detector and control unit. Separate temperature control for dual injection block, columns and detector.

820 ELECTRON CAPTURE. The Electron Capture Detector module is interchanged with the basic Hot Wire Detector module. The addition of the Ionization Detector Electrometer Amplifier module completes this unit.

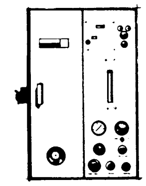
820 MICRO CROSS-SECTION. The Micro Cross-Section Detector is interchanged with the Hot Wire Detector module.

MODEL
222P
BASIC UNIT $2800



A Preparative Gas Chromatograph with linear temperature programming. The temperature of the up-to-one-inch diameter columns may be controlled precisely by direct resistance heating. You can collect sufficient sample with one run, without setting timers. Complete with collection system and columns.

MODEL
154D
SERIES BASIC UNIT $1950



154D THERMISTOR. Here is the *world standard* for gas chromatography. The reliability of this model has been proved by the thousands of instruments installed and operating in the field today. The Model 154D features a precisely-thermostatted, circulating air bath oven, and thermistor thermal conductivity detector.

154D THERMISTOR/FLAME. With the thermistor detector and the flame ionization detector usable independently, in series, or in parallel.

154D THERMISTOR/COLUMN SWITCHING. Three columns may be installed in the instrument and used independently or in series. Columns may be switched in and out while operating, and all columns may be backflushed.

MODEL
154L
SERIES BASIC UNIT $950

154L THERMISTOR. The *lowest-cost* precision-engineered gas chromatograph on the market today. Of the same oven design as the Model 154D and with the same thermistor detector, the Model 154L is ideal for routine analysis.

154L THERMISTOR/COLUMN SWITCHING. Ideal for Natural Gas Analysis where columns must be switched during analysis and heavy ends backflushed.

USE THIS REPLY CARD to get free subscription to the Perkin-Elmer Gas Chromatography Newsletter and further information on products.

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☐ Detailed information on Model(s) ____________________

☐ Price quotation on the following equipment ____________________

Name________________________Title________________

Company____

Street or P.O. Box________________________________

City____________________Zone________State________

ACCESSORIES

1 **D2 Integrator.** An all-electronic integrator which combines high speed with automatic operation; **7-digit readout of area** with 3-digit readout of both time of beginning of the peak and time of peak maximum.

2 **194B Printing Integrator.** While low in cost, this integrator performs functions otherwise obtainable only in very high-priced instruments; that is, a printed digital readout at rates up to 6,000 counts per minute, no pen excursions to count or interpolate.

3 **Pyrolysis Accessory.** Features include capability for handling samples in both solid and liquid states, accurate measurement of the sample and its residue, instantaneous heating of sample to desired temperatures and wide operating temperature range (150—1000°C).

4 **Micro-Reactor Accessory.** This is essentially a micro-pilot plant with heated reaction chamber and direct introduction into the gas chromatograph. Particularly useful for surveying activities of catalysts as reflected in the composition of reaction products.

5 **Column Switching and Sampling Valves.** Gas sampling and liquid sampling valves, switching and reverse flow valves, all made of Teflon and stainless steel to prevent sample contamination.

6 **Recorders.** Perkin-Elmer's selection includes ten models, all leading makes; also, the correct chart paper for each chromatogram.

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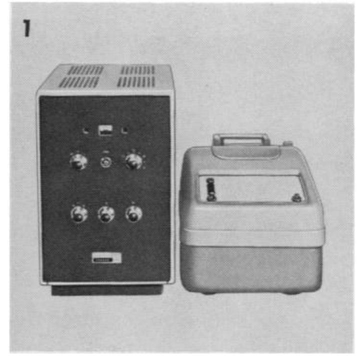

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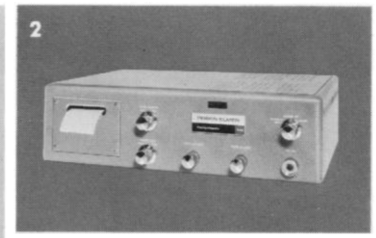

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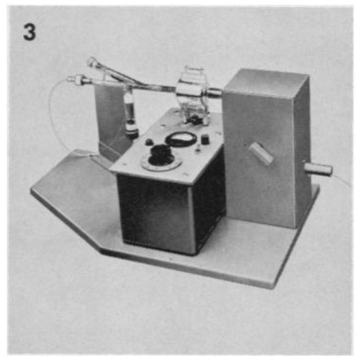

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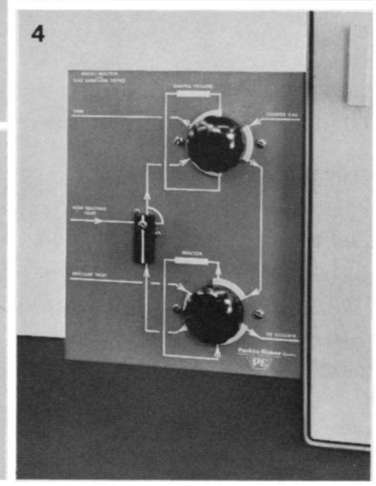

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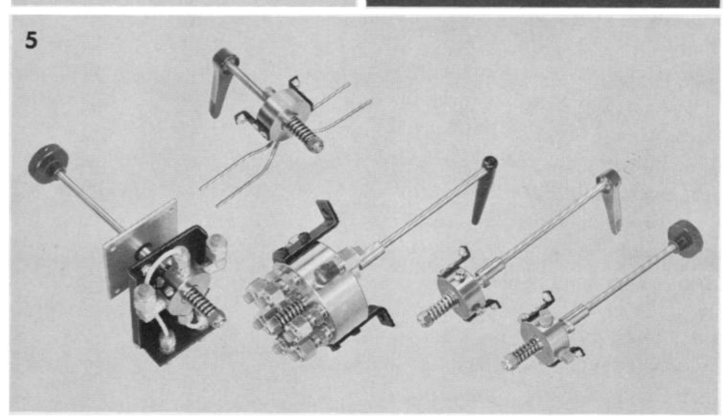

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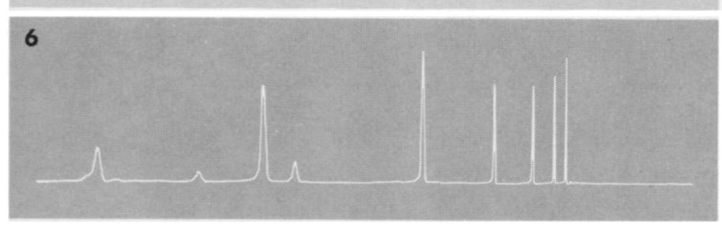

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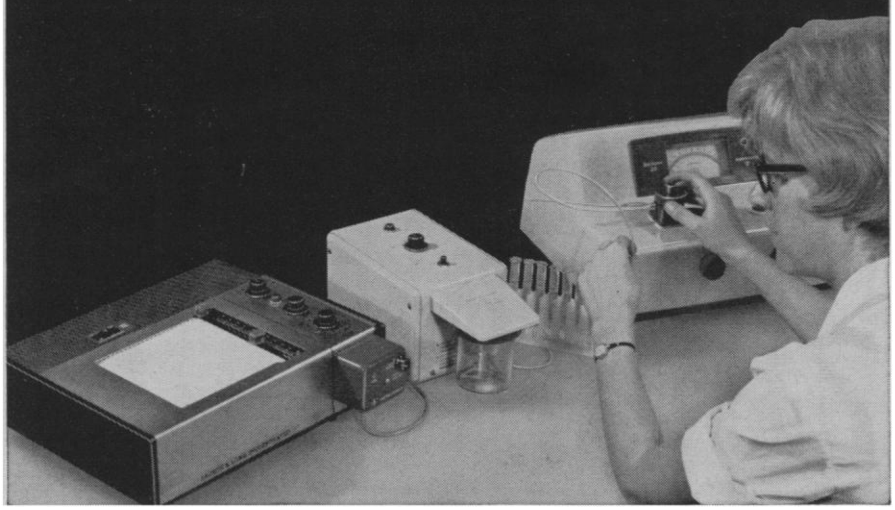
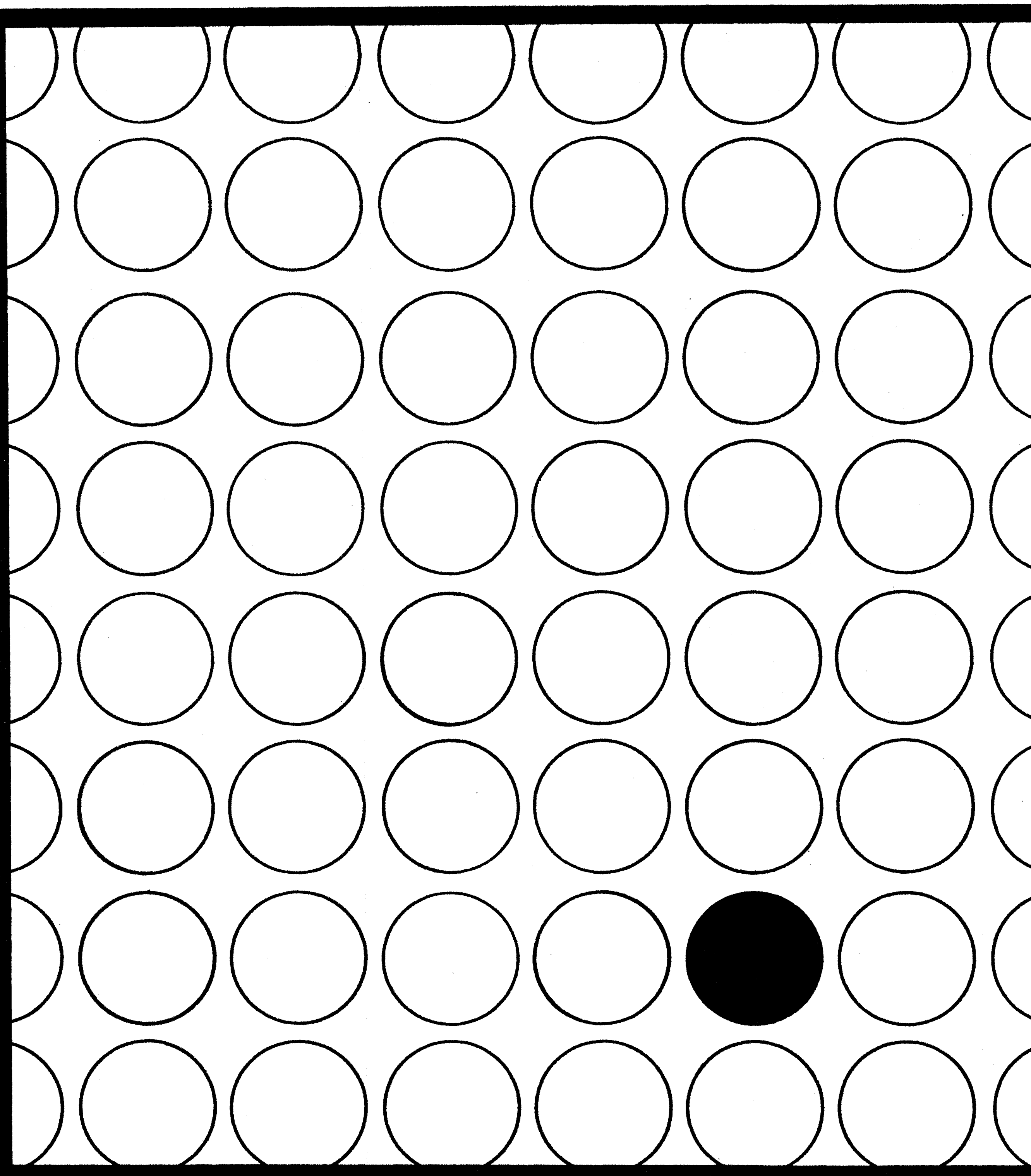


structures been elucidated. They are characterized by conversion to red pigments on heating with mineral acid. An important place in this class is occupied by the flavan-3,4-diols, which have been implicated in astringency and (in studies by Roux, Hillis, and others) in the biosynthesis of condensed tannins. A new group of leucoanthocyanins is the proanthocyanins, whose aglycones are oligomeric in nature and have monomers joined by various linkages. An example is the dimer composed of cyanidin and (+)-catechin, isolated in 1962 by Freudenberg and Weinges, in which a ketal linkage is involved. Geissman and Dittmar have isolated from the avocado seed a condensation product of flavan-3-ol and flavan-3,4-diol, which appear to be joined by a carbon-carbon linkage.

Other flavonoid compounds which have been known for many decades but whose structures have been elucidated only recently are the glycoflavonoids, or C-glycosylflavonoids. These were reviewed by Margaret K. Seikel (U.S. Forest Products Laboratory, Madison, Wisconsin). Although vitexin, an 8-glycosylapigenin, was discovered in 1898 by Perkin, the structure of the hydroxylated side chain was fully worked out only 6 years ago and is still questioned. During the past decade this field has developed rapidly to the point where almost two dozen compounds, mostly flavones, are now recognized to have widespread distribution among plants. The existence of a carbon-linked sugar chain can be recognized by the great resistance to hydrolysis under conditions in which glycosidic cleavage normally occurs. Although the nature of the flavonoid is readily determined, the major stumbling block thus far in making structural determinations has been to establish the nature and the point of attachment of the side chain, which are known unequivocally only for vitexin and its 5-deoxy derivative. *Vitex lucens*, the classical source of vitexin, has been shown by Seikel to contain additional glycoflavonoids, among which luteolin derivatives possibly containing two side chains are of greatest interest.

Flavonoid glucosides of a North American native skullcap (*Scutellaria epilobifolia*) were discussed by J. E. Watkin (National Research Council of Canada, Saskatoon), whose prime interest has been biosynthetic relationships. In addition to the 7-glucuronide of 5,6,7-trihydroxyflavone (baicalein), a known compound, the 7-glucuronides



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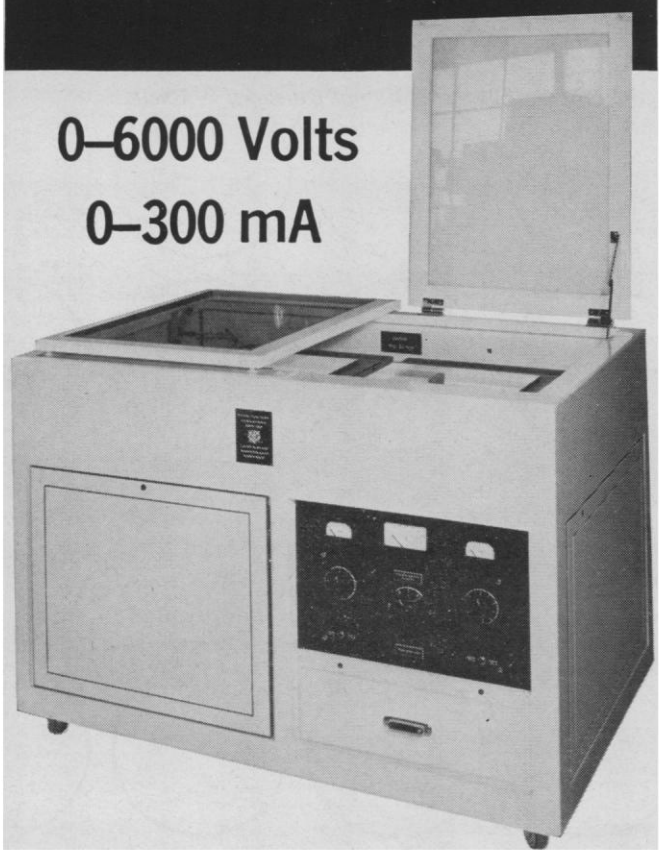

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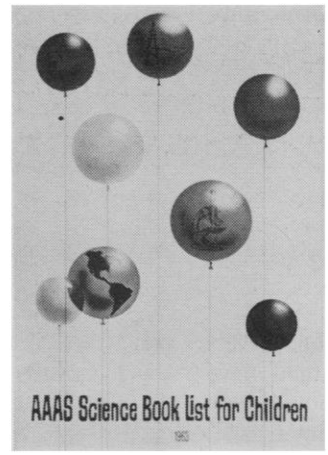

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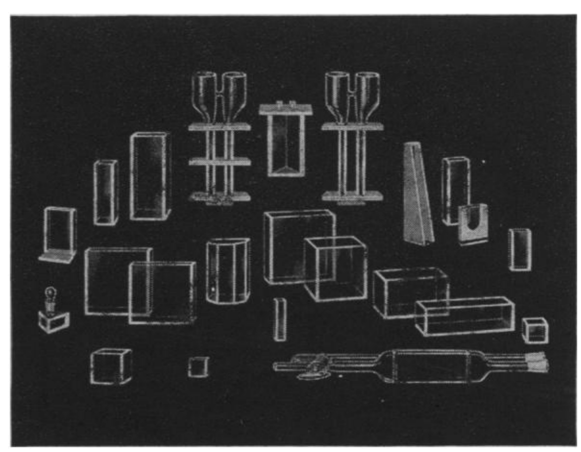

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of the new aglycones, 2′-methoxy-5,7-dihydroxyflavone, (-)-5,6,7-trihydroxyflavone, and 5,7,8-trihydroxyflavone, have been identified in this species. A very active glucuronidase found in this plant has also been partially purified. Watkin's studies at the enzyme level have not yet contributed positive results to answer the puzzling question of what additional intermediates are concerned in the formation of flavonoids from cinnamic acids and acetate.

During the second session, several groups of phenolics other than flavonoids were considered. Although chlorogenic acid has been known since 1837, and other hydroxycinnamoylquinic acids have been known for many years, the analogous shikimic acid esters, which are closely related biosynthetically, were unknown until the recent work of Goldschmid and Hergert on western hemlock. V. P. Maier (U.S. Department of Agriculture, Pasadena) dealt with the occurrence, isolation, structural chemistry, and chemical synthesis of these esters. Three new compounds which he isolated from dates—dactylifric acid, isodactylifric acid, and neodactylifric acid—were considered in detail. Crystalline dactylifric acid was shown, by degradation and synthesis, to be 3-*O*-caffeoylshikimic acid, while iso- and neo-dactylifric acids appear, from their periodate reactivities, to be 4-*O*- and 5-*O*-caffeoylshikimic acids, respectively. All are enzymic browning substrates. Maier emphasized the susceptibility of these compounds to acyl migration and the potential complexities due to the possible presence of multi- or mixed hydroxycinnamoyl residues. Important advances, which may extend to the biochemical field, can be expected in this area.

The fungi were considered during a contribution by T. J. Sproston (University of Vermont, Burlington) on the isolation and characterization of 1,4-naphthoquinones. Although quinonoid compounds are also formed by lichens and green plants, they are most readily recovered from fungal cultures, where they sometimes separate in crystalline form. A detailed report on the isolation and characterization of lambertellin, a new hydroxy-1,4-naphthoquinone from *Lambertella hicoriae* Whet., was presented. Existing evidence points to its identity with 2,3-(2-keto-methyl-α-pyrano)-5 hydroxy-1,4-naphthoquinone, there being still some doubt about the position of the methyl substituent.

W. L. Stanley (U.S. Department of Agriculture, Albany, California) reviewed recent developments in the chemistry of coumarins and discussed methods for recovering, separating, identifying, and synthesizing natural coumarins. He showed representative spectra from a large collection which he has accumulated. He discussed in detail his own work on the identification of coumarins and furanocoumarins from cold-pressed lemon, grapefruit, and lime peel oils. With the aid of column and chromatostrip chromatography, 12 of these compounds have been positively identified and several others have been tentatively identified. In lime oil were found at least five such compounds previously unreported from that source, and in bergamot oil, two. The structure of a new coumarin, auraptenol, from Seville orange oil, has been established to be 7-methoxy-8-(2-hydroxy-3-methyl-3-butenyl) coumarin.

The Plant Phenolics Group of North America plans to publish the proceedings of the symposium.

STEWART A. BROWN
*National Research Council,
Saskatoon, Saskatchewan*

Forthcoming Events

December

1–3. **Isotopically Labeled Drugs** in Experimental Pharmacology, Chicago, Ill. (Intern. Atomic Energy Agency, 11 Kärntner Ring, Vienna, Austria)

1–3. Association for Research in **Ophthalmology**, annual, Iowa City, Iowa. (The Association, 10515 Carnegie Ave., Cleveland 6, Ohio)

1–4. American Inst. of **Chemical Engineers**, 56th annual, Houston, Tex. (AICE, 25 W. 45 St., New York, N.Y.)

1–4. **American Medical Assoc.**, clinical meeting, Portland, Ore. (R. M. McKeown, 510 Hall Bldg., Coos Bay, Ore.)

1–7. **Anatomical Pathology**, 4th Latin American congr., San Salvador, El Salvador. (R. Masferrer, Latin American Soc. of Anatomical Pathology, Dept. of Pathological Anatomy, Hospital Rosales, San Salvador)

1–7. **Pharmacy** and **Biochemistry**, 6th Pan American congr., Mexico City, Mexico. (G. B. Griffenhagen, Div. of Communications, American Pharmaceutical Assoc., 2215 Constitution Ave., NW, Washington, D.C.)

1–7. American **Phytopathological** Soc., 3rd Carribean meeting, San Jose, Costa Rica. (B. H. Waite, c/o United Fruit Co., La Lima, Honduras)

2–5. **Agronomical Research**, 2nd world congr., Rome, Italy. (Intern. Confederation of Technical Agriculturalists, 24 Beethovenstr., Zurich, Switzerland)

2–5. **Entomological** Soc. of America, St. Louis, Mo. (ESA, 4603 Calvert Rd., College Pk., Md.)

2–6. **Chemical Industries**, 29th exposition, New York, N.Y. (Publicity Dept., 480 Lexington Ave., New York, N.Y.)

2–13. **Immunization** in the Control of Communicable Disease, seminar, Manila, Philippines. (World Health Organization, Regional Committee for the Western Pacific, P.O. Box 2932, Manila)

4–6. **Oceanographic Data** Exchange, working group, Intergovernmental Oceanographic Commission, Paris, France. (W. S. Wooster, Office of Oceanography, UNESCO, Place de Fontenoy, Paris 7e)

4–6. **Ultrasonics Engineering**, symp., Washington, D.C. (T. R. Meeker, Bell Telephone Laboratories, Allentown, Pa.)

4–8. Central American **Medical** Congr., San Salvador, El Salvador. (R. C. Bustamante, 25 Calle Poniente 10–25, San Salvador)

4–10. American Acad. of **Optometry**, Chicago, Ill. (C. C. Koch, 1506–1508 Foshay Tower, Minneapolis 2, Minn.)

5–6. **Forest Genetics**, short course and meeting, Tucson, Ariz. (R. F. Wagle, Dept. of Watershed Management, Univ. of Arizona, Tucson)

5–6. Thermal Stability of **Polymers**, symp., Columbus, Ohio. (P. M. Stickney, Battelle Memorial Inst., 505 King Ave., Columbus, Ohio 43201)

5–6. **Syntagmatic Organization Language**, 2nd seminar, New Brunswick, N.J. (Graduate School of Library Service, Rutgers Univ., New Brunswick, N.J.)

6. Reliability in **Space Vehicles**, 4th seminar, Los Angeles, Calif. (W. H. Bleuel, Jr., Endevco Corp., 801 S. Arroyo Pkwy., Pasadena, Calif.)