SCIENCE

26 February 1965

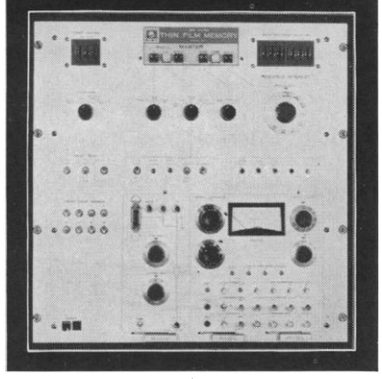
Vol. 147, No. 3661

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

SEA PORPOISE

RIDL NANOLYZER

Unprecedented speed and accuracy in a multichannel analyzer.

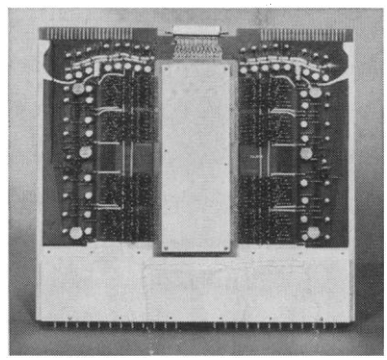


The new RIDL Nanolyzer* offers two principal advantages over other presently available multichannel analyzers: speed and accuracy. It can accept, analyze, and store data seven to fifty times faster than conventional analyzers. It will also store at rates of over 200,000 counts per second with a minimum of distortion when NaI(Tl) detectors are used. These benefits are obtained by using several totally new circuit concepts, chief among which are those described at the right.

Of equal importance are the Nanolyzer's convenient operation and the ease of servicing. Its compact packaging has been achieved by using printed circuit boards with Silicon Nand Arithmetic Package (SNAP-LOGIC*) encapsulated circuits. This also contributes to easy maintenance.

The Nanolyzer can be used with all standard readout devices. For more information, please consult your RIDL sales engineer or write for your copy of our 24-page Nanolyzer Brochure.

THIN-FILM MEMORY



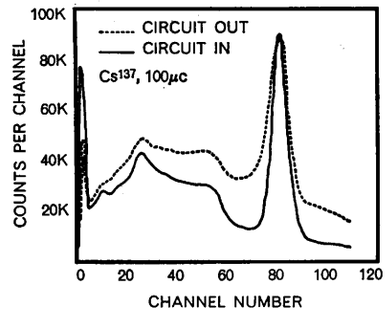
Plug-in circuit board with 128-word thin-film memory plane.

The high-speed, thin-film memory planes used for data storage are the heart of the Nanolyzer. The memory is word-organized with 256 words of 24 bits each. It can store 10^6 (minus 1) bits of information on each memory location in a 1, 2, 4, 8CD code. The memory is located on two identical plug-in circuit boards for simplicity and serviceability. Each plug-in board contains, in addition to a 128-word memory plane, all of the select matrix and memory drivers for that memory plane and preamplifiers for each of the 24-bit outputs.

100-MC ADC

The 100-mc Analog-to-Digital Converter uses a radically new technique for pulse-height analysis. By accurately determining when the pulse to be analyzed arrives, a sample of the pulse that is linear and independent of pulse amplitude can be used for analysis. Besides eliminating the annoying linearity problems associated with peak detection, this technique reduces analyzer "open time" to a minimum and provides a time base for subsequent analysis.

PILE-UP REJECTION



Cs^{137} spectra accumulated at high counting rates with and without pile-up rejection circuit.

When the ADC is operated at counting rates exceeding 100,000 counts per second, spectrum distortion due to pile-up will severely limit the usefulness of the accumulated data. Therefore, a pile-up rejection circuit has been incorporated in the ADC to minimize spectrum distortion due to pile-up. Pile-up rejection is accomplished by inspection logic which inspects the ADC baseline just before the pulse arrives and rejects the incoming pulse from analysis if the baseline is not at ground due to pile-up or baseline shift. The chart above compares a typical distortion-free curve obtained with the Nanolyzer using pile-up rejection with a curve of poorer resolution obtained from a conventional analyzer without pile-up rejection.

ANTIWALK DISCRIMINATOR

The ADC input circuits use pulse-sampling techniques for accurate data analysis at extremely high counting rates. Difficulties of determining the peak are eliminated by the built-in ANTIWALK* discriminator whose output occurs at the input pulse crossover. The discriminator output determines the start of the sampling period, ensuring a "true" sample independent of pulse height. Time resolution of 5 to 10 nanoseconds, independent of discriminator level, is typical for this circuit.

*Registered trademark of RIDL NUC:R-4-266

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26 February 1965
Vol. 147, No. 3661

SCIENCE

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AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

COVER

Keiki, a trained Pacific bottlenose porpoise, swims free in the ocean near Oahu, Hawaii. During speed tests the animal would respond to signals emitted underwater by an electronic device. See page 1048 [Camera Hawaii, Honolulu]

IBM now offers the most powerful, small, digital computer for less than $700/month

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Our new 1130 Computing System can whiz through 120,000 additions per second...handle over a million logic decisions a second.

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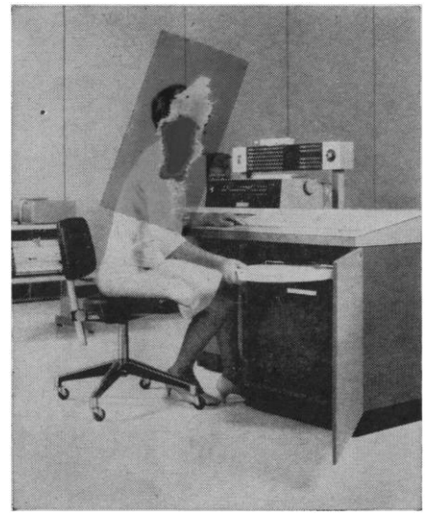

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3. Civil Engineering Coordinate Geometry (COGO)
4. Petroleum exploration and production calculations
5. Numerical surface techniques and contour map plotting

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The "TV Journal" is produced cooperatively by 20 scientific and engineering societies, and will consist of 20 half-hour telecasts. The series is coordinated by the AAAS, and is underwritten by grants from the National Science Foundation and The Timken Roller Bearing Company.

PROGRAM NO.	PROGRAM TOPIC	PARTICIPATING SOCIETY
1	**Air Pollution Control**	American Chemical Society
2	**Supersonic Air Travel**	American Institute of Aeronautics and Astronautics
3	**Lunar Surface Controversy**	New York Academy of Sciences
4	**Environmental Control**	American Society of Heating, Refrigerating and Air-conditioning Engineers
5	**Observatories in Space**	American Astronomical Society
6	**Seeing Inside Metals**	American Society for Metals
7	**Fiber Optics**	Optical Society of America
8	**Metropolitan Planning and Design**	American Society of Civil Engineers
9	**The Particle Jungle**	American Institute of Physics
10	**Operations Research Techniques**	American Institute of Industrial Engineers
11	**Topology**	Conference Board of the Mathematical Sciences
12	**Traffic Control Techniques**	Institute of Electrical and Electronics Engineers
13	**Conflict Resolution Research**	American Psychological Association
14	**Pursuit of Perfection**	American Society for Quality Control
15	**Cholesterol Fats and Heart Disease**	Federation of American Societies for Experimental Biology
16	**Information for Effective Engineering**	Engineers Joint Council
17	**Communication Among Animals**	American Institute of Biological Sciences
18	**Cryogenics**	American Institute of Chemical Engineers
19	**Man-made Weather Modification**	American Meteorological Society
20	(to be announced)	American Association for the Advancement of Science

PROGRAM SCHEDULE

The "TV Journal" will be seen on most of the nation's educational TV stations on a staggered basis. The series will start on the first group of stations during the week of 28 February, and then on another group of stations during the week of 14 March, and so on. Check your local program guide for day and time of broadcast.

Starts week of 28 February

California	Los Angeles
	San Francisco
D. C.	Washington
Illinois	Chicago
Louisiana	New Orleans
Massachusetts	Boston
New York	New York
	Schenectady
Ohio	Cleveland
Pennsylvania	Pittsburgh
Texas	Houston
Washington	Seattle
	Yakima
Wisconsin	Milwaukee

Starts week of 14 March

Alabama	Montgomery
	Birmingham
	Cheaha State Park
	Dozier
California	Sacramento
	San Bernardino
Michigan	East Lansing*
Missouri	St. Louis
Ohio	Athens
	Columbus
	Newark
	Toledo
Pennsylvania	Philadelphia
Texas	Dallas
Virginia	Norfolk

***Starts 3/13**

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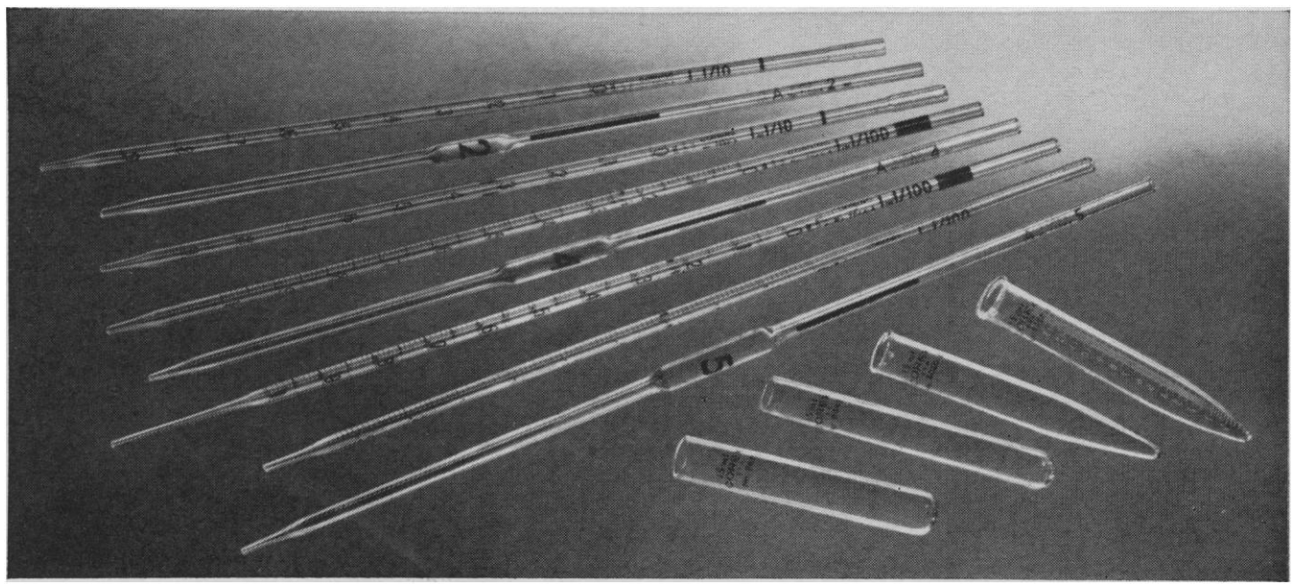

We will replace without charge any quantity of COREX serological, Mohr, or volumetric pipets, and/or centrifuge tubes that you buy and register with us on or after February 1, 1965, which become unserviceable in normal use *for any reason* before December 31, 1965.

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That's why this year we are extending our free-replacement offer to cover the entire line of COREX pipets and tubes . . . and to cover all the rest of 1965.

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Buy with the assurance that, if any COREX pipet or tube you order becomes unusable for any reason—shipping, breakage, clouding, fading—in normal use between now and December 31, you will get a replacement free.

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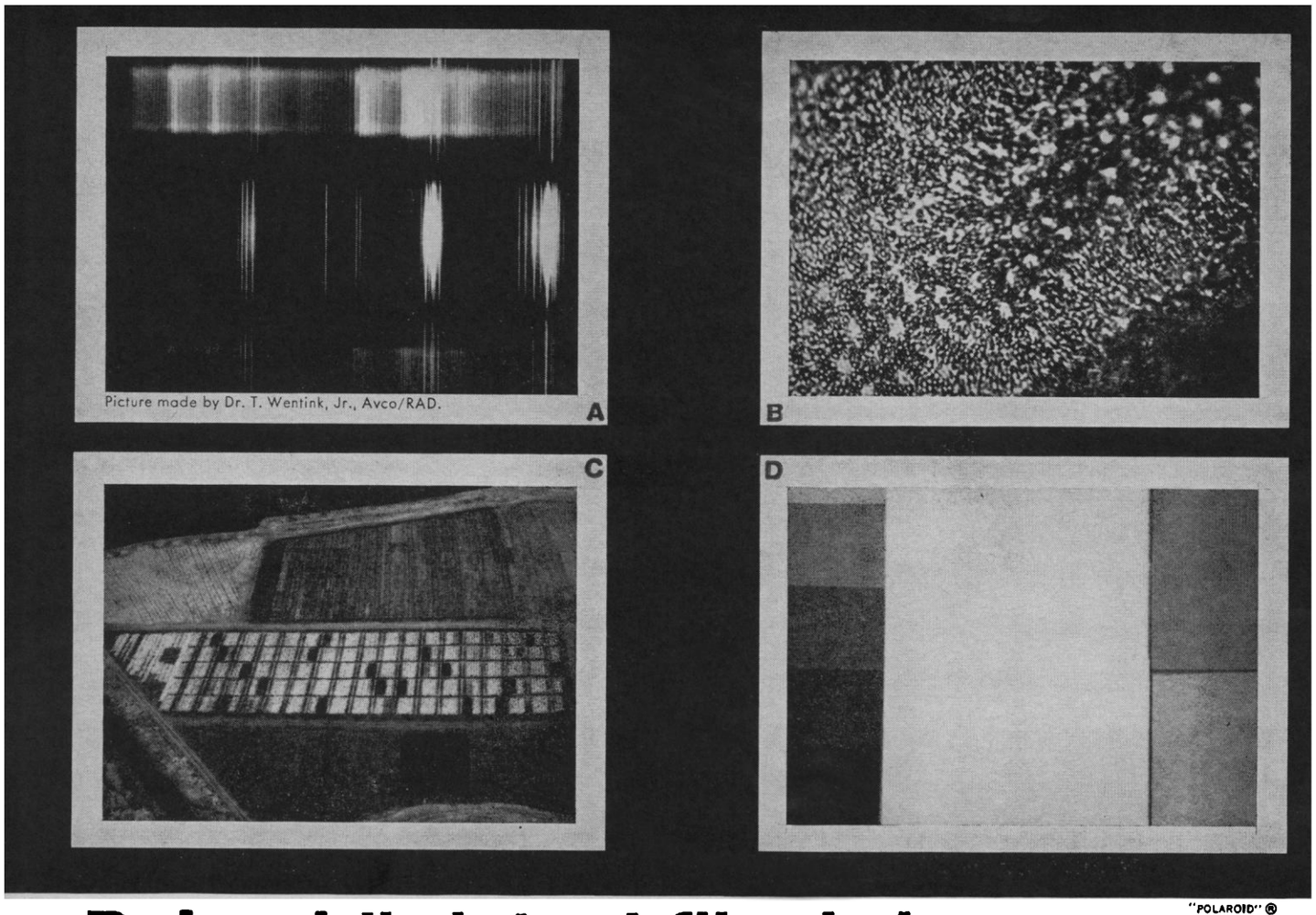

"POLAROID" ®

Polaroid's latest film brings you information from the infrared in 15 seconds.

It's called Polaroid Type 413 Land Infrared Film. Its spectral sensitivity extends from the visible into the infrared beyond 9000Å, peaking at 8400Å. Its development time is 15 seconds.

Being able to see your infrared pictures on the spot has important advantages. You can go ahead with testing or experimentation uninterrupted. If you need a record of spectrographic data, for example, you've got it then and there. **Picture A**—arc emission spectra, 6000Å-8800Å—is an example of the sharp, detailed record you get after a 15-second pause in operations. (Top and bottom records are CN spectra, middle record is a copper spectrum.)

Also, if your picture requires special or elaborate equipment, Type 413 film saves you the risk of having to set it up twice. **Picture B,** for example, a microspectrograph of the cones of the retina, required the use of infrared lighting because visible light causes bleaching of the pigments. The scientist who took it saw his results immediately and knew he had a perfect picture while his set-up was still intact.

While on-the-spot recording is the most important advantage of this remarkable new film, it isn't the only one. Type 413 film is also three times as sensitive as conventional infrared films. Its A.S.A. equivalent speed is 800 without filters. Since this permits faster shutter speeds and smaller lens apertures, the film is ideal for applications like aerial photography. In **Picture C**—an aerial shot of a potato field used for plant pathology testing—you can see how clearly the film was able to record the fungus-infected areas (dark rectangles) using an extremely fast exposure setting. Shot was made at f/32 and 1/300th of a second.

And Type 413 film is as easy to use as any other Polaroid Land film. It can be used in almost all standard Polaroid Land cameras and camera backs using Series 40 film and the procedure is the same. Just snap the picture, pull the tab, and peel off the finished print in 15 seconds. Because it's as simple as that to use, the film will enable technicians and other personnel who may not be trained photographers to take perfect infrared pictures whenever they're needed. **Picture D,** for example, a record of the infrared reflectance of concrete curing compounds, is a type of photograph often called for in materials testing—and any Sunday photographer could have filled in and done the job.

Because of these advantages, Type 413 film will have wide use in almost every field of industrial and scientific photography. In laser research, spectrographic analysis, specialized industrial photography where heat is a factor, plant pathology, general medical research—wherever there is a need to investigate the infrared.

If you would like to know more about our latest film, write to: Sales Department, Polaroid Corporation, Cambridge, Mass. 02139.

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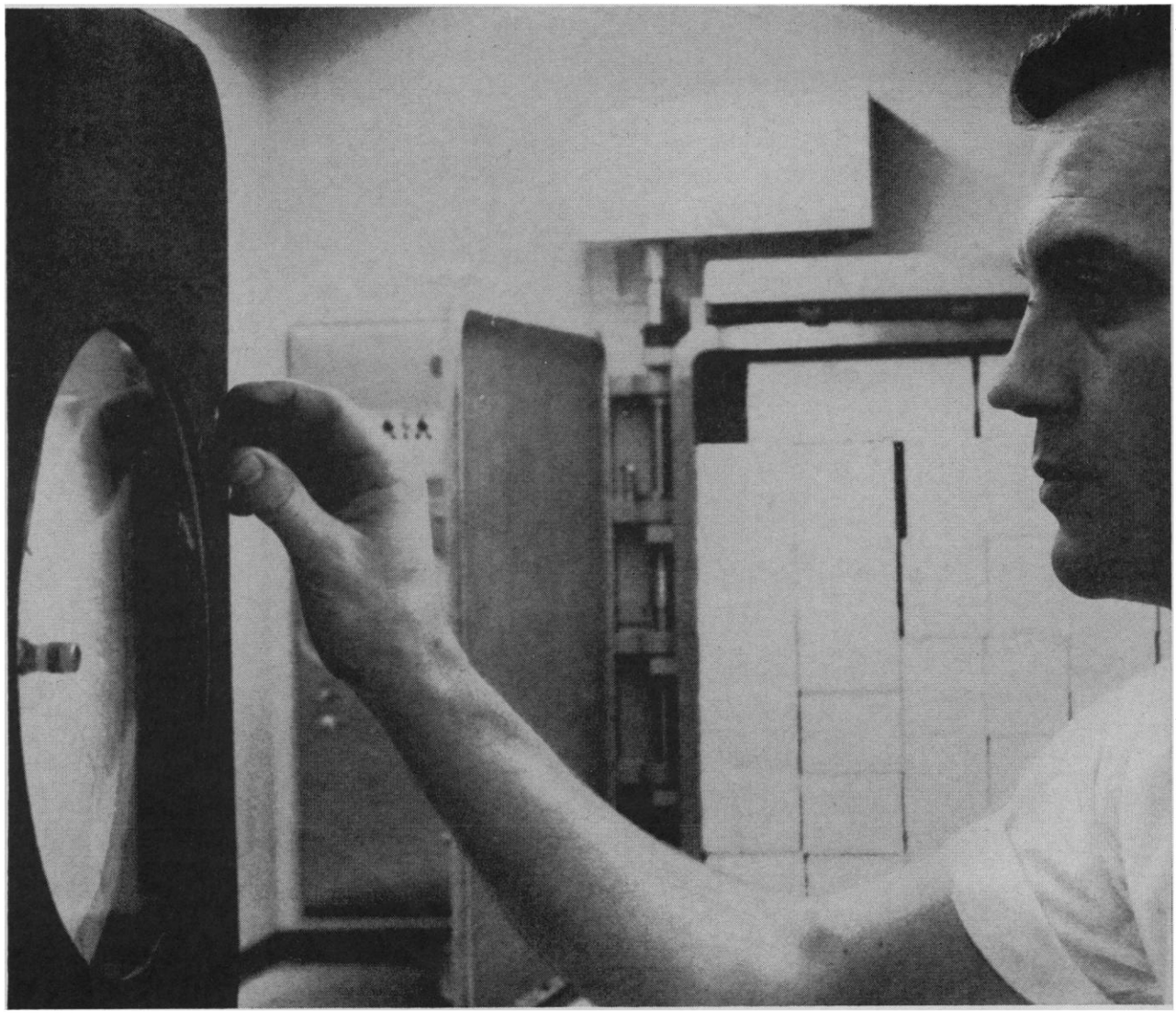
What's the BIG IDEA in Industrial Sterilizers?



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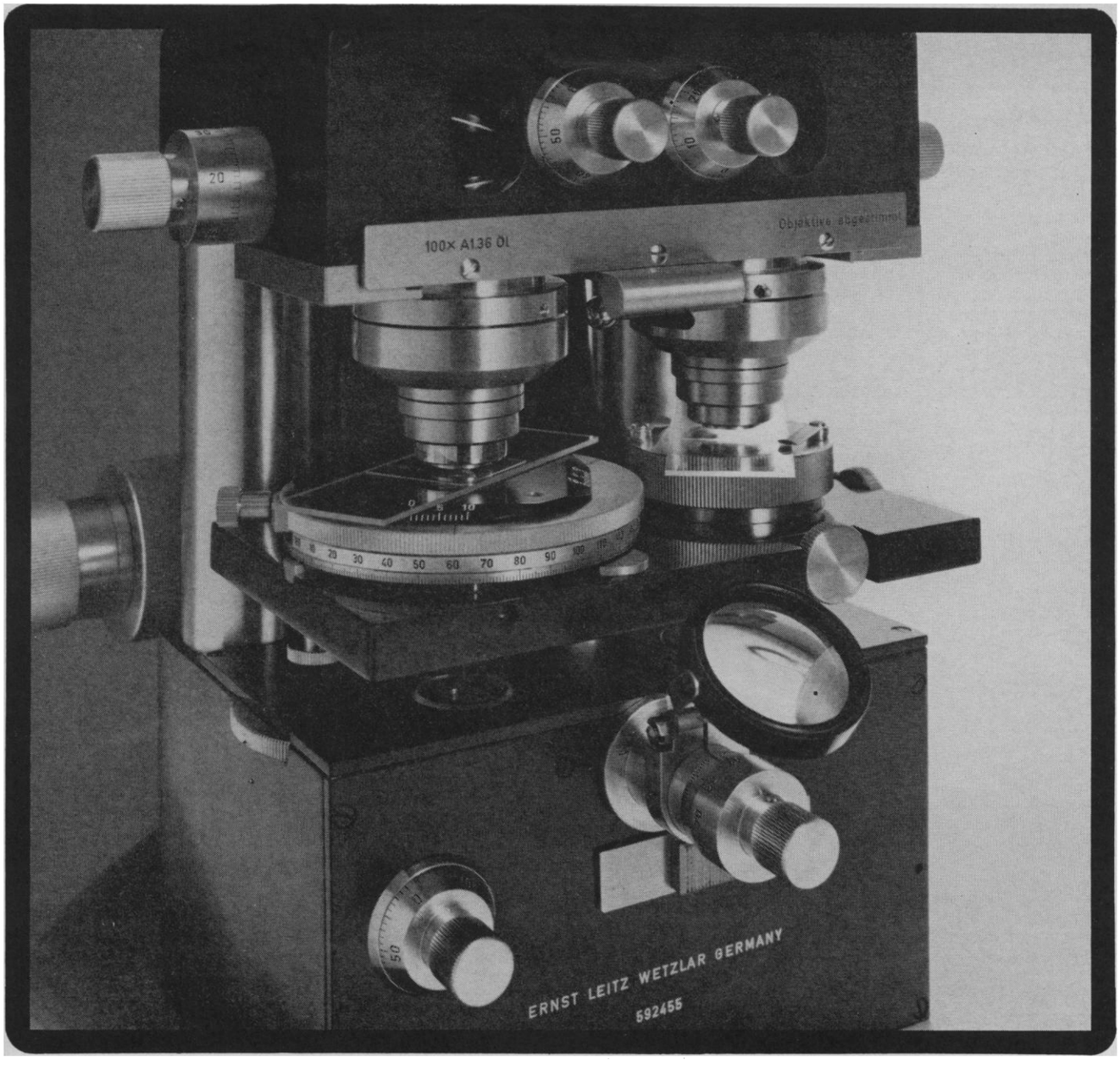

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26 February 1965, Volume 147, Number 3661 **SCIENCE**

Science, Technology, and the Gold Drain

On the surface, the gold drain is a problem largely for economists, bankers, and politicians. A closer look indicates a deep and complex relation to science and technology.

Were it not for the net contribution of research-intensive products to the balance of trade, much more of our gold would have been lost long since, or stringent controls would have been applied. For example, in the period January to September 1962,* the value of exports of synthetic fibers and goods made from them, and of chemicals and related products, reached the annual rate of $1.9 billion, while the corresponding value of imports was $0.5 billion. Other great contributors to our favorable balance of trade included industrial machinery, electrical apparatus, and aircraft. Altogether, research-intensive products were exported at the rate of $10.5 billion, while the rate for corresponding imports was $2.2 billion.

In 1964 our total exports exceeded imports by nearly $7 billion. Yet there was a balance-of-payments deficit of over $3 billion; part of this was manifested as gold drain, and part as increased liquid assets which foreigners hold in this country. Foreign aid, military expenditures abroad, and tourism are usually thought of as the major elements responsible for the balance-of-payments deficit, but outflow through these channels was overshadowed by a net outflow of about $6 billion for U.S. private investments. The United States is continuing to increase its creditor position.

A large fraction of the capital that has gone abroad has been sent by industrial companies such as E. I. du Pont de Nemours, International Business Machines, and General Electric. These and scores of other large organizations have erected, usually through affiliates, numerous manufacturing installations that embody the most advanced technology and that produce research-intensive products. New plants are financed only in part by money from the United States. Earnings of existing facilities abroad are plowed back and used to build additional plants, and local capital also is employed. The vigor with which Americans are operating in Europe is one of the principal reasons for President de Gaulle's recent annoyance with our monetary and fiscal policies.

At present about 80 percent of the production of these European affiliates is consumed in the nations in which the plants are located. As yet, few of the products are exported to the United States, but it would be astonishing if these foreign plants did not eventually compete vigorously for a greater share of world trade. In addition to erecting plants, many of the companies have established research facilities abroad, staffing them largely with foreign scientists. Profits and technical knowledge already are flowing back to this country, and that flow will increase. Nevertheless, it is difficult to predict whether in the long run these foreign investments will serve the national interest.

Our ability to compete has diminished.† For instance, in 1953 our export price for steel plate was $104 per metric ton; in 1961 it had risen to $127. The corresponding prices for steel plate produced by the European Coal and Steel Community were $115 in 1953 and $99 in 1961. Our competitive position as world suppliers of research-intensive products has also weakened. This may be seen by comparing 1961 prices, using 1953 prices as an index of 100. For electrical machinery, the figures were: United States, 123; Germany, 109; Japan, 103. Some economists feel that our competitive ability has recovered somewhat. However, during the first 8 months of 1964, net imports of steel mill products were at an annual rate of 3 million tons; in 1961 the net was 1.2 million tons.

Ability to compete in the world market is fundamental to our economic well-being. In the arena of foreign trade our future success is by no means guaranteed.—PHILIP H. ABELSON

* H. B. Lary, *Problems of the United States as World Trader and Banker* (Princeton University Press, Princeton, N.J., 1963), p. 92. † B. Balassa, Ed., *Changing Patterns in Foreign Trade and Payments* (Norton, New York, 1964), p. 30.

The acceptance of the original Gammascope in a wide variety of applications has prompted the development of an even more versatile system — the Gammascope II. The basic concept of a low cost, self-contained 100-channel Pulse Height Analyzer has been retained. New circuitry, housed in a more compact cabinet, now adds inputs for multiscaling and Mössbauer effect studies. New output circuits permit readout on virtually every type of analog and digital equipment. The Gammascope II truly offers the physicist, chemist or biologist an instrument equally useful for class room demonstrations or exacting experiments. (Gammascope 101 is still available for applications where its features are especially useful.)

4 Switch Selected Operating Modes

100-channel analysis — this provides a high resolution spectrum analysis of charged particles. Scale expansion provides resolution equivalent to 800 channels for storage of a selectable portion of the spectrum. In this capacity the Gammascope will effectively replace the single-channel spectrometer in nuclear medicine, radio-chemistry, and nuclear physics research.

Single-channel analysis — window controls on the Gammascope permit selection of an energy range of interest intensified on the multi-channel spectrum display. With controls set for the range of interest, the instrument provides pulses in that range for counting on an external scaler. Pulses selected by the window can also be used for counting in the multi-scaler mode, or for sampling of the velocity signal in Mössbauer studies.

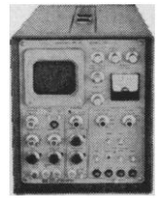
Multiscaling — the Gammascope provides 100 channels of multiscaling with 8 selectable dwell times from 0.1 to 1000 milliseconds. The single-channel window selects pulses of the desired energy range, which are then automatically stored in successive channels corresponding to a preset time interval. Multiscaling is particularly useful in half-life studies of short-lived isotopes and for investigation of Mössbauer effects.

Mössbauer Analysis — The Gammascope is equipped with an input for an analog signal. In addition, in the Mössbauer mode pulses from the detector can be fed to the single-channel analyzer. The output is used to sample the velocity signal by the analog to digital conversion circuitry, thus providing a count in the channel corresponding to the instantaneous amplitude of the velocity. This mode of operation eliminates the necessity for precise timing by the counting channels and the Mössbauer drive, thus greatly simplifying demonstration of Mössbauer effects.

Specifications

Inputs: high level — 0-10 volts (0-100 volts optional); low-level — up to 50 mv. at max gain, polarity negative
Output: compatible with x-y plotter, digital printers, typewriter, paper tape punch, external visual displays, and IBM compatible magnetic tape system.
Memory capacity: 10^5–1 counts per channel
Mössbauer input: ± 2 volts
Displays: Live: during data accumulation. Static: stored data
Preset Time: live times from 0.1 to 400 minutes and infinity

For full details on the GAMMASCOPE II, contact your nearest TMC office or write Technical Measurement Corp., 441 Washington Avenue, North Haven, Connecticut.



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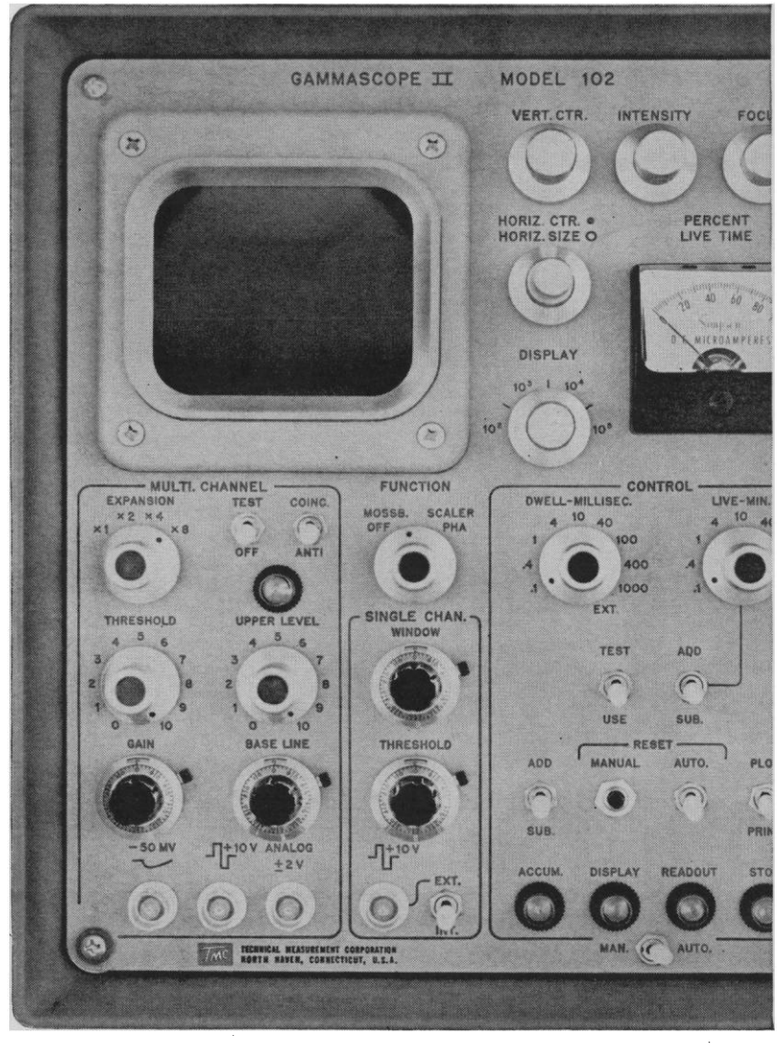

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See us at the 16th Pittsburgh Conference on Analytical Chemistry, at the Penn-Sheraton, Pittsburgh, March 1-5

gree to which the wider sharing of wealth in Vicos has liberated the poor (by local standards), who made up 92.3 percent of the serf population in 1951 from exploitation not only by the manor lessor and by mestizo merchants in nearby towns, but also by the 7.7 percent of the serf population that owned enough cattle to command ready cash under the manorial system. Cash income permits new peasants to hire draft animals instead of waiting until the ox-wealthy farmers finish preparation of their own fields; it allows them to purchase fertilizers instead of begging animal owners to graze their stock on the supplicants' fields, or watching soil fertility and crop production decline. Modernization has materially equalized personal relations in Vicos.

P. L. Doughty (Indiana) discussed interrelations between power, respect, affection, and rectitude values in Vicos. He emphasized that in 1951 the people of Vicos were very subordinate in Peruvian society. The hierarchical organization of the manorial system affected every aspect of the life of a serf. Being regarded as property and infrahuman, serfs received no respect from members of the dominant group. Their only source of affection was the family, in which individual worth was reckoned largely in economic terms; and affection suffered in competition with the drive for survival. Regarded as immoral and outside the national legal system, Vicos serfs shared very few rectitude values with other Peruvian citizens. Their own self-image was negative.

The impact of the Cornell Peru Project has been markedly reflected in improving interpersonal relations. With abolition of servitude, payment of wages, and encouragement of initiative, Vicos Indians began to feel increased personal dignity, worth, and status. They began to deal more effectively with outsiders and to develop their potential abilities. With the acquisition of land, one major value of still-traditional Peruvian society, the new peasants of Vicos automatically acquired greatly enhanced status as landowners. The firm economic production base has contributed to a growth of community pride and prestige, regionally and nationally. Improving control over environment develops growing respect for the individual within the family and great amelioration in the position of children.

J. O. Alers (Cornell) pointed out that the strategy of development at Vicos, although not by intention, has followed the alternative of devoting major available resources to the development of education and the economy, while leaving health improvements that tend to lower the death rate at the lowest priority. He noted that the level of anxiety has risen among Vicos males as modernization proceeds.

As a demographer, Alers stressed the threat posed to the economic and social progress thus far achieved in Vicos by the increasing population and the effect of the resultant population density on the agricultural land base. He expects the future development of Vicos to be greatly enhanced if the new peasants are able to employ political influence at the highest levels of the Peruvian government. This will be possible only if the people increase their literacy in order to form an effective voting bloc and if their augmented wealth enables them to organize themselves and similar rural communities into pressure groups with resources to carry out productive lobby-

ing. To achieve such a condition, Vicos needs to continue its educational and economic development, perhaps at the expense of immediate consumption in the form of health improvements. It cannot be done if the number of people increases so swiftly as to compromise their educational and economic means to political power, according to Alers.

H. F. Dobyns (Cornell) maintained that enlightenment and skill are strategic components of power. He characterized the traditional Andean manor as a social system permitting the overlord to monopolize enlightenment in order to maintain the traditional exploitation of Indian serfs; serfs were excluded from the enlightenment process. Dobyns labeled the Cornell Peru Project intervention a systematic diffusion of knowledge of many kinds by various techniques of formal and informal instruction. He emphasized numerous new power domains that have resulted in Vicos from the enlightenment of its people. Literate schoolboys serving as field-labor time-keepers for nonliterate community council delegates have acquired considerably more power than was ever before available to persons of their age in Vicos. Literate sons have also acquired much power within their families, particularly with regard to commercial and economic relations with Spanish-speaking mestizos; their increased authority shows that the traditional authority of elders in this society has been a function of slow but cumulative enlightenment rather than of aging per se. For the first time, Dobyns continued, educated Vicos boys and girls have established power domains over children of other families in zones other than their own as public school teachers. The Vicos data demonstrate that rapid social change is possible when it substitutes gratification for deprivation.

In the light of the Vicos experience, H. D. Lasswell (Yale) pointed to the importance of creating policy scientists trained to bring their basic disciplinary training to bear upon practical policy problems. He commented upon the significance of the contextual approach to problem-solving on the part of the director of the Cornell Peru Project and the pertinence of this method for national development. Using Vicos as a springboard, Lasswell outlined a generalized model for value shaping and sharing as it contributed to inducing initiatives and accelerating development. Finally, he discussed induced initiative as a national development strategy.

In closing the session, Lasswell stressed the contribution of the Vicos project to the policy-science technique of prototyping, which he distinguished from experimentation: although the papers were couched in terms of value-category analysis, their general tenor was of prototyping.

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Forthcoming Events

March

1–2. Systems for the **Intellectual Organization of Information**, seminar, Rutgers Univ., New Brunswick, N.J. (S. Artandi, Graduate School of Library Service, Rutgers Univ., New Brunswick)

1–4. **Unmanned Spacecraft**, Los Angeles, Calif. (R. D. DeLauer, TRW/Space Technology Laboratories, Norton Air Force Base, San Bernardino, Calif.)

1–5. National Council on the **Aging**, 14th annual, Washington, D.C. (NCA, 49 W. 45 St., New York, N.Y. 10036)

1–5. Society of **Plastics Engineers**, annual, Boston, Mass. (G. P. Fong, c/o Sweetheart Plastics Inc., Guildware Park, Wilmington, Mass.)

4–5. Physical Basis of **Radioisotope Applications**, Wantage, England. (C. G. Clayton, U.K. Atomic Energy Authority, Wantage Research Laboratory, Wantage)

4–6. Fundamental **Cancer Research**, 19th annual symp., Univ. of Texas, Houston. (D. N. Ward, Univ. of Texas Medical Center, Houston 77025)

4–6. Central **Surgical** Assoc., Milwaukee, Wis. (C. E. Lischer, 457 N. Kingshighway, St. Louis 8, Mo.)

5–6. **Congenital Malformations of the Central Nervous System**, intern. colloquium, Paris, France. (J. Chevreux, c/o Service de M. le Prof. Leon Michaux, Hôpital de la Salpetrière, Boulevard de l'Hôpital, Paris[13e])

5–7. American Assoc. of **Pathologists and Bacteriologists**, Philadelphia, Pa. (M. I. O'Connor, Williams and Wilkins Co., 428 E. Preston St., Baltimore, Md. 21202)

5–7. National **Wildlife** Federation, 29th annual, Washington, D.C. (T. L. Kimball, 1412 16th St., NW, Washington, D.C.)

7–10. International Acad. of **Pathology**, 54th annual, Philadelphia, Pa. (F. K. Mostofi, Armed Forces Inst. of Pathology, Washington, D.C.)

7–10. **Mineralogical** Assoc. of Canada, 10th annual, Toronto, Ontario. (J. A. Mandarino, Dept. of Mineralogy, Rolay Ontario Museum, 100 Queen's Park, Toronto 5).

8–9. **High Speed Testing**, intern. symp., Boston, Mass. (R. H. Supnik, Plas-Tech Equipment Corp., 4 Mercer Rd., Natick, Mass.)

8–10. **Calibration**, intern. conf., Leipzig, Germany. (Kammer der Technik, Ebertstr. 27, Berlin W.8)

8–10. **Marine Systems**, conf., American Inst. of Aeronautics and Astronautics/U.S. Navy, San Diego, Calif. (AIAA, 1290 Sixth Ave., New York, N.Y. 10019)

8–10. Society of **Toxicology**, annual, Williamsburg, Va. (C. S. Weil, Mellon Inst., 4400 Fifth Ave., Pittsburgh, Pa. 15213)

8–11. American College of **Surgeons**, clinical congr., Seattle, Washington. (S. P. Harbison, 55 E. Erie St., Chicago, Ill.)

8–12. American Soc. of **Civil Engineers**, Mobile, Ala. (W. H. Wisely, ASCE, 345 E. 47 St., New York, N.Y. 10017)

8–12. **Personnel Dosimetry** for Accidental High Level Exposure to External and Internal Radiation, symp., Vienna, Austria. (J. H. Kane, International Conferences Branch, Div. of Special Projects, U.S. Atomic Energy Commission, Washington, D.C. 20545)

9–10. **Arms Control**, first West Coast conf., Los Angeles, Calif. (R. D. DeLauer, TRW Space Technology Laboratories, Redondo Beach, Calif.)

9–11. **Wildlife Management** Inst., Las Vegas, Nev. (C. R. Gutermuth, 709 Wire Bldg., Washington, D.C.)

10–12. **Particle Accelerator**, conf., Washington, D.C. (R. S. Livingston, Oak Ridge Natl. Laboratory, P.O. Box X, Oak Ridge, Tenn.)

13. Experimental Basis for the Current Management of **Portal Hypertension**, Philadelphia, Pa. (B. Sigel, Woman's Medical College of Pennsylvania, 3300 Henry Ave., Philadelphia 19129)

13–18. **Proctology**, 17th annual teaching seminar, New Orleans, La. (A. J. Cantor, 147-41 Stanford Ave., Flushing, L.I., N.Y. 11355)

14–16. Society for the Study of **Development and Growth**, southeastern regional, Univ. of Georgia, Athens. (D. T. Lindsay, Dept. of Zoology, Univ. of Georgia, Athens 30601)

15–17. **Plant Protection**, 2nd intern. conf., Naples, Italy. (Intern. Anti-Parasitic Centre, Via Barberini, 86, Rome, Italy)

15–17. **Solar Energy** Soc., intern. symp., Phoenix, Ariz. (SES, Arizona State Univ., Tempe 85281)

17–19. **Instrumentation** in the Iron and Steel Industry, 15th natl. conf., Pittsburgh, Pa. (R. P. Trauterman, Allegheny-Ludlum Steel Corp. Research Center, Alabama Ave., Backenridge, Pa.)

17–20. **Medical Schools and Teaching Hospitals**: Curriculum, Programming and Planning, New York Acad. of Sciences, New York, N.Y. (NYAS, 2 E. 63 St., New York 10021)

17–20. American **Orthopsychiatric** Assoc., New York, N.Y. (E. Harrison, 477 FDR Drive, New York, N.Y.)

18. American **Vacuum** Soc., midwestern section, Houston, Tex. (J. H. Kimzey, Manned Spacecraft Center, 2101 Webster-Seabrook Rd., Houston 77058)

18–19. **Zinc Metabolism**, symp., Detroit, Mich. (A. S. Prasad, School of Medicine, Wayne State Univ., Detroit 48207)

18–20. **Michigan Acad.** of Science, Arts, and Letters, Univ. of Michigan, Ann Arbor. (I. J. Cantrall, Museum of Zoology, Univ. of Michigan, Ann Arbor)

19–20. New York **Microscopical** Soc., biennial symp., New York, N.Y. (T. G. Rochow, American Cyanamid Co., Room 467A, Stamford, Conn. 06904)