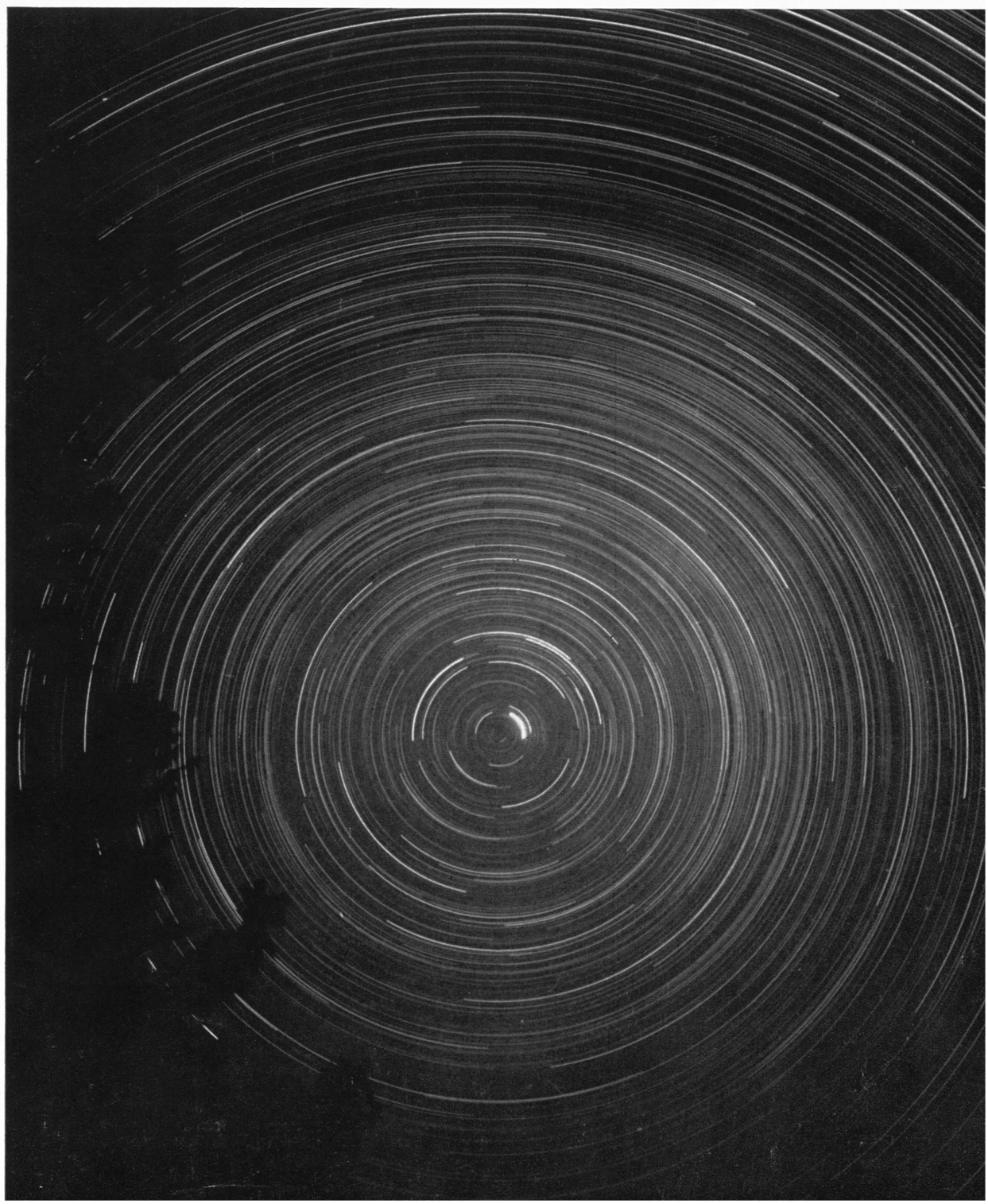
SCIENCE

27 January 1961

Vol. 133, No. 3448

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



Preparative Ultracentrifugation gives the ultimate in fractionation according to size, density, or both

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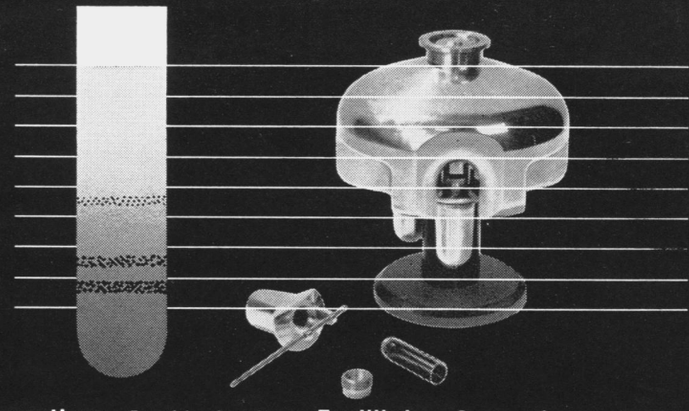

STABILIZING DENSITY GRADIENTS
Gradients can be formed either before centrifugation begins, by layering solutions of different concentrations of a substance such as sucrose—or they can be formed during centrifugation by the redistribution of a material like cesium chloride under the influence of centrifugal force.

Rate Separations—In this density gradient method, particles migrate from the top of the tube at different rates depending on their size, shape and density. Slight differences in density can be exaggerated by changing the density of the solution in the centrifuge tube.

Equilibrium Separations — In this method, particles seek their own density levels in the tube and attain equilibrium positions which are dependent upon density alone. Resolving power in separating materials is dependent upon the magnitude of the density gradient.

The standard equipment for doing density gradient work is the Model L Preparative Ultracentrifuge (left) and SW-39 Swinging Bucket Rotor (above). The rotor operates at speeds to 39,000 rpm, generating 173,000 g at the outer tube edge.

Let the Model L with its outstanding ability to speed through jobs—both routine and exotic—start working for you now. Write for full technical information including: a description of the instrument; an applications chart showing types of materials which can be run (with rotors, times, speeds and references); a new paper summarizing density gradient techniques and how to use them.

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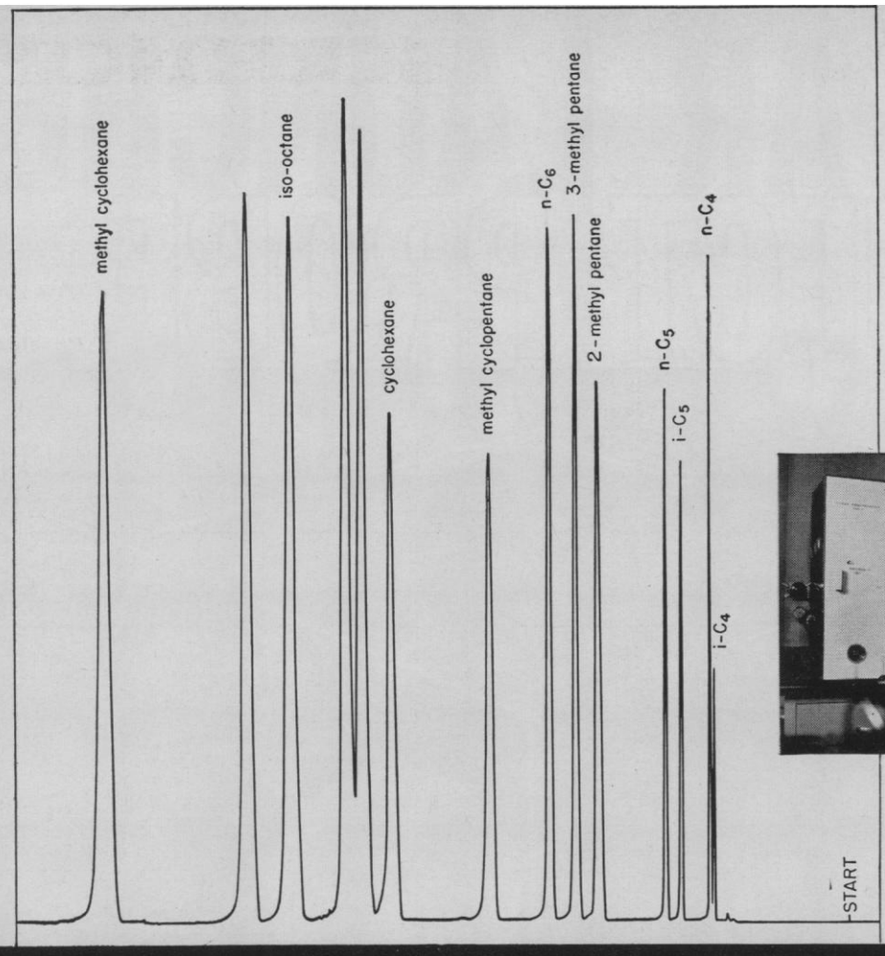
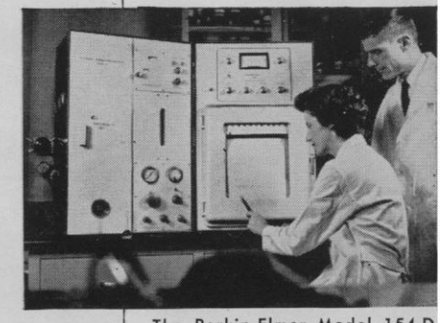


This chromatogram was run on a Model 154-D Vapor Fractometer, utilizing a 150' propylene glycol ("R") Golay* column. Detector was of the flame ionization type. The chromatogram displays high-efficiency separation of a number of C_4-C_6 saturated hydrocarbons.

*Patent No. 2,920,478



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27 January 1961, Volume 133, Number 3448

SCIENCE

Cover

Circumpolar star trail study showing Polaris circling about 1 degree from the true Pole and showing 2000 stars, 42 of which can be seen by the eye (exposure time, 4 hours). From *Outer Space Photography for the Amateur* by Henry E. Paul; see page 271. [Amphoto, New York]

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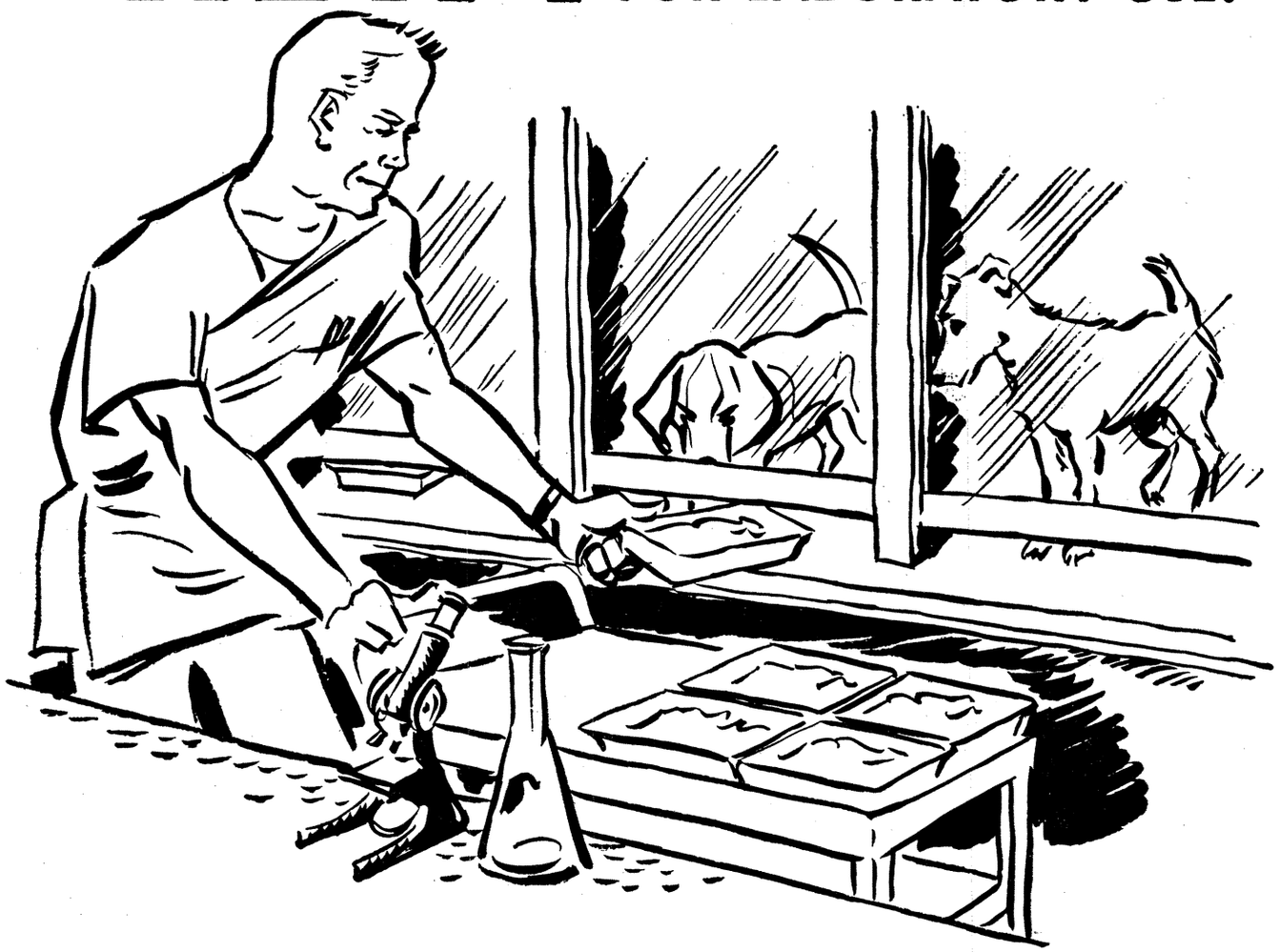

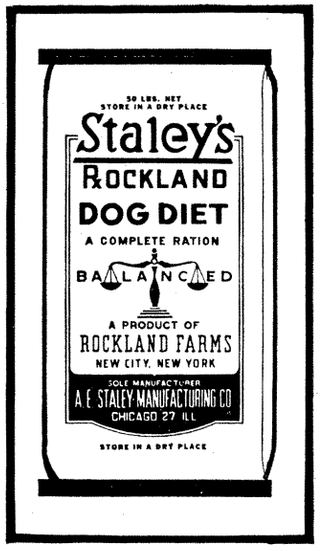

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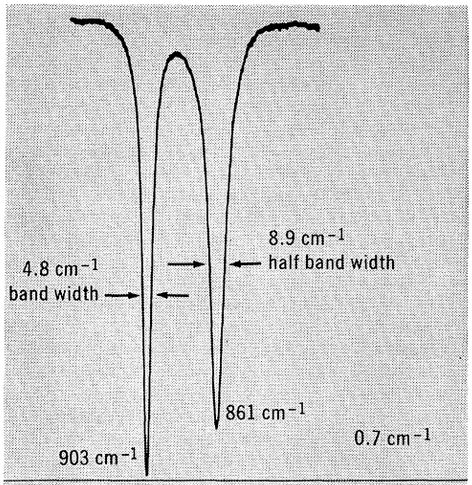
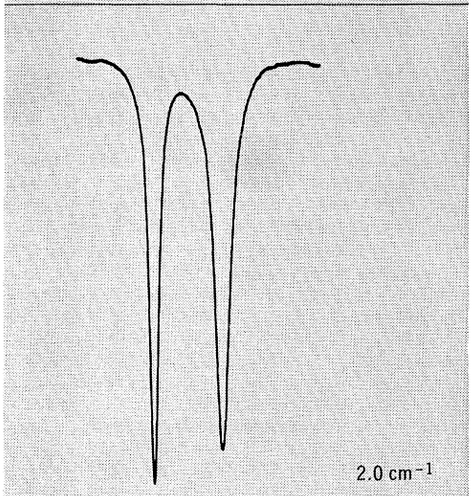
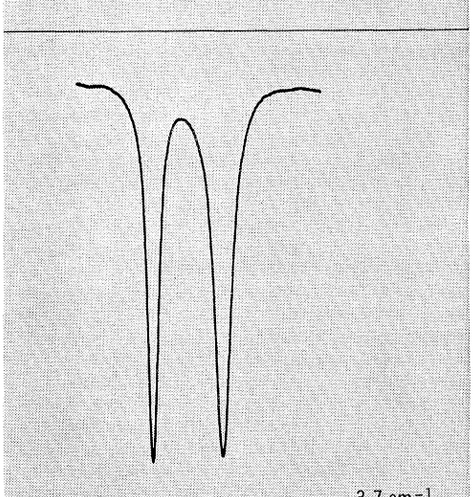
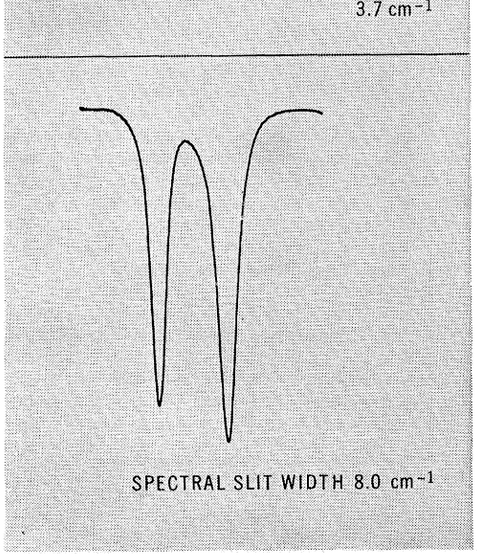


Left, spectrum of a 0.21 mm. thickness sample of spectro-grade cyclohexane demonstrates the importance of high resolution for routine *quantitative analysis.*

Right, the C-H stretching band of methane illustrates the increased research *data obtainable with high resolution spectroscopy.*







Beckman IR... highest resolution for routine quantitative analysis and advanced theoretical studies.

High resolution of the Beckman IR-7 does more than merely separate closely spaced neighboring bands. Note, for instance, how the apparent intensities of the two cyclohexane bands increase with higher resolution. The relatively greater increase in the intensity of the 903 cm^{-1} band at higher resolutions is the result of its narrower half-band width. These two commonly analyzed samples demonstrate the importance of high resolution in both low and high frequency regions and, for both gas and liquid samples. Comparative spectra were run with identical samples; slit width and resolutions, were varied as noted. ⌘ High resolution is essential for *all areas of spectroscopy;* for studies of molecular motion and structure, for differentiating between substances which exhibit similar spectra, and also for providing increased sensitivity and absolute accuracy for quantitative analysis. A further long-run advantage of high resolution is the increased potential for transferring data from one instrument to another. For more information about high resolution spectrophotometers, including indene spectra, write for Data File 38-1-02.

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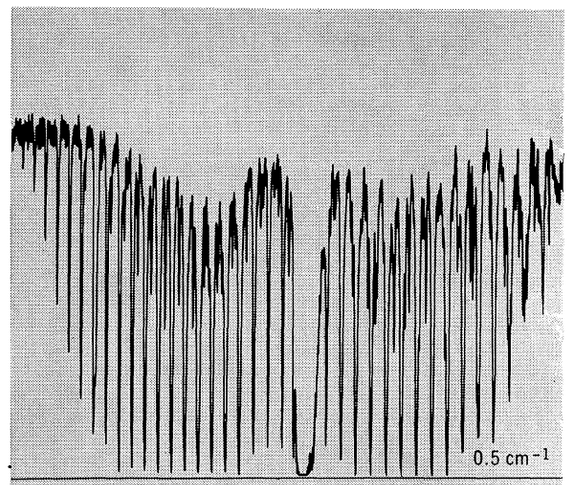

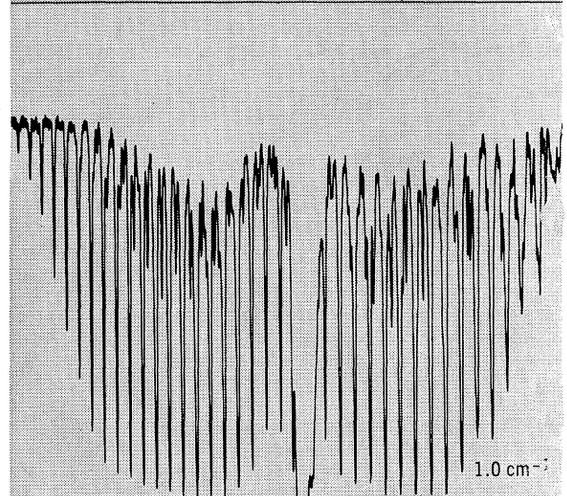

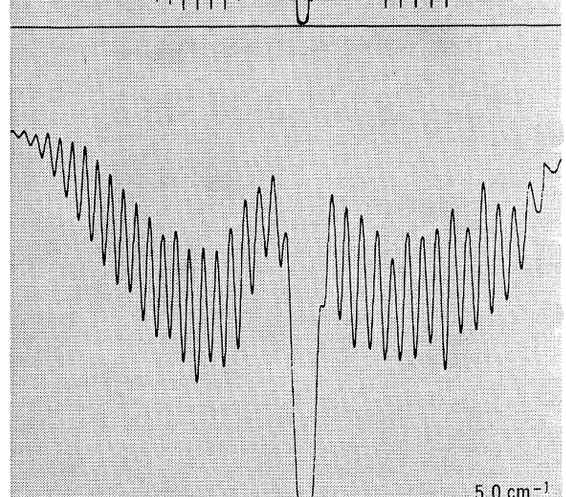

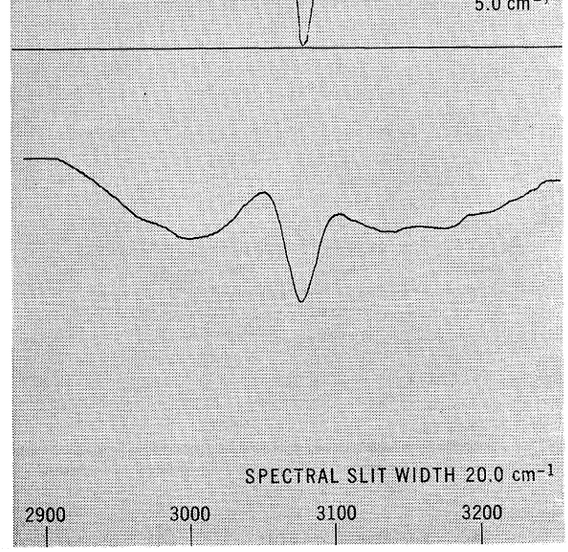

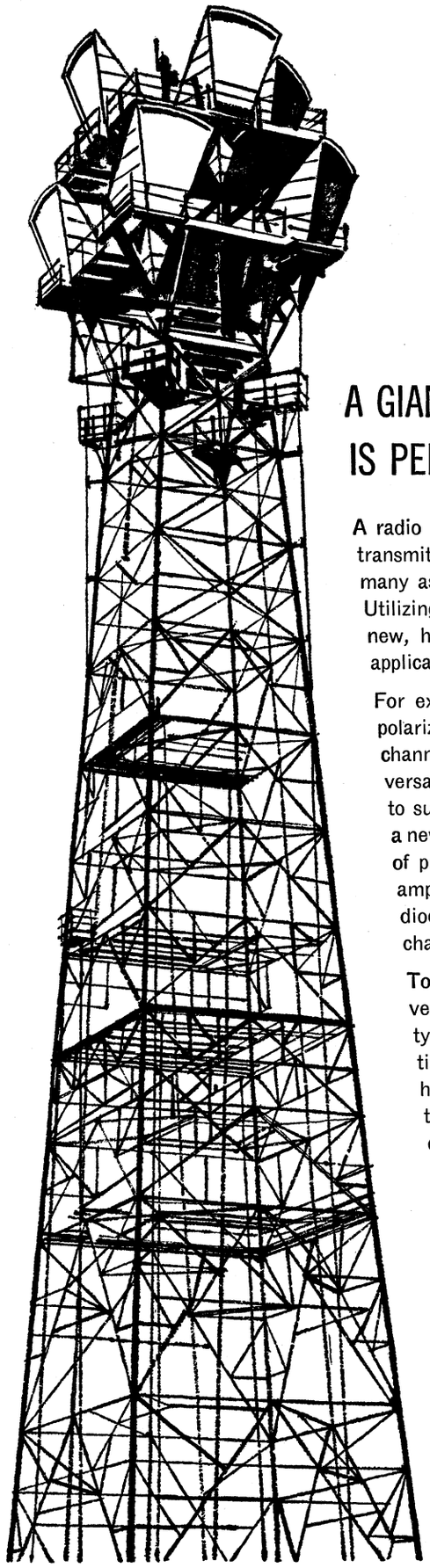

A GIANT RADIO HIGHWAY IS PERFECTED FOR TELEPHONY

A radio relay system operating at 6 billion cycles per second and able to transmit 11,000 voices on a single beam of microwaves—several times as many as any previous system—has been developed at Bell Laboratories. Utilizing the assigned frequency band with unprecedented efficiency, this new, heavy-traffic system was made possible by the development and application of new technology by Bell Laboratories engineers and scientists.

For example, they arranged for the waves in adjacent channels to be polarized 90 degrees apart, thus cutting down interference between channels and permitting the transmission of many more telephone conversations in the same frequency space. They developed ferrite isolators to suppress interfering wave reflections in the waveguide circuits; and a new traveling wave tube that has ten times the power handling capacity of previous amplifiers and provides uniform and almost distortionless amplification of FM signals. They devised and applied a new high-speed diode switching system which instantly switches service to a protection channel when trouble threatens.

To transmit and receive the waves, the engineers applied their invention, the horn-reflector antenna. Elsewhere, this versatile antenna type is brilliantly aiding space communication research in the reception of radio signals from satellites. For radio relay, a single horn-reflector antenna can efficiently handle both polarizations of the 6000 megacycle waves of the new system; at the same time it can handle 4000 and 11,000 megacycle waves used for existing radio relay systems. Thus it enables all three systems to share economically the same radio towers and routes.

Produced by the Bell System's manufacturing unit, Western Electric, the new system is now in operation between Denver and Salt Lake City, and will gradually be extended from coast to coast. This new advance in radio technology is another example of how Bell Telephone Laboratories works to improve your Bell communication services.

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27 January 1961, Volume 133, Number 3448

SCIENCE

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Advising the President on Manpower

The President needs, and gets, advice on a wide variety of matters. Among the more highly institutionalized sources, his Council of Economic Advisers exists by congressional statute, and his Science Advisory Committee by his own decision. His Task Force on Education has advocated an Advisory Committee on Education, and the President himself has hinted at the possibility of a comparable body to consider natural resources.

Before the structure of presidential advisory bodies grows too complex and compartmentalized, it would be well to consider the matter on a more comprehensive basis, or to consider advisory bodies that would deal with wider ranges of topics than any of those yet mentioned. Senator Clark made one such proposal last spring in recommending an Advisory Council on Manpower. He was thinking broadly of the optimal development and utilization of the nation's human resources. The advisers he had in mind would be an integrating force among the several agencies of the government that deal with, advise upon, or directly influence education, economic trends, the labor force, manpower distribution, and kindred matters.

There is a considerable number of such agencies, including the Office of Education, the National Institutes of Health, the National Science Foundation, the International Cooperation Administration, and the Departments of Agriculture, Defense, and Labor. They offer scholarships or fellowships to attract students into selected professions; they study manpower trends; their policies of utilization, taxation, and military service make some kinds of work more attractive than others. And the government itself employs millions of men and women for many kinds of work in many parts of the world.

When the government itself is doing so much both to study and to influence the development and utilization of the nation's human resources, it becomes almost obligatory to establish means by which the influences and their effects can be viewed as a whole. Because so many independent agencies of government are involved, it is only at the presidential level that responsibility for the over-all view can be exercised. Yet a statutory Advisory Council on Manpower may not be the proper means. Hearings on Senator Clark's bill in June and December elicited a good deal of support for an integrated review of the nation's human resources problems and a good deal of doubt concerning another statutory council of presidential advisers. It would be better, most witnesses agreed, to let the President select his own methods, so long as he accepts responsibility for establishing some adequate means of assuring continuing top-level attention to the vital problems of attaining optimal development and utilization of the nation's greatest source of strength, its wealth of human ability.

The burden of the presidency is already so great that one cannot lightly recommend the addition of a new responsibility. Yet the optimal development and utilization of human ability—the one natural resource for which there is no substitute—is so basic to the achievement of our national purposes and so fundamental an element of the democratic ideal that it is hard to think of a long-range problem more deserving of presidential attention, or more worthy of a periodic presidential report to the Congress and the nation.—D.W.

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Meetings

Forthcoming Events

February

6–8. American Acad. of Allergy, 17th annual, Washington, D.C. (J. O. Kelly, 756 N. Milwaukee St., Milwaukee 2, Wis.)

6–8. Geodesy in the Space Age, symp., Ohio State Univ., Columbus. (W. A. Heiskanen, Ohio State Univ., 1314 Kinnear Road, Columbus 12)

6–10. British Medical Assoc., annual, Auckland, New Zealand (E. Grey-Turner, B.M.A., Tavistock Sq., London, W.C.1)

9–15. Second Allergy Conf., Nassau, Bahamas. (I. M. Wechsler, P.O. Box 1454, Nassau)

13–16. American Soc. of Heating, Refrigerating and Air-Conditioning Engineers, Chicago, Ill. (R. C. Cross, 234 Fifth Ave., New York 1)

14–15. Conference on Microdosimetry, 2nd, Rochester, N.Y. (N. Kreidl, Bausch & Lomb Optical Co., Inc., Rochester 2)

15–17. International Solid-State Circuits Conf., Philadelphia, Pa. (J. J. Suran, Bldg. 3, Room 115, General Electric Co., Electronics Park, Syracuse, N.Y.)

16–18. Biophysical Soc., annual, St. Louis, Mo. (W. Sleator, Dept. of Physiology, Washington Univ., St. Louis 10)

22–25. American Educational Research Assoc., annual, Chicago, Ill. (G. T. Buswell, 1201 16th St., NW, Washington 6)

23–25. Fifteenth Annual Symp. on Fundamental Cancer Research, Houston, Tex. (Publications Dept., Univ. of Texas M.D. Anderson Hospital and Tumor Inst., Texas Medical Center, Houston 25)

23–25. Symposium on Molecular Basis of Neoplasia, Houston, Tex. (Publications Dept., Texas Medical Center, Houston 25)

26–1. American Inst. of Chemical Engineers, natl., New Orleans, La. (F. J. Van Antwerpen, AICHE, 25 W. 45 St., New York 36)

26–2. American Inst. of Mining, Metallurgical, and Petroleum Engineers, annual, St. Louis, Mo. (AIME, 29 W. 39 St., New York 18)

27–3. Conference on Analytical Chemistry and Applied Spectroscopy, 12th, Pittsburgh, Pa. (L. P. Melnich, U.S. Steel Corp., Monroeville, Pa.)

March

2–4. Optical Soc. of America, spring meeting, Pittsburgh, Pa. (Miss M. Warga, 1155 16th St., NW, Washington 6, D.C.)

2–5. National Wildlife Federation, 25th annual, Washington, D.C. (Natl. Wildlife Federation, 1412 16th St., NW, Washington 6)

5–9. Gas Turbine Conf. and Products Show, 6th annual, Washington, D.C. (Meetings Dept., American Soc. of Mechanical Engineers, 29 W. 39 St., New York 18)

6–8. North American Wildlife and Natural Resources Conf., 26th, Washington, D.C. (C. R. Gutermuth, Wildlife Management Inst., 709 Wire Bldg., Washington 5)

7–9. American Railway Engineering Assoc., annual, Chicago, Ill. (N. D. Howard, 59 E. Van Buren St., Chicago 5)

8–10. Instrument Soc. of America Conf., 11th annual, Pittsburgh, Pa. (R. R. Webster, 900 Agnew Ave., Pittsburgh 30)

8–11. Neurosurgical Soc. of America, Boca Raton, Fla. (R. K. Thompson, 803 Cathedral St., Baltimore 1, Md.)

9–10. Magnetohydrodynamics, symp. on engineering aspects of, Philadelphia, Pa. (N. W. Mather, Project Matterhorn, P.O. Box 451, Princeton, N.J.)

12–17. American College of Allergists, annual, Dallas, Tex. (P. Gottlieb, 818 Medical Arts Bldg., Philadelphia, Pa.)

13–17. National Assoc. of Corrosion Engineers, annual, Buffalo, N.Y. (W. A. Mapler, 18263 W. McNichols Rd., Detroit 19, Mich.)

13–24. Radiological Health, course in, Cincinnati, Ohio. (Chief, Training Program, Sanitary Engineering Center, 4676 Columbia Parkway, Cincinnati 26)

14–16. Clinico-Pathological Significance of Renal Biopsy, Ciba Foundation symp. (by invitation only), London, England. (Ciba Foundation, 41 Portland Place, London, W.1)

14–16. Inter-Station Supersonic Track Conf., 6th symp., China Lake, Calif. (U.S. Naval Ordnance Test Station, Code 307, China Lake, Calif.)

15–17. Medical Photography and Cinematography, intern. cong., Cologne, Germany. (Deutsche Ges. für Photographie, Neumarkt 49, Cologne)

16–17. Textile Engineering Conf., American Soc. of Mechanical Engineers, Clemson, S.C. (ASME Meetings Dept., 29 W. 39 St, New York 18)

16–18. Aviation/Space Education, 5th natl. conf., Washington, D.C. (Natl. Aviation Education Council, 1025 Connecticut Ave., NW, Washington 6)

17–19. International Medical Conf., Liège, Belgium. (Medical Commission of the FIR, Castellezgasse 35, Vienna II)

19–25. American Soc. of Photogrammetry, American Cong. on Surveying and Mapping, Washington, D.C. (C. E. Palmer, ASP, 1515 Massachusetts Ave., NW, Washington 5)

20–22. American Physical Soc., Monterey, Calif. (W. A. Nierenberg, Univ. of California, Berkeley 4)

20–23. Institute of Radio Engineers, 1961 intern. convention, New York, N.Y. (E. K. Gannett, IRE, 1 E. 79 St., New York 21)

20–24. American Surgical Assoc., Boca Raton, Fla. (W. A. Altemeier, Cincinnati General Hospital, Cincinnati 29, Ohio)

20–24. National Health Council, forum and annual meeting, New York, N.Y. (NHC, 1790 Broadway, New York 19)

20–24. Western Metal Cong. and Exposition, 12th, Los Angeles, Calif. (A. R. Putnam, American Soc. for Metals, Metals Park, Ohio)

21–23. American Meteorological Soc., general meeting, Chicago, Ill. (E. P. McClain, Dept. of Meteorology, Univ. of Chicago, Chicago 37)

21–23. American Physical Soc., Division of High-Polymer Physics, 21st, Monterey, Calif. (D. W. McCall, Bell Telephone Laboratories, Murray Hill, N.J.)

21–23. American Power Conf., 23rd annual, Chicago, Ill. (W. C. Astley, Philadelphia Electric Co., 900 Sansom St., Philadelphia 5, Pa.)

(See issue of 20 January for comprehensive list)