TECHNOLOGY REVIEW

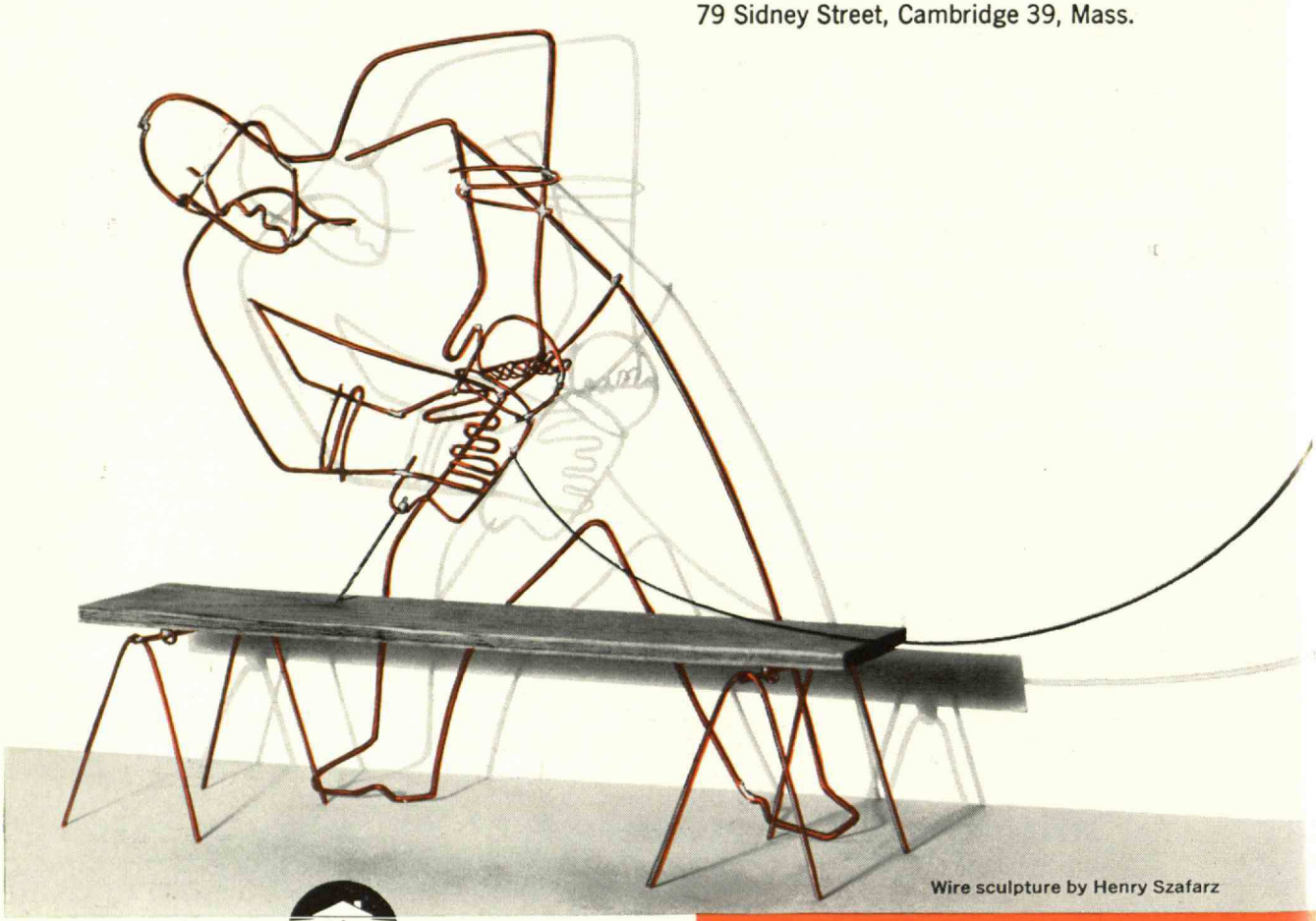
May 1957

"Week-end Wizard"

The spirit of do-it-yourself has made us a nation of handy men. At the same time, it has sharpened our appreciation of power tools and equipment: Simplex-TIREX cords and cables, for instance. These expertly engineered cords and cables are on the job everywhere: in home workshops, in factories, in mines, and on giant construction projects.

TIREX cords and cables, newly improved for greater flexibility, feature cured-in-lead Neoprene Armor that resists abrasion, oil, heat and water . . . gives longest service.

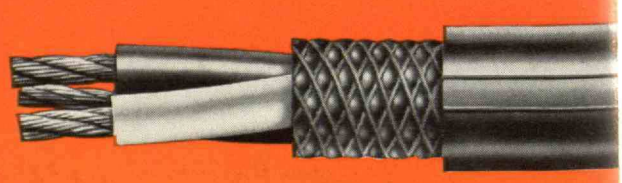
SIMPLEX WIRE & CABLE CO.,
79 Sidney Street, Cambridge 39, Mass.



Wire sculpture by Henry Szafarz

LIVE BETTER ELECTRICALLY

Simplex

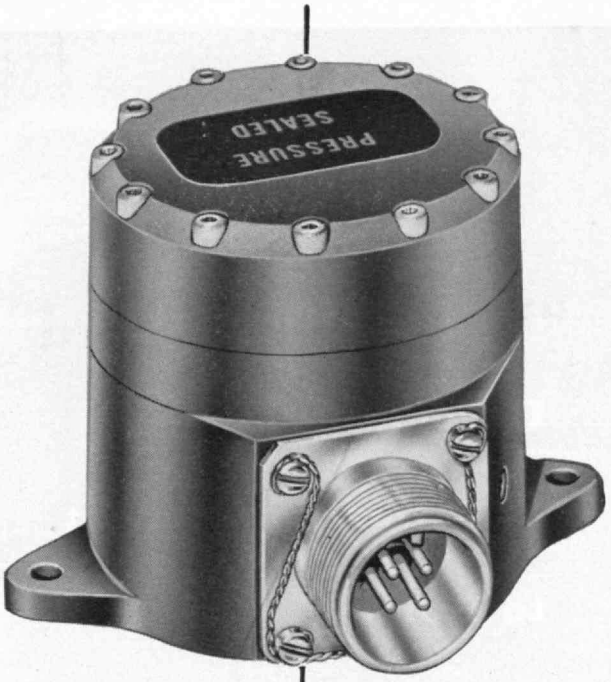


Tirex Portable Cable

LINEAR ACCELEROMETERS

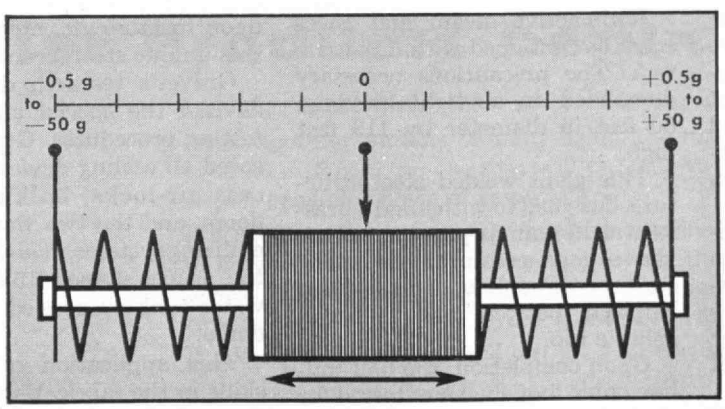
for Aircraft and Missiles

ZERO CROSS-COUPLING NON-PENDULOUS TYPE



Shown Actual Size

Honeywell Linear Accelerometers sense positive or negative accelerations or both in either the vertical or horizontal plane. Designed for use in aircraft and missiles, they are available in a variation of ranges from ± 0.5 g to more than ± 50 g's depending upon requirements. These units consist of a centrally located mass restrained by coil springs and supported on a linear-type ball-bearing. Any movement of the mass on either side of the null displacement position is measured by a potentiometer pick-off, providing a high level output signal. Viscous damping is incorporated for improved dynamic response. Zero cross-coupling is inherent with this true linear non-pendulous design. (Cross-coupling is defined as a change in output signal caused by an acceleration applied from any direction in a plane normal to the sensing axis) Excitation may be as high as 100 volts (A-C or D-C) depending on the potentiometer resistance. *Write for Bulletin LA . . .* Minneapolis-Honeywell, Boston Division, Dept. 1, 1400 Soldiers Field Road, Boston 35, Mass.



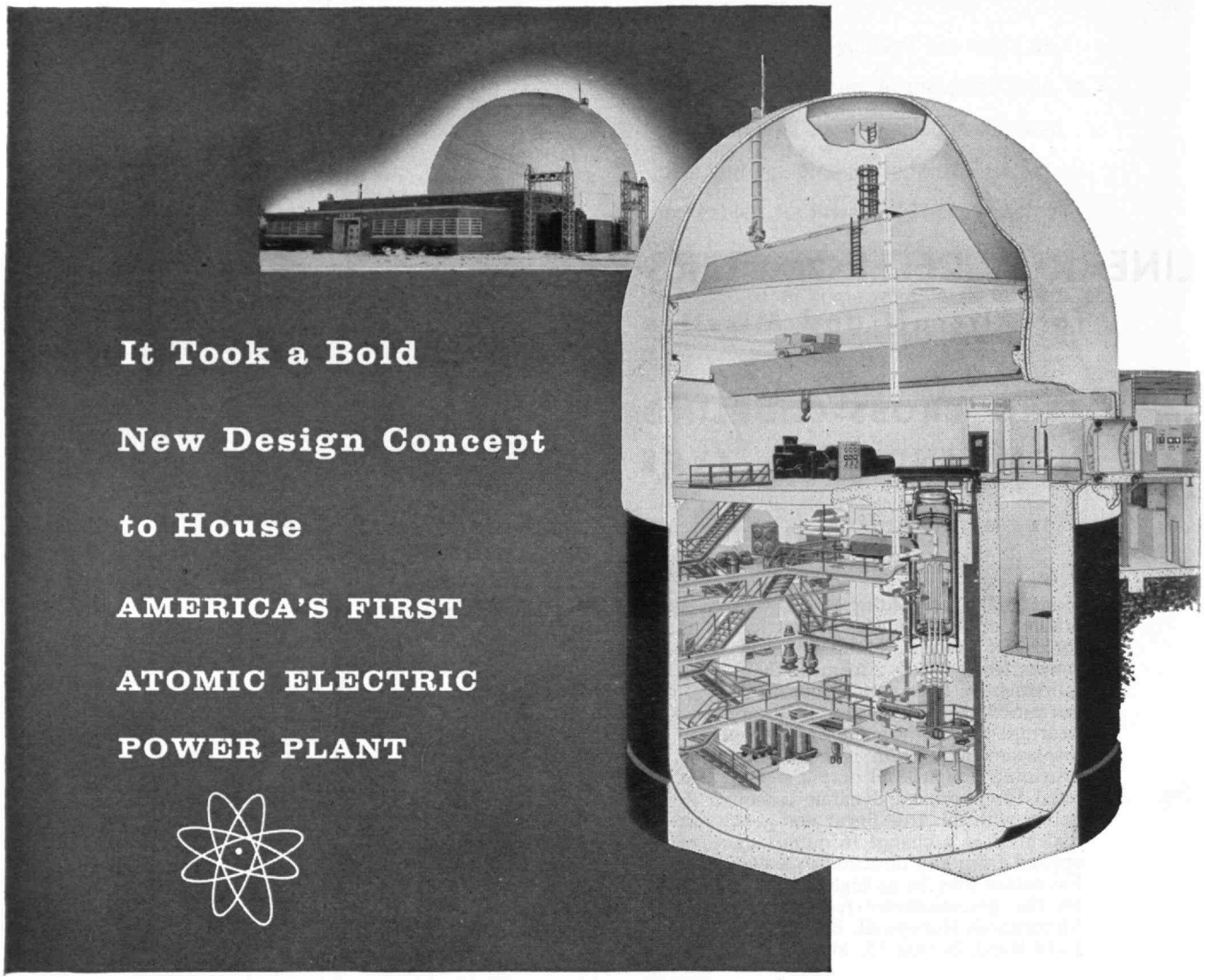
- **LINEAR RESPONSE**
- **D-C OUTPUT SIGNAL**
- **VISCOUS DAMPING**
- **HERMETICALLY SEALED**
- **EXTREMELY RUGGED**
- **WEIGHT: APPROXIMATELY 0.9 POUNDS**
- **ENVIRONMENT: MEETS MIL-E-5272A**

MINNEAPOLIS **Honeywell** HONEYWELL

BOSTON DIVISION

Write for Bulletin LA

THE TECHNOLOGY REVIEW, May, 1957, Vol. LIX, No. 7. Published monthly from November to July inclusive at Emmett Street, Bristol, Conn. Publication date: twenty-seventh of the month preceding date of issue. Annual subscription, $4.00: Canadian and Foreign subscription, $4.50. Entered as second-class matter December 23, 1949, at the Post Office, at Bristol, Conn., under the Act of March 3, 1879.



How do you house an atomic electric power plant? Dig a hole five stories down. Erect a giant ten-story welded steel "containment vessel." Seal it off air-tight, and you have one of the largest pressure vessels man has ever been called on to build.

That's the story, over-simplified, of the unique housing required for America's first nuclear-powered electric plant, the Experimental Boiling Water Reactor, at Argonne National Laboratory, Lemont, Illinois.

In our practical, efficient world of engineering, there is a sound structural reason for the unusual dome-shaped building, now recognized by everyone as the symbol of atomic-power-for-peace.

Radioactive steam and gases must be contained within the system. The precautions necessary demanded an air-tight building, 80 feet in diameter by 119 feet high.

This giant welded steel structure, designed to withstand a pressure of 15 pounds per square inch above gage pressure, was made concave throughout, with a semi-ellipsoid bottom and a hemispheric top.

Upon completion, the half-million cubic foot shell was tested for air-tightness. Never before had so large a welded structure required such thorough testing against air loss.

Graver's skills, backed by a century of experience, were called upon to fabricate, erect and test this unique steel structure.

Graver's research department devised the special air-tightness testing procedures. Graver fabricated all sealing devices—the access air-locks, bulkheads and doors, and the two water-demineralizing systems. It also furnished the saucer-shaped 15,000 gallon water tank suspended under the dome.

This application of Graver's skills in the fabrication and erection of America's first atomic power plant is indicative of Graver's readiness to help you fulfill your plans for the future, no matter how unusual or exacting the requirements.

Building for the Future on 100 Years of Craftsmanship in Steels and Alloys

GRAVER TANK & MFG. CO., INC.

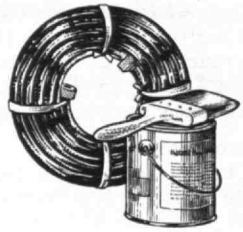
EAST CHICAGO, INDIANA • NEW YORK • PHILADELPHIA • EDGE MOOR, DELAWARE
PITTSBURGH • DETROIT • CHICAGO • TULSA • SAND SPRINGS, OKLAHOMA
HOUSTON • LOS ANGELES • FONTANA, CALIFORNIA • SAN FRANCISCO

GRAVER®

. . . tires or toys

. . . ribbons or ropes

. . . house paints or hoses



Better Products begin with CABOT!

It's truer today than ever — no product has a monopoly on quality.

As competition stiffens in many fields, the manufacturer's search for a meaningful product *difference* — one that will put a hefty *plus* in sales — must begin with the wisest possible choice of raw materials.

It is here that Cabot, with its 75 years experience in supplying superior raw materials to industry, can be of immense help — whether you make house paints or garden hoses. From the wide variety of Cabot materials . . . from our extensive experience in raw material problems . . . may come the product plus you've been looking for.

It costs you nothing to find out if Cabot can help you . . . why not call us today?

WHICH OF THESE CABOT MATERIALS CAN HELP YOUR PRODUCT?

CABOT CARBON BLACKS . . . *more than 45 different grades of channel, furnace and thermal blacks for use by the rubber, printing ink, paint, varnish, lacquer, enamel, plastics, paper, phonograph record, battery and other industries.*

WOLLASTONITE . . . *as a paint pigment, this white, uniform calcium metasilicate, has more desirable properties than other extenders used singly or in combination. Excellent for ALL types of paint, and for the quality improvement of wall tile and semi-vitreous ceramics.*

CAB-O-SIL® . . . *this unique colloidal silica, in extremely small quantities, greatly improves large numbers of products. The best flow control agent available, it's especially remarkable for its unusual combination of properties. Used for rubber, paint, varnish, printing ink, plastics, lubricants, cosmetics, many other products.*

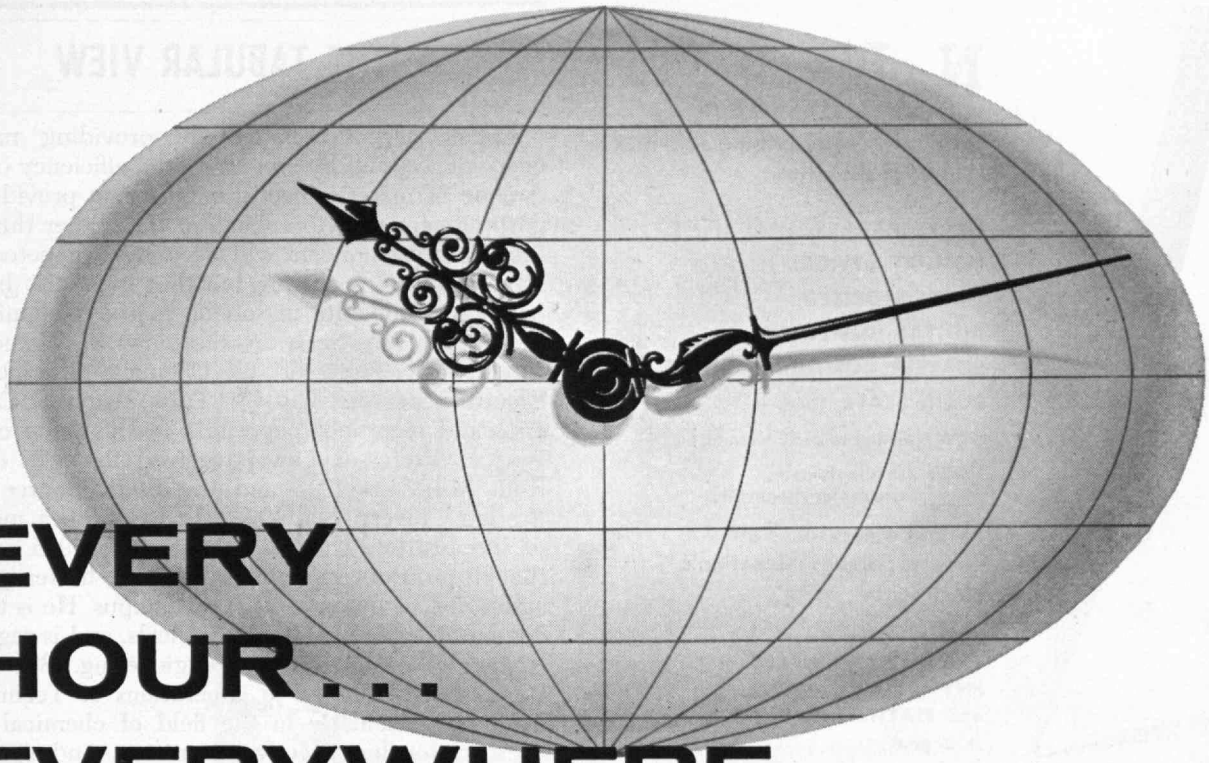
CABFLEX® PLASTICS CHEMICALS . . . *a complete range of plasticizers developed for the specific improvement of rubber and vinyl plastic products.*

PT® PINE TAR PRODUCTS . . . *these versatile quality controlled materials improve the performance of a wide variety of products, including: rubber, paint, cordage, oakum and insecticides.*

For complete information, phone or write:

GODFREY L. CABOT, INC.
77 FRANKLIN ST., BOSTON 10, MASSACHUSETTS
Phone: Liberty 2-7300

CABOT®



EVERY HOUR... EVERYWHERE

...electric power becomes more abundant

In the twentieth century, prosperity is directly related to abundant electricty! This realization has swept the globe in recent years, leaving in its wake an outcropping of power facilities beyond the most extravagant predictions. In all corners of the earth, electrification is becoming the watchword for progress.

Even in the United States, where an ample supply of electrical power has long been taken for granted, electric generating capacity is increasing at an unprecedented rate. In fact, the projected new capacity to be installed in the next decade will substantially exceed the total capacity that the American utility industry has attained in the seventy-five years it has been in existence.

Combustion Engineering is proud of its contribution to the more abundant power movement. Doing business throughout the free world, C-E has helped bring the most advanced, the most economical facilities for steam-electric generation to countries all over the globe. And in 1956 it did so on a greater scale than ever before – with sales of utility boilers at home and abroad, expressed in terms of generating capacity, reaching an all-time record of ten million kilowatts – more capacity than the entire American utility industry installed in any year prior to 1954. These newly ordered C-E Boilers will soon be helping to bring more electricity to homes and industries in twenty-seven states of the U.S.A. and numerous foreign countries.

C-E ACTIVITY "ROUND THE WORLD" IN 1956 is shown by this list of countries outside the U.S.A. in which C-E steam generating and related equipment was placed in service in 1956—or is currently on order or under construction. This equipment includes boilers not only for power generation but for all steam requirements of industry—in plants small and large, using a wide variety of fuels.

Argentina
Belgium
Brazil
British West Indies
Canada
Chile
Colombia
Cuba
Dominican Republic
Ecuador
Egypt
El Salvador
England
Finland
Formosa
France
Guatemala
Holland
India
Israel
Italy
Japan
Korea
Mexico
Newfoundland
Norway
Panama
Peru
Philippines
Puerto Rico
Sicily
South Africa
Spain
Spanish Morocco
Sumatra
Venezuela

COMBUSTION ENGINEERING

Combustion Engineering Building • 200 Madison Avenue, New York 16, N. Y.

B-982A

ALL TYPES OF STEAM GENERATING, FUEL BURNING AND RELATED EQUIPMENT; NUCLEAR REACTORS; PAPER MILL EQUIPMENT; PULVERIZERS; FLASH DRYING SYSTEMS; PRESSURE VESSELS; SOIL PIPE

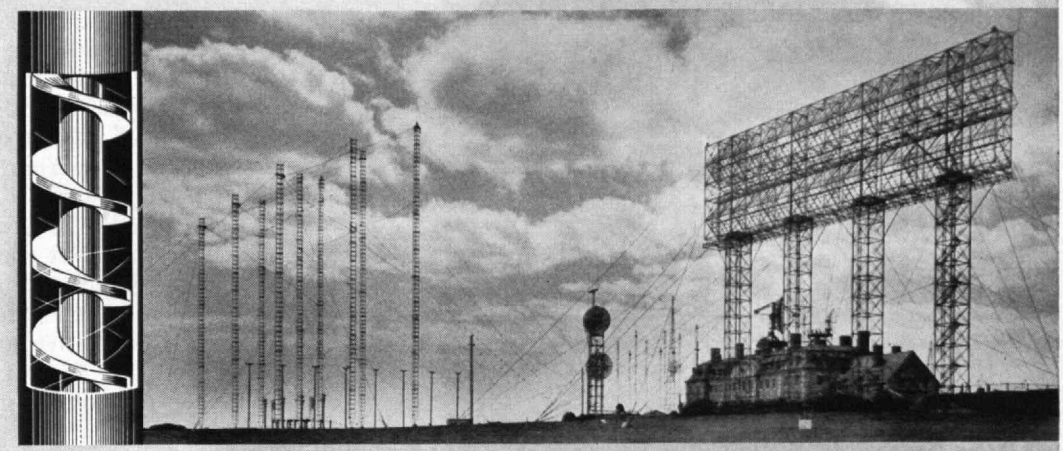
THE TABULAR VIEW

Engineering Profession.—By providing mastery over science, and by increasing the efficiency of production of material needs, engineering provides opportunity for man to engage in the higher things of life. Future engineers will need the competence to solve technical problems, but they must also be prepared to co-operate in solving man's economic and social problems. Such are the views of WARREN K. LEWIS, '05, Professor of Chemical Engineering, Emeritus, expressed at the Tulsa Regional Conference and recorded (page 351) in this issue of The Review. Professor Lewis received the S.B. degree from M.I.T. in 1905 and the Ph.D. degree from Breslau University in 1908. He has been a member of the Institute's teaching staff since 1905 and although professor emeritus since 1945, he remains an active and vigorous man about campus. He is the recipient of many professional awards, and is regarded as the father of chemical engineering. But "Doc" Lewis is best known to generations of Technology Alumni, particularly in the field of chemical engineering, for his effective, inspiring, and sparkling teaching. Some of his better known anecdotes from his teaching and professional experience have been collected in a booklet, *A Dollar to a Doughnut.*

High School Science. — Because science has become a vital part of the total culture of our times,

(Concluded on page 336)

Demonstrating Outstanding Characteristics
for Forward Scatter Systems . . .



Round Hill Field Station, M.I.T.'s Lincoln Laboratories, South Dartmouth, Mass.

Styroflex Coaxial Cable

A recent series of experimental tests conducted by the Round Hill Field Station of M.I.T.'s Lincoln Laboratories at South Dartmouth, Mass., clearly showed that Styroflex coaxial cable has a number of practical advantages when used as the connecting link between the antenna and transmitter or receiver in forward scatter systems.

The tests demonstrated the particular importance of these general Styroflex characteristics:

1. 1000-foot continuous lengths without splices.
2. Low attenuation.
3. Excellent electrical properties.
4. Capacity to handle high power.
5. No age deterioration regardless of climatic conditions.

An additional advantage of Styroflex—when used as a receiving transmission line—is its extremely low inherent noise level.

Inquiries regarding specific applications for Styroflex are invited.

PHELPS DODGE COPPER PRODUCTS CORPORATION

300 PARK AVENUE, NEW YORK 22, N. Y.

THE TABULAR VIEW

(Concluded from page 334)

there is good reason for teaching it in secondary schools as an indispensable element of modern liberal education. There is also need to develop a sense of the importance and pride of learning, according to views expressed (page 355) by CHANCELLOR J. A. STRATTON, '23. Dr. Stratton's remarks were originally presented as part of a symposium on Secondary School Education, held in Kresge Auditorium on January 17, under the auspices of the Boston Section of the Institute of Radio Engineers. To the many honors Dr. Stratton has already received, the Medal of Honor of the I.R.E. – that society's highest award – was presented in New York in March for his contributions as teacher, scientist, author, and administrator. Since becoming provost in April, 1949, Dr. Stratton has been primarily concerned with the Institute's educational policies. Appointments as M.I.T. Vice-president in 1951, and Chancellor in 1956, have increased his administrative responsibilities as well.

Automation. — One of the most elusive things we have run across in recent years is a rational and concise definition of automation. GORDON S. BROWN, '31, Professor of Electrical Engineering, regards this form of robotry as "a manifestation of a great revolution in the way man co-operates with nature" in his article in this issue (page 359). Professor Brown received the S.B., S.M., and Sc.D. degrees from M.I.T. in 1931, 1934, and 1938, respectively. He was director of the Servomechanism Laboratory from its formation in 1941 until 1952, during which time he made an enviable name for his professional work in this field. He was named associate head of the Department of Electrical Engineering in 1950, and head of that Department in 1952. Except for introductory remarks not reproduced here, The Review's article represents the text of an address delivered by Professor Brown some months ago before the Royal Canadian Institute.