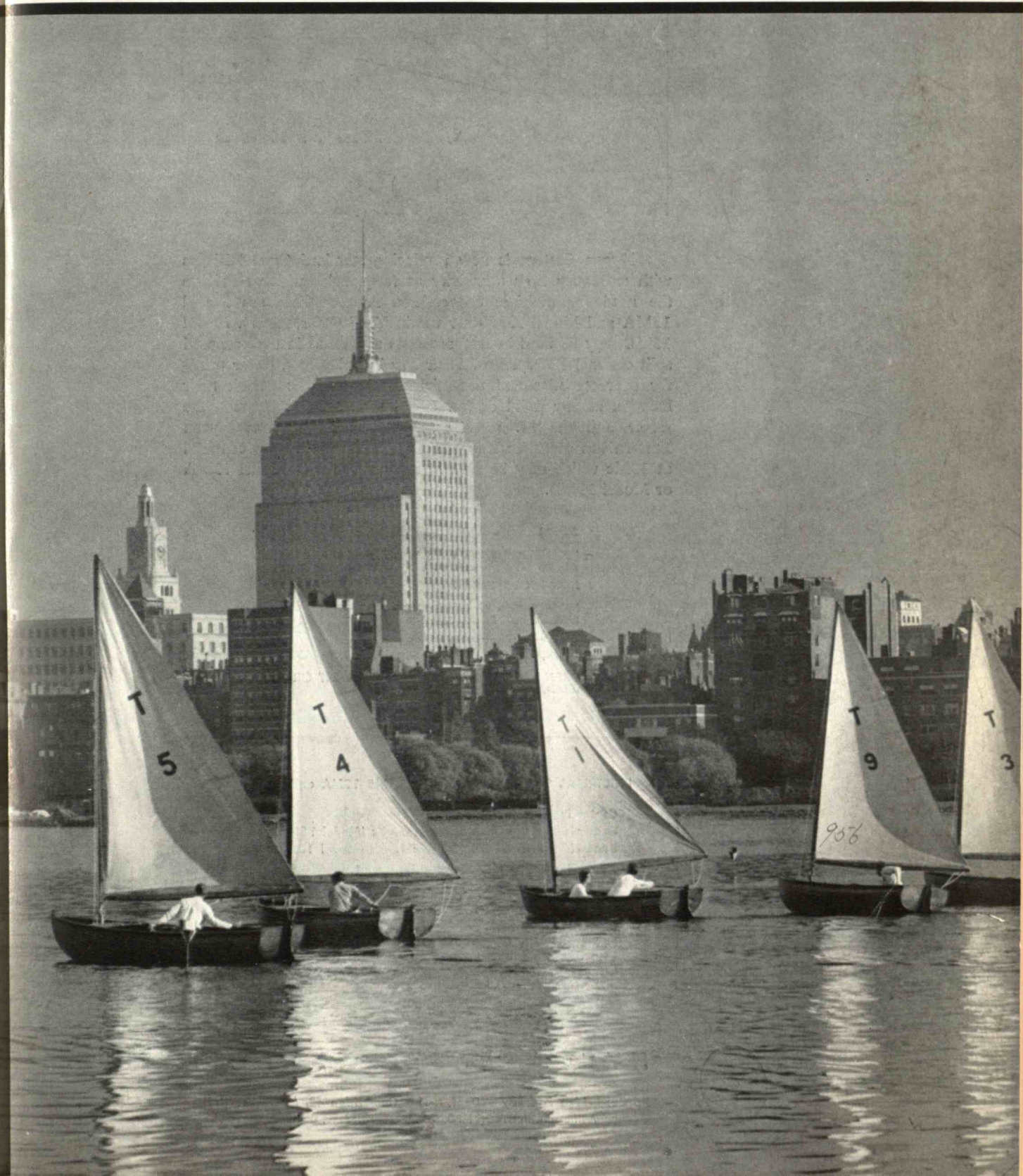


TECHNOLOGY

REVIEW

November 1956



Now . . . only 1 Conversion from VHF to Audio

HYCON EASTERN



Shown 1/2 size
Crystal Filter Model 13MA
patent pending

CRYSTAL FILTERS

Hycon Eastern is now producing standard Crystal Filters with extremely high selectivity at frequencies which eliminate the need for multiple conversions. Among these are Model 13MA and Model 13MB for use in VHF FM receivers. Model 13MB may be used in AM receivers as well as in the proposed split channel FM systems. Their low insertion loss, linear transfer characteristics and non-microphonic qualities permit their location at any point of low signal level such as between the mixer and the i.f. amplifier. For FM applications Hycon Eastern has available standard Crystal Discriminators centered at 13Mc which may be used in conjunction with Model 13MA or Model 13MB.

SMALL SIZE — ONLY 3 1/16" X 1" X 1 1/2"

- **FREQUENCY SHIFT LESS THAN $\pm .005\%$ TOTAL FROM -55° C. TO $+85^{\circ}$ C.**
- **NON-MICROPHONIC**
- **UNAFFECTED BY IMPEDANCE VARIATIONS COMMONLY ENCOUNTERED IN TRANSISTOR CIRCUITS**
- **WORKS DIRECTLY TUBE-TO-TUBE OR TRANSISTOR-TO-TRANSISTOR WITH NO PADDING**
- **HERMETICALLY SEALED, NO ALIGNMENT OR READJUSTMENT NECESSARY**

ELECTRICAL SPECIFICATIONS — MODELS 13MA and 13MB

Center Frequency: 13Mc

Bandwidth at 6 db Attenuation: 30 Kc (Model 13MA)

Bandwidth at 6 db Attenuation: 15 Kc (Model 13MB)

Shape Factor: $\frac{60 \text{ db Bandwidth}}{6 \text{ db Bandwidth}} = \frac{1.8}{1}$

Power Insertion Loss: 6 db Maximum

Passband Response Variation: ± 1 db Maximum

Ultimate Attenuation: 80 db Minimum

Write for Crystal Filter Bulletin



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Foamflex Coaxial Cable

**with outstanding properties for
Community Antennas, Signal Circuits
and Aviation Communications**

Foamflex coaxial cable—a companion of Styroflex and Spirafil coaxial cables—is the latest addition by Phelps Dodge to its unique line of semi-flexible, aluminum sheathed, communication cables.

This new low-loss, radiation-free cable is particularly adapted to use in community antenna systems, signal circuits and aviation communications, including both airborne and ground installations.

Foamflex coaxial cable has a number of outstanding advantages. These include

lighter weight, longer cable life and improved operating characteristics over solid dielectric (RG) types of cables, with good frequency response over wide temperature variations.

★ ★ ★

Foamflex is available in 50 ohm and 70 ohm impedances. When intended for underground duct or direct burial installations and submarine applications, a Habirlene (polyethylene) jacket is supplied for corrosion protection.

**A special bulletin describing Foamflex coaxial cable
will be supplied upon request. Write Dept. HF1.**



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NORTHROP'S NEW GEAR GENERATOR

First of its kind for
Hobbing Precision Gears

(HAWTHORNE, CALIF.) Stone Age and Missile Age meet in a new and revolutionary type of gear generator now in use at Northrop Aircraft's Snark SM-62 missile machine shop at Hawthorne. Pre-historic granite, polished to optical

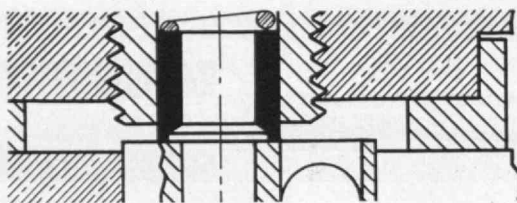


accuracy, provides the foundation that makes this unique Northrop-built generator virtually vibrationless. It is declared by Northrop missile engineers to have the most accurate indexing machine system of any machine in the United States.

An upper and lower carriage permits a two-way optical check of the indexing system which is first located manually and then adjusted through the optical system to an accuracy of one-tenth of a second of arc (4.8 millionths per inch). Possibility for error is reduced to a minimum by a warning from a loud buzzer if the machine is out of sequence when the operator presses a button to start the hob.

This new device is but one of many that illustrate the advanced thinking that never ceases at Northrop. In keeping with this look-ahead spirit, Northrop's new multi-million-dollar engineering and science center, now nearing completion, will offer every facility to young engineers who will find here the aircraft industry's finest scientific installations.

At Northrop, quality of personnel ranks equally with quality of equipment. There, an engineer finds himself moving quickly ahead on fresh assignments that inspire his enthusiasm as well as challenge his ability. His initiative and ideas are respected, encouraged and rewarded.



MECHANICAL ENGINEERS

Continually expanding programs at Northrop Aircraft are creating new opportunities for mechanical engineers in the following areas: launching and landing gear design, hydraulics and pneumatics, control systems, and equipment.

You'll enjoy the fine spirit of cooperation at Northrop. The new multi-million-dollar engineering and science center, now nearing completion, will be a great place to work in, both as to its modern architectural design and newest scientific installations. You'll be associated with a top engineering team on such notable projects as Northrop's new supersonic trainer airplane, Snark SM-62 intercontinental missile, and other advanced aircraft and missile programs.

You'll be given constantly fresh, challenging assignments. Remuneration will be substantial, with many benefits that are unexcelled in the entire industry—health and life insurance, college educational reimbursement plan, regular vacations plus extra year-end vacations with pay, and a generous retirement plan.

At Northrop, the progress of personnel is important. Initiative and ability are recognized and encouraged, and full opportunity is given to present and discuss ideas.

You will find the career opportunity you are seeking at Northrop, pioneer in the design and production of all weather and pilotless aircraft. If you qualify for one of these attractive positions, contact the Manager of Engineering Industrial Relations, Northrop Aircraft, Inc., Oregon 8-9111, Extension 1893, or write to: 1015 East Broadway, Department 4600-BB, Hawthorne, California.



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NORTHROP AIRCRAFT, INC., HAWTHORNE, CALIFORNIA

Producers of Scorpion F-89 Interceptors and Snark SM-62 Intercontinental Missiles

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New CONVAIR F-102A
All-Weather, Delta-Wing,
Supersonic Jet Interceptor

Doelcam

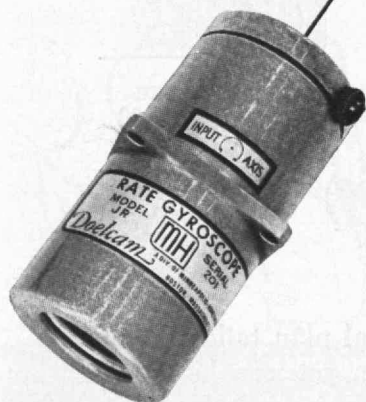
RATE GYRO SYSTEM

in the F-102A features

3 Doelcam Model JR Gyros

with these outstanding characteristics:

- EXCELLENT LINEARITY: 0.25 % of Full Scale.
- LOW HYSTERESIS: Less than 0.1 % of Full Scale.
- LOW THRESHOLD: Less than 0.01 Degree/second.
- MICROSYN PICKOFF: Variable reluctance type providing infinite resolution and high signal-to-noise ratio.
- FULL SCALE RATE: Up to 1000 Degrees/second.
- FULL SCALE OUTPUT: 5 volts.
- RUGGED: Withstands 100G shock.
- VIBRATION: Withstands 15G to 2000 cps.
- SIZE: 2" diameter, 4 $\frac{5}{32}$ " long.
- WEIGHT: 1.8 lbs.



Shown $\frac{1}{2}$ size

In the Convair F-102A Rate Gyro System, Doelcam JR Rate Gyros instantaneously detect aircraft turning rates. Resulting output signals stabilize the aircraft throughout its entire range of speed and altitude. Teamed with other equipment, this Rate Gyro System makes possible uniform pilot control response for all flight conditions. Model JR Rate Gyros are also designed into a number of production and development missile programs. Doelcam products and engineering experience are available to assist in the solution of your Gyro system problems. *Write for Bulletin JR-1.*

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By starting *early* on a Massachusetts

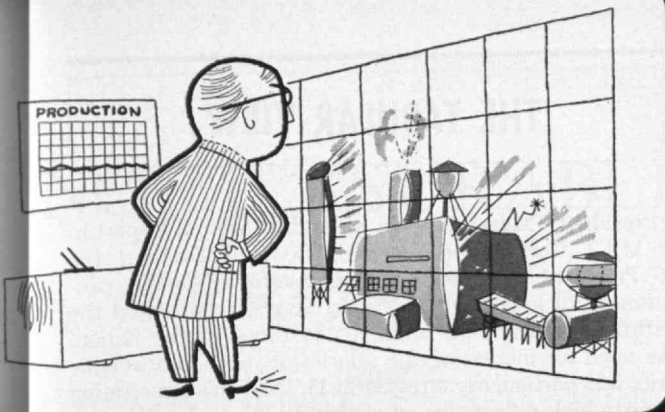
Mutual educational plan tailored to your own situation, you can be *sure* that when your child is ready for college, the money will be ready too.

Ask your Massachusetts Mutual man to show you how simply the dollars needed for a college education can be guaranteed . . . or call our General Agent listed under "Massachusetts Mutual" in your phone book.

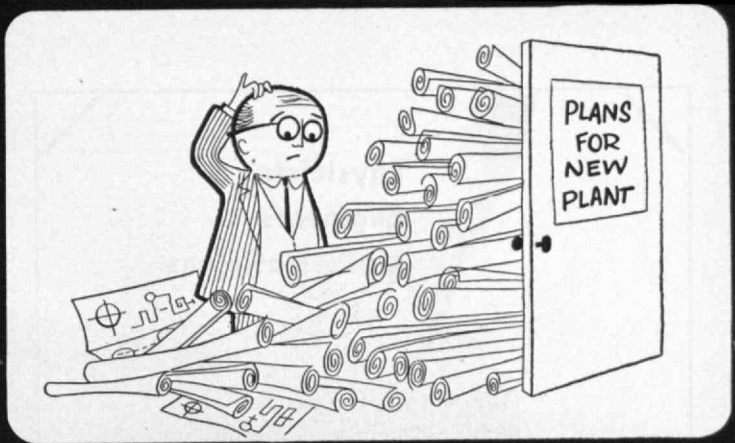
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THE POLICYHOLDER'S COMPANY—ORGANIZED 1851

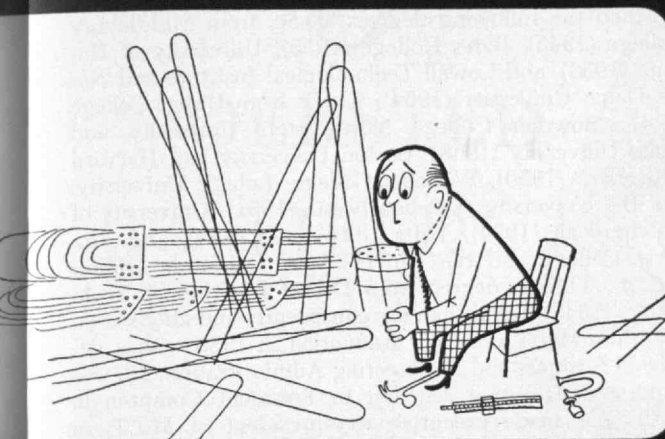
Springfield, Massachusetts



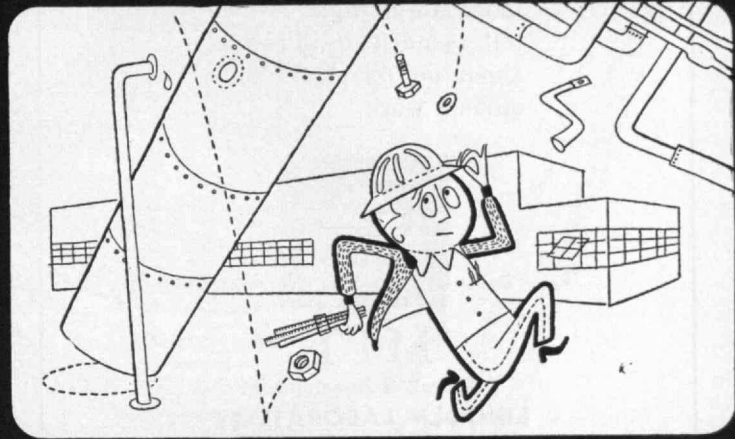
PLANNING A NEW UNIT — OR A COMPLETE PLANT, MILL OR REFINERY?



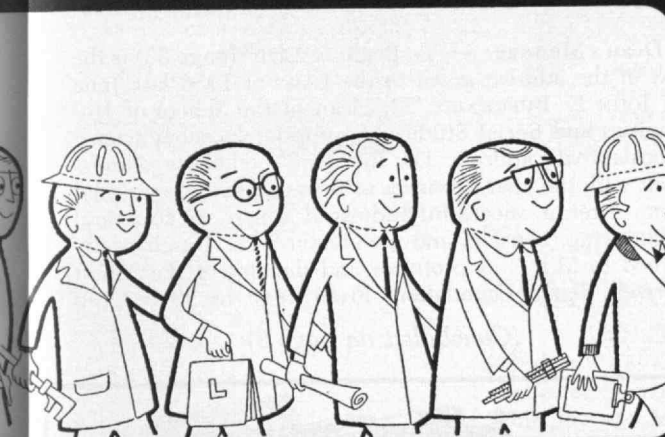
PROBLEMS OF DESIGN AND CONSTRUCTION ARE PILING UP.



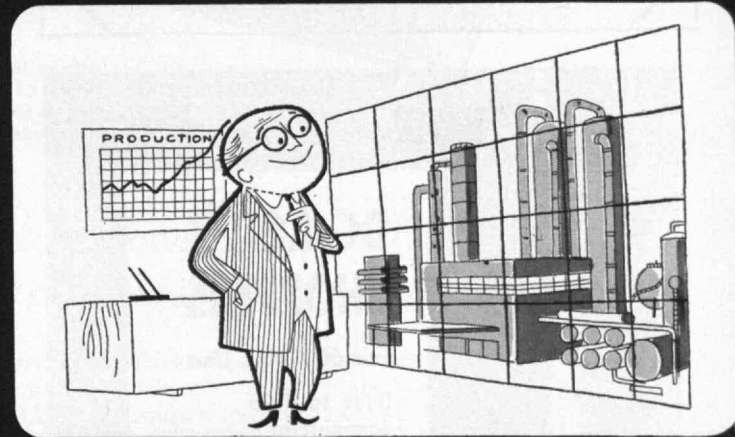
ARE YOU HAVE GOOD ENGINEERS — BUT NOW THEY MUST COPE WITH UNFAMILIAR PROBLEMS.



AND YOUR STAFF JUST ISN'T BIG ENOUGH.



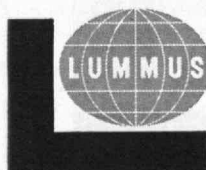
WHY NOT CALL IN LUMMUS, WITH ITS ARMY OF EXPERT ENGINEERS?



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The cartoon, of course, states the situation in very simple terms. But the basic truth is there. Building a new chemical installation, paper mill, petroleum refinery or power plant is more than a "do-it-yourself" project. Lummus has built over 700 plants throughout the world. When you are ready to build your next plant, you can call in thousands of trained men — without adding to your payroll — by calling in Lummus. And remember, your process "secret" is safe with half-century-old Lummus.

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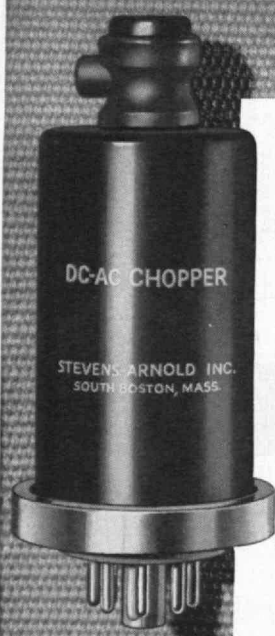
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S/A-10

THE TABULAR VIEW

President's Message. — In his eighth Annual Report to the M.I.T. Corporation (page 29), JAMES R. KILLIAN, JR., '26, President, presented a strong case for advancing education at all levels in the United States, and related the Institute's educational problems to those of the nation. The need for increasing the salaries of those in academic posts was particularly stressed in Dr. Killian's penetrating report which reflects his educational philosophy. Because Dr. Killian's message this year deals so largely with educational topics, it is well to recall that he has been awarded the following degrees: D.Sc. from Middlebury College (1945), Bates College (1950), University of Havana (1953), and Lowell Technological Institute and Notre Dame University (1954); LL.D. from Union College (1947), Bowdoin College, Northeastern University, and Duke University (1949), Boston University and Harvard University (1950), Williams College, Lehigh University, and the University of Pennsylvania (1951), University of Chattanooga (1954), Tufts University (1955), and Amherst College and the University of California (1956); and the D.Eng. degree from Drexel Institute of Technology (1948). Dr. Killian has consistently and ably served his Alma Mater since his graduation in 1926 with a degree in Business and Engineering Administration. He was appointed executive assistant to President Compton in 1939, was made executive vice-president of M.I.T. in 1943, and vice-president in 1945. Following the Mid-Century Convocation in 1949, he became the first Technology Alumnus to serve as its president.

Dean's Message. — "To Begin to Live" (page 33) is the text of the address given to the Class of 1956 last June by JOHN E. BURCHARD, '23, Dean of the School of Humanities and Social Studies. Appropriately enough for a baccalaureate address, Dr. Burchard's scholarly address dealt with the characteristics of the company of educated men. After a successful industrial career in structural engineering, housing, and architecture, Dr. Burchard returned to M.I.T. as professor and director of the Albert Farwell Bemis Foundation. From 1940 to 1945 Dean

(Concluded on page 8)



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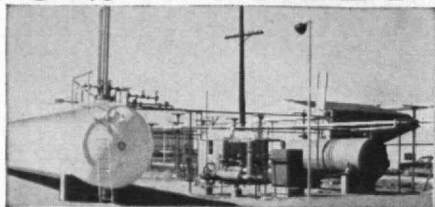


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THE TABULAR VIEW

(Concluded from page 6)

Burchard was on leave of absence for important war work. He returned to M.I.T. in 1945 to become director of libraries, and was appointed dean of humanities in 1948 and dean of the School of Humanities and Social Studies in 1950.

Professor's Message. — Increasingly industry looks to men trained in engineering for its executive talent. The question that naturally arises, "Who is to train engineers for executive posts?" is ably answered (page 36) by JOHN B. RAE, Associate Professor of History. On the M.I.T. staff since 1939, Dr. Rae is currently visiting associate professor of social studies at the Case Institute of Technology, where he is engaged in studying the history of the engineer in business enterprises. His article is a product of a study of the engineer in business which has been supported by the Sloan Research Fund of the M.I.T. School of Industrial Management, the Research Center in Entrepreneurial History at Harvard, and the Social Science Research Council.

Trend of Affairs. — With somewhat different flavor than in the past, the Trend includes contributions from H. E. Lobdell, '17, Executive Vice-president of the Alumni Association under the title "Twenty-five Years Ago This Month" (page 26) and "Individuals Noteworthy" (page 20). Joseph E. Conrad, Regional Director of the Alumni Fund, contributes the text and layout of "First Alumni Fund Conference" (pages 24 and 25).

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