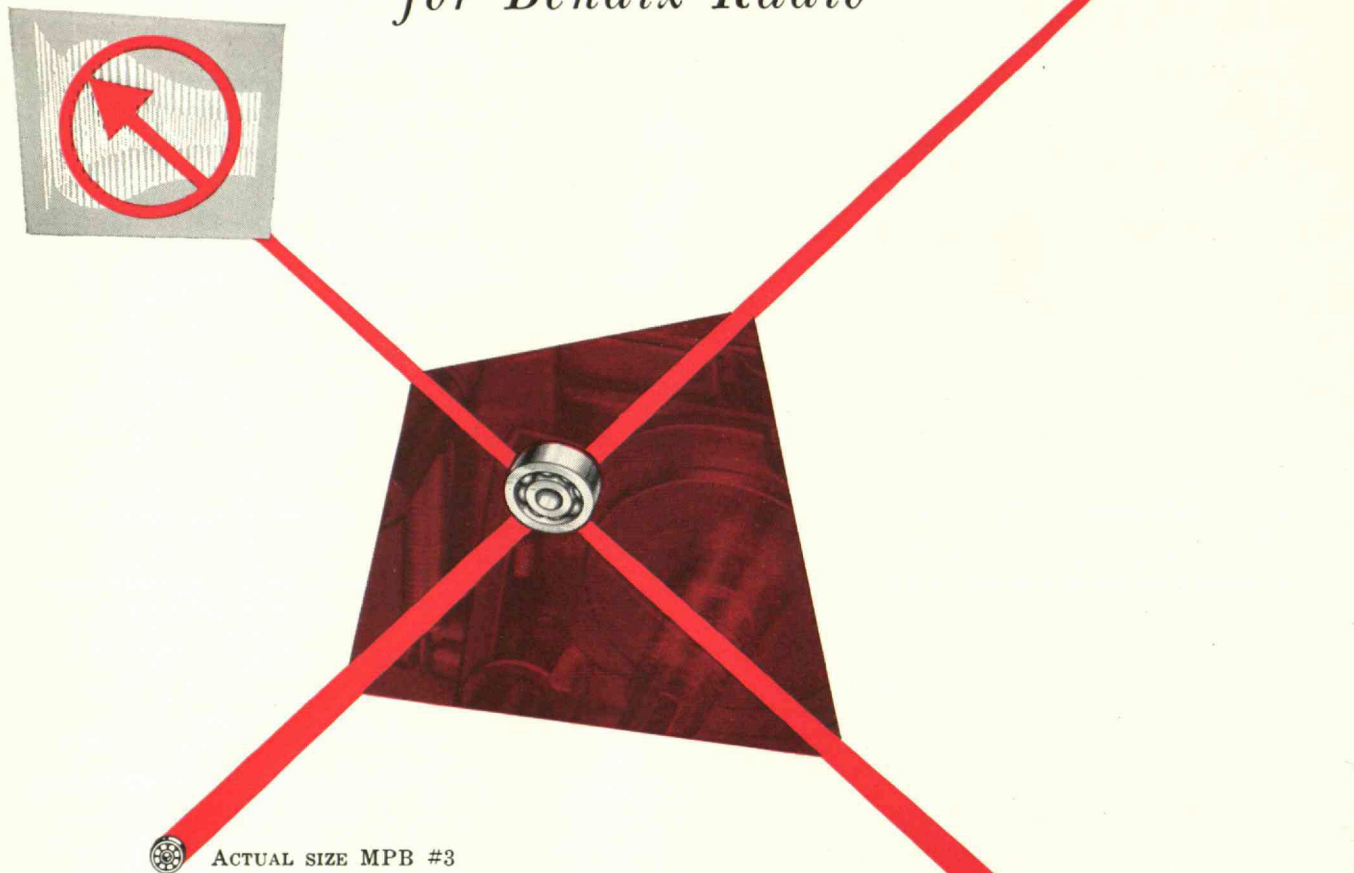


TECHNOLOGY

REVIEW *March* 1955



HOW MPB bearings solve miniaturization problem for Bendix Radio



ACTUAL SIZE MPB #3

MPB ball bearing used as Index Pawl in miniature frequency selector switch

OPERATING CONDITIONS — miniature ball bearing serves as index pawl in 4-position indexing device . . . bearing travels at 936 r.p.m. CRITICAL — low starting torque, low friction rotation . . . high impact loads . . . long, trouble-free bearing life. RESOLVED — by use of MPB No. 3, .1875" o.d. full-race bearing.

To quote Mr. John F. Wroten, Jr., mechanical engineer with Bendix Radio Division, these are some of the reasons why MPB bearings were selected in the miniaturization of their frequency selector switch: "The low friction rotation of the bearing practically eliminates drag in the indexing action, and reduces to a minimum the amount of power required for disengagement. Also, the bearing displays unusually high resistance to the frequent impact loads a detent stop of this kind must withstand Because rolling contact occurs between the pawl and the plate, the plate can be made of soft stainless steel."

For problems involving miniaturization, consult MPB, pioneer manufacturer of miniature ball bearings.

Miniature Precision Bearings, Inc., 103 Carpenter St., Keene, N. H.



LION OIL COMPANY



J. B. ROGERSON,
MANAGER OF MANUFACTURING

EL DORADO, ARKANSAS

October 29, 1954

MANUFACTURING
DIVISION

LUMMUS

NOV. 1, 1954
C.A.B.

DATE REC'D:

ROUTE TO:

REMARKS:

Mr. C. A. Barrere
Vice President
The Lummus Company
2707 Wesleyan
Houston 6, Texas

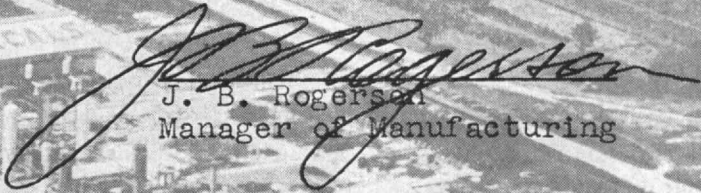
Dear Mr. Barrere:

The construction of our chemical plant in St. Charles Parish, Louisiana, to produce 300 tons per day of ammonia, 450 tons per day of nitric acid, and 550 tons per day of ammonium nitrate pellets was completed by your company June 1, 1954, and was well within labor cost and time allocated to this project.

Please extend our sincere compliments to all of the people in your organization who worked on this project for a job well done.

Yours very truly,

LION OIL COMPANY


J. B. Rogerson
Manager of Manufacturing

JBR:mpd

Illustrated: The Lion Oil Co. chemical plant constructed by Lummus in St. Charles Parish, Louisiana

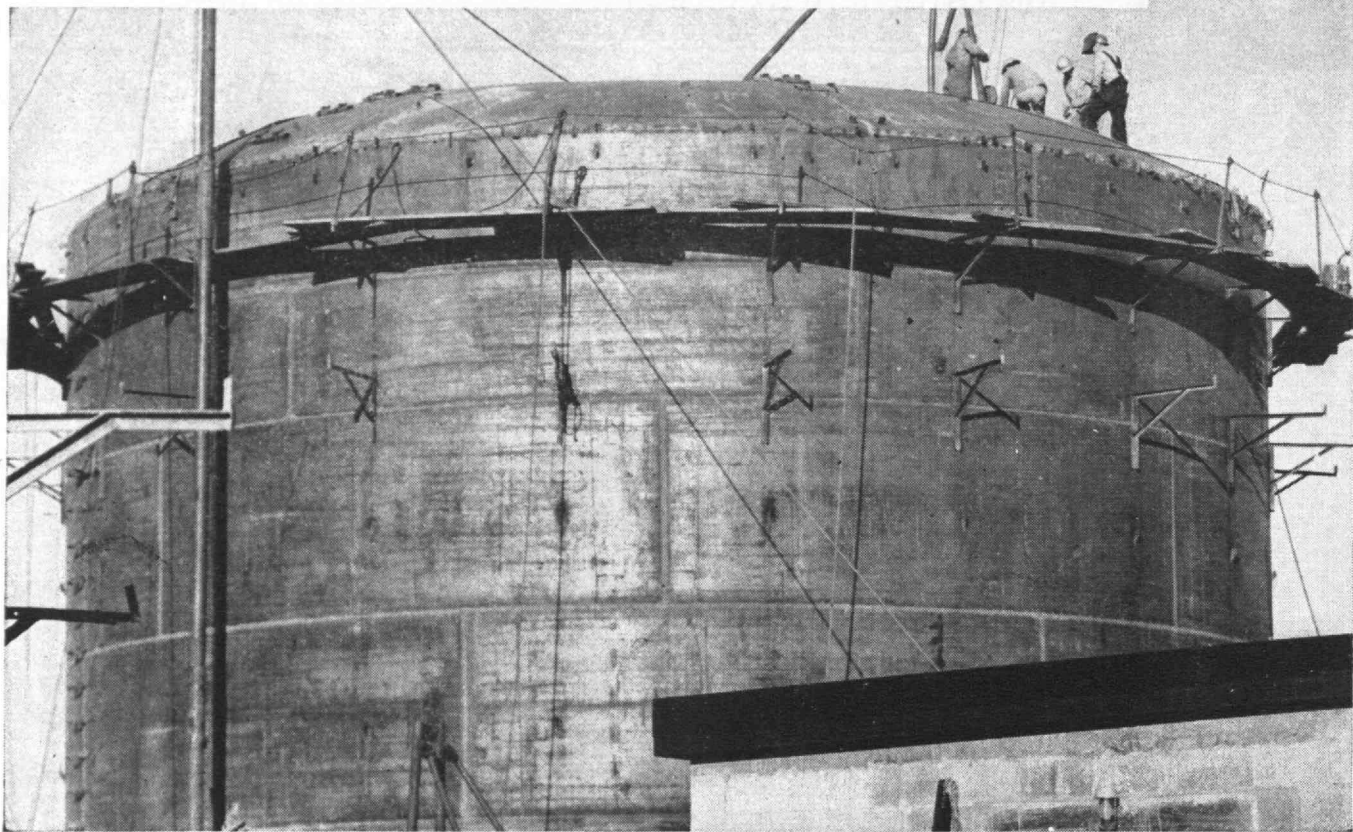
Lummus has recently been awarded the contract to engineer and construct a 60 ton/day anhydrous ammonia plant for Westvaco Chemical Division of Food Machinery and Chemical Corporation.

THE LUMMUS COMPANY, 385 MADISON AVENUE, NEW YORK 17, N. Y.

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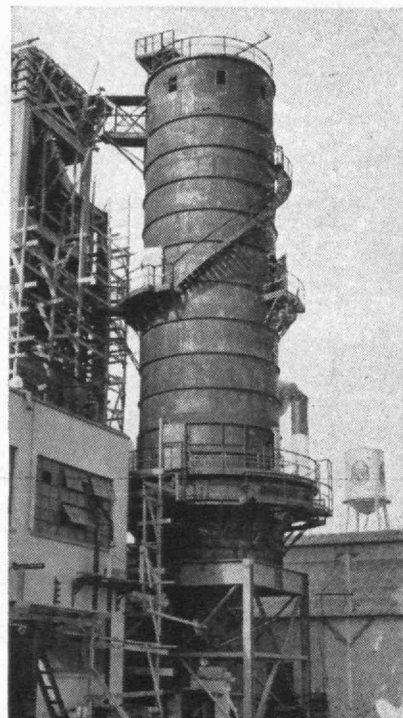
Both in this country and abroad, Graver has acquired a reputation for fine craftsmanship, plus a unique ability to more than satisfy customer demands.

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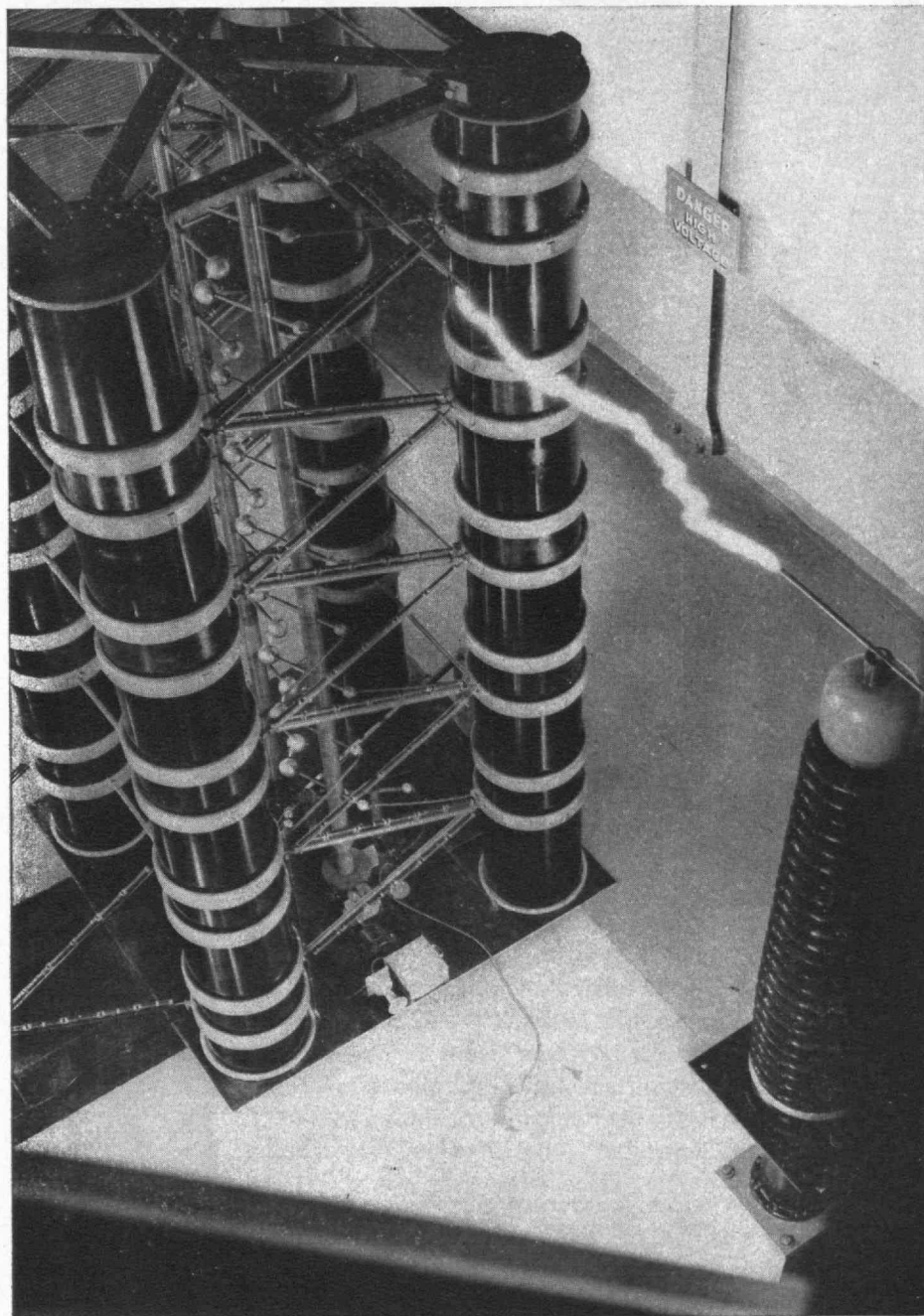
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New Phelps Dodge Research Laboratory

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Modern utility systems are requiring progressively higher voltage underground cables to carry the constantly increasing power loads.

Phelps Dodge is fully equipped to meet these utility demands with its new high voltage laboratory in Yonkers, N. Y. This laboratory is provided with the finest power cable research and testing facilities and is staffed by skilled engineering personnel.

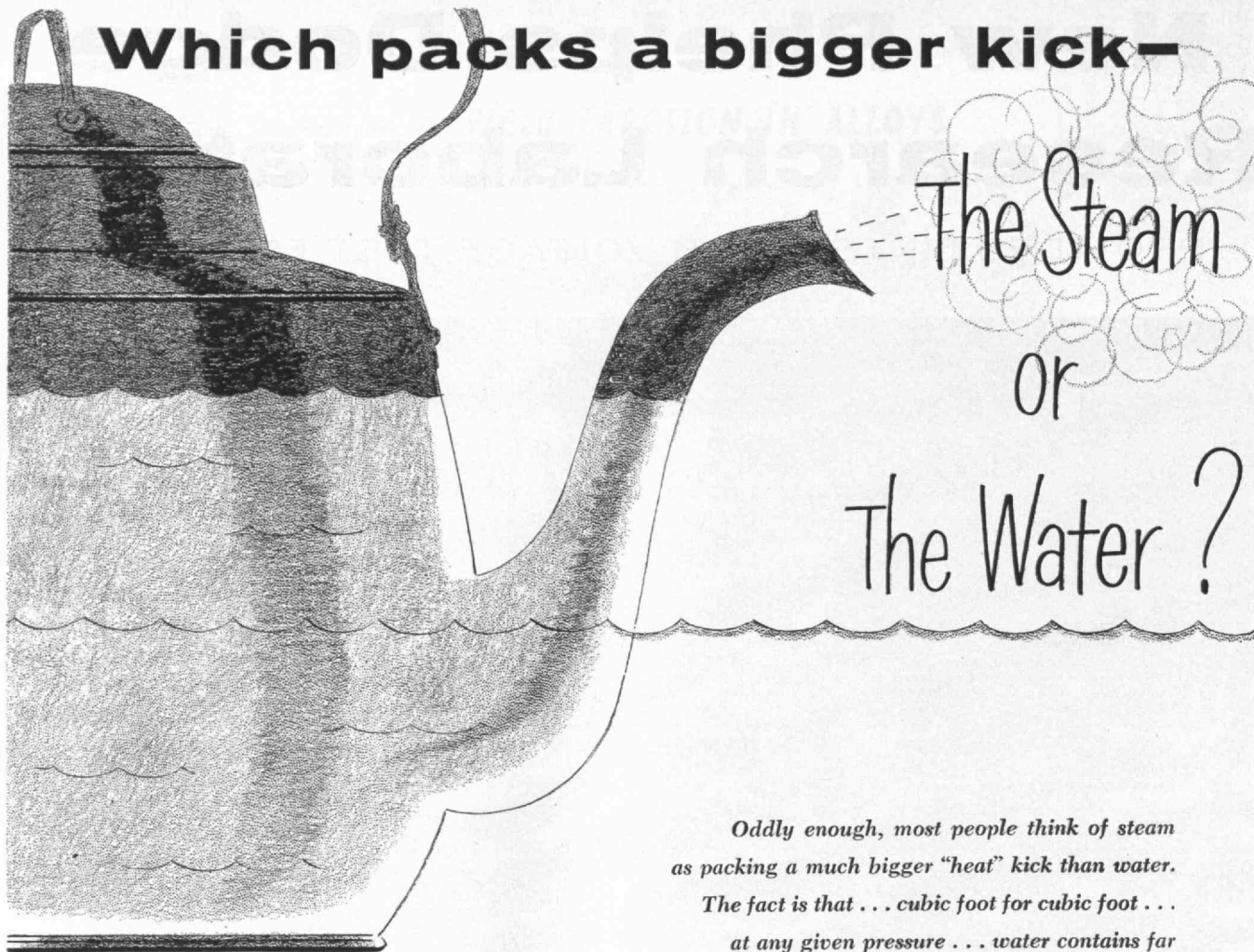
Typical example of this new equipment is the Lightning Generator, shown at left. This generator produces powerful electric discharges equivalent in magnitude and severity to natural lightning. It is capable of attaining surge currents of 30,000 amperes and test voltages up to 2,000,000 volts in less than a millionth of a second.

Ability of the various cable designs to operate continuously at the required extra high voltages is determined by 60-cycle alternating current tests up to 750,000 volts.



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at any given pressure . . . water contains far more heat than steam — more than 50 times as much, for example, at such a typical industrial process pressure as 110 lbs. per sq. in.

That's why we're in hot water—and like it

. . . in the business of making *hot water* boilers, that is. But not for producing the kind of hot water you're familiar with . . . we're talking about high-pressure, high-temperature water—up to 300 lbs. per sq. in. and 425° F. At such pressures and temperatures water offers important advantages over steam for large heating installations and for many process heating requirements. And Combustion has a boiler design that is ideally suited to the job of heating and distributing high-temperature water — the C-E La Mont Controlled Circulation Hot Water Boiler.

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B-804

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Write for Bulletin SMI



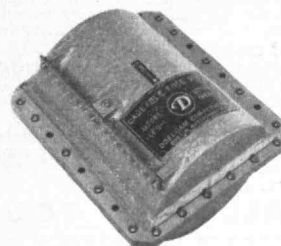
SYNCHROS—Sizes 11 through 31—115 volts, 400 or 60 cps—meet exacting requirements of MIL-S-16892 or FXS-1066.

Write for Bulletin S1



AMPLIFIERS—D-C Indicating Amplifier (shown here), Selected Range D-C Amplifier and Magnetic Null Indicator all use Doelcam Second-Harmonic Magnetic Converter in input stage for low drift and high sensitivity.

Write for Bulletin A1



GYROSCOPES—Cageable Free Gyro (shown here), Junior Rate Gyro, K Rate Gyro, Gyro Stable Platforms—used in guided missiles, aircraft flight evaluation systems and bombing and navigational computers.

Write for Bulletins K, JR, and CFG1

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□ **TWO YEARS IN THE ANTARCTIC** by Kevin Walton. This is the first personal account of two years spent in British Antarctica since the war. Kevin Walton went to the Antarctic as a member of the newly formed Falkland Islands Dependencies Survey and during his first year he trained himself and his dogs to live and travel in difficult country. The next year, an American expedition arrived and later both parties combined to complete an extensive survey of the East Coast of the Graham Land Peninsula. \$4.75

□ **BABA OF KARO** A Woman of the Moslem Hausa by Mary Smith. This remarkable book contains what is probably the first full-scale autobiography of an African woman. Mrs. Smith, who speaks fluent Hausa, became Baba's friend while her husband, Dr. M. G. Smith, a social anthropologist, was engaged in field work in Nigeria. After many conversations between the two women, Baba agreed to dictate the story of her life. Dr. Smith contributes an essay on Hausa life and sociology to provide the background. \$7.50

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□ **ETRUSCAN ART** by P. J. Riis. This book is what might be called a collection of archaeological essays on the art from which Roman art was gradually developed, the art of the Etruscans, also the art of early Rome. The principal aim of the book is to widen the circle of knowledge already established by the university world and modern scholars in this particular field. Bibliographical notes added to the individual chapters will make the book useful to the student as well. The author is Professor of Archaeology at the University of Copenhagen. Illustrated. \$10.00

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THE TABULAR VIEW

Limitations of Logic.—The increased complexity of technology and the need to properly assess the effects of science and engineering on man's life stimulate the need to examine the present status of engineering education. The requisite becomes all the more apparent when it is recognized (as reported on page 80 of the December, 1954, issue of *The Review*) that the nation's colleges and universities will face a bumper crop of students in the next decade or two. One study of engineering education is presented in this issue (page 233) by JOHN B. WILBUR, '26, Head of the Institute's Department of Civil and Sanitary Engineering. Despite the official position of the author, the views expressed by Dr. Wilbur are entirely his personal ones. Professor Wilbur makes an appeal for a "vertical type" of engineering training, in which logic and the informal faculties are developed simultaneously, in contradistinction to the horizontal type of training with "prerequisites." Professor Wilbur received S.B., S.M., and Sc.D. degrees from the Institute in 1926, 1928, and 1933, respectively. After two years in engineering practice, Dr. Wilbur returned to M.I.T. in 1930 as an instructor in Civil Engineering. He was made assistant professor in 1934, associate professor in 1937, and professor in 1943. He became acting head of his Department in 1944, and permanent head in 1946. Professor Wilbur is a member of the American Society of Civil Engineers and of the Boston Society of Civil Engineers. He is a fellow of the American Academy of Arts and Sciences, and an honorary member of Chi Epsilon, the honorary civil engineering fraternity. He is the author of many technical papers and bulletins and, with Professor Walter M. Fife, '21, of a textbook, *Theory of Statically Indeterminate Structures*.

Hold for Future Use.—A few rugged die-hards refuse to see the logic of that tail-chasing, economic shell game which requires our citizens to pay taxes in order that the government can keep agricultural prices up so that taxpayers' foodstuffs cost more than they would without government intervention. The farmers plant, reap, store—

(Concluded on page 224)



Take a leaf from past years.



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THE TABULAR VIEW

(Concluded from page 222)

and collect; the ordinary citizen faces increased taxation so that the cost of his food can be boosted; and the land becomes exhausted! The land now being overworked — to fill storage bins — will be sorely needed in another decade or two to feed our rapidly expanding population. A plan for conserving land is proposed by MILTON E. PARKER, '23, in "A Bumper Crop of Grass" (page 237). Professor Parker brings to his study a vast background of experience in the food industry. He received the S.B. degree in Industrial Biology from M.I.T. in 1923. He served as research associate at M.I.T. for a year under Samuel C. Prescott, '94 (now Professor of Industrial Biology, Emeritus), as dairy technologist of the Research Laboratories of National Dairy Products Corporation, manager of Beatrice Foods Company, as consulting food engineer, and, since 1948, as head of the Department of Food Engineering at the Illinois Institute of Technology. The stimulation and aid received from a similar article in *Lion Oil News* is acknowledged by Professor Parker.

Attila at the Door. — On every hand, throughout the land, we hear the plea that there should be more engineers, of youthful years, preparing for the next World War. The training of scientists and engineers in the U.S.S.R. has had a meteoric rise since the end of World War II, if numbers of enrolled students is a guide. In the United States, however, the number of college students enrolled in science and engineering has dropped steadily in the past few years. This drop in technical education — with Attila at our front door — is of concern to GEORGE TICHENOR who advocates (page 241) technical education for all it is worth. Mr. Tichenor believes that enrollment in science and engineering can be increased, but that we need to recognize that "science offers not only frontiers to be explored, but also the virginal beauty of a poem read for the first time." It will be surprising if Mr. Tichenor's thesis does not raise a few eyebrows — especially in liberal arts educational circles — but a good purpose will have been served if his views provoke others to recognize the nation's current educational needs. Since 1923 Mr. Tichenor has had a varied career as newspaper reporter and writer, editor, novelist, teacher, ghost writer, promotion director, and public relations adviser.

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