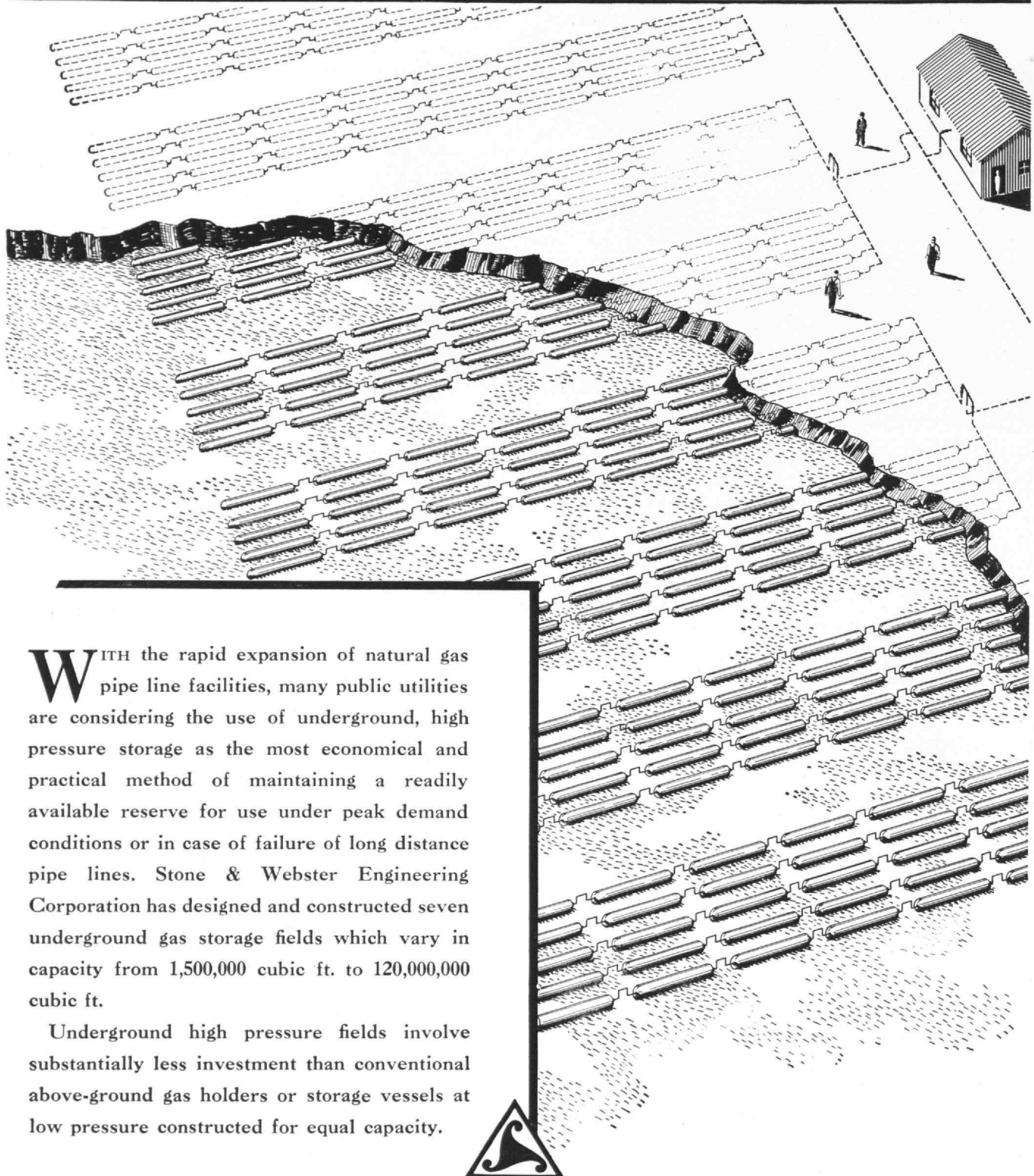


TECHNOLOGY

REVIEW *March* 1950



From Nature's Gas Wells to Man Made Storage



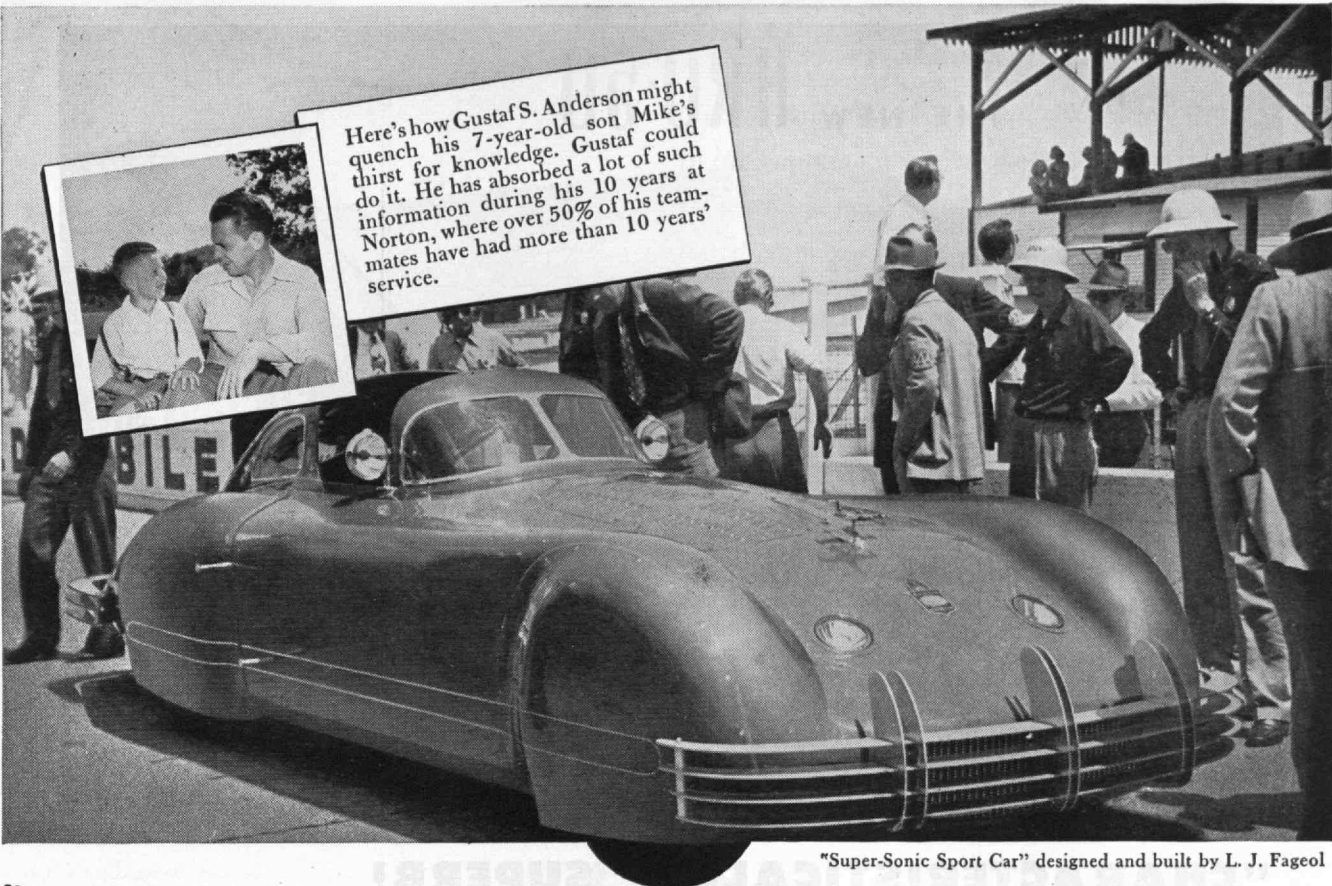
WITH the rapid expansion of natural gas pipe line facilities, many public utilities are considering the use of underground, high pressure storage as the most economical and practical method of maintaining a readily available reserve for use under peak demand conditions or in case of failure of long distance pipe lines. Stone & Webster Engineering Corporation has designed and constructed seven underground gas storage fields which vary in capacity from 1,500,000 cubic ft. to 120,000,000 cubic ft.

Underground high pressure fields involve substantially less investment than conventional above-ground gas holders or storage vessels at low pressure constructed for equal capacity.



STONE & WEBSTER ENGINEERING CORPORATION

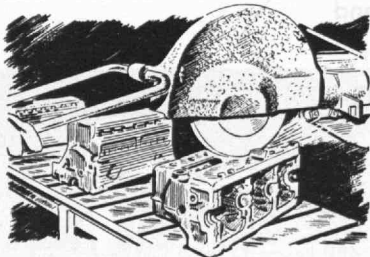
A SUBSIDIARY OF STONE & WEBSTER, INC.



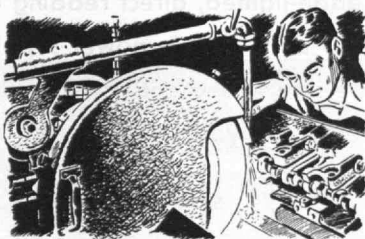
"Super-Sonic Sport Car" designed and built by L. J. Fageol

"WHAT WILL CARS BE LIKE WHEN I GROW UP, DAD?"

"Well, son, you can be sure *your* first car will pack more power, ride smoother and cost less to run than today's cars. The automobile makers know folks always want improvements, so they make better cars every year."



"Norton grinding wheels help — and they start on the first rough castings. Our hones make cylinder walls smooth and long-lasting. Dies and tools are manufactured and maintained with Norton grinding wheels."



"Camshafts must be true, or engines won't run smoothly. Norton Cam-O-Matic grinding machines finish cam contours to close precision. In fact, these speedy, automatic grinders help lower mass production costs."



"New cars look better every year. And their smoother surfaces for better paint jobs come from things like Behr-Manning abrasive discs. Behr-Manning, remember, is an important member of the Norton family."



"Of the thousands of parts that make up a modern car, nearly all of them are made better by the touch of products made by the Norton family. That also applies to just about every other industry, large or small. That's why I like my job of making better products to make other products better."

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"CHARACTERISTICALLY" SUPERB!

Compare the characteristics of the new HRO-50 and see why, once again, the HRO sets the standard of receiver performance! You'll appreciate the convenience of the new HRO-50, too — the new edge-lighted, direct reading dial and the insulated, heavy-duty, built-in power supply. For thrilling performance, be sure to see and try the new HRO-50 — the receiver of the year!



SUMMARY OF CHARACTERISTICS

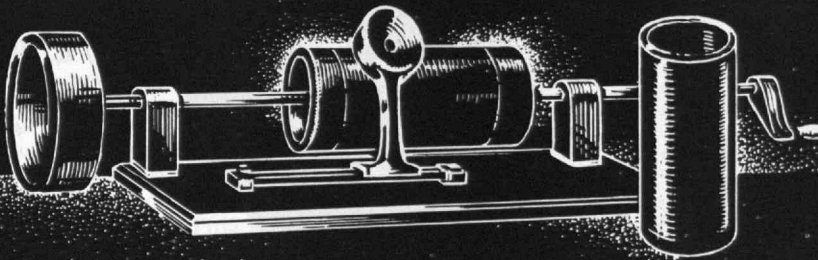
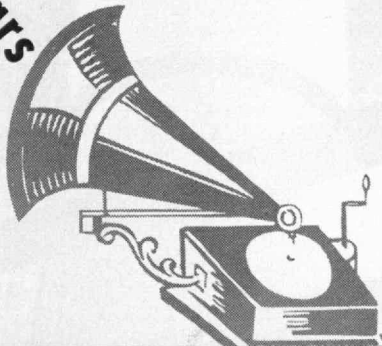
- Freq. Range:** 50-430 kc., 480 kc. — 35 mc.
- Tube Complement:** 6BA6, 1st r.f.; 6BA6, 2nd r.f.; 6BE6, mixer; 6C4 h.f. oscillator; 6K7, 1st i.f.; 6K7, 2nd i.f.; 6H6 det. & a.v.c.; 6H6, a.n.l.; 6SJ7, 1st audio; 6SN7, phase splitter and S-meter amp.; 6V6 (2) p.p. audio; 5V4G, rect.; 6J7, b.f.o.; OBZ, volt. reg. Accessories: Crystal Calibrator, 6AQ5; NFM Adaptor, 6SK7, i.f. amp., 6H6, ratio det.; Select-o-ject, 12AT7 (2).
- Power Output:** 8 watts undistorted, push-pull amplifier fidelity ± 1 db 50-15,000 cycles.
- Sensitivity:** 1 microvolt or better at 6 db sig./noise.
- Selectivity:** Variable from 15 kc. overall to about 400 cycles at 40 db.
- Drift:** Negligible after warm-up.
- Calibration:** Direct frequency reading.
- Shipping Weight:** 100 lbs. incl. spkr. and 4 coils.
- Dimensions:** 16½" deep x 19¾" wide x 10⅞" high.
- Price:** \$335.00 (less speaker).
- Accessories:** 100/1000 kc. calibrator, \$19.95; NFM adaptor \$16.95; SOJ-2, \$24.95.

Carbon black brings music to your ears

Carbon black has always had a definite place in the manufacture of phonograph records. Its use dates back to the time when records looked like dictaphone cylinders and there was music only on one side.

All carbon blacks used in the industry are added primarily for their coloring power, and possible lubricant value.

CABOT carbon black makes it easy to recognize the best quality record. It gives that shiny, jet-black appearance music lovers accept as the hallmark of an excellent record.



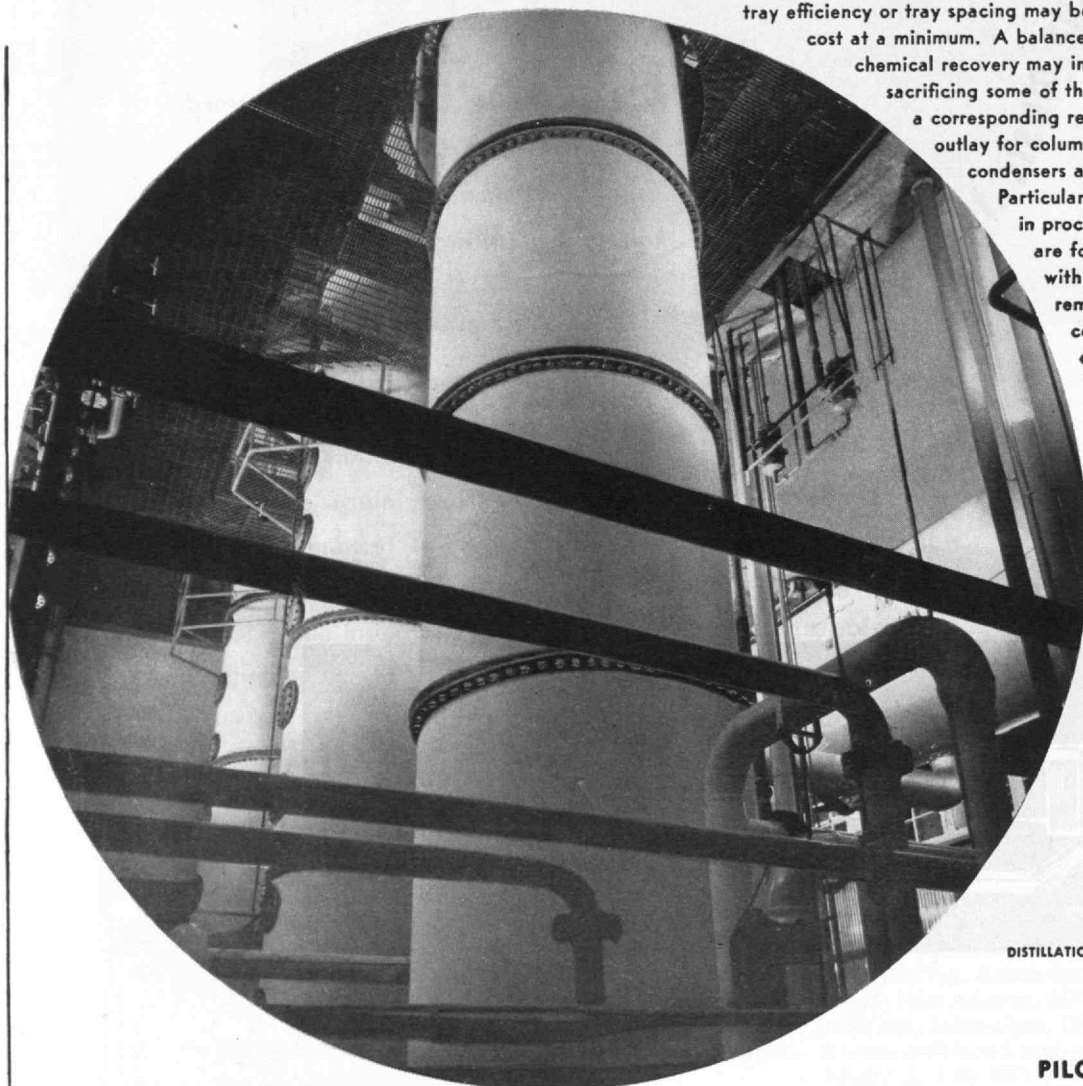
GODFREY L. CABOT, INC.

77 FRANKLIN STREET
BOSTON 10, MASSACHUSETTS

distillation processes and equipment for . . .

. . . the separation of hydrocarbons or other organic chemicals, should be designed for efficiency in terms of overall operating costs and amortization of capital investment. Tray efficiency, cleaning facility and resistance to corrosion are the principal factors to be considered. For practical purposes, tray efficiency or tray spacing may be reduced to keep tower cost at a minimum. A balance of utility costs against chemical recovery may indicate the desirability of sacrificing some of the recoverable material, with a corresponding reduction in the capital outlay for columns and associated calandrias, condensers and heat exchangers.

Particularly when potential changes in process or product specifications are foreseen, distillation columns with sectional shells and removable trays of light alloy construction offer special opportunities for economy because of the ease of transfer from tower to tower as well as cleanability and resistance to corrosion.



Distillation columns of copper construction 60 feet in height with diameters from 72 to 78 inches.



New technical bulletin,
DISTILLATION ENGINEERING AND EQUIPMENT,
is available on request.

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PILOT PLANT

PROCESS DESIGN

MECHANICAL DESIGN

SHOP FABRICATION

FIELD ERECTION

INITIAL OPERATION

What GENERAL ELECTRIC People Are Saying

C. H. LANG,

Vice President

DISTRIBUTION: There's a notion that distribution adds nothing to the product. Engineers, who *do* add a lot of value to the product, are particularly susceptible to this fallacy. But it's just a matter of basic economics.

→ Production adds one value to the product: form utility. It gives raw materials a useful form.

Distribution, on the other hand, adds *two* recognized economic values: place and time utility.

For example, fuel oil in the refinery has been given *form* utility—it will burn efficiently. But it takes distributors and salesmen and advertising men and accountants and truck drivers to get the oil into your fuel tank at home—*place* utility—when the cold weather arrives—*time* utility. And anyone who has caught a cold during a temporary shortage of fuel oil will tell you that this time and place utility is part and parcel of the product's final value.

A. S. M. E.,

New York City,

November 30, 1949



D. E. CHAMBERS,

Research Laboratory

DEVELOPMENTAL STEPS: Suppose a gifted chemist who is interested in learning new facts about the mechanism of polymerization discovers something of significance. This fact may be the means which, properly applied, may allow a completely new material or series of materials to be created. The work of discovering the new fact, of producing for the first time the new materials and describing their general properties, is what I would define as "research."

But it doesn't follow, necessarily, that the first bit of this new material is suitable for an application. It may have general properties which make it appear to have excellent promise for a certain field, but it is usually necessary to expend much more work to fit the new material for a specific field of application—indeed, work in this category may continue almost indefinitely to

produce variations of the material for new applications as these crop up.

It may be that one result of the work on this material produces an insulation of markedly superior properties. However, it will probably be found that, while the material may be reasonably satisfactory to mold, it cannot be extruded—or it cannot be worked in some other way without additional modification.

When the new material has been evolved into, let us say, something really satisfactory for molding operations, the product designer is free to apply it to his various problems. Then, finally, comes the manufacture of the specific product.

National Electronics Conference,

Chicago,

September 27, 1949



D. W. HALFHILL,

Apparatus Department

RECORDING SYSTEM: The need for an adaptable recording system capable of remotely registering non-electrical, as well as electrical, quantities has long been realized. Though individual recording problems have been solved in specific cases and with varying degrees of success, a single device adaptable to the recording of many different entities such as pressure, electrical quantities, temperature, and mechanical motion has not been readily available.

An answer to many of these problems may be found in a recording system recently developed for a flight-recorder program which required that barometric altitude and vertical acceleration forces be logged continuously by passenger-carrying airplanes. A number of unusual features have been included in this recording system which may prove useful outside the field of aviation.

The inherent flexibility of the system allows the recording of almost any quantity, merely by at-

taching appropriate primary detectors... Because its light, sturdy construction permits the system to be used where other devices fail, successful operation is found in marine use, on surface vehicles, and in aircraft. Other uses may be found in industry, where an adaptable recording device has been needed for some time.

General Electric Review,
November, 1949



E. E. CHARLTON,

Research Laboratory

MEDICAL ELECTRONICS: In the operating room, as well as in general diagnosis, is there not a need for an electronic stethoscope with greatly increased sensitivity over the ordinary stethoscope? The surgeon should have instant and continuous knowledge of the heart action of his patient while on the operating table. He is now dependent on observations made with the ordinary stethoscope or by simple feeling of the pulse—observations which cannot be made continuously by the busy anesthetist. In addition it may happen that the heart action becomes so weak that its observation is difficult with present instruments...

A small microphone taped to the patient picks up the heart beat and modulates a small radio transmitter. The anesthetist carries on his person a miniature receiver which activates a sound reproducer of the bone-conduction type. (Use of the bone-conduction type is preferable in order not to diminish the normal hearing capacity of the anesthetist.) Also a permanent recording of the heart action during the operating period could aid the anesthetist to observe slow variations in the heart action and variations in heart-beat intensity.

Inter-American Congress of Surgery,
Chicago,

October 21, 1949

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THE TABULAR VIEW

Let's Organize. — Within a decade after the first class was graduated from the Institute, the need for binding its graduates together was felt by an energetic group of youths, most of whom were still in their twenties. The organization of the M.I.T. Alumni Association, on March 17, 1875, is ably recorded (page 247) by H. E. LOBDELL, '17, Executive Vice-president of the Association, and closely associated with student and alumni matters since his undergraduate days at M.I.T. during World War I. For 25 years, Mr. Lobdell has been associated with the office of the Dean of Students; from 1922 to 1930 he was editor of *The Review*, and since 1930 has been its publisher.

New Weapons. — The February issue of *The Review* contained the first of a two-part article discussing the probable nature of any future war. This study, by M. H. WILLIAMS, "student of geopolitics, teacher, writer, and veteran of World War II," is concluded in this issue (page 250) with further consideration of the destructiveness of some recent innovations of military weapons. The problem of tranquil living is not a matter of technological progress. Indeed, since there is no defense against atomic weapons, our salvation lies rather in developing those political and ethical means which (through sufficiently strong and effective means) outlaw the use of modern arms so that free men may live in peace.

Combine Forces. — Postwar progress in the manufacture and application of laminated materials for structural uses is recounted (page 253) by ALBERT G. H. DIETZ, '32, Associate Professor of Structural Engineering. Dr. Dietz points out that the success of modern sandwich laminates results from combining the properties of core materials with those of panels having strong, smooth, tough surfaces. When two dissimilar substances thus combine forces, the resultant sheets make better building materials, especially when strength, light weight, and low cost are important considerations.

Strike! — PAUL MEADOWS, Associate Professor of Sociology at the University of Nebraska, has long been a student of the social aspects of technology. His writings on such topics have appeared in *The Review* from time to time during the past four years, as well as elsewhere. Dr. Meadows' book, *The Culture of Industrial Man*, published in January, continues his studies of the machine age. So does his article in this issue (page 257). It is largely a coincidence that "A Study of Strikes" should be scheduled for publication at a time when the nation faces its worst coal stoppage in decades. Our social myopia has advanced to the stage of tolerating industrial paralysis on a nationwide scale when strategically placed minorities may be unwilling or unable to place national welfare above their own narrow self-interest.

"Turn — Nighttime into Daytime." — Of special interest to Technology Alumni is the chronicle on "A Stein Song" (page 246) prepared by LONSDALE GREEN, '87.



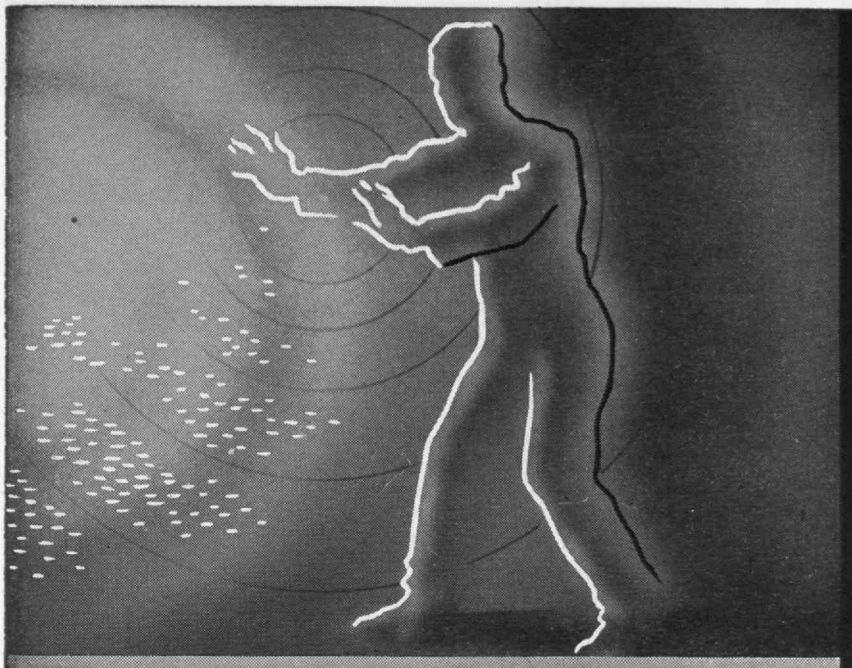
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MAIL RETURNS

Centennial Corroboration

FROM ELBERT G. ALLEN, '00:

Your January number, with its splendid articles reviewing the progress of the past 50 years, is most interesting. Surely it is worth while to stop, look back over our past, and set our sights for future endeavors at frequent intervals. But your statement that this is the inauguration of a new half century raises a ghost which we older Alumni thought was laid 50 years ago.

If it is established that the first year was the year 1 A.D., then it follows that the last year of the first half century was the year 50 A.D., and that the last year of the first half of the Twentieth Century is the year 1950 A.D. And of course the half century will not be completed until the end of the last moment of December 31, 1950.

To corroborate this conclusion, a number of competent authorities were consulted with the following results.

The *Encyclopaedia Britannica* states in its article on the Calendar: "Every year the number of which is divisible by 4 is a leap year, excepting the last year of each century, which is a leap year only when the number of the century is divisible by 4. . . ."

The National Bureau of Standards, in answer to a direct inquiry says: "You are correct in your interpretation of the half century. . . . The reasoning is simple. The first year of our present era is designated as the year 1 A.D. It was not completed until the end of that year. Similarly the half centuries are not completed until the end of the 50th year."

The Nautical Almanac Office of the United States Naval Observatory similarly writes: "Your belief that the half-century will not be over until the end of 1950 is quite correct. This comes about because there was no year zero. The first year of the first century was the year one, and the last year of the first century was the year 100."

And finally Webster's Dictionary gives the following definition of the word "century": "A period of a hundred years . . . specifically one of the hundred-year divisions of the Christian Era; as, the *first century* (A.D. 1-100 inclusive); the *nineteenth century* (A.D. 1801-1900)."

I conclude that we must wait until the end of this year before we can truly say that the half century is ended.
West Newton, Mass.

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(10 contracts since 1918)
Henry Manley, Engineer



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Alfred T. Glassett, '20, Vice President