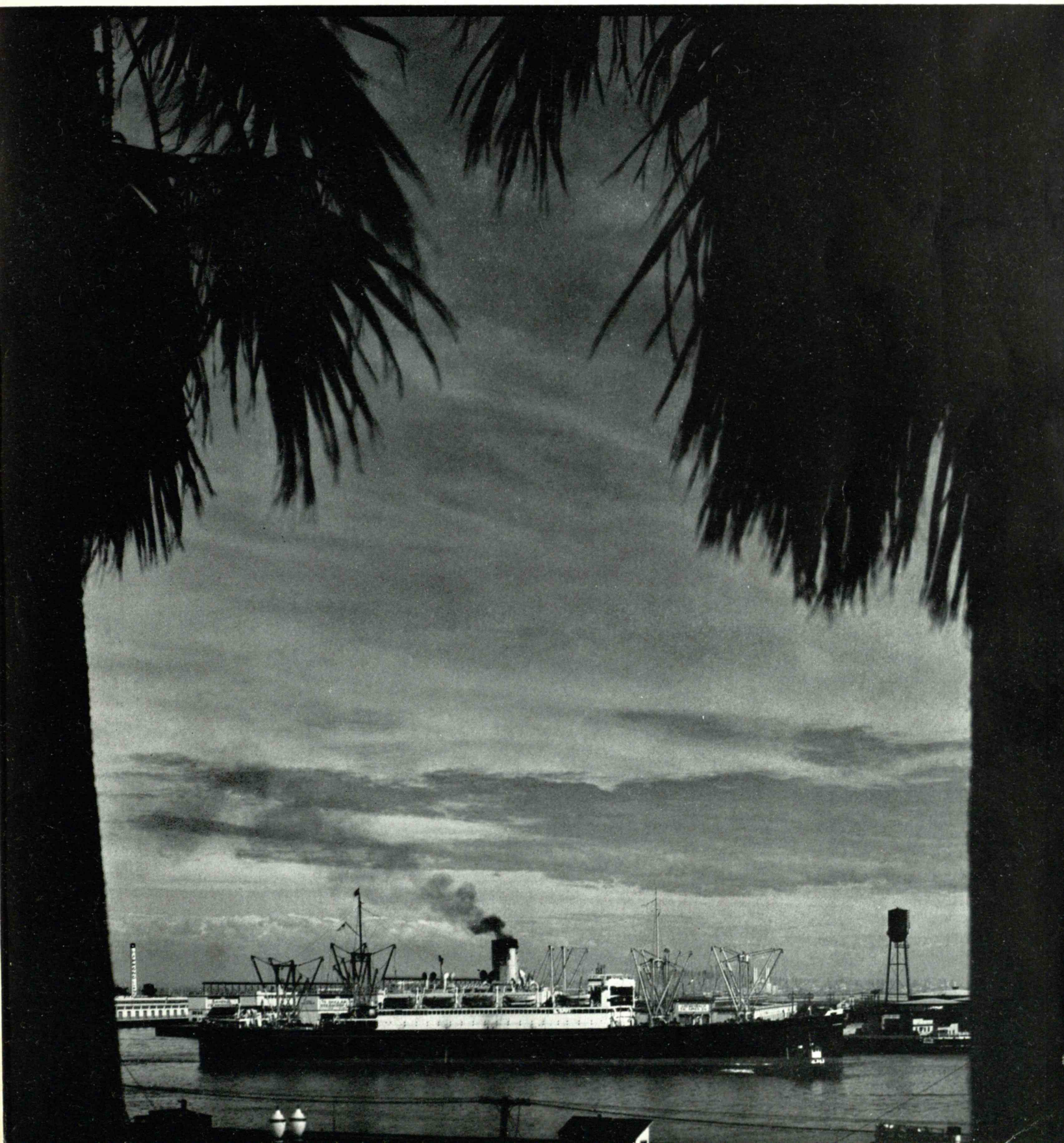
November 1938

TECHNOLOGY REVIEW



THE TECHNOLOGY REVIEW, November, 1938. Vol. XLI, No. 1. Published monthly from November to July inclusive at 10 Ferry Street, Concord, N. H. Publication date: twenty-seventh of the month preceding date of issue. Annual subscription $3.50; Canadian and Foreign subscription $4.00. Entered as second-class matter at the Post Office at Concord, N. H., under the Act of March 3, 1879.

THE TABULAR VIEW

DURING the summer months The Review has nothing to do (or so our readers, impatiently writing for copies they will never get, sometimes suppose) but to let the sun transform smudges of printer's ink into choice diacritical freckles on the proof sheets of our editorial faces. However riotously untrue this picture may be, here we are again — whether we had vacations or not — inaugurating Volume 41. In this, our initial offering, we present two welcome gentlemen with whom you are familiar and two who are new though no less welcome to these pages, respectively (but not in order of their appearance) George R. Harrison and Norbert Wiener, Milton B. Dobrin and George W. Lewis. ¶ If you want DR. HARRISON'S official title, it is director of applied physics and of the research laboratory of experimental physics at M.I.T., but the important fact about the genesis of his article (page 17) is that it is drawn from a book in preparation by him on the contributions of physics to modern life. ¶ Despite the fact that he eschews and side-steps publicity, DR. NORBERT WIENER (page 23) has been much in the public eye recently because of papers presented by him both in New York and Boston on the "calculus of chaos." (Isn't the phrase itself a brilliantly stimulating one?) We can say, we hope, without further disturbing Professor Wiener that he is one of the ablest mathematicians in America, and one of the most brilliantly articulate scholars that we know. ¶ MILTON B. DOBRIN, '36, who makes his journalistic debut in this issue (page 21), was educated both at the Institute and at Columbia University, and since 1937 he has been with the Gulf Research and Development Company in Pittsburgh. ¶ GEORGE W. LEWIS (page 24) is one of the important figures in American aeronautics, being director of aeronautical research for the National Advisory Council for Aeronautics.

FROM the report on summer changes (page 32), we saved out for separate mention here one of the most important alterations of the summer — the sea change (the new offices are green) of the two-family dwelling of The Alumni Association and The Review into something rich and, to knowing visitors, something strange. We now have a third more space, handsomely provided by the Institute, a reception room where Alumni can be pleasantly greeted and even provided with comfortable chairs (come in and let us know if we are right about this), and a rug estimated to be 20 years old.

It is all so elegant and efficient that we probably should be, as a matter of form, didactically saying that The Review in its contents and The Association in its Council meetings will respond to the new environment with a new birth of . . . but that is a sort of moralistic extrapolation that comes hard while we are still reveling in the smell of fresh paint, the prenatal noises of the new differential analyzer overhead, and the complexities of a telephone and buzzer system that seems at times to be too much even for the telephone company itself.

MAIL RETURNS

Assignment on Aerial Bombing

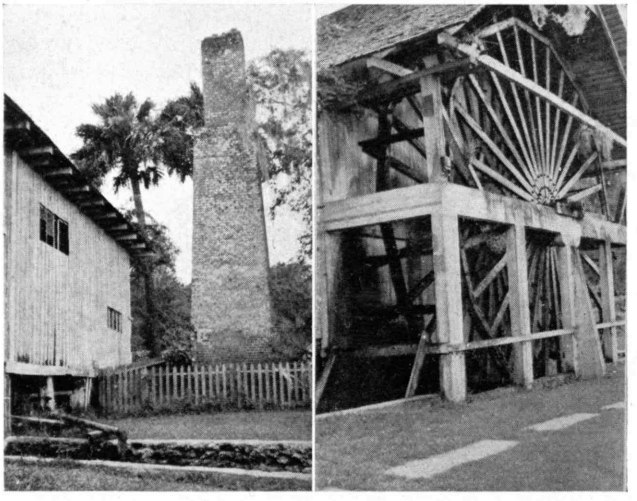
FROM WILLIAM BECKETT, '34:

Mr. Earl H. Leaf's letter describing the bombing of the Tientsin-Pukow railway in China [July Review] has revived a hot controversy among several of us on the effectiveness of aerial bombing in modern warfare. Some of us feel that the principal effect of aerial bombing is to excite the civilian population and that no real military advantage is gained thereby. We also feel that modern antiaircraft defense is very powerful and effective and that the so-called successful bombings which one reads about in the papers and in the dispatches from Spain and China are accomplished because there is no adequate defensive from the ground.

I should like to suggest with all due humility and respect that an article in The Review covering this subject thoroughly and completely in the usual fine style of all Review articles would be of great interest to Review subscribers. The Review, to which I have subscribed ever since I left the Institute, is the most stimulating and informing of all of the magazines to which I subscribe. . . .
Hamilton, Ohio

The Old Mill at Ponce de León Springs

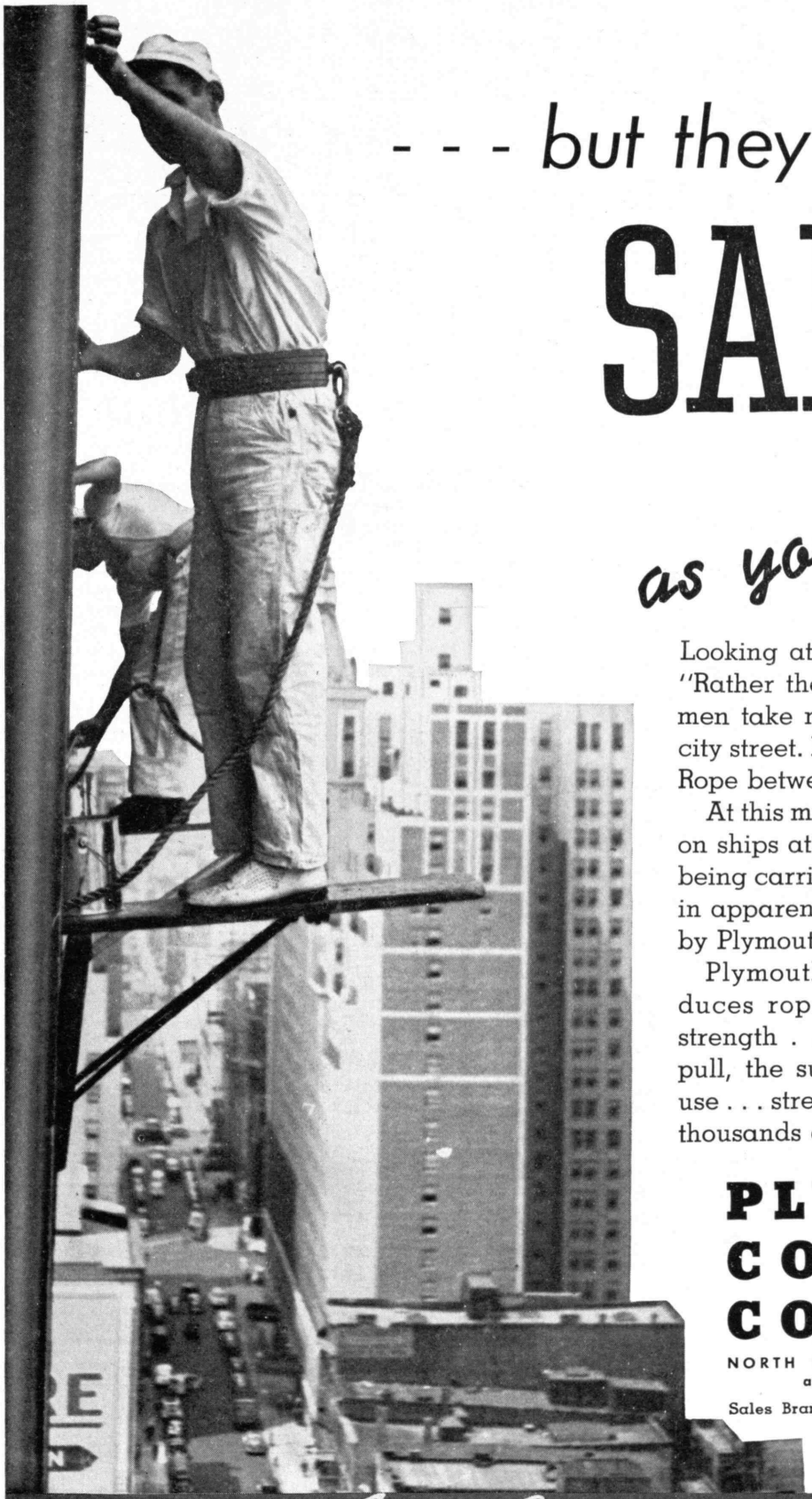
FROM M. B. CRUM, '25:



As an Alumnus and a reader of The Review, I have been quite interested in the pictures sent in by amateur photographers as published. I am inclosing . . . prints . . . which I think may perhaps be of interest to you, not so much for the quality of the photography as for the subject matter.

Some four miles north of De Land, Fla., in Volusia County, lies Ponce de León Springs. Here ended the great Spanish explorer's search for the fabulous Fountain of Youth, and here flourished a Spanish colony for more than 200 years. There is so much of adventure and romance about the old Spanish mill, a part of which still stands near the springs, that it seems as if engineers might perhaps be interested in this early engineering project. Built by the Spaniards to grind the sugar cane grown in the vicinity, it was later reconstructed by the English colonists and today undoubtedly marks one of the earliest evidences of civilization in the state of Florida.

Bits of the original machinery still lie scattered about the existing ruins, and the large chimney, itself a part of the original mill, is almost wholly intact. The bricks in this chimney are supposed to have been burned in Spain and were brought inland from the Florida Coast by oxcarts instead of up the St. Johns River. The Spaniards constructed an earthen dam around the spring, raising the level of the same about six feet above that of the near-by St. Johns River, into which the runoff flows. About half of the flow of this 20,000 gallons-per-minute spring is used for turning the huge (*Concluded on page 4*)



- - - but they feel as SAFE as you do now!

Looking at this picture you may think, "Rather they than I!" But these workmen take more risk in crossing a busy city street. Here they have stout Manila Rope between them and disaster.

At this moment, all over the land and on ships at sea, men and materials are being carried—held—lifted—lowered—in apparent peril *but complete safety* by Plymouth Ship Brand Manila Rope!

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MAIL RETURNS

(Concluded from page 2)

undershot water wheel. The Spaniards thus had ample water power for the grinding of the sugar cane. And the forests furnished fuel for cooking the juice down to a thick syrup or the making of brown sugar and molasses. . . .

Vero Beach, Fla.

An American Fellow in Sweden Proposes —

FROM ERNEST E. LOCKHART, '34:

. . . Since I have lived another week in Stockholm, my first impressions and ideas have taken on, let us say, the vigor of youth and a bit, I hope, of the wisdom of old age. . . .

Here in Sweden and, from what I hear, to a greater extent throughout Europe, the layman has a vividly distorted picture of life in America, the correction of which must be one of the first steps toward peace on a sound basis. One of the first questions a young fellow, 16 years old, living in Gothenburg, asked me was about the incidence of gangsters in New York and Chicago. The impression, even in families where people should know better, is that America is built of skyscrapers in gold brick, its citizens predominantly gangsters, and that the main form of amusement is murder. How droll and yet how pitiful!

We all know how difficult it is to develop the idea of peace among an older generation whose best years were nourished by the hate aroused during the World War. It is likewise easy to imagine that an idea of peace would be developed most readily in a person who had no unpleasant memories and who had hopes that history would fail to repeat itself. I am one such person and I am only one of many in my generation. And yet only something similar to what has happened to me, only an opportunity actually to see how friendly and gracious foreigners can be, can make young people realize that the obtaining and fostering of peace is their job and is not that of politicians and war machines. Here I am working with a group of Germans whose leader in the homeland has developed the finest war machine in history, and I am living with a group of Swedes in a country in which the ambition of the leaders has been the development of international peace. At the present moment I feel that nothing could happen to change into hate my friendship and respect for these various peoples. On the other hand, how different might my feeling be had I been at war with them a few months ago! I feel that there should be more opportunities for young people like me . . . to see what is going on, on the other side of the water, to be able to correct distorted impressions and to form international friendships. I feel that the value to America in future good will to be received because of the fact that Mr. Virding [holder of a Scandinavian fellowship at M.I.T.] is now in America far exceeds the $1,600 which represents our combined stipends. Although $1,000 may mean considerable to a small organization like the American-Scandinavian Foundation, the remission of tuition by an institution like ours means relatively little in its economic status. Would I be rash in saying that the remission of tuition to 25 foreign students means relatively little in the economic status of an institution like ours? If our institute could stand it, why couldn't the hundreds of other colleges and universities throughout the United States do likewise? Why can't institutions of learning be made the centers of development of international good will to a greater extent . . . ?

Stockholm, Sweden

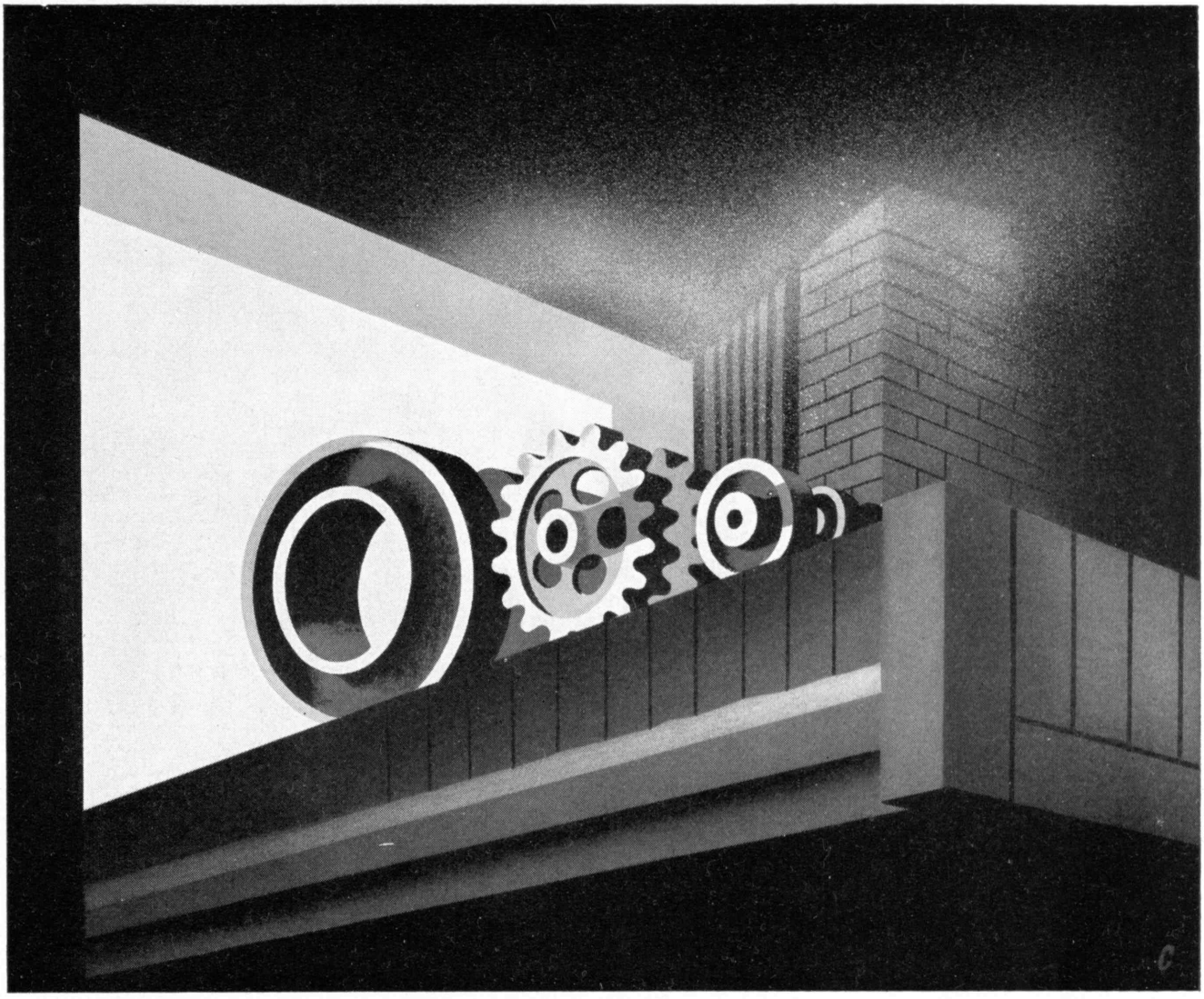
Indivisibility

FROM HOWARD M. EDMUNDS, '05:

. . . I much regretted to note in a recent issue the announcement of the death of Professor Harry W. Tyler, '84. Professor Tyler was extremely helpful to me when I first came to the Institute in 1901. He and his wife stayed at my parents' home in London, and he and I went in to King's College on each of three days when I had to take the examination for entrance to M.I.T.

As a rather striking example of Professor Tyler's sense of humor, may I be allowed to quote that on one occasion, declining an invitation because of a previous engagement, he finished his letter with the phrase "regretting my indivisibility, yours," and so on. . . .

New York, N. Y.



MINIMIZING MASS EFFECT

MANY manufacturers in different lines are profiting from the versatility of Moly steels. In one instance a single cast steel (Chrome-Manganese-Moly) is used for a variety of applications — to the benefit of both manufacturer and users.

Not only do the sizes vary, but the sections and shapes as well. The Moly steel has simplified both foundry production and heat treating problems. It also makes it easier to produce consistent results when simultaneously heat treating a miscellaneous group of castings.

Further field evidences of the practicability of "One steel — many parts" is available. And our book, ***"Molybdenum in Steel,"*** is literally based on experience, not just theory. Climax Molybdenum Company, 500 Fifth Avenue, New York.

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MOLY

THE "ACID TEST" OF BELTING
—*and the* G.T.M.

THE compressor drives in the Vinegar Hill Zinc Company's smelter at Cuba City, Wisconsin, might well be called an "acid test" of belting. Acid fumes from the smelting process caused even top quality "double" belts to crack and separate. The maximum belt life was four years.

That is—it was until December 17, 1930, when a Goodyear COMPASS "40" truly endless belt was installed on No. 1 compressor on specification of the G. T. M.—Goodyear Technical Man. Of this belt a company official recently wrote, nearly eight years after its application:

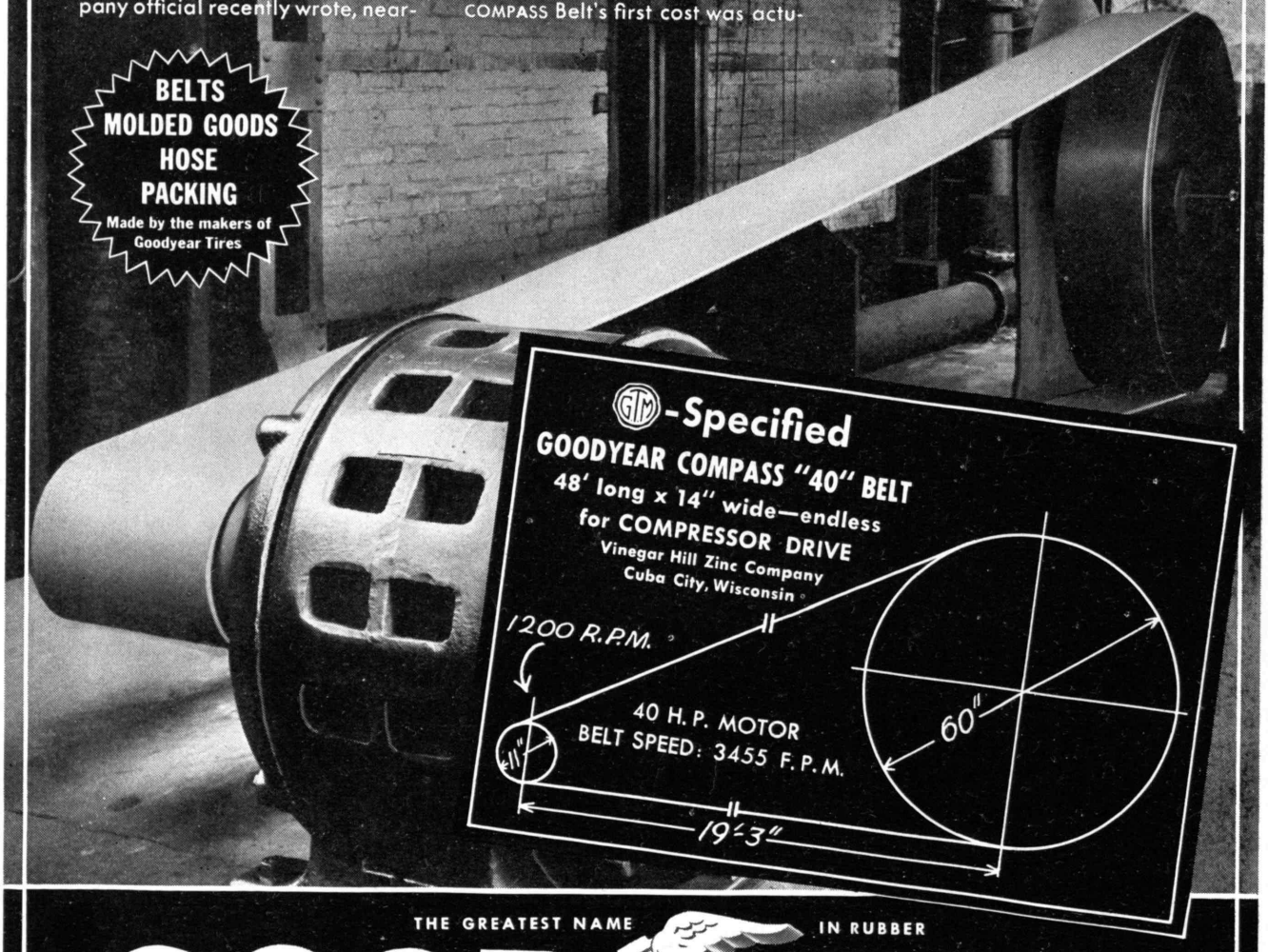
"The (Compass) belt has operated practically twenty-four hours per day, seven days per week, from the time it was installed until the present time. It has given excellent service and is still in very good condition!"

Only taken up 1"

Today the Compass belt shows only a few small cracks in the back of its envelope due to acid fumes. It has never required a single repair and only 1" take-up in all eight years. Yet despite its almost 100% greater service life, the Goodyear COMPASS Belt's first cost was actually 20% less than the "double" belt it replaced!

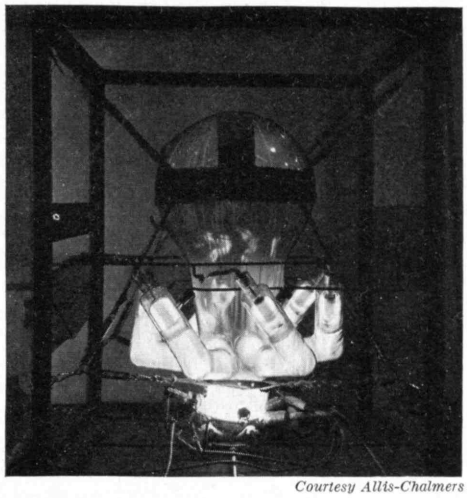
Such ability to give long, economical, trouble-free performance under unusual conditions is typical of all Goodyear Mechanical Rubber Goods. Why not talk over your difficult problems with the G.T.M.—to bring him to your office, write Goodyear, Akron, Ohio, or Los Angeles, Calif.—or phone the nearest Goodyear Mechanical Rubber Goods Distributor.

BELTS
MOLDED GOODS
HOSE
PACKING
Made by the makers of Goodyear Tires



THE GREATEST NAME IN RUBBER

GOODYEAR



Courtesy Allis-Chalmers

Beauty in functional engineering design is found not only in great engineering structures but in subtle and delicate instruments and apparatus. Here is a permanently evacuated and air-cooled 100-kilowatt, 600-volt glass tube rectifier unit used in changing alternating current into direct

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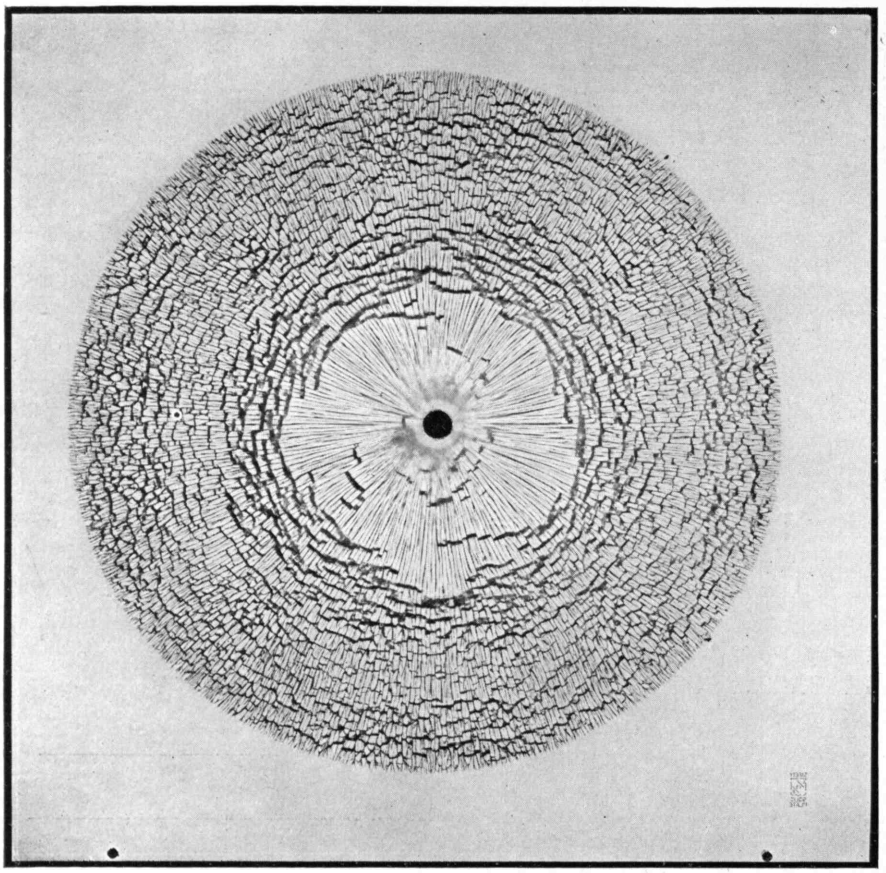
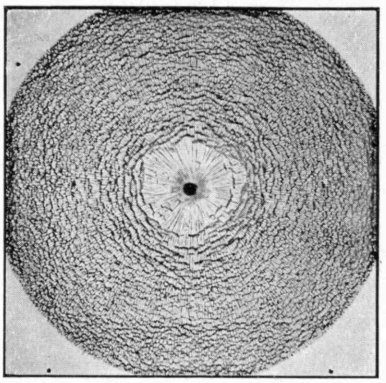
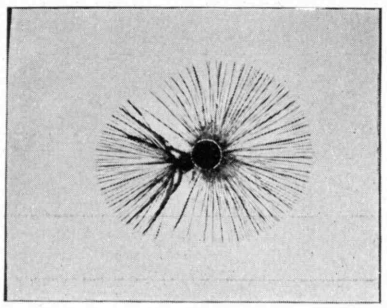
THREE WEEKS MUST BE ALLOWED TO EFFECT CHANGES OF ADDRESS. BOTH OLD AND NEW ADDRESSES SHOULD BE GIVEN.





Left and above. *Two stages in the propagation of radiating cracks from the center of a tempered glass plate. Note that the front of the cracking makes a perfect circle, that the lateral cracks seem to move inward, the radial cracks outward*



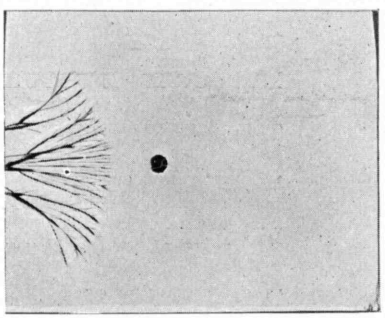
Above. *An imperfection in the glass probably causes the cracks to assume this exceptional asymmetrical formation*

HOW FAST DOES GLASS CRACK?

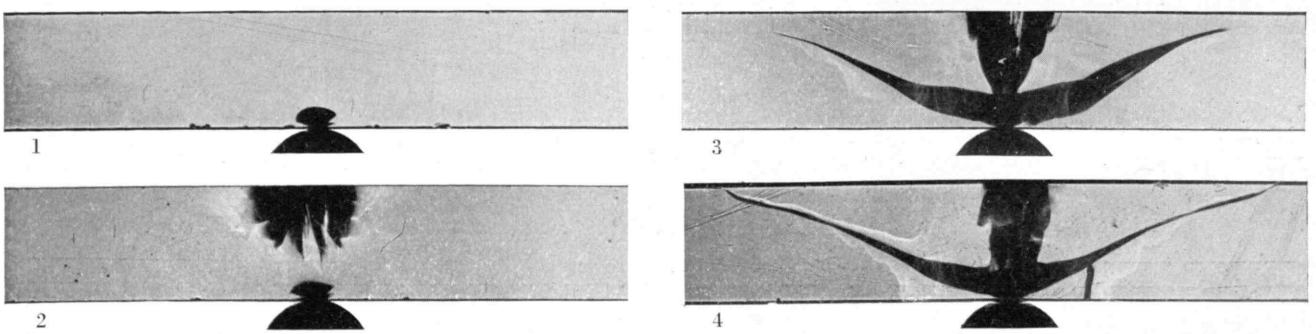
This is not an idle riddle; it is a matter of concern to makers and users of glass, for an understanding answer might aid in making a stronger bottle, a safer safety glass. It is also of interest to Review readers because of the remarkable photographs, here shown, which tell simply by double exposure not only how fast glass cracks but how it cracks.

The technique of taking these pictures is essentially this: A spring-driven metal plunger strikes the glass with enough force to break it and in doing so starts an electrical timing circuit which at the proper split-second sets off an electric flash and exposes the negative, the exposure being less than one-millionth of a second. So accurate and responsive to control is the timing that a crack moving at nearly a mile a second can be stopped dead in its tracks at any desired point — as the two pictures at the top of this page show.

This high-speed photography method of studying the propagation of glass cracks has been carried out by Graduate Student Frederick E. Barstow of M.I.T.'s Department of Physics, working under the direction of Professor Harold E. Edgerton, '27, of the Department of Electrical Engineering. The cracking speed of 5,000 feet per second obtained by the German investigator, Professor H. Schardin, using bullets has been checked by them, and their data indicate that the rate of cracking is independent of the rate of application of the breaking force and that it is the same for both plate and tempered glass.



Above. *Here the elastic wave set up by the plunger hitting the glass travels out to the edge of the plate and starts cracks forming there. The elastic wave travels 15,000 feet per second in the glass, three times as fast as the mile-a-second cracks*



Edgewise views of glass plates cracking (each view is of a different piece of glass at a different stage). The rounded top of the plunger may be seen in contact with the lower side of the plate, and above it in succession are four stages in the progress of the cracking