January 1937

TECHNOLOGY REVIEW

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THE TABULAR VIEW

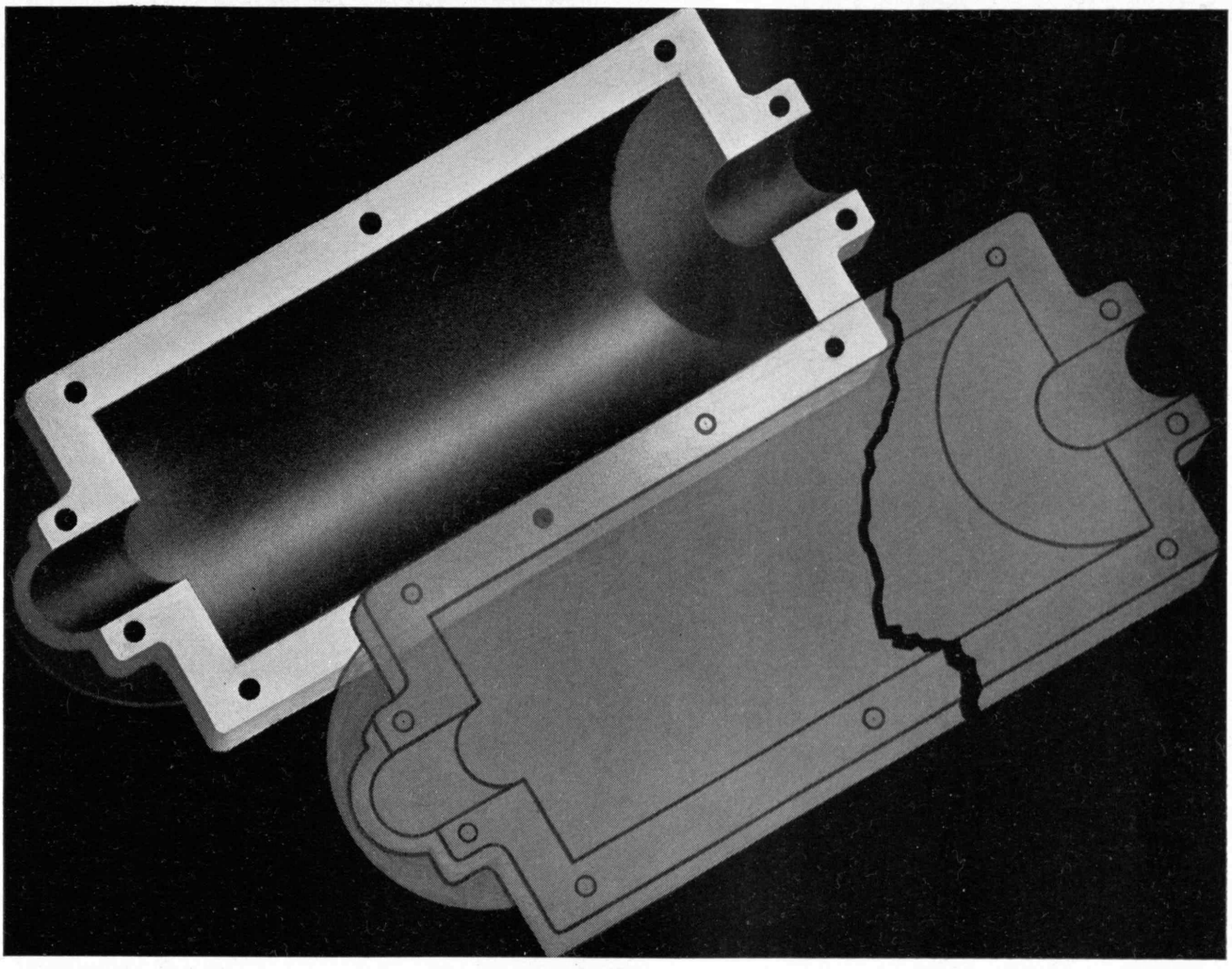
AS The Review enters 1937 it shows an increase in circulation of six per cent over last year and an increase in advertising of ten per cent. These increases are doubly welcome because they signify The Review's growing usefulness to both readers and advertisers and because they help to ease the burden of a steadily growing volume of editorial material and of mounting production costs. We feel, too, that they reflect growing prosperity on the part of those who participate in the publication of The Review by subscribing and advertising. ¶ The opening of the New Year is an appropriate time to repeat some of our major editorial objectives whether or not we have been able to reach them. The general section of the magazine, to meet our specifications, should be in content unique and in style stimulating and lively. It must present material unobtainable in newspapers and other publications; it must be interpretative rather than purely informational. "People," remarked a character in a recent play, "aren't interested in news any more. They want to know what's happened." ¶ The chief responsibility of Review writers is to interpret, to integrate discrete items of news and information, to orientate the reader, to give him a judicial, organized treatment of facts. "The trouble with much of what is called popularization of knowledge," John Dewey once noted, "is that it is content with diffusion of information, in diluted form, merely as information. It needs to be organized and presented in its bearing upon action. Here is the most significant phase of the obligation incumbent upon the scientifically trained men . . . of our age." The Review seeks to participate in discharging this obligation.

IN March, 1932, page 250, The Review published a statement which it hoped would be definitive on the possibility of ramie fiber becoming an important textile raw material. At that time we said: "One of the most persistently recurring of current fables is that ramie fiber (also known as rhea or china-grass) is on the verge of revolutionizing the textile industry. . . . A careful examination of the facts demonstrates how fabulous most of these contentions really are." Recent reports and queries from our readers sent us again to our chief consultant on textile fibers, Edward R. Schwarz, '23, Associate Professor of Textile Engineering at M.I.T., and in response he writes: "We have no argument against attempts to produce a very satisfactory ramie fabric. We simply point out that very many attempts have been made over a period of time and, as the *Industrial Bulletin* of Arthur D. Little, Inc. (Number 62), points out: 'It is correctly stated that the history of ramie is "made up of a long series of failures and financial loss." ' The fact remains that the data as to the comparative strengths of ramie and other fibers are fragmentary and indefinite. It is also true, because of its fundamental structure, that ramie is inherently brittle. To overcome the brittleness, if eventually this should be possible, will necessitate changes in other properties,

such as strength and elasticity, which are likely to offset any advantage gained. Service characteristics can be measured only imperfectly by present laboratory methods, but satisfactory service is the final criterion of success and not the ease or cheapness with which the fiber may sometime be produced and spun."

FOR the pictures of Coulee Dam on page 102 and the information about them The Review is indebted to O. G. F. MARKHUS, Assistant Engineer. ¶ The longleaf pine sequence on page 111 came to us from C. E. PATCH, '02, who is an industrial engineer with the Morton C. Tuttle ('96) Company, a Boston firm widely known as a builder of paper mills as well as the designer of many other important engineering structures. Mr. Patch, whose pictures have frequently appeared in The Review, is an inveterate photographer who finds his skill useful both professionally and for documenting his wide travels. After almost every trip he brings to us a portfolio of pictures and generously permits us to take our choice. ¶ FREDERICK H. SHILLITO (page 109) is instructor in medicine and industrial hygiene at Columbia University, and is on the staff of the Presbyterian Hospital. ¶ EVE WITHERS is a *nom de plume* for a person who has had ample opportunity to observe science and its votaries. We do not venture to speculate whether she writes with her tongue in her cheek. ¶ The photograph on the cover was taken by RICHARD E. POPE of the Technology Photographic Service. The many pictures which are published by us bearing the credit line of this organization give ample proof of the competence of its director, Frank H. Conant, and its chief photographer, Mr. Pope.

"At last! . . . and MOLY did it!"



WHERE is the foundryman who has not encountered difficulties with malleable-iron castings due to primary graphite — especially in parts where coring prevents rapid cooling of heavy sections?

A founder of housings for a piece of apparatus subject to high-pressure loads had such a problem. Coring was complicated and sections were heavy. Rejects were 100%.

The addition of .35% Moly corrected the trouble after everything else had failed. Rejects ceased. Moly not only made production possible, but made the castings even better than had been anticipated.

Your cast-iron problems may be different. They may involve matters of increased toughness, or resistance to heat, or merely the production of high-test iron. In any case, it will pay you to investigate Moly — "industry's most versatile alloy."

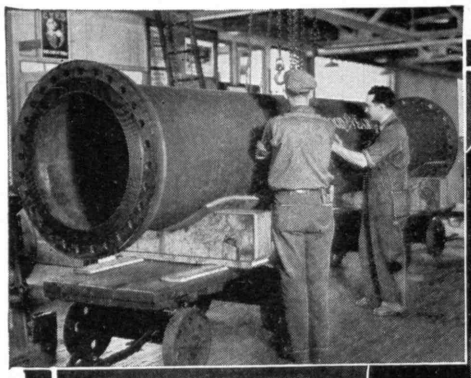
Our technical book, "Molybdenum," is full of practical information. Our periodical news-sheet, "The Moly Matrix," keeps you informed as to the latest developments in Moly irons and steels. They and the help of our experimental laboratory are yours for the asking. Climax Molybdenum Company, 500 Fifth Avenue, New York City.

MOLY

CLIMAX Mo-lyb-den-um

CUTS COSTS

CREATES SALES



NO JOB FOR AMATEURS — building large-diameter sections of Goodyear Hose — no matter in what type of service the hose is to be used — requires the highest type of hose-building art.

WHERE SKILL IS IMPORTANT — building large hose requires expert craftsmanship, from the tube to the cover of the hose. These veteran craftsmen are applying flat steel wire employed in certain types of rough-bore hose.

THE ONE THING NO PRICE LIST SHOWS

counts most in buying large industrial hose

THERE is something far more important than price or even specifications that you should investigate, if you use hose for dredging, sand suction, oil well rotary drilling, or the loading or fueling of ships with oil.

It is something no draftsman can blueprint, no cost accountant can figure. It is the skill and knowledge and craftsmanship of the men who build this huge hose that must be built by hand.

The cornerstone of quality

Here at Goodyear, the youngest in our Number One Crew of seven men who build these rubber monsters, layer by layer, is a mere babe who has been making hose for only 22 years! The experience of the seven totals 191 years — an average of more than 27 years per man!

Year by year for more than a quarter-century, these men have been acquiring the knack and "know how" and teamwork that comes with long practice. Their inimitable skill is the very corner-stone of quality

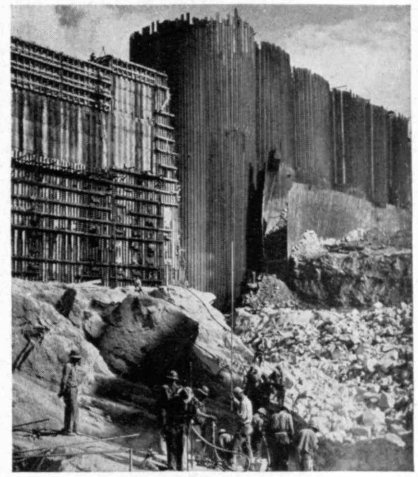
— the priceless ingredient that fuses good engineering and good materials into good hose.

Job-fitted by the GTM

That is why you find Goodyear Hose on all types of jobs the world over — because experience proves its superior construction makes for far longer service at far less cost. And economy is further assured by the fact that Goodyear Hose is individually specified to each job on careful analysis by the G. T. M.— Goodyear Technical Man. This practical authority will gladly consult with you on your special hose requirements. Just write Goodyear, Akron, Ohio, or Los Angeles, California — or the nearest Mechanical Rubber Goods Distributor.

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

OUR CREED — to build only products worthy of THE GREATEST NAME IN RUBBER



Reclamation Bureau

Coulee's Cofferdam Cribs (*See page 102*)

THE TECHNOLOGY REVIEW

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THE COVER

Simultaneous Calculator (*See page 118*)

PUBLISHED MONTHLY FROM NOVEMBER TO JULY INCLUSIVE ON THE TWENTY-SEVENTH OF THE MONTH PRECEDING THE DATE OF ISSUE AT 50 CENTS A COPY. ANNUAL SUBSCRIPTION $3.50; CANADIAN AND FOREIGN SUBSCRIPTION $4.00. PUBLISHED FOR THE ALUMNI ASSOCIATION OF THE M.I.T. DONALD G. ROBBINS, PRESIDENT; C. A. SAWYER, JR., H. B. RICHMOND, VICE-PRESIDENTS; CHARLES E. LOCKE, SECRETARY; J. RHYNE KILLIAN, JR., TREASURER. PUBLISHED AT THE RUMFORD PRESS, 10 FERRY STREET, CONCORD, N. H. EDITORIAL OFFICE, ROOM 11-203, MASSACHUSETTS INSTITUTE OF TECHNOLOGY, CAMBRIDGE A, MASS. ENTERED AS SECOND-CLASS MAIL MATTER AT THE POST OFFICE AT CONCORD, N. H. THREE WEEKS MUST BE ALLOWED TO EFFECT CHANGES OF ADDRESS. BOTH OLD AND NEW ADDRESSES SHOULD BE GIVEN.

For Those Tough Jobs with Round Nosed Wheels . . .

Alundum "C" Abrasive

Abrasive doesn't like to stick to round nosed wheels; it is quickly torn loose — especially on tough jobs such as this rough polishing of long augers. That's why polishers like Alundum "C" Abrasive — its special treatment gives it extra high capillarity, extra sticking power. It makes round nosed wheels last longer, do more work.

Have you tried Alundum "C" Abrasive on your tough jobs? You'll like the way it cuts costs.

NORTON COMPANY, WORCESTER, MASS.

NORTON ABRASIVES

THE
TECHNOLOGY
REVIEW

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The Trend of Affairs

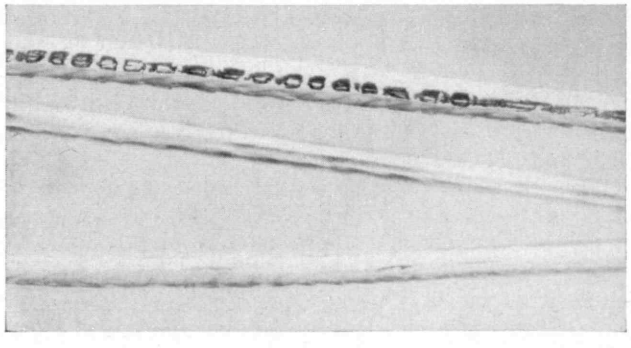
Br'er Rabbit in the Wool Business

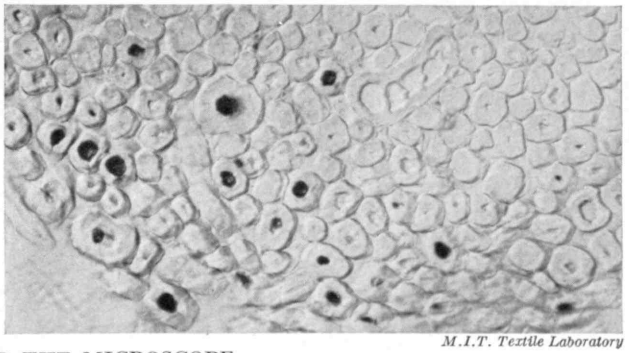
WE heard a reference recently to the "domestic rabbit-wool market" which sent us in search of more information about an industry almost unknown to us and almost everybody else we asked about it. It is general knowledge that the ordinary rabbit supplies fur for felt and skins for fur, but the rabbit-wool industry is a new and fledgling one in this country (the wool began to be imported in noticeable quantities just prior to 1930), despite the fact that French peasant women have been spinning rabbit wool for nearly a century.

One of the surprising facts that we immediately encountered was that already in this country there are such organizations as the New England Rabbit Wool Producers Club and such published literature as "The Angora Wool Farmers' Guide" and "Angora Wool Production." In 1935 there were known imports of rabbit-wool yarn into this country totaling 23,693 pounds. Here was indubitable evidence that Br'er Rabbit had added yarn to his other specialties of fur and felt.

The angora, which is the rabbit from which the so-called wool is obtained, is a native of Asia Minor, but he is now very much at home in England, France, and the United States, particularly in the Pacific Northwest. So silky and fine and soft is the overcoat of this handsome little animal that his fleece has come to be known as *laine de luxe*, or wool of luxury, with prices ranging up to six dollars a pound to prove the aptness of the name. "The fleece," writes William H. Butler in *Textile World*, "compares in fineness to the South American vicuña, is of great tensile strength, very light in weight, pure white in color, apparently warmer than sheep wool, easily dyed, and, even in the long six- or seven-inch fibers, the silky fineness is retained from end to end."

Because of its fineness, however (see illustrations below), angora is very difficult to handle, and cannot be mill-spun without being mixed with wool or silk. In





M.I.T. Textile Laboratory

RABBIT WOOL UNDER THE MICROSCOPE

Left. *Angora rabbit wool normally contains three different kinds of hairs, typical examples of which are shown. The top strand closely resembles the usual hair formation, the one in the center with its many serrations approximates the structure of sheep wool, while the bottom strand is intermediate in structure between the top two.* Right. *Cross section of an angora hair*

R. Lytle Deming, '31

NATURAL ARTIFICIAL

Left. *This flash of lightning seemed to belch forth out of a white-hot caldron in the clouds. Note the back-lighting of the clouds, throwing them in silhouette.* Right. *In General Electric's Pittsfield laboratory, artificial bolts are discharged as the control and behavior of lightning are studied. Here is shown a ten-million-volt discharge as it arcs and writhes its way between two spheres. Lightning does strike twice, say G. E. engineers. In fact, most fires set by lightning are caused, not by a single spark, but by a series of multiple discharges. Nor is the brilliant flash one observes during a storm a bolt from the sky; it is a union of a cloud streamer with a streamer from the earth*

fact, excessive fineness is the source of the local grower's worst headache; the American angora needs to be crossbred with his coarser-haired cousins if a wool that can be used extensively by our mills is to be grown.

Angora is perhaps most widely used as a substitute for cashmere in the manufacture of fine yarn for knitting, either by hand or machine. Cashmere, the lovely, soft wool that is found beneath the hair of goats in Kashmir, Tibet, and the Himalayas and that has been apotheosized by the shawls bearing its name, is now almost unobtainable in this country; opportunity, therefore, knocks at the hutches that are multiplying, chiefly on the Pacific Coast and vigorously on the Atlantic.

Like the sheep, the angora rabbit may be shorn without injury, although a more even wool is obtained by combing. Angoras in the Pacific Northwest are reported to be clipped three times annually, yielding some four ounces each clip. According to Mr. Butler, who seems to speak with authority, there are rabbits which yield as much as 20 ounces annually. Couple these quantities, however small, with the well-known mass-production habits of the rabbit and they become potentially large. The industry will always be a minor one, of course, even with the substantial expansion that may come, but it is none the less interesting if for no other reason than for its demonstration of how goats in the Himalayas can influence the raising of rabbits in the United States.

Hydrogen for Fuel

BLIND, slow, vulnerable to all manner of weapons, the submarine nevertheless remains one of the most dangerous of war craft. Sufficient evidence of its effectiveness is the fact that when England, in spite of her huge fleet and decisively favorable geographical position, was staring directly into the eyes of famine at the height of the U-boat campaign, not more than 140 German submarines were in action. Any improvement in the submarine's speed or striking power is, therefore, more than a matter of mere academic interest to the millions whose fate may be tied up with its activities.

Germany, deprived of her underwater fleet by the Versailles Treaty, is again building U-boats, and although most of them are as yet small (20 of the 32 she officially admits having are of only 250 tons), many have the speed and carrying capacity of much larger craft, because they are driven by power plants of novel design. Inherent in the standard Diesel-electric drive of the submarine is great weight and space per horse power. It is not so much the electric motor that causes the difficulty as it is the tremendous weight and space needed for the storage batteries, sometimes one-sixth of the total submerged displacement. With batteries is associated also the ever present danger of chlorine poisoning should salt water leak into the containers. The reason for using such an unsatisfactory form of underwater drive is, of course, that it places no drain on the meager air supply enclosed in the hull; any alternative must meet this severe condition. By use of a special internal-combustion engine invented by the German engineer, Rudolf A. Erren, and of high pressure electrolyzers, which are also a German development, the navy of the Nazis has a propulsion plant consisting of a single power unit which appears to meet this difficulty successfully.

Several years ago, Erren perfected a hydrogen engine for utilizing off-peak power from hydroelectric stations. Excess electric current is fed to electrolyzers (in use for many years) which separate water into its component elements — hydrogen and oxygen — at pressures of