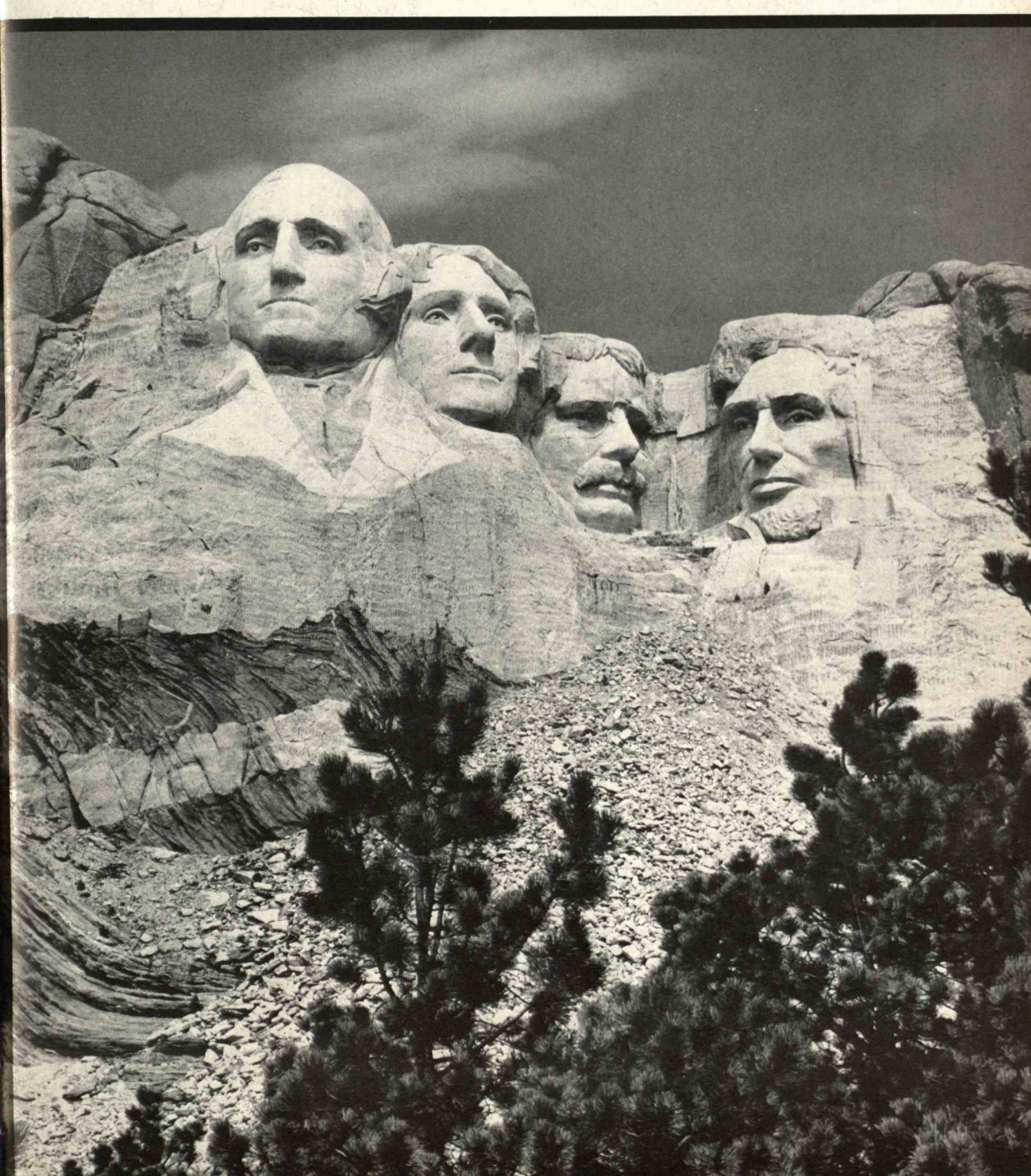


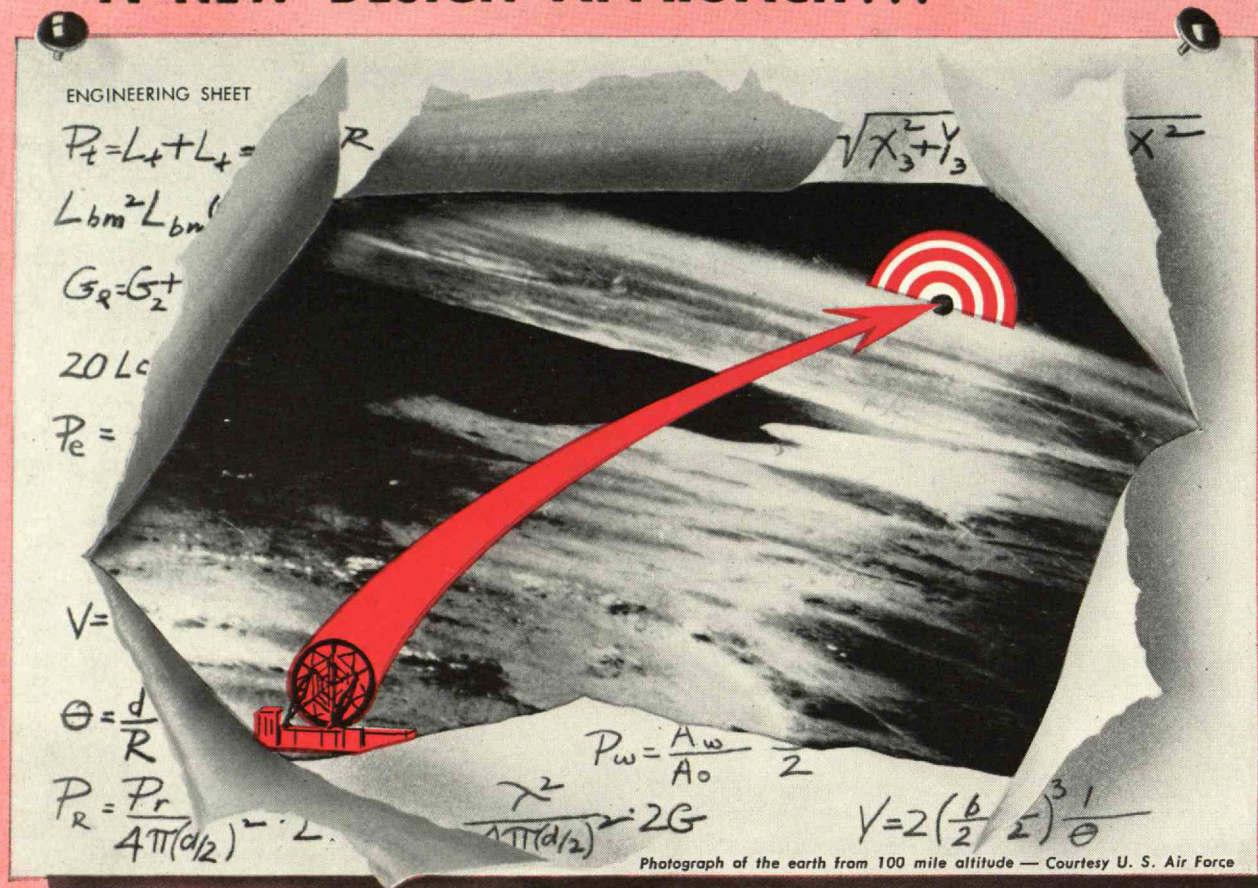
TECHNOLOGY

REVIEW

June 1956



A NEW DESIGN APPROACH...



... BEYOND-THE-HORIZON TRANSMISSION

BEYOND-THE-HORIZON TRANSMISSION

The newest military and commercial long-range communications systems are turning towards the advantages of "scatter" transmission. By transmitting *directly* to stations well beyond the horizon, scatter transmission systems eliminate the construction and maintenance of intermediate microwave stations and avoid cables and repeaters of wire systems, while retaining the wide bandwidths available at high frequencies. This *direct* transmission can span water or inaccessible terrain while giving predictably high signal reliability and freedom from interference.

A NEW APPROACH . . . CONTROLLED SYSTEM DESIGN

A complete analysis including the effects of climate, multipaths, modulation, diversity and prolonged equipment operation combined with an exclusive experimental method of simulating every proposed link enables Hycon Eastern, Inc. to *hit the performance*

target more precisely. We can reduce the expense of a large margin for error and eliminate the possibility of costly site relocations by careful assessment of each customer's needs and operating conditions that will provide him with an optimum design.

HYCON EASTERN OFFERS AN INTEGRATED SERVICE

Within the areas of Hycon Eastern, Inc. and its associated companies can be found complete facilities not only to design, engineer and specify equipment for Beyond-the-Horizon Transmission Systems, but to design Central Offices, Connecting Wire Networks, perform Communication Traffic Density Surveys, Aerial Surveys and Mapping to determine the most efficient routes for land lines and for various radio links such as UHF/SHF line of sight. After the necessary facts have been gathered there further exists the experience to evaluate them and to specify practical equipment with complete independence of judgment necessary to create a complete communications system that will fulfill present and projected needs.



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Phelps Dodge Armo-Lok cable with Habirite (butyl rubber) insulation—a companion to Phelps Dodge Varnished Cambric insulated interlocked armor cable—is more than “just another interlocked armor cable.”

Habirite—developed through years of Phelps Dodge experience in the design and manufacture of high voltage cables—is a specially engineered butyl rubber compound. It far surpasses any other type of rubber insulation for dependable service.

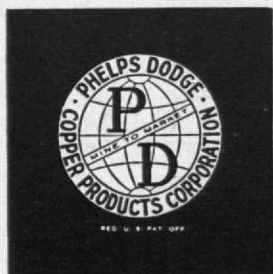
Habirite offers these distinct advantages over other rubber insulations:

- ▶ Far greater resistance to heat and oxidation with consequent higher temperature rating and lower conductor size and cable cost.

- ▶ Far greater resistance to ozone found around high voltage equipment.
- ▶ Far greater mechanical toughness.
- ▶ Better electrical properties affording a greater safety factor in operation.
- ▶ Highest uniformity due to controlled uniformity of raw material.

★ ★ ★

See your Phelps Dodge distributor for information on a complete Armo-Lok system. For catalogue and specification data on Habirite or Varnished Cambric insulated Armo-Lok cable, write: Dept. M-6, Phelps Dodge Copper Products Corporation, 300 Park Avenue, New York 22, N. Y.



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To the engineer who likes to blaze new trails...

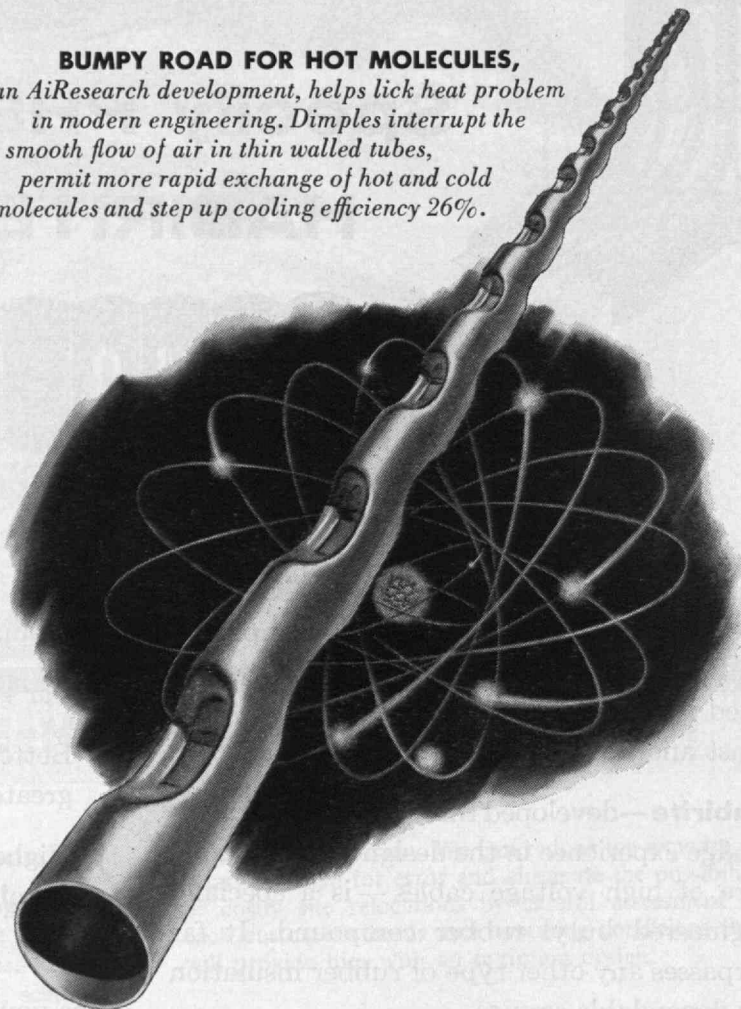
AiResearch is looking for your kind of engineer.

AiResearch is a key company in the industrial future of America. We are playing a vital part in the great engineering advances now taking place.

The field of heat transfer is an example. The advent of high-speed, high-altitude aircraft has made heat control one of the most pressing present-day problems. This promises to be even more acute when atomic energy becomes an industrial fact. AiResearch is constantly developing new methods of heat transfer. But this is only one aspect of our operation. We pioneered the field of small turbomachinery, pioneered aircraft air-conditioning and pressurization systems, developed many different types of pneumatic and electronic equipment, now manufacture more than 1000 different products. We develop new solutions for industry as required.

That's why we need creative engineers...and appreciate them. You who qualify for an AiResearch position will receive stimulating assignments, utilize some of the finest research facilities in the country and be well rewarded financially.

BUMPY ROAD FOR HOT MOLECULES,
an AiResearch development, helps lick heat problem in modern engineering. Dimples interrupt the smooth flow of air in thin walled tubes, permit more rapid exchange of hot and cold molecules and step up cooling efficiency 26%.



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Builders of Future America

*Excerpts from a recent address by Roger M. Blough,
Chairman of the Board, United States Steel Corporation*



"Somewhere in this day's twilight there is a boy sitting alone. He may be your son or a neighbor's son. He is thinking about his most pressing obligation — what to do with his life, what to make of himself.

"Out of nowhere, perhaps, will come the realization that he will find personal growth and confidence and the full life if he can only make a plane that will fly better in the air, or a machine that will run better on rails, or if he can make a device to lessen human drudgery in the home, or build a home so beautiful and so full of human satisfaction that it will excel all that has gone on before.

"For this boy . . . the answer may lie in the insatiable demands for fuel from under the ground and for power to turn the wheels of industry. Or for him, a deep-seated satisfaction may come from learning and knowing that the unfathomable atom can be harnessed.

"Somewhere in that young valiant mind . . . will emerge the image of men of science and men of engineering who became what they are . . . in the dedicated hope that their chosen career may afford them at least one fleeting moment of major achievement.

"That boy, though he may say little, will see in you, and the others like you, the builders of America. And when he sees that much, every thoughtful boy . . . will see a little more. He will see himself grasping your work, building mightily upon what you have built . . . He will see the great challenge of America for his own work and for his own life."

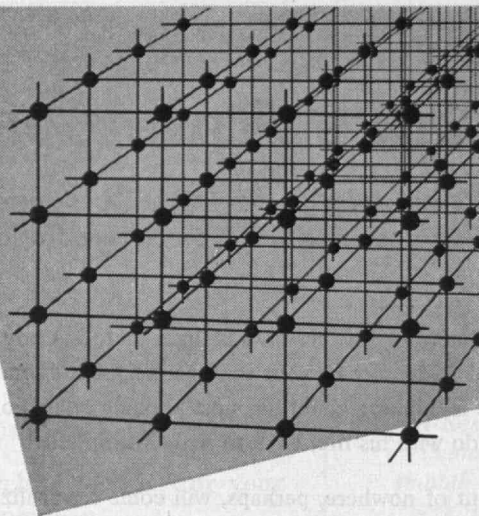
Today, when every effort is being made to focus public attention on the acute shortage of technical manpower, these excerpts from Mr. Blough's address are especially timely. They are printed here in the hope that they will remind Fathers — thinking of their son's careers — of the challenging opportunities the America of tomorrow offers men trained in the fields of science and engineering.

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THE TABULAR VIEW

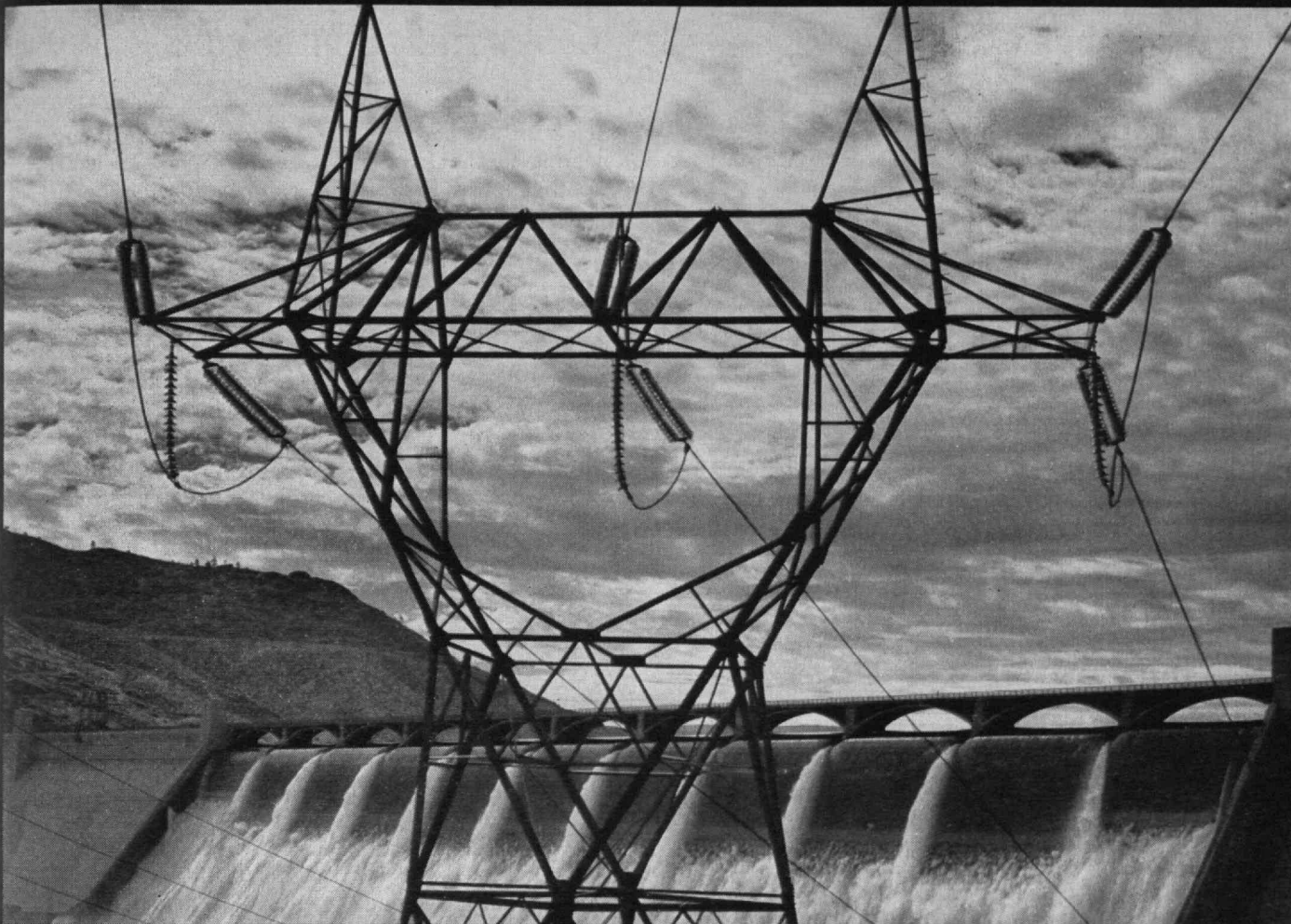
Only the Word Is New.—Few technical trends have attracted more universal and continuous attention than that currently labeled automation. Yet, in many respects, few terms are as well understood, for it is not uncommon for different persons to mean quite different things when they speak of automation. In "Trends in Automation" (page 399) PAUL COHEN, '35, records that automation "is a phase of mechanization" and, as such, is one of the forces that have created the industrial revolution. Recent improvements in techniques of measurement and control—to which progress in the development of automatic computers, servomechanisms, and feed-back systems are primary contributors—are likely to provide a contemporary acceleration to industrial mechanization. But, says Mr. Cohen, "from the evidence only the word is new, not the general technique it describes."

Mr. Cohen skillfully combines literary with engineering achievements, as indeed he has done since his student days at Technology. A native of New Bedford, Mr. Cohen took the Institute's Course in Mechanical Engineering from which he was graduated with an S.B. degree in 1935. He also has an M.S. degree in mathematics and physics. As an undergraduate he was associated with *The Tech*, becoming editor of that newspaper in his senior year. He was an instructor in the Department of English and History at M.I.T. in 1936, and was engineer with the United Shoe Machinery Corporation in Beverly from 1938 to 1946. Since 1946 he has been engaged in engineering and administrative work with the Sperry Gyroscope Company at Great Neck, Long Island, N.Y. Mr. Cohen has been a research engineer in mechanical engineering by vocation, and a skillful writer and interpreter of science and engineering by avocation.

There'll Be a Hot Time.—As aircraft are designed to fly at increasingly higher altitudes and ever-increasing supersonic speeds, a whole new group of design problems arise to plague the aeronautical engineer. One of the most important of these is that of creating a suitable environment within the craft, and particularly of making adequate provision for the insulation, distribution, and dissipation of heat generated within the air frame and that arising from outside sources during flight. The nature of these problems, and some of the possible means of alleviation are discussed in "Thermal Problems of High-Speed Flight" (page 403) by JACK W. RIZIKA, '47.

Mr. Rizika received the S.B. and S.M. degrees in Aeronautical Engineering from the Institute in 1947 and 1949 respectively. Following his graduation from the Institute, Mr. Rizika went to Harvard University where he studied in the School of Engineering Science and Applied Physics from 1949 to 1951, and then at the School of Business and Economics from 1951 to 1953. During 1953 and 1954, Mr. Rizika was project analyst at the Glenn L. Martin Company, and was also engaged in research work at the Institute.

(Concluded on page 390)



Cable insulation that can't take it ... is water over the dam!

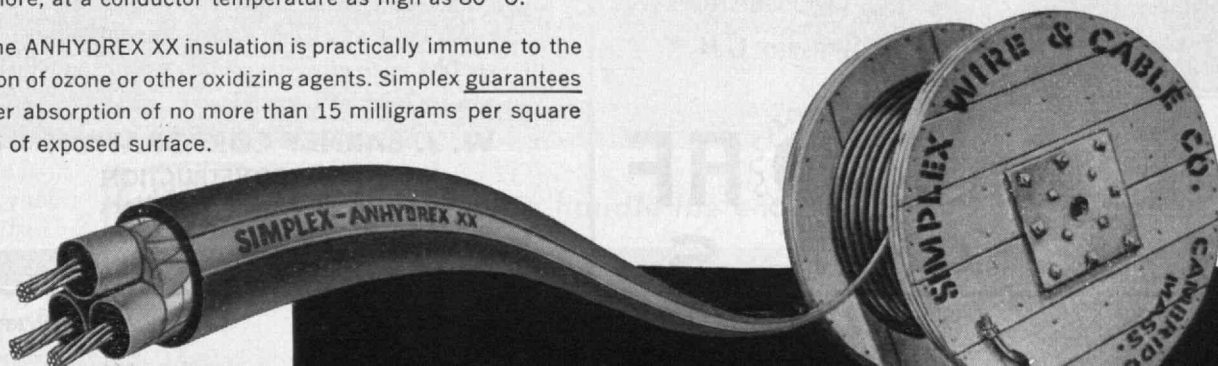
Losing power through weak cable insulation is fast becoming a thing of the past. For, more and more, today's trend is toward Simplex-ANHYDREX XX insulated cables — which withstand the toughest punishment in any location.

Simplex-ANHYDREX XX insulated cables are designed and built to operate under conditions that would destroy any other insulation. They operate at voltages of 2,000 to 25,000 or more, at a conductor temperature as high as 80° C.

The ANHYDREX XX insulation is practically immune to the action of ozone or other oxidizing agents. Simplex guarantees water absorption of no more than 15 milligrams per square inch of exposed surface.

Features like these are making Simplex-ANHYDREX XX cable first choice for all power transmission lines—no matter where the location or what the conditions.

Be sure to specify Simplex-ANHYDREX XX for your high voltage applications. For more information, write for booklet 1009. **SIMPLEX WIRE & CABLE CO.**, 79 Sidney Street, Cambridge 39, Mass.



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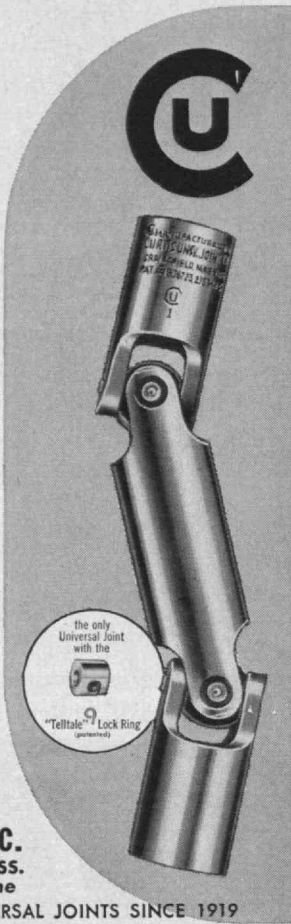
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THE TABULAR VIEW

(Concluded from page 388)

Since 1954 he has been engaged in aeronautical engineering at the Lynn plant of the General Electric Company. Mr. Rizika's first contribution to The Review was "Aeronautical Technology in the U.S.S.R." which appeared in the November, 1954, issue.

"When Pestilence Strikes." — Those who can afford a few evening's divorcement from "tee-vee" or the "moom pitchers" to devote to Lucretius' *On the Nature of Things* are likely to embark on a drastic — if temporary — change of intellectual diet. Despite the admiration it evokes for the cogitative powers of an ancient civilization, the concluding sections of *De Rerum Natura* are as mournful as any opera and provide a vivid description of one of ancient man's scourges — pestilence. In "The First Great Epidemic of History" (page 407) JAMES A. TOBEY, '15, takes up where Lucretius leaves off and examines that historic epidemic of 24 centuries ago from the modern point of view. Dr. Tobey brings to this work — as to his other writings in The Review and elsewhere — a vast knowledge of public health, law, and related matters.

After having attended the Roxbury Latin School, Dr. Tobey received the S.B. degree from M.I.T. in 1916. He went on to take an LL.B. degree from Washington Law School in 1922, an M.S. from the American University in 1923, and returned to M.I.T. for his Dr.P.H. degree which was conferred in 1927. His professional life has been spent in advancing public health and laws affecting it, in lecturing at such institutions as M.I.T., Yale, Harvard, and Columbia. He has been associate editor of the *American Journal of Public Health*, has written about 100 articles and 20 pamphlets. In addition he is author of *The Quest for Health, Personal Hygiene* (with A. J. McLaughlin), *The National Government and Public Health*, and *The Medical Department of the Army*. Dr. Tobey, a frequent contributor to The Review, has also served as a colonel in the Army's Medical Service in Texas.

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Safer on the outside! In this spine-tin-gling test we slicked a section of road with oil—then had two cars hit this slippery stretch at 50 miles an hour and brake at the same instant.

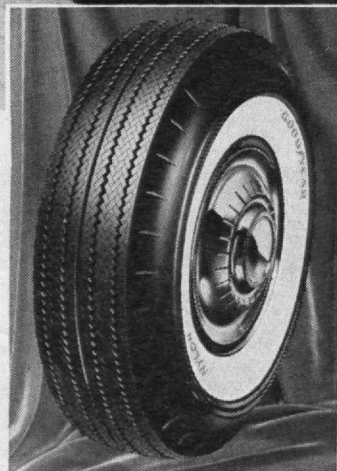
The far car, riding on new tubeless tires with ordinary-type treads, slipped and fish-tailed dangerously. The near car, on new Nylon Custom Tubeless Super-Cushions with Twin-Grip tread, came to a safe, straightline stop 38

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