

TECHNOLOGY

REVIEW *November* 1953



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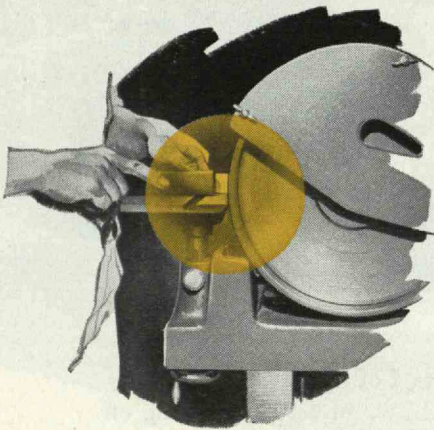
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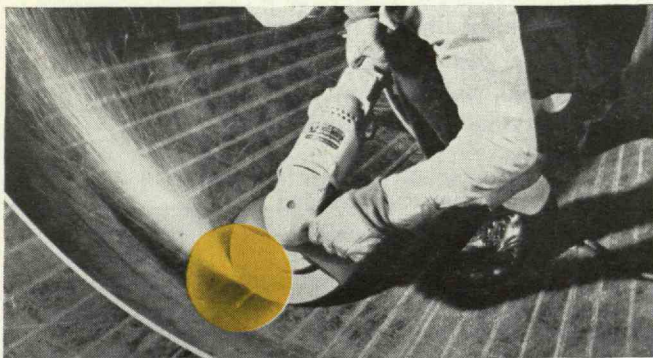


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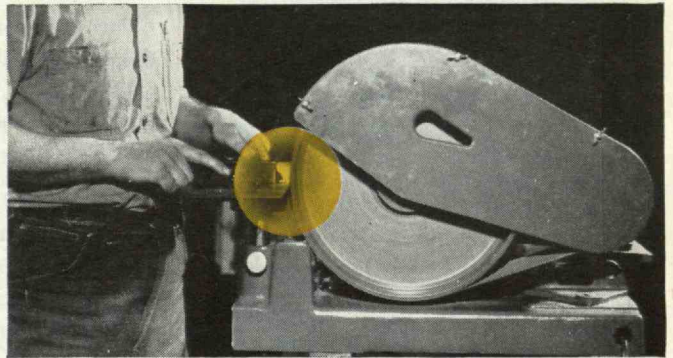
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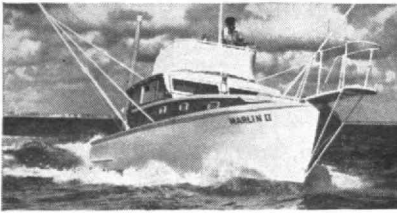
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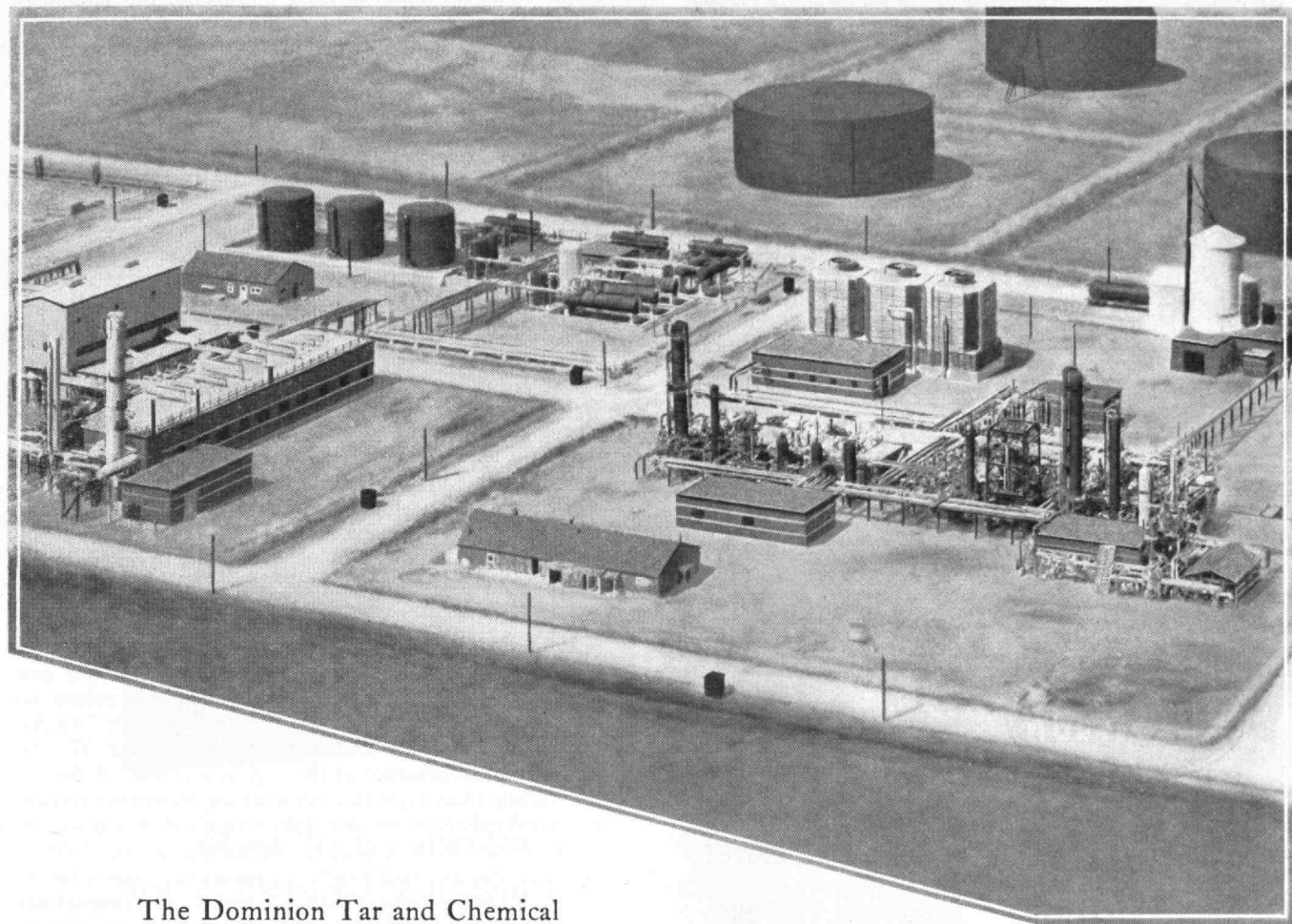
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Chemicals FOR A FAST GROWING REGION



The Dominion Tar and Chemical Company's new plant at Montreal produces ethylene oxide, a component of detergents, solvents and plastics; and glycol, basic chemical in permanent type anti-freeze, explosives and synthetic fibers.

Design and construction of the plant, which has an estimated capacity of 25 million pounds of glycol per year, were by Stone & Webster Canada Limited, utilizing the facilities of Badger Process Division of Stone & Webster Engineering Corporation.

At this plant, located near the St. Lawrence River, Dominion Tar and Chemical Company extracts ethylene from gas piped from nearby refineries, converts it to form ethylene oxide and glycol, and returns the unused gas for further processing.



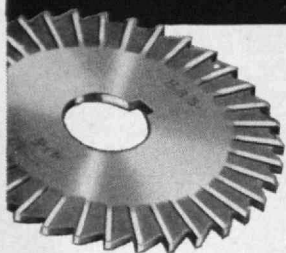
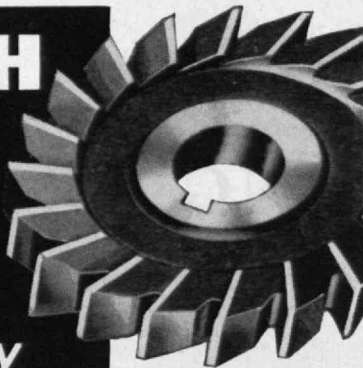
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THE TABULAR VIEW

Human Equation. — As the educational doors fling wide again at the beginning of the fall term, ADMIRAL BEN MOREELL opens Volume 56 of *The Review* with his article appropriately bearing the title "Engineers and Engineering Education" (page 15). Admiral Moreell finds those who leave engineering schools to be well taught in the technical topics of their profession. But engineers must deal with people as well as with materials and ideas, and collegiate instruction on the engineers' responsibilities to their fellow man have left something to be desired. Recalling that the signers of the Declaration of Independence regarded that government best which left as much freedom as possible to the individual, Admiral Moreell warns of unrestrained bureaucracy and stresses the need to instruct engineers in the functions of government as well as in their obligations to society at large. Admiral Moreell, chairman of the Board of Jones and Laughlin Steel Corporation received a degree in civil engineering from Washington University in St. Louis in 1913. After four years' experience on construction projects in St. Louis, he started his naval career, advanced to the position of Chief of the Bureau of Yards and Docks (1937-1945), and became the Navy's youngest vice-admiral at the age of 51. He is the recipient of the Distinguished Service Medal, the Legion of Merit, membership in honorary scientific and engineering societies, and honorary doctor's degrees from 10 universities. Through the good auspices of the M.I.T. Club of Western Pennsylvania, *The Review* is able to include this article which Admiral Moreell delivered as a speech to the Pittsburgh group last May.

Individuality Is a Horrid Word. — The modern characteristics of that segment of our society that has generally been regarded as the backbone of the nation are examined by JULIAN A. JOFFE, '24, in his article "An Appraisal of Suburban Middle Class Life" (page 17). Selecting the suburbanite as the typical example of the upper-middle class type of citizen whose economic security is exceedingly tenuous, Mr. Joffe's study of this group decries the ostentatious display, the indulgence of children, and the uniform conformity to mediocrity which he observes. As the populace blithely accepts, as a normal part of their lives, such things as the leveling effects of mass communication, compulsory social-security laws, low-cost housing at public expense, and progressively high taxes that increasingly diminish personal incentive, Mr. Joffe sees a metamorphosis taking place in the Americanism that once venerated individualism. Recipient of the B.S. degree from the College of the City of New York in 1922 and the S.B. from M.I.T. in 1924, Mr. Joffe took graduate study at the New School of Social Sciences. As a partner in a firm making food products in Mount Vernon, N.Y., he speaks with the experience of a business executive. Supplementing his business activities, Mr. Joffe, a previous contributor to *The Review*, has been engaged in studying and promoting educational and civic enterprises in his community.

More Laurels to Win. — The dairy industry may take justifiable pride in the many technological innovations for which it has been responsible, especially during the past half century. Its laurels are not of the past, however, for this basic industry has ample opportunity to make major contributions in providing an adequate food supply for the world's increasing population. Major progress may be expected from increasing the basic yield of milk per cow, (Concluded on page 6)

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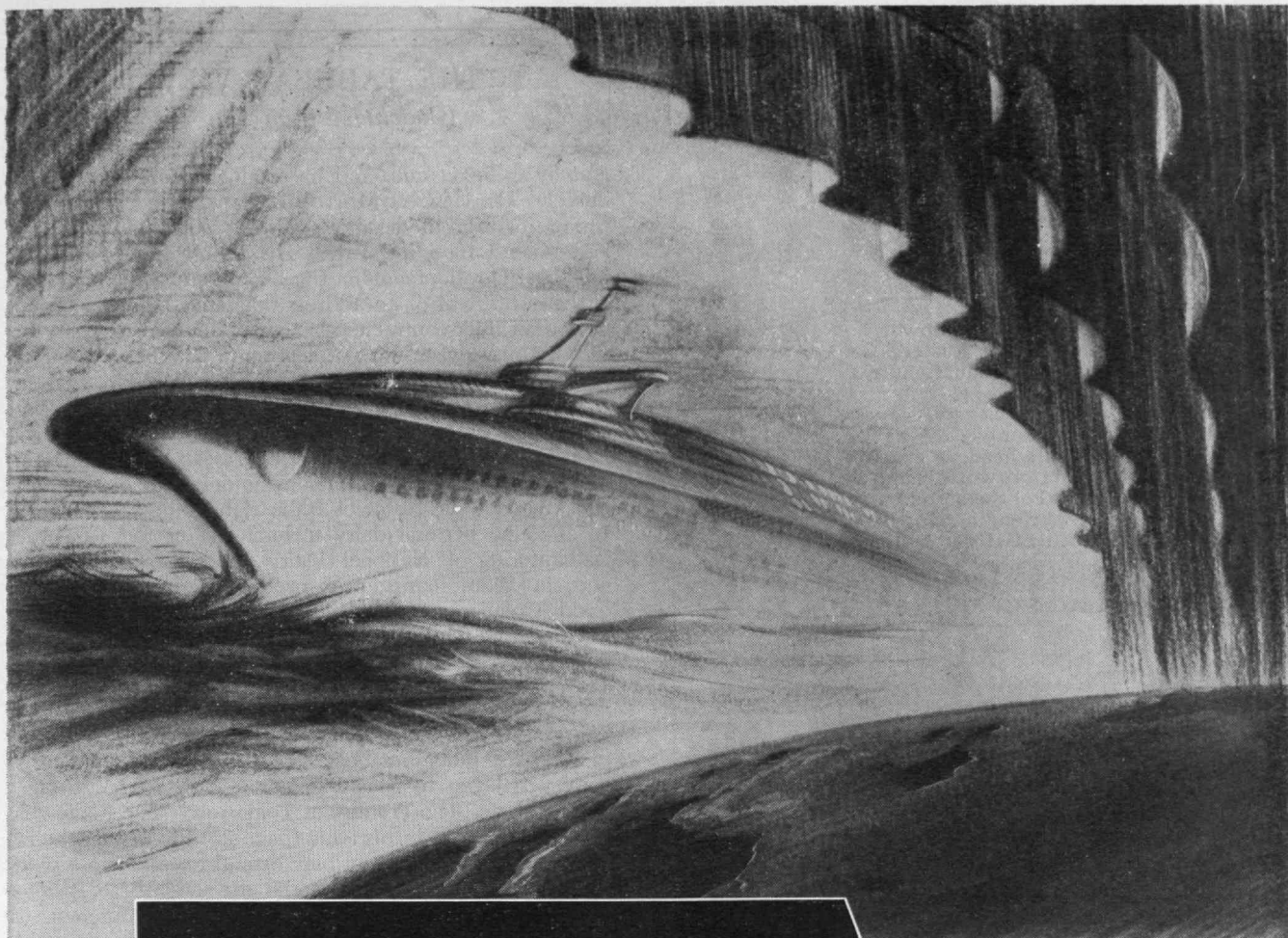
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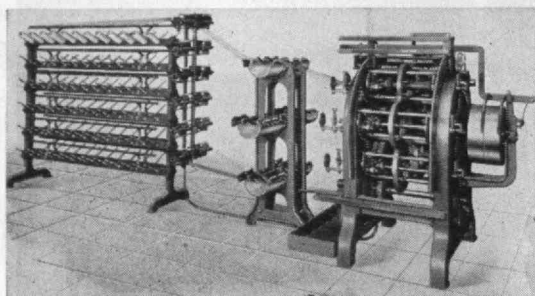
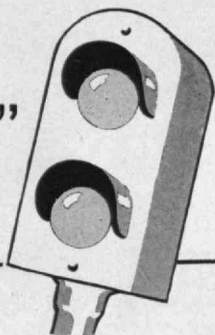
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THE TABULAR VIEW (Concluded from page 4)

and by utilizing milk and its products more effectively. Such are the views of MILTON E. PARKER, '23, whose entire professional life has been closely associated with dairy and related food industries. His article "Future Technological Developments in the Dairy Industry" (page 22) is the outgrowth of an address delivered before a group of market milk contractors last April at the University of Illinois, and revised for publication in *The Review*. After receiving the S.B. degree in Industrial Biology from M.I.T. in 1923, Mr. Parker was engaged in a wide variety of research and quality-control projects in the dairy industry, serving for a year as research associate in M.I.T.'s Department of Biology under Samuel C. Prescott, '94 (now Professor of Industrial Biology, Emeritus). In 1928 he became dairy technologist of the Research Laboratories of National Dairy Products Corporation, and, in 1936, manager of production of the Beatrice Foods Company. In 1944 he opened an office in Chicago as consulting food engineer, and in 1948 organized a Department of Food Engineering at the Illinois Institute of Technology, which he now heads.

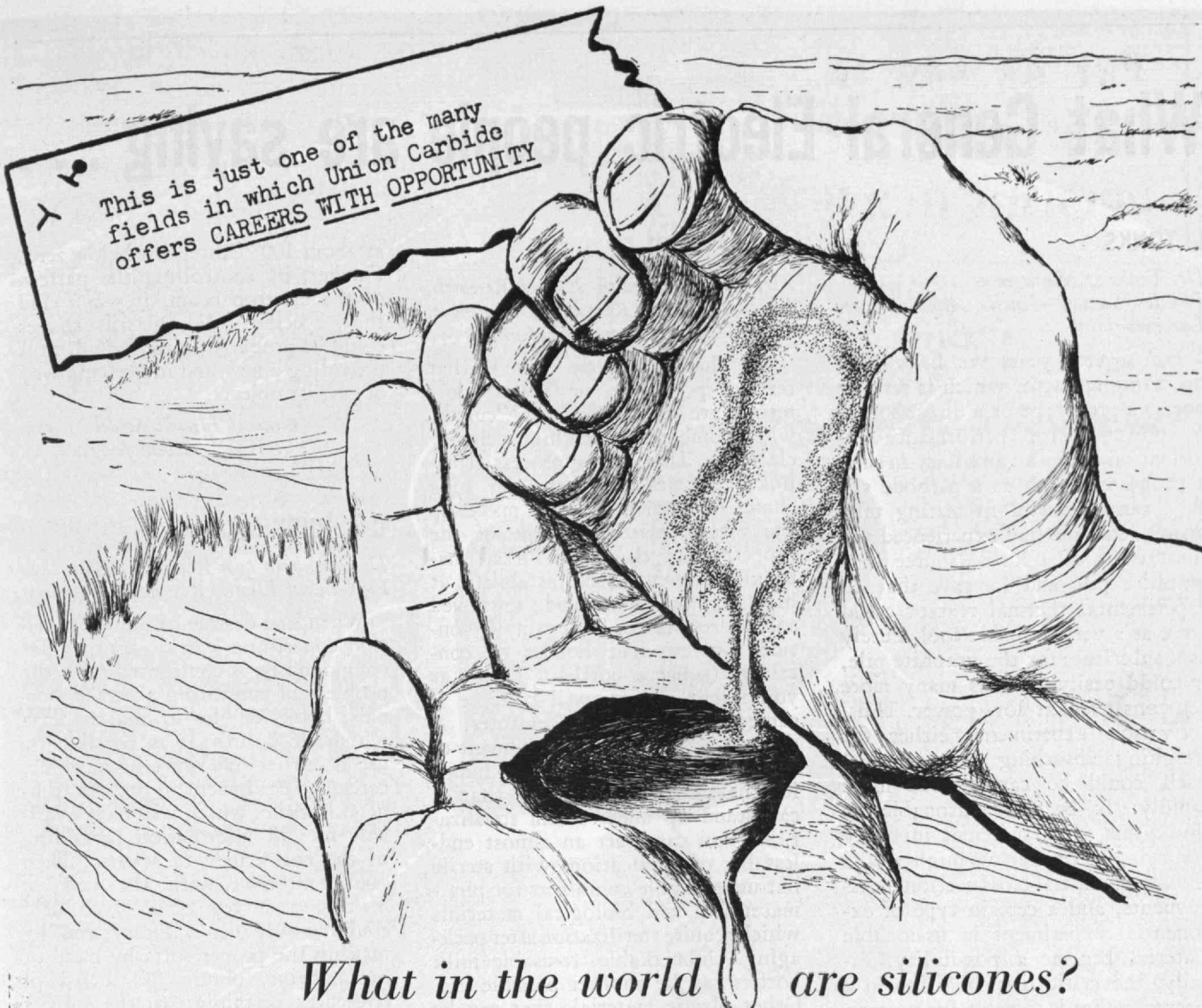
Promises Unfolding. — At the 25th reunion of the Class of 1928 last June, members of that Class and their guests were privileged to hear PROFESSOR ERWIN H. SCHELL, '12, speak on "The Promise of Tomorrow." The Review is happy to include in this issue (page 25) Professor Schell's address so that its content may extend beyond those who were present in Walker Memorial at reunion time. A continuing personal growth, Professor Schell contends, is achieved when we begin to delegate our activities to others, thus multiplying our energies and accomplishments; when we contribute sheerly for the pleasure of giving; when we develop greater loyalties to others. Professor Schell believes that, by learning the application of these arts of delegation and of greater endeavor one's stature inevitably increases and one's worth is enhanced. Professor Schell is a graduate of M.I.T. and received the S.B. degree in Mechanical Engineering in 1912. A member of the Institute's teaching family since 1917, he is now professor of industrial management, and in charge of the Course in Business and Engineering Administration.



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What General Electric people are saying . . .

L. TONKS

*Dr. Tonks is Manager—
Physics Section—Knolls Atomic Power
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For several years we have been operating a reactor which is serving not as a prototype or a direct source of power-reactor performance information but as an auxiliary in such a program—much as a cathode ray tube can be useful in testing television sets. We had experienced the limitations of a Ra-Be source in a graphite pile and foresaw that an experimental thermal reactor could serve as a very valuable tool. Purely as a substitute for the graphite pile, it could easily give us many more neutrons even at low power. Thus, activation experiments either for weighing absorbing foils or fuel itself could be carried out more rapidly. It became reasonable to think that with sufficient intensity and using a chopper we might make actual differential cross-section measurements, and a certain type of exponential experiment in fissionable material became a possibility. Finally, the criticality condition in a reactor makes it suitable for neutron absorption measurements by observing the effect of the material under test on reactivity.

These were the considerations that led us to build our first thermal test reactor based on the fundamental design of Dr. Steward of this Laboratory . . .

Our thermal test reactor has undergone a logical evolution in accordance with its proved usefulness. From a small beginning with a power level of one watt, all-manual controls, makeshift shielding and borrowed fuel, it has justified development into the 10,000-times-more powerful reactor we are about to complete. It is still small as reactors go and yet can give thermal neutron fluxes for experimental purposes which are comparable with far larger units. And by exploiting danger coefficient techniques it can measure thermal capture cross sections of small samples and weigh isotopes.

*at the American Physical Society,
Rochester, N. Y.*

E. J. LAWTON

*Mr. Lawton is with X-Ray Research,
Electron Physics Research Department,
General Electric Research Laboratory*

We have recently found that certain polymers, or plastic materials are cross-linked or "cured" when bombarded with high-velocity electrons. This curing process cross-links, or ties together, the long chain-like molecules that make up the plastic material. Some of the properties of this cross-linked material are greater form stability at high temperatures and improved solvent resistance. For example, consider polyethylene bottles or containers (squeeze bottles). These, as you might expect, will collapse if subjected to high temperatures. A short time electron bombardment of such a bottle, however, will change its characteristics so much that it can stand up under steam sterilization. You can start an almost endless list of applications with sterile but unbreakable containers for pharmaceutical and biological materials which require sterilization after packaging. Unbreakable, re-usable milk bottles can be another possible use. Other plastic materials that can be cross-linked by the electron beam are nylon, rubber, and silicone products.

In some of our earlier work we found that certain liquid materials would polymerize to solid plastics when exposed to the electron beam. In this process, there is a joining together of many smaller molecules to form the long chain-like molecules that make up the solid plastic. This means of initiating polymerization does not necessitate the use of catalyst and high temperature that is required in the conventional chemical polymerization process. In fact, we found that polymerization could be initiated at temperatures as low

as about 100° Fahrenheit below zero. Further, by controlling the pattern of the electron beam, it was found that specific solid plastic shapes could be produced in the liquid, thus providing a new and interesting way of casting objects.

*General Electric Science Forum
WGY, Schenectady, N. Y.*

C. A. BURKHARD

*Dr. Burkhard is a Research Associate at
the General Electric Research Laboratory.*

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