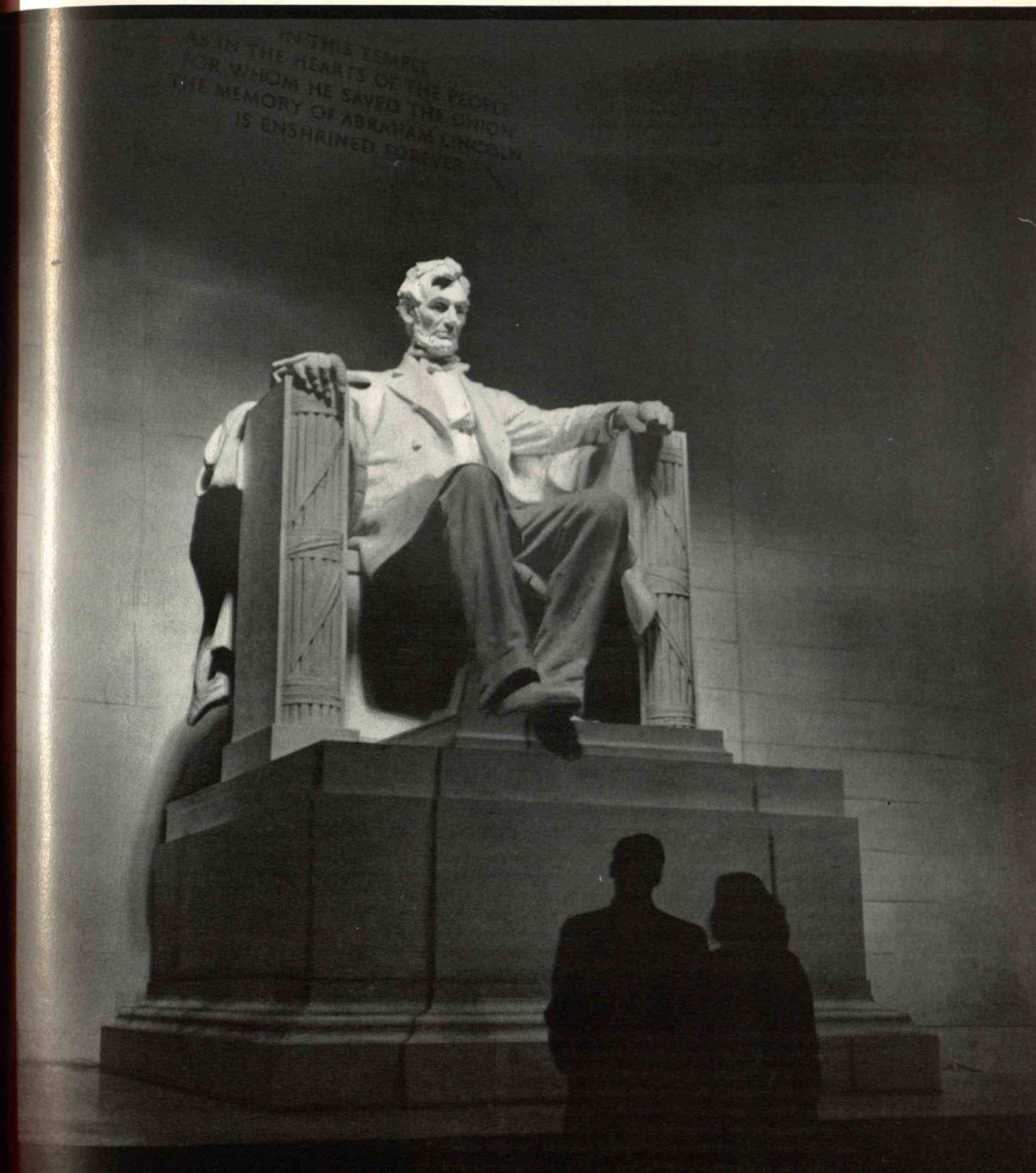
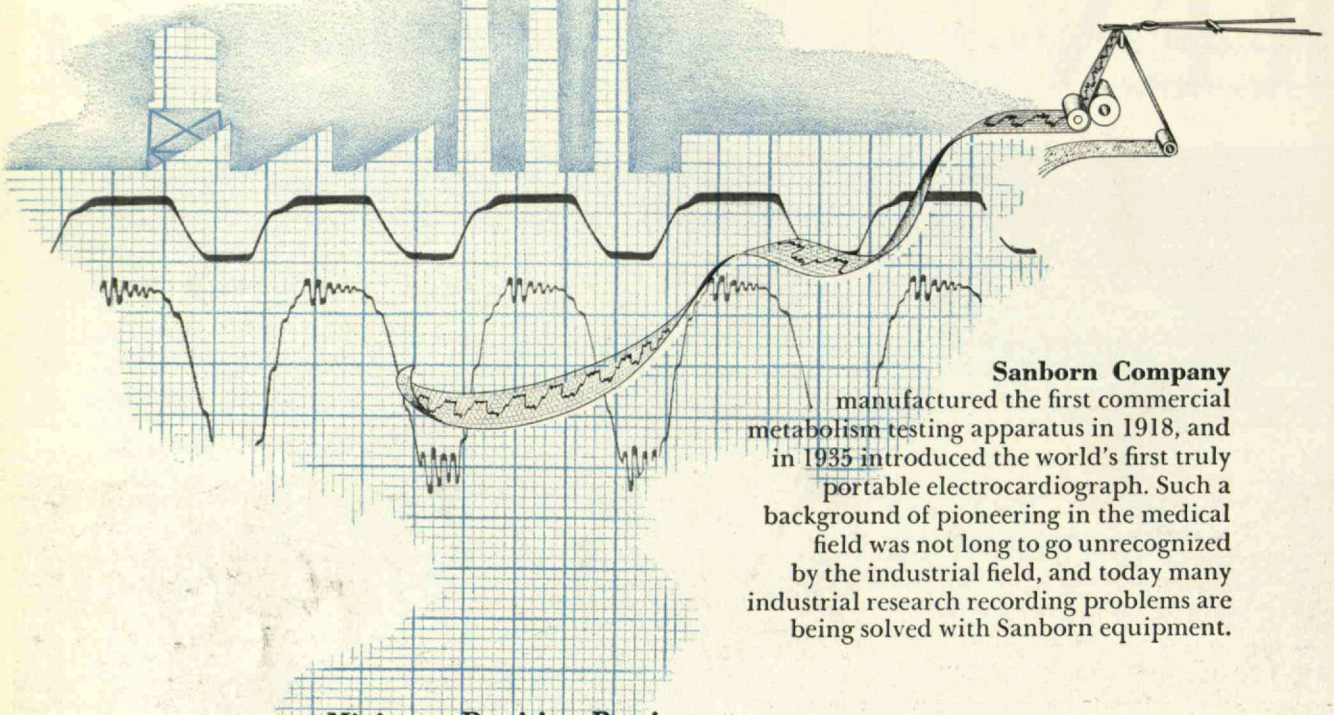
TECHNOLOGY REVIEW

February 1953



Pioneers in Precision

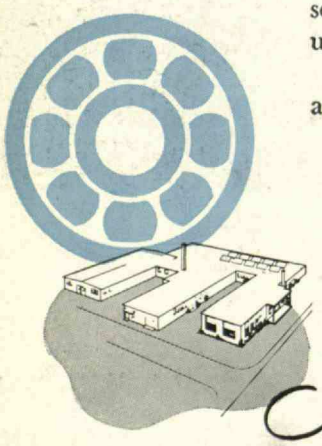


Sanborn Company manufactured the first commercial metabolism testing apparatus in 1918, and in 1935 introduced the world's first truly portable electrocardiograph. Such a background of pioneering in the medical field was not long to go unrecognized by the industrial field, and today many industrial research recording problems are being solved with Sanborn equipment.

Miniature Precision Bearings supply the same operational characteristics commonly associated with larger prototypes. Wherever design problems concerning unusual operating conditions are present . . . extreme temperature . . . shock . . . continuous high load capacity . . . limited space in instrument miniaturization projects . . . **MPB** ball bearings supply a vital need.

For more than 20 years, the originators and pioneer developers of ball bearings in this size range (1/10″ to 5/16″ o.d.), **MPB** supplies ultra quality miniature ball bearings to more than three thousand discriminating users. Exclusive and exacting production procedures – including full grinding, lapping, honing and/or burnishing to ABEC 5 tolerances or better – result in the type of quality which permits installation of these ball bearings in control and recording instruments of highest possible performance standards. **MPB** ball bearings are torque tested, ultrasonicly cleaned, supplied in specific clearances, and classified within the tolerances for prompt assembly and maximum service. More than a million **MPB** ball bearings have been installed in many unusual and distinctive devices.

The most extensive engineering knowledge in miniature ball bearing application is available to you. Also request Catalog and survey sheet TR2



Through extensive expansion, the production of these ultra quality bearings has been considerably increased. However; the continuing trend toward miniaturization, plus a constant demand for better quality bearings, has temporarily limited an immediate supply. Further expansion will soon enable us to serve you promptly.

Miniature *precision* Bearings

Incorporated MPB Keene, New Hampshire

"pioneer precisionists to the World's foremost instrument Manufacturers" { *save space weight friction*

Lifting words off newsprint

How precise can modern grinding be?

So precise that in demonstration the newsprint can be ground from one side of a news page without disturbing the paper itself or the newsprint on the other side. The printed surface is removed with a Behr-Manning coated abrasive drum cover. A roll, precision ground with Norton abrasive grinding wheels, holds the paper in exact position to a fraction of a "hair's breadth" during the grinding process.

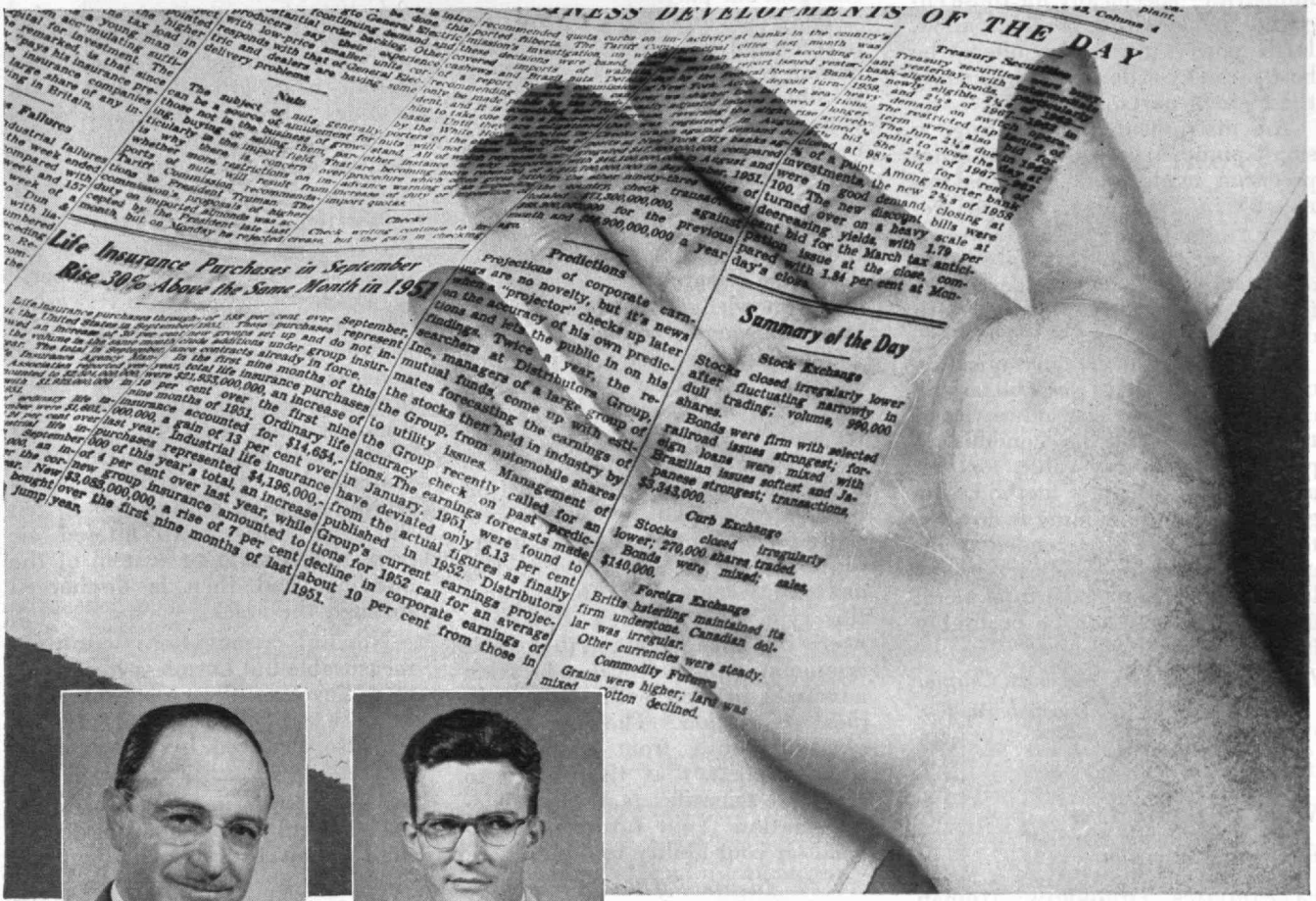
Coated abrasives by Behr-Manning and grinding wheels and abrasives by Norton are performing grinding "miracles" vital to the performance of such products as jet planes, your automobile, your refrigerator and other home appliances.

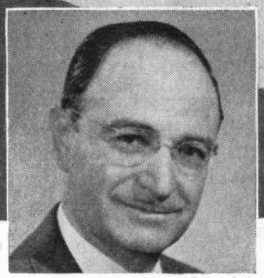
Many of today's finest products would not have been economically possible but for Norton and Behr-Manning abrasive products. These products add value to every product they touch.

***NORTON COMPANY** makes abrasives, grinding wheels, pulpstones, refractories, grinding and lapping machines, non-slip floors, Norbide grain and molded products. Norton Company, Main Office and Works, Worcester 6, Mass.*

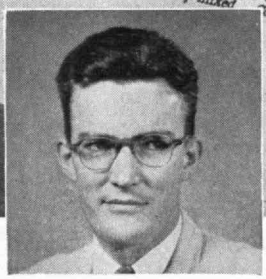
***BEHR-MANNING** makes abrasive paper and cloth, oilstones, abrasive specialties, pressure-sensitive tapes. Behr-Manning Corporation, Division of Norton Company, Troy, New York.*

Plants, Distributors and Dealers the world over





FRANK CRUPI arrived at his present position of Quality Control Manager for Behr-Manning the know-how way. He has made many original improvements in the company's coated abrasives over the past 37 years.



OSGOOD J. WHITTEMORE, Norton Ceramic Research Engineer since 1945, noted for his work in developing pure oxide refractories such as Fused Stabilized Zirconia which can withstand temperatures up to 4700° F.

NORTON

BEHR-MANNING

Making better products to make other products better

NORTON · BEHR-MANNING

THE TECHNOLOGY REVIEW, February, 1953, Vol. LV, No. 4. Published monthly from November to July inclusive at Emmett Street, Bristol, Conn. 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 December 23, 1949, at the Post Office at Bristol, Conn., under the Act of March 3, 1879.

What GENERAL ELECTRIC People Are Saying

G. E. HENRY

General Engineering Laboratory

CLEANING WITH SOUND: It is now some twenty-five years since Wood and Loomis first demonstrated the remarkable physical and chemical effects of high frequency, high power, sound in liquids. People have been busy, during this time, looking for ways to turn these effects to practical advantage, especially in the chemical industry. During the last three or four years, however, the most notable advances have been made not for the chemical producer, but for the metal-working industries—specifically for those engaged in small-parts fabrication. High power ultrasonics offers the best means yet devised for cleaning these small parts.

An instrument ball bearing, a small pump fitting, or some other precision made work piece is immersed in a solvent; a high frequency sound wave beamed through the solvent strikes the metal surface and removes almost instantly any film of oil or grease, together with dirt, chips, or other foreign matter.

There is no longer any question of the superiority of ultrasonic cleaning when the characteristics of the work piece and the economics of production are favorable for the application of the new method. The great question remaining is how far the method can be extended to include different kinds of parts—how large a proportion of the total metal cleaning business can be profitably handled with ultrasonics.

IRE, Evansville—Owensboro Chapter
Owensboro, Ky.

★

W. R. G. BAKER

Electronics Division

ELECTRONICS TOMORROW: Human qualities being what they are, man has always had a great interest in the future.

What electronics will do for us tomorrow, or next year, or 50 years from now depends only partially on the state of the art, or the advancement of our knowledge about electronics. It depends upon what we know about electronics, certainly, but it also depends greatly upon our economic circumstances and our political atmosphere.

Broadly, this is the promise that electronics holds for us. It offers us a means to increase productivity and therefore our standard of living. It offers us quicker and better methods of communications in all areas of industry, commerce, education and entertainment. It offers us a way of making better use of our skills. It offers us a way of bolstering our defenses against aggression.

These promises will not turn into reality automatically and without effort on our part.

They call for investment on our part not only of capital funds but of human resources. We must make it possible for greater numbers of young men and women to receive the education and training that will permit them to participate in this more highly technical civilization and to contribute to its continued growth. We must continue to invest in research, to broaden the basic knowledge on which we can build a stronger economy.

There is one other area in which engineers can make a contribution to the advancement of this country's strength and its future. Science cannot guard against the intellectual germ warfare being carried on by the proponents of the "something-for-nothing-isms." Engineers cannot design electronic devices or atomic weapons to protect against this type of infiltration. But engineers can make certain that their economic and political education advances in step with their technical education. The ability to separate truth from propaganda is as important as the ability to separate scientific fact from misinformation. Your future may depend on your ability to do both.

Institute of Radio Engineers
Washington, D. C.

J. J. FITZGERALD

Knolls Atomic Power Laboratory

SAFETY IN NUCLEAR OPERATIONS: Waste gases as finally discharged into the air, from the Knolls Atomic Power Laboratory at Schenectady, N. Y., are no more radioactive than the normal surrounding atmosphere and in many instances are even less radioactive.

These gases are discharged through a 100-foot stack, and are constantly monitored to make sure that the concentration of radioactive material is kept well below permissible limits.

Constant air monitors are located at selected sites to check the radioactive concentrations at various points near ground level. Plant samples also are analyzed on a regular schedule to evaluate the accumulation of radioactivity on vegetation.

Waste radioactive gases and smokes from the working areas are first passed through a "scrubber," in which a caustic solution washes out the larger radioactive particles as well as the more volatile components. Next they go through a high-efficiency filtering system, which removes more than 99.9 per cent of the small amount of radioactive material left. The air that remains is diluted, from a thousand to ten thousand times, with filtered air from the ventilating system of the building, and then is discharged through the stack.

Normal atmosphere contains measurable but harmless quantities of radioactive elements, and these produce radioactive particles which are also removed by the filtering process.

As a result, in many instances the effluent from our stack is cleaner than the atmosphere itself.

AIEE
New York City

ME...
an AIRCRAFT engineer?
But I haven't majored in aeronautical engineering

That doesn't matter. Lockheed can train you... at full pay!

It's your aptitude, your knowledge of engineering principles, your degree in engineering that count.

Those—plus the opportunity Lockheed is offering you—are all you need for a career as an aircraft engineer. In Lockheed's special program for engineering graduates, you may go back to school, or you may convert to aircraft work by doing—on-the-job training. But whichever it is, you receive full pay while learning.

But Lockheed offers you more than a career. It offers you a new life, in an area where living conditions are beyond compare. Outdoor living prevails the year-'round. Mountains, beaches are an hour from Lockheed.

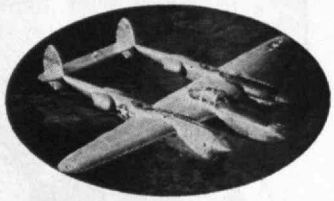
See your Placement Officer today for the details on Lockheed's Aircraft Training Program for engineers, as well as the better living conditions in Southern California.

If your Placement Officer is out of the illustrated brochures describing living and working conditions at Lockheed, write M. V. Mattson, Employment Manager

Lockheed Aircraft Corporation

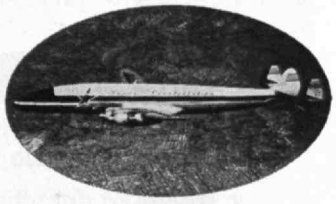
Burbank, California

This Plane made History



The P-38 Lightning – first 400 mile per hour fighter-interceptor, the "fork-tailed Devil" that helped win World War II.

This Plane is making History



The Super Constellation – larger, faster, more powerful; the plane that bridges the gap between modern air transport and commercial jet transport.

This Plane will make History

The jet of the future – the plane you will help create – belongs here.

This plane – which exists only in the brain of an engineer like yourself – is one reason there's a better future for you at Lockheed. For Lockheed will always need engineers with ideas, engineers with imagination, engineers who build the planes that make history.

Nature Controls the Heat in these Schools

James Solomon Russell School, Brunswick County, Va. Total square footage — 67,356. Cost — $524,870. Heating Contractors: W. J. Bloomfield & Son, Inc., Farmville, Va.

Dixon & Norman, Virginia architectural firm specializing in schools, specify Webster Moderator Systems for efficient heat in open-plan buildings fed by long steam lines.

"Nature makes the weather, let her operate the controls" — so say Dixon & Norman, Richmond architects and engineers. For comfort and economy, in all of their larger schools, they use centrally controlled, continuous flow steam heating systems.

"Many of our schools are also used for community activities," Dixon & Norman point out. "Classrooms are larger than average and auditoriums, gymnasiums and shop areas are in separate wings. Despite long steam lines, there is balanced heat distribution because the Moderator System delivers heat evenly and rapidly to every section of a building."

For information about Webster Products for school heating, call the Webster Representative or write us.

Address Dept. TR-2.

WARREN WEBSTER & COMPANY

Camden 5, N. J. Representatives in Principal U. S. Cities

In Canada, Darling Brothers, Limited, Montreal

WEBSTER

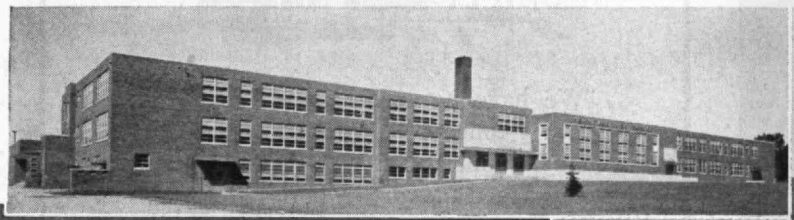
MODERATOR

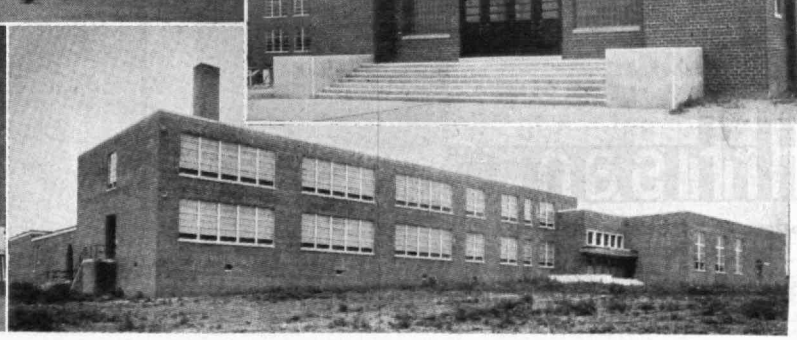
SYSTEM

OF STEAM HEATING

"Controlled by the weather"

TOP LEFT: Hermitage High School, Richmond. Heating Contractors: W. H. White, Plumbing & Heating, Richmond. TOP RIGHT: John J. Wright School, Spotsylvania County, Va. Heating Contractors: W. J. Bloomfield & Son, Inc. BOTTOM LEFT: Montevideo High School, Montevideo, Va. Heating Contractors: J. H. Cothran Co., Inc., Altavista, Va. BOTTOM RIGHT: Union High School, Caroline County, Va. Heating Contractors: J. H. Cothran Co., Inc.





THE TABULAR VIEW

Vegetable. — Are all plants closely related in an evolutionary pattern that can be easily followed, or may different plants result from separate creation? The attempt to answer such questions makes an interesting piece of scientific detective work. So, at any rate, states ERNEST C. CROCKER, '14, whose article, "Following a Cold Trial," (page 199) discusses the work of botanists in working over old clues to discover plant relations. Mr. Crocker is a pioneer in the scientific measurement of flavor and odor, and, indeed, has carved out such a name for himself in this field that he is invariably associated with these subjects. But he has also maintained a lifelong interest in botany in which he has also made noteworthy contributions, partly as an avocation and partly as an adjunct to his primary work. Following his graduation from the Institute in 1914, Mr. Crocker held positions as chemist in industry for five years before returning to M.I.T. as a research chemist in applied chemistry. Since 1922 he has been a member of the staff of Arthur D. Little, Inc., a consulting research organization in Cambridge.

Animal. — The human animal is a strange creature. He has made outstanding progress in the mastery of the physical sciences but is conspicuously less able to manage human affairs. Now that the physical sciences have come to play a major role in man's daily life, the man in the street is suddenly called upon to participate in the administration of a national science policy — a task for which he is eminently unsuited. It is the task of scientists, engineers, and science writers to interpret to the layman the philosophy and significance of scientific progress, as JOHN I. MATTILL points out in "Science Publicity — Challenge and Dilemma" (page 203). Mr. Mattill received the B.A. degree from Carleton College in 1943 and the M.A. degree from the

(Concluded on page 190)