done. The third bomb was a delayed action one, and this I am glad to say has been safely removed before it exploded. It was found to be some 16 feet down and was about 500 pounds in weight. Since then I am glad to say we have not suffered, though several bombs have fallen to the south of us in the Old Deer Park.

I am hoping it may be possible to find accommodation for some of our rarer plants from the Palm House and Temperate House in some place of safety. We are also taking steps to move some of the Herbarium specimens, but with the indiscriminate bombing which is taking place, it is very difficult to find any place which may be safe from enemy attack.

I know that you and other kind friends in America will be very much distressed to hear how Kew has suffered from enemy action, and I much hope that we may be left in peace and that we shall suffer no further damage, as there is no sort of military objective anywhere in this part of the world.

Your sympathy and help are very much appreciated by all of us.

ENGINEERING DEFENSE TRAINING

DEAN S. C. HOLLISTER, of the College of Engineering, Cornell University, has been appointed regional adviser for the State of New York outside New York City on the new national program for Engineering Defense Training. Congress recently appropriated $9,000,000 for special engineering courses at the college level, to be given at government expense. The objective is to train 30,000 students with technical backgrounds to meet future needs of both industry and government in carrying out the defense program.

According to the statement from the Office of Education in Washington, "Courses of study will be given by the colleges both for those able to devote their entire time to preparation for future defense jobs and for workers now employed who desire to fit themselves for more responsible assignments. All instruction will be of college grade equivalent to that given regular candidates for a degree, but the special courses, which will require from two to eight months of study, will concentrate upon training of immediate practical application to specific defense jobs. Classes will be held both at the engineering schools and in or near industrial plants for the benefit of part-time and evening students. The regular college teaching staffs will be supplemented by additional teachers including specially qualified men from the industries to be served."

Dean Hollister for several weeks has been in constant touch with state schools involved: Clarkson College of Technology, Rensselaer Polytechnic Institute, Union College, Syracuse University, the University of Rochester and the New York State College of Ceramics at Alfred, in addition to Cornell University. In this program, he acts as a liaison officer maintaining continual contact with defense industries, Army and Navy district offices, employment services and other sources of information on personnel needs, as well as with local engineering schools equipped to meet demands for training courses as they arise. He is keeping the Washington headquarters continually informed so that deficiencies in any one region may be met, if necessary, by training students in other places where facilities are available.

A survey of the needs of industries in Southern Tier counties of New York State, where courses might be offered by Cornell University, has been made by the College of Engineering. Courses will be set up as rapidly as possible.

THE SCIENCE CARAVANS OF THE GENERAL MOTORS CORPORATION

ALFRED P. SLOAN, JR., chairman of General Motors Corporation, has announced the dedication of two science caravans " to the vital task of arousing the nation to the necessity of intensifying its research activities." He points out that "the hope of America, in time of emergency as in time of peace, lies in the retorts and test tubes of its laboratories." Both caravans will start within the next few weeks.

Mr. Sloan, in his announcement, writes:

> Our decision to send forth the "New Parade of Progress" and the "New Previews of Progress" to spread the gospel of research is, we are convinced, eminently sound. Only a cursory glance at what is taking place in the world to-day is needed to impress on one the importance of constant search for new products and processes.
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> And new products and processes will be equally important to take up the slack of men, money and materials when our present emergency shall have ended. As a nation we should be spending ten—even one hundred times as much as we do for research.

The two General Motors shows, presented without charge to the public, will demonstrate not only what industrial research and engineering have accomplished, but also what may be expected from the laboratories of the future if America takes advantage of its opportunities.

The Parade of Progress will be presented out-of-doors, while the Previews of Progress is designed for indoor performances. Both will reproduce the highlights of the General Motors exhibits at the New York and San Francisco World's Fairs. They were designed and constructed under the general supervision of Dr. Charles F. Kettering, vice-president in charge of research, and will be sponsored by the Department of Public Relations, which is in charge of Vice-president Paul Garrett.

The Parade, with fifty young technicians, will go to the larger cities of the south; Previews of Progress, with a personnel of seven trained young men and de-

signed for performances in schools and halls, will go to the smaller cities in the west.

The Parade of Progress will travel in a caravan of twenty-two streamlined, silver-red "Futurliner" transports and tractor semi-trailer units. It includes a tent that will seat 1,500 persons, all with unobstructed views of the "science circus" stage. Colored fluorescent tubes will illuminate the interior; the exterior will be flood-lighted in color. It will include a small sample section of the General Motors Futurama, exhibited at the New York World's Fair; a diorama dramatizing improvements wrought in an American community by steadily bettered roads and vehicles; an exhibit contrasting past and future American home interiors; a series of dioramas picturing the small beginnings of great American industries; an outdoor stage demonstration of paradoxes of friction and of the elasticity of materials; a display of aviation progress; exhibits portraying progress in glass-making, coachcraft, gasoline and scientific automotive service. Some of these exhibits will be completely automatic in motion and sound; others will be in charge of demonstrator-commentators.

Light and power for the entire exposition will be supplied by a specially designed and constructed Diesel-electric plant, said by Mr. Kettering to be "one of the most complete mobile power plants in existence."

THE FORTIETH ANNIVERSARY OF THE RESEARCH LABORATORY OF THE GENERAL ELECTRIC COMPANY[1]

FORTY years ago E. Wilbur Rice, Jr., at that time vice-president of General Electric Company in charge of engineering and manufacturing, received a visit from two men, one an engineer and the other an attorney. They suggested the company should have a laboratory. There had been a problem in Mr. Rice's mind since Edison's famous lamp patent expired six years previously that something should be done to improve the lamp; but how to go about it had not been decided.

Perhaps here was the answer. So Mr. Rice listened as Albert G. Davis, then head of the patent department, and Dr. Charles P. Steinmetz explained their idea of a laboratory where scientific investigations might go forward on the incandescent lamp and other problems. "But these things can't go on without research," Mr. Davis declared.

Research! It was what Mr. Rice himself had been thinking of. Yet hardly another executive in the country in those days had considered such a step. In the discussion that followed all three men agreed that the laboratory should be entirely separate from the factory and sales branch of the company.

"The company spends thousands of dollars and its best brains in trying to add one half of one per cent. to the efficiency of the generator and transformer, yet this current so carefully generated, transformed and transmitted is sent into the lamp with an efficiency of something like five per cent. or less," Mr. Davis told Mr. Rice.

The ultimate result was that Mr. Rice's recommendation to the board of directors was approved without comment other than that Mr. Rice should exercise care in getting the right man to direct the laboratory. Dr. Willis R. Whitney, at that time a professor at Massachusetts Institute of Technology, was engaged. That was forty years ago, and on Tuesday, December 17, this notable anniversary was celebrated by General Electric, with a program beginning in the afternoon and culminating in the evening with a dinner at the Mohawk Golf Club. The speakers were Dr. Karl T. Compton, president of the Massachusetts Institute of Technology; Charles E. Wilson, president of General Electric, and Samuel Ferguson, president of the Hartford Electric Light Company, who was the first engineer of the General Electric laboratory, and Dr. Coolidge, vice-president of the company and director of the laboratory.

The laboratory had its beginning in Dr. Steinmetz's barn in the rear of his home in Schenectady. The house still stands, but the barn was burned soon after its use as a laboratory. Dr. Whitney came over three days a week to carry on experiments with Steinmetz and the "staff," which at that time consisted of one man, J. T. H. Dempster. After the fire, the laboratory was moved to a one-story frame building in the plant of the company which had been built two or three years earlier for a standardizing laboratory, but which had been discarded when this work was moved into a newer building. The structure was used until the spring floods in 1901 when the research laboratory was moved again, occupying the front part of the new standardizing laboratory. In 1904 it moved to a building of its own, adjoining, and later into its present home, two massive brick buildings.

From Dr. Steinmetz's barn to its present two large buildings in forty years—that is the story of the growth of research in General Electric Company.

THE NATIONAL DEFENSE RESEARCH COMMITTEE

ONE of the guiding principles of the National Defense Research Committee is to distribute the burden of research on problems of national defense in such a way as to cause the least possible interference with research already under way for the military services. With that in mind the committee has endeavored to arrange for research to be done wherever practical in institutions which had not already been engaged in research efforts connected with national defense. Obviously in the application of this principle care must

[1] A statement from The General Electric Company.