



**PORTABLE ROADBED**—This modern variation of the old dirt road shows post-war promise, especially where a practical roadbed must be quickly laid for temporary use, such as detours. The air forces now use it to make portable emergency landing fields. The steel grating panels are easily connected with hammer and pronged tool. Then sand is filled in between meshes.

PUBLIC HEALTH

## Science and the Future

By THOMAS PARRAN, M.D.

Surgeon General, U. S. Public Health Service

*Address before the Awards Dinner of Second Annual Science Talent Search, March 2, 1943.*

► TODAY WE and our Allies are fighting for the four freedoms outlined by our President and confirmed both in the Atlantic Charter and the agreement of the United Nations. They are, you remember: freedom of speech and expression, freedom of worship, freedom from want, and freedom from fear.

In a very real sense, the four freedoms are inherent in the spirit and purpose of science to which you boys and girls have dedicated your futures. Indeed, the interdependence of science and freedom is our hope for the future. Jesus gave us that hope when he said, "Ye shall know the truth and the truth shall make you free."

Without freedom of thought and its expression, science would not exist, and

without science, we could not hope for man's ultimate freedom. Since the dawn of history, and probably in prehistoric eras, men have struggled and died for freedom to know the truth, that others might be free.

One of the earliest accomplishments of primitive "scientists" was to free man from the worship of magic and personal gods. Today, there is no freedom of worship in many lands. More subtle, more destructive than physical restraint, is the spiritual enslavement which fastens man's reverence upon the magic of a super-state and causes him to worship false personal gods.

Through science and its application, down through the ages, we have approached the third freedom—freedom of want. We know that now and hereafter, our greatest task will be to implement the third freedom which the President defined as security "to every nation of a healthy peacetime life for its inhabitants." In so doing, we shall secure freedom from fear, for just as science dispels fear of the unknown, so the free peoples will cast out the powers of darkness

which have deluded them and ruled them by fear.

Our great immediate task of winning the war, then, needs brains and skills as well as bodies and materials. For that reason, those who have special talents must use them fully in the service of the nation, so that we may do our part to make the world free and to build a better world. You 40 boys and girls who have been selected from hundreds of thousands of high school seniors by the Science Talent Search will soon join that "ancient and honorable company of scholars" upon whose curiosity, and knowledge, and integrity, so much depends.

Perhaps some of you are wondering how it is that science, which is so bound up with the constructive force of freedom, must be directed toward the destructiveness of war. I can appreciate your confusion, for those of us in the life-saving professions have more than once witnessed the imprisonment of the great constructive force of science by man's inhumanity to man. But the first rule of the scientist is to test theory by fact, inspiration by reality. And the reality today is that the enemy is at the door, and if we do not beat him, there will be no freedom for any of us. And so with all the knowledge and skill, strength and courage, at our command, we fight him.

And too, war—with all its destruction—is like a catalyzer that speeds a valuable reaction. Right now, the life-saving sciences are making great strides in defense of our fighting forces and our industrial army. New knowledge is being sought, found, and applied—to heal the wounded, to protect us against such diseases as malaria and typhus fever, to provide an enormous supply of blood plasma, to prevent poisoning from the chemicals and metals used in the war industries. Right now, the newer science of nutrition is advancing into new fields. And it is being applied, now, on a wider scale than ever before—both in this country and wherever the United Nations are fighting.

In other fields, incredible changes have taken place during the past two years. Whole new industries have sprung to giant size—for the immediate purpose of winning the war, but they present a vision of future accomplishment for peaceful purposes that is truly dazzling. A new air age is envisioned; the plastics industry promises almost miraculous changes in our ways of living; new methods have been developed which cut

the time needed to manufacture a product tremendously. In addition, we have more machine tools, more metal refineries, and more electric power than ever before. True, these enormous physical resources, along with all our manpower and womanpower, are now devoted to the task of winning the war. But after the war is won, they can be turned into a powerful constructive force. And our scientists must tell us how to use this great industrial machine for the health and happiness of the world.

Meanwhile, on the health front, research of a fundamental and practical sort must continue if we are to improve and keep our ascendancy over the diseases that we know how to control, and to bring under subjection diseases that are still our major plagues. Many of the great plagues of human history are no longer in the headlines, despite the disturbed state of the warring world. We may thank the successful application of science for the fact that such diseases as diphtheria, cholera, typhoid fever, and smallpox have so far receded that we can, *and are*, keeping them down, through control methods tried and true. We may thank science for the methods now being directed toward the control of syphilis, gonorrhea, typhus fever, and yellow fever—methods worked out laboriously, and with great cost and sacrifice in the years past.

Still, much remains to be done by our scientists *now*, and in the future by you and your colleagues. Cancer remains one of the great medical mysteries, for which neither cause, prevention, nor certain cure is known. More knowledge is needed with respect to human nutrition, the feeding of domestic animals, and the production of food. And the very industrial developments which promise so much for better living, offer threats to the lives of the workers in the form of poisonous substances and hazardous processes. Constant research is needed in this field, and is going on now. Few of us realize that before we can produce synthetic rubber successfully, we must learn how to protect the workers from the chemicals used. Few realize that the new speeds and heights of air transport require protection of pilot, crew, and passengers from the effects of high altitude flying.

And, in the application of knowledge already gained, the health professions need more trained people for the eternal vigilance war demands. We can expect plagues to rise again—not necessarily new diseases, but old plagues new in violence, spreading rapidly due to the

changing conditions in the upset world. The abilities of those who are to prepare for a medical or public health career, particularly those of you who have the rare gift of creative inquiry, will be needed as never before in keeping the free world healthy.

All of our health problems are not concerned with enemy bombs and bullets, disease germs, or even ordinary sanitation, with which we struggle in peace as in war. In that connection, I want to tell you a story I heard at a conference sponsored by the Public Health Service the other day in New York.

It is the story of a sailor in the British merchant marine, but it could be the story of any of the brave men who are facing constant danger, day and night, to carry food, ammunition, and other supplies overseas. This man had been at sea for two and a half years without a vacation. He had been through many bad enemy attacks. One of his ships had been torpedoed. He had seen other ships and other men lost, time after time. But he did not crack up.

On his last voyage, there were many delays in getting the ship loaded; ship's stores had been removed before she



## HERE'S HOW TO ENLIST YOUR BINOCULARS

The Navy needs every binocular it can get. If you have a Bausch & Lomb 6 x 30 or 7 x 50 binocular and will turn it over to the Navy for the duration, pack it carefully and ship to the Naval Observatory, Washington, D. C., or deliver to the nearest naval district headquarters. An identification tag bearing your name and address should be fastened securely to each instrument. Accepted binoculars will be acknowledged with a fee of one dollar and will be returned to you after the war if still in use.

The Navy is not authorized to accept gifts or free loans. Therefore, the binoculars are purchased for \$1.00 and if they are available after the war they will be returned to the owner, in which case the \$1.00 will constitute rental and appreciation charges. Commanding officers of naval vessels are requested to notify you of the ship aboard which your binoculars are in service.

## They're in the Navy Now

ON the bridges and look-out stations of American ships, brave men stand alert, searching the horizon—on guard against enemy attack. You can help these men, and thus help to hasten the day of Victory, by sending them your binoculars for the duration.

Binoculars are among the many optical instruments of war that Bausch & Lomb is producing and helping others to produce. Today, even with a twenty-four hour day, and vastly expanded production program there is not room enough, nor time enough, to turn out all of the binoculars the Navy needs.

That is the problem you can solve—you and all the thousands of other owners of Bausch & Lomb 6 x 30 or 7 x 50 Binoculars. Your binoculars can help save American lives and American ships.

**BAUSCH & LOMB**  
OPTICAL CO.  EST. 1853

AN AMERICAN SCIENTIFIC INSTITUTION PRODUCING OPTICAL GLASS AND INSTRUMENTS FOR MILITARY USE, EDUCATION, RESEARCH INDUSTRY AND EYESIGHT CORRECTION

sailed; she ran aground in the harbor; the refrigeration broke down while the ship was in the tropics; food ran low—a whole series of irritations. Our seaman began to have symptoms of stomach ulcer.

Then, one night while supervising the loading of the ship in New York harbor, he collapsed with terrific abdominal pain. He was rushed to the hospital, where the doctors made a thorough examination, but could find no symptoms of stomach ulcer or any other so-called physical disease. Yet, he was a sick man, and in real pain. After two weeks, he was better and was discharged as physically sound. They told him to “rest up for his nerves” and turned him loose to wander around New York. His board and lodging were paid; he was entertained at canteens and given free theater tickets; but he hadn’t a nickel for subway fare or cigarettes. He was despondent and knew he wasn’t well, in spite of the clean bill of health from the hospital.

Finally, he came to the attention of a psychiatrist, a doctor who understands mental distress as well as physical illness. After talking for a few minutes about his immediate worries, the seaman suddenly came out with a terrific blast against his last skipper, and for ten minutes poured out a mass of hostile talk against the skipper, who, he felt, was incompetent, dishonest, and with no regard for the men serving under him.

That man’s story showed the psychiatrist a number of things, chief among them that healthy men and women cannot stand danger, fatigue, strains of many kinds, indefinitely and without relief, and not do some damage to body and spirit—and hence to the very cause we all serve. The man’s underlying resentment against his boss showed the psychiatrist, too, that a healthy man can fight on against overwhelming odds and not crack up unless he feels a sense of injustice, in this case that the boss was not looking after the men properly. This story showed the psychiatrist a fundamental cause of “war nerves,” a condition which many healthy men and women will suffer before the war is over; a condition of which no one need be afraid or ashamed; a condition which can be prevented and cured.

The story showed me something more: the importance of good leadership to high morale—or mental health, if you like. Good leadership—a boss who is competent and interested in the men and women on the job with him—is just as important to the war worker as pro-

tection against poisonous fumes. For there is no more dangerous poison than resentment. Good leadership is just as important to the health of the fighting man as protection against malaria or typhus fever. For there is no more virulent disease than hidden hate.

The theme of this Science Talent Institute is science and the future. You boys and girls will be spending the next years learning technical proficiency in various branches of science, learning to contribute to the world’s knowledge through new discoveries in your chosen fields. I hope that many of you will join us in the fight for human health and happiness. We shall need you, and thousands more of your generation—in the laboratory, in the hospital, in the field, and most of all in the troubled hearts of men and women everywhere. The youth of the entire United Nations will be needed to bind up the wounds, heal the sickness, and feed the starved bodies of the millions in Europe and Asia, and around the globe. They will look to you and your co-workers among our Allies for succor. Doctors, dentists, nurses, technicians, research scientists, experts in many fields will be needed in untold numbers. This is no idle dream. The way is being prepared for you. Some of our young scientists from the Public Health Service with specialists from other organizations are already forming Health Expeditionary Forces, whose first task will be to control epidemic diseases and feed the starving in liberated areas.

There is that other kind of pestilence which I have touched upon and which may spring up in many lands when the fighting is over. That is, the mental distress, even serious mental illness, arising from years of hatred, unsatisfied desires, repressed and conflicting emotions. Resentment and despondency will surely be widespread in the defeated and conquered nations—feelings inspired by disillusionment in leaders who have let the people down so often and so badly, even abandoning them with no regard to their fate. This may seem too gloomy a picture. But let me remind you that now, and in the future, everlastingly, we have working with us a force stronger than hate. A force, which if coupled with the energy now so destructively released in aggression, will indeed make the world free. This constructive force goes by many names, frowned upon, I regret to say, by some scientists as not being subject to proof. It is brotherhood, charity, love—the force for good in each of us. We have not yet used this force

as we should; nor have we yet been able to put “love” in a test-tube. In fact, we have been so busy harnessing our environment that we have learned relatively little about man himself.

Here then, is a challenge to science and the future. A challenge to you and the future. Some of you may have read or seen Sherwood Anderson’s fine play, “There Shall Be No Night.” If any of you boys and girls have entertained a doubt that there is no longer room for the pioneer in science, these words should still it. The central character of the play says:

“You have heard it said that the days of exploration are over—that there are no more lost continents, no more Eldorados. But I promise you that the greatest of all adventures in exploration is still before us—the exploration of man himself—his mind—his spirit—the thing we call his character—the quality which has raised him above the beasts. ‘Know thyself’, said the oracle. After thousands of years, we still don’t know. Can we learn before it is too late?”

You see, we need you and thousands like you, for the world we build will be your world and your children’s. Science needs not only the talent and the skill to acquire new knowledge, but the spirit and the faith to apply knowledge for the welfare of men, women, and children everywhere.

Among countless millions, there is today a growing sense of fellowship, a growing will to have done with destruction, and to release instead mankind’s capacity for peace. This underlying faith stems from the sure knowledge that practical application of science can be used with the same revolutionary effects in *saving* life as it has been used to destroy. We have only begun to glimpse the future’s promise; I know that these young men and women, armed with the disciplined freedom of science, will help fulfill it.

*Science News Letter, March 13, 1943*

## Books

SCIENCE NEWS LETTER will obtain for you any American book or magazine in print. Send check or money order to cover regular retail price (\$5 if price is unknown, change to be remitted) and we will pay postage in the United States. When publications are free send 10c for handling.

Address Book Department  
SCIENCE NEWS LETTER  
1719 N St., N. W. Washington, D. C.