roomed high into the air, simulating an atomic burst on the battlefield. *That* was the real character of FLASH BURN.

The heavily massed forces in solid depth that marked past maneuvers were missing, proving that atomic weapons have written off many of the old rules. In their stead, units obeyed the new combat laws of dispersal and its corollary, mobility.

When the simulated conditions imposed by maneuver planners indicated an unusual deployment of forces for all units participating in the exercise, Captain John W. Lueddeke, Commanding Officer of the 990th Signal Support Company (Large Base), seized on the opportunity to test the idea of passive defense against atomic attack in terms of the signal communications organization. Accordingly, he ordered his operating and administrative sections dug in, and the 990th went underground literally.

How the unit dug itself in is an interesting study in how to make ingenuity and planning in the field pay off.

First, however, a word about FLASH BURN—the largest maneuver of its kind in this country since World War II.

It was planned to test Army units in offensive and defensive operations, including tactical air and airborne activities, with conditions of atomic warfare written into the picture.

The general situation presumed for the exercise was a state of war between the United States and the Aggressor, the latter being lodged on the southeastern coast of the United States in an area that extended coastwise from Georgetown, South Carolina to New Bern, North Carolina, and inland from Kinston, North Carolina to Cheraw, South Carolina. The situation handed the US forces was a tough one. In holding up its end of FLASH BURN, the 990th demonstrated conclusively that it is possible for personnel of a Signal support unit to completely dig in its means of communication without assistance, in order to achieve at least minimum protection, and to continue to operate in the bargain.

Had the maneuver been the real thing, it is highly likely that the only appreciable danger to the 990th's installations might have resulted from radioactivity.

Underground construction amounted to total of 1500 cubic feet of compartment space with approximately 80 per cent of the digging done with hand tools. Thus the matter of actually moving the great quantity of earth displaced revolved around a stout shovel in the hands of a willing individual.

These Signal Corps men are shown operating teletype equipment, installed underground for atomic warfare defense, during the maneuvers in North Carolina.

The dug-in sections were divided into three major areas: company headquarters, motor repair, and a combination switchboard and message center area.

Compartments were connected by a maze of tunnels, which straightened out would have totalled 1500 feet; they were of comfortable height and staggered in such a way that minimum blast and flash effects would have resulted had atomic explosions been real.

The underground motor pool was designed to allow for ramp entrance from the surface of the earth by vehicles ranging in size from a jeep to a 2½-ton cargo truck.

The buried message center and telephone exchange were referred to as the "Country Club" by some people (who probably didn't get to work there) because of the almost comfortable working conditions.

The 990th took to the field with 13 officers, seven warrant officers and 207 enlisted men.

The entrance to the orderly room bunker typifies the sturdiness of the dug-in quarters of the 990th.

In general, the mission of the unit consisted of operations and services including switchboard, teletypewriter, fixed radio, storage and issue of supplies, inspection and maintenance, photography, message center and messengers, and cryptography.

Freedom of movement on the part of major commanders in any carefully planned exercise is always somewhat restricted because the pre-planning removes much of the necessity for staff action and decision. This is done to place movements on an objective basis. Action is narrowed and tightly controlled to achieve the maximum benefit from a minimum expenditure of time, funds, and personnel.

This was true in FLASH BURN and one effect it exercised on communications was to prevent a true test of communications capability and capacity. Since prior planning, as noted, had removed the need for extensive coordination and exchange of information among commanders and staffs, the message load was not realistic.

Events found the telephone system greatly overloaded with calls and, generally speaking, if there was anything typical about communications in the maneuver, it must be supposed that it was this.

However, FLASH BURN was a big success and outfits like the 990th, which were manned to a certain extent with personnel of comparatively little experience in field operations, benefited in many ways.

And what did the 990th plan to do with the great holes they had dug for the occasion? Fill them in, of course!

*8th Annual AFCA Convention Report, continued from the July-August 1954 issue*

# SYMPOSIUM ON CONTINENTAL DEFENSE

from Sept.-Oct 1954 SIGNAL

***May 6, 1954—Shoreham Hotel, Washington, D. C.***

These talks by our government and military leaders on the problems of continental defense are reprinted for the general information of our readers and as an impetus to them for the implementation of local and national defense projects.

## The Air Defense Command

### *General Smith*

IT IS A DISTINCT PLEASURE TO PARTICIPATE IN THIS symposium before a gathering such as this—including, as it does, many persons, both military and civilian, who have had a part in the significant technical advances of the last few years. I know that an examination of the vast job of air defense—with particular reference to the role of communications and electronics—will meet with an immediate appreciation of the complex technical problems involved.

I say "complex" because many of the problems of air defense are just that. They involve technical considerations on a scale which, proportionate to the growing complexity of this atomic and thermonuclear day, challenge the best of our brains and the fullest measure of our ability to work together as an Armed Forces-Industry team in finding their solutions.

That the brains are here I know. That you have a sincere interest in working together is indicated by your very presence here—and the creed of your organization. This creed—somewhat liberally interpreted—is to *provide a partnership of members of the military and civilians in industry dedicated to promoting the security of the United States through industrial preparedness.*

Your goal is to improve the cooperation between the Armed Forces and Industry in the design, production, maintenance, and operation of equipment vital to our country's security. This means—in the particular application considered here this afternoon—the communications and electronic devices which might be described as the "eyes, ears, and nerves" of air defense.

Gentlemen, this goal is so closely related to the over-all problem of air defense that there is no question about our being in this together.

National security, in a broad sense, is everyone's business. But in this particular application, since communications and electronics are so closely integrated in air defense, there is special need for working together.

Since the advent of the modern bomber, adequate air defense has always required relatively complex technical systems; when we add to the bomber modern weapons of mass destruction, we multiply by several orders of magnitude the complexity of the equipments necessary to counter the threat.

"Defend the United States against air attack." This is the Air Defense Command's Mission. Just seven words—with no ifs, ands or buts—and no hints as to the time, place, or nature of such an air attack. It is a simple enough statement in itself, but the magnitude of the undertaking becomes alarmingly apparent when one considers that the United States means 3,000,000 square miles of land with 10,000 miles of boundary—and that the responsibility extends upward some eight—ten—or more miles into the third dimension of the sky.

By the same token, and from the particular viewpoint of our discussions here, the complexity of the problem is more fully apparent when one considers that all of this area—in the air and on the ground—must be bound together by communications and electronics systems which make it possible to alert and defend either a part or the whole as the case might be.

The grave responsibility which we carry causes worry and sleepless nights at our headquarters. Since 1948, starting essentially from scratch, we have worked toward the creation of an air defense system for the protection of the United States. This system as it is now, and as it should be with the technical improvements which we envisage, is what I will later describe.

First, however, let us take a look at the threat. Then we'll take a look at the problems posed by the threat.

You are all aware of the general nature of the atomic threat facing us. I will not attempt to amplify this, but I will add some details on the Russian capability to carry out such a threat.

We *know*, for instance, that the Soviet Union has copied and improved upon our 4-engine bomber, the B-29, and has built over a thousand of these improved planes.

We *know* that this airplane—stripped of equipment except for necessary navigation and bombing gadgetry—

***Major General Frederic H. Smith, Jr., USAF***
**Deputy Commander**
**Air Defense Command**

***The Honorable Arthur S. Flemming***
**Director**
**Office of Defense Mobilization**

***The Honorable Val Peterson***
**Administrator**
**Federal Civil Defense Administration**

***Frederick R. Lack***
**representing Industry**
**Vice President**
**Western Electric Company**

This exhibit of Air Force color photo reconnaissance featured color prints made at various overseas theaters of operation.

has the range to reach and attack all the principal targets of this country on one-way or air-refueled missions.

We *know* that they have still better and faster airplanes under development and test. Recent disclosures as to their new aircraft developments indicate that they are moving ahead rapidly in this field.

And we *know* that several months past, the Soviet Union created an explosion of a thermonuclear device, a development which can lead on to the H-Bomb—lead on to a bomb that is measured *not* just in tens of thousands, or hundreds of thousands of tons equivalent of TNT—but in megatons, in millions of tons equivalent of TNT.

More exact intelligence of the Russian capability cannot be given—for obvious reasons. But this much can be said. We know that today the Soviet Union has the capability to attack us through the air with weapons of mass destruction—weapons which, if delivered without interference, could in a single series of coordinated blows destroy our industry, immobilize our military forces, and emasculate our will to resist. It can also be said that this capability covers high or low altitude methods of attack, in daylight or in darkness, and many avenues of approach.

What this capability will be at any specific time in the future is a matter of conjecture. It is obvious, of course, that it is improving rapidly with time, and it is safe to say that in, say 1958, the Russians might well have the capability of putting several thousand aircraft into the air against us.

Even on a suppositional basis, this leads to one immediate conclusion. Since such an attack in force could come at any one, or several places, it means that we must have a great increase in control capability in air defense to meet the obvious dangers of this build-up.

That is where you come in—where the role of communications and electronics becomes vital to the future effectiveness of our air defense system. Because control capability *means* communications and electronics. It means data links and other devices for the rapid and accurate transfer and assimilation of large quantities of tactical information. It means a vast sensitive system of communications and electronics to give hair-trigger precision and perception to our entire network.

### *Basic Principles of Air Defense*

Generally, this pattern of military and civil air raid warning reflects the basic principles of air defense. These principles generate certain requirements and failure to meet any of these requirements seriously reduces the effectiveness of any system that we might devise.

What are these principles? They're fairly easy to state! Pretty difficult to accomplish! And basically, there are only four of them.

The *first principle*, not necessarily in order of importance, is that the air defense system must provide sufficient *warning* and *protection* for our own offensive striking force—our long-range strategic air effort—to insure that the initial enemy mass attack or series of attacks will not reduce to an ineffective level our own capability to develop counterblows, to strike back still harder and with devastating force.

For it's a *dead certainty*, and let me drive this fact home, that no defense system, no matter what degree of effectiveness we ultimately attain, can alone bring victory. The old military truism, "that the best *de*fense is a good *of*fense," still stands! Consequently, it's vital to the security of our nation that we be in a position to take immediate offensive action not only to reduce the enemy's attack capability at its source but to proceed methodically, and quickly, to destroy his war-making capability.

The military force of our country most capable of launching an immediate retaliatory counterattack against all critical enemy target areas is our own Strategic Air Command—our aerial long-range striking force with its terrific Sunday punch. Any defense system which fails to provide the *warning time* and *the air protection* necessary to preserve that vital retaliatory capability is not fulfilling its mission.

The *second principle* is one which is particularly perti-

nent to this audience consisting as it does, of many executives and engineers representing industrial firms in the communications, electronics and photographic fields. The air defense system must provide sufficient protection for the nation's economy, its industries, to assure *sustained support for the war effort.*

As representatives of industry, and as technical representatives of the Armed Forces, you are all familiar with our mobilization materiel requirements. You are thus aware of the rapid and everchanging nature of today's weapon of war. Because of this rapid and progressive development, the obsolescence rate of weapons is almost **equally rapid.**

It is thus impractical and beyond good common sense to attempt to create, in this day and age, huge stockpiles of "today's" weapons beyond that "mobilization reserve" necessary to permit our essential war industry to swing into high gear for the necessary military program should war come. In considering these factors, a careful economic balance is mandatory, and protection of our hard-core war industry to insure tomorrow's weapons is equally mandatory—protection to the maximum level we can achieve within the defense system in being.

### *Third Principle Most Important*

The Defense System must provide sufficient protection for the people of this nation to assure their physical and their psychological ability to carry on with the operation of our industries and our military machine.

This is perhaps the guiding principle and most important of all. It would seem of little purpose for us to protect our military forces and our industrial potential if we while so protecting accepted such destruction of our population that the people of this nation were unable or unwilling to fight back.

Should fear or panic ever destroy our national will—the iron will and determination of our people to carry the war to the enemy at all costs regardless of our *then* military posture or our industrial potential—we could possibly lose to the enemy by default.

Now, lastly, the defense system as finally determined must be established within the economic capability of this nation to build, and to maintain, and *sustain* a combined offensive-defensive "survival force."

This last principle is perhaps the most difficult of all to interpret and to assess fully. There would be little purpose in building a purely defensive system so elaborate that the cost would bankrupt the country leaving little of economic value to defend, or leaving this nation without an offensive force to carry the war straight back to the heartland of the enemy.

Measured against the magnitude of the air defense problem that this country faces, it's well within the realm of possibility to design *unwittingly* and at the expense of the offensive effort, such a purely "defensive" system.

Let's look briefly at the basic requirements of air defense. To defend our nation against the existing threat requires a system that will, first of all, provide adequate warning. We must have a system that will provide a detection capability extending far enough outward from our borders and our coastal areas to allow the necessary *time* for *interception and air battle* by our fighter planes, and for action by our fighter planes, and for action by our local antiaircraft defenses. We must have the *maximum* "early warning" attainable, both in order to bring our military defense system up to its fullest effectiveness and to alert our civil defense system to the approaching danger.

Next, our air defense system requires high-proficiency fighter-interceptor aircraft capable of making interception in any kind of weather—rain or shine—day or night—winter or summer.

It requires antiaircraft guns and "ground-to-air" guided missiles for the close-in protection of specific targets against those hostile bombers or missiles which may have succeeded in penetrating our outer fighter defenses.

It requires, and this again has particular application here this afternoon, the most complex, but reliable and foolproof control communications systems ever devised by man.

It requires real estate, often very valuable real estate, on which to locate the fighter squadrons, the radar bases and control centers and the antiaircraft and guided missile battalions.

Above all, it requires highly skilled people, thousands upon thousands working round the clock, seven days a week, to operate and maintain this complex equipment and still more people to provide the essential logistic support for the air and the ground crews.

These, gentlemen, are the requirements. Now, let's see what our air defense capability is today.

Obviously, I cannot tell you exactly how much air raid warning time we gain today through the existing air defense system. That would be too much of a convenience to a possible enemy. But I can say this. It is not enough! It is not enough to conform adequately to the basic purposes of an air raid warning system to permit fulfillment of the first three basic principles of air defense that we have examined. We *have* warning, but it is *not* enough to meet the threat inherent in the ever-increasing speeds, altitudes, navigational accuracy, and radar bombing capabilities of the modern bomber.

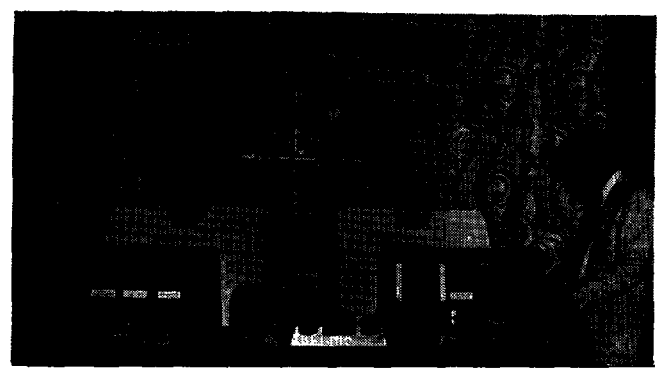
I cannot give you our considered assessment in terms of numbers or percentage of bombers we would expect to kill before bomb release line if an attack were to come tomorrow. We could make such an attack very costly to the enemy. We do not now have, however, the capability of insuring that the country would not suffer grievous loss of life and serious loss of industrial capacity against a cleverly executed attack in force.

We are working toward plugging our obvious deficiencies, and with elements already in the program, our capability will substantially improve with the passage of time. We face, however, an ever-growing capability on the part of the U.S.S.R. which imposes ever-growing requirements upon the air defense system of this country, and we are thus faced with a race in improvements, as well as a race in the quantity of weapons available.

Let's return to the present system and examine what we know we need in air defense in order to gain foreseeable dividends in increased national security.

The first priority is to extend our detection capability and thereby gain increased dividends in early warning. We have already taken steps in this direction by estab-

The Air Force displayed equipment used in aircraft navigational development.



lishing our Northern advance guard, so to speak. We also are well into the development of an airborne early warning and control program which will extend our detection capability well to seaward off both coasts. Obviously, however, this advanced early warning must be pushed further, and so steps already have been taken at the highest planning level to investigate the advisability and the ways and means of putting an early warning net across the continental rim.

As already publicly revealed, certain experimental equipments for such a net are in place. Studies have been made of the phasing into such a net of inexpensive "radar fence" type alerting equipments.

These known means of improving our continental defenses are well into the development stages. What its fulfillment would mean in terms of increased security is immediately apparent. It would mean advanced early warning of several hours in most instances. This, in turn, would mean increased—and in the future, critical—margins for the fulfillment of the three primary purposes of an air raid warning system: Namely:

(1) To provide time for the civilian population to take appropriate passive measures.
(2) To initiate active air defense.
(3) To insure retaliatory attack by our own long-range strategic arm.

To indicate the exact gain in early warning time would be to make unwarranted revelations about our present capability. But I can assure you that this gain, in the event of actual attack, would be felt in untold numbers of lives saved, in an increased flexibility of active air defense to meet and counter an attack, and in the exercise of our own retaliatory power.

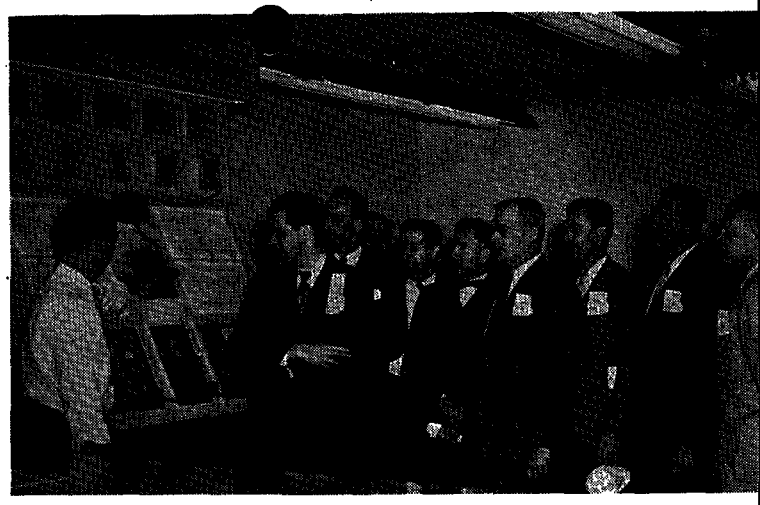
### *Improvements for Electronics Field*

Now to communications and electronics in air defense. This also happens to be one of the known provinces for necessary and foreseeable improvements. It is also one of the most important, since ability to meet and counter enemy capability for large-scale and diversified attacks in the future will depend upon the integrated employment of the most advanced communications and electronics devices. Advances in speed and range of bombers and in the general capability for surprise and swift destruction through the air require that we have corresponding advances in the instrumentalities to meet all conceivable threats. Some of the areas of improvement can be reviewed briefly.

I have mentioned computers. Everyone here is aware of the almost phenomenal advances in this field, in design and capability, as well as application. Computers will soon become a reality in air defense not to replace the element of human judgment, but to take over many repetitive and tiresome functions which cause humans to "miss." These computers permit us to inject into our air defense system that degree of automaticity, and that increased capacity essential to meet the increased speed and number of an enemy's weapons of tomorrow.

Another development is closely related. This is in the field of data transmission which will provide the final, time-saving factor in the high-speed, split-second air war of tomorrow. Your contributions in this area soon may reduce to a fraction the time previously required for the transmission of air defense information within the system. Because of the promising developments in this field, there is little doubt that in the not-too-distant future our planes and missiles will be ground controlled—in the most advanced sense of this term.

As you know, our radars are being improved to provide the type of coverage we need. While this admittedly is a long pull, we have been successful in improving the development-production timetable. We do have now improved radar equipment in our system, and with your aid will continually investigate new technology, ideas and procedures to improve our data gathering facilities.



At the Naval Ordnance Laboratory, a visit to the Magnetics Division's laboratories was a part of the program. Here, Mr. P. W. Barnhart is explaining the magnetic amplifiers developed at the Laboratory and their use in special servo systems.

These are some of the known areas of improvement in which tangible results are already "in the mill," so to speak. There are others, some representing equally important communications and electronic refinements in our fighter and missile capabilities.

There are as yet unknown areas upon which we must await the results of basic and applied research. We are facing a highly competent potential enemy, and our salvation must lie in beating him to the technological punch. We look to you for these improvements as the need can be foreseen.

Your opportunity to take an active part in the continuing preparation of this country's defenses is obvious. As I have indicated, the air defense pattern for tomorrow must involve increasingly the communications and electronics field; your field for the type of continuing cooperation which is the purpose of this organization.

In closing, I want to quote two lines from the foreword to a prospectus of your organization.[2] They say—

". . . . In the first half of this century we have been in two big wars. They were different than previous wars because, in far greater measure than ever before, supremacy in science and industry was necessary for victory. . . ."

This, gentlemen, is your charter for your continuing cooperation in the common job of air defense. But I want to leave you with one thought. We have mentioned the need for some final balance in the economic aspects of air defense. Such a determination requires intensive and continuous studies at all levels—at the very highest levels—and in industry. It is being reviewed and analyzed by all of our military and civilian leaders; by the National Security Council; by the Joint Chiefs of Staff; by the Air Defense Command and Army Antiaircraft Command; by our Intelligence agencies; and by many scientists and military men well versed in ramifications of this problem of air defense.

Part of the decision is up to everyone. Because, again, we're all in this together. Air defense isn't just the Air Defense Command's problem—it's not just the problem of the military. It is the problem of 160 million Americans—it is *your* problem. What you may be able to conceive in the field of communications and electronics may be one of the important factors, one of the essential contributions toward providing more defense within the limits of our ability to sustain its economic burden.

# Symposium on Continental Defense, continued

## The Office of Defense Mobilization

### *Dr. Flemming*

Dr. Flemming, addressing Convention members at the Symposium. In the background is Maj. Gen. Frederic H. Smith, Jr., USAF.

I HAVE BEEN ASKED TO FIT THE SUBJECT YOU HAVE under discussion this afternoon into the over-all setting as far as defense mobilization is concerned.

I think that most of you are aware of the fact that, under the law setting up the Office of Defense Mobilization, it has the responsibility of coordinating on behalf of the President all aspects of the defense mobilization program, including production, procurement, transportation, communication, manpower, etc. Certainly the members of this group are fully appreciative of the setting in which we carry forward our defense program. I would, however, like to underline three aspects of that setting that we feel we must keep in mind.

These three aspects, it seems to me, all have been stated very effectively by the President of the United States on various occasions. The first one is this: The President stated it just about a year ago now, in an address to the nation, when he said, "We are in an age of peril." The second is, "The Soviet now has the capability of attack on us and such capability will increase with the passage of time." That was set forth in a statement issued by the President. The third aspect was set forth in his State of the Union address in January of this year, when he said, "We shall not be aggressors, but we and our allies have and will maintain a massive capability to strike back."

As we keep in mind those three very important aspects of our defense mobilization program, we feel that there are certain specific objectives that we must keep in front of us at all time.

First of all, we feel that we must develop and maintain a strong mobilization base. To us that means we must have available *that combination of facilities, production equipment and skilled workmen, which together with our stockpile of weapons, will enable us to meet rapidly accelerating war-time requirements.* Of course, we feel that a great deal of effort must be placed on the words "rapidly accelerating war-time requirements," because we all believe that should it become necessary for us to move into all-out mobilization, we will not have time on our side as we have in the past.

If we are going to achieve this objective of developing and maintaining a strong mobilization base, there are certain things that we need to do. First of all, of course, we need to know what the gaps are in the mobilization base. I am not going to spend a great deal of time on that. I simply want to say this to you—we feel that more progress has been made in this area possibly than at any other time in the history of mobilization planning. The Defense Department has provided us with the requirements for a thousand major military-end items in the event of all-out mobilization. Those thousand items would account for 80 per cent of our expenditures for military hard goods if we should become involved in all out mobilization. Those items are now being translated into materials requirements and tied in with our defense or war-supporting requirements plus the rock bottom civilian requirements; then, of course, they will be balanced over against supply in order to point up the gaps in our mobilization base.

As you well know, gaps in the mobilization base have been identified. They are set forth, or reflected, in approximately 240 expansion goals that we have kept in mind as we have granted rapid tax amortization certificates and as we have provided other incentives. Around 140 to 150 of those goals have been closed out on the ground that they have been achieved. Approximately ninety goals are still open. We are still doing everything within our power to persuade people to do those things that need to be done if those goals are to be reached, or if those gaps are to be closed.

Those of you who have followed the developments in the field of mobilization planning are very much aware of the fact that some of those goals have been established on the basis of evidence that we would not regard as the best evidence by any means. As we firm up the requirements information from the Department of Defense; as agencies such as Commerce, Interior, Defense Transportation Administration and others provide us with information relative to defense or war-supporting requirements and rock-bottom civilian requirements we are going to put ourselves in a position where our analysis of the gaps in our mobilization base will rest back on a much firmer foundation than has been the case in the past.

Not only do we need to know what those gaps are; we

need programs that will result in filling [redacted]e gaps. As you know, one of the principal incentives provided by the government has been the incentive of tax amortization. Most of you know that the tax amortization certificates that have been issued up to the present time total around 17½ billion dollars. We are still issuing those tax amortization certificates when applications are made that are related to some of our open goals.

### *Gaps Exist In Mobilization Base*

We are very conscious of the fact that we have some expansion goals that are not going to be reached or some gaps in the mobilization base that are not going to be closed if we simply rely on our existing incentives. So we are analyzing the gaps that haven't yet been closed to determine what kind of specific programs we should present to the Congress, providing in some instances additional incentives in order to make it possible for the nation to close the gaps in the mobilization base.

Not only must we identify the gaps, not only must we have programs to close those gaps; but we must also maintain the mobilization base. Now there has been a lot of discussion about that. Just how, as a nation, we can do something that we haven't done before in our history; namely, maintain a mobilization base once it has been brought into existence. All of us are aware of the fact that as a nation in the past we have been inclined to build up our base in order to deal with an emergency, then when we thought that the emergency had passed we just permitted the base to disintegrate.

I am sure that it is perfectly obvious to all of us that we can't maintain that base solely by relying on the production of items that are needed in connection with a defense or a war program. The production curve as contrasted with the peak after the outbreak of hostilities in Korea is moving down. Of course if the international situation permits it that production curve will continue to move down. That means the production lines will be closed down, plants that have been used for defense production will either be closed or will be utilized for the production of items that are needed in connection with the civilian economy.

We feel that if we are really going to accomplish the objective of maintaining the mobilization base, the government is going to have to be ingenious, enter into contracts with management for the maintenance and modernization, for example, of packages of machine tools, for storing those tools in warehouses near the plants that we use for defense or war production if all-out mobilization became necessary. And, more important than anything else, we will need to enter into contracts that *will insure our retaining on the job, a hard core of management, engineering and skilled personnel that could form the nucleus for a stepped-up production program if that program became necessary.* We believe, although we recognize the problems involved, that contracts of that kind can be entered into between government and management. We believe that in some instances that hard core of management, engineering and skilled personnel could be kept busy a good share of the time on the maintenance and modernization of equipment. In other instances they would only be kept busy a portion of the time. Also they should be available for training so as to be kept up-to-date on current developments in connection with the production of particular items.

We not only are concerned about identifying the gaps in our mobilization base; we are concerned not only about programs designed to fill those gaps; and we are concerned not only about the maintenance of the base, but we are also very much concerned about protecting the base. And, of course, there you can see immediately one of the reasons why we [redacted]e a very deep-seated interest in our continental defense program. And you can see also why we feel that this industry has a tremendous contribution to make in the direction of providing us with an effective continental defense program so that we, in turn, can really do something practical and realistic about protecting the base. We do have to keep in mind the fact, as the President said last October, that Soviet Russia does have the capability of attack on the United States. That's a fact we must accept in connection with our plans. That's why, of course, we are so very much interested in a dispersal program. Most of you know what those dispersal standards are. There are local dispersion committees in most of the large communities of this nation, made up of representatives of labor, management and the public. These committees work under the Department of Commerce; they identify the areas of industrial and population concentration. Dispersal standards provide that new plants should be located at least ten miles beyond the perimeter of those areas.

It is interesting to note that if you take the projects calling for investments of a million dollars or more, where rapid tax amortization has been granted, over 80 per cent of those facilities have been located in accordance with dispersal standards.

Next, growing out of our interest in the protection of the mobilization base, is our interest in the whole field of protective construction. As you undoubtedly know, we have said that if a business decides to invest in protective construction in a plant that is related to one of our expansion goals and that is located in one of these critical target areas, we will give them a rapid tax amortization on 100 per cent of the capital investment, provided, of course, the protective construction conforms to the standards set by Governor Peterson's engineers.

Not only do we in the Office of Defense Mobilization have a very real interest in the mobilization base—of developing it and maintaining and protecting it—but we also spend a great deal of time in connection with programs designed to make it possible for us to achieve our stockpile objectives. We have seventy-five major strategic and critical materials that are on our stockpile list at the present time. We have virtually reached our goals as far as thirty-eight of those materials are concerned. In the case of about eighteen of the materials on the list we are still in critical shape. As a nation we have already spent $4,200,000,000 putting strategic and critical materials in stockpile; we have $9,000,000,000 on order and in order to reach our minimum stockpile objectives we will spend another $1,800,000,000 to $2,000,000,000. We are determined to meet those stockpile objectives just as rapidly as we can, even though in order to do so it is necessary for us at times to subject the civilian economy to a rather severe strain. We don't know how much time we have on our side. For that reason, we feel that we've got to move just as fast as it is possible for us to move in the direction of reaching our stockpile objective for nickel, to cite an example which has given all of us a great deal of trouble simply because of the fact that the demand for nickel is considerably in excess of the supply.

### *Continuity of Industry & Government*

Of course, not only are we interested in the facilities, equipment, and materials aspects of our mobilization program, we also feel that as a nation we must develop manpower programs to give adequate recognition to the fact that the lack of skilled manpower could be the one limiting factor in the prosecution of a war.

Also we feel in connection with the mobilization program that we must develop programs designed to insure the continuity of industry as well as the continuity of

government. In the Office of Defense Mobilization we spend a great deal of time on the development of programs in those areas. We depend on the operating agencies of the Government, by and large, to carry out those programs. Personally I'm very much encouraged over the fact that through the Industry Division of the Department of Commerce, the industries, particularly the major industries of this nation, are taking a very real and a very vital interest in programs designed to make it possible for industrial operations to continue if an attack should take place on continental United States.

As we have thought in terms of the objectives that we should keep in mind, we have always had uppermost in our mind this objective of having an effective continental defense program and I appreciate the fact that that program divides itself broadly, roughly, into two parts, the military aspects and the non-military aspects. Because the Director of ODM serves as a member of the National Security Council, it has been my privilege to keep up to date on what the military has been doing in the direction of developing a military program designed to give this country an adequate and effective continental defense program.

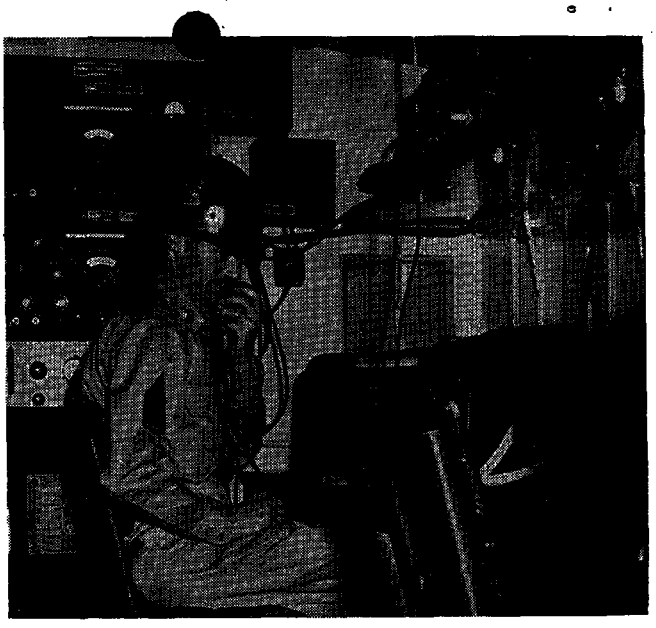
I want to say to you that in my judgment they are doing a tremendously effective job and I also want to say that as far as this administration is concerned, it is determined to do everything that it can to provide the resources that in turn will provide us with an adequate continental defense program. The Defense Department budget for the coming year calls for a considerable increase in expenditures over those planned for this year, although those planned for this year are considerably in excess of three billions of dollars.

But there is also a non-military aspect to the continental defense program. I've already touched on some of these aspects. Governor Peterson at luncheon has touched on some of these aspects as far as the non-military part of the continental defense program is concerned. (See "A Challenge for Defense" by the Honorable Val Peterson, July-August 1954 SIGNAL.)

### *Telecommunications and ODM*

In connection with the continental defense program, all of us in the Office of Defense Mobilization have a very keen appreciation of the role that communications can and must play in the carrying forward of that program as well as other programs directly related to defense mobilization.

In fact, I am sure that that is one of the reasons why the President of the United States, about a year ago, assigned to the Office of Defense Mobilization certain responsibilities in the field of telecommunications. Those of us who have over-all responsibility in the Office believe that we must have a program in the field of telecommunications that will be consistent with and an aid to all of the other objectives to which I have already referred. Under an executive order issued by the President, the Director of ODM is charged with the responsibility of advising and assisting the President concerning his own telecommunications functions. All of you appreciate the fact that the Communications Act of 1934 lodges jurisdiction with the Federal Communications Commission for the regulation of telecommunication operations except those conducted by the Federal Government. That same Act specifically exempts all radio stations owned and operated by the Federal Government from the requirements of the Act and provides that frequencies for such stations shall be assigned by the President. The ODM, of course, is not a radio user and it has no operating responsibility in this area. It functions rather as the staff arm of the President and is the focal point within the Federal Government for the resolution of inter-agency policy and technical conflict.



The 313th Signal Battalion, attached to the 2nd Army at Ft. Meade, Md., demonstrated field equipment to AFCA members during the tour of the Naval Ordnance Laboratory.

Our telecommunications functions fall into the five following categories:

First, the allocation of radio frequencies to meet current operating requirements;

Next, the reallocation and adjustment of radio frequencies in accordance with the Atlantic City Conference of 1947 and the implementing procedures prescribed by the extraordinary Administrative Radio Conference of 1951;

Third, we have the top responsibility for mobilization planning in this area just as we do in the other areas to which I have referred;

Fourth, we have the responsibility for the coordination of the telecommunication plans and programs of the executive branch of the Government;

And finally, we have certain special tasks and responsibilities that are assigned to us by the National Security Council, which, of course, means assigned to us by the President.

When the executive order was issued transferring the functions of what had been the Office of the Telecommunications Adviser to the President to ODM, I immediately established the position of Assistant Director for Telecommunications in our agency. I invited to come in and serve in that position Mr. William A. Porter, whom many of you know as a person who has had an outstanding experience in this area. I want to say to this group that in my opinion he has done an exceptionally fine job in terms of providing the quality of leadership that is required in a position of this kind. He has associated with him a very small but highly competent staff, two of which served with the President's Communications Policy Board, which, as you know, studied this whole area for a year and issued a comprehensive report in 1951.

As soon as Mr. Porter took over he reactivated the Telecommunications Planning Committee, of which he serves as the Chairman. This Committee is composed of the senior communication officials of those departments and agencies of the Federal Government which are, themselves, users of radio and telecommunication. This Committee has three working panels, one of which is engaged in an assessment of our total telecommunication resources as well as our total requirements under normal conditions,

conditions of a limited emergency and conditions of general war. The second panel is engaged in a study of new methods of communications capabilities of foreign nations.

These panels make recommendations to the Committee, the Committee in turn, of course, makes recommendations to the Director of ODM and in a number of instances our communications are then forwarded along to the National Security Council.

Many of you are also acquainted with the Interdepartmental Radio Advisory Committee. It has been in existence a great many years and by Executive Order it has been transferred to the Office of Defense Mobilization and its activities are under the direction of the Assistant Director for Telecommunications.

The Office of Defense Mobilization recognized that much more can and must be done to improve the nation's ability to manage more efficiently its share of this important world resource. We need a clear, comprehensive up-to-date statement of U. S. telecommunication policy. Wheels have been put into motion designed to achieve that objective. We need to improve our organization and procedure to cope with the complex problems with which we are faced. In this particular area the role of the Office of Defense Mobilization is not to tell the agencies of Government how to carry out their mission but to coordinate their efforts from the standpoint of frequency usage and policy so that our national requirements can be met with due consideration and regard for the relative importance of agency mission and with the utmost consideration to the needs and requirements of private industry. It would be absolutely impossible for us to discharge our duties in the field of defense mobilization without recognizing the tremendously important part that communications has played, is playing, and must continue to play in connection with our total national defense effort. It is absolutely impossible for us to live day in and day out, week in and week out with the nation's mobilization defense problem without a growing recognition of the absolute urgency of providing this nation with an adequate continental defense program. And it is absolutely impossible to give consideration to the urgent need for an adequate continental defense program without recognizing our complete dependence on communications if we are to have that kind of a continental defense program.

I can assure you that as we discharge our responsibilities in the telecommunications area, our chief concern and our only concern is to function as a staff arm of the President in such a way as to insure the fact that this nation makes maximum utilization of the resources and the talent that it has in this particular area and does everything it possibly can to focus those resources on the achievement of the objective of a sound continental defense program.

My friends, we can't live with the information that we have these days without recognizing the fact that our total defense mobilization program must be an on-going program. It must be a program that all of us participate in with a real sense of urgency, and it is a program that, if it is to succeed, must have the complete cooperation of those who are engaged in the kind of activity in which you are engaged at the present time. There is no doubt in my mind but that our defense needs must have a top priority as far as the utilization of our time, our energy and our resources are concerned. I know enough about the cooperation that you and your associates have given the nation in the past, and are giving the nation today, to know that we can count on you without any question at all. May I also say that I also know that there is a tremendous amount of experience represented in this audience. If you have ideas and suggestions as to the way in which we can improve our total mobilization program, or ideas and suggestions as to the things that we can do in this area that will insure the fact that this nation of ours will be dealing with Soviet Russia, not from a position of weakness but from a position of strength, we will welcome your ideas and suggestions, and I invite you to address them to me personally and I can assure you that they will be given very careful consideration.

## The Federal Civil Defense Administration

### *Mr. Peterson*

ANY DISCUSSION OF CIVIL DEFENSE AS IT APPLIES TO INDUSTRY includes these nine points:

No. 1. *Industry is the Target.—Plants and people who man them.*

No potential enemy will make the same mistakes as our enemies in the past, namely, to tangle with our military forces and leave our industrial production intact.

Our industrial production centers are particularly vulnerable due to concentrations and interdependence of plants, and we must remember that we can rebuild machinery in a relatively short time but it takes nearly twenty years to create a trained industrial worker.

No. 2. *Survival of Industry and recovery from a devastating attack cannot be left to chance—it is not automatic.*

This point is for the most part an Office of Defense Mobilization responsibility. Bear in mind that survival and recovery of industry under attack conditions will result only from months or even years of planning, preparing plant equipment and personnel for such a disaster, and organizing and training emergency action forces to cope with the effects of such an attack.

In civil defense we wish to stress particularly that activities must include action taken before, during and after an attack, activities which offer positive resistance to effects of blast, fire, and general disarrangement. Above all, it must be coordinated with efforts being taken throughout the nation to alleviate the results of mass destruction weapons on property and people.

No. 3.—*The organization and operation of a civil defense plan within an industrial or commercial establishment follows a well-defined pattern. The details of necessity vary from plant to plant but essential principles are clear.*

There must be effective leadership—responsibility of the owners and operators of these facilities. . . .

Sound business-like preparations of a physical nature to protect people and equipment . . . Dispersal . . . Strengthening of structures, etc. . . .

Organized casualty handling services, trained and equipped to handle multiple injury cases in unprecedented numbers as well as trained rescue teams to release entrapped persons, dead or alive. . . .

Plans for the emergency repair of buildings and machinery, in connection with over-all restoration and rehabilitation plans emanating from government levels. . . .

Systematic coordination of plans for survival within individual plants with those of other plants and above all with those of the community in which the plant is located. . . .

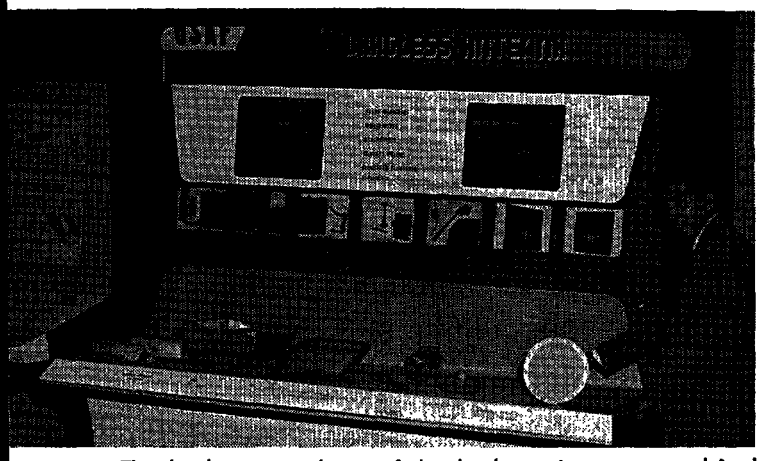
A systematic plan for the preservation of records and other documents essential to the operation of the plant—evidence of title, fiscal records, production records, blueprints, formulae, etc.

It is necessary to remark at this point, that since this country depends upon a well-established credit system for fiscal operations, we cannot permit a breakdown at the plant level of the evidences of credit needed for business continuity after a disaster.

No. 4.—*There are many possible solutions to the problem of individual plants—those faced with the problem at the plant level are in the best position to determine which solution best fits their particular needs.*

Dispersal in civil defense involves advance relocation of industrial and commercial establishments to reduce vulnerability and lessen the advantages to be gained by an attack on the country.

But dispersal is not always feasible. Those who cannot disperse or relocate must be prepared to withstand the



The development and uses of the dragless antenna were explained in this Air Force exhibit.

forces released by modern weapons, to save what can be saved, and get back into production with a minimum of lost time and effort.

The owners and operators of industrial and commercial establishments can best determine the most appropriate solution to their individual defense problems. In an emergency they will be in the best position to carry out the direction of emergency operation calculated to save lives and property. Furthermore, they should recognize the fact that in an emergency they will not be able to rely on the public safety services for protection as their efforts will ordinarily be directed elsewhere. Damage and injuries received under such circumstances must be handled by those already at the scene, IF THEY ARE PREPARED TO HANDLE IT.

Such a solution to the problem is nothing new to industry. Civil Defense in a plant is an extension of normal protective measures, coldly realistic and calculated to handle an increased hazard, of disaster proportions.

No. 5—*Even by the most optimistic estimate, there will never be enough of the resources necessary in terms of both manpower and equipment to meet all of the dangers accompanying an attack upon the country.*

We must pool our resources, both in the preparation and emergency operation stages. Public and private enterprise must become a team in the matter of preparing for the defense of our continent.

We must anticipate the demands of a maximum damage situation and hope for something considerably less, looking for the military defenses to bring this about. In a sense we cannot overestimate our requirements. We could underestimate to our everlasting sorrow.

Our plans must be so complete and so sound that emergency confiscation powers provided for in the FCDA Act, P.L. 920, and again in many of our state civil defense acts, will never have to be invoked.

No. 6—*As a further consideration of the previous point, it is submitted that industrial leaders should be satisfied that those who will have the power to seize and use their equipment and other resources are properly competent to exercise this power in an effective manner.*

There is only one way to insure the existence of such effective organization. Industry must cooperate with public authorities in the development and staffing of effective CD organization and plans for it. In some cases it *may be necessary for industry to assume leadership in establishment of civil defense in their community.*

No. 7.—*There is no magic protective dome which can be lowered over a plant to insure the avoidance of damage to property and injury to personnel.*

Adequate protection will result only from clear thinking, judicious expenditure of time and energy, and above all, full understanding of the problem and the responsibility of management for undertaking its solution.

No. 8—*In the industrial defense picture, as in all of civil defense, there are encountered two attitudes toward Civil Defense; first there are those who will be dependent upon assistance from others in an emergency, largely because they failed to take adequate precautions in advance.*

There are many representative business firms which have faced the problem squarely and undertaken its solution in a realistic manner. There are unfortunately many others who are apparently so preoccupied with production achievement essential to their business that they cannot or WILL NOT find the time or incentive to insure the protection of that business. How many of you realize that the insurance which you carry now will not cover any loss resulting from an enemy attack on this country? How many of you are waiting for the international situation to get worse before you undertake any real emergency planning? How many of you are in this waiting position, realizing in your hearts that this country is seriously threatened and is inviting disaster by such an unwarranted lack of concern with our security?

No. 9—*The effort by the government to create and operate a national system of continental defense suggests a two-fold role to be played by industry:*

1. Organize and operate an adequate defense program within each plant, coordinated with similar programs of other plants and of the communities in which such plants are located.

2. Call upon your know-how, technical skill, and insatiable mechanical curiosity to devise better ways and means of carrying out the many complex problems which beset the nation's continental defense effort.

Our communications specialists tell me that even without the occurrence of an enemy attack, our presently available means of transmitting emergency messages is somewhat inadequate. There are just not enough telephone, radio or telegraph lines and circuits to take care of all the messages with the speed and accuracy that an emergency demands.

Add to this the fact that an attack on the nation, in accordance with even minimum success based upon our military and civil defense planning assumptions, would

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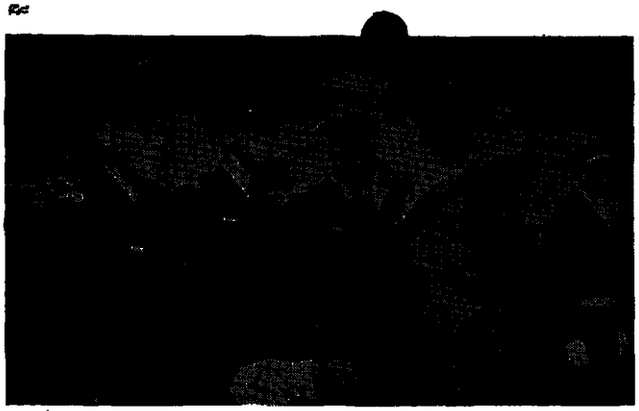
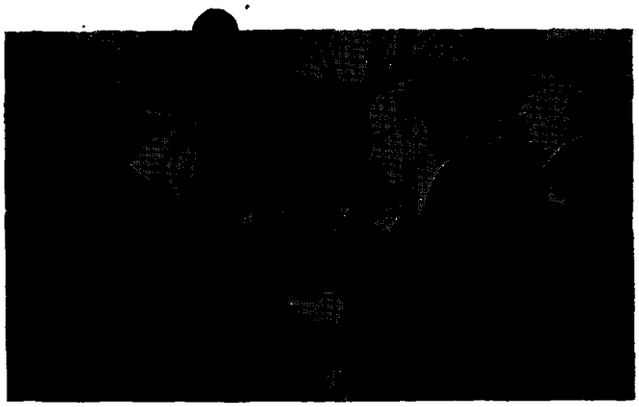


David W. Thomas, Washington State College, is congratulated by Maj. Richard F. Knox of the Department of Air Science.



At the University of Kentucky, Billy S. Simpson is awarded the medal by Dean White. Looking on is Col. Rogers, PMS&T.

## Symposium on Continental Defense
### Mr. Peterson

(*Continued from page* 38)

substantially reduce the capacity of existing message-handling resources. After an attack we face one of the most trying and frustrating situations that the nation has ever been called upon to face. Even assuming that we had the emergency teams, vehicles, medical supplies, fire-fighting equipment, and all the other materials needed to combat the effects of an atomic attack or worse, how would we be able to marshall these resources within stricken cities, between and among groups of stricken areas, across state lines, and even across our international lines, without adequate communications?

There is the matter of our warning system. We should not have to impress upon this audience, the importance of this civil defense measure. But we should tell you, if you are not already aware of it, that its creation has been a serious problem from its start to the present. Even today, with all of the money and engineering that has been poured into this effort, many cities do not find themselves with a fully satisfactory public alerting system. We have a need for better activating and control systems to insure positive warning, free from possibility of mistake or misfire; systems which will reach into the perceptive range of every man, woman and child, including our workers, our families at home, our executive sealed in air-conditioned office buildings. Systems which can reasonably be expected to survive the effects of an attack and remain operative to sound the "all-clear," or even a second warning "red."

We must not overlook the fact that the same destructive forces which will cripple our communications system will also affect our warning devices. In many cities, warning systems are closely tied in with and dependent upon existing communications systems. Some of you may suggest that warnings subsequent to the initial warning "red" can be reliably broadcast using Conelrad facilities, but my communications specialists tell me that unquestionably many of these facilities will also be substantially inoperative in the wake of a well placed nuclear weapon.

I am told that we have a nearly fool proof four-wire circuit for this warning net, designed to overcome ordinary breakdown risk to a large extent. I am also told that this system can be knocked out or seriously impaired even under the most optimistic estimate of damage resulting from an enemy attack.

Gentlemen, we are struggling with these problems. Their solution is vital to our nation's survival. You who live with such matters, day in and day out, must have the capability to seek out positive answers to the riddle.

These are somewhat specialized examples of what we are facing and what we are looking for from the communications and electronics industry. But there are needs for further technical advances in connection with other aspects of the civil defense problem. Medical, welfare, and engineering specialists could undoubtedly fill you in on this subject. To a large extent they have been obliged to deal in realities rather than pursue avenues of research and development into new applications of electronic wonders. We must build our defenses on existing framework. It is suggested that some elaboration of this framework is in order and for this we must turn to you in industry who best understand the capabilities and limitations of your technical storehouse.

Many firms have actively embraced these matters; many more are still to be heard from.

This is clearly the challenge that your government is presenting to you. Will you take the action that is necessary to increase your chances for survival by organizing self-protection programs in your plants, and will you contribute of your technical skill in solving these problems which you alone can adequately dispose of?

## Mackay Announces New Marine Radio Direction Finder

A new marine radio direction finder designed to provide greater accuracy and reliability in determining a ship's position has been announced by the Marine Division of Mackay Radio and Telegraph Company, a subsidiary of American Cable & Radio Corporation.

The new direction finder perfected by Mackay engineers is designed to overcome a serious deficiency of the conventional direction finder, whose single-loop antenna is hand-rotated to obtain a bearing, and so is mounted directly above the receiver-indicator in the wheelhouse or chartroom. Although such instruments are calibrated at installation to allow for the deflection of radio waves by the surrounding superstructure, the subsequent alteration of any metallic part of that superstructure—even a cargo boom, stay, or other rigging—may cause appreciable error in the bearings indicated.

The new Mackay direction finder circumvents these errors at their source by making possible the location of the antenna as much as a hundred feet away from the receiver-indicator, with which it is connected by a coaxial cable. This is accomplished by use of a crossed-loop antenna that does not require rotation and so may be located on top of a mast or at any other unobstructed point. It is the first commercial application of the crossed-loop antenna in the United States.