

# THE NORTHERN FOREST FIRE LABORATORY<sup>1</sup>

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This is a significant day in American forestry. We are gathered here to formally initiate a program long sought by many people—a program which history and the events of recent weeks in western forests demonstrate is urgently needed. The laboratory which stands beside us is designed to facilitate a new and more vigorous attack on an old problem—forest fires. I know that most of you are well acquainted with the vital problem to be tackled by this laboratory. Fifty years ago last month the people of Missoula saw the sun blackened out by the smoke of the devastating 1910 fires which swept more than three million acres of forests in northern Idaho and western Montana. During recent weeks, you have again seen smoke rise in the surrounding forests and your newspapers and radio stations have had almost daily reports of the battle against forest fires. There is little doubt that the problem of forest fires is still a great challenge. But today there is much less likelihood that fires, as serious as they are, may develop into multi-million acre infernos. We have made significant progress since the dark days of 1910. Today we have fire control facilities unheard of fifty years ago—air tankers, helicopters, smokejumpers, chemical fire retardants, bulldozers, and a multitude of other aids.

The fire problem of 1960 and our methods of dealing with it have been vividly illustrated in recent weeks. During the period July 14-28, nearly 1,500 fires occurred in the national forests of the Northwest and California. Under critically dry weather conditions, 53 of these fires spread to sizes of 300 acres or more. In the campaign to control these fires, the Forest Service mobilized more than 24,000 fire fighters. We used 390 bulldozers, 623 pumpers, 175 airplanes, 83 air tankers, and 61 helicopters.

Our battle with fires in the West was by no means over at the conclusion of the two critical weeks in July. During the past month additional thousands of men and hundreds of piece of equipment have been fighting fires throughout the West. Fires knocked out the power lines to Reno, forced evacuation of several Sierra communities, temporarily closed transcontinental highway US 40, and blackened thousands of acres in California, Nevada, and South Dakota.

We know that this has been a severe fire season—a fire season which has challenged the ingenuity and strength of all the private, state, and federal agencies involved in forest protection.

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<sup>1</sup> Dedication address at Northern Forest Fire Laboratory, Missoula, Montana, September 12, 1960.

The great fire fighting forces and the many improved techniques now at our command have surely prevented the development of devastating infernos which could have had disastrous consequences to many part of the West.

We know that we have made progress in fire control. But we also knew that the fire control problems are far from being solved. The recent fires show that the present problems are difficult ones. But future fire problems will be even more difficult.

In the future the stakes in forest resources will be higher and the need for effective fire control will be even greater. In the next 40 years the population of the United States will increase to more than 300 million people. In the Western States it is anticipated that the population will increase more than fourfold to a total of 10 million people by the year 2000. These people will use the forests more than ever before. There will be a far greater demand for all forest resources—wood, water, forage, wildlife, and outdoor recreation. And, because of the number of people in the woods and the use they will make of forest resources, the risk of fire and the losses that fire brings will be greater than ever before. While the risks and the potential losses will be greater, we must do more than hold our own, we must reduce the losses far below these we have suffered in recent years.

These are the reasons for the building of this laboratory. Development of knowledge is the foundation for progress in any field. This laboratory will be devoted to the development of knowledge which will better equip us to deal with present and future fire problems.

We are confident that the research attack on forest fire problems will be successful. This confidence comes from the results already stemming from the fire research program here and elsewhere.

The fire research program of the U. S. Forest Service had its birthplace in Missoula. Harry T. Gisborne, formerly Chief of Fire Research in the Experiment Station at Missoula, was the first full-time forest fire researcher in the United States. He started fire research here in 1922. From that date until his untimely death in 1949, Gisborne ably demonstrated the value of research as a vital force in developing more effective ways for the control of forest fires.

During the life of our comparatively young program of forest fire research, there has been a long list of significant contributions. Here are a few of them:

- Fire researchers have developed the system of fire danger rating. This system provides a method for scientific integration of weather and other factors into a numerical rating of fire danger. People in this area are well acquainted with this fire research contribution. Your

newspapers, radio, and TV stations give daily report of burning index ratings throughout the fire season. As a result, the general public as well as the fire fighters are informed in a systematic and meaningful way of the chances for fires to start, spread, and do damage.

- Our techniques of fire control planning and the design of fire control systems stem directly from research results. Methods for the operations of fire lookout stations, the planning of aerial patrol routes, and the placement of suppression forces stem directly from painstaking research of the many complex factors influencing fire control.
- The use of chemical fire retardants is a product of our fire research effort. Immediately following World War II, pioneer experiments in the bombing of forest fires with water and chemicals were conducted right here at Missoula.
- Fire fighters now have a much better understanding of fire behavior as a result of many years of research in fuel flammability, topographic effects, and forest fire meteorology. This means that fire fighting is safer and more efficient.
- Lightning is the major cause of forest fires in the West. Today, as a result of research, fire fighters are better able to control lightning fires. They have a better understanding of when and where lightning fires will occur and of how they will behave under various atmospheric situations.

There are many other research contributions—techniques for fire hazard reduction, equipment for measuring weather factors, methods for determining fire suppression man-power requirements, systems for evaluating fuel flammability, and a host of others. These contributions have saved untold dollars in fire control costs and in forest resources.

Although fire research results to date stand as very significant contributions to forestry, the potential for future research dwarfs what we have accomplished so far. Many people have said that we are living in a scientific age. The developments in atomic science, rocketry, space research and in many other fields seem to demonstrate that we are indeed in a scientific age. But I suspect that we haven't seen anything yet. I am sure that the products of future scientific research will astound all of us.

Our forest fire research effort so far has done the obvious things. We have tackled the research that we have been equipped to do. In the process our fire researchers have realized that many promising areas of research could be undertaken if proper scientific facilities were available. Accordingly plans were started several years ago to develop forest fire laboratory facilities.

The first proposal to build a fire laboratory at Missoula was prepared in 1950. In the intervening years, until ground was broken for the present laboratory in April 1959, a great deal of investigation was made of the type of fire research facilities needed. Our fire research staff has literally investigated laboratory facilities throughout the world. The basis for the laboratory design has therefore been a research project in itself. The resulting information was then turned over to contract architects and engineers who prepared the final plans.

The Northern Forest Fire Laboratory is indeed a unique structure. There is probably not another structure like it in the world. The 36,000 square feet of floor space contains scientific research facilities designed specifically to investigate a wide variety of fire problems. When the laboratory is fully equipped, we believe that this will be one of the finest research institutions of its kind. This whole complex of combustion chamber, wind tunnels, radar scopes, and laboratories for physics, chemistry, meteorology, and fuels research will constitute a powerful means for making progress in the big job of forest protection and management.

We believe that Missoula is a very appropriate place for this type of a laboratory and that this specific location on the airport is ideal. Here we are surrounded by millions of acres of forest lands where fire is a major problem. Fire researchers at this location work in an environment that keeps them in constant touch with their objectives. Next door to the laboratory is the Smokejumper Center and Aerial Fire Depot. Airplanes used in fire research can be taxied right to the door of the laboratory. Adjacent is the fire Weather Forecasting Center of the U. S. Weather Bureau, and the shape of private aerial service companies. All of these are excellent supporting facilities for fire research which will help us to do our job more efficiently and economically.

We want this laboratory to be a center for cooperative research with projects carried out in conjunction with state, private and federal agencies. Again Missoula is a good place for this type of research. We are fortunate to be in the same location as Montana State University. For many years our research staff has worked closely with the University and with other colleges and universities in this region. We are fortunate too that the laboratory is situated where it can work closely with so many of the private, state, and federal forest protection agencies. All of these agencies are eager for the results of fire research.

In the nation program of forest fire research, the Northern Forest Fire Laboratory has two broad missions: first to conduct both basic and applied research on critical fire problems having nationwide importance; and second, to conduct special regional research on fire problems peculiar to the Intermountain West and Alaska. The research program at the Northern Forest Fire Laboratory will be integrated and coordinated with programs at two other Forest Service Fire laboratories—the

Southern Forest Fire Laboratory at Macon, Georgia and the Western Forest Fire Laboratory planned for construction in California.

Some of the possible and results of the more vigorous research programs which will now be undertaken causes much enthusiasm among the fire researchers. They are excited about many of the things which may come into being as a result of the availability of the new research facilities. Here are a few of the possible developments:

- Fire hazard reduction by using chemicals and mechanical fuel chippers to lower the flammability of dangerous forest fuels.
- Prevention of man-caused fires by pin pointing the best spots, times, and methods for preventive actions.
- Better control of lightning-caused fires by using radar to track lightning storms and weather modification techniques to reduce lightning activity and fire danger.
- Fire detection by the use of radar, electronic warning systems, and heat-scanning devices.
- Better prediction of fire behavior by applying new knowledge which will stem from both laboratory and field research in combustion and by using new instruments and techniques for recording atmospheric factors.
- Better fire suppression by using improved fire retardant chemicals, mechanized attack, and new concepts of air and ground attack.
- Beneficial use of fire by using new techniques, equipment, and chemicals for burning logging slash, removing unwanted vegetation, and preparing seed beds.

The final and most important element in this whole process of fire research is people. We have created fine new research facilities here. But these facilities will mean little unless they can be operated by highly qualified people. The challenge of unlocking the secrets about forest fires and of capitalizing on the exciting possibilities that may come from fire research roots squarely on the staff that will operate this laboratory. These fire researchers must employ many scientific disciplines—forestry, physics, chemistry, meteorology, mathematics and engineering. Collectively and individually they must apply expert skills, uninhibited initiative, and continuing perseverance to a big and difficult task of scientific research.

I am confident that we are initiating a powerful force today that will produce results of great importance to all of the American people. I believe that we will unlock the door to better fire control. Therefore, with confidence and pleasure I present the keys to the Northern Forest Fire Laboratory to the Director and the staff of the Intermountain Forest and Range Experiment Station.