the right atmosphere¹

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Washington, D.C.

I bring you greetings on the occasion of this first national conference on fire and forest meteorology jointly sponsored by the American Meteorological Society and the Society of American Foresters.

The coming together of these two professional societies represents a landmark in the long history of cooperative endeavor among meteorologists and foresters. It is recognition of what many members of both organizations have long known: that no science or service can operate as effectively independent of related sciences or services; that the fastest progress is made when researchers and administrators of good will ally themselves with their counterparts in neighboring fields—when occupation and communication barriers are overcome and the advantages of working together fully realized. (I do have to mention communication barriers since we professionals tend to take ourselves very seriously indeed and would not be caught dead without our own jargons.)

Nor do I feel a stranger at this joint meeting. Before coming to our Society two years ago, it was my privilege and opportunity for eight years to represent the protection interests of forest owners in the West, participate in a number of western fire weather meteorologists' conferences, and carry the cudgels for improved fire weather services. From this latter effort I still bear the scars of frustration over failure to obtain adequate priority and financing for fire weather research, in particular.

Forestry is a mighty broad profession—much broader than most nonforesters, and some foresters, realize. We define it as the science, the art and the practice of managing for human benefit and use the natural resources which occur on and in association with forest lands. These resources are not limited to trees, but include other plants, animals of all descriptions, the climate, the soil, and related air and water.

To be successful in managing these diverse forest resources for people, a forester must involve himself with the physical, biological and social sciences. He must have access to knowledge in all of these sciences on which to base sound management decisions. In the physical sciences, the need for enlightenment on atmospheric

phenomena is especially great. Forest scientists have done some good work on climate near the ground with varying forest cover. But foresters generally must turn to the meteorologist to report the condition of the atmosphere at a given place and time with respect to temperature, moisture, air motion and electrical activity.

The application of this information, of course, is as varied as the forest resources and their uses. Forecasts of weather are needed for planning most forest operations. For example, tree planting, road construction, timber harvesting, slash burning, prescribed burning, fire detection and control, and handling public use of forest lands must all be coordinated with weather conditions. It follows that the more advance the warning of changing weather, the more successful these operations can be. Thus foresters have a continuing need for accurate, long-range weather forecasts, a need which grows with the value of forest resources to people.

No greater need for accurate weather prediction exists in forestry than in the field of fire detection and control. At stake is the protection of the invaluable resources of water, timber, wildlife and scenery, not to mention human lives. It should be no surprise to anyone for me to state that fire weather services to forestry have not kept pace with the need. The total effort, in fact, has dropped behind in terms of relative priority. As the burgeoning air transport industry has involved millions of human lives in a form of transportation having maximum exposure to weather conditions, and the exciting development of weather-tracking satellites has produced usable results in the photography of clouds, the more prosaic and far less costly weather services involving the less populous, forested third of America have had to take a seat increasingly further back when appropriations time rolls round. Only by capitalizing on an extra-bad fire year where losses in human and forest resources are high, by dramatizing and emotionalizing (not part of a forester's training and makeup), can favorable attention of appropriations committees be focused on the modest amounts being requested. Often as not, it has been a matter of restoring what had been deleted from the budget at the departmental level itself.

The history to date of the National Fire Weather Plan illustrates this process. The Plan was conceived and developed with maximum cooperation among the

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Weather Bureau, the Forest Service and other forestry organizations in light of demonstrated needs. It was well launched, got off to a good start, and showed great promise. But what was to have been a three-year plan became a five-year plan—even longer as cutbacks in scheduled appropriations increases threw the program more and more off schedule.

The portions of the first phases of the National Fire Weather Plan which have been implemented constitute without question a net improvement in service. New stations have been established to permit more accurate local forecasting and new equipment provided for increased effectiveness. However, the research support which the Plan calls for has not materialized. Fire weather research is still mostly a part-time assignment of forecasters, with only a relative handful of full-time researchers in the country.

What is the *real* reason for this atmospheric myopia? How can the great physical science of meteorology be utilized more effectively in the protection of America's forest resources from fire—a conservation must? Be directed in a more concerted way toward the solution of specific protection problems? How can research in this area provide the strong backup that is needed for improved fire weather forecasting? How may the significant, diverse findings reported at this joint conference be augmented and complemented to the point of breakthroughs in specific areas?

Without in any way presuming to reflect the views of my own organization, I would like to venture a partial answer. Could it be that two contrary philosophies have acted to hold up progress in fire weather research?

- 1.) the idea that global atmospheric research and weather satellites will be able to do the *whole* job in weather research and services; and
- 2.) the opposing idea that fire weather research and services should both be done by the practicing meteorologist on the ground.

The corollaries to each of these contrary beliefs are:

- 1.) that weather should be centralized and independent of administrative services; and, conversely,
- 2.) that fire weather research should be entirely decentralized and a function of administrative services.

I suspect that neither of these approaches is the better one; that strict adherence to either would be disastrous. What is indicated is a combination of the two. As a generalist among specialists, I may be allowed to guess with impunity that global cloud tracking and photography by satellites is useful to fire weather service, but only when combined with the more detailed tracking of clouds by weather radar stations and with other localized weather data. Certainly the terrain of much of our forest land is such as to introduce a multi-

tude of local influences which modify local weather. It is hard to imagine *all* of the effective research in fire weather being done at atmospheric research centers and laboratories.

On the other hand, there seems much to be gained by fire weather people taking full advantage of the exciting new concentration of atmospheric research facilities at Boulder and Ft. Collins, Colorado. The Environmental Science Services Administration's Institutes for Environmental Sciences combine with the National Center for Atmospheric Research, its \$5.5 million laboratory at Boulder, and the resources of cooperating universities at Boulder and Ft. Collins to constitute an unusually fine environment for weather research of all kinds.

The U.S. Forest Service is beginning to concentrate efforts in meteorological research at Colorado State University. This will supplement its forest fire meteorological research already underway at the three forest fire laboratories in Macon, Georgia, Riverside, California, and Missoula, Montana. The long history of the Forest Service in research and administration teaches the value of having each independent of the other. It also shows the value of concentrating the main thrust of research in a given field where the facilities and climate for that research are best. More recent experience in forestry, in particular the operation of the McIntyre-Stennis Act with matching grants to forestry schools, has shown the advantage of spreading the research dollar among various organizations having the right climate for research.

Looking to the future, one might predict that eventually a fire weather laboratory will be needed as the focal point for a considerably intensified research effort. Surely, means will have to be found for coordinating the cloud-tracking information of weather radar stations with the photographs of clouds taken from satellites, relaying both to a central point where they can be fed into a computer and the results, in the form of weather forecasts, transmitted thence to users.

I would hope, too, that the nation's system of weather radar stations would be completed at any early date. Apparently, stations have been located mainly where hurricanes and severe storms threatened human life. To obtain the radar station at Point Six near Missoula it was necessary to convince government officials that lightning storms are severe storms, which proved not an easy task. The efforts a few years ago to get approval for the weather radar stations which would cover the Pacific Coast came to naught. Since the prevailing winds and weather over much of the country come from the Pacific Ocean, this oversight constituted another kind of atmospheric myopia. One hated to think that it would take another Hurricane Freida with a blowdown of two billion feet of timber—and perhaps the loss of human lives thrown in—to prove, by the severe storm test, that radar tracking of clouds is desirable here, too.

Fortunately, work is now underway to obtain weather radar at Mt. Ashland in Oregon and Larch Mountain in Washington.

The future will expect miracles of foresters and forest lands, in the same way that the present is expecting—and getting—miracles from the environmental scientist. A smaller base of available forest land will have to produce more benefits for more people. *Today's* losses of forest resources from fire will become untenable. The forester will be seeking protection tools yet un-

dreamed of. He will turn increasingly to the meteorologist for accurate, advance notice and evaluation of changes in local weather conditions, for long-range weather predictions on which he can rely.

Above all, let us hope as these related disciplines move ahead together, that foresters will make optimum use of the weather services which meteorologists make available to them. For only thus can the *full* benefit of cooperation between our two professions be ultimately realized.

news and notes

John W. Firor named NCAR Director

Dr. John W. Firor has been named director of the National Center for Atmospheric Research (NCAR) in Boulder, Colo. Dr. Firor has served with NCAR since 1961 as associate director and director of its High Altitude Observatory.

Dr. Firor's appointment was made by the University Corporation for Atmospheric Research (UCAR), with the approval of the director of the National Science Founda-

tion. UCAR is the nonprofit corporation of 24 U.S. universities that operates NCAR under contract with the National Science Foundation.

Dr. Firor succeeds Dr. Walter Orr Roberts, who was appointed NCAR's first director when the center was created in 1960. Dr. Roberts will now serve full time as president and chief executive officer of the University Corporation for Atmospheric Research, an appointment that he formerly held concurrently with his post as director of NCAR.

Commenting on Dr. Firor's appointment, Dr. Roberts said: "John Firor has outstanding qualities for scientific leadership at NCAR. I have long anticipated the day when I could turn over direction of NCAR to a scientist in whom our staff and the scientific world will have full confidence. The day has now arrived. It is a matter of great gratification to me to be able to turn my own major efforts towards the broader problems of the advancement of atmospheric science, and in particular to the promotion of new programs of atmospheric research in the universities of this country and the world."

Dr. Leland J. Haworth, director of the National Science Foundation, said of the action: "The appointment of Dr. Firor will insure that NCAR continues to be a dynamic, high-quality research institution. Under Walt Roberts, NCAR

developed into a position of leadership in research in the many difficult and challenging areas of the atmospheric sciences. We are delighted that Dr. Firor has accepted the post as his successor, and we expect that NCAR's activities, many of which are related to such major social problems as weather control and air pollution, will continue undiminished in quality and vigor."

Dr. A. Richard Kassander, chairman of the NCAR Board of Trustees and director of the Institute of Atmospheric Physics of the University of Arizona, said: "The corporation has recognized for some time the growing need for a full-time chief executive. Establishing the directorship of NCAR as a separate position, distinct from the UCAR presidency, will enable the corporation to make the most of opportunities for advancement of the atmospheric sciences, both through operation of NCAR and through closer cooperation with university atmospheric science programs and with national and international efforts in atmospheric research."

Firor, a native of Georgia, attended elementary school in Athens, Ga., and high school in Denver, Colo. He graduated from the Georgia Institute of Technology in 1949 with a B.S. in physics, and earned the Ph.D. in physics from the University of Chicago in 1954.

Before joining NCAR, he was a staff member of the Department of Terrestrial Magnetism of the Carnegie Institution of Washington for eight years. Since 1962, he has been a professor-adjoint of astrophysics on the faculty of the University of Colorado.

Firor's personal research interests include the effects of the Earth's atmosphere and magnetic field on cosmic rays; radio astronomy, especially radio waves from the Sun; infrared emission from the solar corona; and atmospheric and space research in general.

Firor is a member of the American Astronomical Society, the American Meteorological Society, the International Astronomical Union, Sigma Xi, and the American Geophysical Union. He is also a member of the U.S. committee for the Global Atmospheric Research Program, the Astronomy Missions Board of NASA, and chairman of the National Academy of Sciences Committee on Data Interchange and Data Centers.

(More news and notes on page 730)

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