UNITED STATES DEPARTMENT OF COMMERCE
WEATHER BUREAU
WASHINGTON

June 13, 1957

IN REPLY, PLEASE ADDRESS
CHIEF, U. S. WEATHER BUREAU
WASHINGTON 25, D. C.
AND REFER TO
C-3.1

FILE: 922 MEMO (Climatological Services Memorandum No. 60) WASHINGTON, D. C. 6-13-57

MEMORANDUM

TO : Area and State Climatologists, Substation Inspectors, Field Aides, WRPCs, River District Offices, and Area Engineers. (With copies to Regional Offices for information)

FROM : Office of Climatology

SUBJECT: Climatological Services Memorandum No. 60

GENERAL

1. WORKSHOP ON AGRICULTURAL METEOROLOGY: Following is a report by Wayne C. Palmer on the Madison, Wisconsin, AMS Workshop on Agricultural Meteorology, May 14-16, 1957:

" The meeting was well attended by soil physicists, plant physiologists, foresters, agronomists, ecologists, meteorologists, climatologists and others. The 'spirit' of the meetings was unusual in that almost everyone in attendance seemed to be very interested and enthusiastic.

"The objectives of the meeting concerned the outlining of the needs of agriculture and the meteorological services which can be provided to meet those needs. Surprisingly enough, agriculture, while mentioning the desirability of improved forecasts - both short and long range - did not dwell unduly on this point. It seemed to be the consensus that climatological information could be used very effectively.

"Unfortunately, there was some confusion throughout the papers and discussions as to whose needs were being considered. Most of those in attendance were research people, and at times the discussions of meteorological observations needed by agriculture concerned the detailed micro-observations needed in connection with field plot experiments. At other times the discussion centered on the matter of observations and services needed to help the farmer. Sometimes the discussion concerned the more basic scientific aspects such as radiation balance and water balance.

"While these different aspects are all very worthwhile, it appears that in the beginning a program for increased agrometeorological observations must be geared to some particular objective and certain specific and more or less limited needs; otherwise the problems mushroom into something that is quite beyond attainment in the near future.

"There was almost unanimous agreement that the basic problems evolve from a lack of knowledge of the effects of various weather elements on various

plants during the different phenological periods of the plant. In other words, what is critical to what plant at what time? Until the agronomist can answer this question, it is going to be difficult for the meteorologist to efficiently provide the 'best' information. In this connection Dr. C. B. Tanner, Soils Department, University of Wisconsin, made a plea for the agronomist's need for help from the meteorologists in getting some new controlled climate laboratories - at the same time recognizing that the phytotron was not the answer to all questions.

"There was also agreement on the obvious - but often overlooked - fact that representativeness is much more important than precision as far as any observations are concerned. Along this line Dr. P. E. Waggoner, Chief, Soils and Climatology, Connecticut Agricultural Experiment Station, suggested that it may be that a climatologist can estimate total evapotranspiration from a 40-acre field to within 10% or more accurately than a soil scientist can measure it. Evapotranspirometers may be accurate but the observations are generally unrepresentative. D. E. McCloud, Department of Agronomy, University of Florida, showed instances of water loss from evapotranspirometers (modified Thornthwaite type) in Puerto Rico of as much as 20 inches per week. The 'oasis effect' was completely dominating the observations. Dr. Thomas F. Malone, Director of Research, Travelers Insurance Companies, pointed out that evapotranspiration observations need be no more accurate than are the precipitation observations and suggested that the time may not yet be ripe for standardization of evapotranspiration observations.

"The matter of phenology received a good deal of attention. Many individuals emphasized that plant - weather research must take account of phenology. It was recognized that phenology is an integrating meteorological measurement and Professor Verner E. Suomi, Head, Department of Meteorology, University of Wisconsin, suggested that phenological observations be included in the Weather Bureau's cooperative observer program. He further suggested that integrating measurements rather than 'spot' measurements are needed insofar as agriculture is concerned and considers this to be the real deficiency of the 'poor man's' net radiometer.

"Real progress is going to depend to a considerable extent on an improvement in communications - between research workers in various fields, between operating meteorologists and farmers and between the various scientific societies. Mr. Richard J. Roth, Chairman of the A. M. S. Committee on Agricultural Meteorology, urged the representatives of the other societies, such as the American Society of Agronomy, to set up within their organizations committees for considering weather and their specialty. In order for the operating meteorologist to provide the most useful information to the farmer, it was proposed that a liaison agriculturalist be assigned to keep the meteorologist informed as to those questions which are pertinent at any particular time in various areas and to interpret the forecasts and other meteorological information in a manner that is appropriate to the various interested agricultural groups.

"Dr. Malone and Dr. Waggoner expressed surprise that the meeting had somehow failed to discuss climatic foreshadowing. Both felt that this field offers some real possibilities for agricultural weather service.

"It is a well-known fact that many of the meteorological observations now taken are not sufficiently representative to be useful to the agronomist who is trying to find out what kind of weather a plant 'wants' for each stage of its growth. In order to collect meteorological information which would be useful for this purpose, it seems imperative that the agro-climatological recommendations of the National Research Councils Committee on Climatology be adopted. The installation of their recommended minimum observational program at those Agricultural Experiment stations where personnel and facilities warrant would provide basic information for plant-weather research. (Each experiment would likely require supplementary meteorological observations of one kind and another.) At the outset these agro-meteorological observations would be more or less apart from the day-to-day operational service requirements of agriculture, but as this network grows it will provide the nucleus for an improved operational service. Along this same line, the meetings pointed up the need for increased research and development in observational techniques and instrumentation for agricultural meteorology and climatology.

"From these observations and the attendant plant-weather research it should be possible to determine the minimum observational requirements for an operational network. Some consideration should be given to the possibility of tying this program in with the climatological benchmark station program at those benchmark stations which are located at suitable agricultural experiment stations. This might provide impetus for both programs.

"Professor Suomi stressed the point that knowledge and data are currently available for an improved service to agriculture; we need not wait until many years of 'better data' have been collected. From the cooperative network data it is possible to derive a great deal of useful climatological information.

"It seems entirely feasible to undertake the collection of a small amount of additional data from the cooperative observer network. This would appear to be the best source for obtaining phenological observations. In addition, it would appear possible to obtain maximum and minimum soil temperatures at, say, two depths at selected cooperative sites. Beyond a small item or two such as these, there is little likelihood of expanding the observational program at the ordinary cooperative station.

"This is by no means a complete report on this very interesting and educational meeting which I was fortunate enough to have been able to attend; but is, rather, a report of my impressions of some of the highlights, questions raised and some remarks on some of the problems involved in getting this highly important program underway. Dr. Barger, Professor Suomi and the other members of the program committee are to be commended for the excellent meeting which they arranged."

2. PROGRESS REPORT ON SUBSTATION CLIMATOLOGICAL SUMMARY PROGRAM: To date a total of 116 of these summaries have been published. The number by states or territories follows:

Alaska	15	Iowa	3	Ohio	3
Arkansas	6	Louisiana	1	Oklahoma	3
California	1	Michigan	2	Oregon	10
Colorado	2	Mississippi	1	South Carolina	18
Florida	5	Montana	7	Utah	10
Georgia	4	New Mexico	4	Washington	2
Illinois	3	New York	5	Wyoming	1
Indiana	3	North Carolina	7	Total	116

The above listing includes only those single-sheet summaries outlined in paragraph C-0543, W. B. Manual, Volume III. There are a few other substation summaries of the more comprehensive type that have been prepared from time to time by State Climatologists and former Section Directors.

These 116 substation summaries now equal more than 40% of the number of Local Climatological Data annual summaries published for first-order stations, and are rapidly becoming a very valuable addition to our file of published summaries.

3. TABLES OF MEAN TEMPERATURE AND PRECIPITATION: Reference: Item 11, CSM #49 A series of Letter Supplements presenting 25-year mean temperatures and precipitation by months on a state divisional basis has been started. Copy is prepared at the WRPCs using the 1931-1952 cards punched in connection with Bulletin W Supplement, plus data for 1953, 1954, and 1955 to obtain a 25-year value for substations. (For first-order stations the standard 30-year normal, 1921-1950 is used.)

Data for 2 states, Florida and New York, have been printed. About 16 additional states will be ready within the next 3 months. A copy of each Letter Supplement will be sent to each State Climatologist, as well as a supply of approximately 100 for his own state.

4. THE METRIC SYSTEM: The following is taken from a Central Office letter on the metric system:

"We certainly agree that the general adoption of the metric system would be of scientific benefit to the country and would facilitate advanced teaching and research. The scope of this problem, however, is so broad that it requires the cooperation of all concerned and, above all, public acceptance. The latter involves an intensive program which must begin in our educational system. A new generation, convinced of its advantages, will more readily accept the change than will a generation which has become so involved in our present system.

"Meteorologists have adopted the metric system for all scientific purposes. At the last Congress of the World Meteorological Organization the Celsius degree (the WMO has adopted the name Celsius as more appropriate than centigrade) and the metric system were recognized as the most appropriate for international use and all countries were urged to move toward its adoption for purposes of international exchange as early as practicable.

"Several years ago the Weather Bureau abandoned inches of mercury and adopted the millibar as the unit for measuring and reporting barometric

pressure. Temperatures in degrees Celsius are used in all of our upper air observations and in all charts, tables and calculations for forecasting and research.

" Complete adoption of the metric system would require that we measure, publish and distribute: temperatures in degrees Celsius, rainfall in millimeters, wind speed in centimeters per second, ceiling and visibility in meters or multiples thereof, etc. It would involve conversion of past records to this system, new scales for all instrumental equipment (perhaps gradual replacement, after a period of converting readings from the present to the metric system) and, last but by no means least, public acceptance. Although the problem of conversion of past records will assume greater magnitude as time goes on, the real problem is that of public acceptance. That is where we hope eventually to capitalize on the efforts of those who will pioneer in the educational aspects of the changeover."

5. PAPERS PREPARED: Recent papers prepared by Weather Bureau climatologists include the following:

"Winds of the Upper Troposphere and Lower Stratosphere over the United States", by Marvin W. Burley, Earl M. Ritchie, and Charles R. Gray, published in the January 1957 issue of the Monthly Weather Review.

"A Possible Singularity in the January Minimum Temperature at Phoenix, Arizona", by Paul C. Kangieser, published in the February 1957 Monthly Weather Review.

"Forecasting Ceilings at Denver, Colorado", by Merle J. Brown and Kenneth C. Tillotson, published in the April 1957 issue of the Bulletin of the American Meteorological Society.

The following articles have been carried in the National Weekly Weather and Crop Bulletin:

"How Dry is Dust?", by Milton L. Blanc in the May 27, 1957 issue.

"Measuring Soil Moisture", by Milton L. Blanc, in the May 6, 1957 issue.

"Iowa Soil Moisture Survey", by G. L. Barger in the April 29, 1957 issue.

"Relationship Between Precipitation and Traffic Accidents in Seattle, Washington", by M. D. Magnuson in the April 22, 1957 issue.

"Does a Wet March Signify the End of a Drought?", by W. C. Palmer in the April 8, 1957 issue.

"Cooling Degree Days", by E. C. Thom in the March 25, 1957 issue.

"Climate and Cotton Culture", by John L. Baldwin in the February 25, 1957 issue.

"Climate of New Jersey", by A. J. Kantor in the February 18, 1957 issue.

"The January Thaw", by R. E. Lautzenheiser in the February 11, 1957 issue.

"Weather and Peaches in Georgia", by H. S. Carter in the January 28, 1957 issue.

"Presidential Inauguration Day Weather", by M. L. Waggoner in the January 14, 1957 issue.

6. WEATHER PROGRAM AT MOREHEAD PLANETARIUM: From February 27 to March 25, 1957, the Morehead Planetarium of the University of North Carolina at Chapel Hill presented a program called "Weather Whys". Performances were presented each evening, with afternoon shows on weekends, and special performances for school children. Following the astronomically-slanted introduction, there followed an explanation of the seasons and climate, the taking, collection and utilization of weather observations and the instruments used, special comments on the climate of North Carolina, and a sequence portraying the movement of airmasses and fronts resulting in a local thunderstorm. Throughout the performance, the discussion was accompanied by special visual material projected on the planetarium dome; the thunderstorm sequence had appropriate visual and sound effects, including thunder and lightning and ending with a rainbow. Recorded narration by the State Climatologist accompanied a portion of the performance, which ended with a tribute to our cooperative observers.

The State Climatologist's office at Raleigh worked closely with the Planetarium staff in planning the program; a number of meteorological instruments and climatological publications were loaned for display.

Free passes for the program were sent to all observers in the state.

7. PROGRAMING AND COORDINATION OF SURVEYING AND MAPPING: A copy of Circular No. A-16, March 25, 1957 and attachment will be distributed to each State and Area Climatologist for information only. The attachment to the memorandum, Exhibit B outlines procedures for standardizing the preparation of compiled maps issued by any Federal agency.

8. NARRATIVE WEATHER STORY IN CLIMATOLOGICAL DATA: Reference: Our memorandum of March 15, 1957. We want to thank all those who commented on the value of the narrative weather story in Climatological Data. A number of changes were suggested, including substitution of a table of extremes for that portion of the text.

A number of replies were to the effect that the value of the story to the user was not known. Before making any material change in the present arrangement of the text we want to poll users in an attempt to find out how often the text is used by them.

9. ECOLOGY: "Ecology" is a quarterly periodical published by the Duke University Press, Durham, North Carolina. It is devoted to all phases of ecological biology, and occasionally carries items of meteorological significance.

At the present time we do not feel that we can justify a subscription for

for each State and Area Climatologist; however, State Climatologists located near State Colleges or Universities should endeavor to borrow copies from the library. If they should prove sufficiently useful, we would give consideration to the purchase of this publication for those State Climatologists who do not have access to them.

FOR WRPCs

10. AMENDMENTS TO PROCEDURES: The following instructions have been issued to the WRPCs:

Paragraph 1009.652. Change the present note, "The Station Index lists observation times in local standard time", to:

> "The Station Index shows observation times in local standard time. During the summer months some observers take the observations on daylight saving time".

Paragraph 1009.83. Add the following after the note about evaporation: "Long-term means for full-time stations (those with Weather Bureau, Weather Bureau Airport, or Weather Bureau City in the station name) are based on the period 1921-1950 adjusted to represent observations taken at the present location. Long-term means for all stations except full-time Weather Bureau stations are based on the period 1931-1955."

This note should not be used, of course, for a given state until the 25-year long-term means are actually used.

Paragraph 1010.011 (3). Amend by changing the words "exceed slightly" to "differ slightly from".

H. E. Landsberg
Director, Office of Climatology

GUIDE TO CLIMATOLOGICAL SERVICES MEMORANDUM NO. 60