

UNITED STATES DEPARTMENT OF COMMERCE  
WEATHER BUREAU  
WASHINGTON

January 21, 1958

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

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MEMO

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. 63

GENERAL

1. CUT-DOWN IN NEW STATION ESTABLISHMENTS: In the calendar years 1955-1956 there were 481 new substations established in the United States, Alaska, Puerto Rico and Virgin Islands, and in the Pacific Area. Some of these stations were for programs for other agencies and were supported by their funds, but the major portion was supported entirely from S&E funds. This increase, which still continued in the first half of 1957, roughly approximates the total number of stations in Nebraska and Oklahoma. It has, of course, greatly increased the workload at WRPCs for processing and preparation for publications to a point where it has become too much for the S&E funds and staff to handle. The cost of equipment, increased work load on Substation Inspectors and the attendant travel costs have not been planned to cover new installations. No additional support is included in the current year spending plan, and it is likely that no new funds will be made available for network operations during FY 1959.

It is necessary, therefore, that recommendations for new substations supported by S&E funds be thoroughly justified when submitted to the Central Office. The justification should include recommendation of an offset - such as discontinuance of a less important station or cessation of publication of its data. The recommendations will then be critically screened here. It is extremely doubtful that proposals can be approved for the establishment of new substations, and the publication of data therefrom unless accompanied by adequate offsets.

2. DEFINITIONS: Re CSM 46, Item 1 and CSM 52, Item 1:

The following definitions have been adopted by WMO, to be effective July 1, 1958.

Normals - Period averages computed for a uniform and relatively long period comprising at least three consecutive 10 year periods.

Climatological Standard Normals - Averages of climatological data computed

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for the following consecutive periods of 30 years, 1 January 1901 to 31 December 1930, 1 January 1931 to 31 December 1960, etc.

(Note: When data are not continuous, adjusted normals may be computed.)

Period averages - Averages of climatological data computed for any period of at least 10 years starting on 1 January of a year ending with the digit 1.

Climatological Station -

Climatological stations shall be classified as:

(a) Principal climatological station. A climatological station at which hourly readings are taken, or at which observations are made at least three times daily in addition to hourly tabulation from autographic records.

(b) Ordinary climatological stations- A climatological station at which observations are made at least once daily, including daily readings of extreme temperature and of amount of precipitation.

(c) Precipitation stations - A station at which observations of precipitation only are made.

(d) Stations for specific purposes - A climatological station established for the observation of a specific element, or elements.

Since these terms now have a specific meaning internationally we should accustom ourselves to using them.

### 3. INTERPRETATION OF CLIMATOLOGICAL DATA AS PREDICTIONS:

Recent newspaper clippings have indicated a tendency of news reports to interpret climatological data as a prediction. Although there are some indications of serial correlation on a monthly basis it is extremely dangerous to predict the nature of this winter based upon supposed trends in the immediate past. To quote the probabilities of snowfalls, degree days, days below zero or 32°, days of rain etc. is a legitimate use of climatological statistics. On the other hand, to state that there will be a definite number of weather occurrences within a specific period is not yet within the realm of legitimate use of climatological data.

Caution should be used in discussion of prospects of future events. In all cases of presentations of climatological probabilities it should be clearly indicated that there is a basic difference between use of probabilities and an actual forecast.

4. SOIL TEMPERATURE OBSERVATIONS: The following is from a memo on this subject to the Ohio State Climatologist:

"It appears that eventually the Weather Bureau will be responsible for the installation and operation of a network of agricultural-meteorological stations at representative Experiment Farms over the United States. However,

for a number of reasons including the Bureau's present financial situation, there does not appear to be any chance for such a program getting underway in the near future. For the present, at least, ag-met. observations at Experiment Farms must continue to be made by the Universities or Experiment Stations with their own instruments.

"As to your specific problem, the question of instruments for the measurement of soil temperature has not been completely resolved. As you know the WMO has recommended that earth temperatures be measured at 10, 20, 50, and 100 cm. (4, 8, 20 and 40 inches). Observations once a day are sufficient at depths where the diurnal change is negligible. Most investigators agree that this would be at or below three feet and for many purposes the diurnal range at 18 or 20 inches is small enough that a once-a-day reading would suffice. At shallower depths continuous readings would be best and when they are not possible, the daily maximum and minimum should be obtained. For this purpose it is convenient to use maximum and minimum indicating thermometers. It has been found that the bi-metal dial-type instrument does not provide sufficient power to accurately operate the maximum and minimum pointers. In addition, it has certain conduction errors such that the final temperature is a vertically integrated rather than a horizontally integrated one. The Silver Hill Observatory is currently testing a new mercury-in-steel, capillary maximum and minimum, dial-type thermometer for the measurement of air temperature. Similar units are now on order from the Palmer Thermometer Company, Cincinnati, for testing as soil thermometers. Initial tests suggest that these units will be satisfactory for both air and soil temperatures. In addition the instrument is so designed that it appears feasible to use it as a maximum-minimum dew point indicator by the addition of some device such as the lithium chloride dewcell. The Agronomy and Physics Department at Ohio University may be interested in contacting the Palmer Company.

"There is a good theoretical basis for considering that maximum and minimum temperature observations from a single level at about 4 to 8 inches below the surface would prove to be biologically significant and that this may be regarded as a "characteristic level" for soil temperature measurement.

"As to exposure, it is desirable to obtain observations from instruments under both sod and bare soil in an open fairly level area free from irrigation or other artificial influence. Soil type should be characteristic of the typical local agricultural areas.

"The above remarks hardly constitute the recommendations which you requested but the testing program is not completed and this presentation of "the state of affairs" is about the best that can be done at this time. I am sorry we cannot offer more active cooperation with the University, but our present budget will not permit it."

5. RESPONSIBILITY TO COOPERATIVE OBSERVERS: CSM #62-6, item 2, outlined the division of responsibilities among Central Office units toward the cooperative climatological observers. This item had in mind purely the climatological functions of the observers. The same observer, however, in many cases, per-

performs other related duties such as river and rainfall reporting for the hydrologic services, frost and storm warning services, etc.

The supervising WBO's, in connection with special services of observers, such as the River District offices, play an important part in the original selection of observers and in maintaining their morale. These WBO's have what is probably the closest personal contacts with a large number of the observers through daily or less frequent telephone calls. In addition, there are the annual visits to the observers to review reporting instructions, discuss questions regarding river readings, etc.

In this connection, the Hydrologic Services Division is responsible for:

- (a) Designing of observational and reporting forms and instructions, in cooperation with O&SF Division and Office of Climatology.
- (b) Collecting of river and rainfall data and reports from observers.
- (c) Design of new instrumentation for accuracy and ease of river, rainfall, and snow reporting, in cooperation with Division of Instrumental Engineering and O&SF Division.

6. STORM REPORTS BY CLIMATOLOGISTS ON LEAVE: The following is a report by Mr. M. O. Asp, Climatologist at the Weather Records Processing Center in Kansas City:

"The report of Mr. Lautzenheiser's activities in investigating storm data while on leave last summer was especially interesting to me since I had a similar experience last June.

"My family and I were on a vacation trip in central Minnesota at the time a tornado struck Fargo, North Dakota. The next morning we drove to Fargo since we had many relatives living in the Fargo-Moorhead area. After checking with my brother to find that none of my folks had suffered loss, and finding that our friends who were in the path of the storm had not been critically injured, I reported to the WBAS Fargo offering to help. No help was needed at the WBAS but Mr. Hendrickson, Acting MIC, invited me on a survey trip the next morning together with other Weather Bureau Representatives who were coming to Fargo. The following morning a survey of the entire storm path was made in a Fargo police car by Mr. Grubb and Mr. Sadowski of the CO, Mr. Hendrickson and myself.

"Besides surveying the damage we visited the local television station and the principal newspaper. At the television station we were shown many pictures of the storm and resulting damage. Results of the visit at the newspaper office are on the attached clipping.

"As a result of the survey I wrote a summary in the North Dakota Climatological Data for June. This was done after permission was obtained from Mr. Bavendick, State Climatologist for North Dakota to write the severe storm section because of my experience in Fargo. The CD is enclosed. The survey was also discussed with Severe Storm research people in Kansas City.

"I am pleased that the Office of Climatology is encouraging Weather Bureau people in general to pay more attention to severe local storms and thus result in better reporting. It is believed that Weather Bureau people should also be advised that their reports should always be furnished promptly to the State Climatologist since the State Climatologist has the primary responsibility for the reporting of severe storms for climatological purposes. As previously reported, we in WRPC Kansas City make every effort to advise the State Climatologists about all severe storms that come to our attention. Clippings and observers' accounts of severe storms are forwarded promptly, as are the SELS records of storms.

"I have considerable interest in the climatology of tornadoes and realize that much can be done in this field. I scratched the surface so to speak in regard to tornadoes in Oklahoma and Arkansas. I would be happy to investigate any severe storms that may occur when the need arises."

7. IOWA AGRICULTURAL ADJUSTMENT CENTER: The following is taken from Dr. Barger's activity report.

"It may be of interest to people in the Bureau to know that Iowa State College workers in agriculture have been active in the past year in establishing an Agricultural Adjustment Center, whose purpose is the stabilization of farm income. Among projects considered within the Agronomy Department, those dealing with weather effects on crop output were considered to be most pertinent in this new field of emphasis. Since appreciable foundation support is anticipated for the Center, there is a possibility that research work relating weather to agriculture may gain support through this source. The center is expected to have somewhat of a national impact. It is hoped that workers from many interested states might come here for rather extended periods of time to study the problems involved in adjusting agricultural output to current and future demands. Since weather could very logically be termed the major reason for year to year variation in output, studies of crop responses to weather factors could be a real part of this undertaking'.

8. PROGRESS OF NC-26: The following is also taken from a recent activity report of the Central Area Climatologist:

.---- "Plans were approved at this meeting for continuing the project until approximately ten station records have been analyzed for the states of Minnesota, Michigan, Wisconsin, Ohio and Indiana. Preliminary plans have been started for utilizing the facilities of the National Weather Records Center in punching data needed in Minnesota and Wisconsin. It is hoped that the machine tabulations on this project will be essentially completed by June 30, 1958, and that the final Atlas-type publication will be completed during the ensuing fiscal year. A temperature study also was approved at the October meeting of NC-26 members. The preliminary work will be done by Dr. Decker at the University of Missouri. --- It is also planned to produce a pamphlet describing the instruments recommended for agricultural observing stations and the manner in which they should be exposed. Where appropriate it is hoped that sources, or at least descriptions, of the instruments will be made available."

9. STATE CLIMATOLOGIST TITLE: Occasionally it is pointed out that there is some possibility of confusing State Climatologists with state employees in the mind of the public. The title, State Climatologist, is well accepted and convenient and we are reluctant to propose any change that would, for example, require preparation of new personnel papers etc.

To reduce the possibility of confusion, it would be well to refer to State Climatologists as Weather Bureau State Climatologists in introducing them or referring to them in publications. This applies also to Area Climatologists.

10. WEATHERWISE FOR SUBSTATION OBSERVERS: In view of the critical fiscal situation, no effort was made to increase the number of Weather Wise subscriptions purchased next year for observers. We do hope eventually to increase the number so that each non-institutional observer will get a copy.

11. PUNCHED CARD FILES GROW: The following story by Roscoe Fleming was printed in the December 4, 1957 issue of "The Christian Science Monitor":

U. S. Weather Facts - Charted

"A little known but ever-growing cooperative service of the United States Weather Bureau and various state institutions, particularly the land grant colleges is performing work of increasing importance.

"This is in the realm of climatological projects which have specialized so far in reducing to usable form the literally millions of separate daily weather observations that have been taken at thousands of points, both by professionals and by the bureau's large corps of volunteer weather observers.

So far, with some exceptions, most of the data made possible by the ever-growing volume of these observations has been published only as averages and extremes published by the bureau. The hand labor involved in doing more with them was formerly so tremendous that thousands of transcribers alone would have been needed.

"HANDWORK REDUCED

"Now, however, the new punch-card techniques, plus the coming of computers, has eliminated this bogey of tremendous handwork. The Weather Bureau itself has been using punch cards and electronic analysis for current observations since 1948, and continues to do so.

"But Congress has never given it funds enough to put all its tremendous backlog of observations taken before 1948 into the punch-card files.

"Only under the urge of war did the even more urgent job of mass-duplicating all the past weather maps get done, and then not by the Weather Bureau, but by the military. And the reduction of all available weather and climatic data to usable form is one of these housekeeping jobs which Congress never seems to feel is urgent enough to get into the budget.

"So the bureau started out to see if land-grant and other colleges and universities, which now have computer and punch-card equipment, might not work with the bureau in weather research within their own states or areas.

"Iowa State College was the pioneer, and its courses and accumulated knowledge of agricultural knowledge of agricultural climatology, as it is called, date back to 1943. The title may be a little misleading, since fundamental climatic data can be and is being used (through industrial meteorologists) as much to the advantage of various types of industry and business as in farming.

At Iowa State many specialists in climatology have received degrees, and their work and that of others already form a valuable body of applied climatic data. For example, the drought hazard to which the corn crop is subjected has been computed for 13 of the largest corn-growing counties and is available to farmers for their information and protection.

"In Minnesota, which is also cooperating, the university has accumulated complete punch-card data of the distribution of rainfall that reaches the soil.

"At the University of Missouri the cards have been used to pin-point the precipitation pattern and the climatological hazards, as from frost, more precisely by localities than ever before.

"In Iowa again, anyone interested, such as farmer, highway or construction engineers (concrete can't be poured when it's too cold), heating engineers, shippers, and the whole variety of other business and professional men to whom weather conditions are important, can now obtain probability tables telling just what the risk of certain critical temperatures is by areas and dates.

#### "COLLEGES PARTICIPATE

"At the universities of Arizona and Utah these figures have been used to study cloud-seeding results and in basic cloud-physics investigations.

"Among others participating now are the state colleges or universities of North Carolina, South Dakota, Montana, Michigan, Oklahoma, North Dakota, Kansas, Arkansas, Minnesota, Wisconsin, Florida, Illinois, New Hampshire, Ohio, Washington, Wyoming, Purdue University in Indiana, which is the state landgrant school; the Illinois Water Survey in cooperation with the university; the Texas Board of Water Commissioners, and so on. Limited projects requiring small funds are under way at Colorado State University at Fort Collins and some other institutions.

"The bureau says the work costs comparatively little when matched against the continuing and growing value of the data, and that its short cuts and expert help, in addition to much of the needed material, are available in all such projects entered into under contract."

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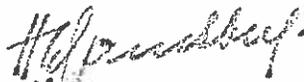
12. PUBLICATION ON EVAPOTRANSPIRATION: The Indiana State Climatologist has recommended a publication which evaluates progress in evapotranspiration measurements, particularly in Europe.

It is the February 1956 issue of Netherlands Journal of Agricultural Science Volume 4, No. 1 in which are published the proceedings of the Informal Meeting on Physics in Agriculture, September 7-13, 1955 at Wageningen, Netherlands.

A copy may be borrowed from the Central Office Library.

13. PHENOLOGY OF LILAC BLOOM IN MONTANA: The above article, reporting on the 1956 project, was carried in December 27, 1957 issue of Science, page 1344. Credit is given to Mr. R. A. Dightman, Montana State Climatologist for his cooperation in the project. A similar project, on a larger scale, was carried out in 1957 through cooperation of Mr. Dightman and Mr. Steffan, and will be continued in 1958.

14. CASH AWARDS FOR STATE CLIMATOLOGISTS: Two Weather Bureau State Climatologists, Mr. Nathan Kronberg of South Carolina and Mr. Gilbert Sternes of Oregon have each been awarded \$200 cash awards in recognition of the fine work they have done.



H. E. Landsberg  
Director, Office of Climatology

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