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UNITED STATES DEPARTMENT OF COMMERCE
U.S. WEATHER BUREAU
WASHINGTON

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IN REPLY, PLEASE ADDRESS
CHIEF, U. S. WEATHER BUREAU
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MEMO

(Climatological Services Memorandum No. 68)

WASHINGTON, D. C.
9-10-58

MEMORANDUM

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

FROM : Office of Climatology

SUBJECT : Climatological Services Memorandum No. 68

GENERAL

1. REPORT OF THE ADVISORY COMMITTEE ON CLIMATOLOGY: Following is the report to the Chief of Bureau of the Committee on Climatology, Advisory to the United States Weather Bureau:

During the year 1957-1958 the Committee reviewed the Weather Bureau work on soil moisture, soil temperature, and their relation to drought.

The Committee wishes to commend the Office of Climatology and the cooperating Agricultural Experiment Stations for the progress which is being made in the research projects now under way. Available funds are insufficient to pay the costs of needed research. The importance of this research amply justifies the allotment of substantially larger amounts of money than are now available.

Committee Recommendations

I. Soil Moisture

Continue research directed toward comparing present methods of determining soil moisture.

- a) Pond vs. Penman formula. The Penman formula agrees quite well with measurements of evaporation in humid, cool climates but is of doubtful value in dry summer climates.
- b) Pan vs. Blaney-Criddle. Research is needed to serve as a basis for revising the Blaney-Criddle formula or in developing a new one which will render usable the pan data from class A evaporation stations in the West.
- c) Continue and extend the research being done by Palmer to determine such important points as the beginning of "drouth" and water requirements of major midwest crops. The Committee believes this project has great possibilities for developing valuable information.

- d) The neutron scattering meter shows much promise and work should be continued to develop this method of measuring soil moisture.
- e) Much more research needs to be done on moisture capacity for major soil types at different levels of fertility and at various depths to the maximum root penetration of principal crops such as corn, wheat, soybeans, oats, cotton and tobacco.
- f) Depth of water table below ground surface in wells is one measure used in western states in taking inventories of water resources. Features such as annual cycles and departures from a mean appear to be related to variations in precipitation. This procedure might well be followed in other parts of the country where existing records of wells are available or may be made at suitable intervals.
- g) The research being initiated at the Kansas Experiment Station to determine water evaporation from the soil by measuring eddy transfer of vapor must be adequately and properly instrumented if it is going to produce valuable information.

II. Soil Temperature

Soil temperature measurements are badly needed in the climatological program. These measurements should be taken over a network not less dense than the bench mark stations.

Maximum and minimum temperatures should be taken at standard depths, e.g. 10, 20, 50 and 100 cm. and, for at least half of the locations, at 200 or 250 cm.

Soil surface temperatures should be taken over wide areas by a radiant energy device from an airplane. This is an expensive instrument but the information obtained from its use by the Office of Climatology will amply justify the cost.

These measurements are essential to a clear understanding of the total energy exchange of the earth's surface.

- ## III. Soil moisture and temperature measurements are of great interest to a number of agencies such as the Forest Service and Soil and Water Conservation Branch, ARS. The Committee recommends that these agencies be invited to work with the Weather Bureau.

J. H. Longwell
Chairman

2. WESTERN REGIONAL TECHNICAL WORK PLANNING CONFERENCE FOR SOIL SURVEY,
January 27-31, 1958: We have received from Mr. Merle J. Brown, State Climatologist for Utah and Nevada, a report of Committee No. 9 of the above conference which lists the following problems:

- (A) Significant Variations in Climatic Factors Associated with the Transition from Predominantly Cool-Season to Warm-Season Grasses in the Plains.
- (B) What Climatic Factors Are Principally Responsible for a Marked Change in the Kind of Climax Plant Cover Associated with Identical Amounts of Annual Precipitation in the Plains, Mountains, and Western Slope Areas of the Central Rocky Mountains.
- (C) Missing Climatic Data.
- (D) Moisture Effectiveness and Conservation.
- (E) Soil Cover and Frost Risk.
- (F) Present and Past Climate As A Soil Forming Factor.
- (G) Defining Climatic Phases of Soils.
- (H) Yield Estimating Equations for Crops.
- (I) Refinement of the New Mexico Climatic Zone Map.
- (J) Need for Critically Evaluating the Relationship of Certain Climatological Indices to Soil Development.
- (K) Influence of Direction and Degree of Slope and Temperature.
- (L) Establishment of Key Species of Vegetation.

Key Items Recommended for Study in 1958

- A. The committee recognizes that a need exists for detailed maps characterizing temperature and precipitation in Utah and recommends that these be developed as a pilot project for developing techniques suitable for use in the entire Western States area. This work will be done under the supervision of Mr. Brown of the U. S. Weather Bureau with guidance from other members of the committee. It will be necessary to determine the best method of summarizing the data, to take into account the seasonal requirements of crops, and to devise methods of interpolating missing data, and to extend short term data to a longer normal period. Ways and means of obtaining some financial support for this work will need to be investigated.

- B. The committee wishes to call attention to the necessity for considering the availability of long time climatological data in the selection of sites for studying benchmark soils.
- C. It is recommended that attention be given as soon as possible to climatic conditions determining the extent of certain plant association areas mentioned by Heerwagen in items (1) and (2) of this report.
- D. The study of the relationship between yield of crops and climatic and soil factors in the Western Great Plains should be continued. In this connection it should be noted that two groups of research workers have recently become active in this field. These are the W-48 committee on climate in agriculture composed of Experiment Station Workers in the Western States and the Production Economics Section, ARS, at Ft. Collins under the leadership of L. G. Sittler.
- E. Preliminary work on cyclic salts in the coastal areas should be continued.

Should additional information be desired about any part of this report, it can be obtained from the chairman of the committee.

- 3. COPY OF "WEATHER" FOR COOPERATIVE OBSERVERS: Approval has been obtained to purchase a copy of "Weather" by Lehr, Burnett and Zim, for each non-institutional cooperative observer. The copies, when received, will be distributed by the WRPCs.
- 4. LAYOUT OF "CLIMATES OF THE STATES": The plan of layout for the "Climates of the States" is as follows:

Cover Page -

Narrative Climate of the State. Will start on bottom half of cover page and continue on following page(s).

Freeze Data Table. Will contain data for all stations in the state for which they are available. The table will show the following -

- Mean date of last Spring occurrence
- Mean date of first Fall occurrence
- Mean number of days between dates
- Years of record - Spring
- Number of occurrences in Spring
- Years of record - Fall
- Number of occurrences in Fall

for the usual freeze threshold temperatures of 32, 28, 24, 20, and 16°F.

Mean Temperature and Precipitation Table. These are the same tables that have recently been published as Letter Supplements. Known errors will have been corrected.

Normals, Means and Extremes Tables. These will be published for all first-order stations in the state. The table from the 1957 LCD annual will be used, plus footnotes beneath each table showing any "year" extremes that occurred in the locality for years prior to the period of record given in the 1957 table.

Isoline Maps. Five of these maps will be included, one each for -
 Mean Temperature, January
 Mean Temperature Range, January
 Mean Temperature, July
 Mean Temperature Range, July
 Mean Annual Precipitation

State Map - to show location of stations.

Tropical Storm Map - to indicate graphically the number of times destruction was caused by tropical storms, 1901-1955. It will be included only for the 28 eastern and gulf states shown by the chart to have been affected.

General Reference Notes - will comprise reference notes in detail and instructions for obtaining further data information.

State Climatologists have been asked to prepare the narrative summary. When the publication is ready to go to press we plan to send a copy to the appropriate State Climatologist for a final review of the completed job.

5. SUBSTATION SUMMARY PROGRESS. To date 173 of these summaries have been received. A breakdown by states having participated in this program shows -

Alaska	15	Louisiana	1	Oklahoma	6
Arkansas	6	Michigan	16	Oregon	12
California	5	Mississippi	2	South Carolina	18
Colorado	5	Montana	8	Tennessee	1
Florida	6	New Mexico	5	Texas	3
Georgia	9	New York	5	Utah	14
Illinois	3	North Carolina	9	Washington	5
Indiana	8	Ohio	7	Wyoming	2
Iowa	2				

Although local Chambers of Commerce and Trade Organizations are good prospects for cooperation in this program, we are also pleased with the results achieved from other groups. State agencies, universities and colleges, and public utility corporations have cooperated generally on a large scale. An advantage gained from cooperators such as these is that they do not limit themselves to one locality since their interests are usually statewide. Among this type of cooperators are the following:

State Development Board (South Carolina)
Georgia Department of Agriculture
Arkansas Agricultural Extension Service
Illinois State Water Survey Division
Tennessee State Planning Commission
Clemson College (South Carolina)
Montana State College
Port Huron - Marysville Industrial Development Corporation (Michigan)
Battle Creek Area Development Corporation (Michigan)
Utah Committee on Industrial and Employment Planning and University of
Utah Bureau of Economic and Business Research
Consumers Power Company (Michigan)

Accordingly in those localities where it appears to be impractical for a local group to sponsor such a summary, we should always attempt to obtain a sponsor with wider interests.

6. SPECIAL SEVERE WEATHER CARD: At the suggestion of a State Climatologist who is using one advantageously in his state, we are having printed a small franked postcard for the use of selected observers. A small supply of these cards, with the State Climatologist's address stamped thereon, would be sent to a selected observer. When a severe or damaging storm occurs within the observer's general area he would jot down preliminary notes on the "what, when, and where" of the storm. This would keep the State Climatologist informed at least of the fact that there was a storm, and where. Such information may often escape the local papers particularly if it is in a distant area of the state. If of sufficient import more detailed information could be obtained by sending the observer the WB Form 614-2 "Severe Storm Report" or, if necessary, visit the locality for first-hand information.

A supply of about 100 of these cards will be furnished to each State Climatologist when printed.

7. FURNISHING WEATHER DATA FROM SUBSTATIONS: Recently, a situation arose in one town where the cooperative observer refused to furnish weather information to the local newspaper for personal reasons. The editor, a State Senator, has attempted to force the Weather Bureau to require that the observer furnish the data. This seems like a good time to reiterate that our cooperative observers are under no obligation to furnish such data. That is, furnishing information is a voluntary service on their part and they need not make their home, etc. a public place (see C-0260, Weather Bureau Manual, Volume III). Our position is that the observations become public property when they are received by a Weather Bureau Office (WRPC, WBO, etc.). In this case, the observer was informed that he could not use the Weather Bureau as an instrument to further his personal arguments with the editor but that if the observer did not wish to furnish the data on the basis that it was an imposition on him, the Weather Bureau would not require that he do so.

8. COOPERATION WITH STATE HIGHWAY DEPARTMENTS: The following memo was written to the Ohio State Climatologist:

"On May 15 an informal conference was held at the University of Maryland on the general subject of the use of maleic hydrazide (MH-30) in various agronomic situations. The occasion was a visit from Dr. John W. Zukel, Biologist, U. S. Rubber Company and Mr. Paul W. Bohne, Jr., Area Supervisor, Research and Development Division, Naugatuck Chemical Company. Dr. O. E. Street and Dr. Jack Hoyert represented the Agronomy Department of the University and Mr. Milton L. Blanc was invited to represent the general field of climatological investigations.

Some work has been done at Maryland on the use of MH-30 to control tobacco suckers with encouraging results. Other applications such as control of strawberry runners, tree branches, and height of grass as well as weed control were discussed.

One promising field, the control of growth of grasses, is of special interest to highway maintenance officials. Under ideal conditions one application of the chemical will eliminate the necessity of mowing for an entire season. However, the cost of the chemical is such that the economic benefits are marginal and there is need for additional work on rates of application and on factors which influence optimum absorption by the plant. Preliminary studies indicate that microclimate plays a key role, connected closely with turgidity and moisture relations in the plant at time of application and for from six to twenty-four hours (possibly longer) after application. Temperature (or possibly sunshine) may also be a factor.

There may be an opportunity for Weather Bureau cooperation in research in this field at the State level at a number of points. We have discussed the general problem with Mr. Wilbur Simonson in the Office of Engineering in the Department of Commerce, Bureau of Public Roads. He was advised of our organization and it appears that the State Climatologists in some areas may be asked for assistance. We assured him of their interest in such applications of climatological information. He was also advised of our facilities at Asheville for data processing.

This appears to offer possibilities for a very useful investigation in the application of climatological information and we will be interested in any further developments."

9. PUBLICATIONS FURNISHED TO STATE AND AREA CLIMATOLOGISTS AND WRPC'S: The following publications have been distributed since CSM # 64 was issued:

"Chances of Dry Periods in Missouri" - Bulletin 707, University of Missouri, Agr. Exp. Station.

"Estimation of Rainfall Probabilities" by Friedman and Janes of Storrs.

"Effect of Changing Observations on Mean Temperature" by J. Murray Mitchell, Jr., reprinted from Vol. 39, No. 2 of A.M.S. Bulletin.

"The Distribution of Annual Tropical Cyclone Frequency" by H. C. S. Thom.

Research Report No. 1, "The Growing Season" by Wang and Suomi, University of Wisconsin.

Circular 64 - "Third Progress Report, July 1, 1956 through August 31, 1957" Illinois State Water Survey Division.

Report of Investigation 33 "Cloud Distribution and Correlation with Precipitation in Illinois", Changnon and Huff.

"The Evapotranspiration Problem" by van der Bijl.

Supplement No. 1 of W.M.O. Publication No. 49 (including definition of normals).

"Atlas of Five-Day Normal Sea Level Pressure Charts for the Northern Hemisphere" (not sent to WRPCs).

"Bibliography of Climatology and Human Comfort" - University of Washington.

"Visual Range in the Polar Regions with Particular Reference to the Alaskan Arctic" - by J. Murray Mitchell, Jr., reprinted from Polar Atmosphere Symposium Part I Metl. Section.

Translation of Budyko's book "Heat Balance of the Earth's Surface".

"The Climate of South Carolina", South Carolina Agricultural Experiment Station.

"Tenth Annual Progress Report, Missouri Climatological Research Project", University of Missouri and Weather Bureau.

"A Method for the Evaluation of Hail Suppression" by H. C. S. Thom, reprinted from Journal of Applied Mathematics and Physics.

10. NOTIFYING THE WRPC CONCERNING THE CD NARRATIVE WEATHER STORY: The following memo has been sent to all WRPCs:

"The suggestion has been made by the Southeastern Area Climatologist that each WRPC furnish the State Climatologist with a supply of self-addressed postal cards. When there is no story, the State Climatologist would only need to date and sign it. These cards could be used to notify the WRPC by the 10th of the following month whether or not a story would be furnished for that month. This sounds like an excellent idea to us as it will save typing a memo and an envelope when no story is needed (and several State Climatologists have no typing help). We suggest that you use the regular penalty cards and run them through your addressograph to print both your address and the message, something like:

Narrative Summary for the CD.
None required.
Summary will follow.
Please send these cards as soon as it is convenient."

11. ATMOSPHERIC DISTURBANCES: The following letter on this subject was written to an insurance company in reply to a query:

"Replying to your letter dated July 7, we are attaching the addresses of our state climatological offices, where details are available about individual storms within states. There is a question, however, about being able to provide a direct answer to any inquiries as to whether localized storms on specific dates were caused by the same atmospheric disturbance because of the vague nature of the term 'atmospheric disturbance'.

There exists no full agreement, either in the literature or in common usage, as to what constitutes an atmospheric disturbance. The phrase is frequently applied to large low pressure areas that are distinguishable on weather maps, but it is also applied to other atmospheric phenomena of both larger and smaller scales. It is not possible to give a strict meteorological definition of the term and it would be our recommendation that insurance companies discontinue its use."

12. PRESS CLIPPING SERVICE: The following memo was written to the Iowa State Climatologist:

"We have felt that the clipping services generally have been very advantageous to the Weather Bureau. The value of a good clipping service should not be measured entirely by the number of clippings submitted if the non-receipt of clippings can reliably be taken as an indication of the non-occurrence of unusual weather.

Since you feel that the present clipping service in Iowa is not worth-while, we suggest that you try to find another service that is better. If you can not do this, and if you feel that adequate reports for Iowa can be obtained without paid press clipping service, we have no objections to your discontinuing the service."

13. NAVAL OFFICERS VISIT, SAN FRANCISCO, WRPC: On July 15 and again on July 22, 1958 several naval officers from the Naval Post Graduate School at Monterey, California visited the WRPC to learn of that unit's operations. This has become an annual event.

14. NOMENCLATURE FOR NEW TEMPERATURE - DEW POINT SYSTEMS: The following memo, which has been sent to all RAOs, is reproduced here for information:

"It has been pointed out that the name 'telepsychrometer', with which we have previously referred to the new temperature-dew point systems, is not an appropriate term. Since the Dewcel method of obtaining dew point places the Dewcel in a class of instruments called hygrometers, the new system will hereafter be called a 'hygrothermometer'. We will appreciate your cooperation in using this term in all correspondence to field stations and in public relations, so that the name will be commonly accepted."

for *R.W. Schloemer*
H. E. Landsberg
Director, Office of Climatology

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