

UNITED STATES DEPARTMENT OF COMMERCE

WEATHER BUREAU
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IN REPLY, PLEASE ADDRESS
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FILE: 922 MEMO

MEMORANDUM

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

FROM : Director, Climatology

SUBJECT : Climatological Services Memorandum No. 83

(Climatological Services Memorandum No. 83)

1. DR. LANDSBERG REPORTS: The following items are taken from Dr. Landsberg's report of his recent trip to Europe:

A. Solar and Terrestrial Radiation: It appeared to me that a much greater interest in all phases of radiation existed both in the meteorological services and academic institutions in Europe. Particularly impressive was the beautifully equipped radiation station of the Belgian Meteorological Institute. Among the innovations is the radiation balance equipment with digital printout of data. Interesting work is underway in West Germany to measure earth surface temperatures from a jet helicopter by means of an infra-red sensor capable of measuring radiation temperatures to about 1° C accuracy. Regrets were expressed in several quarters that there are not more stations in U. S. territory measuring all elements of the radiation balance routinely and publishing the results.

B. Nuclear Products: Elaborate installations are in operation in various countries for monitoring radioactive products in the air. Primarily measured is Beta-activity. At most stations the equipment is connected to automatic alarm devices if activity exceeds a given value. In spite of the fact that present atmospheric values have gone down very substantially, nearly all installations were still being expanded. The weather services of several countries have taken over completely the monitoring of atmospheric radioactivity.

C. Meteorological Data Centers: The problems of collection and exchange of meteorological data were discussed with many colleagues. Opinions in this field differ widely. On one end it is desired to have a single center for all data on the other end simple collection of information by the responsible agency in its own archives was deemed sufficient. The compromise reached at the sessions of the International Association for Meteorology and Atmospheric Physics in Helsinki to have WMO collect and publish atmospheric radiation, nuclear and chemical data and keep track of aerological data is at least an interim solution. An important sector of opinion is that only a center with

WASHINGTON, D.C.
12-7-60

electronic machine facilities will be satisfactory for the future. The majority leans, however, to the stand that complete and prompt publication of data is the best answer.

D. Air Pollution Studies: Considerable effort is in evidence on studies of atmospheric pollution including atmospheric chemistry, quite aside from the radiological surveillance already mentioned. Interesting was the Belgian use of a vaseline coated aluminum sphere, exposed for 2 weeks, for determining dust pollution by wind direction. Another dust recorder impinges the impurities on a slowly moving film. This is covered by a second thin film and transported through a photoelectric recorder which registers the density of the deposit. Carbon Monoxide records are also maintained in several of the large W.-European cities. With the tremendous increase of slow-moving street traffic of cars and trucks the danger limit of 0.01% of this gas is occasionally exceeded.

E. Agricultural Bioclimatology: In this field very prodigious efforts are under way in most countries I visited. Most meteorological services regard this as one of their most important fields of investigation. I saw many elaborate microclimatic installations. Microclimatic mapping for agricultural land utilization is also a major effort. Statistical studies on the relation of plant growth and weather are under way at several places. Prediction of harvest dates is a particularly important aim because of the scarcity of harvesting and processing equipment which has to be shared by many farm units. Scientifically of greatest interest is the phenological chain of bioclimatic stations through Central Europe from Italy to Norway. All these stations use for the phenological observations the same species of genetically identical plants. This is a long-range program, arranged by international agreement among the participating nations.

F. Human Bioclimatology: This effort too is widespread and intensive. A great deal is devoted to the study of large groups of both healthy and sick persons at health resorts. Several of these studies are carried on for the compulsory health insurance organizations. Notable among early results is the frequently observed worsening of patients during the first week of climatic change, also the apparent need to extend vacation (or cure) periods to at least 4 weeks to accomplish objectively recordable benefits. The German Weather Service has worked out statistical relations between various weather situations and progress of a variety of organic diseases. These are based on 10,000s of cases. These relations are now being used to issue daily medico-meteorological forecasts to several large hospitals. These forecasts are available to the medical staff only. Interesting from our point of view were three papers presented by Israeli authors at Bioclimatic Congress on the use of the "Discomfort Index" (Temperature-Humidity Index). In essence these showed that a cumulative departure from a base value is linearly related to the water requirements of persons in the desert. Also the heat stress is well represented from a physiological point of view by the D. I.

2. ABSTRACTS: In order to help the abstract journals in their work, and to make information on published papers more widely available, every author of a professional paper should submit an abstract at the time that the paper comes in for review. The distribution of accurate and relevant scientific

information can thus be vastly improved.

In order that a standard format may be used for abstracts the following guide is given. This guide is taken from the Journal of the Franklin Institute, September, 1960, pages 257 and 258:

"GUIDE FOR THE PREPARATION AND PUBLICATION OF SYNOPSES

- 1) "Synopsis" is a term adopted by the Royal Society of London (in fulfillment of a recommendation of the Scientific Information Conference sponsored by the Society in 1948) and by the Unesco International Conference on Science Abstracting, 1949, to describe an author's summary of a scientific paper which is published simultaneously with the paper itself after editorial scrutiny by the editor of the journal in which it is published.
- 2) The purpose of a synopsis is not only to convenience the readers of the journal in which it is published, but also to reduce the cost and to expedite the work of the abstracting journals, and thus to contribute to the general improvement of informational services in the scientific field.
- 3) The synopsis should comprise a brief and factual summary of the contents and conclusions of the paper, a pointer to any new information which it may contain, and an indication of its relevance. It should enable the busy reader to decide more surely than he can from the mere title of the paper whether it merits his reading it.
- 4) The author of every paper is consequently requested to provide also a synopsis of it, in accordance with the following suggestions.

STYLE OF WRITING

- 5) Use complete sentences rather than a mere list of headings. Any reference to the author of the article should be in the third person. Standard rather than proprietary terms should be used. Unnecessary contractions should be avoided. It should be presumed that the reader has some knowledge of the subject but has not read the paper. The synopsis should therefore be intelligible in itself without reference to the paper. (For example, it should not cite sections or illustrations by their numerical references in the text.)

CONTENT

- 6) As the title of the paper is usually read as part of the synopsis, the opening sentence should be framed accordingly so as to avoid repetition of the title. If, however, the title is not sufficiently indicative, the opening sentence should indicate the subjects covered. Usually, the beginning of a synopsis should state the objects of the investigation.
- 7) It is sometimes valuable to indicate the treatment of the subject by words such as: brief, exhaustive, theoretical, etc.
- 8) The synopsis should indicate newly observed facts, conclusions of an experiment or argument, and, if possible, the essential parts of any new theory, treatment, apparatus, technique, etc.
- 9) It should contain the names of any new compound, mineral species, etc., and any new numerical data, such as physical constants; if this is not

possible, it should draw attention to them. It is important to refer to new items and observations, even though some may be incidental to the main purpose of the paper; such information may otherwise be hidden although in fact it might be very useful.

- 10) When giving experimental results the synopsis should indicate the methods used; for new methods the basic principle, range of operation and degree of accuracy should be given.

REFERENCES, CITATIONS

- 11) If it is necessary to refer in the synopsis to earlier work, the reference should always be given in the same form as in the paper; otherwise, references should be omitted.
- 12) Citations to scientific journals should be made in conformity with the standard practice of the journal for which the paper is written. (The International Conference on Science Abstracting has recommended the standard proposed by the International Organization for Standardization, Technical Committee 46, names of journals being abbreviated as in the World List of Scientific Periodicals.)

LENGTH

- 13) The synopsis should be as concise as possible. It should only in exceptional cases exceed 200 words, so as - among other things - to permit it, when printed, to be cut out and mounted on a 3 x 5 inch card.

PUBLICATION - LANGUAGE AND FORMAT

- 14) The International Conference on Science Abstracting has recommended that synopses be published in one of the more widely used languages, no matter what the original language of the paper, in order to facilitate its international usefulness.
- 15) The International Conference on Science Abstracting also commended the practice of certain journals in which all the synopses appearing in a single issue are printed together either inside the cover or with advertisements on the back in such a way that they can be cut out and mounted on index cards for reference without mutilating the pages of the journal itself. For this purpose the synopses should be not more than about 4 inches wide so as to be mounted on 3 x 5 inch cards.

3. VENEZUELA AGROMETEOROLOGY SEMINAR: The Government of Venezuela acted as host to an Inter-Regional Seminar on Tropical Agrometeorology at Maracay during the period September 15-28, 1960. The Seminar was organized with the assistance of the World Meteorological Organization (WMO) under the United Nations Technical Assistance program.

The experts invited to conduct the two-week series of lectures and work shops were Lionel P. Smith, England, Juan J. Burgos, Argentina, and Milton L. Blanc, USA. The meetings were conducted at the luxurious Hotel Maracay with field trips to Limon, Calabozo, Guarico, Rancho Grande, and other points of interest. Dr. K. Langlo represented the WMO Secretariat. Mr. Antonio W. Gold-

brunner, WMO Permanent Representative in Venezuela, Mr. Jesús M. Sánchez y Carrillo, head of the Agrometeorology Branch of the Department of Agriculture, and Mr. Leonardo Díaz Gánzalez of the Ministry of International Affairs, were the Organizing Committee and functioned actively and efficiently as "on-the-spot" hosts and expeditors.

Approximately 50 participants, representing eight Latin American countries, registered for the meetings. Dr. Darell E. McCloud, U.S.D.A., A.R.S., Beltsville, was the participant from the United States.

The lectures and workshops (which will be published later by the host government) covered a wide range of subjects including:

Principles of Agricultural Meteorology

Weather Forecasts for Agriculture

The Hydrologic Balance

Soil Temperature

Climatic Classification

Precipitation Statistics

Instruments and Observations

Aircraft in Agriculture

The Seminar had no formal status so far as drafting resolutions or recommendations is concerned. However, it did draw up a number of general conclusions for mutual assistance in future planning in this field. A condensed list of these conclusions follows:

1. Reports of investigations in agro-meteorology should include details regarding methods and conditions of measurements quoted.
2. Networks of precipitation stations in tropical areas should normally have a greater density than in temperate regions. Rainfall intensity data are needed in greater quantity.
3. Soil temperature data should be based on daily maxima and minima at depths down to 50 cm.
4. Several participants expressed need for closer collaboration within countries and between countries in the field of agro-meteorology.
5. All investigations into tropical agriculture (including plants, animals, diseases and pests) should include means for measuring the meteorological variables.

6. Irrigation plans should be based on some system of computing the hydrological balance.

The general consensus was that the Seminar was a success and that similar meetings should be held in other Latin American countries in future years.

4. TEMPERATURE AND PRECIPITATION PROBABILITIES FOR COUNTY CLIMATIC SUMMARIES
 Ref. MAL No. 39-60 and Item 2, CSM #82. The following are the instructions for working up the statistics for the 3rd, 4th, 6th, and 7th columns of the Table for Temperature and Precipitation described in the References.

Columns 3 and 4 of the temperature and precipitation table are designed as substitutes for the extremes of record, which are rare events, with the chance of occurrence depending on the length of record. It is proposed that these extremes be replaced by means of a somewhat more common event, having a specified chance of occurrence. It seemed useful to know, for example, just what temperature level, in two years out of ten, the four highest July maxima would equal or exceed. The 4th highest daily maximum of the month (the m-th value, where m=4) in contrast to the highest daily maximum itself, can be considered normally distributed, hence easily handled statistically to give exact risk statements.

Computation of the suggested risk statistics of the 4th highest maximum and the 4th lowest minimum is in two parts, first, extraction of the items from the basic data and, second, computing a mean and standard deviation. Each station month for the period of record of the selected station is visually scanned to get one each of these items. It is satisfactory to use published data as the source. Any convenient method and device to facilitate the work is, of course, used, but it does not seem necessary to formally array, in ascending or descending order, the maximum and the minimum daily temperatures for the month. In this scanning, duplicated values must be counted as individual items in the ascending or descending order of temperatures. Please note the examples given below, in which the underlined values would be the 4th highest. (Data are arrayed only for convenience in illustration).

105, 102, 101, 101, 101, 98,
 112, 108, 107, 105, 104, 104,
 102, 102, 100, 100, 99, 98,
 100, 99, 99, 97, 97, 95,

In scanning station months where some of the data are missing, the scanner should be reasonably sure that he is not overlooking the true 4th highest or 4th lowest. Whether this is so can be inferred by examination of adjacent stations. In a great many cases, the missing value(s) could not reasonably be the 4th highest or lowest even if all data were present. When, however, the contrary seems likely and the 4th highest might have occurred on a day with missing data, this particular station month should not be used.

One 4th highest maximum and one 4th lowest minimum are obtained from each

usable station month over the period of record used, and these comprise two lists of data for each calendar month. It would seem unnecessary that each list consist of more than 30 items, and it would probably be all right if the total were as few as 10 or 15 items. Computing mean and standard deviation of the items in each list locates the center and indicates the dispersion of these m-th value temperatures. At .84 standard deviations above the mean of the 4th highest maxima and at .84 standard deviations below the mean of the 4th lowest minima are the levels which are surpassed 2 years in 10 during the given calendar month.

Computing a standard deviation is not the only way to get a risk figure, but for normally distributed data it is certainly the easiest way to get a temperature value corresponding to a pre-set level of probability. Alternatively, the m-th values for a length of record could be arrayed and the 2 in 10 temperature values found approximately by counting off 20% of the items from the end value.

In columns 6 and 7, the spread, over the years, of the monthly rainfall totals is given. Since these totals in most cases would have a gamma distribution, it would be better not to express the dispersion as a standard deviation. Computation of the gamma parameters O and B has been greatly simplified in recent years by a technique developed by H. C. S. Thom. Where, however, Thom's method is felt to be too laborious, the 1 in 10 points for columns 6 and 7 can be obtained by arraying and counting.

5. PUBLICATION OF SUBSTATION SUMMARIES FOR ARIZONA: The Institute of Atmospheric Physics, University of Arizona, has prepared and published an excellent treatise entitled "ARIZONA CLIMATE". The volume is of loose-leaf construction and contains, in part, separate weather summaries, similar to our own substation climatological summaries, for 113 locations in Arizona. Although separates of these summaries have not been printed, microfilm copy of them will be prepared by the National Weather Records Center for use by the Arizona State Climatologist in making copies on the reader-printer as the occasion demands. The 113 summaries make a welcome addition to our growing list of this type of informative climatological issues which now total over 400. Requests for information on the availability of the individual summaries or of the publication itself, should be directed to the State Climatologist for Arizona.

6. SALE OF PUBLICATIONS BY STATE CLIMATOLOGISTS: It has never been intended that the State Climatologist operate a sales office for climatological publications. The State Climatologist's office does maintain a small supply of Climatological Data for the state and should also have a few copies of such items as "Bulletin W Supplement", "5-Year Summary of Hourly Observations", "Climates of the States", etc. These are to be used for local certification or as samples; they may be distributed without charge to qualified persons or when such action is the most efficient way of answering a request for data. They may also be given out on loan. Whether a publication is sold or dispensed without charge is left to the judgement of the State Climatologist operating under instructions in the Weather Bureau Manual.

The sale of government publications is the function of the Superintendent of

Documents who has a staff for that purpose. The State Climatologist can handle a cash sale when the time required for a purchaser to obtain the publication through the Superintendent of Documents would be an inconvenience. It is expected that some State Climatologists will handle more cash sales than others but we believe that such differences are unrelated to the efficiency of the personnel involved. There is no need to report publication sales in regular activity reports.

Cash payments must be scrupulously handled and forwarded as outlined in Para. H-1308, Weather Bureau Manual, Volume I. Records of sales should be kept as simple as possible. Inventory records of publications at field offices are not needed.

7. PREPARATION OF WB FORM 614-3: An occasional typographical error is unavoidable in preparing this form. The NWRC informs us that such errors are corrected either by erasure (not conducive to satisfactory printing results), or by application of a correction fluid as stated in the WB Manual, Volume III, Para. C-0513. The NWRC suggests, and we recommend, the use of one or another of a commercial preparation, which is quicker, neater, and more easily accomplished, for making these corrections. Two of these preparations, one under the trade name of KO-REC-TYPE, the other TIPP-EX, are more or less nationally known products and are probably available at your local office supply store. It may well be worth your while to investigate this locally.

8. USDA YEARBOOK: The 1960 USDA Yearbook "Power to Produce" is now published. We do not plan to obtain copies for State Climatologists since this issue is not closely related to their work.

9. WB FORM 1067 SUBSTATION SUMMARY OF CLIMATOLOGICAL DATA: Does any State Climatologist continue to use this Form? There have been no requests for it for several years.

10. SPACE AND FACILITIES FOR STATE CLIMATOLOGISTS: Wherever space is available at a regular Weather Bureau establishment, it is usually desirable to have the state climatologist located there. This provides ease of administration, capability of filling leave gaps and common sharing of stenographic and other assistance. There are also the major advantages that accrue from professional association.

At some of the newer airports space is available for State Climatologists, but must be leased at regular commercial rates since space is made available to the Weather Bureau only for "aeronautical connected services". Quite often other Federal space is available at 1/2 to 3/4 the charges of premium office space at airports. If public contacts can be met adequately by "in town" space, the savings may justify the inconvenience resulting from physical separation from the regular Weather Bureau Office.

In some states, the principal contacts of the State Climatologist may be with Agricultural Experiment Stations, Universities or Water Boards. Experience has indicated that some such cooperators are willing to furnish free space, telephone and typing service in order to secure the prestige and convenience

of having the State Climatologist near at hand. Certainly such offers should not be overlooked in consideration of meeting our obligations to the public at a minimum cost to the government.

11. DEPARTMENT OF AGRICULTURE LIAISON: At the invitation of Dr. H. C. Knoblauch, U. S. D. A., Mr. Lynn L. Means, Forecasts and Synoptic Reports, and Mr. Milton L. Blanc, Office of Climatology, spoke before an interested group of Agricultural Research Service officials on the general subjects of Weather Bureau service to agriculture in synoptic meteorology and climatology. Dr. Knoblauch is Assistant Administrator for Experiment Stations and Director of the State Experiment Stations Division in ARS. The seminar group consisted of the specialists in the several disciplines in agronomy (similar to the departments in a large well-organized agricultural college) who visit and assist in coordinating the research programs of the state experiment stations. They were aware of and keenly interested in many facets of the state and area climatologists' programs and were appreciative of the opportunities to expand the use of climatology in agricultural research.

12. DEGREE OF SLOPE AT SOIL TEMPERATURE STATIONS: Ref. CSM #72, Item 6. The slope at some soil temperature stations is carried in CD as a percentage value and in other cases in degrees. The percentage value should be used in all cases. For example, a slope of 5 feet per hundred (or 1 foot in 20) is a 5% slope.

13. PUBLICATIONS FURNISHED STATE AND AREA CLIMATOLOGISTS SINCE CSM #82: Estimation of Annual Fuel Requirements for Existing Dwellings - manuscript by H. C. S. Thom of the Office of Climatology.

Weather and Corn Production in South Carolina, Clemson Agricultural College.

Climatology at Work, edited by Dr. G. L. Barger, U. S. Weather Bureau.

H. E. Landsberg
for
H. E. Landsberg
Director, Climatology

GUIDE TO CLIMATOLOGICAL SERVICES
MEMORANDUM NO. 83

<u>Item</u>		<u>Page</u>
1	DR. LANDSBERG REPORTS.	1
2	ABSTRACTS	2
3	VENEZUELA AGROMETEOROLOGY SEMINAR	4
4	TEMPERATURE AND PRECIPITATION PROBABILITIES FOR COUNTY CLIMATIC SUMMARIES	6
5	PUBLICATION OF SUBSTATION SUMMARIES FOR ARIZONA	7
6	SALE OF PUBLICATIONS BY STATE CLIMATOLOGISTS	7
7	PREPARATION OF WB FORM 614-3	8
8	U. S. D. A. YEARBOOK	8
9	WB FORM 1067 SUBSTATION SUMMARY OF CLIMATOLOGICAL DATA	8
10	SPACE & FACILITIES FOR STATE CLIMATOLOGISTS	9
11	DEPARTMENT OF AGRICULTURE LIAISON	9
12	DEGREE OF SLOPE AT SOIL TEMPERATURE STATIONS	9
13	PUBLICATIONS FURNISHED STATE & AREA CLIMATOLOGISTS SINCE CSM #82	9