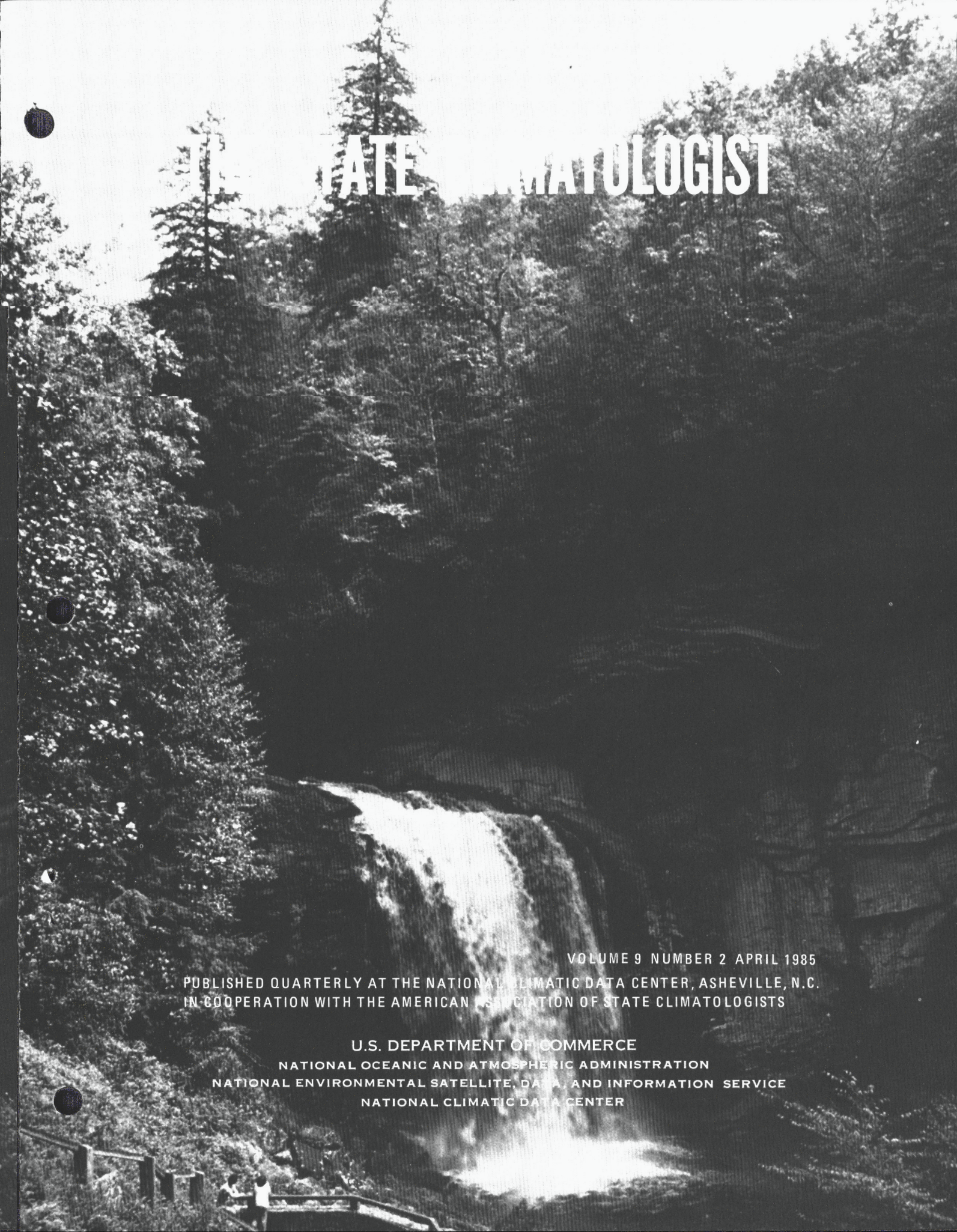

STATE CLIMATOLOGIST

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IN COOPERATION WITH THE AMERICAN ASSOCIATION OF STATE CLIMATOLOGISTS

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL ENVIRONMENTAL SATELLITE, DATA, AND INFORMATION SERVICE
NATIONAL CLIMATIC DATA CENTER

COVER PHOTO: Looking Glass Falls S.W. of Asheville, NC.

Photo by G.W. Goodge.

NCDC BRIEFS

The first member of the 1985 NCDC/State Climatologist Exchange Program has come to NCDC. Dr. Michael Folkoff (Assistant State Climatologist from Connecticut) came to develop a climatic data base for Connecticut that can be used as a data source for deriving long-term records for newly installed automated weather stations. The data base will also be used in the State's Geographic Information System (GIS).

ADDRESS UPDATES

ILLINOIS

Dr. Wayne M. Wendland
Illinois State Water Survey
2204 Griffith Drive
Champaign, IL 61820

TEXAS

Professor John F. Griffiths
Area Code has changed from 713 to 409

NORTH CAROLINA

Dr. Jerry M. Davis
Phone Number change from 919-737-2210 to 919-737-7243

NCDC'S COOPERATIVE DATA BRANCH

We are the Cooperative Data Branch (CDB) of the National Climatic Data Center (NCDC). Most of us are pictured in Fig. 1, 2 and 3, but some of us are camera shy. There are 29 people in our branch. We want you to get to know us and what we do.

We receive, pre-analyze, process, verify, and edit meteorological data. We lay out and coordinate the printing of publications and produce digital archive files. To see how all this is done, we'll take you on a trip thru CDB. You will arrive with data in its raw form and depart with data in a finished product. You will learn why CDB gives double meaning to the words Cooperative Data Branch.

Most of the data we work with is observed by NWS cooperative observers, thus the first reason for the word COOPERATIVE in our Branch name. Each month we receive, in round numbers, Fisher Porter punched paper tapes from 2,000 stations, Universal gauge charts from 800 stations, and 100 worked-up (79ID) precipitation forms. Each month 8,000 E15 forms arrive in our Branch.

Other types of data that we work with are monthly surface and upper air data from 2,000 worldwide stations, wind data from 21 RCS sites, and NWS maximum precipitation data. In fact, our data responsibilities go to the end of the Earth. Ice formations along the coastlines of the Antarctic and Arctic are data we work with as well.

The branch reorganized in January 1985. Those of you that knew us in the old days may be surprised to learn that we no longer have state desks. There really isn't a CD section or an HPD section anymore. Instead, there is a Data Processing Section. Charlotte Ward is the capable Section Chief. Thelma Dyer is a work leader for everyone who is assigned to work hourly precipitation data. Bill Parker leads the work done with Summary of the Day data. Members of the Data Processing Section will work with data from any and all of the 50 states, although we must admit there are states that some like to work on more than others. Betty Shuford just loves to work the arrays on Montana, for instance. Then there is a Publications Control Section headed by the ever-talented Jay Ziemianski. Alan McNab, the Branch Chief, and the members of his staff round out CDB.

Although there are sections in CDB, major emphasis is placed on the first word of our name. We are COOPERATIVE. Every member of CDB cooperates with every other member to do the best job we can with the data. Thus, the second meaning of our Branch name. For example, Jan Miller and C. W. Dykes no longer translate and verify the data, respectively, but each can take data through any stage of the processing, wherever their efforts are needed most. In fact, plans call for lots of cross-training in the variety of skills needed for processing summary-of-the-day and hourly precipitation data.

As data forms arrive in CDB, we note the date in a log book for that particular type of data. In the case of HPD data, the log is a VAX computer file, which is available to regional Cooperative Program Managers (CPMs). Practically every form receives some type of pre-analysis. We check E15 forms to make sure that the monthly total precipitation is entered and that the station number is correct and legible. The beginning dates and times of new Fisher Porter tapes are checked for continuity with the last month's date, ending dates, and times. Any comments on the general conditions of Fisher Porter tapes that may prove essential in verifying the computer edit later on

Fig. 1

From left to right Marjorie McGuirk, Vernell M. Woldu, Alan McNab, Roberta Corne, Charles G. Aiken, Lewis A. Blodgett, Jr., Sara Lackey, and J. D. Ziemianski.

Fig. 2

Mary Necko, Juanita M. Moore, Claudia N. Trout, John M. Cart, Jr., Irene Hunter, Betty Edstrom, Charlotte Ward, Bruce Emory, and Bill Parker.

Fig. 3

Myron Padgett, Jan C. Miller, Ted Burlew, Connie Gray, C. W. Dykes, Emily Atkins, Jean Carter, and Thelma Dyer. Not pictured Elizabeth Koon, Betty Shuford and Lanny Dimmick.

is entered into a comment file. Pre-analysis of data forms has proven to save time in the overall data processing routine.

After pre-analysis, data are entered into a computer - or should we say computers. Table I shows features and functions about the computers we use. Once data are in a computer readable form, data processing, in the purest sense of the word, truly begins. Errors in these digital data files could have been introduced during the manual entry phase or at the time of observation. CDB watches over a computer edit process to ensure that the data are as accurate as possible. Data are checked for internal consistency (e.g., maximum temperature greater than the minimum), temporal consistency (e.g., temperature change between hours within some reasonable limits), and spatial consistency (e.g., each station should compare well with surrounding stations). We then verify data flagged by the computer edit. For example, we check Summary of the Day variables with the station data listings and the arrays. Later we send the arrays to State Climatologists for additional insight.

When the data base is as close to being correct as we think we can get it, we put data in final forms, publications and digital files. All the edited data files are collated and merged to produce the digital data files. The data files are run through graphics programs to produce a publication image form. These images are then sent to a DICOMED to produce 35mm roll film. After one last visual check, we send the film to the printing plant to print the final publication.

Table II lists publications and associated digital files that are comprised of data processed by CDB.

What Table II does not list are all the other publications that are managed by the Publications Control Section. This section is the vital link connecting CDB to the print shop. Here we lay out the Cooperative Newsletter and BAPMON publications. We give one last check to 35mm film before it goes on its way to the printing plant. Not only all the issues listed in Table II, but also 98,000 Local Climatological Data issues, 10,350 Cooperative Newsletters, and 2,500 Storm Data publications are printed on our approval. We coordinate the revisions and reprinting of the Environmental Information Summaries. Just recently for example, Sarah Lackey has been drafting updates on the station location base maps and John B. McBroom (Fig. 7) has been entering updates to the Station History file.

A brief word about the Station History file will illustrate the cooperation among CDB. A Master Station Index (MSI) controls which stations will go through the Summary of the Day and Hourly Precipitation edits. The Data Processing Section edits the MSI as necessary to include station changes in that particular month's data. For example, we make an entry if a station changes recording gauges. It is only after B44 forms arrive that official changes are allowed to be made in the Station History file. All changes made in the Station History file are, on the other hand, immediately available to the MSI. All B44 forms are sent to us by CPMs.

That concludes our trip through CDB. We have enjoyed telling you about us and hope you enjoyed getting to know us and what we do. We will continue to work with State Climatologists, CPMs, and each other, to computerize and publish Cooperative Data.

Computers & Peripherals	Computer Functions
SPERRY 1100/62	
2 terminals	Station History updating Master Station Index updating Summary of The Day processing Array updating Digital data base formatting
DIGITAL VAX-11/780	
2 terminals	Hourly Precipitation updating Merges primary stations' hourly precipitation Log-in HPD data
ECLIPSE S-140	
7 terminals	Hourly Precipitation pre-analysis
2 digitizer boards	Universal gauge digitizing
1 digitizer board	Maximum precipitation work
2 Mitron translators	Fisher-Porter readings
9-track tape drive	Transfer data from ECLIPSE to VAX
DICOMED	
D148 recorders	GPO fiche production 35mm roll film production Publication - forms storaging

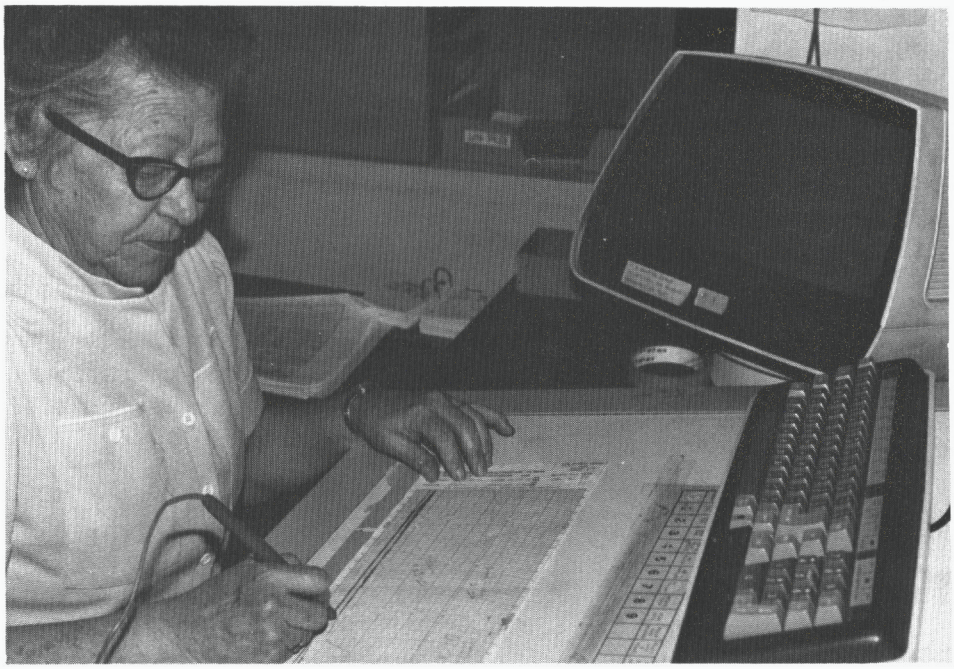
Table I: The features and functions of the computers CDB use.

Publication Name	Number of Issues Printed Per Month	Digital File Identification Number	Digital File Name	Volume of Date Per Month (Kilo bytes)
Climatological Data	42,000	3200	Summary of Day Coop	2,500
		3200	Summary of Month Coop	500
Hourly Precipitation	9,500	3240	Hourly Precipitation	500
		3260	15 min Precipitation	100
Monthly Climatic Data for the World	1,150	9643	Global Monthly Surface	1,500
		9642	Global Monthly Upper Air	1,000
		9767	Station History	5,000

Table II. Publications and digital files that contain data which CDB processes.

Fig. 4

Irene Hunter mounts a universal gauge chart on an Eclipse digitizer board which converts the analogue trace to precipitation amounts.



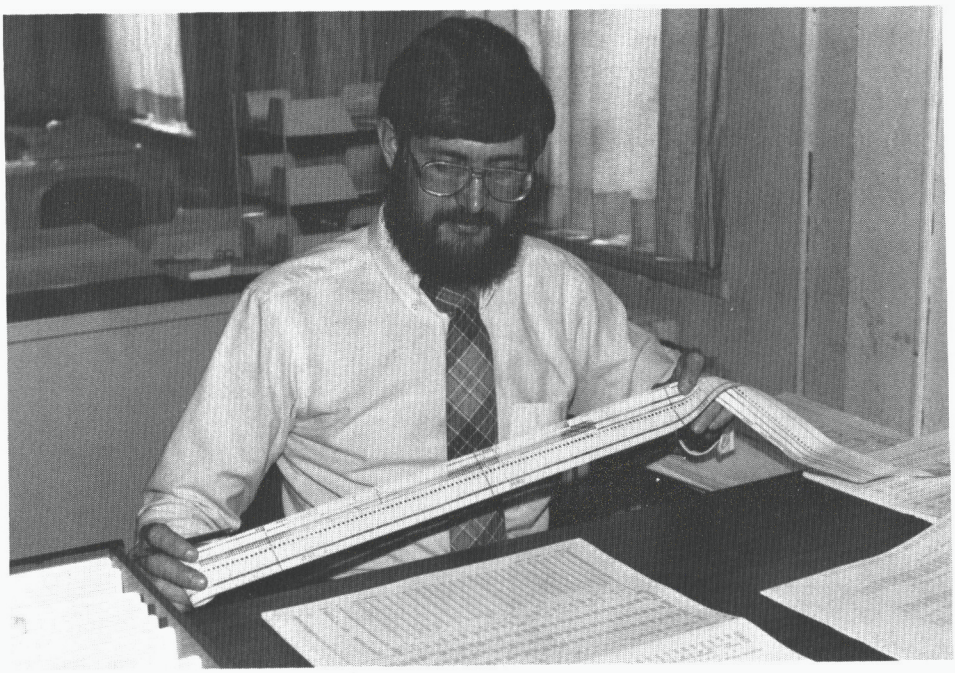


Fig. 5

The Fisher/Porter paper tape C.W. Dykes is working with has already been read into an Eclipse S-140 computer by a Mitron Translator. C.W. is searching a time period the computer listed as "missing" to see if an "accumulated" value can be entered into the record via a keyboard.

Fig. 6

Juanita M. Moore is working with the arrays. A station's EIS daily precipitation values are checked day by day against the computer listing if the total monthly precip. value fails a sum-check edit. Likewise, if temp. errors are indicated on the array, the values are validated with the E15 form.

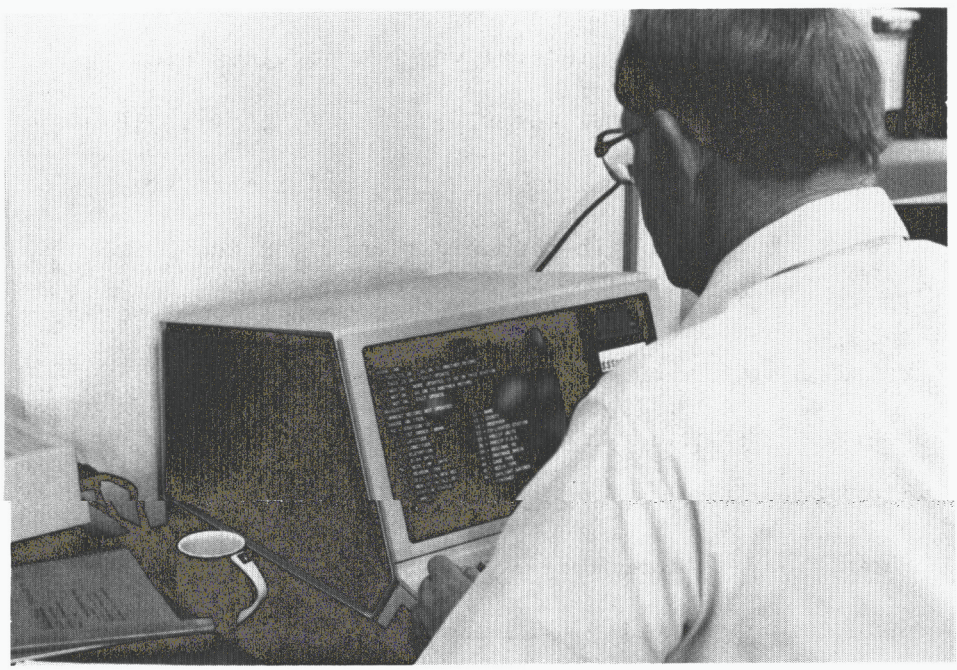


Fig. 7

John B. McBroom compares the information on B44 forms (e.g., changes in instrument types and locations, changes in observation times, closing and opening of stations) with the information stored in the Station History file and makes changes as necessary.

HOW STATE CLIMATOLOGY EVOLVED IN THE U.S.

by H. E. Landsberg

One can probably date the beginning of interest in climatology in the individual states to the establishment of a network of meteorological stations in the State of New York in 1825. The initiator was Simeon De Witt (1756-1834) who, as Surveyor General of the state, had begun making observations in Albany in 1798. In later years in his capacity as a regent of the University of New York, he secured instruments for the 36 State Academies (corresponding to present-day High Schools) and set up a system for uniform meteorological observations. In 1839 Pennsylvania followed suit by establishing similar stations under the supervision of the Franklin Institute in Philadelphia. Massachusetts made a somewhat abortive attempt to follow suit in 1850. The New York stations also faltered after De Witt's death but the remaining stations were incorporated into the cooperative observer network of the Smithsonian Institution in the late 1840s. This ended climatological data collection identified by states for awhile.

A revival occurred after creation of a federal weather service which was established by law and assigned to the Signal Corps of the U.S. Army in 1870. The reason for this assignment was twofold. The Signal Corps at that time

rk of telegraphic communications, and the false

y personnel under military discipline could be

ions at odd times and in remote places. The

vers was transferred from the Smithsonian

rps in 1874. But the Weather Service concentrated

k a back seat. Also, there

he agricultural interests

ngress also kept Signal

controlled the largest netwo

assumption was made that onl

relied upon to make observati

cooperative network of obser

Institution to the Signal Co

on forecasting and in its early days climatology too

was a strong feeling in the farming community that t

in weather and climate were being neglected. The Co

Service appropriations for weather work to a minimum.

This prompted some states in the agricultural heartland to supplement their meteorological needs by establishing state weather services. The first was Iowa in 1878. It was followed by Nevada. The Signal Service welcomed this development not only for the supplemental funds but also because they hoped to build some support against a rising tide of advocates to transfer the weather service from military to civilian administration. The Chief Signal Officer since 1880, Brig. Gen. W. B. Hazen, detailed Lt. H. H. Dunwoody (later Major) to assist states in establishing weather services. This was very successful in the farm states, and by 1885 Illinois, Indiana, Kansas, Michigan, Missouri, Nebraska, New Jersey, and Ohio had established such services. Maryland began somewhat later. Representatives from these state weather services met in Washington, D. C. in 1885 to align their activities and voice the concerns for forecasts and crop-related climate services. They also took over some of the administration of the cooperative observing network in their respective states. After General Hazen died in 1887, Brig. Gen. Adolphus W. Greeley (1844-1935) who had won fame as an Arctic explorer became Chief Signal Officer. At that time the Weather Service was even deeper in the civilian vs. military struggle. Acrimonious articles about prowess in forecasting between H. H. Clayton of the Blue Hill Observatory and H. A. Hazen of the Washington Signal Office were scattered in Volumes 8-10 (1886-1888) of Science. A strong lobby in Congress advocated a transfer of the weather tasks to civilian management. General Greeley was smart enough not to fight that effort, although he had a personal interest in climatology. In the 1888-1891 period he wrote several treatises dealing particularly with the drought-prone areas of the High Plains, the Northwest and the Southwest.

In 1890 the Congress passed the law transferring the Weather Service to the Department of Agriculture. The actual change-over took place in 1891, and

a fairly thorough reorganization took place. The then 48 states were divided into 46 sections for climatological purposes, with the New England States in one section and Maryland and Delaware combined into another section. Each section had a director, many of whom were located in the State capitals, especially in the Midwest. Their duties were supervision of the forecast activities in their sections, the supervision of the cooperative stations, and the compilation of climatic data. This system stayed essentially unchanged until 1954. Yet the work emphasis changed. In the earlier years many of the section directors took a great interest in the climatological activities and undertook notable climatological studies. The advent of aviation placed great new responsibilities on their shoulders. Many of them carried on valiantly. A few deserve special mention: Edward H. Bowie of California, Charles D. Reed of Iowa, Snowden D. Flora of Kansas, Isaac M. Cline of Louisiana, Thomas A. Blair of Nebraska, and J. Cecil Alter of Utah. As the last major climatological feat in the Department of Agriculture, all the section directors joined with a group of other distinguished government scientists to bring out that magnificent yearbook of Agriculture "Climate and Man" (1941). The guiding hand and many useful contributions of J. B. Kincer, Chief of the Bureau's Climate and Crop Weather Division, must also be acknowledged.

Then an era of deterioration struck, probably in part caused by the transfer of the Weather Bureau to the Department of Commerce in 1940 and the exigencies of World War II. After that war the only noteworthy climatological development was the automation of climatic data processing. This was essentially a product of the vast use of climatic information by the military during the war which necessitated the transfer of marine and foreign data to punch cards. On the other hand, the scientific climatological work became minimal. There remained some sparks in the Midwest. The North-Central Agricultural Experiment Stations started a climatology project, and the Weather

Bureau cooperated through an area climatologist, Dr. Gerald Barger, with that effort. But the Advisory Committee on Weather Services in its 1953 report "Weather is the Nation's Business" lamented that climatological work had shrunk to machine tabulations and other routines. The section directors had their hands full with aviation weather service and many had their offices moved to airports. Climatological work had been relegated to low priority and was often handled by a junior staff member. Climatic information service had become a nuisance for a busy 24-hour forecast office.

In May 1954 the writer was asked to become chief of what was then called the Climatological Services Division. It was a challenging task. After making a quick survey of the state of affairs, a program for climatology in the Weather Bureau was mapped out. It was submitted to the Chief of Bureau, Dr. F. W. Reichelderfer in a 7-page memorandum on June 15, 1954. It comprised a number of sections, dealing with the climatological publications, data analysis, acquisition of ocean and foreign data, establishment of a research program, and revamping of the management of the Division and also the training of scientific personnel for the climatological service.

The most revolutionary recommendations dealt with the field service. This part of the proposed program will be of most interest to the present state climatologists. It is therefore quoted in full.

> "It is quite evident that professional climatological service in the field is not on the same level as the synoptic service. Only a few field officials have adequate training or background in climatology. Consolidation of section centers also seems likely to result in loss of power rather than in more or better service to the public. The following would be the minimum requirements for improvements.

a. Establish four additional area climatologists.

   (1) NW area (emphasis on forecast problems)

   (2) SW area (emphasis on arid region problems)

   (3) S area (emphasis on marine problems)

   (4) NE area (emphasis on industrial problems)

b. Establish state and territorial climatologists in all states and territories.

c. Locate area and state climatologists where there is maximum opportunity for collaboration with state officials, state universities, agricultural experiment stations, etc.

d. Fill positions of area and state climatologists only with personnel having climatological background and experience.

e. Make climatological work the only function of state and area climatologists.

f. Set positions of area and state climatologists up at a good civil service grade level to permit employment of high-caliber professionals."

The memorandum also recommended that all routine work for preparation of data bulletins and all quality control and archival work be concentrated at Asheville.

Dr. Reichelderfer approved the recommendations, and to the end of his tenure as Chief of Bureau in 1963 gave unstinting support to what soon became the Office of Climatology. There was some resistance in the field, probably mostly because this was a "change" and the loss of the nice title "section director" was resented by some. In one state the local congressman objected

vociferously. But most meteorologists-in-charge were glad to get rid of responsibilities for climatology.

The plan was gradually implemented as funds and positions became available. You all know the sad sequel when personnel ceilings for NOAA and the weather service forced the collapse of the federal support for the state climatology program. You also know the painful reconstitution of the work with state support - back to where it started about a century ago.