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MINUTES OF THE 1994 AASC ANNUAL MEETING MADISON, WISCONSIN JULY 28-29, 1994

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Minutes of the 1994 AASC Annual Meeting Madison, Wisconsin July 28-29, 1994

The meeting was opened at 9:00 am by Jim Zandlo, President of AASC. After some brief comments by Pam Naber Knox about local meeting arrangements, Jim spoke for a few minutes on the state of climatology and our role in it. He emphasized the need to identify new sources of data and to make the data more accessible, both in time and in variety of formats. He pointed out the need to find better ways to describe the climate as well as the importance of fostering communication so that our needs, as well as the needs of the climate data users' community, can be identified. Finally, he closed with a brief overview of the agenda and some issues that we would be discussing at the meeting.

Thursday morning was devoted to presentations by federal agencies on their current climate programs. Phil Pasteris of the Soil Conservation Service described the current status of the PRISM project which includes: updated precipitation maps for every

state; an updated Climate Atlas; a national serially complete daily dataset for ecosystem modeling; quality control techniques of real-time data; and eventual Internet access. George Taylor, the Oregon SC and one of the leaders of the PRISM project, described the model that is being used to generate the state precipitation maps and showed examples of maps for the US, Idaho, and Oregon. They have five states in the West completed, and will begin the rest of the western US in FY94. The rest of the country will be started in FY95.

Kelly Redmond of the Western Regional Climate Center described drought management strategies for the West. He pointed out the problems with understanding precipitation variations in space and time with the variety of data sources available, as well as the difficulty of changing the public perception of water supplies. He believes that the coordination of climate activities is the biggest task. Kelly also noted that their work has shown that using standardized precipitation information for drought management is usually better than using Palmer drought indices.

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Edward O'Lenic of the NWS Climate Prediction Center (as it will be officially renamed in fall 94) described the coming changes in long leadtime climate forecasts. CPC will make forecasts for up to a year ahead and will begin to issue their long-term forecasts well ahead of the verification period. Many of their new forecasts are based on ensemble averages of many model runs, and also take advantage of improvements in predictions of sea surface temperature in the equatorial Pacific Ocean. They will also start to improve their "truth in labeling" by describing where they think the forecasts have skill and where they do not. He provided a preview of new products, which are also available in an experimental forecast bulletin published by CPC on a quarterly basis.

Norris Nielsen of the Tennessee Valley Authority provided an overview of the Committee on the Environment and Natural Resources and the status of their global climate programs. He described changes in the structure of the advisory councils and listed the cooperating agencies involved. Finally, he provided a catalog of all groups studying various aspects of global climate change: prediction, impacts, and policies.

Barry Rock, the new director of the GLOBE (Global Learning and Observations to Benefit the Environment) program, provided a summary of this new educational program introduced by Vice President Al Gore. The intent of the program is to get students in grades K-12 involved in environmental issues by having them collect environmental data to be used by scientists as ground truth or supplemental data for ongoing environ-

mental studies. They hope to have 500 schools involved across the country by 1995. Eventually, it will be an international program. If you are interested in more information, he can be reached at 202-395-7600 or by email at b_rock@globe.gov

Several state reports followed Dr. Rock's presentation; they are grouped together with all the state reports at the end of the meeting notes.

After lunch, Arnold Court and Paul Waite presented an eloquent and dramatic account of state climatologists' problems a hundred years ago. They described the early efforts to start state climate programs, with special emphasis on Gustavus Hinrichs and his heroic efforts to start the first state program. They also described Hinrichs' student, Nipher, and his development of the Nipher wind shield for rain gauges. They concluded by noting that there are still opportunities to use older weather data, and to learn from the original state climatologists' conclusions.

Following the presentation by Arnold and Paul, the annual AASC business meeting was held. The minutes of the business meeting follow the state reports. The regular meeting resumed on the following day.

Friday morning was filled with reports on a variety of climate activities at several federal and state agencies. Ken Hadeen of the National Climatic Data Center provided an overview of NCDC's operations and highlighted their emphasis on service. They had 105,000 contacts which required human contact in the first three quarters of FY94. The number varied widely from one state to another.

The Research Customer Services Group has been growing particularly fast. He noted that three new CD-ROMs are available and that NCDC is now accessible by MOSAIC, allowing Internet access to a variety of climate databases. He also mentioned their plans to archive ASOS and NEXRAD data. Ken also mentioned that four SCs are working under the SC exchange program at NCDC--Don Jensen, Wayne Wendland, Aulis Lind, and John Griffiths--and encouraged others to apply next year. The new building will be ready for occupancy in October or November.

Don Meyer of the Great Lakes Environmental Research Lab described data rescue activities in the Great Lakes states. They have gathered monthly temperature and precipitation data and comprehensive metadata for eight states (about 3000 sites) for the period of record to 1990. They are currently quality-controlling the data. Eventually, the data will be used to study lake levels and regional climate.

Dean Braatz of the NWS, Minneapolis River Forecast Center, described efforts to begin work on a snow and ice atlas for regions east of the Rockies. They held a preliminary workshop on May 19, 1994, to discuss strategies for dealing with quality control of snow data, period of record choice, and resources to complete the project. At present the implementation is uncertain due to funding problems.

After the morning break, Howard Johnson of Oklahoma updated the group on the Oklahoma Mesonet, which was commissioned in January 1994. They are currently operating over 100 sites measuring temperature,

humidity, pressure, wind, soil temperature, and solar radiation at 15 minute intervals across the state. He described some of the funding problems that had been overcome to get the system running, and noted that the data are available from a number of sources. Presently they are doing very little quality control, but are in the process of developing appropriate techniques based on comparisons with nearest neighbors.

Al Dutcher of Nebraska introduced a cooperative project he is working on with the Weather Channel about scheduling of lawn watering. Using a combination of FOUS data from the NWS and evapotranspiration models run locally, they are producing maps of water deficit and optimal watering rates, which will soon be provided to the Weather Channel for on-air broadcast. This project will help people to judge how much water they need to apply to their lawns without overwatering, which is especially important in areas of dry conditions.

Bruce Smith, an Atmospheric Environmental Resource Associate (AERA) from Wausau, Wisconsin, presented information on the American Meteorological Society's Project Atmosphere, which is jointly funded by NSF. The goal of the project is to improve and enhance earth science education at the K-12 level. Almost every state has at least one AERA, and he wanted to make sure that SCs know about this important educational activity. He suggested that we invite AERA representatives to next year's meeting, too. Bruce's phone number is 414-733-0205.

At lunch, Dr. Pao Wang of the University of Wisconsin Atmospheric and Oceanic Sciences Department gave a

humorous and informative talk on ancient Chinese climatology. He described the use of oracle bones and other climate records and how they are interpreted in the context of our present-day understanding of climate. He pointed out that the first "state" climatologists were actually kings, and so should be treated royally.

After lunch, an hour was set aside for computer demonstrations. Online databases available from the Midwestern, Northeast, Western, and High Plains Climate Centers were displayed, and stand-alone software such as the Midwestern RCC agricultural atlas were also demonstrated. In addition, Jeff Brown from ID Software Developers previewed their new database product, LIGHTNING.

A number of State Climatologists gave reports, and then after a break the final topic, the NWS modernization plans, were discussed. Bob Leffler of the NWS described a new project being developed to produce county-level temperature forecasts using NWS cooperative data in conjunction with the forecasts for nearby major cities. He described some of the problems that will need to be corrected before forecast equations can be developed, and pointed out that this will tie climatology back into forecasting. A pilot study is underway to look at physiographic regions in Maryland and proper assignment of counties to representative airport stations. Eventually, testing will begin in several other states, and will become operational if results continue to be positive.

Tom Blackburn of the NWS Cooperative Program listed a number of changes which will affect the cooper-

ative program; the collection of climate data, including the impacts of ASOS and ROSA; and changes in instrumentation. He described the current plans to replace Cooperative Managers with Hydromet Techs at forecast offices, and emphasized the need to train the DAPMs, not just the Hydromet Techs.

Greg Carbone of the University of South Carolina described a cooperative project between USC, the Southeast Regional Climate Center, the SC office, and the NWS using NEXRAD and GIS datasets. He provided an overview of NEXRAD products and discussed how the improved resolution of NEXRAD rainfall can help supplement and improve climate impact studies. He showed examples of a dam failure case study and soybean yield studies which incorporate both NEXRAD rainfall and soil variability from a GIS.

Following a few final remarks, Jim Zandlo turned the gavel over the Dave Smith, the new President, and the meeting was adjourned at 4:30 pm on July 29.

State Reports

New Jersey - Dave Robinson

The SC office is moving toward consolidation of climate activities, but is waiting to secure final approval from the dean. They have pressed CD-ROMs containing daily data from over 1000 stations; the data are unedited but are flagged for questionable values. Dave has become a major media contact, answering many questions about the Newark temperature and snowfall observations.

Missouri - Wayne Decker

A new Missouri Climate Center was approved by the Legislature and will become operational on July 1. They will be looking for someone to fill the role of director in the next few months.

Michigan - Fred Nummerger

He is running an environmental sensor comparison project at a site north of Grand Rapids. It will compare liquid-in-glass thermometers to MMTS, other aspirated and non-aspirated thermometers, and tipping buckets to standard rain gauges. They have already noticed some problems with hoar frost cutting off ventilation and sunlight reflecting off snow. He also mentioned that, due to the past cold winter, Michigan lost 95% of its peach production and many trees.

Idaho - Myron Molnau

He presented some information about temperature normals and probabilities of occurrence for calculating exceedance temperatures. He also described some wind erosion work; a new station network; projects on water rights and endangered species; and the possibility of new facilities next year.

Arizona - Tony Brazel

He provided a brief history of Arizona climate activities from 1971 to the present, and noted that Sandra Brazel had been with the office for 20 years. The climate group is presently called the Office of Climatology, and is in the Department of Geography. They

have developed a number of climate databases and an automated network, and are working on projects in precipitation archiving of Department of Water Resources data; the climate sensitivity of the Inner Gorge of the Grand Canyon; and an EPA project looking at the area near the border with Mexico at Nogales. Howard Crichfield sends his regards.

Illinois - Wayne Wendland

He is generating climate summaries for a number of stations around the state, and has finished nine so far. He is working on a three-year project reconstructing flood frequencies in the Midwest using tree rings from stands in flood plains. Last week he attended the National Water Quality Assessment (NAWQA) advisory meeting in Reston, Virginia, as a replacement for Pam Naber Knox, and wants to let SCs know that this major USGS project is underway. In the NAWQA program, 60 regions around the country were selected for intensive study on various aspects of water quality and quantity. Climate data will be included in the analyses of the sites.

Puerto Rico - Amos Winter

He started his program three years ago from scratch. He has 120 active coop observers, which is very high resolution considering the size of the island. His user requests are starting to increase, since the NWS now realizes that the SC office exists. Many of the requests are in Spanish. Parts of Puerto Rico are experiencing extreme drought. In San Juan water service is restricted to two hours every other day.

Maryland - Alan Robock

He has the SC title, but no release time and no money except for \$15K for a service assistant. He is working toward changing that as time permits.

Nevada - Hal Klieforth

They are fighting to get an increase to their modest budget. They have had drought in 7 of the last 8 years. The Truckee basin has a mesoscale network of 35 sites at 1-5 miles separations, ranging from 4,500-10,000 feet elevations. They are working on some snow studies looking at the temporal characteristics of tipping bucket rain gauges, and are dealing with the environmental impacts of using antifreeze in the gauges in winter.

California - Bill Mork

He noted that Jim Goodridge is moving from Chico to Mendocino. He reported that they received 60% of normal rainfall in 1994 so far, and that the drought continues. He also spent some time discussing the degradation of hourly observations with ASOS, particularly in lack of remarks on surrounding weather, and suggested that the ASOS needs to be augmented wherever possible.

ASOS Continuity Study - Norm Canfield

Norm described his activity on the frozen precipitation working group for ASOS, and said that the group strongly recommended that the universal gauge should be maintained at as many ASOS sites as possible, and that the evaluation of ASOS equipment should continue. Their long-term recommendation was to get rid

of the heating tipping bucket rain gauges and install Belfort rain gauges at forecast offices. They will continue to test optical rain gauge systems.

South Carolina - Dave Smith

He noted that the Georgia and Florida SCs are retiring. They are under new administration and are dealing with the changes wrought by that. He also noted that Alden and three other vendors will be looking for nodes for NEXRAD data. He briefly mentioned his work on the state Climate Change Task Force.

Colorado - Nolan Doesken

Tom McKee says hello - he started 20 years ago today. Nolan described his ASOS climatic data continuity project, and pointed out that ASOS reports cooler and drier conditions than the old system. They have received state funding to study extreme precipitation characteristics at higher elevations.

Business Meeting

The business meeting was called to order at 2:45 pm on Thursday, July 28. The first order of business was to approve the minutes of the last meeting. It was so moved and seconded, and the minutes were approved by voice vote.

The second item of business was the Treasurer's report. Pam Naber Knox reported that the balance of the checking account was \$3,474.33 and that of the savings account was \$10,161.10 as of July 19, not including meeting expenses for this year. The total was \$13,635.43, an increase of \$4,480.48 over the balance two years ago. This increase is due to the

lack of AASC-sponsored travel, surpluses in meeting accounts for the last two years, and low business expenses such as postage. The amount of money in the Treasury was discussed, but was generally considered to be appropriate for the size of our group. It was also determined that we should pursue a federal tax-exempt status (which was examined in the early 1980's but was not accomplished at that time). Wayne Wendland volunteered to get forms to fill out. They will be filled out by the new Secretary-Treasurer.

Under old business, Pam Naber Knox reported that AASC has had four honorary members in the past, and asked if we wanted to present honorary memberships to others. Discussion led to the general agreement that we should consider those who provided special service to the AASC, state climatology programs, and to a lesser extent, climatology in general. Fred Nurnberger and Pam Naber Knox will serve as the nominating committee. There was no other old business.

Under new business, nominations for associate members were noted by Pam Naber Knox: Alice Presley of Pennsylvania by Hal Klieforth, Russ Vose (soon to be of Arizona) by Tony Brazel, Don Meyer of Great Lakes Environmental Research Lab in Michigan by Fred Nurnberger, and Steve Meyer of Nebraska by Al Dutcher. It was moved and seconded that these new associates be approved, and they were approved by voice vote. Pam Naber Knox also noted that New Hampshire will be getting a new SC: Barry Keim.

Wayne Decker asked the AASC to consider extending invitations of

membership to Canadian provincial or regional climatologists. Discussion centered on whether they would be interested in joining, changes that would need to be made to the constitution, and how ongoing changes in the Canadian climate agencies' structure would affect things. Ken Kunkel volunteered to check with contacts on structural changes. Wayne Decker suggested that they be invited to next year's meeting. Ken Hadeen also mentioned that they would be having a series of meetings this fall with Canadian climatologists and would bring it up at that time. Representatives from the equivalent of CPC and NCDC would also be welcome.

A letter written by Nolan Doesken on behalf of AASC on the problems of the ASOS instruments was discussed. This letter stated our concerns over the inaccuracies of the tipping bucket rain gauge and the lack of solar radiation data. Ken Hadeen mentioned that the NWS had already decided to go back to universal rain gauges where they exist until they can improve the accuracy of the tipping bucket rain gauge. They are also looking into optical rain gauges. After protracted discussion, Don Jensen moved and Fred Nurnberger seconded that the letter be sent to the NWS to show our continuing concern with ASOS, after modification by a working group of Nolan Doesken, Mary Knapp, Norm Canfield, and Hal Klieforth. A friendly amendment was offered by Wayne Wendland to state that in the absence of an alternative, the present system be maintained. This was approved by voice vote.

Dave Smith asked about our participation in the modernization of the NWS Cooperative Program. He moved that the AASC endorse and

participate in a National Task Force organized by the American Meteorological Society to look at Coop Modernization, and to give authority to the Executive Committee to appoint a member to the Task Force. This was seconded and strongly supported by the group. It was suggested that some of our treasury be used to pay travel expenses for this meeting, if needed. The motion was approved by voice vote.

The next item of business was election of new officers. First, Wayne Wendland announced his retirement from the Nominations Committee, a post which he has held for several years. Don Jensen was approved to take his place. Keith Eggleston was nominated as the new Secretary-Treasurer, and Myron Molnau as the new President-Elect. The new officers were approved by voice vote.

The final item of business was to choose the meeting location for next year's meeting. Puerto Rico was nominated by Pat Michaels, and Asheville was nominated by Ken Hadeen. The vote was 7 for Puerto Rico, 15 for Asheville, so the meeting will be held in Asheville next year. It will be scheduled near the end of July to coincide with the Bele Chere festival which is held in downtown Asheville, if hotel arrangements can be worked out.

At the end of the business meeting, Dave Smith became the new president. The AASC heartily thanked Pam for her work for the last two years. The meeting was adjourned at 4:00 pm.

Nineteenth Century Challenges to the Iowa Weather Service

Imagine, if you will, establishing a state-wide weather service with the purpose of preparing a comprehensive study of the climate of that state without any promise of funding for weather instruments, staffing, training, offices, office equipment, printing or publication. Fortunately for the Iowa Weather Service (IWS) this seemingly impossible dream belonged to the brilliant, multitalented State University of Iowa Professor of Physical Sciences Gustavus Hinrichs. Dr. Hinrichs, educated at the University of Copenhagen, came to Iowa in 1861. Soon thereafter, he was appointed head of the newly created Department of Modern Languages (he published in at least four) at the State University of Iowa (SUI). In 1863 he became Professor of Natural Philosophy, Chemistry and Modern Languages (Iowa City Press-Citizen 1953). He was also one of the original eight members named to the faculty of the newly established medical school in 1870. In 1871 he became the Professor of Physical Sciences and Director of the laboratory. He was the second college professor in the United States to establish a physical laboratory for students in which they could experiment, and before the mid 1870's SUI was recognized as having one of the four leading science laboratories in North America.

The talents of this genius were well known at home and abroad. The SUI medical historian noted that "in 1872, 290 of the 400 students in the Univer-

sity were enrolled in his courses. The champions of the classical courses grew envious and with the accession of President Thatcher, the scientific course was relegated to a secondary position." In fact, in their angry envy, they made it a point to thwart and contain the ambitious and very capable Gustavus Hinrichs and they saw to it that he received no support in 1873 when he saw the need for the state climatological program nor in the period prior to 1875.

Professor Hinrichs, undaunted by the lack of support for the envisioned climatological program, issued his written call in August 1875 to "friends of scientific work...to secure as complete a history of the weather of Iowa as possible in order to furnish material for an exhaustive study of the climate of our state. On the first day of October 1875 actual and regular weather observations were begun at 60 stations which were distributed over all parts of Iowa, but closest together in the most densely populated parts of the state." (IWS, First Annual Report. 1876).

Professor Hinrichs described his volunteer observer corps as largely physicians, but coming from many walks of life. The volunteer observers bought their own weather instruments and paid their own postage to regularly mail their observations read daily at 8 am, noon, and 8 pm to the central observatory first located on campus, then in 1876 at his own home. The forms and observing format were supplied to the observers by Dr. Hinrichs. The Iowa observing symbols and definitions were those adopted for use in all countries by the International Congress of Meteorologists which met in Vienna, Austria, in September 1873. He organized the

State into 27 weather districts, using a planimeter to secure the best distribution of counties (IWS, First Quarter 1878). Timely weather reports were regularly released to the Iowa newspapers between the fourth and the seventh of the month following, which according to his account in the Iowa Weather Report "was long in advance of the monthly weather reports issued in Washington, D.C. (Signal Corps Weather Service) and which at the same time are naturally much more complete so far as our state is concerned."

The need for state weather services had long been obvious. Conceding the earlier organized attempts by a few of the Northeastern states, Dr. Hinrichs observed that there as no other state weather service in operation at that time. None of the prior efforts achieved the lasting success of Professor Hinrichs' single-handed launching of the IWS in 1875 although some were soon begun thereafter, modeled after his program.

One can only conjecture what motivated Gustavus Hinrichs to undertake the considerable task of organizing and operating the Iowa Weather Service without support and very little encouragement. Was his interest sparked by his association with SUI Professor Theodore S. Parvin, the first volunteer weather observer in Iowa who maintained records from 1838 to 1874, or was it his own weather observations at Iowa City from 1871? Possibly he may have come in contact with the 15 years of noninstrumental weather records (1582-1597) kept at Uraniborg by the famous Danish astronomer, Tycho Brahe; those records were studied and published in the 19th Century (Dictionary of Scientific Biography). Per-

haps all or part of these reasons shaped Dr. Hinrichs resolve to overcome what may well be the greatest set of challenges in the establishment of any state weather service.

In the 1876 and 1877 reports of the Iowa Weather Service appended to the Iowa Agricultural Society respective annual reports, Professor Hinrichs noted that the continued expenditure of his considerable time and money to operate the IWS would be imprudent for him.

In 1878, the sought after state support was granted by the 17th General Assembly (Chapter 45) to establish "at Iowa City a Central Station for the Iowa Weather Service, with Gustavus Hinrichs as the director thereof... The duties of said director shall be to establish volunteer weather stations throughout the State, and to supervise the same." The director was expected to analyze the data and prepare the quarterly and annual reports for publication. The act provided \$1000 annually to pay for actual expenses and clerk hire but no salary was to be paid the director nor the volunteer observers (IWS, First Quarter 1878). Through his entire tenure as director from 1875 to 1889 Dr. Hinrichs never received remuneration for those dedicated services so freely given to the Iowa Weather Service.

In 1879 Gustavus Hinrichs stretched his budget to enroll a total of 145 observers who signed a training agreement and reported their observations. In April 1879 he circulated a call for crop observers and initiated an abbreviated crop reporting service which was to function so well the following year that the Iowa Agricultural Society appropriated funding to run it in their organization in 1881.

In 1879 he had a three story observatory building erected at the northeast corner of his home which was to serve as the Central Station until 1889, which for the first time provided a central location for the several weather instruments utilized, served as an observatory, provided offices and storage of the ever increasing number of weather observations gathered in Iowa (IWS First Biennial Report).

The IWS Second Biennial Report (1881) narrates the first general distribution of IWS purchased weather instruments in early summer 1880 which totaled 36 thermometers with shade, 18 psychrometers with shade (dry and wet bulb thermometers), and 8 evaporimeters. He presented the well documented notable storms of 1878 including the twin twisters of Easter Sunday, April 21, 1878 over western Iowa. In the same report Hinrichs states: "In Missouri, Nebraska, Kansas, and New Jersey, a state weather service has been organized similar to our own, and in several other states efforts are being made in the same direction. While serving as a model at home our Service enjoys the highest consideration abroad." The IWS Third Biennial Report (1883) listed the distribution of 31 rain gauges, 39 snow gauges, 5 thermometers with shade, and 2 simple barometers placed with selected volunteer observers. In 1883 he reported 105 volunteer weather observers regularly reporting to the Central Station.

The IWS also gathered a variety of scientific data in addition to the weather observations including ozone measurements, magnetic measurements, sunspot observations, earthquake accounts, and notes concerning

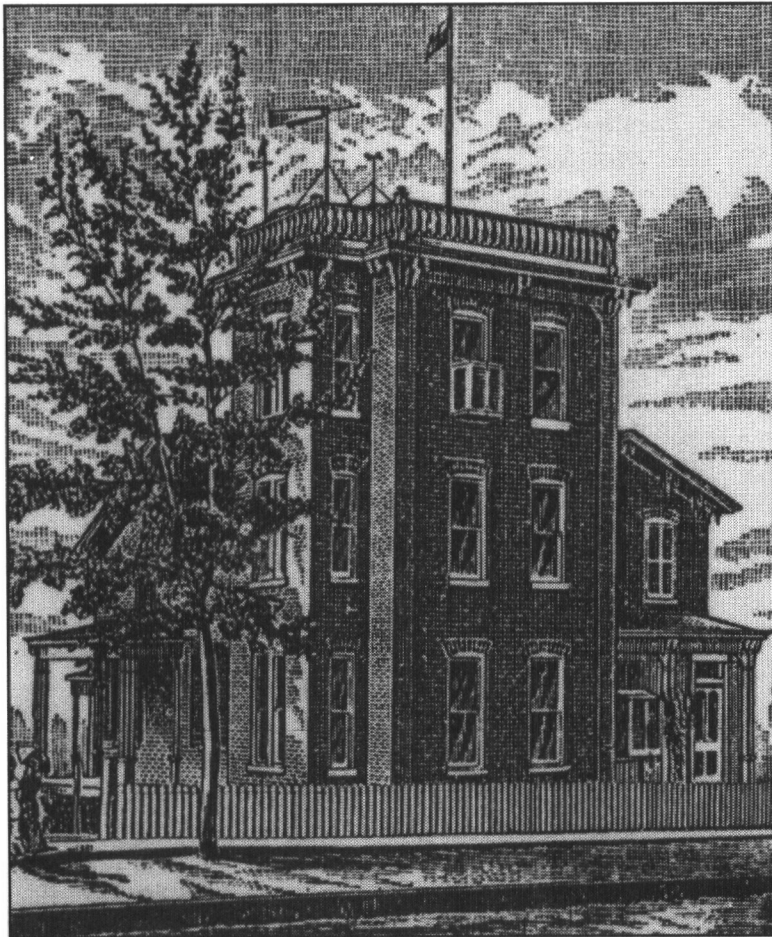
the Amana meteorite fall of February 12, 1875 consisting of about 100 samples and 1000 pounds. Hinrichs also prepared various climatological maps and analyses, a number of severe storm analyses, and taught meteorology classes at SUI from 1879 until his departure from the University in 1886.

In 1879 Hinrichs displayed the Signal Corps weather signal flags but discontinued that practice before long, as he came to view their predictions as unreliable. In August, 1883 he spoke to the American Association for the Advancement of Science in regard to the unreliability of the flag forecasts and in the IWS Report (1886) he devoted a few pages to this subject which seems to indicate a widening gulf between the two weather services and may, at least, partly account for the lack of distribution of his Rainfall Laws which was to be a USDA Weather Bureau bulletin for release in 1893.

Interestingly, Gustavus Hinrichs utilized his many talents to establish and continue a lasting state weather service that today is the longest continuously operating state weather service, the first established west of the Mississippi River, and the only one in existence when established. Yet this most productive, capable genius whose abilities were recognized at home and abroad for his numerous accomplishments including the writing of some 300 publications and 25 books encountered considerable conflict with other faculty. His conflicts probably began in the early 1870's when jealous faculty succeeded in reducing his nationally recognized physical science program. In the

medical school Peterson (1952) writes that "Gustavus Hinrichs, Professor of Physical Sciences and one of the ablest of the faculty, was in constant conflict with his associates and particularly antagonistic to (the Medical School Dean) Dr. Peck." In 1886 he was dismissed and he retaliated with a bitter attack on the University, the Medical School and Professor Peck. His charges were ably prepared and an investigation could not be avoided. The final outcome upheld the dismissal of Gustavus Hinrichs, but found some of his points valid which required University adjustment. Dr. Hinrichs continued to lead the Iowa Weather Service until his departure for St. Louis University to assume his appointment as a professor of chemistry in 1889 where he served until his retirement in 1907.

Fortunately, the State of Iowa appointed a successor in 1890, J. R. Sage as the new director and the Signal Corps detailed Dr. George Chappel as the assistant director of what now became the Iowa Weather and Crop Reporting Service. The Iowa Weather Service survived the challenges of creation and existence because of the tenacity, abilities and sacrifices of Gustavus Hinrichs and Iowa remains deeply indebted to this far-sighted scientist. He must have favorably viewed the transition of the operational program into the capable hands of Dr. George Chappel who was associated with the program until 1918. Today many, if not all, state climatologists must empathize with the trials and vision of Gustavus Hinrichs as they, too, struggle to establish programs so vitally important to our nation and to each state.



IOWA WEATHER REPORT. 1882

The Central Station of the Iowa Weather Service occupies the third story and flat roof or terrace of the residence of the Director, represented in the adjacent cut.

From the terrace a fine view of the entire landscape and a free view of the sky is had, the building standing near the edge of the bluffs east of the Iowa River, in Iowa City. On this terrace are placed all instruments requiring full exposure. The top of the flag staff is 50 feet above ground. The room immediately below this roof is the observatory proper. From its windows the sky is freely visible in all directions, and the room is now well filled with meteorological instruments and collections; among the former may be mentioned a self-registering barometer and thermometer of Richard Freres, Paris; while the latter contains a choice collection of meteorites from nearly forty localities. Three rooms on the second floor comprise the Central Office proper. The main office is immediately below the observatory, in the three story addition, erected 1879. The file of the reports from the observers is the most valuable object in these rooms.

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