THE STATE AGRICULTURAL COLLEGE
OF COLORADO.

THE THIRTEENTH
ANNUAL REPORT

OF

The Agricultural Experiment Station

FOR 1900.

THE STATE AGRICULTURAL COLLEGE.

THE AGRICULTURAL EXPERIMENT STATION

Fort Collins, Colorado.

BOARD OF CONTROL:

THE STATE BOARD OF AGRICULTURE.

Executive Committee in Charge.

Hon. P. F. Sharp, Denver, Chairman.

Hon. J. L. Chatfield, Gypsum. Hon. B. F. Rockafellow, Canon City.

Hon. Jesse Harris, Fort Collins. Hon. P. A. Amiss, Pruden.

Station Staff.

L. G. Carpenter, M. S. ..... Director and Irrigation Engineer
C. S. Crandall, M. S.* ..... Horticulturist and Botanist
C. P. Gillette, M. S. ..... Entomologist
W. P. Headden, A. M., Ph. D. ..... Chemist
W. W. Cooke, B. S., A. M.† ..... Agriculturist
B. C. Buffum, M. S.‡ ..... Agriculturist
J. H. Cowen, B. S., M. A.§ ..... Horticulturist and Botanist
W. Paddock, M. S.‡ ..... Horticulturist and Botanist
R. E. Trimble, B. S. ..... Assistant Meteorologist and Irrigation Engineer
F. L. Watrous ..... Assistant Agriculturist
L. A. Test, B. M. E., A. C. ..... Assistant Chemist
E. D. Ball, M. S.‖ ..... Assistant Entomologist
C. H. Potter, M. S. ..... Assistant Horticulturist
F. C. Alford, B. S. ..... Assistant Chemist
Joseph Lownes, B. S.¶ ..... Assistant Chemist
E. S. G. Titus, B. S. ..... Acting Assistant Entomologist
H. H. Griffin, B. S. ..... Superintendent

Arkansas Valley Sub-station, Rocky Ford.

J. E. Payne, M. S. ..... Superintendent

Plains Sub-station, Cheyenne Wells.

Officers.

President Barton O. Aylesworth, A. M., LL. D.

L. G. Carpenter, M. S. ..... Director
A. M. Hawley ..... Secretary
L. M. Taylor** ..... Stenographer and Clerk
W. R. Headden, B. S. ..... Stenographer and Clerk

* Entered Government service July 1, 1900.
† Resigned September 1, 1900.
‡ After September 1st.
§ Elected July 2; died July 12, 1900.
‖ Absent on leave from Oct. 1.
¶ Died December 9, 1900.
** To May 1, 1900.

LETTER OF TRANSMITTAL.

To His Excellency,

CHARLES S. THOMAS,

Governor of Colorado:

In accordance with the act of congress, which requires a full and detailed report of the operations of the experiment station to be made annually to the governor, I have the honor to present herewith the thirteenth annual report. The financial statement is for the United States fiscal year, ending June 30, the other operations being reported substantially for the calendar year.

Respectfully submitted,

L. G. CARPENTER,
Director.

The Agricultural Experiment Station,
State Agricultural College,
Fort Collins, Colorado,
December 22, 1900.

SECRETARY'S FINANCIAL STATEMENT

OF THE

EXPERIMENT STATION FUNDS.

FOR THE FISCAL YEAR ENDING JUNE 30, 1900.

RECEIPTS.

	Hatch Fund.	Special Fund.	Total.
United States treasurer	$15,000 00	.....	.....
Balance on hand July 1, 1899	.....	$ 391 69	.....
Rent, farm and miscellaneous sales	.....	1,133 22	.....
Total	$15,000 00	$ 1,524 91	$16,524 91

DISBURSEMENTS.

Salaries	$10,394 06	$ 372 12	$10,766 18
Labor	2,320 18	116 30	2,436 48
Publications	644 90	381 10	1,026 00
Postage and stationery	194 00	16 28	210 28
Freight and express	33 14	1 65	34 79
Heat, light and water	2 08	3 30	5 38
Seeds, plants and sundry supplies	265 29	24 68	289 97
Fertilizers	55 05	.....	55 05
Feeding stuffs	14 00	60	14 60
Library	10 75	.....	10 75
Tools, implements and machinery	128 56	7 25	135 81
Furniture and fixtures	46 64	32 30	78 94
Scientific apparatus	81 03	2 50	83 53
Live stock	42 75	.....	42 75
Traveling expenses	652 13	97 10	749 23
Contingent expenses	54 00	.....	54 00
Buildings and repairs	61 44	152 26	213 70
	$15,000 00	$ 1,207 44	$16,207 44
Balance on hand July 1, 1900		317 47	317 47
Totals		$ 1,524 91	$16,524 91

REPORT OF THE DIRECTOR.

The agricultural experiment station, in accordance with the law of congress, is made a department of the State Agricultural College. By its fundamental act the Agricultural College was required to do considerable experimental work, so that the passage of the Hatch act by congress did not inaugurate agricultural experimentation at the Agricultural College but endowed work for that particular purpose. In furnishing this annual income, the government made certain conditions, which were accepted by the state legislature by act of 1889.

The experiment station is the special organization for carrying on the work of experimentation and as distinct from that of teaching. Nearly every member of the staff of the experiment station is also on the staff of instruction, and where this is the case, the salary is borne jointly by the two funds. While sometimes the demands of the station work and those of instruction seem to conflict, there is no doubt that the association of the college and station has been of benefit to each; to the station because it has thus found an organization already in existence, with high ideals, with equipment of building and libraries, and much apparatus available for investigation; and to the college because it secures the inspiration which comes only from contact with scientific problems at first hand. The connection has enabled both to secure men which neither could alone. It has also enabled the college to meet one of the purposes of institutions of learning—the development as well as the dissemination of knowledge.

The station has it own executive head, termed the director. Since September, 1899, this has been separate from the presidency of the college, as the experience of other states has shown to be desirable. The director is the official head of the station, has charge of matters relating to it, the authorization of expenditures, preparation of plans in conference with the staff, and subject to the approval of the executive com-

mittee. As the station as a whole is termed a department of the college, the branches of the station have been termed sections, directed by a specialist. The officers are the agriculturist, the horticulturist, the chemist, the entomologist and the irrigation engineer, with assistants. There are two substations—one in the Arkansas valley at Rocky Ford, one on the plains at Cheyenne Wells.

The regulations of the station, as established by the State Board of Agriculture, and substantially following the suggestions laid down by Director A. C. True, of the office of experiment stations of the Department of Agriculture, are given in full. As compared with the previous loose organization, they place added responsibility on the director, and give him correspondingly greater power.

REGULATIONS OF THE STATE BOARD OF AGRICULTURE GOVERNING THE EXPERIMENT STATIONS.

"*Resolved*, That the following communication from the Director of Experiment Stations of the United States be spread on the records and adopted, as expressing the future policy of the board regarding the work and organization of the experiment station:

U. S. DEPARTMENT OF AGRICULTURE,
OFFICE OF EXPERIMENT STATIONS,
Washington, D. C., August 19, 1899.

HON. P. F. SHARP,

President of the Board of Agriculture, Denver, Colo.:

Dear Sir—Referring to our recent conversation regarding the organization and work of the Colorado Experiment Station, it seems to me that the following points should especially engage the attention of the governing board in considering the reorganization of the station:

1. The station is, under the law, a department of the college, and as such should have an organization which will consolidate it and enable it to work as a unit. Experience shows that this can best be done by giving the station its own executive head (a director), and organizing a staff to work under his immediate direction.

2. The director should be made fully responsible for the planning and carrying out of the work of the station, for its expenditures and publications, and for the management of all business details, and he should be given ample authority for these purposes. The board should look to him for the initiative in all matters relating to the station, including the nomination of members of the staff, and should ordinarily confine

itself to the appointment of the officers of the station and passing upon the plans for work and expenditures submitted by the director, through the president of the college, and auditing accounts. The director and other chief officers of the station should be chosen to serve during good behavior and efficiency, and the plans of work and expenditures should be submitted to the board annually.

3. The members of the staff should be individually responsible to the director as regards station work and should be held to the performance of work ordered by the director, which would often involve the co-operation of several members of the staff. As members of the station staff, the professors should be distinctly subordinate to the director. In this respect they should hold a different position as regards station work from that which they hold as instructors in the college. Thus, the professor of chemistry is the head of the department of chemistry of the college, as far as instruction goes, and as such is subordinate only to the president of the college, but as chemist of the station he should act under the orders of the director.

4. The station council should be simply an advisory body, holding meetings for consultation on station interests, but voting, if at all, merely to express opinions.

5. The general plan of expenditures should be drawn up annually by the director after consultation with members of the staff, and approved by the board. This should include estimates for salaries, expenses of the several departments, publications, etc. There should always be a certain reserve fund, to be spent at the discretion of the director, to meet emergencies arising during the year.

Expenditures should be made on requisition drawn by the different members of the staff and approved by the director, and all bills should be approved before payment by the director. The accounts and vouchers for each year should be finally audited and endorsed by a committee of the governing board.

6. The main work of the station should be along one or two lines, and all members of the staff should co-operate in this work as far as practicable. This need not exclude smaller pieces of work in a few other lines, and it is well for each department to have some work in which it alone is concerned. In Colorado it seems natural and desirable that the station should concentrate its work on irrigation problems, and it should be a leading authority on these problems.

Plans for the work should be carefully drawn up annually by the director, after consultation with members of the staff, and when approved by the board should be carried out carefully and vigorously. Careful attention should be given to the proper recording of work, and the station records should be preserved in fireproof safes or vaults.

7. *All* the work of the station, wherever conducted (whether at Fort Collins or in other localities in the state), should be under the immediate charge of the director, or such member of the staff as he may assign to have charge, and the director should be made responsible for the management of all work without regard to locality. Sub-stations are not con-

templated by the Hatch act, and have generally proved very expensive and of little value, those in Colorado not being exceptions to the rule.

The station should work for the general interests of the agriculture of Colorado and should carry on its investigations wherever they can best be prosecuted, but should be free to move its field work from point to point as the requirements of the work may demand. It is not fair to the farmers of the state to maintain expensive sub-stations in two or three favored localities. The amount of field work to be done at Fort Collins should be determined by the nature of the investigations pursued by the station at any time and may be relatively small. If the station is organized to pursue a series of *special investigations* for the benefit of Colorado agriculture there will be little difficulty in deciding where the work can best be done. The location of the work in any given instance should, of course, be left to the director and other expert officers of the station.

I am not sure I have covered all the points you desired me to touch upon. I shall, of course, be glad to write you further at any time.

Very respectfully yours,

(Signed) A. C. TRUE.

Resolved, That in order to carry the foregoing recommendations into effect, the following regulations be adopted:

1. That the experiment station shall be a department of the college (as provided by law), with the director as the responsible head. The heads of the sections, with the president of the college and the secretary of the State Board of Agriculture, shall constitute the advisory council to meet with the director from time to time for mutual consultation and consideration of station interests.

2. Excepting for the year 1900, for which year the executive committee will act, in March, for the board, the director shall prepare and submit to the board, at its annual (December) meeting, after consultation with members of the staff, plans for the station work and estimates for the expenditures for the following year. After approval by the board, it shall be the duty of the director to see that such plans are duly carried out, and thereafter, such work wherever carried on shall be under his immediate charge, or such member of the staff as he may assign to it.

3. Expenditures from the funds under station control shall be on requisition signed by the director, and the bills approved by him before being audited by the executive committee and paid. In the absence of the director at or near the close of the month, some other member of the staff may be designated by him to act in his stead in this regard.

4. Bulletins or other regular publications of the station shall be printed on the approval of the director and authorization of the executive committee. The printing of these shall be done, where possible, on contracts made by the director at the lowest figure obtainable on competitive bids for such work upon uniform specifications.

5. That the director of the station be authorized and instructed to lease such portions of the lands now held by the State Agricultural College for experimental purposes, as are not needed for scientific experimentation. Further, that such land shall be leased only on condition that the lessees thereof shall keep and report to the director a complete record of the sowing, irrigation, cultivation and yield of the crops grown on such lands.

6. Further, that the director be instructed to inaugurate and maintain throughout the station work a fundamental and comprehensive system of experimentation along the line of irrigation and irrigated agriculture without detriment or prejudice to investigations or experiments of the several sections on subjects directly concerning their departments of the station.

7. All rules and regulations relating to the powers of the director or operation of the station which conflict with the above resolutions, are repealed."

Adopted December, 1899.

WORK FOR 1900.

Under the plan of organization contemplated in the regulations, the plans of work for the current year were submitted to the executive committee and adopted by them in April. As the report presented at that time and the schedules show the policy of the station and the conditions under which the station acted, it is given in full, as it gave some discussion of the conditions.

"Before giving the schedules of work of the experiment station, it is desirable to call attention to the general situation of the station and the changes introduced by the recent legislation of the board.

There have been five specialists working separately and independently. The two substations may also be added. Each has been doing earnest work, but on his own line of

investigation, almost without relation to any of the others. As every question has various sides, and, for a complete investigation, needs the work of several specialists, this policy has prevented the cumulative influence of work from various sections. In other words, there has not been one station, but seven stations. As I take the instructions of the board, following the recommendations of Doctor True, they tend to unite the work without destroying the individuality of the worker.

If station experience shows anything, it is that the lines of investigation, whether of the station or of the separate workers, should be few in number and should be carried along some principal line; and that each investigation should be carried to completion before seriously beginning another.

Colorado is so rich a scientific field that every worker has been tempted to attempt too many investigations. The result has been a spreading of the efforts to such an extent that the progress of one investigation is blocked by the demands of the other. We thus have a great many lines of investigation in which something has been done for a series of years. Hence, as a matter of business sense, without regard to the importance of the investigations themselves, it is desirable to carry these inquiries to completion, in order to obtain the benefit of the time and money already expended.

The field is so broad, and there are so many interests which want investigation, that (a) evidently we must omit or postpone many questions, or take them up incidentally; (b) among them to chose more especially those which are peculiar to the state, utilizing the results of other states where possible, or leave to the stations of other states the investigations which those stations can or will take up; (c) carry on fewer investigations, but carry them to completion; (d) in the case of the substations, to cause them to supplement the work of the main station, systematize their records, and make their work available to the main station.

Our peculiar questions, where we can best add to the general scientific and practical knowledge, and wherein we can get the least help from other sources, are along the lines growing from the methods of agriculture; i. e., by irrigation. Water is an element in plant growth as essential as nitrogen; hence, while Eastern stations are searching for manures containing nitrogen, we are led by just as great necessity to hunt for water. The search for nitrogen is

largely a chemical question; that for water involves, to a greater or less extent, engineering questions. Some of the most important inquiries along these same lines lie in the domain of the chemist, the botanist, and the agriculturist. Incidentally, there are other questions which are peculiar to our state, or to the present conditions. Where the studies elsewhere can solve the questions here arising, it is better to leave those to other stations.

The plains, covering nearly one-third of the state, justify a more systematic investigation into their possibilities. This is likely to be a question long of solution, and we should not be disappointed if a great deal of practical value does not result. Still, the extensive area involved justifies a serious study. The necessity of maintaining a substation at Cheyenne Wells, and the expense involved, hampers rather than aids the main inquiry. A considerable part of the most valuable work can best be investigated in the laboratory, or by examination of the specialists here.

The questions of the Arkansas valley now are sugar beets, cantaloupes, and the fundamental one of irrigation. The San Luis valley has the question of cereals and forage plants, in addition to the questions growing out of the water supply.

The Western slope needs attention. As a general proposition, we ought to begin to consider the special questions affecting them, with the idea that, when free from the entanglements of Eastern Colorado, some of their special questions may be taken up with vigor. It is thought that some desirable work can be begun this season along the line of the codling moth.

The schedules show the commencement of a main work along the lines of irrigated agriculture, wherein several sections are uniting in work of a common bearing. These are:

1. Continuation of investigations by the engineering section on the physical questions of irrigation and water supply.

2. By the botanical section, the starting of a study of the relations of plants to water, including a vast number of questions necessary to understand the principles of agriculture.

3. The beginning of a more extensive investigation on the irrigation waters of the state by the chemical section.

There is a lessening of the incidental questions in the schedule, and, while secondary questions must be taken up from time to time, these are baneful in their effects on the best work of the station.

The schedules submitted are as follows:

SECTION OF METEOROLOGY AND IRRIGATION ENGINEERING.

1. The irrigation questions of the state, especially the duty of water, the seepage determinations on various streams, and more specific investigations in the Arkansas and San Luis valleys, including chemical analyses.

2. Meteorology as before, with reduction of some of the data already secured.

SECTION OF BOTANY AND HORTICULTURE.

1. A study of the relations of plants to water.

2. The study of the flora of the state, special attention being given to:

   1. The weeds of the farm and garden.
   2. Grasses, native and introduced.

3. Economic fungi. The investigation of such depredations by fungi as may be reported to the station.

CHEMICAL SECTION.

1. A study of the irrigation waters of the state, including work on Part II of Bulletin No. 46, "A Soil Study."

2. Continuation and completion of a study of methods used in extracting beeswax from old combs.

3. Study of Colorado grasses in co-operation with the department of botany.

4. A digestion experiment with sheep. This is intended to be supplemental to Bulletin No. 39.

This work, already begun, will require more than a year for completion.

EXPERIMENTAL WORK OF THE AGRICULTURAL SECTION.

1. Wheat—Tests of the effect of changing from a higher to a lower altitude, and from a lower to a higher; the same for latitude, and for both combined.

(a) Oats—Tests for the effects of changes in altitude, similar to those with wheat.

Tests for the development of a variety of oats with a thinner husk.

2. The value of alfalfa ensilage for feeding.

3. Land Plaster—The benefit to be derived from its use.

Secondary and Incidental.

4. Peas and Oats—An endeavor to learn why peas and oats do not thrive in the vicinity of Fort Collins.

5. Alfalfa—Co-operative tests with Turkestan alfalfa.

6. Sugar Beets—Tests for the production of seed.

7. Feeding Tests—Are now being conducted with dairy cows and sheep.

8. Creameries—Collection of statistics.

ENTOMOLOGICAL SECTION.

1. *Unfinished Work:*

(a) Experiments with the codling moth, to determine the number of broods in different parts of the state, the relative values of different remedies, and to determine some points in life-history.

(b) A study of the *orthoptera* (grasshoppers, etc.) of the state. The object is to determine quite fully the species that occur in Colorado; also their range, food-habits, destructiveness to cultivated plants, and remedies.

(c) Collecting and rearing insects to determine food-habits, life-histories, and the Colorado fauna.

(d) Experiments for the destruction of miscellaneous insect pests as opportunities occur.

(e) Experiments in the apiary:

2. Testing different makes and styles of comb foundation.

2. *New Work:*

(a) A study of the disease known as "Foul Brood" for the purpose of determining whether or not the germs and spores can be destroyed in honey, so as to make it safe to feed the latter back to the healthy colony of bees.

(b) The beginning of a study of insects injurious to sugar beets in Colorado.

THE ARKANSAS VALLEY SUB-STATION.

1. The Cantaloupe—An extension of previous work in controlling the blight, in a number of different places.

2. Sugar Beets—A study of the beet in the various soils of the Arkansas valley, and under different conditions.

A systematic attempt to utilize the experience of the many growers to determine the essential treatment and the best method to produce high-grade beets.

3. Experiments with the codling moth on one or more orchards.

On the Station Grounds.

CANTALOUPES—

1. Breeding for improvement by selection and hand pollination.

2. Trials of spraying for control of insects and blight.

3. The effect of different amounts of irrigation.

SUGAR BEETS—

For seed bearing and production.

With notes on those grown by leasers.

TOMATOES—

Experiments for control of blight.

Manner of planting and pruning as affecting production.

Secondary and Incidental.

Some tests on potatoes, hairy vetch, grasses, and wheat, with records on orchards and fruits.

Also observations in meteorology.

THE PLAINS SUB-STATION.

1. To examine the plains of Eastern Colorado with wagon and study the methods of those securing a foothold; and by personal contact and inquiry establish the basis for

more specific inquiry, especially to study the methods of those individuals or communities securing a foothold.

2. To continue the test of cultivation and of varieties at the station.

In this connection to use about twelve acres of station land for that purpose. The rest of the land to be continued in cultivation, substantially as at present.

A large part of the energies of the director during the past year has been given to the questions pertaining to that of office. The mailing list has been entirely revised, and transferred from the book form to a card index, arranged by postoffices and then alphabetically. It is also classified so the newspapers, libraries, exchanges and those desiring only special classes of bulletins, can be separated at once. The mailing list has materially grown, but until the rearrangement in method, it did not seem desirable to make a systematic effort to increase it. There are now about 6,500 people receiving the bulletins regularly. As the expense is borne by United States appropriation, it has not seemed proper to decline to send to any applicant in the United States. The files of bulletins from other states, a most valuable and necessary feature of the office, are nearly completed. To fill the vacancies has required much correspondence, and long search. As fast as the files of any state are complete, they are bound. The office has also been arranged for the more systematic preservation of the current files, and for conveniently mailing bulletins from the office.

During the year, five regular bulletins have been issued and mailed, and four are in press, to be issued early in the coming year. It appears that the list of issues for the coming year will be greater. There is more matter in condition for preparation for publication, needing only time on the part of the author to prepare. During the past year about a million and a half pages have been distributed.

The bulletins form one means of placing the results of the work of the station before the people interested. So far it has been the principal one. In addition, all the members of the staff take part in farmers' institutes in different parts of the state. These usually take place in the winter season. So far there has been little attempt at exercising so much control as would be involved in bringing the dates so as to

least disturb the work of the station or the college. It would seem desirable that a closer supervision be had in order that they may become more useful.

The usefulness of the station is increased through the correspondence of the various workers. This is of considerable amount. Whenever inquiry is made, it is the policy of the station to give information asked for, or to place the inquirer on the way to a satisfactory reply. The inquiries often take much time, more, perhaps, than the questioner would willingly have required. At the same time all legitimate correspondence of this kind is welcomed. It is felt that this correspondence should be greater. It is desired that the farmers of the state should feel free to ask for information of the station, and should look to it for help in the problems which arise.

In order to reach many with information requiring immediate distribution, or of not sufficient completeness to warrant a bulletin, a series of shorter bulletins, called press bulletins, has been started. It is not intended that these shall exceed four pages, and preferably not so long as that. This series has not been developed with us as yet, but it promises to be one means of reaching many. These bulletins have been printed in smaller editions than the regular bulletins, and have been sent to newspapers, and to selected names according to the subject matter. As there are few papers devoted to agriculture in this state, it may be desirable to extend the circulation more widely and to increase the number.

For a number of years the irrigation engineer of the station has carried on measurements of the Cache a la Poudre river, and as the information obtained weekly was of considerable value to the local community, reports have been issued, termed river press bulletins. These have been distributed more especially in Northern Colorado, but have frequently been widely quoted elsewhere.

CHANGES IN THE STAFF.

Early in the spring the resignation of Prof. W. W. Cooke was presented to the board and accepted, to take effect September 1. Prof. Cooke became connected with the station, September 1, 1893, and for seven years has served as agriculturist of the station. During this time he has been

the author of numerous bulletins issued by the station, and has been a very acceptable worker at farmers' institutes.

As his successor, Prof. B. C. Buffum, of the Wyoming University, was elected at the June meeting of the board. Prof. Buffum graduated from the Colorado Agricultural College in 1890, and became assistant to the irrigation engineer and meteorologist. He resigned the following spring to take a place at the University of Wyoming, where he has since remained. Prof. Buffum has been an ardent worker at that station, the results of his investigations appearing in numerous bulletins.

Prof. C. S. Crandall had been accorded leave of absence from May 1, to visit Europe for travel and study, and especially to visit the European herbaria to study the type specimens of plants of some of the Western species. He had been gone but a short time when his resignation was received, an advantageous offer from the United States Division of Forestry attracting him where his energies could be concentrated along fewer lines. He therefore resigned to enter the service, July 1. Prof. Crandall came to the Colorado Agricultural College as professor of botany and horticulture and horticulturist and botanist of the experiment station, on January 1, 1890, succeeding the late Professor Cassidy, and has been an indefatigable collector and student of Colorado botany. The station and college possess a large herbarium of Colorado plants.

At a special meeting of the board, on July 9, 1900, Mr. J. H. Cowen, M. S., M. A., was selected as his successor. Mr. Cowen had graduated from the Colorado Agricultural College in 1894, and on the death of Mr. Huffington was chosen assistant horticulturist. Mr. Cowen had been an enthusiastic student of natural science, and gave great help to the members of the staff along entomological and botanical lines, even before graduation. He was one of the collectors who is frequently mentioned in Bulletin 31 on Hemiptera, by Prof. Gillette. His name is one of the most common in the botanical collection. Resigning as assistant in 1898, he went to Cornell University, where he received the degree of M. A. in 1900, and was appointed to a fellowship in horticulture for 1900-01. He seemed remarkably well adapted for the work here, by taste and from preparation. His previous work here and his acquaintance with our conditions made him especially fitted for our work. Prof. Bailey says:

"Mr. Cowen's death was a great shock to us. We thought him one of the best men whom we ever had. Of all the men whom I have recommended to position or who have been elected from this place, I think that none has seemed so well qualified to fill the particular place to which he was chosen as Mr. Cowen."

Within a few days after his election he was attacked with appendicitis. He went to the hospital at Ithaca, N. Y., for an operation, without a thought of fatal result. The operation seems to have been successful, but a complication from malignant jaundice caused his death within a few hours, and the station and college loses a worker in whom they had reason to place much hope.

At a special meeting of the board, August 15, Professor Wendell Paddock of the Agricultural Experiment Station of Geneva, N. Y., was chosen to fill the vacancy caused by the death of Prof. Cowen. Prof. Paddock graduated at the Michigan Agricultural College, and has been, for a number of years, assistant horticulturist at the Geneva station, where his work along the line of horticulture has resulted in numerous bulletins.

With the increase in the work of the director's office, Mr. L. M. Taylor, who had been acting as instructor in typewriting and stenography in the commercial department, as well as stenographer and clerk in the station, found the combined duties greater than one could attend to, and relinquished the work of the station. Mr. Taylor was found especially valuable from his knowledge of the work of the station, as well as for his exactness and skill. Mr. W. R. Headden, a graduate both of the regular college course and of the commercial course, was chosen to fill the place, and has been found an intelligent and able help.

With the first of January we lose Mr. Frank L. Watrous from the station staff. Mr. Watrous has been connected with the station almost ever since its organization. In the fall of 1888 he took charge of the Arkansas Valley substation, superintended the laying out of the grounds and re- fall of 1888 he took charge of the Arkansas Valley sub-sta- agriculturist in 1892. He has made an excellent record in both places, and takes with him to his new work the good wishes of those who have been associated with him.

While preparing this report the station loses the services of Mr. Joseph Lownes, assistant chemist, through death. Mr. Lownes, a graduate of the State University of

Nebraska, and with former experience in chemical work in one of the sugar factories of that state, became connected with the station as assistant chemist two years since, and proved capable of every trust reposed in him. He clung to duty against the protests of his associates until his remaining strength was not sufficient to carry him through a siege of typhoid fever.

On account of poor health Mr. Carl H. Potter, assistant horticulturist, has asked for and been granted a leave of absence from active duty. He will, however, aid in the investigations at his home in the fruit regions of Western Colorado. He is succeeded in active work by Mr. F. M. Rolfs, a graduate of the Iowa Agricultural College, more recently an assistant at the New York Experiment Station, Geneva, N. Y.

Mr. A. H. Danielson, a graduate and assistant of the University of Wyoming, has been selected as assistant agriculturist, and on account of his skill in photography as photographer for the station, to aid all sections where photographic illustration is needed.

PUBLICATIONS.

The principal publications of the station are the bulletins. These have been issued during the year in editions of 7,000 copies, except in the case of bulletin 56, which was a technical bulletin, and issued in an edition of 2,000 copies. This class of publications is sent to the whole mailing list, except in the case of the technical bulletins.

The annual report to the governor was issued in an edition of 1,250 copies. This is sent to the other experiment stations, to the various agricultural colleges, to libraries which keep a file of the station publications, to newspapers in Colorado, and to exchanges, and some individuals on request.

Press bulletins form a recent series, designed as a means to distribute information to the press or to individuals, as the occasion demands. As Colorado has few papers of an agricultural nature, it will doubtless be necessary to give these wider distribution.

River press bulletins, a series issued as a private bulletin from the irrigation engineering section for several years, but not as a station publication until the summer of 1899.

These include information obtained in certain studies of that section, which was desired by irrigation interests in Northern Colorado. Issued in small editions, and the distribution principally in Northern Colorado. Occasionally reprinted in other parts of the state.

The publications of the station since, and including, the last annual report have been as follows:

The twelfth annual report to the governor, 114 pp., 8 pl., 7 cuts.

Contents—

Report of the director, 12 pp.
Letter of Dr. True on Organization of Experiment Station Inventory, 3 pp.
Outline of work for 1899, 7 pp.
Report of agriculturist, 2 pp.
Report of horticulturist and botanist, 5 pp.
Report of entomologist, with notes on some of the injurious insects of the year, 4 pp.
Report of chemist, 1 p.
Report of meteorologist and irrigation engineer (with summary of seepage measurements on various streams, flow of the Poudre river, etc.), 10 pp.
Meteorological tables for 1898 and 1899, 17 pp.
Report of the Plains sub-station, 4 pp.
Report of the Arkansas Valley sub-station, with notes on crops raised, 16 pp.
*Record of the six years' work at the Plains sub-station, 16 pp.

Bulletins.

No. 53. Strawberries. 28 pp., by C. S. Crandall and C. H. Potter. Includes a summary of directions for treating strawberries, and a report on the new varieties which have been tested at the station.

No. 54. Apiary Experiments. 28 pp., 6 plates, by C. P. Gillette. Tests of the use of artificial foundation in comb building. Experiments to determine the extent to which it is used by the bees and the thickness giving the best results. Also notes on substitutes for pollen.

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*The record of six years' work at the Plains sub-station was also issued as a separate report.

No. 55. Forests and Snow. (In press.) 20 plates, by L. G. Carpenter. Gives plates showing the condition of snow in thick timber and in this timber close by, with some discussion of the relation of forests to water supply.

No. 56. The Birds of Colorado (a second appendix to bulletin 37), Technical Series No. 5. 60 pp., by W. W. Cooke. Giving additional species of birds found in Colorado, based largely on the Carter collection and notes. This brings the total species seen in Colorado up to 387.

No. 57. Farm Notes. Alfalfa, Corn, Potatoes and Sugar Beets. 40 pp., W. W. Cooke. Gives notes on these subjects not previously published.

No. 58. A Soil Study. Part II. The Crop Grown: Sugar Beets, 46 pp., by W. P. Headden. A continuation of the study in bulletin 46, including studies of the effect of manure on beets; the drying out of beets, relation of richness of beets to their size; composition of beet ash; effect of soaking.

No. 59. Field Notes of Trips on the Plains, J. E. Payne. (In press.)

No. 60. Bush Fruits, C. H. Potter. (In press.)

No. 61. Bromus Inermis, F. L. Watrous, H. H. Griffin, J. E. Payne. (In press.)

Press Bulletins.

No. 1. Issued August, 1899, as a broadside. The Sugar Beet Caterpillar. By C. P. Gillette.

No. 2. Issued April, 1900. Colorado Sunshine. By L. G. Carpenter.

No. 3. Cantaloupe Blight. By H. H. Griffin. Giving some results of treatment with Bordeaux mixture. Sent to growers in the Arkansas Valley.

No. 4. The Beet Army Worm. By C. P. Gillette. Gives cautions and methods of treatment in case of appearance of this pest.

River Press Bulletins. The first one for 1900 was issued April 24, and continued weekly until October 16, making twenty-six regular issues.

WORK IN THE STATE.

With the great area and diversified conditions of Colorado, the station ought not, if it could, confine its efforts to

a single locality. The variations in altitude and latitude represent as great difference in climate as between Charleston and Spitzbergen. While agriculture is not carried on through such range, the problems thus brought for solution are exceedingly diversified. And with the great areas and distances involved, the station must deliberately neglect many problems, of importance to some. In an area in the Eastern States no greater than Colorado, comprising the six New England States and New York, there are seven experiment stations, each of which receives as much from the government as the one in Colorado. Still they are not considered too numerous, for the states themselves support two more in the same area, and the state appropriations to the stations in this area are nearly $100,000 in addition to those from the general government.

The station does not attempt to confine its work to the region of the main station. More and more it is desired to take up and follow investigations to the localities where information is best obtained. Thus already the work of the station reaches out to many parts of the state, and it is hoped to become more effective as the present plans develop. During the past year the entomologist or his assistant has carried on systematic observations at Grand Junction on the codling moth; has visited both that section, the San Luis Valley, the Arkansas Valley, the Platte Valley, as called by the ravages of the sugar beet or other injurious insects. The chemist has analyzed many samples of sugar beets in connection with the investigations formerly reported, besides carrying on the laborious investigations already in progress. The change in the sections of agriculture and horticulture during the year has prevented the usual activity in those sections, nevertheless the agriculturist has carried on investigations in the San Luis Valley, looking toward inproving the wheat there available, with the special object of hastening the time of ripening to avoid frosts. The horticulturist has given attention to various plant diseases, and has been called away to attend to various plant diseases that seemed to be likely to prove serious. The irrigation engineer has carried on measurements on the Duty of Water at various places in the Arkansas Valley and in Northern Colorado. He has also measured on a large scale the seepage gains and losses from canals and to the streams, and begun measurements of the sediments in some streams of the state. These measurements have been extended to the Western slope. The superintend-

ents of the sub-stations have been less confined to the limits of the station farms. The superintendent of the Plains Sub-station has visited the eastern portion of the Plains region of the state, as reported in bulletin 60. The superintendent of the Arkansas Valley sub-station has visited various parts of that valley in the study of the control of the cantaloupe blight, and of the sugar beet problem.

Investigations so carried on with the co-operation of other people have given, for investigations of the kind to which the method may be applied, far greater returns for the money available. It does not seem necessary to construct a canal to try an experiment in water.

It is gratifying that this work has been of use. The established recognition of Colorado as a state adapted to the growth of sugar beets and the establishment of the sugar industry on a sure foundation, has been possible through the work of the station through the past twelve years.

SUB-STATIONS.

Two sub-stations have been in operation during the past year.

The Plains sub-station:

A sub-station was started at Cheyenne Wells in Eastern Colorado in 1884. The expense of the first buildings and of the equipment was borne by the Internal Improvement Fund of the state, and by local subscription. The maintenance has been borne by the Hatch fund, appropriated by congress. During this time the plan followed was to attempt, on the land in the control of the station, to make a success of crops, either by new methods of cultivation, by conserving moisture, or in finding varieties which were best adapted to the conditions. For some years the superintendent in immediate charge has been Mr. J. E. Payne, a graduate of the Kansas Agricultural College, who has been an enthusiastic worker in attempting to develop the possibilities of the Plains. Still the trial cannot be considered a success, as a demonstration of profitable crop production. A charge in method seems desirable, and by studying the Plains on a broader plan more seemed possible of accomplishment. The area of what may be called the Plains of Colorado is so great, an extent of practically 275 by 175 miles, or say 40,000 square miles, an

area greater than most states east of the Mississippi, that there is opportunity for much variation. Reports of successes of settlers who have maintained a foothold for a series of years, were worthy of investigation. Accordingly, both because more seemed possible to accomplish with the funds available, and also because the Washington authorities had ruled that the Hatch fund was not intended to maintain permanent sub-stations, a change in plan was desirable. The work planned at the sub-station was reduced, so as to free the superintendent from duties which required his presence there, he was furnished with a team and wagon, and his time largely spent in studying the conditions of Eastern Colorado, especially where settlers had maintained a foothold for a series of years. A portion of the report of the summer's trip will be issued shortly as a bulletin. The Plains have been given up generally as an insoluble problem, and they must necessarily be given up to the range industry. A basis for any sound study must be from facts as they are found, and the work as already developed, serves to show some hope of improvement. The area is so large, some 40,000 square miles, that some effort is justified. The nature of the problem is such that manifestly, a long time will be necessary, except as we study the experience of those already there.

The expense of the sub-station for the fiscal year has been $1,242.18.

The Arkansas Valley sub-station:

For reasons similar to those which led to a change in plan in the case of the Plains sub-station, the plan at the Arkansas Valley sub-station was altered. The trouble with the sub-stations, for one thing, has been, that not only has the station been attempting to do farming rather than experimenting, but the management of a farm of such size and variety of interests, has been sufficient to absorb the energy of the person in charge almost to the exclusion of work which is far more important. Accordingly, with the consent of the board, it was decided to lease all but a small part of the station farm, requiring, however, experimental observations from those to whom leased, restrict the area under the direct charge of the superintendent, free him from so much detail work, and expect him to devote a greater part of his time to investigation, and co-ordinate his work with that of the station as a whole, that the work would be mutually helpful. The results of the first year have fully justified the change,

if any justification were needed. It is designed that the station shall thus be useful to the whole Arkansas Valley, not simply to the region about Rocky Ford. The expenditures on the station have been $1983.61 for the fiscal year and the receipts $1079.87. It is the first time in its history that the cost has been less than $2000, or the net cost less than $1000. The plan has not only reduced the expenses, but has increased the results, and this will be more evident with another year. The total cost of the station to date has been $31,466.07, with a return of $10,244.13.

The land at Monte Vista, at one time used as a sub-station, which was furnished temporarily by the State Land Board as long as used for experimental purposes, has been called for by the land board. It has been in their possession for over a year, though the formal transfer has not been made as yet. The station still possesses the improvements and some personal property at that station; the committee appointed by the board having found it difficult to dispose of the property to good advantage during the year.

The Divide station was organized on land furnished by subscriptions of small amount, and is of small area. As no support is likely to be given by the legislature, and as the buildings are fast going to ruin, the sooner the remains of the station are closed out the better it would seem to be.

The whole cost of the sub-stations has been during the thirteen years:

Arkansas Valley sub-station	$31,466.07
San Luis Valley sub-station	15,408.97
Plains sub-station	9,818.98
Divide sub-station	8,313.56

The returns, which reduce the net outlay, have been $12,505.74, principally from the Arkansas Valley sub-station.

Following the report of the director will be found the reports of the agriculturist, the horticulturist, the chemist, the entomologist, the irrigation engineer, and of the superintendents of the sub-stations. These give a valuable summary of this work, though the length of the reports is no indication of the work done. The agriculturist and the horticulturist entered upon their duties the first of September, after the field work of the year was substantially accomplished. The demands upon them in organizing the work, have been many. The reports of the sub-stations are relatively longer,

as they include fuller statements needed for the use of the home station.

The present outlook for the station work is excellent, both because the field work is promising, and because, with the readjustment, the financial affairs of the station are being placed on a better basis, which will enable more to be accomplished.

Respectfully submitted,

L. G. CARPENTER, Director.

INVENTORY.

NOVEMBER, 1900.

DIRECTOR'S OFFICE.

Office fixtures and equipment	$ 420 30	
Stationery supplies	197 60	
Half tones, zinc etchings and photographs	200 00	
Bulletin library	500 00	
		$ 1,317 90

AGRICULTURAL SECTION.

Implements and tools	$ 56 00	
Office equipment and miscellaneous	386 00	
		$ 442 00

ENTOMOLOGICAL SECTION.

Laboratory supplies	$ 73 95	
Entomological supplies	70 85	
Insecticides and insecticide apparatus	86 05	
Apiary	152 10	
In charge (miscroscope, etc.)	310 00	
		$ 692 95

HORTICULTURAL SECTION.

Glassware	$ 6 74	
Photographic apparatus and supplies	84 95	
Instruments	43 00	
Trees and nursery stock	294 10	
Herbarium	1,560 00	
Miscellaneous	1 25	
		$ 1,990 04

METEOROLOGICAL AND IRRIGATION ENGINEERING SECTION.

Meteorological instruments	$ 545 15	
Office fixtures	34 00	
Stationery, books, maps, etc	32 60	
Irrigation and hydraulic apparatus	236 35	
Photographic supplies and negatives	146 95	
Miscellaneous	146 31	
		$ 1,141 36
Library		$ 1,100 00
Total main station		$ 6,684 25

ARKANSAS VALLEY SUB-STATION.

Water rights and apparatus	$ 1,836 00	
Fences, gates and bridges	338 30	
Buildings and improvements—		
Dwelling	$900 00	
Barn	750 00	
Wells, cistern and cellars	125 00	
Sheds and outbuildings	160 00	
Set farm scales	60 00	
Instrument shelter	15 00	
		$ 2,010 00
Live stock—four horses, three hogs	181 00	
Implements and tools	393 15	
Miscellaneous	54 50	
Farm produce on hand—		
130 tons alfalfa	$390 00	
335 bushels oats	134 00	
125 bushels wheat	75 00	
226 bushels corn	79 10	
35 bushels rye	21 00	
20 bushels soy beans	24 00	
10 bushels cow peas	12 00	
75 pounds vetch seed	4 50	
4 tons sugar beets	16 00	
12 barrels apples	24 00	
20 tons sugar beets (rent)	100 00	

Farm produce on hand—Continued.			
5 acres beet land (rent)	25 00		
110 pounds cantaloupe seed	55 00		
35 pounds beans	1 05		
4 pounds grass seed	60		
914 pounds tomatoes (estimated)	7 25		
Melon returns (renters)	60 00		
Returns from station melons (estimated)	20 00		
Miscellaneous	20 25		
		$ 1,068 75	
			$ 5,881 70

PLAINS SUB-STATION.

Dwelling and barn	$800 00		
840 rods barbed wire fence	100 00		
3,000 feet supply pipe (iron)	30 00		
		$ 930 00	
Two horses		75 00	
Implements		127 95	
Apparatus		152 10	
Supplies and farm products		73 50	
			$ 1,358 55

SUB-STATION AT MONTE VISTA.

Buildings, fencing, etc	$ 1,497 00		
One team horses		150 00	
Windmill and appliances		150 00	
Farm implements		82 15	
			$ 1,879 15

SUB-STATION AT DIVIDE.

40 acres land at Monument		200 00	
Buildings		729 00	
			$ 929 00
Total sub-station property			$10,048 40
Total main station property			6,684 25
Total experiment station property			$16,732 65

In addition, the station has the use and control of other property, as long as used for experiment station purposes, as follows:

160 acres at Cheyenne Wells		$ 160 00	
Arkansas Valley Sub-Station—			
40 acres garden and fruit land	$3,000 00		
160 acres farm land	8,000 00		
		$11,000 00	
			$11,160 00

EXCHANGES.

BOOKS, PAMPHLETS, SCIENTIFIC PROCEEDINGS, ETC.

ARGENTINE REPUBLIC:

Ministerio de Agricultura: Puerto Deseado.

AUSTRALIA:

Department of Agriculture, Perth.
Department of Agriculture, Victoria.

CANADA:

Department of Agriculture, Ontario.
Department of Agriculture, Ottawa.

COSTA RICA:

Musea Nacional: Ferraz. Informe de 1899-1900.

ENGLAND:

G. C. Bignell: The Ichneumonidae of the South of Devon.

FINLAND:

Acta Societatis pro Fauna et Flora Finnica, XIX.: 1.

FRANCE:

V. Vermorel: Defense des Recoltes par le tir du Canon; Note sur l'Emploi du Sulfure de Carbone.
L. Ravez: les Produits de la Vigne; les Systemes de Taille.
L. Ravez et A. Bonnet: Parasitisme du Phoma reniformis.

GERMANY:

Dr. C. Brick: Botanisches Museum Abtheilung fur Pflanzenschutz zu Hamburg. 2. 1899-1900.
Dr. M. Hollrung: Jahresbericht uber die Neuerungen und Liestungen auf dem Gebiete des Pflanzenschutzes.

HAWAII:

Henry S. Townsend: Report of the Minister of Public Instruction.
Report of the Hawaiian Experiment Station, Honolulu.
Bulletin of Manual Training School, Kamehameha.

INDIA:

Department of Land Records and Agriculture, Madras.

JAMAICA:

Institute of Jamaica, Kingston.

NEW SOUTH WALES:

Department of Agriculture, Sydney.
Botanical Gardens, Sydney.

PERU:

Ministerio de Fomento: Moreno. Las Irrigaciones de la Costa.

UNITED STATES:

American Philosophical Society, Philadelphia, Pa.
Academy of Science, Rochester, N. Y.
Bussey Institution, Cambridge, Mass.
Carnegie Library, Pittsburg, Pa.
Department of Agriculture, Harrisburg, Pa.
Elisha Mitchell Scientific Society, Chapel Hill, N. C.
Geological and Natural History Survey of Minnesota.
Iowa Horticultural Society, Des Moines, Iowa.
Indiana Academy of Science, Indianapolis, Indiana.
John Crerar Library, Chicago, Illinois.
Kansas State Horticultural Society, Topeka, Kansas.
Lloyd Library and Museum, Cincinnati, Ohio.
Massachusetts Horticultural Society, Boston, Mass.
Missouri Botanical Gardens, St. Louis, Mo.
New York Botanical Garden, New York, N. Y.
New York State Museum, Albany, N. Y.
Portland Society of Natural History, Portland, Maine.
Public Library, Boston, Massachusetts.
State Board of Agriculture, Topeka, Kansas.
State Board of Agriculture, Boston, Massachusetts.
State Board of Agriculture, Raleigh, North Carolina.
State Board of Agriculture, Providence, Rhode Island.
State Board of Agriculture, Augusta, Maine.
State Board of Health, Augusta, Maine.
State Board of Health, Trenton, N. J.
State Board of Horticulture, Denver, Colorado.
State Board of Horticulture, Butte, Montana.
State Board of Horticulture, Sacramento, California.
Torrey Botanical Club, New York, N. Y.
Utah State Farmers' Institute, Ogden, Utah.
U. S. Weather Bureau:
- Nebraska Section.
- Illinois Section.
- Colorado Section.
- New Mexico Section.
- Minnesota Section.
- Tennessee Section.
- Wyoming Section.
- Oregon Section.

Wisconsin Dairymen's Association, Fort Atkinson, Wisconsin.

SCIENTIFIC PERIODICALS.

Agricultural Journal and Mining Record, Maritzburg, South Africa.
Insect World, Gifu, Japan.
Kongl. Landtbrusk-Akademiens Handlingar och Tidskrift, Stockholm, Sweden.
Le Naturaliste Canadien, Chicoutimi, Quebec, Canada.
Sanitary Inspector, Augusta, Maine.

AGRICULTURAL JOURNALS.

Agricultural Epitomist, Spencer, Indiana.
Agricultural Gazette, Sydney, New South Wales.
American Agriculturist, New York, N. Y.
Acker und Gartenbau-Zeitung, Milwaukee, Wisconsin.
Beet Sugar Gazette, Chicago, Illinois.
Boletin de la Comision de Parasitologia Agricola, Condesa 4½, Mex.
Boletin da Agricultura, Sao Paulo, Brazil.
Co-Operative Farmer and Maritime Dairyman, Sussex, N. B.
Chicago Daily Drovers Journal, Chicago, Illinois.
El Agricultor Mexicano, C. Juarez, Mexico.
Elgin Dairy Report, Elgin, Illinois.
Edwards Fruit Grower and Farmer, Missoula, Montana.
Farmers Advocate, London, Ontario, Canada.
Farm and Dairy, Sydney, New South Wales.
Farm and Home, Springfield, Mass.
Farming World, Toronto, Canada.
Farmers Home, Dayton, Ohio.
Farmers Guide, Huntington, Indiana.
Farmers Tribune, Des Moines, Iowa.
Golden Egg, Saint Louis, Mo.
Home, Field and Forum, Oklahoma City, Oklahoma.
Homestead The, Des Moines, Iowa.
Indiana Farmer, Indianapolis, Indiana.
La Laiterie Belge, Renaix, Belgium.
Mark Lane Express and Agricultural Journal, London, England.
Milk News, Chicago, Illinois.
Michigan Sugar Beet, Bay City, Michigan.
Missouri Valley Farmer, Kansas City, Mo.
Mirror and Farmer, Manchester, N. H.
National Farmer and Stockgrower, Chicago, Ill.
National Stockman and Farmer, Pittsburg, Pa.
Orange Judd Farmer, New York, N. Y.
Ohio Farmer, Cleveland, Ohio.
Pacific Coast Fruit World, Los Angeles, California.
Practical Farmer, Philadelphia, Pa.
Practical Fruit Grower (The Southwest), Springfield, Mo.
Rural Topics, Morgan City, La.
Rural World, London, England.
Ranch and Range, Seattle, Washington.
Southern Planter, Richmond, Va.

Sugar Beet, Philadelphia, Pa.
Up-to-Date Farming and Gardening, Indianapolis, Indiana.
Western Creamery, San Francisco, California.
Western Fruit Grower, Saint Joseph, Mo.
Wallace's Farmer and Dairyman, Des Moines, Iowa.
West Virginia Farm Review, Charleston, W. Va.

GENERAL NEWSPAPERS.

Chronicle-News, Trinidad, Colorado.
Colorado Springs Gazette, Colorado Springs, Colorado.
Denver Citizen, Denver, Colorado.
Denver Investor, Denver, Colorado.
Fort Lupton Advertiser, Fort Lupton, Colorado.
Golden Globe, Golden, Colorado.
Grand Valley Sun, Grand Junction, Colorado.
Montrose Press, Montrose, Colorado.
Public Ledger, Philadelphia, Pa.
Salt Lake Herald, Salt Lake City, Utah.
Sun The, Baltimore, Maryland.

REPORT OF THE AGRICULTURIST.

The station worker who enters a new field labors under difficulty for a time. This is especially true of the agriculturist. He requires time to become acquainted with the conditions in the state and the needs of the farmer before inaugurating new lines of work which will result in information of value, and he must delve deeply into old records of what has been going on in the department before he is either able to continue the good work or report data which will be of intrinsic worth to the state's agriculture.

The conscientious station worker is anxious to be useful to those for whose benefit the station is established, and will not report anything but that which he believes to be reliable information, based on careful logical reasoning from observations and facts known to be scientifically accurate. Again, much data may be obtained which is of value, in that it adds to the sum total of human knowledge, but which is of no immediate practical value to the farmer. This kind of information should not be lost, but there are so many things which the farmer needs to know that I feel our first duty is to bring "grist to his mill." In order to do this, it is essential to know his conditions and needs. If we would aid him in solving the knotty problems with which he comes face to face, we must know what these problems are.

I have never been widely separated from the agriculture of this region, but only three months has passed since I assumed the duties of agriculturist in this station. On this account it is not possible for me to add to this report the results of experimental work done.

WORK OF THE DEPARTMENT.

My predecessor, Prof. W. W. Cooke, published two bulletins during the year. They were No. 56, a supplement to "Colorado Birds," and No. 57.

Farm Notes—The reader is referred to the bulletin on farm notes, published in July, which seems to contain a report of all the investigations of the station of which record

was made up to July of the present year. The larger part of the time of the station assistant, Mr. F. Watrous, has been given to the management of the college farm. In addition to this, however, he has kept the notes on investigation with varieties of wheat and oats at the home station, and a complete and valuable set of notes on the live stock.

The past season was the first year of a well-planned experiment with varieties of wheat and oats. This work is being conducted on the home station, and on the farm of Mr. Jas. A. Kelly, at Monte Vista, in the San Luis valley. It not only contemplates the improvement of varieties for each of these localities, but also a study of these grains grown at high and low altitudes, and is designed to demonstrate the comparative value of improving seed at home or getting improved seed from a widely differing locality. The larger part of the time which I have been able to give the station work has been devoted to these grains. I made two trips to Monte Vista. On the first visit I assisted Prof. Cooke in harvesting the small plats of grain, and learned the method and purport of the experiment. At the second visit, in September, the grain in the straw from small plats was boxed, and that from larger plats was threshed out and shipped to Fort Collins, where studies are being made of the stooling, growth, and productiveness of each variety. The experiment promises results which will be of great value to the farmers of the state. Before leaving Wyoming, Prof. Farrer, of Australia, sent me a large number of new crosses of wheats. Prof. Foster, of the Wyoming station, has since kindly offered to divide these samples with me, and it is hoped that something peculiarly adapted to this climate and of superior milling quality may be obtained from them.

Since the beginning of the school year much of my time has been taken up with teaching, but some experimental work has been inaugurated. We have carried out an experiment in feeding Belgian hares. This work was merely inaugurated for class instruction. Each member of the junior class in stock feeding fed a separate ration to a lot of three hares for five weeks. The work was so carefully and conscientously done, and has apparently resulted so successfully, that it may be of sufficient interest to publish in bulletin form. Many people in the state have taken up the rabbit industry and are looking for information on the subject. Little information is available in regard to the feeding of hares. The flesh of the Belgian can not be excelled as food

for man, and while these animals have the cleanest of habits, they will eat and thrive on a great variety of foods. The nine rations fed in our experiment had ratios of from less than 1 to 3 to nearly 1 to 9, and as all the rabbits did well, it indicates that they will adjust themselves to a wide range of foods and combinations of foods.

Investigations are now under way with the feeding of swine with rations, in which chopped alfalfa is a factor, to determine whether it is of advantage to give such roughage along with grain to fattening hogs. This experiment is being conducted by Mr. C. J. Griffith, assisted by Mr. W. B. Smith, one of the senior students in agriculture. An experiment has also been inaugurated to determine the comparative value of combinations of home-grown grain, compared with corn shipped in for fattening lambs.

FUTURE INVESTIGATIONS.

The plans of work for the ensuing year, an outline of which has been submitted to the director, contemplates the continuance of the work with wheat and oats at the home station and at Monte Vista, and the beginning of other work believed to be of greatest importance to the state.

I am anxious to investigate those subjects which are of immediate importance to the farmer and assist in the building up and improvement of our agriculture. From my observation and correspondence, I think questions relative to stock raising and the production and use of stock food, the securing and maintenance of permanent pastures, the growing of useful plants on waste lands, and practical problems in grain growing, potato raising and rotations to keep up soil fertility, are problems of paramount interest. It may be found wise to continue some work in a small way with sugar beets. The college has been growing beets for twelve years and published eight bulletins, giving results of carefully conducted experiments. This covers a wide field of investigation, and while the subject has not been exhausted, the industry is now on a commercial basis; factories already established are meeting with unexpected success, and it is not necessary that we should do more than investigate special things in beet growing which may demand our attention.

Some difficult problems confront the potato grower. Potatoes are one of our most important crops, and parts of the state have become famous for the production of this staple.

For no apparent reason potatoes do not thrive in many parts of the state, and where they are most successfully grown there seems to be difficulty in keeping the seed from running out or deteriorating. We should investigate at home and cooperate in potato districts to assist in making the industry more remunerative.

NOTES AND RECORDS.

Taking trustworthy notes and keeping accurate and complete records is no small part of our station work. Unless the records contain complete and accurate notes of every investigation, systematically arranged and available, they are of absolutely no value. Heretofore it seems that the office help in this department has been too small to keep systematic records, and the notes taken are in widely scattered day books. Getting the back notes transferred to permanent record books, along with the recording of new work, will keep our office force very busy for some time. Until everything is so recorded that it can be referred to in the shortest possible time, we will make but slow progress. At present, when any question arises, which can only be answered by referring to back records, it may take a day or several days to find it.

In addition to the regular notes, I expect to make photographs an important part of the records. These pictures not only record many things which it is impossible to note, but they serve a useful purpose in illustrating when the results of our investigations are published.

ORGANIZATION.

The present plan for newly organizing the work in this department may be briefly stated as follows:

First—To lay out permanent experimental plats on the farm for general crop and soil investigations, and the continuance with trials under way of wheat and other crops. To establish a permanent pasture of different grasses and grass mixtures.

Second—To differentiate the work by putting the station assistant in charge of crops and crop and soil notes, and the college assistant in charge of the dairying and animal husbandry. Making each responsible for a part of the office work and records, and relieving each, so far as possible, from the details of farm labor.

Third—The notes and records will be given first attention until they are thoroughly organized and systematized.

EQUIPMENT AND NEEDS.

Our actual equipment belonging to the station is very small, but it would seem that the relation of the college to the station enables us to use the farm and general farm equipment for many investigations. Properly recording the farm operations is continually giving results of scientific interest. At the same time we may organize a few lines of pure investigation. While we need many things in the department, the present greatest need of the station is more complete equipment for the work with wheat. We should have a small mill for making flour of small samples of wheat, and instruments for testing the flour from these samples. Such a mill, with power to run it, and the glutometers and other equipment necessary, would be expensive, but we will not be able to do complete and satisfactory work until they are obtained. The milling qualities of the wheat are as important as great productiveness. As yet, we know little of the comparative merits of the hundreds of varieties of wheat, compared with what there yet remains to be found out; questions than which few, if any, are of greater import.

In conclusion, I may say that the outlook for this department is bright. We are in a position to offer a helping hand to the agriculturists of the state. The station, in connection with the teaching in the college, offers great opportunity for young men who wish to receive training in scientific investigation.

B. C. BUFFUM,
Agriculturist.

Colorado Experiment Station,
December 12, 1900.

REPORT OF THE HORTICULTURIST AND BOTANIST.

The absence of Prof. Crandall in the early part of the season, and his subsequent resignation to accept a more remunerative position, has left the work of the section practically at a standstill. Mr. Potter's time being largely taken up with the care of the department, he has been able to do but little research work. However, he has devoted considerable time to a disease of peas, which is especially severe in the vicinity of Longmont. This disease is of an obscure nature, attacking the plants below ground, and unless some means of combatting it is found, it is feared that the pea-canning industry at that place must soon be abandoned. This would mean a great loss to the farming community, since about 2,500 acres of land are devoted to pea growing.

Mr. Potter has also kept careful records of the work that was under way, and has prepared a bulletin on "Bush Fruits," besides attending to the station correspondence.

The variety tests of native plums has been continued, which includes not only a comparison of the different varieties in a commercial way, but a record of the blooming period of the varieties, and a study of the degree of self-sterility of the blossoms of the different sorts. These records are available for publication when sufficient additional data has been secured.

The variety tests with small fruits have been continued. The plantations include nineteen varieties of currants, seventeen of blackberries, eight of gooseberries, twenty-four of raspberries, and one hundred and fifty of strawberries.

The work on the flora of the state has necessarily been at a standstill for the season.

Respectfully submitted,

WENDELL PADDOCK.

REPORT OF THE ENTOMOLOGIST.

I have the honor to submit herewith the annual report of the entomological section of the agricultural experiment station for the year 1900.

IMPORTANT INSECTS OF THE YEAR.

The Codling Moth (*Carpocapsa pomonella* Linn.) continues to be the most destructive insect to the apple within the state. Spraying with one of the arsenical mixtures has become quite a general practice in most of the apple-growing districts, and those who are spraying every year, most intelligently and thoroughly, are well repaid in the greatly improved condition of their fruit. It is to be regretted that so many spray carelessly and with too little attention to the right time, and that others can not be induced to take any measures for the destruction of this insect, thus making their orchards so many breeding places for the moth, which then spreads into other orchards.

The Peach Twig-Borer (*Anarsia lineatella* Zell.) continues in injurious numbers on the west slope, particularly about Grand Junction and Delta. At the latter place, on the 26th of last May, the writer found both larvæ and pupæ in considerable numbers under bands that had been placed upon the trees the previous season. I feel certain that bands upon the trees can be used quite successfully to reduce the numbers of this pest.

The Fruit Tree Leaf-Roller (*Cacoecia argyrospila* Walk.) has practically ceased to be a pest in the northern portion of the state, where it was so destructive for a number of years. Its disappearance seems to be due to a more general spraying of orchards and the increase of its natural enemies. Of the latter, insect parasites and red-winged blackbirds have been particularly efficient.

The Box Elder Leaf-Roller (*Cacoecia semiferana* Walk.) has also nearly disappeared as far south as Boulder, and probably for the same causes mentioned in case of the preceding species. Early and thorough applications of one

of the arsenical mixtures to the foliage of the infested trees is an effectual remedy for the destruction of the rollers.

The Leaf-Crumpler (*Phycis indiginella* Zell.) has been reported, on several occasions, to the experiment station. The specimens have been sent from nursery stock and from young fruit trees, upon the twigs of which the little clusters of dried and crumpled leaves had attracted attention. Close attention to gathering and crushing or burning these leaf clusters during the winter will doubtless be sufficient to keep this insect from becoming seriously abundant.

Climbing Cutworms have been reported on different occasions as destructive to the foliage of small fruit trees. The past spring these cutworms were abundant in orchards in the vicinity of Fort Collins. They were first noticed early in the spring, before the trees had begun to put out leaves. They were taken, for the most part, under burlap bands that had been placed about the trunks for another purpose. From these caterpillars, *Agrestis auxilaris* was bred. The moths of this species are very abundant here upon the windows of our dwelling houses about the last of May each year.

The Eight-Spotted Forester (*Alypia octomaculata* Fabr.) is an ever-present pest in the vineyards of the state and upon the Virginia creepers. While it is most often complained of upon the latter vine, it also becomes quite destructive to grape foliage at times. Under date of July 9 last, Mr. W. A. Goodman, of Altman, Colo., wrote concerning this insect as follows: "What is it? and what can I do for it? It has almost devastated some vineyards in this vicinity."

We have found a spray of Paris green, London purple or arsenite of lime very effectual in destroying the caterpillars.

The Achemon Sphinx (*Philampelus achemon* Dru.) is also a common insect upon the foliage of the grape and Virginia creeper, and I have frequently found it more injurious than the preceding species. It is controlled by the same remedies.

The Pear and Cherry-Tree Slug (*Eriocampa cerasi* Peck) is generally distributed through the orchards of the state, and in some localities, where the proper remedies have not been applied, it has done great harm. I have found its injuries particularly severe about Grand Junction, in orchards that are poorly cared for. On the 25th of last May I found the eggs very abundant in pear leaves in some orchards

near Grand Junction. As many as twenty eggs were found in a single leaf, and on the date mentioned only a single young slug was found. So hatching had just begun.

The Woolly Aphis (*Schizoneura lanigera* Hausm.) seems to be under very good control in most of the orchards of the state, and less inquiries are received concerning it than in former years. Many orchardists have begun using tobacco about the crown of the trees for the destruction of the root form, which is probably the best known remedy.

The Apple-Tree Aphis (*Aphis mali* Fabr.) has been increasingly abundant upon the foliage of the apple for a few years past. The eggs are deposited in great numbers upon the twigs of apple trees in the fall, but the lice do not become sufficiently abundant to attract attention before the middle of the summer, so that it is very seldom that anything is done to destroy them. Winter applications for the destruction of the eggs is what is needed for the control of this Aphis.

The Putnam Scale (*Asphidiotus ancylus* Put.) seems to be more destructive in Colorado than in the eastern states. While I have known but a few instances where it has been abundant enough to kill a tree, a few such cases have occurred and on several occasions it has been mistaken for San Jose scale because of its abundance. On the 26th of last May I visited an orchard near Delta, where the scale had been reported to me as very numerous. While the scales were found generally distributed throughout a large orchard, they were not causing serious damage to more than three or four trees, and it was doubtful if any of those would have died this year from its attack, though it was advised they be cut and burned. At the date of my visit I found the female scales just beginning to deposit their eggs, which were light amber in color. The scales were worst on a plum tree of some European variety.

Judging from the lately reported experiments of Prof. J. B. Smith, of Rutgers College, N. J., it is probable that all trees infested with this scale can be saved by careful treatment with a heavy crude petroleum during the winter. Prof. Smith found that an oil, testing not less than 42 degrees on the Beaume oil scale, would destroy scale lice and not injure trees, unless applied in unnecessary amounts.

The Willow and Cottonwood Scale (*Chionaspis ortholoбis* Comst.) is a rather abundant scale on both willow and

cottonwood in Colorado, and often attracts attention because of its white color. According to the observations of the writer, this scale is rather partial to the Carolina poplar, young trees of which are often badly incrusted with the scales. The frequent inquiry is "Will this scale get upon our fruit trees?" There is no danger of that. The twice-stabbed ladybird is a most efficient destroyer of this scale in the vicinity of Fort Collins.

Leaf-Hoppers (*Typhlocyba* Sp.) continue to be quite destructive to the foliage of grape vines and Virginia creepers in Colorado, particularly on the eastern slope of the mountains. The hoppers spend the winter in the adult state under leaves and in grass and in similar locations for protection. In the spring they attack almost any green thing until the leaves of the vines are open. I have found them at this time feeding freely upon leaves of strawberry, currant, gooseberry, alfalfa, grass and some of the native plants. When the leaves of the grape vine and Virginia creeper are open, they migrate to them, and continue feeding, and also deposit their eggs, one in a place, within the tissue of the leaves. They are frequently abundant enough to cause the death of most of the first leaves. It is the second brood that swarms among the foliage late in the summer and that attracts most attention. Methods of control have been given in bulletins from the station.

The Apple Twig-Borer (*Amphicerus bicaudatus* Say) is frequently complained of as a pest on the eastern slope of the Rockies within the state, but I have not known of its work in the western portion of the state. It seems to flourish best in the Arkansas valley, in the vicinity of Rocky Ford and Lamar. I extract the following from a letter by Mr. Frank Applegate, of Lamar, dated January 11, 1900: "I have found a bug of some kind in my orchard that has nearly ruined it. Can you tell me what it is? * * * It has bored many of the apple trees and grape vines. Many of the main limbs are bored, as well as the small ones." This is seldom a serious pest, and it is probable that cutting out the beetles and destroying them each winter will keep the borers from becoming bad pests, even in limited localities.

The Cottonwood Leaf Beetle (*Lina scripta*,) has attracted some attention the past year as a defoliator of Carolina poplars in nursery rows. It also attacks the foliage of larger trees, but its injuries to them have not been serious.

The Wheat Aphis (*Nectarophora granaria* Kirby) appeared in destructive numbers in wheat fields in the eastern portion of the state the past summer. Mr. E. D. Ball investigated the injuries along the line of the Santa Fe railroad during the first week in July, and found the injury severe; so that he estimated that many fields would not yield more than half a crop as the result of the attack of the lice. Oat and barley crops were also attacked to some extent. Rather severe injuries to the grain crops extended as far west as Denver.

Cutworms in Alfalfa—A rather remarkable outbreak of cutworms in alfalfa fields occurred in the state the past summer. A few moths bred from worms sent for identification proved to be *Carncades tessellata*. A large percentage of the worms sent were parasitized, so it is hopeful that they may not be as abundant another summer. One worm, filled with small Encyrtid parasites, was isolated and the parasites counted by Mr. Titus, after hatching. The number from the one worm was 1,096.

Mr. Frank Beach, county surveyor of Bent county, wrote from Las Animas on June 3, as follows: "Dear Sir—We are troubled with millions of worms on the alfalfa. The young alfalfa coming after the hay seems a favorite food for them, and they keep it eaten off to the ground. They also like cabbage, sweet potatoes, rhubarb, lettuce, turnips, etc." On the 18th he wrote: "* * * There are no blossoms in my alfalfa fields; the worms have eaten the blossoms as fast as they appeared. The lower leaves have also been destroyed. Fields cut two weeks ago show no new growth. * * * Irrigation does not seem to affect them. I have tried Paris green and flour, 1 to 20, and it has proven effectual where they were on sugar beets. They are not as numerous now as they were two weeks ago." On June 20 he writes again: "The alfalfa worms are fast disappearing. The alfalfa hay in places stinks from the dead worms in it."

Mr. Beach also reported larvæ of ground beetles destroying the cut-worms in considerable numbers.

On May 16, Mr. M. B. Colt, secretary and local manager of the Alamosa Land and Canal Company, wrote, sending a number of the worms and telling of their injuries to alfalfa. On the 19th of May he sent more worms, and, among other things, said: "The worms sent you were gathered in a space about three feet square. Where they have attacked the al-

falfa they have very nearly destroyed it. They are in patches in the fields from 40 to 100 feet square; other portions of the same field do not seem to be affected and the alfalfa is growing all right. This is the first injury we have had from these worms."

Mr. A. F. Middaugh, of the A. F. Middaugh Mercantile Company, Del Norte, wrote: "Dear Sir—I send you by mail a sample of alfalfa that has been cut off by the worms. * * * They work on the old plants more than on the new. Some fields they clean up in one year. For the last three years they have taken from one-fourth to one-third of my crop. When water is turned on they come to the surface and in places are so thick as to dam the water."

It was from the worms sent by Mr. Middaugh that the parasite mentioned above were reared.

On June 19 Mr. C. J. Lewis, of the Fort Morgan *Times*, wrote to make inquiry concerning "multitudes of worms that were eating the bloom from alfalfa."

Similar complaints came from Mr. Thomas Ashton and Mr. B. D. Prentiss, of Laird, Colo. Frank Payne, of the Cheyenne Wells experiment station, complained that the same worms were eating off melon plants.

The Beet Army-Worm (*Laphygma flavimaculata* Harv.) which was so destructive to sugar beets near Grand Junction in 1899, for some reason, did not appear in injurious numbers in that locality the past summer. The writer visited Grand Junction the last week in May of this year, and made a thorough search for this insect, without finding more than scattering specimens. During August, when the second brood should have been abundant, Mr. E. D. Ball visited the same locality and found only an occasional worm upon the beets.

The very sudden appearance of this insect, which had never before been considered injurious, in such destructive numbers, and its equally sudden disappearance, is quite remarkable. Particularly is this so from the fact that the fall brood of worms in 1899 were but little parasitized and the moths matured in enormous numbers. The latter must have failed, for some reason, to winter over.

Beets were planted extensively for the first time at Rocky Ford and Lamar last spring. The year previous the worms were noticed in considerable numbers in some experimental patches of beets by Mr. H. H. Griffin, who sent speci-

mens to the station. This year the first brood appeared in destructive numbers, and Mr. Ball went to investigate the trouble, and gathered the following points of information concerning it:

The worms began hatching the first week in June, and by the 14th were abundant, and spraying was begun.

Moths were said to be flying abundantly about the beets two weeks before the worms were noticed.

The worms were worst on earliest planted beets. Late planted beets were only injured when near weeds or patches of early beets.

Beets were planted from April 10 to the last of May.

Those who used flour and Paris green found it cost about eighty cents per acre for material.

The poisons were quite effectual, particularly where two sprayings were made with Paris green.

Thousands of the worms were seen migrating, and they were found to be traveling from two to three feet a minute, by the watch.

The worms were found feeding upon native plants and weeds, especially of the beet family. Among these were lamb's quarter (*Chenipodium*, Sp.); Russian thistle, and *Atriplex*.

Other Beet Insects—I also extract the following from Mr. Ball's notes of the past summer on beet insects:

Nysius augustatus (often called "false chinch bug"), more or less abundant everywhere, in some cases causing beets to wilt and die.

Agallia uhleri (a small leaf-hopper), abundant nearly everywhere in the Arkansas valley, doing most of its work at the bases of the leaves.

Platymetopius, Sp., fairly common, but not doing serious harm.

Systena taeniata (a small flea-beetle), in small numbers nearly everywhere, east of Pueblo, in some places, quite abundant.

Monoxia puncticollis, quite abundant in some patches about Rocky Ford.

Deilephila lineata was found as an occasional feeder, especially where purslane was allowed to grow.

Bee Paralysis—The disease which has taken this name in Colorado, and which has been so fatal in limited localities some years, was reported to the station by only one party this year. The report came from Mr. M. A. Gill, of Erie, and was dated May 16.

Black Brood, so far as I am able to determine, does not occur in Colorado. Numerous samples of diseased brood have been received with the question, "Is it black brood?" but in every case the brood has lacked the characteristics of that disease. All the cases examined seemed to be "pickled brood" insead. This latter disease is quite generally distributed over the state, but seldom, if ever, is serious enough to destroy or even greatly weaken a colony.

EXPERIMENTAL WORK.

The experiments of the year have conformed quite closely to the schedule that was presented for the year. Under "Collecting and Rearing Insects to Determine Food Habits and Life Histories" I would say that many species, not hitherto in the collection, have been added, and much has been added to the knowledge of food habits and life histories of the *Jassidae* (leaf-hoppers) through the efforts of Mr. Ball.

The experiments with the codling moth were very successfully carried out at the station, and several parties in other portions of the state have, at my request, made observations and experiments, which have greatly aided me in deciding upon the number of broods in different portions of the state. In this connection I would specially mention the names of Mr. H. H. Griffin, superintendent of the sub-station at Rocky Ford; Mr. Silmon Smith and Mrs. F. R. Smith, of Grand Junction; Dr. R. J. Peare and Mr. Thurston White, of Canon City, and Hon. David Brothers, of Edgewater.

The results of these experiments and observations are reserved for a bulletin, to appear later.

The study of the grasshoppers of the state has progressed fairly well, and will furnish material for a bulletin at some future time.

No new appliances were purchased for the apiary this year, and so no tests of appliances were made. The test of foundations was carried out. Bulletin No. 47, reporting tests of different foundations, was published early in the summer.

The study of foul brood was not completed, owing to a lack of material for cultures at the time when it was needed.

The study of beet sugar insects was begun, and some of the notes on these insects are given above.

All of which is very respectfully submitted.

C. P. GILLETTE.

REPORT OF THE IRRIGATION ENGINEER.

The investigations of the past year have been a continuation of the plans carried on for a number of years past. Besides the many minor questions, the principal effort has been given to essentially two investigations—one on the use of water for irrigation, as applied on different farms and under different conditions, and the other on the seepage or return waters. A report of investigations on the amount of water used was given in Bulletin 22, which has been out of print for a long time. The measurements since made give an additional mass of information, which is being worked up for early publication. The results show the importance of long-continued measurements on the same field, under the varying conditions of successive years, and that conclusions drawn from one or two years' observations may be shown to be very misleading by the longer series. These measurements have included crops at and near Fort Collins, two farms having been continuously used for nine years, at Holly, Rocky Ford, Canon City and Pueblo, besides records of canals on a larger scale. The importance of such data is that a knowledge of the amount of water so needed forms the basis of any reasonable distribution of water on canals, and serves to give a basis for estimate of the possibilities of our water supply.

The measurements of seepage return to streams, which was originally undertaken tentatively, have proven of much importance. Attention was at first directed along this line because the results were large for a moderate expense. Some measurements have been carried on over all the tributaries of the Platte; on the Arkansas, from the mountains to the state line of Kansas; on the Rio Grande, from the canon above Del Norte to the New Mexico line; on its tributary, the Conejos; and on the Uncompahgre, on the western slope. The linear distance is something like eight hundred miles, possibly more. Boulder and South Boulder creeks, Clear creek, Bear creek on the Platte, Conejos and the Uncompahgre were taken for the first time this year. The cost of these particular measurements has been small. The results of this series

of investigations have been to demonstrate the fact that there is return to the streams of a portion of the water taken out for irrigation, and that this gives a constant increase of the area possible to irrigate. The measurement has been more recently directed to determine the important relation between the area irrigated or the amount of water applied, and the amount returning. The extension to the whole Platte valley makes a completeness to the series enabling us to study the amount in the valley as a whole.

Likewise, the study of the losses from canals has been continued. A larger fund of information has been collected. This likewise is leading to more important conclusions than were anticipated, and promises some of the most important deductions yet made. It is tending to show the source of the great losses in ditch distributions, and will lead to important applications in the way of economizing much of this loss, which is now so great.

The investigations on seepage were extended to the Rio Grande some years ago, in anticipation of the questions which it was foreseen might arise on that river to threaten the interests of Colorado irrigators. Such troubles arose as a side issue in the Elephant Butte case, which was on trial at the time of the last annual meeting of the board. Our investigations caused the writer to be consulted by both sides of the case, and his attendance for the defense. The case was one brought by the general government to restrain in the construction of a dam known as the Elephant Butte. An injunction was demanded because it was claimed that the impounding of the waters by the dam would materially affect the navigation of the Rio Grande some 1,700 miles below. The doctrine laid down by the United States supreme court had ominous bearings on the agriculture of the West, because in effect it said that irrigation had no rights which navigation was bound to respect. It was, however, successfully shown that the large part of the river arises in Mexican tributaries, and, in fact, that the river above the Conchos is frequently dry. It was also shown that the river loses so much of its water in the dry or little irrigated regions in southern New Mexico that the contribution of the river above El Paso to the lower stream was not material. The measurements which had been carried on at two stations in southern New Mexico for some years showed a loss of over one-half the flow in a distance of less than two hundred miles. As showing the menace to the western agriculture, it should be said that

the entire navigation, on whose behalf the suit was urged, not at the complaint of the vessel either, consisted of one flat boat, drawing from one and one-half to two feet of water, and making, in the most favorable seasons, from two to three trips per month for a distance of less than two hundred miles.

The examination of the Arkansas conditions has been made with the view that similar questions are likely to arise on that stream.

A continuation of the study of the water flow in a typical irrigation stream has been made. An automatic register has been used and continuous records maintained.

Some arrangements had been made with the department of agriculture for co-operative work. As it was found that co-operation, as interpreted by one of the officers, involved the breaking of a long series of records of investigations originated and carried on by this station, this did not seem advisable unless a modification were made in that regulation.

Some of the duties falling on the head of the section as director of the station, and especially those caused by the rearrangement of the station work, confined the head of the section during the season more than was anticipated. As more of these duties are brought into routine form, the less interruption will be felt from them.

I wish to acknowledge the aid of Mr. R. E. Trimble, who for a long time has been assistant in this section, and upon whom the routine observations have specially fallen; of Mr. Amos Jones, assistant in the department of engineering, for aid in the measurements in the San Luis valley and for other irregular work; of Mr. R. W. Hawley, who acted in the Arkansas valley throughout the summer, traveling in so doing over 1,000 miles on his wheel, and to Mr. Antoine Jacob, a student in the senior class of the Agricultural College, for aid in measurements on the Conejos.

Among the many others who have been of material assistance may be mentioned Hon. B. F. Rockafellow, P. H. Sheridan, F. S. Earle, S. H. Atwater, and A. E. Gravestock, Canon City; C. K. McHarg, Supt. Bentley, and J. S. Greene, Pueblo; Samuel Taylor, Avondale; S. W. Cressey and J. H. Crowley, Rocky Ford; J. H. McClelland, Fort Collins; P. J. Preston and C. W. Beach, Las Animas; W. F. Crowley, W. M. Wiley and T. W. Montgomery, Holly; and M. V. Keator, Artman. Also the following water commissioners: L. H.

Dickson, Longmont; Thos. Kneale, Niwot; W. E. Cole, Golden; Chas. Clark, Morrison; P. H. Shue, Ouray; W. E. Obert, Delta; C. C. Hawley, Fort Collins; J. B. Traxler, Lamar; L. C. Mitchell, Monte Vista; and J. C. Dalton, Manassa.

Many others gave freely of time and information, or even more.

A summary of some of the results is appended.

Respectfully submitted,

L. G. CARPENTER.

SEEPAGE GAINS AND LOSSES.

The measurements to determine the gains or losses from seepage have been continued as in previous years, and a summary is given in the following tables. It is expected to give these reports more in detail and to bring together the measusements made since Bulletin 33, on "Seepage or Return Waters from Irrigation," was issued in 1896. The measurements this year have been extended to several streams in the Platte basin, so that we now have measurements on the Platte and all of the tributaries, and a comparison of these results, it is hoped, will bring out new facts in regard to the laws of the return of water. In general, the conclusions of Bulletin 33 have been sustained, and an increase in the amount of seepage water has been found from year to year. The amounts of increase in the different basins bear different ratios to the acreage, but the cause of this difference can not be confidently given at present.

The measurements in detail have often shown a loss along portions of the streams. This is true of the Platte, the Arkansas and the Rio Grande, at least for portions of the streams. This is quite noticeable in sections of the Arkansas and the Rio Grande, so much so in the latter stream that the loss is not yet explained. The matter is of considerable importance, because in it may be involved the large questions of water rights on those streams. On the Rio Grande the measurement was extended for some forty miles above the section previously measured, going up the Rio Grande to the South Park. The greatest loss has been found at the

rim of the valley. A measurement was also made on the Conejos river, so that we have the principal portion of the streams of the San Luis valley. A measurement was also made on the Uncompahgre from Ouray to its mouth, near Delta, for the first time. These results are summed up in the following tables, all measurements being given in cubic feet per second. The results on the Arkansas river are not worked up at the time of this report:

CACHE LA POUDRE RIVER.

	1900 July-Aug.	1900 Aug.-Sept.
Weir to water works	+5.08	+4.38
Water works to L. and W.	−3.13	+4.15
L. and W. to No. 2 supply	.....	−3.56
Supply to Strauss bridge	.....	+11.49
Strauss to No. 2 canal	−16.84	+1.37
No. 2 to Eaton ditch	+5.63	+3.08
Eaton to No. 3 canal	+6.30	+1.30
No. 3 to mill power canal	+30.17	+21.40
Mill power canal to Camp ditch	+34.29	+24.49
Camp ditch to mouth	+43.39	+34.85
Totals	.....	110 02

BIG THOMPSON CREEK.

	Distance Miles	1900 July	1900 September
Home supply to Barnes' ditch	5.7	+8.18	+8.67
Barnes' ditch to Loveland and Greeley canal	3.1	+6.27	−9.28
Loveland and Greeley to Big Thompson ditch	10.5	−4.63	+9.08
Big Thompson to Hill and Brush ditch	5.3	+7.98	+3.01
Hill and Brush to Big Thompson and Platte River ditch	10.6	+8.80	+5.09
Big Thompson and Platte to the Evans town ditch	11.0	+25.25	+11.50
Totals	46.2	+51.85	+28.07

LITTLE THOMPSON.

	Distance Miles	1900 September
Eagle ditch to Dry creek	3	+1.91
Dry creek to Rockwell ditch	2	+5.19
Rockwell to Miner & Longdon ditch	3	+3.89
Miner & Longdon to mouth	6	+10.93
Total	14	21.92

ST. VRAIN CREEK.

	1900 October
Lyons to the Oligarchy ditch	—5.76
Oligarchy to the Niwot ditch	+2.85
Niwot to the Boulder-Weld county line	+14.72
County line to Boulder creek	+10.47
Boulder creek to Fleming place	+5.58
Fleming place to Platte river	+8.55
Total	+36.41

LEFT HAND CREEK.

	1900 October
Johnson ditch to Holland ditch	+1.25
Holland ditch to Williamson and Way ditch	+0.39
Williamson and Way to one mile west Burch school	+0.18
Burch school to St. Vrain creek	+6.01
Total	+7.83

From both St. Vrain and Left Hand, 44.24.

BOULDER CREEK.

	1900 October
Gaging station to Valmont bridge	+13.65
Valmont bridge to Leggett crossing	+ 3.86
Leggett crossing to Boulder-Weld county line	+11.60
Boulder-Weld county line to mouth	— 1.49
Total	+27.60

SOUTH BOULDER CREEK.

	1900 October
Gaging station to Dry creek	+ 0.93
Dry creek to mouth	+ 0.12
Total	1.05

From both Boulder and South Boulder, +28.65.

CLEAR CREEK.

	1900 October
Three-quarters mile above Golden to Rocky Mountain ditch	— 2.48
Rocky Mountain ditch to Slough branch	+ 8.02
Slough branch to Jefferson-Arapahoe county line	+ 4.36
Jefferson-Arapahoe line to Clear creek and Platte river ditch	+ 3.75
Clear creek and Platte river ditch to mouth	+ 2.15
Total	+15.80

BEAR CREEK.

	1900 October
Morrison to Pioneer Union ditch	+ 3.70
Pioneer Union to Jefferson-Arapahoe county line	+ 9.53
Jefferson-Arapahoe line to mouth	+ 2.48
Total	+15.71

RIO GRANDE RIVER.

	1900 August
South Fork to United States gaging station	+48.15
United States gaging station to Del Norte	—25.95
Del Norte to Off's	+21.69
Off's to the Prairie canal	—10.05
Prairie canal to Monte Vista bridge	— 3.24
Monte Vista to San Luis canal	+21.89
San Luis canal to Hickory Jackson ditch	+13.78
Hickory Jackson to Alamosa	+ 0.14
Alamosa to above mouth of Conejos river	+ 0.24
Above Conejos river to below mouth of Conejos	— 0.35
Below mouth of Conejos to Los Sauces	+ 1.75
Los Sauces to Iron bridge	— 5.09
Total	+62.96

The first section above given has been measured for the first time in 1900, and, in comparing with the results of previous years, should be left out of account.

CONEJOS RIVER.

	1900 August
Gaging station to San Juan bridge	+ 2.09
San Juan bridge to Conejos bridge	—22.12
Conejos bridge to Cerritos	+ 0.30
Cerritos to San Antonio creek	— 1.02
San Antonio creek to McIntire place	+ 6.65
McIntire place to McIntire Springs	+ 3.00
McIntire Springs to mouth	+ 6.88
Total	— 4.22

UNCOMPAHGRE RIVER.

	1900 November
Bachelor mine switch to 11th correction line	+1.10
Eleventh correction line to Ridgeway	+23.28
Ridgeway to 6½ miles below Ridgeway	−2.65
Six and one-half miles below Ridgeway to Ouray-Montrose county line	+11.10
Ouray-Montrose county line to Stark bridge	+10.23
Stark bridge to Montrose	−0.09
Montrose to mouth of Spring creek	+19.43
Spring creek to Olathe	+15.97
Olathe to Boles & Manny ditch	−4.04
Boles & Manny ditch to mouth	+14.23
Total	+88.56

REPORT OF THE ARKANSAS VALLEY SUBSTATION.

The policy of the sub-station this year has been different from that of former years, in that less work has been attempted upon the property belonging to the station, thus relieving the superintendent of many of the duties connected with the farm, and enabling him to apply much of his time to observations and investigations in different parts of the valley.

The superintendent has visited the valley from Pueblo to Holly, and has put in approximately one-half of his time in this outside work. Two visits were made to points east of La Junta, one to Pueblo, three to Ordway, and much time given to observations at points between Manzanola and La Junta.

The principal field work of the season has been done with the cantaloupe and sugar beet, giving some attention to questions relating to the tomato. Attention has been given to matters of minor importance in so far as it might give us an insight into the work of the future.

The operations on the station proper have included work with the following: Cantaloupes, sugar beets, tomatoes, legumes for green fertilizers, pasture plants, potatoes, wheats, care of experimental orchard, codling moth (in orchard of Mr. Crowley), meteorology, and distribution of seeds.

The 200 acres controlled by the station have been leased the past season to four different parties, except about fifteen acres reserved for experimental purposes. From the leased land some information of experimental value has been secured, besides a considerable revenue, lessening the net cost of the sub-station by about $1,000.

CANTALOUPES.

The experiments with the cantaloupe have included the following lines of work:

1. Noting the amount and distribution of the blight.

2. Use of the Bordeaux mixture in the control of the disease.

3. The proper times and amount of spray.

4. Effect of the Bordeaux upon the quality of the fruit.

5. Potassium sulphide as a spray for control of the blight.

6. Cross fertilizing of the cantaloupe with its own pollen; also with that of the cucumber, pumpkin, squash and watermelon.

7. Effect of seed selection.

Observations were made over the valley from Pueblo to Holly for the purpose of noting the distribution of the blight. At every place visited, except Pueblo, we found the disease prevalent. There seemed to be no uniformity in regard to the extent to which the disease attacked the fields. Severe cases of it were seen in almost every locality.

The results with the use of the Bordeaux have confirmed those of last year, as reported in Press Bulletin 4 and in the local press. Upon the station about five acres were used in the spraying experiments, together with four acres sprayed for Mr. Deweese, all of which were comparable with adjoining fields. In addition to the above we had under observation four fields sprayed by farmers. Two early sprayings were given two acres on the station, and the same were given those of Mr. Deweese. One acre on the station was sprayed once, quite late in the season, and a small area was given three sprayings. Those under observation outside were given from one to three sprayings.

The season was not a favorable one for the spread of the disease. The summer was extremely dry, and in many places the blight was not severe enough to injure the vitality of the plant, hence the results are not so marked as they would have been had the weather been more moist. However, on the station, the benefit to the vines was quite apparent, but the most benefit does not lie in the visible preservation of the vines so much as in the preservation of the quality of the fruit, together with the manner in which the fruit ripens.

The parties picking the cantaloupes on the station saw a marked difference in the time and manner in which those on the unsprayed vines ripened, as compared with those sprayed. Unsprayed melons ripened rapidly, and the ripening period was two weeks shorter than when sprayed, the

difference in quality corresponding in the same degree. The remark was made by many who saw the sprayed portion: "How nice and green your vines appear!" They were strong and healthy to the time of frost.

In every instance, those under observation confirmed the results of the station in a greater or less degree.

Observation shows that this disease often impairs the vitality of the vine and reduces the quality of the fruit, when it does not appear to have spread to an injurious extent. The cultivator may not even be aware of its presence.

One row 500 feet long was sprayed with potassium sulphide in water, at the rate of one pound to fifteen gallons of water, at which strength it burns the foliage without any apparent value as a remedy for the disease.

One hundred and ninety-five crosses were made in our study of cross fertilizing as above mentioned. We were successful in securing three fruits of the cantaloupe crossed with its own pollen, and a cross of the pumpkin upon the cantaloupe. In the other attempts there was no success.

Three grades of seed were used in a test of the effect of seed selection upon the resultant crop. The results show a difference of seven per cent. in the amount of first-class fruits between the first and third-grade seeds.

SUGAR BEETS.

Observations and experiments upon the following subjects have been made with the sugar beet:

1. Time and manner of planting to secure a stand.
2. Use of various implements in overcoming the formation of a crust over the young plant.
3. Time and amount of irrigation as affecting yield and quality.
4. Depths of planting.
5. Sub-soiling.
6. Effect of seed selection upon the resultant crop.
7. Kinds of insects infesting beets and remedies for their control.

The earliest planting of which I am aware was done on April 9. The weather conditions during April were unusual. During the month 7.16 inches of rain fell, which was well distributed, the weather remaining comparatively warm and

favorable to germination. So much rain fell during April and May that but little irrigation was required for germinating the seed, hence there was little difference in the manner of planting. In most instances good stands were secured, and where failure resulted it was more often due to deep planting than to any other cause.

The greatest difficulty the farmer had to overcome this year was the formation of a hard crust upon the surface of the soil, through which the young plants could not penetrate. To destroy this crust with the least injury to the plant and soil was, then, the problem. The implements used for the purpose were the roller, light harrow and spider-feet of the beet cultivators.

Comparison of the different implements has shown that the harrow is the most efficient, used in the early morning when the soil is damp. Rolling the crust has a tendency to bruise and injure the young plants. A comparison of the two methods shows much better stands from the use of the harrow.

In most cases two or three irrigations were required for the maturing of the crop. Upon a four-acre field, of uniform fertility, of the station, we had an opportunity to study what effect the amount of irrigation may have upon the tonnage and sugar content.

This field was first irrigated from the fifth to the eighth of July; a second time from August sixth to tenth. A portion of the field was irrigated for the third time on the sixteenth of August. The latter yielded at the rate of seventeen and one-fourth tons per acre, while the remainder gave but eleven and three-fourths tons per acre.

The highest percentage of sugar with two irrigations was twenty per cent., and the lowest fifteen per cent. The three irrigations showed seventeen per cent. the highest, and fifteen per cent. the lowest. The results would seem to indicate that the tonnage may be appreciably increased by the judicious use of water without a corresponding decrease in the sugar content, but the maturity of the beet will be retarded, which fact must be taken into consideration.

For the purpose of testing to what depth planting should be done to secure the best results, five plantings were made, respectively, one, one and one-half, two, two and one-half, and three inches in depth.

The depth of covering was so gauged that perfect accuracy was obtained and the results are as follows:

With the one and one and one-half inch plantings perfect stands were secured; and with the two inch planting one-half a stand. A few plants came up at two and one-half inches, but deeper than this none appeared. Germination was secured by rainfall, so that the conditions were uniform, and the results are positive as to the depth to which beet seed should be planted.

Two years ago beets were selected that analyzed from seventeen to twenty-three per cent. of sugar for the purpose of planting, to note the effect of seed selection upon the future crop. Seed was grown from them last year, and this season it was sown. Samples were taken at different times for analysis of those grown from parent beets, showing seventeen and twenty-one per cent. of sugar.

The results are disappointing, in that there was no special difference in the sugar content of the different samples. The results would indicate that perhaps more depends upon proper care and cultivation than upon seed selection, where, as in this case, both selections are made from high-grade beets.

The sugar beet has not been free from the attacks of insects, viz., the grasshopper, leaf-roller (*Agallia*), false chinch bug (*Nysius*), two species of cutworm (alfalfa worm), blister beetles, and beet army-worms. The most serious damage was done by the leaf-hoppers and beet army-worms. The former did more or less damage the whole season, but not of a serious nature. The latter appeared about the middle of June, and threatened for a time to destroy some fields.

Observations were made upon sprayings performed with Paris green and water (one pound to 75 and 100 gallons), and with white arsenic (one quart of the solution to fifty gallons); also upon the use of Paris green and flour mixture to dust the plants.

I conducted some trials with Paris green and water (one pound to fifty gallons), to which was added one pound of soap; also the use of a quart of strong kerosene emulsion to the barrel of water. The soap proved to be a valuable addition to the Paris green spray, as it made the poison adhere to the leaf and distributed it more evenly over the surface. The work of the season showed that the Paris green spray must be used as strong as one pound of poison to fifty or seventy-five gallons of water for success.

The arsenical solution was quite effective, and considerable benefit was derived from the dusting; but the plants are not well covered by the latter method, besides it is too expensive. The use of the poison and soap mixture completely destroyed the worms in the field in less than three days.

TOMATOES.

The following lines of investigation have been under way with the tomato:

1. Field planting vs. transplanting.
2. Early and late transplanting as affecting yield and ripening.
3. Transplanting in the field.
4. Early and late pruning as affecting production and ripening.

The above work was of a preliminary nature. There is a considerable failure on the part of the tomato to fruit, and the experiments were planned looking to a study of the cause. Many are the reasons ascribed, but careful experimenting proves that not all the theories put forth are correct. The yield was not nearly as good from the field-grown plants as from the transplanted ones.

Early transplanting gave much better results than late, and no benefit was secured from transplanting in the field. No benefit was derived from the pruning, except possibly a few tomatoes ripened a few days earlier on the late pruned vines.

LEGUMES.

The work of testing leguminous crops for green fertilizers has been continued with the following plants: hairy vetch, cow pea, and soy bean. Three plantings of the hairy vetch were made in the fall of 1899, for the purpose of testing the time at which it may be sown in the fall and make a fertilizer for the succeeding year's crop. The plantings were made August 31, September 26, and October 10. The planting of August 31 stood about two feet high by the twelfth of May and commenced to bloom. The planting made the twenty-sixth of September was about one foot high by the twelfth of May and would have made splendid pasture. The area devoted to these two sowings was six-sevenths of an acre, from which 3,000 pounds of straw and seed was har-

vested, besides a vast amount of aftermath remaining on the ground. The yield of seed was 300 pounds. This plant promises to be a valuable acquisition to the agriculture of this section as a forage plant, a green fertilizer, for bee forage, and as a soil binder in the spring. We now have it in such a position that we will be able to secure comparative results with it as a fertilizer another year.

The splendid results secured where alfalfa is employed as a fertilizer show the necessity and advisability of employing nitrogenous crops as fertilizers for this soil. The many places where alfalfa can not be used compels the use of some other legume.

The cow pea is a valuable plant for green fertilizing, as well as for its grain. About one acre was grown this year, but at present the threshing is not completed and yields can not be reported. Root tubercles were plentiful upon both this plant and the hairy vetch, and the amount of vegetable matter left upon the ground after harvesting is such as to commend them to all who wish a soil improver.

The medium soy bean grows and bears well, and its fertilizing value to the soil is no inconsiderable amount. Unfortunately, we have not been able to thresh out the grain to show what it produces, but I estimate it will yield from fifteen to twenty bushels per acre. This is such as to warrant its growth for grain and forage, in addition to the fertility derived.

PASTURES.

The testing of grasses for pasture has been continued. Those under observation the past year were orchard grass, brome grass (*bromus inermis*), perennial rye grass, and a sowing in August of the fall meadow oat grass. The first mentioned has proven its adaptability to this section. It resists drought, makes good growth, and cows pastured upon it do well. The bromus has proven to be of no value to this section. It makes some growth in the early spring, but does not withstand the heat of summer. Pasturing shows it to have but little nutritive value. The perennial rye grass has been under observation only one year, but it gives promise of good results. The growth is good and a heavy sod is formed. It remains green during the hot summer, and stock eat it with avidity.

POTATOES.

We have continued some investigations to gain further information as to why this crop is not a success in this section. The past year has shown that to the climate to the greatest degree, and not to the soil, must be ascribed the failure. The work on the station was a comparative one as to the manner of planting. Alfalfa sod was selected for the purpose, which was fall and spring plowed. About three weeks before the time of planting, half of the land was irrigated and when dry enough was plowed, and the seed planted in the furrow. The other half was planted and afterwards irrigated in furrows. The purpose of this was to note the effect upon the crop of the different means of germinating the seed.

Equally good stands were secured on each section, and the treatment throughout the season was the same. The summer was extremely hot and dry, and both sections were entire failures.

Observations of other fields that were comprised of low-lying, sub-irrigated lands, which gradually merged to that which was higher, dryer and more sandy, revealed the cause to which success or failure is due. Upon the low, wet land, where cool conditions could be maintained, somewhat satisfactory results were secured; while, on the other hand, where such conditions could not be obtained, the result was a failure.

WHEAT.

The varieties of wheat recorded in the report of 1899 as being sown in a field way were turned over to the leasers, hence complete records could not be secured. Some of the same varieties were duplicated in small plats in an experimental way, and from observations of their growth and behavior we have discarded all but two varieties, viz., Ruby and Defiance. In a field way the latter yielded sixty-seven bushels from 2.7 acres of land. The seed was sown the latter part of January.

Both of the above varieties are either spring or winter wheats in this section, and the possibility of their being sown so late makes them especially desirable kinds. Often, weather conditions and water supply are such that wheat can not be sown early in the fall, but favorable conditions

may prevail at winter periods. This is many times an advantage to the farmer. In point of yield and milling properties these varieties have no superior among those tested. Of the strictly winter wheats, the "Hunter's Winter" was the most desirable one tested. It ripens about the twenty-fifth of June, and thus is harvested before hot weather occurs, which is apt to shrivel the grain and reduce the yield. From one pound of the "Defiance" seed, eighty pounds of grain were secured, and from one pound of "Ruby," seventy-nine pounds of grain.

ORCHARD.

Many of the trees in the old orchard have shown that they were not adapted to this section, and for that reason they have been cut down. The varieties of apples remaining are the Duchess, Ben Davis, Early Harvest, Whitney No. 20, Wealthy, Kirkbridge Early White, Red Astrachan, Salome, Saps of Wine, Missouri Pippin, Walbridge, Utter's Red, Bellflower, Arkansas Black, Northern Spy, McIntosh Red and McMahon's White. Some trees that failed to grow in the new orchard have been replaced, and to these have been added some new varieties for testing. Very good growth of all kinds has been made. There still remain some vacant places that should be filled by new and promising kinds.

ENTOMOLOGY.

In connection with the section of entomology considerable work has been done with the codling moth. For this work the Hon. J. H. Crowley kindly placed at our disposal such trees as were desired. Complete notes were kept and the records furnished Prof. Gillette. Bearing trees in the station orchard were used in a study of the percentage of worms remaining in the apple at the time of harvest, and a further study of the percentage of wormy apples on the trees at harvest time.

The records now contain the results of three years' work, along different lines, in a study of this insect, and give us some information desired by the horticulturist as to its habits and control.

METEOROLOGY.

The meteorological observations have been continued and reports made to the weather bureau, section of meteorology, and the local press. Some of the back records have

been compiled and use made of the same by parties interested in beet culture.

SEEDS.

As the policy of the station has been to distribute the work over the valley and to give the tests as wide a range as possible, some co-operative tests with farmers were inaugurated with different field crops. For this purpose the following kinds of seeds were distributed and reports will be collected: Cow peas, soy bean, coffee pea, White Kansas, Iowa Silver Mine, and Golden Beauty corn; cantaloupe, and hairy vetch.

Eighteen parties received seed. The objects for which they have grown them are: fertilizer, forage, cover crops, grain, bee forage, and test of the distribution of cantaloupe blight.

FEEDING.

Late in November arrangements were made for the feeding of sheep on sugar beet pulp.

The principal object of the feeding is a comparison of the pulp with corn as a fattening food for sheep, and the establishment of a value for the former with the latter. About 250 head will be fed.

Respectfully submitted,

H. H. GRIFFIN,
Superintendent.

REPORT OF THE PLAINS SUB-STATION.

In the main, the work was carried out as it was planned.

Weather—A very heavy rainfall in April soaked the soil to a depth of from three to six feet. The rainfall in the succeeding months was light and poorly distributed for the growth of crops. A record of temperature, wind, rainfall and relative humidity of the air has been kept throughout the year, as in previous years. I have also acted as a volunteer weather observer for the United States weather bureau.

HORTICULTURE.

All fruit trees made a good growth this year. Three apple trees blossomed. One Duchess of Oldenburg, which was located where no extra water could reach it, matured two apples, which were fine specimens. Two Missouri Pippin trees blossomed, but only one matured fruit. It produced fourteen mature specimens of medium size. These Missouri Pippin trees are located where they get some water from the prairie, and the one which matured fruit is so near the house that some waste water was given it.

Plums—Several varieties blossomed. Some extra fine fruit was produced, but no trees bore what could be called a good crop. Some of these trees were set in 1894 and some in 1895, and the record is so incomplete that we can not give the names of the varieties which produced fruit. Of the varieties set in 1897—three each of Weaver, Rollingstone, Wolf, Cheney and American Eagle—one Wolf tree is dead, but two Wolf plum trees bore some fine fruit; one Cheney tree also bore some good specimens; the other three varieties bore no fruit. The wind caused considerable loss of fruit.

Cherries—Early Richmond, Early May and English Morello trees bore good crops. One small English Morello tree was so loaded that the leaves were scarcely visible. The common Morellos bore a small crop, while the Rocky Mountain cherries were loaded, as usual, with fruit, which is of doubtful quality. They appear to be the same as the dwarf cherries found growing on the chalk hills upon the plains.

Cultivation has increased the size, and selection has reduced the bitter principle, but the main characteristics of the choke cherry remain.

Gooseberries—The Downing and Houghton gooseberries both bore good crops.

Apricots—The Russian apricots set in 1899 all lived and grew well this year. None bore fruit.

Peach Trees—Twelve of the nineteen peach trees set in 1899 are still alive. Twenty-four more were set this year, but, on account of an accident at the time of setting, only a few lived.

Dewberries—In 1899 fifty each of Lucretia and Mammoth dewberries were set on the north side of a sod wall, where much moisture collects. Twenty of the Lucretia and five of the Mammoth plants lived. Some fine fruit was produced by the Lucretia plants this year. A few blossoms were seen on the Mammoth plants, but no fruit matured properly. The Lucretia plants have spread like they considered themselves at home.

Blackberries—Of the one hundred and fifty plants set in 1899, only a few are now alive. These are not thrifty.

Raspberries—None of the plants set in 1899 are now alive. The old stock of Cuthbert raspberries set in 1894 continue to live, but they have never borne more than a few berries any year.

Crabapples—All but one of the crabapple trees set in 1899 are alive. They have made a good growth.

Pears—The six dwarf pear trees set in 1899 have made a small growth, and are still in good condition.

FOREST TREES.

The ash, black locust and Russian mulberry trees, which were planted around the orchard in 1895 now make quite a good wind-break, although they are sixteen feet apart. The black locust, ash and box-elder, which have grown from seeds planted in 1897, are still thrifty. Of the thirty varieties of seed planted in 1899, only black locust, honey locust, walnut and coffee bean have grown. Nearly all these germinated in 1900.

Russian Mulberries—In 1897 we planted five rows of Russian mulberries across the field at intervals for wind-breaks. Observation has shown that the harm they do or-

dinary crops by taking up the moisture outweighs the benefits derived from their use. I have found the roots of a Russian mulberry, which was not more than six feet high, fifty feet from the shrub to which they belonged. One row was grubbed out in 1900. The others should be grubbed as soon as convenient.

The following table gives result of the tree planting done in 1899:

Variety.	No. Planted in 1899.	No. Alive Oct. 1, 1899.	No. Alive Oct. 1, 1900.
Elm	100	43	43
Honey locust	1,000	424	331
Ash	1,000	414	378
Catalpa	100	90	77
Wild black cherry	100	16	11
Russian wild olive	10	10	10
Russian apricot	12	12	12
Pear (dwarf)	6	6	6
Cherry (cultivated)	6	4	4
Crabapple	10	9	9
Peach	19	12	12
Prune	5	1	1

Garden—A small garden was quite productive. Beans, peas, radishes, lettuce and onions from sets did well. We have failed, always, to raise onions from seed.

Potatoes—One-half an acre of Early Ohio potatoes was planted. These, in common with nearly every potato patch in eastern Colorado were almost an entire failure. The cause was an attack of potato beetles (*Meloidae*), followed by prolonged drought.

Sweet Potatoes—Two hundred plants were set. They yielded at the rate of ninety bushels per acre.

Melons—Several varieties of watermelons and muskmelons were planted. Cutworms did much damage when the plants were small. The vines which lived bore fair crops. The coyote is one of the worst enemies with which the watermelon grower has to contend. Coyotes are as fond of ripe watermelons as piccaninnies are said to be.

Squash—Several varieties were planted. Squash bugs took all the vines that the cutworms left.

Cucumbers—Cucumbers produced a good yield. They were not attacked by any enemies, and have proved to be one of the most profitable of all garden crops.

Sweet Corn—Maule's First of All, Nonesuch, Country Gentleman were planted. This gave a long roasting-ear season. Each variety produced a light crop, on account of lack of rain at a critical time.

Popcorn—White Pearl was the only variety planted. It produced a good crop of corn, and the largest crop of corn fodder which was grown on the place this year.

Flowers—Sweet peas, nasturtiums, portulacca, hardy phlox, cosmos, marigolds, oxalis and balsams were planted where waste water from the house could be given them in time of need. It was used on all except the balsams, which seemed to do well with only the natural rainfall. In order to obtain the greatest possible benefit from the water, it was usually applied warm, and was poured into trenches beside the plants. Then, as soon as the water had soaked into the soil, the trenches were filled with loose, dry earth. The sweet peas bore enormous crops of flowers and all the other varieties did well. The cosmos did not begin to produce flowers until October 1. The plants were a blaze of blossoms from that time until killed by the freeze, October 30. They successfully withstood a temperature of 26 degrees F. These were photographed, and photographs will be filed later.

FIELD CROPS, 1900.

Canada Field Peas—A small plat of Canada Field Peas was planted. The yield was so light that they were not harvested.

Cow Peas—Taken by grasshoppers. This is the first time we have failed to raise cow peas here.

Tree Beans—Taken by grasshoppers.

Oats—One variety of oats, U. S. No. 2788, was sown April 14. The yield was eighteen bushels per acre.

Wheat—One variety of spring wheat, U. S. No. 2953, was sown April 14. The yield was ten bushels per acre.

Grass—Bromus inermis, Agrophyrum tenerum, Agrophyrum cristatum (seed furnished by the United States department of agriculture) were sown April 3. Very little germinated. None can be found on the plats now. Paspalum dilatatum (Australian seed) also failed to grow.

Bromus Inermis—Seeded in 1898, on a two-acre plat; still shows a good stand on about four square rods. Some of it grew sixteen inches high this year. We have left all parts of the plat where any grass shows, in order to give the grass a chance to spread and become thicker, as it is supposed to do. We can not see that it is any thicker than it was a year ago.

Sand Vetch—A plat of Vicia villosa was planted. The seed was furnished by the United States department of agriculture. A good stand was obtained. Twice before we have obtained stands of Vicia villosa, which were destroyed by accidents before the merits of the plant could be tested. But this is in a place where it can be left, undisturbed, indefinitely.

Hagi—Seed furnished by United States department of agriculture. It was planted April 24. A few plants, which closely resemble Lespedeza, native in central Kansas, have been obtained. They are now about a foot high.

Flax—One-half an acre of Russian flax was planted this year. A few feet of row was planted in 1898, and the same amount in 1899. Both these trials showed well-filled bolls. The plat this year produced a yield of eight and one-third bushels per acre. It was planted April 4 on ground plowed five inches deep and carefully prepared. It was cut July 9.

Alfalfa—The one-half acre of alfalfa sown in 1897 and two acres sown in 1899 were cut May 30, yielding about one-half ton per acre. The same ground was cut over again July 9, and a crop of Russian thistles taken from it. These are stacked for use during the coming winter. After this crop was taken off a part of the ground was disced to cultivate the alfalfa. So far, we have seen very little result from the summer discing. We feel sure, however, that the disced portion was not injured by the treatment.

Sorghum—Nine varieties of sorghum were planted in large plats. An accurate account was kept, showing the time spent in planting, cultivating and harvesting. All were planted with a lister drill, May 4 to 10, and were given careful field culture, consisting of harrowing and plowing at such times as seemed necessary when following rational farm practice, the object of which is to make the crop pay, financially. Once, on account of not being able to cultivate at the right time, a part of the crop became so weedy that the weeds had to be cut out with a hoe. This increased the ex-

pense, but it is included in the estimate of expenses, because such things frequently happen in farm practice.

The cost of producing one acre of sorghum and putting it into the shock was:

Labor of man and team, per acre	$2 07
Three pounds of seed at 2 cents, per acre	06
Feed of team and wear of tools, per acre (estimated)	25
Total cost per acre	$2 38

Only twenty-five acres were planted. By raising it on a larger scale, we believe that the cost would be considerably reduced.

The seed of Early Amber, Colman, Edgar and Folger's Early was furnished by the United States department of agriculture. The other varieties were bought from seedsmen. The following table shows the yields of the varieties:

Name	Yield of Fodder Per Acre, Pounds	Yield of Seed
Early Amber	2,178	Very little seed
Collier	1,971	No seed
Edgar	2,430	No seed
Colman	3,132	No seed
Folger's Early	4,095	No seed
Early Orange	2,394	No seed
White African	2,700	No seed
Kansas Orange	3,591	Considerable seed
Early Minnesota	2,835	Considerable seed

The following table gives the results of some sorghums grown in small plats:

Name	Yield of Fodder Per Acre, Pounds	Yield of Seed
Honey Dew, from U. S. department of agriculture	5,400	Good yield of seed
Chinese, from U. S. department of agriculture	5,400	Seed badly mixed
No. 161, from U. S. department of agriculture	5,000	Much seed ripened

Early Amber, from Joseph Ruby, Thurman, Colo., planted June 7; ripe September 1.
No. 939, from U. S. department of agriculture, planted April 24; ripe August 20.

No. 939 is from seed obtained in northern Siberia. It grew but little leaf and a hard stalk.

Black-hulled white Kafir corn was planted May 10. A poor stand was obtained. It matured no seed, but grew tall, and made very thick, heavy stalks. The yield was estimated at 1,245 pounds per acre.

A small plat of Brown Durra was put in on plowed ground with a planter drill. It was so thick in the row that it made very small heads and a heavy weight of leaves. The yield of fodder was estimated at 2,000 pounds per acre. The yield of seed was not estimated.

CORN AT THE PLAINS SUB-STATION.

The full record of the corn trials at the sub-station are here inserted, to make the record of the crops as given in the last annual report complete. The tests have been as follows:

1894—Four varieties, planted May 10 to 16: Will's Gehu, failure; Pride of the North, some fodder; Queen of the Field, fodder; White Australian, fodder.

1895—Eight varieties, planted from May 23 to 25: Pride of the North, a good yield of fodder; Early Sanford, Red Cob Ensilage, Reiley's Favorite, Leaming 90-day, Goddard's King of the Early, Early Mastodon and Colorado White, fodder.

1896—Twelve varieties, planted May 18 to 26: Will's Gehu, a few nubbins; the remaining varieties fodder only—Pride of the North, Queen of the Field, White Australian, Early Sanford, Colorado White, White Kansas King, Eclipse, Giant Long White Flint, Imperial Leaming, Early Butler and Early Thompson.

1897—Planted from May 15 to 17.

Variety.	Yield Per Acre.
Will's Gehu	6.19 bushels
Pride of the North	4.90 bushels
Queen of the Field	12.30 bushels
White Australian	9.10 bushels
Early Sanford	22.00 bushels
Reiley's Favorite	22.68 bushels
Colorado white	2.00 bushels
White Kansas King	4.00 bushels

Variety.	Yield Per Acre.
Eclipse	7.30 bushels
Gt. Long White Flint	7.70 bushels
Imperial Leaming	6.60 bushels
Early Butler	5.00 bushels
Snowflake White	7.70 bushels
Pearl White	10.30 bushels
Giant Mexican, fodder	fodder
Longfellow	19.10 bushels
Minn. White	19.30 bushels
Minn. King	11.90 bushels
Drought Register	9.80 bushels
Iowa Gold Mine	11.60 bushels
Negro Equality	3.80 bushels
Rustler	16.70 bushels
Mercer	18.70 bushels
New Leaming	9.90 bushels
Murdock's 90-day	10.60 bushels
Champion Early White Pearl	8.90 bushels
Extra Early Huron	9.30 bushels
Angel of Midnight	7.50 bushels
Golden Beauty	9.20 bushels
Early Huron	8.50 bushels
Houghton's Silver White	11.80 bushels
South Dakota Flint	6.00 bushels
Brazilian Flour	1.30 bushels
North Dakota Flint	8.80 bushels
Swadley	9.10 bushels
Early Eclipse Yellow	1.50 bushels
King Philip	6.60 bushels
Squaw	7.80 bushels
Canadian Yellow Dent	5.70 bushels
Wh. Cap Yellow Dent	6.50 bushels
Waushakum Yellow	6.90 bushels
Wisconsin Early White	2.50 bushels
Evergreen Sw., fodder	720 pounds
Southern Ensilage	2070 pounds
Giant, fodder	2160 pounds
Superior, fodder	2052 pounds
Elephant, fodder	1494 pounds

Variety.	Yield. Per Acre.
Early Ripe, fodder (some seed)	2538 pounds
Early Yellow Rose	.50 bushel
Dakota Dent	6.40 bushels
Parson's White	8.20 bushels
Golden Row	15.40 bushels
Star Leaming	6.90 bushels
Queen of the North	5.60 bushels
1898—Planted May 21 to 23—	
Pride of the North	12.0 bushels
Queen of the Field	12.3 bushels
Mercer	14.0 bushels
New Leaming	10.8 bushels
Murdock's 90-day	10.0 bushels
Golden Beauty	8.6 bushels
Early Huron	4.5 bushels
Houghton's Silver White	13.1 bushels
South Dakota Flint	8.6 bushels
North Dakota Flint	15.0 bushels
Swadley	13.0 bushels
King Philip	13.4 bushels
Squaw	12.3 bushels
Canadian Yellow Dent	9.6 bushels
Best home grown mixed (planted on packed ground)	12.7 bushels
Best home grown mixed (planted on unpacked ground)	10.7 bushels

1899—Planted May 15. Three varieties: Pride of the North, 3.0 bushels per acre; Best Home-Grown Mixed (planted on packed ground), 3.0 bushels per acre; Best Home-Grown Mixed (planted on unpacked ground), 2.7 bushels per acre.

1900—Six acres were planted May 4 to Salzer's Earliest Ripe fodder corn. It tasseled when it was from three to four feet high. The yield of fodder was very light, and it produced only about four bushels of grain per acre.

SOIL MOISTURE.

So much rain fell during April that the ground was wet to from two feet and ten inches to more than six feet. It was thought desirable to observe the movement of the moist-

ure during the season, so twenty-seven places were marked for observation—these representing a great variety of local conditions concerning the amount of water which could collect at the different locations. Observations were taken by boring and examining the soil by feeling it with the fingers. While this is not a delicate test, yet when no moisture can be felt in the soil by the fingers, plants do not do well when growing in it. So, for practical purposes, we considered it of some value.

The plan was to take observations twice each month during May, June, July and August; but other work interfered, so that only three observations were taken. These were taken May 1, July 28 and August 22. The auger used was only six feet long, so at the first test there were six places where the auger did not reach dry soil. Leaving these and others concerning which the records show incomplete tests out of the calculation, the test showed:

May 1—Moisture from the surface to 3 feet.....2.3 in. av.
July 28—Moisture from 6 inches below surface to 4 feet.....2.6 in. av.
August 22—Moisture from 9.7 inches below surface to 3 feet.....2.6 in. av.

INVESTIGATION OF EASTERN COLORADO.

This work was done by traveling about the country in a spring wagon. During the summer we traveled more than thirteen hundred miles. Settlers were interviewed and their evidence recorded. The investigation was confined mainly to Kit Carson county and the eastern half of Arapahoe county. Stock raising is the main business in all communities, except near Vernon and Idalia. Small herds occupy the uplands, where water is scarce. The large cattle companies are confined to the valleys, where water is plentiful. Those keeping small herds usually raise feed to carry their stock through the winter storms. But nearly all stockmen prepare to feed the weak animals. Near Vernon and Idalia wheat raising is still the main business, and some seem to have done well. Some alfalfa is raised in the valleys of the Republican, but nowhere on an extensive scale. Native hay is cut every year in the valleys, and on the uplands about two years in every five.

Those parts of the country where water is readily found by digging or boring have held the settlement, but where water is hard to find the country is deserted.

Fruit—Hundreds of orchards have been set out, but now there are only a few trees here and there. It has been found that cherries, plums, gooseberries and wild currants can be grown on the uplands with moderate success. Some apples, peaches and grapes have been produced, but these have generally failed.

Forest Trees—The remains of timber claims show that the ash, the honey locust and the black locust are the best trees for groves on the uplands. But some groves of black locust have been destroyed by borers. I have found elm trees doing well where they were planted among other trees.

Utilization of Natural Conditions—The best example of this is at the place of James Howell, which is seven miles northeast of Flagler. This place is located on a small stream. The side hills have been planted to trees, and large pits dug above each tree to catch the storm water for the trees. The creek has been damned, its course turned out of the natural channel and trees planted in the old creek bed. The seepage from the pond above sub-irrigates the trees below. Also, a pond is located on the side hill, above the fruit garden, so it will catch some storm water from the prairie. Groves and hedges of black locust form windbreaks about the orchard and lots. A well, located at the upper end of the garden, is used at times to water some plants. I saw grapes, currants, apples, cherries, gooseberries, plums and walnuts at the place. Some trees were loaded with fruit.

Irrigated Places—The small irrigation plants are too numerous to mention. The majority are run for comfort, but a few are conducted for profit, and with success. The increase of herds depending upon the same well, which once watered the garden, has caused the abandonment of many successful small gardens on the uplands.

Irrigation Ditches—One small ditch in the valley of the north fork of the Republican supplies several hundred acres with water. The Arickaree seems to be used very little for irrigation on account of the sandy nature of most of the valley land. The valley of the south fork of the Republican has several small private ditches, which are doing good work. Two large ditches, which were built several years ago by a company, seem to be unused now.

Upland Farming—Crops—Where stock raising is the main business, sorghum is one of the favorite crops. It will average one ton per acre.

Millet gives a smaller yield than sorghum, but it is a favorite forage crop with many.

Broom corn is quite a sure crop, but uncertain demand prevents extensive planting.

Corn is generally planted. The yield for the whole region will not exceed ten bushels per acre.

Oats will not give an average yield of more than ten bushels per acre over the whole region. They are sown for hay by many.

Wheat is the most popular of small grains. Yields of from nothing to forty bushels per acre have been reported. The general average per acre for the whole region is probably about six bushels.

Barley is but little grown. Many consider it the surest crop which has been tried. Yields of eighty-three bushels per acre have been reported. The average yield per acre is near fifteen bushels for the region. Barley is used mainly as feed for stock. Very little is raised for market.

Rye is but little grown. The yield will not usually exceed ten bushels per acre.

Flax has been successfully produced, but low prices and occasional failures caused production to cease.

Other forage plants used extensively are native grasses, which furnish hay; Russian thistles (which were the subject of a press bulletin, issued by the Colorado experiment station in July, 1900), and native salt weed.

SOIL STUDY.

As I traveled I observed the soil, and took some samples which seemed to be types. These are stored for future use. An extended report of my work in this line is on file in the director's office.

CULTURE AND METHODS.

The feeling is general that no method of planting or cultivation is sure to produce a crop. Also, experience has

shown that the soil is so rich that when there is sufficient rainfall, properly distributed, a large crop will be harvested, no matter how it is planted and cultivated. Some soils maintain a soil mulch on the unbroken land in dry times. These are well fitted to give a maximum crop for a minimum amount of labor.

CONCLUDING OBSERVATIONS.

1. Nature seems to have fitted this country for a grazing country.

2. Crowded conditions in other places have compelled people to settle here, where conditions of life are hard; and after trying it, those who are still here claim that they know of no place where they can do better, so they intend to stay.

3. General crop failures and small returns for grain raised have driven the settlers to make stock raising their main business.

4. As the range becomes crowded with small herds, it will be impossible for all to keep enough cattle to maintain themselves by raising beef alone. Then the dairy business must develop, and natural advantages will be utilized to help out the living.

5. Windmill irrigation must be more largely used on the uplands, and all the water of streams (underflow, flood waters and ordinary flow) will probably be used at some time in the future.

RECOMMENDATIONS.

1. The investigation should be continued.

2. A study of native hay and pasture grasses should be undertaken with a view to extending the range of those of special merit, wherever possible.

3. Windmill irrigation should be studied and settlers assisted by teaching them to improve their methods, wherever possible.

4. The plants where storm-water reservoirs are used for catching water from the prairies should be watched, and their projectors encouraged.

5. The distribution of the native salt weed should be determined, and if it is found a profitable crop its limits should be extended.

6. A special study should be made of the three valleys of the Republican river, the Big Sandy and the sand hills of eastern Colorado.

Respectfully submitted,

J. E. PAYNE,
Superintendent.

METEOROLOGICAL OBSERVATIONS, 1900.

The following tables, prepared by Mr. R. E. Trimble, give a record of the principal observations made during 1900, and especially the ones which are most often inquired about. Records have been maintained at Fort Collins nearly regularly since 1884, besides 1873 and 1874. The record has been maintained to give not only the elements ordinarily included in weather observations, but a number of those important in agricultural meteorology, but less often recorded. Among these special attention has been given to the sunshine, measuring both its duration and its intensity—an automatic photographic record of the amount, and the Arago-Davy conjugate thermometers for the intensity. Maximum registering thermometers have also been used for the solar intensity. Considerable trouble has been had with these, as the range of those in the market is not sufficient to withstand the great radiation here. This report is prepared too early to present the chart of the year's sunshine, which will later appear in press bulletin form.

The year 1900, whose record is given, while furnishing the greatest rainfall of which we have record, is in its characteristics a dry year. This is because the excess of the precipitation all comes in two—practically one—months. Over one-half of the rainfall fell in April, all the other months except September being below the normal. This gives the year the characteristics of the dry seasons—an increased temperature and greater range, with more sunshine. The highest temperature of the year was but 94.4 degrees, with a minimum of 23 degrees below zero. The wind was much less than usual, being but 55,000 miles during the year, while the average is over 66,000 miles. It is interesting to compare the features of April, the extremely rainy month, with the others. Its average daily range was but 23 degrees, a deficit of 6.5 degrees; while the average range in August was 37 degrees, an excess of 3.5 degrees. The other dry months show a daily range greater than the normal.

EXPLANATION OF THE TABLES.

The tables show the daily observations at the main station at Fort Collins, with summaries of the observations by months for Fort Collins, the Arkansas Valley substation at Rocky Ford, the Plains substation at Cheyenne Wells, and at several volunteer stations, with other observations of soil temperatures, evaporation, etc., at Fort Collins.

In the detailed tables, under dry bulb and wet bulb, are given the observations taken to determine the amount of moisture in the air. The dry bulb temperature is that of an ordinary thermometer properly exposed, and the wet bulb is an exactly similar thermometer moistened with pure water. This is sometimes called the temperature of evaporation, because it shows the cooling due to the evaporation of the film of water over the thermometer. Actually, the two thermometers are swung in the open air. It is found that with the best of instrument shelters there is a noticeable difference between the readings inside and outside.

The dew point and relative humidity are found from the observations of the dry and wet bulb. The temperature of dew point shows the temperature at which, if the air is cooled down, dew (or frost) would begin to be deposited. The relative humidity is given in per cent., and shows the per cent. the actual amount of moisture present is to the amount which the atmosphere could hold.

The daily mean dew point and relative humidity is the mean of the two observations at 7 a. m. and 7 p. m.

The maximum and minimum temperatures are determined by the ordinary type of recording thermometers, both being read at 7. a. m. and 7 p. m. Usually the highest temperature occurs during the daylight hours, but in exceptional cases during the winter it may occur outside of these times. In such cases the time of maximum temperature is found by the sheets from the thermograph, and the highest and lowest temperatures of the twenty-four hours are recorded in these columns. The mean temperature for the day is the mean of the highest and the lowest temperatures. The range is the difference between the maximum and the minimum temperatures of the day.

The readings of the barometer are taken from an ordinary mercurial thermometer in the office. The readings as

given are corrected for temperature and instrumental error, but not for elevation of the basin, which is 4,994 feet above sea level.

The terrestrial radiation is determined by a minimum thermometer placed in the instrument plat, with its bulb a few inches above sod, and the column headed "Radiation" is the difference between the reading of this instrument and the minimum thermometer. It will be noted that it is less than the minimum thermometer, and that the radiation is often considerable. The precipitation is measured in inches. The movement of the wind is determined by means of anemometers placed on the tower of the college building, about sixty feet above the ground, and is measured in miles.

The actinometer records are those taken from a set of Arago-Davy conjugate thermometers, the one being a black bulb and the other a bright bulb thermometer, enclosed in an envelop of glass, and with the bulbs freely exposed to the sky. The reading is taken at noon. As other duties often interfere with presence at the office at this hour, there are numerous blanks. The radiation is expressed in calories, as determined from a table which was made by comparing the observations throughout a cloudless day at short intervals. It thus includes the constant of these particular instruments, and is thus given in absolute measurements.

The soil temperatures are taken by means of long thermometers, with bulbs set in the ground at the depths indicated. Set "A" is in an irrigated tract of ground, with a small lateral running near the side of the enclosure. The surface is covered with grass. The readings are taken at 7 a. m. and 7 p. m. Set "C" is located in a tract of unirrigated ground above ditches, and as it is some distance from the office the readings are taken weekly at 4 p. m. The extreme temperature is given in the next table, which shows the highest temperatures as found by the readings at 7 a. m. and 7 p. m. In some cases the maximum readings have been disturbed by irrigation water, which has brought the maximum temperature at a different time than would be the case under ordinary conditions.

The evaporation is measured in a tank three feet cube placed flush with the ground. The readings of the height of the surface of the water are made by means of a hook gage, which permits the measurement to be taken to the one-thousandth part of a foot. From April to September readings

are taken twice per day, at 7 a. m. and 7 p. m. From September until the formation of ice, late in November, the readings are taken at 7 a. m. only. In the winter season, after ice forms, readings are taken monthly. The ice is broken until it is free from the sides of the tank, then the level of the water surface is measured. Sometimes ice forms to a considerable thickness, and the separation of the ice from the sides of the tank has led to punctures of the sides.

A set of maximum and minimum thermometers are kept in the surface of the water during the summer season. An anemometer is also placed close to the ground to record the wind movement. The average temperature of the tank is less than that of water freely exposed to the air during the summer season, so that the evaporation is less than that from lakes under ordinary conditions. Tanks have been sent at different times to high altitudes, but the records have so far been incomplete and unsatisfactory. It is expected to take more in the years to come.

TABLE I.

METEOROLOGICAL RECORD FOR JANUARY, 1900.

	Temperature, Dew Point and Relative Humidity								Daily Mean Dew Point
	7 A. M.				7 P. M.				
	Dry Bulb	Wet Bulb	Dew Point	Relative Humidity	Dry Bulb	Wet Bulb	Dew Point	Relative Humidity	
	F°	F°	F°	Per ct.	F°	F°	F°	Per ct.	F°
1	13.7	13.3	12.2	93.9	20.2	19.0	16.3	85.1	14.2
2	9.2	9.0	8.4	96.5	27.0	24.1	18.6	70.3	13.5
3	27.8	25.3	20.9	74.8	25.6	23.0	18.0	72.2	19.5
4	27.8	27.0	25.8	91.9	24.0	23 0	21.1	88.7	23.4
5	15.8	15.0	12.8	88.6	22.2	21.0	18.6	85.9	15.7
6	14.1	13.2	10.5	86.5	29.2	24.6	15.6	56.2	13.1
7	13.0	12.7	11.8	95.3	29.0	24.0	13.7	52.2	12.7
8	13.2	12.3	9.5	86.1	37.3	29.0	13.6	37.2	11.6
9	23.8	22.2	19.1	81.8	29.2	25.1	17.4	60.9	18.2
10	17.8	16.8	14.3	86.6	35.9	27.0	8.0	30.6	11.2
11	12.3	12.1	11.5	96.8	36.2	28.0	11.9	36.2	11.7
12	20.1	18.3	14.1	77.5	24.0	21.3	15.7	69.8	14.9
13	49.0	38.0	23.4	36.7	52.0	39.0	21.5	**30.3**	22.4
14	28.8	25.8	20.5	70.8	42.3	33.9	21.6	43.4	21.1
15	32.3	31.8	**31.1**	95.5	31.0	31.0	31.0	**100.0**	31.0
16	29.3	28.9	28.3	96.0	28.8	28.8	28.8	**100.0**	28.6
17	33.5	28.0	18.5	53.2	30.8	26.9	20.1	64.2	19.3
18	17.0	16 2	14.1	89.0	29.2	25.9	20.0	68.3	17.0
19	18.2	17.5	15.9	90.7	33.6	27.9	17.9	51.7	16.9
20	23.3	21.8	18.9	82.7	33.5	29.3	22.7	64.1	20.8
21	18.0	16.8	13.8	84.2	23.0	20.8	16.3	74.6	15.1
22	18.0	16.8	13.8	84.2	33.0	25.1	7.3	33.3	10.5
23	16.2	15.5	13.7	90.2	26.2	24.2	20.5	78.8	17.1
24	34.0	26.8	12.5	40.5	26.3	22.8	15.8	63.8	14.2
25	9.2	8.6	6.6	89.4	22.3	19.0	11.1	61.4	8.8
26	13.0	11.0	4.6	69.3	21.0	18.8	13.8	73.2	9.2
27	16.2	14.0	7.8	69.4	16.6	16.2	15.2	94.5	11.5
28	—5.0	—5.2	**—6.0**	93.8	6.8	6.2	4.0	88.5	—1.0
29	35.8	28.8	16.6	44.5	23.8	22.8	20.9	88.6	18.8
30	4.2	4.2	4.2	**100.0**	38.3	29.3	12.2	33.8	8.2
31	11.0	10.8	10.2	96.7	30.5	25.3	15.1	52.1	12.6
Means	19.70	17.85	14.17	81.71	28.67	24.59	16.91	64.83	15.54
Normal	15.8	13.7	------	------	24.9	20.8	------	------	10.5

TABLE I—Continued.

METEOROLOGICAL RECORD FOR JANUARY, 1900.

	Daily Mean Relative Humidity	Maximum Temperature	Minimum Temperature	Daily Mean Temperature	Range	Barometer, Corrected for Temperature and Instrumental Error			Terrestrial Radiation	
						7 A. M.	7 P. M.	Mean	Instrument Reading	Radiation
	Per ct	F °	F °	F °	F °	Ins.	Ins.	Ins.	F °	F °
1	89.5	39.0	10 0	24.5	29 0	25.176	25.231	25.203	6 0	4.0
2	83.4	43.4	8 7	26.0	34.7	25.147	25.024	25.086	4.5	4 2
3	73.5	55.0	22.8	38.9	32.2	24.895	24.873	24 884	19.7	5.1
4	90.3	50.0	23.7	36.9	26.3	24 891	24.999	24.945	20 2	3.5
5	87.2	50.0	15 5	32 7	34.5	25.136	25.127	25.131	10.0	5.5
6	71.4	52.0	10.0	31.0	42.0	25.125	25.211	25.168	7.9	2 1
7	73.7	49.9	14.3	32.1	35.6	**25.290**	25.090	25.190	10 0	1 3
8	61.7	48.0	9.2	28.6	38.8	24.900	24.920	24.910	5.0	4 2
9	71.3	47.0	25.3	36.2	21.7	25.158	25.100	25.159	20 8	1 5
10	58.6	48.2	10.2	29.2	38.0	24.922	25.042	24 982	6.3	3.9
11	66.5	44.2	11.4	27.8	32.8	25.036	24.789	24.913	6 1	5 3
12	73.7	51.0	18.7	34.8	32.3	24.904	24.932	24.918	12 9	5.8
13	33.5	60.2	24 8	42.5	35.4	24.844	24.899	24.871	20.0	4 8
14	57.1	58.0	25.2	41.6	32.8	24.845	24.839	24.842	19.9	5.3
15	97.7	34.0	30.6	32 3	**3.4**	25.034	25.060	25.047	26.8	3.8
16	98.0	35.2	29.0	32.1	6.2	25.011	24.980	24.996	**28 2**	**0 8**
17	58.7	44.6	26.7	35.7	17.9	25.063	25.235	25.149	24.8	1 9
18	78.7	50.2	13.7	31.9	36.5	25.263	25.184	25.223	10.0	3.7
19	71.2	**63.0**	18.0	40.5	**45.0**	25.068	24.953	25.011	14.0	4.0
20	73.4	48.3	20.0	34.2	28.3	25.125	24.985	25.055	16.7	3.3
21	79.4	51.5	13.1	32.3	38.4	24.992	25.009	25.000	8.0	5 1
22	58.7	59.5	15.0	37 2	44.5	25.001	25.110	25.056	11.5	3.5
23	84.5	55.2	14.6	34.9	40.6	25.018	**24.732**	24.875	10.7	3.9
24	52.2	41.6	28.3	35.0	13.3	24.874	25.119	24.996	21.7	6.6
25	75.4	40.0	5.0	22.5	35.0	25.176	25.120	25.148	2.0	3.0
26	71.2	40.4	9.0	24.7	31.4	25.020	24.902	24.961	4.1	4.9
27	82.0	26.8	10.1	18.4	16.7	24.963	25.039	25.001	6.3	3.8
28	91 1	17.5	**6.0**	5.8	23.5	25.177	24.931	25.054	**−12.0**	6.0
29	66.6	48.9	−2.4	23.2	51.3	24.818	24.933	24.876	−4.9	2.5
30	66.9	46.0	6.0	26.0	40.0	24.872	24.928	24.900	1.0	5.0
31	74.4	47.8	11.4	29.6	36.4	25.053	25.051	25.052	8.2	3.2
Means	73.27	46.66	15.22	30.94	31.44	25.026	25.013	25.019	11.17	4.05
Normal	71.2	40.5	11.0	25.8	27.3	.....	.....	24.917	.....	5.2

TABLE I—Concluded.

METEOROLOGICAL RECORD FOR JANUARY, 1900.

Precipitation				Direction of Wind		Total Movement 24 Hours following 7 a. m.	Actinometer at Noon				Frost or Dew
Time of Beginning	Time of Ending	Total Amount Rain and Melted Snow	Average Depth of Snow	7 A.	7 P.		Black Bulb	Bright Bulb	Difference	Radiation	
		Ins.	Ins.			Miles	C°	C°	C°	Cal.	
.....	.....	.....	.....	NW	S	139.0	31.0	12.0	19.0	11.74	F
.....	.....	.....	.....	N	NW	66.7	32.9	14.6	18.3	11.50	F
.....	.....	.....	.....	W	W	102.4	36.6	19.7	16.9	10.99	.....
.....	.....	.....	.....	N	N	84.4	16.1	9.1	7.0	4.04	.....
.....	.....	.....	.....	NW	W	111.9	40.6	21.3	19.3	12.76	F
.....	.....	.....	.....	E	NW	102.5	28.8	15.6	13.2	8.20	F
.....	.....	.....	.....	0	N	106.3	.....	.....	.....	.....	L F
.....	.....	.....	.....	NW	NE	160.2	35.0	17.7	17.3	11.09	F
.....	.....	.....	.....	E	SW	160.8	35.8	17.9	17.9	11.52	.....
.....	.....	.....	.....	N	N	208.3	8.1	2.0	6.1	3.32	F
.....	.....	.....	.....	S	E	165.5	37.6	16.3	21.3	13.73	F
.....	.....	.....	.....	W	W	156.1	34.5	17.2	17.3	11.05	.....
.....	.....	.....	.....	SW	W	184.0	30.0	19.2	10.8	6.83	.....
.....	.....	.....	.....	E	SE	112.8	.....	.....	.....	.....	.....
6.50 A	8.00 P	.10	.....	0	SE	83.0	8.6	3.1	5.5	3.01	.....
.....	.....	.03	1.5	N	SE	103.0	12.8	4.5	8.3	4.64	Sn
.....	.....	.....	.....	NW	N	211.9	36.3	12.3	24.0	15.16	.....
.....	.....	.....	.....	NW	W	103.2	30.8	14.2	16.6	10.33	F
.....	.....	.....	.....	NW	SW	128.4	42.8	25.3	17.5	11.90	F
.....	.....	.....	.....	W	W	149.9	32.0	15.6	16.4	10.31	F
.....	.....	.....	.....	NW	W	148.7	.....	.....	.....	.....	F
.....	.....	.....	.....	E	E	84.4	40.0	21.8	18.2	12.09	F
.....	.....	.....	.....	SE	W	256.8	37.6	17.7	19.9	12.89	.....
.....	.....	.....	.....	N	NW	385.5	35.2	15.7	19.5	12.42	.....
.....	.....	.....	.....	N	E	124.5	32.9	12.8	20.1	12.55	F
.....	.....	.....	.....	NW	W	112.0	32.8	13.2	19.6	12.25	L F
6.30 P	nt	T	.....	NE	E	160.5	.....	.....	.....	.....	.....
.....	.....	.08	.9	S	NW	227.1	.....	.....	.....	.....	Sn
6.00 P	7.15 P	.04	.7	NW	N	484.4	38.8	19.7	19.1	12.52	.....
.....	.....	.....	.....	N	NW	213.3	30.6	12.1	18.5	11.42	Sn
.....	.....	.....	.....	SW	W	137.9	34.5	16 0	18.5	11.76	F
.....	.....	0.25	3.1	....	....	160.5	31.26	14 87	16 39	10.39	.....
.....	.....	0.60	.....	....	....	192.0	.....	.....	.....	.....	.....

TABLE II.

METEOROLOGICAL RECORD FOR FEBRUARY, 1900.

	Temperature, Dew Point and Relative Humidity								
	7 A. M.				7 P. M.				
	Dry Bulb	Wet Bulb	Dew Point	Relative Humidity	Dry Bulb	Wet Bulb	Dew Point	Relative Humidity	Daily Mean Dew Point
	F°	F°	F°	Per ct.	F°	F°	F°	Per ct.	F°
1	12.2	11.5	9.3	88.9	29.8	24.6	14.1	51.3	11.7
2	12.8	12.2	10.5	90.6	31.7	26.0	15.0	49.3	12.7
3	24.0	20.9	14.2	65.4	35.8	27.8	12.1	37.1	13.2
4	17.2	15.8	12.1	81.0	34.6	29.2	20.4	55.4	16.2
5	21.2	20.0	17.5	85.5	30.9	24.1	8.8	38.8	13.2
6	21.1	18.0	10.1	62.4	47.0	32.0	−1.9	12.9	4.1
7	13.1	11.8	7.8	80.0	9.6	8.0	2.0	72.4	4.9
8	−7.2	−7.2	−7.2	100.0	18.8	14.2	−1.2	41.1	−4.2
9	16.7	14.0	6.1	63.0	29.0	26.1	21.0	71.8	13.5
10	9.8	9.2	7.3	89.6	25.0	23.0	19.2	78.1	13.3
11	48.9	35.3	12.6	23.1	24.0	24.0	24.0	100.0	18.3
12	13.0	13.0	13.0	100.0	−4.8	−4.8	−4.8	100.0	4.1
13	7.4	7.0	5.5	92.5	6.8	6.8	6.8	100.0	6.1
14	0.8	0.8	0.8	100.0	1.0	1.0	1.0	100.0	0.9
15	−16.8	−16.8	−16.8	100.0	−1.2	−1.2	−1.2	100.0	−9.0
16	−21.7	−21.7	−21.7	100.0	8.3	7.2	3.1	80.1	−9.3
17	−18.0	−18.0	−18.0	100.0	4.0	3.2	−0.1	83.0	−8.9
18	15.2	13.6	9.2	76.9	26.1	23.6	18.9	73.6	14.0
19	21.2	20.0	17.5	85.5	25.8	25.0	23.7	91.4	20.6
20	20.8	20.4	19.6	95.1	37.8	30.2	17.3	42.9	18.5
21	25.9	23.2	18.0	71.4	29.8	26.8	21.6	71.6	19.8
22	20.8	20.3	19.3	93.9	32.8	29.8	25.3	73.9	22.3
23	28.2	24.0	15.7	59.0	29.0	25.1	17.8	62.5	16.7
24	20.8	20.2	19.0	92.7	37.0	32.0	24.9	61.3	22.0
25	44.2	34.8	21.1	39.6	31.2	28.0	22.8	70.9	21.9
26	29.7	29.7	29.7	100.0	31.0	31.0	31.0	100.0	30.4
27	30.8	27.2	21.1	66.8	20.9	19.9	17.7	87.8	19.3
28	14.8	14.8	14.8	100.0	33.8	30.2	25.0	69.4	19.9
Means	15 25	13.36	9.57	82.25	23.62	20.46	13.72	70.59	11.65
Normal	15.6	13.7	.....	.....	24.8	20.9	.....	.....	11.6

TABLE II—Continued.

METEOROLOGICAL RECORD FOR FEBRUARY, 1900.

Daily Mean Relative Humidity	Maximum Temperature	Minimum Temperature	Daily Mean Temperature	Range	Barometer, Corrected for Temperature and Instrumental Error			Terrestrial Radiation	
					7 A. M.	7 P. M.	Mean	Instrument Reading	Radiation
Perct.	F°	F°	F°	F°	Ins.	Ins.	Ins.	F°	F°
70.1	48.2	10.7	29.4	37.5	24.988	24.982	24.985	7.4	3.3
69.9	46.8	14.0	30.4	32.8	24.974	24.789	24.881	10.0	4.0
51.3	48.0	29.0	38.5	19.0	24.711	24.844	24.778	20.0	**9.0**
68.2	46.6	13.7	30.2	32.9	24.841	24.759	24.800	8.8	4.9
62.3	44.3	15.4	29.8	28.9	24.765	24.733	24.749	11.9	3.5
37.7	56.1	15.0	35.6	41.1	24.627	**24.398**	24.512	10.4	4.6
76.2	15.0	8.7	11.8	6.3	24.664	24.786	24.725	8.6	**0.1**
70.5	33.1	−6.8	13.2	39.9	24.849	24.766	24.808	−10.6	3.8
67.4	37.2	11.6	24.4	25.6	24.834	24.979	24.906	8.0	3.6
83.9	49.0	7.0	28.0	42.0	25.068	24.927	24.998	3.1	3.9
61.5	**58.0**	23.0	40.5	35.0	24.575	24.700	24.637	19.6	3.4
100.0	23.8	−2.0	10.9	25.8	24.894	24.888	24.891	−9.0	7.0
96.3	25.1	−7.0	9.0	32.1	24.779	24.816	24.798	−12.2	5.2
100.0	6.0	0.0	3.0	6.0	24.889	24.979	24.934	−2.3	2.3
100.0	5.9	−17.2	−5.5	23.1	24.908	24.984	24.946	−19.2	2.0
90.0	23.8	**−23.4**	0.2	**47.2**	25.127	25 228	25.177	**−28.7**	5.3
91.5	26.0	−18.0	4.0	44.0	**25.299**	25.185	25.242	−22.8	4.8
75.3	41.2	4.6	22.9	36.6	25.003	24.868	24.936	0.0	4.6
88.4	39.2	17.2	28.2	22.0	24.855	24.662	24.758	13.7	3.5
69.0	44.1	18.0	31.0	26.1	24.749	24.860	24.805	12.8	5.2
71.5	40.2	26.3	33.3	13.9	25.010	24.997	25.003	23.0	3.3
83.9	49.6	22.0	35.8	27.6	24.807	24.886	24.847	18.7	3.3
60.8	39.7	28.4	34.0	11.3	25.054	25.058	25.056	24.6	3.8
77.0	47.9	19.0	33.5	28.9	24.984	24.904	24.944	17.0	2.0
55.2	52.8	31.3	42.0	21.5	24.817	24.998	24.907	**29.3**	2.0
100.0	34.1	29.0	31.6	**5.1**	24.914	24.848	24.881	27.2	1.8
77.3	35.8	19.6	27.7	16.2	24.991	25.175	25.083	14.0	5.6
84.7	40.1	10.3	25.2	29.8	25.088	24.894	24.991	8.1	2.2
76.42	37.77	10.69	24.23	27.08	24.895	24.889	24.892	6.84	3.86
72.6	40.3	11.8	24.9	25.0	.....	.....	24.920	.....	4.7

TABLE II—Concluded.

METEOROLOGICAL RECORD FOR FEBRUARY, 1900.

	Precipitation				Direction of Wind		Total Movement 24 Hours following 7 a. m.	Actinometer at Noon				Frost or Dew
	Time of Beginning	Time of Ending	Total Amount Rain and Melted Snow	Average Depth of Snow	7 A.	7 P.		Black Bulb	Bright Bulb	Difference	Radiation	
			Ins	Ins			Miles	C°	C°	C°	Cal	
1	....	....	....	....	N	N W	124.4	37.4	18.7	18.7	12.15	F
2	....	....	....	....	N W	W	158.1	20.7	10.9	9.8	5.79	F
3	....	....	....	....	N W	W	317.3	35.5	18.0	17.5	11.26	.....
4	....	....	....	....	N W	N W	91.0	....	....	....	....	F
5	....	....	....	....	N	E	227.2	31.9	15.2	16.7	10.48	F
6	....	....	....	....	S W	W	431.0	44.6	24.2	20 4	13.92	.....
7	6.45 A	nt	.02	....	N E	N	208.8	5.5	−5.0	10 5	5.51	Su
8	....	....	T	....	N W	N W	137.5	29.1	8.1	21 0	12.69	Su
9	....	....	....	....	N W	W	106.8	32 4	16.2	16.2	10.23	.....
10	....	....	....	....	N W	S W	151.9	36 1	17.1	19.0	12.21	.....
11	6.00 P	nt	.04	....	W	N	463.6	....	....	....	....	.....
12	....	....	.25	4.0	W	N W	101.8	41.7	12.5	29.2	8 86	Su
13	2.00 P	....	.19	3 ¼	S W	N E	115.2	25.3	5 2	20.1	11.84	F
14	....	nt	.29	3 ¾	S	S E	92.1	....	....	....	....	Su
15	4.30 P	8.00 P	.08	.95	N W	N E	84.7	24.5	0 4	24.1	14.32	Su
16	....	....	.03	.5	S	E	140.0	39.3	6.8	32.5	20.36	Su
17	....	....	....	....	W	W	85.4	41.9	12.8	29.1	18 83	F
18	....	....	....	....	N W	N W	119.8	....	....	....	....	.....
19	....	....	....	....	S E	W	98.5	....	....	....	....	.....
20	....	....	....	....	W	N W	133.0	50.5	22.0	28.5	19.75	F
21	....	....	....	....	S	W	179.3	42.5	18.5	24.0	15.90	.....
22	P M	....	T	....	N W	N E	296.0	22.0	11.6	10.4	6.20	.....
23	....	....	....	....	N	S E	230.4	33.2	17.0	16 2	10.29	.....
24	....	....	....	....	N	S E	391.6	36.2	15.2	21.0	13.40	F
25	....	....	....	....	N W	S W	364.8	....	....	....	....	.....
26	6.00 A	nt	.11	1.0	N E	0	162.3	8.3	5.7	2 6	1.44	Su
27	....	....	.11	1 ¼	N W	S W	230.7	44.6	18.5	26.1	17.43	Su
28	....	....	....	....	N W	W	130.1	24.1	8.9	15.2	9.04	F
Means	....	....	1.12	15.3	....	....	199.0	32.15	12.66	19.49	11.90	.....
Normal	....	....	0.62	....	....	....	202.0	....	....	....	....	.....

TABLE III.

METEOROLOGICAL RECORD FOR MARCH, 1900.

	Temperature, Dew Point and Relative Humidity								
	7 A. M.				7 P. M.				
	Dry Bulb	Wet Bulb	Dew Point	Relative Humidity	Dry Bulb	Wet Bulb	Dew Point	Relative Humidity	Daily Mean Dew Point
	F°	F°	F°	Per ct.	F°	F°	F°	Per ct.	F°
1	33.9	29.1	21.4	59.4	32.9	30.9	28.1	82.2	24.7
2	26.9	26.1	24.8	91.7	37.0	35.2	33.0	85.7	28.9
3	30.8	29.8	28.4	90.6	44.4	37.0	27.7	52.0	28.1
4	27.0	27.0	27.0	**100.0**	27.0	27.0	27.0	**100.0**	27.0
5	23.0	23.0	23.0	**100.0**	35.0	26.1	**6.0**	29.0	14.5
6	23.1	20.9	16.4	74.7	32.0	27.0	18.1	55.5	17.2
7	25.2	23.8	21.2	84.7	38.0	31.8	22.5	53.3	21.9
8	28.0	27.0	25.4	89.8	55.7	40.2	19.0	23.7	22.2
9	38.7	31.2	19.0	44.7	43.0	36.2	27.6	54.1	23.3
10	36.0	32.0	26.4	68.1	46.2	39.7	32.5	59.2	29.4
11	33.2	30.8	27.4	79.0	45.3	36.3	24.2	43.1	25.8
12	40.2	34.1	25.9	56.4	56.2	39.2	13.0	**18.1**	19.5
13	33.9	31.2	27.4	77.0	44.0	35.8	24.8	46.6	26.1
14	30.0	30.0	30.0	**100.0**	36.9	29.8	16.8	45.3	23.4
15	21.8	21.8	21.8	**100.0**	28.2	28.0	27.7	98.0	24.7
16	22.1	21.3	19.7	90.4	25.7	24.0	20.9	81.7	20.3
17	17.0	17.0	17.0	**100.0**	39.0	31.2	18.5	43.2	17.8
18	26.9	25.7	23.7	87.5	40.9	34.1	24.7	52.3	24.2
19	34.6	31.5	27.2	74.2	40.4	33.4	23.3	50.3	25.2
20	28.2	27.2	25.6	89.9	34.0	30.0	24.0	66.3	24.8
21	30.0	27.2	22.6	73.5	40.0	32.0	19.4	43.2	21.0
22	31.3	29.0	25.6	78.8	43.2	34.1	20.6	40.1	23.1
23	30.7	26.9	20.3	64.9	49.4	40.0	29.0	45.4	24.7
24	31.1	31.1	31.1	**100.0**	37.0	32.8	27.1	67.3	29.1
25	31.7	30.2	28.1	86.3	50.9	38.9	23.2	33.9	25.6
26	32.8	30.0	25.9	75.4	48.7	41.9	**34.9**	59.3	30.4
27	38.5	35.0	30.6	73.7	31.0	30.2	29.0	92.5	29.8
28	13.2	12.7	11.3	92.3	34.1	32.0	29.2	82.0	20.3
29	26.2	25.2	23.5	89.3	32.7	27.9	19.7	58.1	21.6
30	23.3	23.1	22.7	97.7	38.9	35.0	30.1	71.1	26.4
31	30.8	30.0	28.8	92.5	41.0	36.0	29.8	64.8	29.3
Means	29.04	27.13	24.17	83.31	39.64	33.35	24.24	57.98	24.20
Normal	26.9	24.1	------	------	35.0	29.1	------	------	19.8

TABLE III—Continued.

METEOROLOGICAL RECORD FOR MARCH, 1900.

	Daily Mean Relative Humidity	Maximum Temperature	Minimum Temperature	Daily Mean Temperature	Range	Barometer, Corrected for Temperature and Instrumental Error			Terrestrial Radiation	
						7 A. M.	7 P. M.	Mean	Instrument Reading	Radiation
	Per ct.	F°	F°	F°	F°	Ins.	Ins.	Ins.	F°	F°
1	70.8	51.8	30.0	40.9	21.8	25.028	25.092	25.060	27.2	2.8
2	88.7	50.7	26.7	38.7	24.0	25.047	25.031	25.039	24.7	2.0
3	71.3	58.2	29.2	43.7	29.0	24.890	24.868	24.879	27.3	1.9
4	100.0	47.6	25.7	36.6	21.9	24.968	24.882	24.925	25.6	0.1
5	64.5	42.4	21.7	32.1	20.7	24.648	24.776	24.712	22.2	−0 5
6	65.1	41.6	21.2	31.4	20.4	24.937	24.977	24.957	18.0	3.2
7	69.0	55.4	20.8	38.1	34.6	25.028	24.984	25.006	18.0	2.8
8	56.7	65.2	25.8	45.5	39.4	24.933	24.978	24.955	23.2	2.6
9	49.4	61.0	33.3	47.1	27.7	25.267	25.251	25.259	27.8	5.5
10	63.7	**76.9**	33.4	55.2	43.5	25.249	25.148	25.199	28.7	4.7
11	61.0	75.2	29.7	52.4	45.5	25.193	25.108	25.150	25.2	4.5
12	37.3	73.0	27.0	50.0	46.0	25.057	25.082	25.070	23.3	3.7
13	61.8	60.9	27.6	44.3	33.3	25.091	25.224	25.157	22.2	5.4
14	72.6	43.2	25.2	34.2	18.0	25.264	25.072	25.168	21.3	3.9
15	99.0	29.9	21.7	25.8	**8.2**	25.030	24.920	24.975	20.7	1.0
16	86.1	30.0	21.0	25.5	9.0	24.900	24.936	24.918	20.4	0.6
17	71.6	47.7	16.0	31.8	31.7	24.936	24.834	24.885	15.0	1 0
18	69.9	59.8	19.7	39.8	40.1	24.800	24.732	24.766	17.2	2.5
19	62.2	56.0	24.0	40.0	32.0	24.793	24.897	24.845	20.8	3.2
20	78.1	46.3	25.2	35.7	21.1	25.169	25.144	25.157	22.9	2.3
21	58.4	58.1	19.8	39.0	38.3	25.136	24.992	25.064	16.8	3.0
22	59.4	62.7	20.7	41.7	42.0	24.967	24.800	24.883	16.6	4.1
23	55.2	58.5	27.0	42.7	31.5	24.871	24.826	24.849	22.1	4.9
24	83.6	61.8	29.0	45.4	32.8	24.785	24.873	24.829	24.7	4.3
25	60.1	60.0	22.6	41.3	37.4	24.869	24.794	24.831	18.7	3.9
26	67.4	67.2	26.4	46.8	40.8	24.704	24.677	24.691	24.3	2.1
27	83.1	39.2	30.2	34.7	9.0	**24.647**	24.797	24.722	**29.9**	1.2
28	87.1	38.7	**9.7**	24.2	29.0	25.029	25.060	25.044	**4.9**	4.8
29	73.7	43.9	21.9	32.9	22.0	25.182	25.224	25.203	19.1	2.8
30	84.4	47.0	18.2	32.6	28.8	**25.299**	25.153	25.226	16.0	2.2
31	78.7	61.5	22.8	42.2	38.7	25.216	25.123	25.170	19.4	3.4
Means	70.64	53.92	24.30	39.11	29.62	24.998	24.976	24.987	21.40	2.90
Normal	66.9	49.6	21.6	34.9	27.1	.....	.....	24.901	.....	4.9

TABLE III—Concluded.

METEOROLOGICAL RECORD FOR MARCH, 1900.

Precipitation				Direction of Wind		Total Movement 24 Hours following 7 a. m.	Actinometer at Noon				Frost or Dew
Time of Beginning	Time of Ending	Total Amount Rain and Melted Snow	Average Depth of Snow	7 A.	7 P.		Black Bulb	Bright Bulb	Difference	Radiation	
		Ins.	Ins.			Miles	C °	C °	C °	Cal.	
.....	.....	.....	.....	N	S	192.6	38 5	19.8	18.7	12.25	.....
.....	.....	.....	.....	NW	NW	90.1	32.6	17.3	15.3	9.70	F
.....	.....	.....	.....	W	S	126.3	28.5	13.7	14.8	9.11	.....
.....	.....	.....	.....	SE	SE	164.0	.....	.....	.....	.....	Fog
10.40 A	.....	T	.....	E	W	283.1	2.5	—1.8	4.3	2.26	Hr F
.....	.....	.....	.....	SE	N	97.8	26.0	12.2	13.8	8.37	F
.....	.....	.....	.....	NW	NW	123.4	39.0	21.0	18.0	11.87	F
.....	.....	.....	.....	S	SW	209.5	34.5	19.9	14.6	9.42	F
.....	.....	.....	.....	W	SW	146.5	42.5	25.0	17.5	11.88	.....
.....	.....	.....	.....	S	W	124.8	48.9	32.5	16.4	11.74	.....
.....	.....	.....	.....	N	W	131.7	.....	.....	.....	.....	.....
.....	.....	.....	.....	SE	W	231.2	50.0	33.2	16.8	12.11	L F
.....	.....	.....	.....	NE	N	225.5	46.2	28.3	17.9	12.48	.....
nt	7.15 A	.22	2.6	E	NW	188.2	35.3	17.0	18.3	11.72	Sn
nt	7.20 A	.14	1.8	SE	S	231.2	9.1	2.1	7.0	3.83	Sn
11.00 A	3.00 P	.07	Melted	S	SW	116.4	.....	.....	.....	.....	.....
.....	.....	.....	.....	0	W	120.2	34.1	16.5	17.6	11.20	Hr F
.....	.....	.....	.....	0	NE	238.7	.....	.....	.....	.....	F
.....	.....	.....	.....	S	N	300.2	41.7	23.0	18.7	11.56	F
.....	.....	.....	.....	0	S	167.3	.....	.....	.....	.....	F
.....	.....	.....	.....	S	W	116.9	41.7	24.2	17.5	11.80	F
.....	.....	.....	.....	SE	W	150.1	44.5	27.3	17.2	11.87	F
.....	.....	.....	.....	NW	S	130.7	36.3	21.7	14.6	9.55	.....
3.45 P	.....	T	.....	0	N	194.7	24.2	16.8	7.4	4.53	Fog
.....	.....	.....	.....	NE	SW	133.8	.....	.....	.....	.....	F
6.50 P	nt	T	.....	0	N	176.1	34.9	24.5	10.4	6.84	.....
12 N	5.00 P	.57	3.5	N	S	127.5	.....	.....	.....	.....	Rn
.....	.....	.....	.....	0	SW	166.2	49.6	19.8	29.8	20.40	F
.....	.....	.....	.....	NW	N	141.8	24.0	10.8	13.2	7.90	F
7.50 P	10.00 P	.....	.....	SE	N	112.7	33.3	14.9	18.4	11.60	F
.....	.....	.07	.....	0	NW	121.1	40.5	23.4	17.1	11.45	F
.....	.....	1.07	.....	.....	.....	163.9	34.93	19.30	15.64	10.23	.....
.....	.....	0.86	.....	.....	.....	235.0	.....	.....	.....	.....	.....

TABLE IV.

METEOROLOGICAL RECORD FOR APRIL, 1900.

	Temperature, Dew Point and Relative Humidity								Daily Mean Dew Point
	7 A. M.				7 P. M.				
	Dry Bulb	Wet Bulb	Dew Point	Relative Humidity	Dry Bulb	Wet Bulb	Dew Point	Relative Humidity	
	F°	F°	F°	Per ct.	F°	F°	F°	Per ct.	F°
1	38.2	35.1	31.3	76.6	49.7	38.3	23.3	35.4	27.3
2	44.9	39.2	32.9	63.2	56.2	42.5	26.6	**32.2**	29.7
3	43.0	37.1	30.0	60.5	53.7	45.2	37.3	54.1	33.7
4	37.3	37.0	36.6	97.5	33.0	32.6	32.1	96.4	34.3
5	33.9	33.3	32.6	94.8	34.1	33.8	33.4	97.4	33.0
6	32.3	32.3	32.3	**100.0**	38.5	38.5	38.5	**100.0**	35.4
7	36.3	35.3	34.1	91.9	47.2	44.8	42.8	85.0	38.5
8	44.7	41.7	38.8	80.4	42.9	42.5	42.1	97.2	40.4
9	37.1	36.1	34.9	92.0	39.6	37.0	34.0	80.9	34.5
10	31.2	31.2	31.2	**100.0**	24.2	24.0	23.6	97.8	27.4
11	18.2	18.0	**17.6**	97.4	29.7	27.7	24.6	80.6	21.1
12	31.2	30.2	28.8	90.7	37.1	34.1	30.2	76.7	29.5
13	36.9	34.3	31.0	79.6	48.3	41.1	40.3	74.4	35.6
14	40.8	37.2	33.1	74.5	44.2	41.9	39.7	84.7	36.4
15	42.0	39.9	37.8	85.4	39.7	38.1	36.4	88.2	37.1
16	39.2	34.2	27.6	63.4	43.1	36.0	26.4	52.6	27.0
17	32.5	32.0	31.4	95.5	32.8	32.5	32.1	97.3	31.8
18	19.8	19.2	18.0	92.5	50.2	45.1	40.6	70.1	29.3
19	44.7	41.2	37.7	77.2	56.1	48.7	42.8	61.0	40.2
20	47.5	44.2	41.3	79.5	56.1	48.0	41.3	57.7	41.3
21	49.7	45.7	42.3	76.2	58.2	48.6	40.6	52.7	41.5
22	46.6	44.8	43.3	88.6	42.7	38.0	32.6	68.2	37.9
23	42.6	38.2	33.3	70.1	49.0	42.0	34.8	58.4	34.1
24	47.0	41.2	35.2	64.1	46.9	43.3	40.1	77.6	37.6
25	45.5	43.1	41.0	84.6	44.9	41.1	37.3	75.3	39.2
26	47.5	43.5	39.8	75.3	58.2	44.5	30.0	34.4	34.9
27	53.1	45.9	39.6	60.2	43.9	43.2	42.6	95.2	41.1
28	47.6	45.6	43.9	87.5	51.3	49.8	**48.7**	91.1	46.3
29	39.0	37.8	36.5	90.9	34.6	32.9	30.6	85.6	33.5
30	34.3	34.0	33.6	97.4	39.9	37.9	35.7	85.4	34.7
Means	39.49	36.95	34.25	82.92	44.20	39.89	35.37	74.79	31.81
Normal	41.4	36.0	.....	.....	48.2	38.7	.....	.....	28.0

TABLE IV—Continued.

METEOROLOGICAL RECORD FOR APRIL, 1900.

Daily Mean Relative Humidity	Maximum Temperature	Minimum Temperature	Daily Mean Temperature	Range	Barometer, Corrected for Temperature and Instrumental Error			Terrestrial Radiation	
					7 A. M.	7 P. M.	Mean	Instrument Reading	Radiation
Per ct.	F°	F°	F°	F°	Ins.	Ins.	Ins.	F°	F°
56.0	71.0	27.0	49.0	44.0	25.162	25.022	25.092	22.1	4.9
47.7	**73.9**	28.7	51.3	45.2	24.977	24.809	24.893	24.2	4.5
57.3	68.8	29.6	49.2	39.2	24.755	24.762	24.758	24.7	4.9
96.9	38.2	32.5	35.3	**5.7**	25.006	25.105	25.056	31.5	1.0
96.1	42.5	32.1	37.3	10.4	25.103	25.066	25.085	31.8	0.3
100.0	44.7	29.4	37.1	15.3	25.014	24.872	24.943	26.3	3.1
88.5	54.0	31.0	42.5	23.0	24.667	24.653	24.660	29.8	1.2
88.8	56.2	31.5	43.8	24.7	24.635	24.557	24.596	28.5	3.0
86.4	48.0	36.1	42.1	11.9	24.649	24.844	24.747	35.5	0.6
98.9	32.0	24.1	28.0	7.9	25.073	**25.403**	25.238	26.0	**−1.9**
89.0	37.7	**5.1**	21.4	32.6	25.344	25.233	25.288	**−2.0**	7.1
83.7	45.7	23.2	34.5	22.5	25.190	25.027	25.109	20.0	3.2
77.0	53.5	30.8	42.1	22.7	24.876	24.715	24.795	27.5	3.3
79.6	55.2	32.8	44.0	22.4	24.732	24.777	24.755	29.2	3.6
86.8	42.0	35.0	38.5	7.0	24.847	24.933	24.890	34.8	0.2
58.0	50.2	38.8	44.5	11.4	25.025	25.016	25.020	38.1	0.7
96.4	40.8	32.2	36.5	8.6	25.005	24.987	24.996	31.8	0.4
81.3	58.4	12.5	35.5	**45.9**	24.970	24.889	24.930	4.8	**7.7**
69.1	68.3	31.6	49.9	36.7	24.981	24.913	24.947	29.7	1.9
68.6	72.0	33.5	52.8	38.5	24.899	24.762	24.830	30.0	3.5
64.5	70.3	37.9	54.1	32.4	24.742	24.589	24.666	34.5	3.4
78.4	56.0	40.9	48.4	15.1	**24.538**	24.570	24.554	37.3	3.6
64.2	59.9	31.1	45.5	28.8	24.726	24.772	24.749	26.8	4.3
70.9	59.6	36.0	47.8	23.6	24.798	24.777	24.787	31.3	4.7
79.9	58.1	35.3	46.7	22.8	24.791	24.786	24.789	29.8	5.5
54.9	66.9	30.0	48.5	36.9	24.831	24.766	24.798	26.4	3.6
77.7	68.7	41.7	55.2	27.0	24.849	24.940	24.895	35.3	6.4
89.3	61.7	43.2	52.4	18.5	25.001	24.974	24.987	**41.1**	2.1
88.2	39.6	32.4	36.0	7.2	25.163	25.309	25.236	32.0	0.4
91.4	42.1	32.0	37.1	10.1	25.274	25.127	25.201	32.0	0.0
78.85	54.53	31.27	42.90	23.27	24.921	24.899	24.910	28.36	2.91
57.0	61.9	32.1	46.3	29.7	----------	----------	24.940	------	4.5

TABLE IV—Concluded.

METEOROLOGICAL RECORD FOR APRIL, 1900.

	Precipitation				Direction of Wind		Total Movement 24 Hours following 7 a. m.	Actinometer at Noon				Frost or Dew
	Time of Beginning	Time of Ending	Total Amount Rain and Melted Snow	Average Depth of Snow	7 A.	7 P.		Black Bulb	Bright Bulb	Difference	Radiation	
			Ins	Ins			Miles	C°	C°	C°	Cal	
1	----	----	----	----	N W	W	135.9	----	----	----	----	F
2	----	----	----	----	0	W	149.5	46.7	31.8	14.9	10.55	F
3	----	----	----	----	S W	E	588.2	----	----	----	----	----
4	nt	----	1.52	7.0	E	E	77.5	----	----	----	----	Rn
5	----	7.30 A	.49	1½	0	N	92.9	48.6	21.7	26.9	18.47	Sn
6	5.30 P	----	.23	----	N W	N	120.4	38.8	18.0	20.8	13.75	Fo
7	----	nt	.20	----	W	W	110.5	----	----	----	----	Rn
8	3.30 P	----	.22	----	N W	S	248.8	----	----	----	----	F
9	11.30A	nt	.91	----	S	N	234.5	22.6	11.1	11.5	6.85	Rn
10	nt	7.30 P	.62	6.5	N E	N	224.2	44.1	17.9	26 2	17.43	Sn
11	----	----	----	----	W	W	108.0	----	----	----	----	----
12	----	----	----	----	W	S	126.4	32.8	17.2	15 6	9.90	F
13	7.10 P	----	T	----	N E	S	110.1	37.7	17.6	20.1	13.02	F
14	5.50 P	6.20 P	.15	----	W	N	210.3	31.0	17.8	13.2	8 34	F
15	nt	Int. all day	.84	----	N	NNW	427.4	----	----	----	----	Rn
16	nt	----	----	----	N	N W	255.3	29.0	13.7	15.3	9.44	----
17	3.00 P	8.30 A	.46	2¾	N E	N E	79.5	10.5	5.9	4 6	2.56	Sn
18	----	nt	.13	1	W	W	78.6	----	----	----	----	Sn
19	----	----	----	----	W	S	116.4	44.2	28.5	15.7	10.87	F
20	----	----	----	----	S E	S	154.2	45.0	29.0	16 0	11.13	F
21	5.50 P	----	T	----	E	N E	151.5	47.2	30.6	16.6	11 72	D
22	Int. a	ll day	.08	----	N	N	196.7	----	----	----	----	D
23	----	----	----	----	N	N W	102.2	29.1	18.7	10.4	6.54	F
24	2.30 P	----	.02	----	S	N W	145.6	----	----	----	----	L F
25	5.00 P	----	T	----	N	S E	134.7	22 5	15.2	7.3	4.42	L F
26	----	----	----	----	N	N W	135.8	45.0	28.5	16.5	11 46	Hv F
27	2.30 P	----	1.10	Some hail	N E	N E	239.6	46.2	29.7	16.5	11.57	----
28	5.35 P	5.45 P	.70	Some hail	N W	N	208.1	39.2	23.8	15.4	10.20	Rn
29	nt	All day	2.39	----	N W	N W	131.6	----	----	----	----	Rn
30	----	8 00 A	.50	4.5	S E	0	72.4	40.2	18.1	22.1	14.49	Su
Means	----	----	10.56	22¾	----	----	172.2	36.86	20.78	16.08	10.66	----
Normal	----	----	2.12	----	----	----	244.	----	----	----	----	----

TABLE V.

METEOROLOGICAL RECORD FOR MAY, 1900.

	Temperature, Dew Point and Relative Humidity								Daily Mean Dew Point
	7 A. M.				7 P. M.				
	Dry Bulb	Wet Bulb	Dew Point	Relative Humidity	Dry Bulb	Wet Bulb	Dew Point	Relative Humidity	
	F°	F°	F°	Per ct.	F°	F°	F°	Per ct.	Per ct.
1	33.2	33.2	33.2	**100.0**	48.9	44.9	41.4	75.9	37.3
2	47.1	42.3	37.7	70.1	50.4	45.3	40.9	70.2	39.3
3	48.7	45.5	42.8	80.6	57.6	48.0	39.9	51.8	41.3
4	58.2	48.7	40.9	52.7	62.8	52.0	44.0	50.4	42.5
5	53.8	49.1	45.6	73.8	58.7	46.2	34.2	39.8	39.9
6	54.2	47.1	41.2	61.4	55.3	50.2	46.4	72.2	43.8
7	59.1	49.1	40.9	51.1	59.7	47.6	36.7	42.4	38.8
8	51.7	47.5	44.2	75.9	61.2	49.9	40.8	47.1	42.5
9	53.9	47.7	42.7	65.8	68.1	55.7	47.5	48.0	45.1
10	60.2	53.0	48.1	64.3	65.7	54.0	45.9	48.9	47.0
11	62.0	51.1	42.7	49.4	63.7	52.0	44.3	49.4	43.5
12	56.0	43.8	30.8	38.6	58.9	49.0	40.9	51.4	35.8
13	55.9	44.1	31.8	40.3	64.7	47.3	**29.4**	**26.5**	30.6
14	47.6	43.9	40.6	77.2	51.8	46.8	42.7	71.3	41.7
15	52.1	47.0	42.8	70.9	57.0	47.2	38.6	50.4	40.7
16	53.0	46.9	41.8	65.9	62.9	51.1	42.0	46.4	41.9
17	57.2	46.2	36.0	45.2	45.8	43.8	42.0	87.1	39.0
18	46.0	44.0	42.2	87.2	48.9	43.9	39.3	70.0	40.7
19	47.7	44.7	42.1	81.4	50.1	47.9	46.3	86.8	44.2
20	45.7	45.7	45.7	**100.0**	47.3	45.8	44.6	90.6	45.2
21	50.9	48.8	47.2	87.6	55.3	51.2	48.3	77.5	47.7
22	56.2	51.0	47.2	72.0	62.7	54.9	49.9	62.9	48.6
23	55.9	46.8	38.8	52.8	61.6	53.0	47.0	58.9	42.9
24	55.6	51.9	49.4	79.6	61.0	52.4	46.3	58.6	47.8
25	62.7	55.0	50.1	63.4	66.9	53.9	44.8	44.8	47.5
26	59.8	52.0	46.5	61.4	68.3	57.1	50.2	52.6	48.3
27	59.7	52.8	48.1	65.4	69.6	53.9	42.3	37.3	45.2
28	59.2	55.7	53.6	81.7	72.1	57.1	47.4	41.6	50.5
29	67.9	54.9	45.1	45.5	66.0	54.0	45.6	48.0	45.4
30	58.9	54.3	51.4	76.2	68.7	59.8	54.9	61.4	53.1
31	59.2	56.2	**54.4**	84.3	67.7	52.5	40.7	37.5	47.6
Means	54.49	48.39	43.41	68.44	59.98	50.59	43.39	56.70	43.40
Normal	51.3	45.2	.....	.....	56.6	47.0	.....	.....	38.6

TABLE V—Continued.

METEOROLOGICAL RECORD FOR MAY, 1900.

	Daily Mean Relative Humidity	Maximum Temperature	Minimum Temperature	Daily Mean Temperature	Range	Barometer, Corrected for Temperature and Instrumental Error			Terrestrial Radiation	
						7 A. M	7 P. M.	Mean	Instrument Reading	Radiation
	F°	F°	F°	F°	F°	Ins.	Ins.	Ins.	F°	F°
1	87.9	61.7	**29.8**	45.7	31.9	25.007	24.926	24.966	26.3	3.5
2	70.2	59.2	45.0	52.1	14.2	25.129	25.112	25.121	41.2	3.8
3	66.2	69.5	34.3	51.9	35.2	25.150	25.007	25.078	28.8	5.5
4	51.5	74.4	40.0	57.2	34.4	25.021	24.870	24.946	34.2	5.8
5	56.8	75.7	43.1	59.4	32.6	24.850	24.761	24.805	38.1	5.0
6	66.8	68.3	44.0	56.2	24.3	24.852	24.894	24.873	39.1	4.9
7	46.8	70.3	46.4	58.3	23.9	25.055	25.104	25.080	40.8	5.6
8	61.5	72.6	39.6	56.1	33.0	**25.251**	25.220	25.235	32.4	7.2
9	56.9	79.1	42.4	60.8	36.7	**25.251**	25.073	25.162	35.2	7.2
10	56.6	84.1	43.2	63.6	**40.9**	25.069	24.910	24.990	36.2	7.0
11	49.4	81.4	42.8	62.1	38.6	24.869	**24.678**	24.773	35.4	7.4
12	45.0	72.1	47.0	59.6	25.1	24.793	24.698	24.746	38.5	8.5
13	33.4	74.0	51.4	62.7	22.6	24.794	24.833	24.813	37.1	**14.3**
14	74.2	66.2	45.9	56.0	20.3	25.068	25.077	25.073	43.7	2.2
15	60.7	66.8	41.3	54.1	25.5	25.211	25.132	25.171	34.0	7.3
16	56.1	73.9	35.0	54.4	38.9	25.081	24.871	24.976	29.1	5.9
17	66.2	61.9	45.1	53.5	16.8	24.877	24.994	24.936	40.8	4.3
18	78.6	57.4	37.7	47.6	19.7	25.016	24.991	25.003	35.0	2.7
19	84.1	63.0	32.8	47.9	30.2	25.015	24.959	24.987	28.8	4.0
20	95.3	51.0	44.9	47.9	**6.1**	25.013	25.047	25.030	44.8	**0.1**
21	82.5	65.1	44.8	55.0	20.3	25.083	25.007	25.045	42.1	2.7
22	67.5	74.9	40.3	57.6	34.6	24.936	24.814	24.875	36.5	3.8
23	55.8	73.2	49.8	61.5	23.4	24.952	24.981	24.967	44.8	5.0
24	69.1	73.2	44.8	59.0	28.4	24.978	24.903	24.940	40.1	4.7
25	54.1	77.7	49.3	63.5	28.4	25.074	25.093	25.084	43.3	6.0
26	57.0	82.1	43.7	62.9	38.4	25.150	25.008	25.079	37.2	6.5
27	51.4	**84.7**	44.7	64.7	40.0	25.022	24.926	24.974	39.2	5.5
28	61.6	82.3	44.9	63.6	37.4	24.990	24.920	24.955	39.5	5.4
29	46.8	82.2	54.2	68.2	28.0	25.004	25.021	25.012	48.0	6.3
30	68.8	81.9	42.0	61.9	39.9	25.094	24.936	25.015	39.1	2.9
31	60.9	83.0	48.1	65.6	34.9	25.013	24.916	24.965	41.2	6.9
Means	62.57	72.35	43.17	57.76	29.18	25.022	24.957	24.989	37.76	5.41
Normal	60.7	69.0	40.8	54.8	28.1	.....	.....	24.948	.....	5.9

TABLE V—Concluded.

METEOROLOGICAL RECORD FOR MAY, 1900.

Precipitation				Direction of Wind		Total Movement 24 Hours following 7 a. m.	Actinometer at Noon				Frost or Dew
Time of Beginning	Time of Ending	Total Amount Rain and Melted Snow	Average Depth of Snow	7 A.	7 P.		Black Bulb	Bright Bulb	Difference	Radiation	
		Ins.	Ins.			Miles	C°	C°	C°	Cal.	
9.00 P	.....	.....	.....	S	S	179.5	.....	.....	.....	.....	Fog
6.45 P	.....	.01	.....	N	E	120.2	27.8	19.0	8.8	5.51	Rn
.....	.....	.....	.....	S E	S W	171.6	45.9	29.8	16.1	11.28	L F
.....	.....	.....	.....	W	N W	142.2	49.5	33.2	16.3	11.73	D
.....	.....	.....	.....	N	N W	149.3	49.5	33.1	16.4	11.79	D
11.14 P	8.00 P	.08	.....	S W	N E	197.3	.....	.....	.....	.....	.....
... ..	.....	.04	.....	N W	N	233.2	36.0	19.7	16.3	10.57	Rn
.....	.....	.....	.....	S E	S E	160.3	.....	.....	.....	.....	D
.....	.....	.....	.....	N	W	105.3	49.3	33.5	15.8	11.37	D
3.00 P	.....	T	.....	S E	N	136.7	36.5	30.5	6.0	4.06	D
.. ...	.....	.....	.....	W	N	214.6	54.9	38.1	16.8	12.57	D
.....	.....	.....	.....	N W	N W	252.8	48.8	31.6	17.2	12.27	.....
.....	.....	.....	.....	S E	S	170.0	.....	.....	.....	.....	.....
Int. AM	.....	.14	.....	S W	S E	107.1	21.0	13.4	7.6	4.54	.....
nt	nt	.07	.....	N	N W	96.8	.....	.....	.....	.....	Rn
.....	.....	.....	.....	S	N	159.5	48.4	32.2	16.2	11.56	L F
5 00	6.40	.08	.....	N	S W	121.1	22.2	17.4	4.8	2.92	.....
.40 P	3.00 P	.02	.....	W	W	98.6	23.8	16.7	7.1	4.34	.....
5.30 P	.....	.05	.....	N E	S	197.0	31.3	21.2	10.1	6.47	D
Int PM	9.00 A	1.21	.....	E	E	189.2	.....	.....	.....	.....	Rn
nt	nt	.02	.....	0	W	96.8	43.3	27.4	15.9	10.92	Rn
.....	.....	.....	.....	W	S	186.6	.....	.....	.....	.....	D
.....	.....	.....	.....	N W	S	158.4	46.5	30.8	15.7	11.06	.....
6.10 P	6.20 P	.03	.....	N	W	122.5	33.2	22.7	10.5	6.81	D
.....	.....	.....	.....	N	N	110.7	49.8	34.7	15.1	11.00	D
.....	.....	.....	.....	N W	S E	89.1	50.0	35.1	14.9	10.82	.....
.....	.....	.....	.....	0	W	103.3	.....	.....	.....	.....	D
.....	.....	.....	.....	S W	S	132.6	52.1	37.4	14.7	10.86	D
9 00 P	.....	T	.....	N W	S	123.5	.....	.....	.....	.....	.....
.....	.....	.....	.....	E	S	97.7	.....	.....	.....	.....	.....
.....	.....	.....	.....	N W	E	144.7	33.9	27.5	6.4	4.24	.....
.....	.....	1.75	.....	....	....	147.3	40.65	27.86	12.80	8.89	.....
.....	.....	2.74	.....	....	....	198.	.....	.....	.....	.....	.....

TABLE VI.

METEOROLOGICAL RECORD FOR JUNE, 1900.

	Temperature, Dew Point and Relative Humidity								Daily Mean Dew Point
	7 A. M.				7 P. M.				
	Dry Bulb	Wet Bulb	Dew Point	Relative Humidity	Dry Bulb	Wet Bulb	Dew Point	Relative Humidity	
	F °	F °	F °	Per ct.	F °	F °	F °	Per ct.	F °
1	55.3	48.6	43.4	64.0	61.2	56.9	54.4	78.4	48.9
2	56.9	52.9	50.3	78.6	68.7	58.1	51.8	55.0	51.0
3	60.2	56.8	54.9	82.5	61.1	55.1	51.3	70.2	53.1
4	58.2	55.1	53.2	83.5	62.7	55.2	50.4	64.2	51.8
5	59.1	54.2	51.1	74.7	65.2	55.0	48.3	54.4	49.7
6	65.2	56.5	51.2	60.5	69.9	54.8	44.1	39.7	47.7
7	69.2	52.3	**38.7**	35.1	67.4	55.4	47.4	48.9	43.0
8	60.7	53.7	49.1	65.4	72.6	54.7	41.5	32.6	45.3
9	64.9	56.8	51.9	62.8	64.7	51.1	40.2	40.9	46.1
10	45.1	42.0	39.0	79.9	53.1	51.2	49.9	**89.1**	44.4
11	57.9	53.9	51.4	78.9	61.7	54.9	50.6	66.8	51.0
12	56.9	52.7	49.9	77.5	63.2	53.2	46.2	53.9	48.1
13	61.2	56.0	52.9	74.0	64.0	57.6	53.9	69.6	53.4
14	62.9	59.0	56.9	80.8	61.3	51.0	43.1	51.4	50.0
15	60.1	54.1	50.2	69.8	69.9	58.3	51.4	52.1	50.8
16	60.9	54.1	49.7	66.5	68.8	60.0	55.2	61.9	52.4
17	65.2	51.7	41.2	41.7	66.0	57.8	53.0	63.0	47.1
18	61.9	56.1	52.6	71.5	69.0	59.2	53.6	58.2	53.1
19	62.0	56.9	53.9	74.8	71.9	60.2	53.7	53.0	53.8
20	65.6	57.1	52.0	61.5	75.7	60.3	51.4	42.8	51.7
21	73.1	62.6	57.4	57.8	76.1	64.3	58.6	54.9	58.0
22	70.8	61.9	57.4	62.5	75.1	63.0	56.9	53.3	57.2
23	68.9	61.3	57.4	66.7	73.0	61.1	54.7	52.9	56.0
24	65.8	59.2	55.6	69.5	75.6	61.1	53.1	45.7	54.4
25	72.1	59.1	51.5	48.5	74.2	61.9	55.0	52.1	53.5
26	66.3	58.2	53.6	63.5	78.1	61.9	53.0	41.9	53.3
27	73.2	63.0	58.0	58.9	75.9	65.3	**60.4**	58.8	59.2
28	67.1	61.1	58.0	72.6	74.4	60.1	51.9	45.5	54.9
29	68.0	59.2	54.3	61.5	74.9	57.9	47.1	37.2	50.7
30	65.9	59.5	56.0	70.4	78.0	57.0	42.2	**28.1**	49.1
Means	63.35	56.19	51.76	67.13	69.11	57.79	50.83	53.88	51.29
Normal	60.4	53.5	.....	.....	65.9	55.1	.....	.....	48.1

TABLE VI—Continued.

METEOROLOGICAL RECORD FOR JUNE, 1900.

Daily Mean Relative Humidity	Maximum Temperature	Minimum Temperature	Daily Mean Temperature	Range	Barometer, Corrected for Temperature and Instrumental Error			Terrestrial Radiation	
					7 A. M.	7 P. M.	Mean	Instrument Reading	Radiation
Per ct.	F°	F°	F°	F°	Ins.	Ins.	Ins.	F°	F°
71.2	66.3	52.2	59.2	**14.1**	**25.196**	25.110	25.153	48.2	4.0
66.8	77.0	46.3	61.7	30.7	25.091	24.991	25.041	40.0	6.3
76.3	77.7	45.6	66.1	32.1	25.041	25.005	25.023	39.1	6.5
73.9	71.8	51.6	61.7	20.2	25.049	25.059	25.054	47.2	4.4
64.5	79.2	43.0	61.1	36.2	25.044	24.989	25.016	36.7	6.3
50.1	86.1	46.0	66.1	40.1	24.994	24.935	24.965	40.0	6.0
41.0	89.8	55.1	72.4	34.7	25.015	25.027	25.021	42.7	**12.4**
49.0	85.1	46.0	65.6	39.1	24.983	24.819	24.901	39.8	6.2
51.9	84.2	52.0	68.1	32.2	24.817	24.862	24.839	43.5	8.5
84.5	61.0	45.7	53.3	15.3	25.173	25.045	25.109	42.2	**3.5**
72.8	75.7	41.6	58.7	34.1	25.045	25.009	25.027	35.8	5.8
65.7	80.9	**40.7**	60.8	40.2	25.000	25.025	25.013	32.6	8.1
71.8	74.1	49.2	61.6	24.9	25.136	25.011	25.073	41.3	7.9
66.1	76.7	51.3	64.0	25.4	24.985	24.919	24.952	47.2	4.1
61.0	82.2	43.2	62.7	39.0	25.024	24.936	24.980	38.8	4.4
64.2	87.7	43.7	65.7	**44.0**	24.930	24.838	24.884	38.3	5.4
52.3	80.2	53.4	66.8	26.8	24.993	25.065	25.029	44.2	9.2
64.9	83.7	48.9	66.3	34.8	25.130	25.083	25.107	43.2	5.7
63.9	85.3	53.0	69.2	32.3	25.152	25.080	25.116	46.7	6.3
52.1	91.0	50.1	70.5	40.9	25.108	25.025	25.066	43.2	6.9
56.4	92.9	58.0	75.5	34.9	25.029	25.004	25.017	48.1	9.9
57.9	89.6	56.2	72.9	33.4	25.055	25.022	25.038	48.1	8.1
59.8	87.1	57.0	72.0	30.1	25.089	24.993	25.041	51.1	5.9
57.6	89.0	55.0	72.0	34.0	25.035	24.981	25.008	49.2	5.8
50.3	90.9	58.4	74.7	32.5	25.023	24.955	24.989	49.1	9.3
52.7	**94.4**	57.1	75.7	37.3	24.960	24.950	24.955	48.8	8.3
58.8	89.1	54.7	71.9	34.4	24.964	24.991	24.978	47.7	7.0
59.1	94.1	55.0	74.6	39.1	25.017	24.973	24.995	50.3	4.7
49.3	87.7	56.6	72.1	31.1	25.019	24.895	24.957	51.9	4.7
49.3	92.7	54.0	73.4	38.7	24.858	**24.789**	24.823	50.2	3.8
60.51	83.44	50.69	67.06	33.75	25.032	24.979	25.006	44.17	6.51
61.2	79.3	48.1	63.4	31.4	----------	----------	24.975	------	6.2

TABLE VI—Concluded.

METEOROLOGICAL RECORD FOR JUNE, 1900.

	Precipitation				Direction of Wind		Total Movement 24 Hours following 7 a. m.	Actinometer at Noon				Frost or Dew
	Time of Beginning	Time of Ending	Total Amount Rain and Melted Snow	Average Depth of Snow	7 A.	7 P.		Black Bulb	Bright Bulb	Difference	Radiation	
			Ins.	Ins.			Miles	C°	C°	C°	Cal.	
1	About 3.00 A	....	.08	....	N	W	110.3	....	....	....	....	Rn
2	....	....	....	....	NW	E	93.0	49.4	33 8	15.6	11.24	.....
3	1.00 P	....	T	....	NW	0	124.6	....	....	....	....	D
4	....	....	....	....	E	W	169.4	28.5	21 0	7 5	4.75	.....
5	....	....	....	....	0	....	151.0	....	....	....	....	.....
6	....	....	....	....	W	....	217.7	....	....	....	....	.....
7	....	....	....	....	N	W	142.5	....	....	....	....	....
8	4.30 P	....	T	....	NW	S	144.9	....	....	....	....	.....
9	7.00 P	....	T	....	NW	N	233.2	58 2	40 6	17.6	13.53	D
10	6.45 A	....	.13	....	N	S	155.5	....	....	....	....	Rn
11	7.00 P	....	.01	....	0	S	125.3	44.5	31 0	13.5	9.45	D
12	....	....	....	....	S	SW	122.0	....	....	....	....	D
13	5.15 P	5.45 P	.51	....	SE	SW	139.1	....	....	....	....	.....
14	3.45 P	....	.01	....	NW	N	133.9	39.6	30.5	9.1	6.24	D
15	....	....	....	....	0	S	104.8	51.1	36 6	14.5	10 63	D
16	....	....	....	....	NW	0	127.7	54 0	39.1	14.9	11.15	D
17	1.15 P	....	T	....	NE	SW	115.2	....	....	....	....	.....
18	4 00 P 5.00 P	5.10 P	.07	....	0	S	141.7	....	....	....	....	.....
19	....	....	....	....	N	S	77.5	....	....	....	....	D
20	....	....	....	....	0	SW	95.0	55.5	41.5	14.0	10.63	D
21	....	....	....	....	0	S	110.9	51 7	44.1	7.6	5.75	.....
22	....	....	....	....	N	E	95.5	55.0	41 8	13.2	10.02	.....
23	....	....	....	....	NE	SE	106.0	54.0	40.1	13 9	10.44	D
24	....	....	....	....	NW	W	107.0	....	....	....	....	.....
25	4.45 P	....	T	....	NW	NW	113.4	56.0	41.7	14.3	10.89	D
26	....	....	....	....	NW	S	141.2	....	....	....	....	D
27	....	....	....	....	N	S	134.6	54.5	40.6	13.9	10.54	.....
28	....	....	.01	....	SE	S	132.7	59.3	45.1	14.2	11.09	D
29	....	....	T	....	NW	SE	93.1	30.6	25.7	4.9	3.18	D
30	....	....	T	....	0	S	175.6	....	....	....	....	D
Means	....	....	0.82	....	....	....	131.1	49.46	36.88	12.58	9 30	.....
Normal	....	....	1.57	....	....	....	159.	....	....	....	....	.....

TABLE VII.

METEOROLOGICAL RECORD FOR JULY, 1900.

	Temperature, Dew Point and Relative Humidity								
	7 A. M.				7 P. M.				Daily Mean Dew Point
	Dry Bulb	Wet Bulb	Dew Point	Relative Humidity	Dry Bulb	Wet Bulb	Dew Point	Relative Humidity	
	F°	F°	F°	Per ct.	F°	F°	F°	Per ct.	F°
1	66.0	58.8	54.8	67.1	69.0	60.0	55.1	61.2	54.9
2	64.1	56.0	51.0	62.4	73.9	64.2	59.6	61.0	55.3
3	61.1	53.1	47.6	61.3	67.7	57.0	50.4	54.0	49.0
4	67.0	58.0	52.8	60.2	65.7	59.2	55.6	69.9	54.2
5	61.0	56.5	53.8	77.4	69.8	56.3	47.5	45.2	50.7
6	60.7	51.8	45.3	57.0	81.2	55.7	**35.3**	**19.3**	40.3
7	61.7	52.0	44.9	54.2	70.9	61.8	57.2	61.8	51.0
8	60.1	52.3	46.8	61.6	73.0	58.0	48.6	42.2	47.7
9	66.2	57.7	52.7	61.8	74.2	57.9	47.6	38.9	50.2
10	64.1	55.2	49.5	59.1	73.0	64.0	**59.7**	63.1	54.6
11	67.8	59.6	55.1	63.8	73.9	61.1	54.2	50.2	54.6
12	66.1	57.5	52.4	61.4	74.8	62.7	56.6	53.1	54.5
13	68.0	60.0	55.7	64.7	71.1	61.0	55.7	58.2	55.7
14	71.0	61.2	56.1	59.2	71.5	62.1	57.4	60.9	56.8
15	61.4	56.2	53.1	74.0	57.2	55.1	53.9	88.5	53.5
16	56.1	54.3	53.2	90.0	65.4	57.1	52.1	62.2	52.6
17	60.0	56.8	55.0	83.5	73.4	63.3	58.4	59.3	56.7
18	64.9	54.0	46.5	51.5	70.3	60.4	55.1	58.5	50.8
19	51.0	51.0	51.0	**100.0**	55.0	53.1	51.9	89.3	51.5
20	50.0	49.7	49.5	98.1	66.1	56.1	49.8	55.8	49.6
21	61.9	54.9	50.5	66.0	69.8	59.0	52.6	55.0	51.6
22	66.3	58.4	53.9	64.3	69.2	58.9	53.0	56.4	53.4
23	67.6	61.6	58.6	72.8	62.9	59.0	56.9	80.8	57.8
24	63.2	59.0	56.7	79.4	63.9	59.9	57.8	80.6	57.2
25	61.4	58.7	57.3	86.3	67.9	61.1	57.6	69.5	57.5
26	62.4	60.0	58.8	87.8	70.1	60.1	54.7	58.0	56.7
27	64.2	59.7	57.4	78.3	73.3	60.0	52.5	48.1	55.0
28	59.9	53.3	48.9	66.5	66.5	58.0	53.1	62.0	51.0
29	59.9	56.0	53.7	80.0	71.0	60.7	55.3	57.4	54.5
30	63.7	58.0	54.8	72.7	74.0	59.0	50.0	42.9	52.4
31	61.9	56.8	53.8	74.7	74.2	58.1	48.0	39.6	50.9
Means	62.60	56.39	52.62	70.87	69.67	59.35	53.33	58.16	52.97
Normal	64.4	58.0	------	------	69.8	59.7	------	------	53.8

TABLE VII—Continued.

METEOROLOGICAL RECORD FOR JULY, 1900.

	Daily Mean Relative Humidity	Maximum Temperature	Minimum Temperature	Daily Mean Temperature	Range	Barometer, Corrected for Temperature and Instrumental Error			Terrestrial Radiation	
						7 A. M.	7 P. M.	Mean	Instrument Reading	Radiation
	Per ct.	F°	F°	F°	F°	Ins.	Ins.	Ins.	F°	F°
1	64.1	80.2	54.0	67.1	26.2	24.796	24.802	24.799	49.5	4.5
2	61.7	86.9	54.8	70.8	32.1	24.946	24.752	24.849	49.2	5.6
3	57.7	85.0	49.3	67.2	35.7	24.905	24.858	24.881	45.7	3.6
4	65.0	73.9	55.6	64.7	18.3	24.914	24.834	24.874	51.9	3.7
5	61.3	83.9	51.0	67.5	32.9	24.814	24.838	24.826	48.1	2.9
6	38.2	90.8	50.1	70.4	40.7	24.959	24.823	24.891	43.8	6.3
7	58.0	82.2	52.6	67.4	29.6	25.133	25.124	25.129	45.2	7.4
8	51.9	82.8	49.3	66.1	33.5	25.184	24.916	25.050	43.6	5.7
9	50.3	92.0	51.4	71.7	40.6	24.965	24.922	24.943	44.1	7.0
10	61.1	91.3	50.0	70.6	41.3	25.028	24.979	25.004	44.0	6.0
11	57.0	92.4	55.0	73.7	37.4	25.051	24.998	25.024	49.1	5.9
12	57.3	92.7	56.1	74.4	36.6	24.978	24.884	24.931	49.0	7.1
13	61.4	90.0	54.9	72.5	35.1	24.915	24.842	24.879	47.3	7.6
14	60.1	**92.9**	56.0	74.4	36.9	24.839	**24.728**	24.783	49.0	7.0
15	81.2	74.1	54.9	64.5	19.2	24.942	24.949	24.946	**58.3**	....
16	76.1	73.0	52.1	62.6	20.9	25.098	25.097	25.097	49.9	2.2
17	71.4	90.1	46.9	68.5	**43.2**	25.039	24.922	24.981	42.4	4.5
18	55.0	82.0	50.9	66.4	31.1	25.020	24.948	24.984	44.9	6.0
19	94.7	59.7	51.6	55.7	**8.1**	25.205	25.162	25.183	49.8	1.8
20	76.9	79.1	**40.2**	59.6	38.9	25.154	25.044	25.099	**36.0**	4.2
21	60.5	87.8	46.0	66.9	41.8	25.046	24.998	25.022	41.1	4.9
22	60.4	88.1	53.4	70.8	34.7	25.075	24.904	24.990	45.9	7.5
23	76.8	78.1	58.9	68.5	19.2	25.148	25.163	25.155	51.8	7.1
24	80.0	73.5	52.3	62.9	21.2	25.181	25.182	25.182	47.7	4.6
25	77.9	77.7	50.9	64.3	26.8	25.189	25.076	25.132	47.2	3.7
26	72.9	80.5	55.0	67.7	25.5	25.044	25.010	25.027	49.3	5.7
27	63.2	89.8	54.6	72.2	35.2	24.992	24.978	24.985	50.3	4.3
28	64.2	75.7	55.5	65.6	20.2	25.189	25.145	25.167	48.8	6.7
29	68.7	86.0	48.5	67.3	37.5	25.181	25.065	25.123	43.3	5.2
30	57.8	88.7	51.8	70.2	36.9	25.186	25.146	25.166	44.2	7.6
31	57.2	92.8	50.7	71.8	42.1	**25.218**	25.134	25.176	41.3	**9.4**
Means	64.52	83.67	52.07	67.87	**31.59**	25.043	24.975	25.009	46.84	5.52
Normal	65.2	84.3	53.3	68.4	31.3	.....	.....	25.071	.....	5.9

TABLE VII—Concluded.

METEOROLOGICAL RECORD FOR JULY, 1900.

Precipitation				Direction of Wind		Total Movement 24 Hours following 7 a. m.	Actinometer at Noon				Frost or Dew
Time of Beginning	Time of Ending	Total Amount Rain and Melted Snow	Average Depth of Snow	7 A.	7 P.		Black Bulb	Bright Bulb	Difference	Radiation	
		Ins	Ins			Miles	C°	C°	C°	Cal	
3.00 P	.....	T	.....	N	S W	121.9	.....	.....	.....	.....	.....
.....	.....	.....	.....	W	N W	101.1	51.5	36.8	14.7	10.80	D
4.15and 7.00 P	.....	.08	.....	S	W	122.7	.....	.....	.....	.....	.....
11.00 A	.....	.08	.....	N W	S W	83.3	.....	.....	.....	.....	Rn
nt	nt	.03	.....	N	S W	222.3	39.2	31.1	8.1	5.48	Rn
.....	.....	.....	.....	0	W	190.9	52.3	38.5	13.8	10.24	.....
.....	.....	.....	.....	E	N E	98.1	.....	.....	.....	.....	.....
.....	.....	.....	.....	W	S	136.4	.....	.....	.....	.....	.....
.....	.....	.....	.....	E	N E	123.4	48.5	36.5	12.0	8.71	.....
.....	.....	.....	.....	0	E	110.0	.....	.....	.....	.....	.....
8.....	.....	.....	.....	S E	W	83.2	55.0	41.2	13.8	10.45	D
.....	.....	.....	.....	S E	W	114.8	60.9	45.5	15.4	12.08	.....
.....	.....	.....	.....	0	W	108.7	42.8	35.9	6.9	4.89	.....
.....	.....	.....	.....	....	W	191.6	56.0	38.7	17.3	13.03	.....
.....	.....	.07	.....	N W	0	95.0	.....	.....	.....	.....	.....
.....	About 4.00 A	.19	.....	0	0	86.0	40.3	32.5	7.8	5.40	.....
.....	.....	.....	.....	....	0	122.2	.....	.....	.....	.....	.....
.....	.....	.....	.....	....	0	137.6	21.0	14.6	6.4	3.84	.....
.....	.....	.19	.....	....	....	50.7	.....	.....	.....	.....	.....
.....	.....	.01	.....	....	....	95.8	55.2	40.4	14.8	11.18	.....
.....	.....	.....	.....	....	....	88.1	.....	.....	.....	.....	.....
4.00 P	.....	T	.....	....	N E	123.7	.....	.....	.....	.....	.....
4.40 P	5.25 P	.43	.....	N	N	105.5	27.0	24.5	2.5	1.59	D
.....	.....	.06	.....	0	S E	89.9	.....	.....	.....	.....	D
.....	.....	.....	.....	N E	N E	83.1	47.9	33.8	14.1	10.10	D
6.45 P	.....	T	.....	N	N E	113.0	55.0	39.6	15.4	11.59	D
.....	.....	.....	.....	N	N W	119.6	56.9	41.8	15.1	9.55	D
.....	.....	.....	.....	N	W	113.2	38.7	28.2	10.5	7.11	.....
.....	.....	.....	.....	N E	N W	99.0	.....	.....	.....	.....	D
.....	.....	.....	.....	N	E	94.7	53.7	40.0	13.7	10.28	.....
.....	.....	.....	.....	N	0	108.3	.....	.....	.....	.....	D
.....	.....	1.14	.....	....	....	114.0	47.17	35.27	11.90	8.61	.....
.....	.....	1.87	.....	....	....	138.	.....	.....	.....	.....	.....

TABLE VIII.

METEOROLOGICAL RECORD FOR AUGUST, 1900.

	Temperature, Dew Point and Relative Humidity								Daily Mean Dew Point
	7 A. M.				7 P. M.				
	Dry Bulb	Wet Bulb	Dew Point	Relative Humidity	Dry Bulb	Wet Bulb	Dew Point	Relative Humidity	
	F °	F °	F °	Per ct.	F °	F °	F °	Per ct.	F °
1	62.2	53.7	47.9	59.7	74.2	64.1	**59.3**	59.7	53.6
2	75.0	58.8	48.9	39.9	75.2	59.0	49.2	40.0	49.0
3	71.8	60.9	55.1	55.7	72.0	58.7	50.8	47.3	53.0
4	64.7	57.7	53.7	67.3	70.0	59.2	53.1	55.1	53.4
5	66.6	61.2	58.5	75.0	65.6	60.1	57.3	74.2	57.9
6	66.1	59.9	56.6	71 4	66.2	58.7	54.5	65.9	55.5
7	64.8	56.9	52.2	63.6	75.7	58.8	48.4	38.2	50.3
8	62.0	59.0	57.4	84.9	72.8	61.0	54.6	53.1	56 0
9	64.9	57.2	52.6	64.4	68.0	55.8	47.8	48.6	50 2
10	61.8	55.1	50.9	67.3	67.8	57.5	51.3	55.9	51.1
11	61.0	53.3	48.1	62.5	67.0	55.4	47.8	50.2	48 0
12	65.2	52.3	42.6	43.9	67.7	58.0	52.3	57.8	47.4
13	58.9	50.9	45.0	59.9	68.1	58.6	53.1	58.8	49.1
14	60.8	51.2	44.0	54.1	64.2	53.7	46.4	52.5	45.2
15	62.2	55.9	52.0	69.3	67.2	54.0	44.7	44.3	48.3
16	57.6	50.2	44.6	62.0	67.3	53.0	42.3	40.3	43 5
17	53.0	46.9	41.8	65.9	72.6	55.9	44.4	36.5	43.1
18	61.1	51.9	45.2	60.0	73.0	54.3	40.1	30.5	42.6
19	61.8	56.0	52.4	71.5	67.3	56.8	50.3	54.5	51.4
20	64.2	56.3	51.5	63.3	69.0	57.9	51.2	53.4	51.3
21	61.6	57.1	54.5	77.5	63.2	57.5	54.3	72.5	54 1
22	55.1	52.9	51.5	**87.6**	64.2	55.2	49.4	58.8	50.5
23	57.7	53.1	50.1	75.7	62.0	46.7	**31.5**	31.8	40.8
24	58.1	47.1	37.2	46.0	63.1	49.2	37.2	38.3	37.2
25	56.8	50.0	44.9	64.3	63.5	52.2	43.8	48.9	44.3
26	57.2	51.1	46.7	68.0	71.8	55.8	44.8	38.1	45.8
27	60.2	50.3	42.6	52.3	64.0	56.8	52.5	66.1	47.5
28	60.8	56.1	53.3	76.3	73.0	58.0	48.6	42.2	51 0
29	57.0	52.0	48.5	73.4	69.8	59.9	54.5	58.2	51 5
30	62.3	56.8	53.6	73.1	75.3	55.7	41.4	**29.8**	47.5
31	57.7	52.2	48.4	71.2	65.8	56.0	49.8	56.4	49.1
Means	61.62	54.32	49.43	65.39	68.60	56.56	48.60	50.25	49.02
Normal	61.9	55.7	------	------	68.0	57.4	------	------	51.2

TABLE VIII—Continued.

METEOROLOGICAL RECORD FOR AUGUST, 1900.

Daily Mean Relative Humidity	Maximum Temperature	Minimum Temperature	Daily Mean Temperature	Range	Barometer, Corrected for Temperature and Instrumental Error			Terrestrial Radiation	
					7 A. M.	7 P. M.	Mean	Instrument Reading	Radiation
Per ct.	F°	F°	F°	F°	Ins.	Ins.	Ins.	F°	F°
59.7	**94.0**	48.8	71.4	**45.2**	25.161	25.040	25.100	39.1	9.7
39.9	93.2	62.5	77.8	30.7	25.074	24.999	25.037	**52.1**	**10.4**
51.5	90.0	53.0	71.5	37.0	25.013	24.946	24.979	46.2	6.8
61.2	87.1	52.9	70.0	34.2	24.993	24.950	24.972	46.2	6.7
74.6	87.0	56.0	71.5	31.0	25.011	24.988	24.999	48.7	7.3
68.7	83.2	54.2	68.7	29.0	25.019	24.994	25.007	48.3	5.9
50.9	91.7	47.3	69.5	44.4	25.027	24.982	25.004	41.6	5.7
69.0	88.7	54.2	71.5	34.5	25.005	24.940	24.973	48.6	5.6
56.5	89.9	50.0	69.9	39.9	24.972	24.963	24.967	44.1	5.9
61.6	86.8	49.0	67.9	37.8	24.931	24.897	24.914	43.3	5.7
56.3	88.3	46.1	67.2	42.2	25.027	24.942	24.985	39.7	6.4
50.9	89.1	46.4	67.8	42.7	25.016	25.000	25.008	38.2	8.2
59.3	85.0	47.5	66.2	37.5	25.053	24.978	25.015	38.8	8.7
53.3	85.2	45.8	65.5	39.4	25.037	24.940	24.989	39.3	6.5
56.8	84.4	49.9	67.2	34.5	25.042	24.927	24.984	44.0	5.9
51.2	87.7	42.8	65.2	44.9	25.042	24.932	24.987	**36.4**	6.4
51.2	86.6	44.9	65.8	41.7	24.978	24.993	24.986	40.2	4.7
45.2	87.3	48.8	68.0	38.5	24.918	24.924	24.921	43.5	5.3
63.0	87.0	51.1	69.1	35.9	25.035	25.059	25.047	44.6	6.5
58.4	86.1	55.5	70.8	30.6	25.165	25.121	25.143	48.1	7.4
75.0	84.0	50.4	67.2	33.6	**25.174**	25.087	25.130	47.4	**3.0**
73.2	82.0	46.8	64.4	35.2	25.115	24.959	25.037	43.8	**3.0**
53.7	77.6	45.1	61.3	32.5	24.896	24.834	24.865	41.7	3.4
42.2	71.1	49.1	60.1	**22.0**	**24.828**	24.906	24.867	44.1	5.0
56.6	80.6	**41.2**	60.9	39.4	24.979	24.936	24.958	36.5	4.7
53.0	85.8	43.1	64.5	42.7	24.985	24.975	24.980	38.8	4.3
59.2	83.8	47.0	65.4	36.8	25.148	25.107	25.127	41.8	5.2
59.3	89.1	49.1	69.1	40.0	25.133	24.996	25.065	44.7	4.4
65.8	90.7	52.0	71.3	38.7	25.024	24.895	24.959	45.5	6.5
51.4	90.9	53.0	72.0	37.9	24.943	24.906	24.925	46.5	6.5
63.8	86.0	50.7	68.3	35.3	24.922	24.888	24.905	44.3	6.4
57.82	86.45	49.49	67.97	36.96	25.021	24.968	24.995	43.42	6.07
63.8	84.2	51.1	67.5	33.5	--------	--------	25.082	------	5.5

TABLE VIII—Concluded.

METEOROLOGICAL RECORD FOR AUGUST, 1900.

	Precipitation				Direction of Wind		Total Movement 24 Hours following 7 a. m.	Actinometer at Noon				Frost or Dew
	Time of Beginning	Time of Ending	Total Amount Rain and Melted Snow	Average Depth of Snow	7 A.	7 P.		Black Bulb	Bright Bulb	Difference	Radiation	
			Ins.	Ins.			Miles	C°	C°	C°	Cal.	
1	....	....	....	....	NE	W	120.5	53.1	40.8	12.3	9 27	D
2	....	....	....	....	NW	N	151.8	....	....	....	....	.....
3	P	....	T	....	N	NW	153.4	....	....	....	....	.....
4	10.00P	....	.01	....	N	NW	103.3	55.0	42. 0	13.0	9.87	D
5	2.00P	....	.02	....	0	SE	95.5	....	....	....	....	D
6	....	....	....	....	0	E	91.2	33.1	27.6	5.5	3 63	.....
7	....	....	....	....	N	S	119.6	....	....	....	....	D
8	....	....	....	....	0	S	98.6	52.0	38.2	13.8	10.22	D
9	3.30P	....	T	....	E	NE	131.2	48 2	37.7	10.5	7.64	D
10	1.30P	....	T	....	S	E	103.4	58.1	42 7	15.4	11 88	D
11	....	....	....	....	NE	W	126.4	52.4	37.8	14.6	10.81	.....
12	....	....	....	....	N	E	133.9	....	....	....	....	.....
13	....	....	....	....	N	0	94.7	41.6	32 5	9.1	6 33	D
14	....	....	....	....	0	S	131.7	50.4	37.1	13 3	9.75	.....
15	....	....	....	....	N	S	97.1	54.5	39.8	14.7	11.05	D
16	....	....	....	....	SE	SW	126.9	54.6	39.6	15.0	11.27	D
17	....	....	....	....	N	N	98.7	43.5	32.8	10.7	7 51	.....
18	....	....	....	....	E	NW	101.8	49.7	38.2	11.5	8.44	.....
19	....	....	....	....	SE	S	90.2	....	....	....	....	.....
20	3.00P	....	.09	....	SE	SW	94.4	54 0	40.1	13.9	10.45	.....
21	9.00P	....	.04	....	0	S	113.4	....	....	....	....	.....
22	....	....	....	....	0	NW	101.3	46.8	36.3	10.5	7.56	Ru
23	....	....	....	....	N	NE	207.2	49.2	32.6	16.6	11.90	D
24	....	....	....	....	S	NE	100.0	....	....	....	....	.....
25	....	....	....	....	0	NW	102.4	50.0	35.4	14.6	10.61	D
26	6.40P	....	T	....	N	W	110.5	....	....	....	....	D
27	....	....	....	....	N	NW	112.9	51.6	38.7	12 9	9.56	D
28	....	....	....	....	NW	SE	94.7	....	....	....	....	D
29	....	....	....	....	S	S	108.8	55.1	40.6	14.5	11.02	.....
30	....	....	....	....	N	NW	116.0	....	....	....	....	D
31	....	....	....	....	NW	....	74.2	....	....	....	....	D
Means	....	....	0.16	....	....	....	113.1	50.15	37.39	12.76	9 41	.....
Normal	....	....	1.24	....	....	....	132.0	....	....	....	....	.....

TABLE IX.

METEOROLOGICAL RECORD FOR SEPTEMBER, 1900.

	Temperature, Dew Point and Relative Humidity								
	7 A. M.				7 P. M.				Daily Mean Dew Point
	Dry Bulb	Wet Bulb	Dew Point	Relative Humidity	Dry Bulb	Wet Bulb	Dew Point	Relative Humidity	
	F°	F°	F°	Per ct.	F°	F°	F°	Per ct.	F°
1	60.0	53.8	49.7	68.8	71.2	53.7	40.3	32.8	45.0
2	53.2	46.1	39.9	60.8	59.2	52.0	46.9	63.7	43.4
3	55.8	51.3	48.1	75.6	73.7	58.3	48.8	41.4	48.4
4	60.2	57.0	55.2	83.5	70.1	55.3	45.1	40.8	50.2
5	55.9	51.2	47.9	74.6	65.9	52.5	42.4	42.6	45.1
6	59.5	52.0	46.7	62.6	66.4	57.2	51.7	59.1	49.2
7	61.3	56.6	53.8	76.5	70.8	59.6	53.3	54.1	53.6
8	64.0	58.1	54.8	71.9	63.3	60.2	**58.6**	84.7	56.7
9	60.0	57.5	56.1	87.0	62.5	59.0	57.1	82.6	56.6
10	57.0	55.9	55.2	94.0	63.2	59.0	56.7	79.4	55.9
11	58.4	56.1	54.7	87.7	62.3	54.8	50.0	64.0	52.4
12	54.0	51.2	49.3	84.3	61.5	54.7	50.4	66.8	49.8
13	55.2	51.9	49.7	81.7	63.9	54.9	49.1	58.6	49.4
14	65.1	45.3	21.8	19.2	62.9	46.9	30.9	30.2	26.4
15	52.2	47.0	42.7	70.4	60.0	49.2	40.3	48.3	41.5
16	42.5	40.0	37.5	81.8	52.6	48.0	44.4	73.9	40.9
17	45.5	44.5	43.6	93.5	55.1	51.7	49.4	81.1	46.5
18	49.0	43.1	37.4	64.8	58.5	40.0	**11.2**	**15.3**	24.3
19	47.5	39.2	29.4	49.7	60.9	42.9	19.9	20.4	24.7
20	47.2	39.3	30.1	51.7	51.5	43.8	35.8	56.4	32.9
21	43.6	37.9	31.3	62.3	60.1	46.0	31.9	34.6	31.6
22	51.8	42.1	31.7	46.3	51.7	45.7	40.4	65.8	36.1
23	47.3	42.3	37.5	69.2	62.0	52.3	45.3	54.5	41.4
24	53.2	48.8	45.4	75.2	51.2	46.0	41.6	70.0	43.5
25	43.2	42.7	42.2	96.5	41.8	41.2	40.6	95.8	41.4
26	35.8	35.2	34.5	95.1	36.3	36.0	35.6	**97.5**	35.0
27	36.7	36.2	35.6	96.0	38.9	36.8	35.5	84.7	35.6
28	34.8	34.3	33.7	95.8	47.2	42.8	38.6	72.7	36.1
29	38.8	37.1	35.1	87.2	52.9	46.0	40.0	61.7	37.6
30	40.5	38.2	35.7	83.5	49.5	45.9	42.9	78.4	39.3
Means	50.97	46.40	42.21	74.91	58.24	49.75	42.49	60.40	42.35
Normal	51.8	46.1	.....	.....	59.6	49.2	.....	.....	41.3

TABLE IX—Continued.

METEOROLOGICAL RECORD FOR SEPTEMBER, 1900.

	Daily Mean Relative Humidity	Maximum Temperature	Minimum Temperature	Daily Mean Temperature	Range	Barometer, Corrected for Temperature and Instrumental Error			Terrestrial Radiation	
						7 A. M.	7 P. M.	Mean	Instrument Reading	Radiation
	Per ct.	F°	F°	F°	F°	Ins.	Ins.	Ins.	F°	F°
1	50.8	87.2	50.0	68.6	37.2	24.928	24.964	24.946	41.2	5.8
2	62.2	72.8	45.7	59.2	27.1	25.278	25.158	25.218	38.1	7.6
3	58.5	85.3	50.2	67.8	35.1	25.123	24.959	25.041	45.1	5.1
4	62.2	83.6	51.7	67.6	31.9	24.991	24.949	24.970	45.2	6.5
5	58.6	84.7	45.0	64.9	39.7	25.173	25.140	25.156	40.3	4.7
6	60.8	80.9	47.0	63.9	33.9	25.227	25.101	25.164	40.5	6.5
7	65.3	87.2	52.6	69.9	34.6	25.084	25.049	25.067	46.1	6.5
8	78.3	**88.2**	53.5	70.9	34.7	25.068	25.033	25.050	46.8	6.7
9	84.8	81.4	55.0	68.2	26.4	25.089	24.954	25.022	**53.5**	1.5
10	86.7	77.4	54.0	65.7	23.4	25.005	24.978	24.991	46.8	7.2
11	75.9	73.7	51.2	62.4	22.5	25.126	25.094	25.110	46.2	5.0
12	75.5	81.7	47.0	64.4	34.7	25.110	24.995	25.053	41.5	5.5
13	70.2	84.5	45.0	64.7	39.5	25.002	24.733	24.867	38.2	6.8
14	24.7	82.0	55.7	68.9	26.3	24.862	24.923	24.893	42.3	13.4
15	59.3	73.0	43.0	58.0	30.0	25.181	25.124	25.152	35.2	7.8
16	77.9	61.0	42.1	51.5	18.9	25.245	25.134	25.190	42.2	-0.1
17	87.3	70.0	40.5	55.3	29.5	25.065	24.873	24.969	35.0	5.5
18	40.0	81.0	40.1	60.5	40.9	24.980	24.969	24.974	30.2	9.9
19	35.1	70.1	36.5	53.3	33.6	25.107	25.022	25.065	29.0	7.5
20	54.0	70.9	34.7	52.8	36.2	25.057	25.024	25.040	28.7	6.0
21	48.5	70.0	34.1	52.1	35.9	25.057	24.986	25.022	27.2	6.9
22	56.0	70.7	35.2	52.9	35.5	25.161	25.020	25.090	27.9	7.3
23	61.9	81.9	35.6	58.8	**46.3**	24.817	**24.469**	24.643	29.9	5.7
24	72.6	67.8	47.0	57.4	20.8	24.490	24.596	24.543	40.6	6.4
25	96.1	48.8	41.4	45.1	**7.4**	24.892	25.100	24.996	37.8	3.6
26	96.3	41.9	34.1	38.0	7.8	**25.295**	25.285	24.290	32.2	1.9
27	90.4	47.7	33.0	40.3	14.7	25.253	25.148	25.201	32.2	0.8
28	84.2	62.8	**29.7**	46.3	33.1	25.157	25.217	25.187	**25.3**	4.1
29	74.5	73.6	32.6	53.1	41.0	25.180	25.048	25.114	27.9	4.7
30	80.9	74.0	34.0	54.0	40.0	25.090	24.939	25.014	28.0	6.0
Means	67.65	73.86	43.24	58.55	30.62	25.070	24.999	25.035	37.47	5.77
Normal	60.7	77.9	42.6	59.7	35.5	.....	.....	25.056	.....	5.8

TABLE IX—Concluded.

METEOROLOGICAL RECORD FOR SEPTEMBER, 1900.

Precipitation				Direction of Wind		Total Movement 24 Hours following 7 a. m.	Actinometer at Noon				Frost or Dew
Time of Beginning	Time of Ending	Total Amount Rain and Melted Snow	Average Depth of Snow	7 A.	7 P.		Black Bulb	Bright Bulb	Difference	Radiation	
		Ins.	Ins.			Miles	C°	C°	C°	Cal.	
.....	.....	T	.....	E	W	183.6	56.4	40.8	15.6	11.96	D
.....	.....	.....	.....	S	SE	116.1	.....	.....	.....	.....	.....
.....	.....	.....	.....	NW	SE	122.9	52.5	37.0	15.5	11.45	D
.....	.....	.01	.....	NW	NW	126.8	.....	.....	.....	.....	.....
9.00 P	.....	T	.....	NW	.....	134.7	.....	.....	.....	.....	Rn
.....	.....	.....	.....	.....	.....	120.0	.....	.....	.....	.....	.....
.....	.....	T	.....	.....	.....	133.1	.....	.....	.....	.....	.....
.....	.....	.25	.....	N	.....	94.1	.....	.....	.....	.....	.....
.....	.....	.22	.....	N	.....	105.4	.....	.....	.....	.....	.....
5.15 P	8.00 P	.16	.....	N	N	91.7	.....	.....	.....	.....	.....
.....	.....	T	.....	SE	S	111.1	.....	.....	.....	.....	.....
.....	.....	.....	.....	S	SW	95.5	54.2	37.4	16.8	12.51	H D
.....	.....	.....	.....	E	S	221.9	51.6	35.4	16.2	11.85	D
.....	.....	.....	.....	W	NW	174.6	Taken	out	.....	.....	.....
.....	.....	.....	.....	.....	NE	130.1	Taken	out	.....	.....	.....
.....	.....	.....	.....	N	NE	85.3	Taken	out	.....	.....	.....
.....	.....	.....	.....	E	NE	149.5	Taken	out	.....	.....	.....
.....	.....	.....	.....	SE	W	253.4	Taken	out	.....	.....	.....
.....	.....	.....	.....	S	W	153.5	.....	.....	.....	.....	L F
.....	.....	.....	.....	NW	NW	103.6	.....	.....	.....	.....	L F
.....	.....	.....	.....	N	N	99.4	.....	.....	.....	.....	L F
.....	.....	.....	.....	N	N	128.6	.....	.....	.....	.....	L F
4.00 P	.....	T	.....	NW	N	101.9	.....	.....	.....	.....	F
11.00 P	Int. P M	.11	.....	E	N	122.2	.....	.....	.....	.....	Rn
.....	.....	.35	.....	SE	E	103.8	.....	.....	.....	.....	Rn
.....	.....	.54	.....	E	E	72.5	.....	.....	.....	.....	Rn
.....	Abt S. A	.28	.....	SE	N	72.0	.....	.....	.....	.....	Rn
.....	.....	.....	.....	NW	N	107.7	.....	.....	.....	.....	HvF
.....	.....	.....	.....	0	N	89.6	.....	.....	.....	.....	F
.....	.....	.....	.....	SW	NE	98.9	.....	.....	.....	.....	.....
.....	.....	1.92	.....	.....	.....	123.4	53.68	37.65	16.03	11.94	.....
.....	.....	.85	.....	.....	.....	139.	.....	.....	.....	.....	.....

TABLE X.

METEOROLOGICAL RECORD FOR OCTOBER, 1900.

	Temperature, Dew Point and Relative Humidity								Daily Mean Dew Point
	7 A. M.				7 P. M.				
	Dry Bulb	Wet Bulb	Dew Point	Relative Humidity	Dry Bulb	Wet Bulb	Dew Point	Relative Humidity	
	F °	F °	F °	Per ct.	F °	F °	F °	Per ct.	F °
1	43.1	39.8	36.4	77.7	60.2	46.0	31.8	34.3	34.1
2	42.4	40.0	37.5	83.5	55.8	45.0	34.4	44.8	35.9
3	42.0	40.1	38.1	86.8	54.0	45.3	37.2	53 3	37.7
4	61.8	45.7	28.6	28.6	57.3	46.0	35.3	44.0	31.9
5	43.2	38.8	33.9	70.4	58.1	45.8	33.9	40.1	33.9
6	48.0	37.1	22.1	35.9	45.0	33.2	12.7	26.8	17.4
7	30.8	29.2	26.9	85.0	37.7	32.8	26.0	62.7	26.5
8	31.8	28.8	24.1	73.1	43.0	36.6	28.7	57.2	26.4
9	31.2	29.0	25.7	79.6	38.9	33.1	25.0	57.2	25.3
10	32.9	29.1	23.2	66.9	42.2	35.2	25.9	52.3	24.6
11	37.2	32.0	24.5	59.9	46.9	37.9	32.1	56.7	28.3
12	34.7	30.8	25.1	67.7	53.2	44.0	34.9	50.2	30.0
13	40.2	36.6	32.4	74.1	59.2	47.3	36.5	42.9	34.4
14	49.8	44.2	39.0	67.1	61.6	48.8	37.7	41.2	38.4
15	56.6	48.1	41.1	56.1	53.2	48.2	**44.3**	71.9	42.7
16	40.4	39.9	39.4	96.3	43.8	42.0	40.3	87.9	39.8
17	35.5	35.0	34.4	95.8	49.1	44.0	39.3	69.6	36.9
18	39.2	37.5	35.6	87.3	46.1	41.2	36.3	69.0	35.9
19	39.8	37.5	35.0	83.2	55.0	45.2	35.8	48.8	35.4
20	53.7	42.1	29.0	39.0	42.0	37.9	33.3	71.8	31.2
21	47.0	34.0	**11.2**	**23.4**	54.7	41.8	26.6	34.1	18.9
22	42.1	34.6	24.2	49.0	44.8	36.8	26.5	48.7	25.3
23	40.1	34.2	26.3	57.7	43.3	38.4	32.9	67.2	29.6
24	34.5	33.5	32.2	91.5	40.0	35.8	30.7	69.7	31.5
25	35.0	33.0	30.4	83.2	44.2	36.5	26.6	50.0	28.5
26	37.6	32.0	23.8	57.3	52.2	41.0	27.9	39.4	25.8
27	40.0	35.9	31.0	70.4	53.9	43.2	32.0	43.5	31.5
28	31.9	30.0	27.2	82.7	50.0	43.1	36.3	59.7	31.8
29	31.2	30.3	29.0	91.5	46.8	38.9	29.6	51.5	29.3
30	37.0	31.6	23.6	58.2	30.0	28.1	25.2	81.8	21.4
31	15.0	15.0	15.0	**100.0**	46.0	34.4	15.8	29.4	15.4
Means	39.54	35.01	29.22	70.29	48.65	40.44	31.34	53.47	30.28
Normal	38.4	34.0	.....	.....	46.7	38.6	.....	.....	28.2

TABLE X—Continued.

METEOROLOGICAL RECORD FOR OCTOBER, 1900.

Daily Mean Relative Humidity	Maximum Temperature	Minimum Temperature	Daily Mean Temperature	Range	Barometer, Corrected for Temperature and Instrumental Error			Terrestrial Radiation	
					7 A. M.	7 P. M.	Mean	Instrument Reading	Radiation
Per ct.	F°	F°	F°	F°	Ins.	Ins.	Ins.	F°	F°
56.0	76.1	36.0	56.0	40.1	24.867	24.858	24.862	30.0	6.0
64.1	77.0	35.5	56.3	41.5	24.976	24.930	24.953	29.2	6.3
70.1	77.0	35.5	56.2	41.5	25.045	24.967	25.006	30.1	5.4
36.3	**83.0**	39.2	61.1	43.8	24.976	24.896	24.936	32.7	6.5
55.2	79.0	35.0	57.0	44.0	24.846	24.645	24.746	29.1	5.9
31.4	55.2	38.4	46.8	16.8	24.901	25.164	25.032	28.7	9.7
73.8	58.0	23.7	40.9	34.3	25.309	25.289	25.299	17.2	6.5
65.2	67.6	25.0	46.3	42.6	**25.351**	25.330	25.341	17.1	7.9
68.4	69.8	24.0	46.9	45.8	25.318	25.112	25.215	21.8	2.2
59.6	71.8	23.0	48.4	46.8	25.051	24.963	25.007	17.3	7.7
58.3	76.0	28.7	52.3	47.3	25.028	25.008	25.018	20.7	8.0
58.9	74.7	27.0	50.9	**47.7**	25.035	24.925	24.980	20.1	6.9
58.5	71.0	34.0	54.0	40.0	24.959	24.965	24.962	26.1	7.9
54.2	72.8	43.0	57.9	29.8	25.053	25.074	25.063	36.2	6.8
64.0	60.3	50.2	55.2	**10.1**	25.201	25.339	25.270	**44.3**	5.9
92.1	65.5	37.0	51.3	28.5	25.341	25.254	25.298	30.6	6.4
82.7	72.9	**32.1**	52.5	40.8	25.230	25.150	25.190	25.3	6.8
78.1	72.9	33.8	53.3	39.1	25.152	25.053	25.102	24.8	9.0
66.0	72.0	32.2	52.1	39.8	24.925	24.721	24.823	29.0	3.2
55.4	58.6	45.6	52.1	13.0	**24.486**	24.685	24.586	43.8	1.8
28.8	61.5	38.5	50.0	23.0	24.886	24.892	24.889	26.7	**11.8**
48.8	75.1	35.5	55.3	39.6	24.885	24.862	24.873	36.8	**−1.3**
62.5	61.9	35.3	48.6	26.6	25.010	25.128	25.069	29.1	6.2
80.6	62.0	32.3	47.2	29.7	25.049	24.924	24.987	27.1	5.2
66.6	59.1	31.5	45.3	27.6	25.117	*25.154	25.135	25.4	6.1
48.3	72.0	27.6	49.8	44.4	25.091	25.059	25.075	21.5	6.1
57.0	68.9	35.5	52.2	33.4	25.068	25.038	25.053	29.8	5.7
71.2	65.0	26.4	45.7	38.6	25.066	24.892	24.979	20.2	6.2
71.5	62.0	29.6	45.8	32.4	24.756	24.749	24.753	23.3	6.3
70.0	42.1	32.0	37.0	**10.1**	24.918	25.010	24.964	31.8	0.2
64.7	51.9	**12.5**	32.2	39.4	25.022	24.966	24.994	**6.2**	6.3
61.88	67.60	32.83	50.21	34.78	25.030	25.000	25.015	26.84	5.99
64.0	64.7	32.3	47.8	32.6	----------	----------	25.028	------	6.0

*From Registering Aneroid Barometer.

TABLE X—Concluded.

METEOROLOGICAL RECORD FOR OCTOBER, 1900.

	Precipitation				Direction of Wind		Total Movement 24 Hours following 7 a. m.	Actinometer at Noon				Frost or Dew
	Time of Beginning	Time of Ending	Total Amount Rain and Melted Snow	Average Depth of Snow	7 A.	7 P.		Black Bulb	Bright Bulb	Difference	Radiation	
			Ins.	Ins.			Miles	C°	C°	C°	Cal.	
1	....	....	....	....	0	NW	129.6	33.4	25.7	7.7	5.06	F
2	....	....	....	....	NW	NW	105.2	....	....	....	....	F
3	....	....	....	....	NE	N	144.5	49.6	33 0	16 6	11.94	F
4	....	....	....	....	S	SW	173.8	52.1	36.1	16.0	11.76	.....
5	....	....	....	....	NW	NW	313.2	51.3	35.2	16.1	11.75	F
6	....	....	....	....	W	NW	303.8	44.6	25.1	19.5	13.35	.....
7	....	....	....	....	N	NE	97.1	....	....	....	....	Hv F
8	....	....	....	....	SW	NW	82.3	45.1	26.7	18.4	12.70	Hv F
9	....	....	....	....	NW	NW	109.5	....	....	....	....	F
10	....	....	....	....	NW	NW	93.6	47.7	30.6	17.1	12 10	F
11	....	....	....	....	SE	SW	104.3	50.5	37.3	13.2	9.39	F
12	....	....	....	....	NW	NW	90.5	49.1	32.2	16.9	12.09	F
13	....	....	....	....	NW	N	95.1	41.0	28.2	12.8	8.74	.....
14	nt	....	T	....	SE	NE	122.3	....	....	....	....	.....
15	7.10 P	nt	.15*	....	N	E	111.9	13.5	11.1	2.4	1.38	.....
16	....	....	.09	....	N	NW	110.9	....	....	....	....	.....
17	....	....	....	....	NW	NE	90.6	....	....	....	....	.....
18	....	....	....	....	S	N	105.3	....	....	....	....	.....
19	....	....	....	....	NE	NE	121.5	....	....	....	....	.....
20	....	....	....	....	N	N	362.7	....	....	....	....	.....
21	....	....	....	....	NW	N	341.3	....	....	....	....	.....
22	....	....	....	....	SE	NW	117.1	48.6	32.0	16.6	11.85	F
23	....	....	....	....	N	S	143.4	....	....	....	....	.....
24	....	....	....	....	SW	W	148.5	....	....	....	....	.....
25	....	....	....	....	SW	N	134.0	....	....	....	....	.....
26	....	....	....	....	N	E	133.6	....	....	....	....	.....
27	....	....	....	....	SW	NNW	119.9	....	....	....	....	.....
28	....	....	....	....	NW	NW	151.3	....	....	....	....	.....
29	....	....	....	....	NW	NW	204.5	....	....	....	....	.....
30	....	....	....	....	SE	0	158.0	....	....	....	....	.....
31	....	....	....	....	NW	W	136.5	....	....	....	....	.....
Means	....	....	0.24	....	....	....	150.2	43.88	29.43	14.44	10.20	.....
Normal	....	....	0.96	....	....	....	175.	....	....	....	....	.....

* Rainfall also 10.00 A. M. ot 12:15 P. M., 15th.

TABLE XI.

METEOROLOGICAL RECORD FOR NOVEMBER, 1900.

	Temperature, Dew Point and Relative Humidity								Daily Mean Dew Point
	7 A. M.				7 P. M.				
	Dry Bulb	Wet Bulb	Dew Point	Relative Humidity	Dry Bulb	Wet Bulb	Dew Point	Relative Humidity	
	F°	F°	F°	Per ct.	F°	F°	F°	Per ct.	F°
1	26.8	24.0	18.8	71.0	42.0	34.1	22.7	46.3	20.7
2	29.0	26.1	21.0	71.9	43.0	36.1	27.3	53.8	24.2
3	52.5	38.0	16.7	**24.0**	43.8	34.0	19.0	36.7	17.8
4	32.5	26 8	16.3	50.3	42.0	32.0	14.9	33.0	15.6
5	24.9	21.5	14.3	63.3	46.6	33.8	13.0	26.1	13.7
6	31.2	25.7	15.0	50.4	46.8	34.2	12.8	25.2	13.9
7	33.0	27.2	16.7	50.1	34.7	29.8	22.1	59.5	19.4
8	25.5	23.9	21.0	82.6	27.0	24.7	20.5	76.2	20.7
9	32.3	29.3	24.7	73.5	42.3	33.9	21.6	43.4	23.2
10	22.6	20.8	17.2	78.9	32.3	24.7	7.4	34.4	12.3
11	16.2	14.0	7.8	69.4	33.5	25.0	4.9	29.4	6.3
12	20.3	17.1	8.7	60.4	58.8	43.2	24.9	27.1	16.8
13	33.3	26.8	14.3	44.9	33.9	28.6	19.7	55.4	17.0
14	18.3	17.8	16.7	93.4	44.2	34.3	19.3	36.6	18.0
15	27.1	26.0	24.2	88.5	30.8	29.6	**27.9**	88.6	26.1
16	30.6	29.2	27.2	86.7	37.8	31.7	22.6	53.8	24.9
17	29.0	26.5	22.3	75.6	32.0	28.1	21.7	65.3	22.0
18	11.0	10.9	10.6	98.3	22.9	20.8	16.5	75.7	13.5
19	17.8	17.3	16.2	93.4	21.0	19.0	14.5	75.6	15.4
20	14.8	14.8	14.8	**100.0**	14.8	14.2	12.6	91.1	13.7
21	17.6	16.9	15.3	90.6	53.9	39.1	18.2	24.5	16.7
22	52.8	39.2	20.8	28.6	35.0	31.0	25.2	67.2	23.0
23	30.8	28.1	23.9	75.0	42.0	32.7	17.9	37.3	20.9
24	32.7	23.7	**—0.4**	**24.0**	27.2	24.0	17.9	67.6	8.8
25	22.2	20.8	18.0	83.5	28.9	22.9	9.1	43.1	13.5
26	30.8	27.8	22.9	72.4	34.2	29.0	20.4	56.5	21.7
27	35.9	32.0	26.5	68.8	35.7	31.2	24.7	63.8	25.6
28	22.2	20.4	16.7	78.6	23.2	21.2	17.2	77.0	16.9
29	14.9	14.0	11.4	86.9	38.8	28.8	8.4	27.8	9.9
30	11.4	10.8	9.0	90.2	28.8	22.5	7.5	39.7	8.3
Means	26.67	23.25	16.95	70.84	35.91	29.14	17.75	51.26	17.35
Normal	25.4	22.6	------	------	33.8	28.2	------	------	18.1

TABLE XI—Continued.

METEOROLOGICAL RECORD FOR NOVEMBER, 1900.

	Daily Mean Relative Humidity	Maximum Temperature	Minimum Temperature	Daily Mean Temperature	Range	Barometer, Corrected for Temperature and Instrumental Error			Terrestrial Radiation	
						7 A. M.	7 P. M.	Mean	Instrument Reading	Radiation
	Per ct.	F°	F°	F°	F°	Ins.	Ins.	Ins.	F°	F°
1	58.6	52.6	21.2	36.9	31.4	25.091	25.127	25.109	12.1	9.1
2	62.9	63.0	25.5	44.2	37.5	25.252	25.269	25.260	20.0	5.5
3	30.3	72.2	28.9	50.6	43.3	25.235	25.143	25.189	22.2	6.7
4	41.7	65.4	30.6	48.0	34.8	25.176	25.151	25.164	24.5	6.1
5	44.7	65.2	21.2	43.2	44.0	25.181	25.104	25.144	15.0	6.2
6	37.8	69.8	27.5	48.6	42.3	25.173	25.062	25.117	18.8	8.7
7	54.8	64.0	33.1	48.6	30.9	25.136	25.087	25.112	22.8	**10.3**
8	79.4	41.6	23.4	32.5	18.2	25.076	25.115	25.095	16.6	6.8
9	58.4	61.3	16.9	39.1	44.4	25.213	25.203	25.208	10.6	6.3
10	56.7	52.1	20.7	36.4	31.4	25.334	**25.392**	25.363	13.5	7.2
11	49.4	60.7	13.2	36.9	47.5	25.330	25.216	25.273	6.2	7.0
12	43.7	**74.0**	17.9	46.0	**56.1**	25.208	25.094	25.151	10.6	7.3
13	50.2	49.7	32.0	40.8	17.7	25.129	25.023	25.076	23.0	9.0
14	65.0	61.1	17.0	39.1	44.1	24.848	24.994	24.921	11.8	5.2
15	88.5	32.9	21.6	27.2	11.3	25.108	24.973	25.041	14.2	7.1
16	70.3	62.9	25.6	44.3	37.3	24.928	24.860	24.894	21.6	4.0
17	70.4	53.0	30.3	41.6	22.7	24.705	24.822	24.763	24.4	5.9
18	87.0	32.0	10.3	21.2	21.7	24.795	24.636	24.716	6.0	4.3
19	84.5	26.9	15.9	21.4	11.0	24.640	24.729	24.684	12.1	3.8
20	95.6	19.0	13.0	16.0	**3.0**	24.756	24.719	24.738	13.0	**0.0**
21	57.5	58.0	**8.7**	33.3	49.3	24.652	**24.515**	24.583	5.2	3.5
22	47.9	56.0	35.0	45.5	21.0	24.739	24.986	24.863	**31.2**	3.8
23	56.2	49.0	27.8	38.4	21.2	24.949	24.958	24.953	23.7	4.1
24	45.8	45.7	26.0	35.9	19.7	25.238	25.297	25.268	25.8	0.2
25	63.3	50.2	13.0	31.6	37.2	25.142	25.067	25.104	5.7	7.3
26	64.4	50.9	24.0	37.4	26.9	25.019	25.000	25.010	17.7	6.3
27	66.3	43.0	29.5	36.3	13.5	25.122	25.196	25.159	22.2	7.3
28	77.8	49.7	13.3	31.5	36.4	25.175	25.145	25.160	7.0	6.3
29	57.4	57.4	13.2	35.3	44.2	25.143	25.206	25.174	7.4	5.8
30	64.9	54.2	12.4	33.3	41.8	25.237	25.064	25.151	5.6	6.8
Means	61.05	53.12	21.62	37.37	31.39	25.058	25.038	25.048	15.68	5.94
Normal	67.5	50.6	20.9	35.0	30.2	.....	.....	25.005	.....	6.0

TABLE XI—Concluded.

METEOROLOGICAL RECORD FOR NOVEMBER, 1900.

Precipitation				Direction of Wind		Total Movement 24 Hours following 7 a m.	Actinometer at Noon				Frost or Dew
Time o Beginning	Time of Ending	Total Amount Rain and Melted Snow	Average Depth of Snow	7 A.	7 P.		Black Bulb	Bright Bulb	Difference	Radiation	
		Ins.	Ins.			Miles	C °	C °	C °	Cal.	
.....	.....	.....	.....	SE	0	133.1	.....	.....	.....	.....	.....
.....	.....	.....	.....	W	NE	113.8	.....	.....	.....	.....	.....
.....	.....	.....	.....	NW	....	123.8	.....	.....	.....	.....	.....
.....	.....	.....	.....	E	N	130.9	.....	.....	.....	.....	.....
.....	.....	.....	.....	N	NE	154.8	.....	.....	.....	.....	.....
.....	.....	.....	.....	W	W	215.7	.....	.....	.....	.....	.....
.....	.....	.....	.....	SW	SW	170.8	.....	.....	.....	.....	.....
.....	.....	.....	.....	W	NW	84.5	19.4	9.5	9.9	5.79	.....
.....	.....	.....	.....	NW	W	137.1	43.5	26.1	17.4	11.95	F
.....	.....	.....	.....	SW	W	211.0	40.1	22.0	18.1	12.03	.....
.....	.....	.....	.....	NW	NW	101.8	.....	.....	.....	.....	.....
.....	.....	.....	.....	W	NW	219.2	48.0	30.9	17.1	12.13	.....
.....	.....	.....	.....	S	S	190.0	.....	.....	.....	.....	.....
.....	.....	.....	.....	N	NW	132.7	41.8	24.0	17.8	12.00	F
.....	.....	.....	.....	E	W	69.3	8.3	2.5	5.8	3.17	.....
.....	.....	.....	.....	SW	NW	133.3	45.0	27.8	17.2	11.91	.....
.....	.....	.....	.....	S	NE	136.5	.....	.....	.....	.....	.....
9:00 A	.....	T	.....	SE	SW	75.1	.....	.....	.....	.....	.....
6:55 P	.....	T	.....	SE	E	199.9	19.4	16.0	3.4	2.03	.....
nt	9:00 A	.07	1¼	E	SE	100.1	14.4	0.0	14.4	7.97	Sn
.....	.....	.....	.....	SE	SW	455.9	19.6	7.6	12.0	6.98	F
.....	.....	.....	.....	NW	SE	155.5	33.0	18.1	14.9	9.49	.....
PM	.....	T	.....	0	NW	296.7	19.4	11.3	8.1	4.77	.....
.....	.....	.....	.....	WNW	S	183.9	35.4	16.6	18.8	12.03	.....
.....	.....	....	.....	N	NW	87.8	.....	.....	.....	.....	.....
.....	.....	.....	.....	W	N	106.1	9.9	6.8	3.1	1.73	.....
7:00 P	.....	T	.....	N	SW	172.4	17.2	10.0	7.2	4.19	.....
.....	.....	.....	.....	NW	NW	108.6	37.2	24.0	13.2	8.74	F
.....	.....	.....	.....	SE	SE	114.0	.....	.....	.....	.....	F
.....	.....	.....	.....	0	NW	181.2	.....	.....	.....	.....	F
.....	.....	0.07	1¼	....	....	156.5	28.23	15.82	12.40	7.93	.....
.....	.....	0.40	.....	....	....	184.0	.....	.....	.....	.....	.....

TABLE XII.

METEOROLOGICAL RECORD FOR DECEMBER, 1900.

	Temperature, Dew Point and Relative Humidity								Daily Mean Dew Point
	7 A. M.				7 P. M.				
	Dry Bulb	Wet Bulb	Dew Point	Relative Humidity	Dry Bulb	Wet Bulb	Dew Point	Relative Humidity	
	F°	F°	F°	Per ct.	F°	F°	F°	Per ct.	F°
1	39.0	29.9	13.1	34.2	40.3	30.8	13.7	33.6	13.4
2	28.1	25.1	19 6	70.3	30.1	27.1	22.0	71.9	20.8
3	19.6	17.6	12.7	74.7	41.9	32.0	15.1	33.5	13.9
4	25.0	22.9	18.9	77.0	42.0	34.3	23.4	47.6	21.1
5	35.7	30.4	22.2	57.5	37.8	32.9	26.1	62 8	24.2
6	25.9	24.1	20.8	80.8	41.3	35.2	**27.3**	57.5	24.0
7	21.0	20.8	20.4	97.6	29.3	24.9	16.9	59.2	18.7
8	18.8	17.7	15.1	85.7	35.0	28.0	15.2	43 5	15.1
9	18.8	18.8	18.8	**100.0**	21.0	19.8	17.3	85.4	18.1
10	11.8	11.2	9.5	90.3	23.3	20.9	16.0	72.6	12.7
11	12.2	11.9	11.0	95.2	26.8	23.9	18.4	70.1	14.7
12	22.2	18.1	7.4	52.2	34.0	25.2	4.2	**22 0**	5.8
13	16.4	14.4	8.8	72.3	33.0	25.0	6.8	32.5	7.8
14	10.1	8.0	0.0	64.5	21 2	17.9	9.4	60.1	4.7
15	23.1	19.6	11.3	60.2	40.9	30 9	12.7	31.3	12.0
16	23.1	20.2	13.8	66.7	34.7	26.0	6.4	30.0	10.1
17	29.7	22.9	6.6	37 0	31.2	23.0	1.0	27.6	3.8
18	41.1	30.9	12.1	30.4	28.1	21.8	6.2	39.1	9.2
19	12.0	11.0	7.8	84.0	31.0	24.0	8.1	37.2	7.9
20	19.3	17.1	11.5	71.9	46.1	34.1	14.1	27.4	12.8
21	41.1	31.9	16.6	36.7	41.1	30.4	9.7	27.2	13.2
22	34.0	25.0	2.9	26.5	32.0	23.4	0.6	25.9	1 7
23	23.9	19.2	7.2	48.2	30.3	26.2	18.8	62.0	13.0
24	14.8	11.3	−1.0	49.6	30.9	27.5	21.8	68.7	10.4
25	27.0	24.7	20.5	76.3	26.4	22.6	14.8	60.9	17.7
26	15.9	14.6	11.1	81.6	32.0	25.8	13.4	42.5	12.2
27	26.2	23.9	19.6	75.7	20.2	17.9	12.3	71.4	16.0
28	−0.8	−0.8	−0.8	**100.0**	9.7	8.2	0.3	74.2	−0.2
29	3.2	2.4	−1.0	82.4	30.1	24.3	12.0	46.4	5.5
30	11.3	11.0	10.1	95.1	−7.6	−8.1	−11.3	82.5	−0.6
31	−21.8	−21.8	**−21.8**	**100.0**	−19.0	−19.0	−19.0	**100.0**	−20.4
Means	20.25	17.23	10.48	70.15	28.87	23.13	11.41	51.83	10.94
Normal	20.1	17.6	.....	.....	27.1	22.9	.....	.....	13.4

TABLE XII—Continued.

METEOROLOGICAL RECORD FOR DECEMBER, 1900.

Daily Mean Relative Humidity	Maximum Temperature	Minimum Temperature	Daily Mean Temperature	Range	Barometer, Corrected for Temperature and Instrumental Error			Terrestrial Radiation	
					7 A. M.	7 P. M.	Mean	Instrument Reading	Radiation
Per ct.	F°	F°	F°	F°	Ins.	Ins.	Ins.	F°	F°
33.9	49.4	24.7	37.0	24.7	24.996	25.106	25.051	17.9	6.8
71.1	40.8	24.5	32.7	16.3	25.233	25.224	25.228	15.3	9.2
54.1	48.8	7.0	27.9	41.8	25.131	25.131	25.131	1.6	5.4
62.3	50.0	22.7	36.3	27.3	25.116	25.135	25.126	17.2	5.5
60.1	52.0	27.3	39.7	24.7	25.132	25.205	25.168	22.0	5.3
69.2	58.3	22.7	40.5	35.6	25.155	25.258	25.207	17.7	5.0
78.4	59.3	21.2	40.2	38.1	25.267	25.164	25.215	15.7	5.5
64.6	**62.9**	18.8	40.9	44.1	25.175	**25.296**	25.236	12.1	6.7
92.7	48.0	15.3	31.6	32.7	25.234	25.062	25.148	8.2	7.1
81.4	50.8	13.3	32.1	37.5	25.137	25.166	25.151	7.2	6.1
82.7	53.8	10.0	31.9	43.8	25.126	24.968	25.047	4.0	6.0
37.1	53.3	15.7	34.5	37.6	24.992	24.974	24.983	9.2	6.5
52.4	46.0	15.0	30.5	31.0	24.959	25.021	24.990	8.1	6.9
62.3	51.9	13.0	32.4	38.9	25.113	25.043	25.079	5.0	8.0
45.5	59.3	12.0	35.7	**47.3**	24.967	25.095	25.031	11.0	1.0
48.3	57.0	19.2	38.1	37.8	25.057	24.979	25.018	15.2	4.0
32.3	57.1	23.6	40.3	33.5	24.993	25.107	25.050	16.5	7.1
34.8	45.0	27.4	36.2	17.6	25.114	25.288	25.201	21.9	5.5
60.6	50.1	13.1	31.6	37.0	25.287	25.199	25.243	7.2	5.9
49.6	60.0	19.5	39.8	40.5	25.105	24.800	24.952	13.4	6.1
32.0	59.0	34.0	46.5	25.0	24.572	24.516	24.544	26.3	7.7
26.2	38.3	31.4	34.8	**6.9**	24.674	24.863	24.769	**31.2**	**0.2**
55.1	37.1	23.6	30.4	13.5	25.001	25.034	25.017	19.2	4.4
59.1	43.8	14.9	29.3	28.9	25.009	24.922	24.966	6.6	8.3
68.6	40.8	24.5	32.7	16.3	25.052	24.958	25.005	17.3	7.2
62.1	48.0	13.3	30.6	34.7	24.832	24.824	24.828	8.3	5.0
73.5	33.2	19.4	26.3	13.8	25.075	25.278	25.176	12.9	6.5
87.1	32.5	−3.3	14.6	35.8	25.257	25.012	25.135	−9.6	6.3
64.4	47.8	1.1	24.5	46.7	24.737	**24.511**	24.624	−5.7	6.8
88.8	*25.5	−7.0	9.2	32.5	24.768	24.901	24.834	−20.4	**13.4**
100.0	5.7	**−22.0**	−8.0	27.7	24.951	25.022	24.987	**−30.6**	**8.6**
80.99	47.27	16.00	31.64	31.28	25.039	25.034	25.037	9.74	6.26
69.8	44.1	15.3	29.3	28.8	.....	.....	24.975	.....	6.1

*From Self-Register.

TABLE XII—Concluded.

METEOROLOGICAL RECORD FOR DECEMBER, 1900.

	Precipitation				Direction of Wind		Total Movement 24 Hours following 7 a. m.	Actinometer at Noon				Frost or Dew
	Time of Beginning	Time of Ending	Total Amount Rain and Melted Snow	Average Depth of Snow	7 A.	7 P.		Black Bulb	Bright Bulb	Difference	Radiation	
			Ins.	Ins.			Miles	C°	C°	C°	Cal.	
1	....	....	....	....	NW	NW	353.2	36.2	19.8	16.4	10 65	.....
2	....	....	....	....	SW	N	144.3	....	....	....	....	L F
3	....	....	....	....	E	NW	113.0	17 6	9.2	8 4	4 87	.....
4	....	....	....	....	W	S	112.0	20.6	15.0	5 6	3.36	.....
5	....	....	....	....	E	N	195.3	30.7	17 8	12.9	8 14	.....
6	....	....	....	....	NE	0	198.2	28.5	19.3	9.2	5.79	F
7	....	....	....	....	N	W	100.6	40.5	22.9	17.6	11 76	F
8	....	....	....	....	NW	W	121.7	42.7	25.6	17.1	11.64	.....
9	....	....	....	....	E	SW	80.7	....	....	....	....	F
10	....	....	....	....	SW	0	135.8	36.5	19.0	17.5	11.34	F
11	....	....	....	....	S	NW	120.5	38.0	19.8	18 2	11 90	F
12	....	....	....	....	S	NW	143.0	39.2	21.5	17.7	11.63	.....
13	....	....	....	....	W	W	103.2	....	....	....	....	.....
14	....	....	....	....	N	N	96.5	37.4	19 0	18.4	11 97	.....
15	....	....	....	....	W	W	187.1	24 5	15.5	9.0	5.49	.....
16	....	....	....	....	NE	W	115.2	....	....	....	....	F
17	....	....	....	....	W	S	196.9	41.8	19.6	22 2	14.73	.....
18	....	....	....	....	NW	N	273 3	33.9	17.0	16 9	10.76	.....
19	....	....	....	....	S	N	111.6	37.2	19 0	18.2	11.83	.....
20	....	....	....	....	W	NE	131.6	40.2	22.6	17.6	11.73	.....
21	....	....	....	....	SE	NW	583.8	42.0	24 2	17.8	12.02	.....
22	....	....	....	....	NW	NW	423.4	18.3	8.1	10.2	5.91	.....
23	....	....	....	....	NW	NW	319.9	....	....	....	....	.....
24	....	....	....	....	SW	NW	182.9	33 0	15.5	17.5	11.04	.....
25	....	....	....	....	NE	S	222.4	....	....	....	....	.....
26	nt	nt	....	....	NW	NE	254.9	37.5	19.0	18.5	12.04	.....
27	....	....	T	T	N	N	186.0	31.6	11.7	19.9	12.31	Su
28	....	....	....	....	NW	NW	92.0	29.7	9.9	19 8	12.08	F
29	....	....	....	....	SW	NW	174.5	33.8	16.0	17.8	11.29	F
30	nt int	in d'y	0.11	1.8	N	0	162.2	....	....	....	....	Su
31	....	....	....	....	NW	N	79.8	29.5	1.8	27.7	16.38	F
Means	....	....	0.11	1.8	....	....	184.4	33.37	17.03	16.34	10.44	.....
Normal	....	....	0.31	....	....	....	188.0	....	....	....	....	.....

TABLE XIII.

SUMMARY FOR AGRICULTURAL COLLEGE, FT. COLLINS, COLORADO.

Latitude, 40° 34'. Longitude, 105 W. from Greenwich. Elevation of Barometer, 4,994 feet; Ground, 4,980 feet.

FOR 1900.

MONTH	TEMPERATURE (In Degrees Fahrenheit)											No. Days		Precipitation (Inches)	Snowfall (Inches)	No. of Stormy Days	Relative Humidity, Mean	Dew Point, Mean	No. of Days Frost or Dew Was Observed	
	Mean (½ Max. and ½ Min.)	Average Maximum	Average Minimum	7 A. M.	7 P. M.	Absolute Maximum	Absolute Minimum	Mean Range	Greatest Range	Wet Bulb 7 A. M.	Wet Bulb 7 P. M.	Av Temp. Below 32°	Minimum Below 32°						Frost	Dew
January	30.9	46.7	15.2	19.7	28.7	63.0	−6.0	31.4	45.0	17.9	24.6	14	31	0.25	3.1	3	73.3	15.5	16	0
February	24.2	37.8	10.7	15.3	23.6	58.0	−23.4	27.1	47.2	13.4	20.5	20	28	1.12	15.3	8	76.4	11.7	9	0
March	39.1	53.9	24.3	29.0	39.6	76.9	9.7	29.6	46.0	27.1	33.4	5	29	1.07	7.9	5	70.6	24.2	17	0
April	42.9	54.5	31.3	39.5	44.2	73.9	5.1	23.3	45.9	37.0	39.9	2	14	10.56	22.8	11	78.9	34.8	12	2
May	57.8	72.3	43.2	54.5	60.0	84.7	29.8	29.2	40.9	48.4	50.6	0	1	1.75	....	7	62.6	43.4	2	12
June	67.1	83.4	50.7	63.4	69.1	94.4	40.7	33.7	44.0	56.2	57.8	0	0	0.82	....	7	60.5	51.3	0	15
July	67.9	83.7	52.1	62.6	69.7	92.9	40.2	31.6	43.2	56.4	59.4	0	0	1.14	....	9	64.5	53.0	0	9
August	68.0	86.5	49.5	61.6	68.6	94.0	41.2	37.0	45.2	54.3	56.6	0	0	0.16	....	4	57.8	49.0	0	17
September	58.6	73.9	43.2	51.0	58.2	88.2	29.7	30.6	46.3	46.4	49.8	0	1	1.92	T	8	67.6	42.4	7	4
October	50.2	67.6	32.8	39.5	48.7	83.0	12.5	34.8	47.7	35.0	40.4	0	11	0.24	....	2	61.9	30.3	11	0
November	37.4	53.1	21.6	26.7	35.9	71.0	8.7	31.4	56.1	23.3	29.1	6	27	0.07	1.2	1	61.0	17.3	6	0
December	31.6	47.3	16.0	20.3	28.9	62.9	−22.0	31.3	47.3	17.2	23.1	13	30	0.11	1.8	1	61.0	10.9	10	0
Average	48.0	63.4	32.6	40.3	47.9	94.4	−23.4	30.9	56.1	36.	40.4	60	172	19.21	52.1	66	66.3	32.0	90	59
Normal	46.5	62.2	31.7	39.5	46.7	....	.....	30.0	....	35.0	39.0	....	....	14.14	....	72.	65.1	30.2	.....	.....

TABLE XIV.

SUMMARY FOR ARKANSAS VALLEY SUBSTATION, ROCKY FORD, COLORADO. H. H. GRIFFIN, Observer.

Latitude, 39° 3′. Longitude, 103° 45′. Elevation, 4,160 feet.

FOR 1900.

MONTH	TEMPERATURE (In Degrees Fahrenheit)											No. Days		Precipitation (Inches)	Snowfall (Inches)	No. of Stormy Days	Relative Humidity, Mean	Dew Point, Mean	No. Days Frost or Dew Was Observed		Prevailing Direction of Wind
	Mean	Average Maximum	Average Minimum	Wet Bulb 7 A. M.	Wet Bulb 7 P. M.	Absolute Maximum	Absolute Minimum	Mean Range	Greatest Range			Av. Temp. Below 32°	Minimum Below 32°						Frost	Dew	
January	34.5	48.8	20.2	23.7	32.6	67	2	28.6	56	22.3	29.3	9	31	T	T	0	77.9	21.6	....	....	W
February	30.8	47.4	14.3	18.7	29.9	67	−10	33.1	50	17.4	26.0	11	28	0.52	5.0	3	77.0	16.9	....	....	WNW
March	45.2	63.9	26.4	31.1	46.8	82	19	37.5	55	28.4	37.0	1	29	0.37	....	2	58.5	23.1	....	....	ENE
April	48.7	61.8	35.7	42.6	49.8	79	17	26.1	47	39.7	44.1	1	6	7.15	T	11	74.5	37.5	....	2	NW
May	61.7	76.5	46.9	55.4	62.3	90	38	29.6	39	50.9	54.1	0	0	2.28	....	7	69.7	47.8	....	9	N
June	72.0	88.8	55.1	65.4	73.0	101	48	33.6	46	59.6	61.5	0	0	1.47	....	5	64.0	55.7	....	19	E
July	74.4	90.8	58.0	66.4	71.0	103	52	32.8	47	59.8	61.2	0	0	1.77	....	6	60.7	54.8	....	15	NE
August	73.7	92.6	54.9	64.7	74.5	96	44	37.7	47	57.7	60.9	0	0	1.05	....	1	57.6	53.0	....	18	SW
September	65.2	81.6	48.7	55.8	65.2	95	30	32.9	55	50.0	54.7	0	1	0.08	....	2	61.6	45.9	1	2	E
October	55.7	73.9	37.4	45.5	55.4	88	26	36.5	52	39.7	44.9	0	8	0.60	....	4	56.5	33.3	1	....	W
November	4.07	59.3	22.0	27.6	37.9	77	9	37.3	57	24.7	31.4	3	27	0.06	0	1	63.2	19.8	....	....	NW
December	32.5	51.6	13.4	17.7	31.2	70	−21	38.2	57	11.6	25.5	10	30	0.24	3	2	63.5	12.0	....	....	WNW
Average	52.9	69.8	36.1	42.9	51.9	103	−21	33.7	57	38.5	43.6	35	160	15.59	8.0	44	65.7	35 0	....	....	....
Normal	51.5	68.5	35.1	42.8	52.5	....	....	33.2	....	38.8	45.2	....	....	13.89	....	39.4	67.1	36.6	....	....	....

TABLE XV.

SUMMARY FOR PLAINS SUBSTATION, CHEYENNE WELLS, COLORADO. J. E. PAYNE, Observer.
Latitude, 38° 50'. Longitude, 102° 20'. Elevation, 4,278 feet.

FOR 1900.

MONTH	TEMPERATURE (In Degrees Fahrenheit)											No. Days		Precipitation (Inches)	Snowfall (Inches)	No. of Stormy Days	Relative Humidity, Mean	Dew Point, Mean	No. Days Frost or Dew Was Observed		Average Cloudiness	Prevailing Direction of Wind
	Mean (½ Max. and ½ Min.)	Average Maximum	Average Minimum	7 A. M.	7 P. M.	Absolute Maximum	Absolute Minimum	Mean Range	Greatest Range	Wet Bulb 7 A. M.	Wet Bulb 7 P. M.	Av. Temp. Below 32°	Minimum Below 32°						Frost	Dew		
January	34.5	47.9	21.4	25.6	32.0	63.2	—5.6	26.7	42.0	23.4	27.7	9	31	0.03	0.5	1	70.7	19.6	8	0	....	NW
February	28.6	42.3	14.8	19.7	24.2	62.0	—7.0	27.5	44.0	18.1	21.9	14	28	0.67	5.0	4	81.0	16.0	....	0	....	NW
March	41.2	56.4	26.1	32.4	39.1	83.0	14.0	30.3	50.0	29.5	33.2	4	23	0.56	3.0	3	68.4	24.7	1	1	....	W
April	48.4	59.2	37.6	43.8	46.9	79.0	20.0	21.6	41.0	40.9	42.8	1	4	9.95	4.0	8	79.9	38.5	....	....	....	E
May	60.1	74.1	46.1	58.1	59.9	87.0	38.0	27.9	38.0	51.7	52.2	0	0	0.80	....	4	66.5	46.6	0	3	....	SSE
June	70.7	85.0	56.4	66.7	70.9	98.0	49.0	28.6	36.0	59.5	60.8	0	0	2.47	....	5	64.7	55.1	0	4	....	S
July	74.2	88.9	59.5	70.0	74.8	100.0	51.0	29.5	41.0	61.4	60.1	0	0	2.02	....	5	56.0	53.6	....	....	....	S
August	75.2	91.8	58.6	70.2	75.7	100.0	45.0	33.3	44.0	61.1	59.9	0	0	0.30	....	2	52.4	52.8	....	....	....	SW
September	64.2	78.3	50.1	57.7	62.8	93.0	34.0	28.2	45.0	51.8	53.5	0	0	1.31	....	4	64.0	46.7	....	....	....	E
October	54.9	71.1	38.7	48.2	50.4	86.0	23.0	32.4	45.0	42.0	40.8	0	3	0.22	T	1	57.3	32.3	....	....	....	W
November	*43.9	*61.4	24.0	31.6	33.6	*76.0	12.0	*35.1	*46.0	27.5	28.3	....	24	T	T	0	64.0	19.1	4	....	2.9	W
December	*31.4	*47.1	18.1	24.0	27.6	66.0	-16.0	31.2	*41.0	21.3	24.0	....	30	0.18	2.0	1	69.5	16.1	....	....	2.6	NW
Average	52.3	67.0	37.6	45.7	49.8	100.0	-16.0	29.4	50.0	40.7	42.1	....	143	18.51	14.5	38	66.2	35.1	13	8	2.9	.....
Normal	50.4	65.3	35.5	44.7	49.1	....	....	29.7	....	39.7	41.7	....	....	16.13	....	43.1	67.2	34.5	....	....	....	.....

*Part of month.

TABLE XVI.

SUMMARY AT CARLYLE LAMB'S, AT THE BASE OF LONG'S PEAK, ESTES PARK P. O., COLORADO.
Elevation, 9,000 feet, Approx.
FOR 1900.

MONTH	Mean Temperature	Average Maximum	Average Minimum	Absolute Maximum	Absolute Minimum	Mean Range	Greatest Range	No. of Days		Precipitation (Inches)	Snowfall (Inches)	No. of Stormy Days
								Average Below 32°	Minimum Below 32°			
January	25.8	38.6	12.9	53	—12	25.7	45	26	31	0.18	3.5	2
February	21.6	31.1	12.1	41	—9	19.0	40	26	28	0.82	14.5	4
March	30.6	42.0	19.3	60	8	22.7	33	20	28	0.35	5.5	4
April	31.6	43.4	19.7	63	—9	23.7	40	13	30	6.34	69.0	13
May	44.9	57.9	31.8	70	19	26.2	45	1	13	0.55	3.5	2
June	54.6	68.2	41.0	81	32	27.2	37	0	0	0.80	T	5
July	54.8	69.5	40.0	78	27	29.5	41	0	1	0.48	.....	5
August	56.2	71.2	41.3	79	33	29.9	41	0	0	0.17	.....	3
September	47.0	60.7	33.3	72	23	27.4	42	1	12	1.83	3.0	8
October	40.5	53.4	27.5	64	11	25.9	38	3	24	1.04	1.0	3
November	33.4	44.3	22.6	55	3	21.7	36	10	27	0.32	5.5	3
December	26.2	36.4	16.0	50	—27	20.4	46	19	31	0.62	9.0	4
Average	38.9	51.4	26.5	81	—27	24.9	46	119	225	13.50	114.5	56
Normal	37.6	49.8	25.5	....	.....	24.2	....	125	221	17.37	.....	66.7

TABLE XVII.

SUMMARY AT GLENEYRE P. O., NEAR HEAD OF THE LARAMIE RIVER. MRS. F. W. SHERWOOD, Observer.
Elevation, 8,000 feet.

FOR 1900.

MONTH	Av. Temp. 7 A. M.	Av. Temp. 2 P. M.	Av. Temp. 9 P. M.	Mean Temp. ½ (Max.+Min.)	Average Maximum	Average Minimum	Absolute Maximum	Absolute Minimum	Mean Range	Greatest Range	No. Days Av. Below 32°	Days Minimum Below 32°	Precipitation (Inches)	Snowfall	No. of Stormy Days
January	16.1	30.8	18.4	20.3	32.4	8.1	43	—17	24.3	39	29	31	1.20	12	5
February	13.7	27.9	16.5	17.9	29.8	6.0	42	—19	23.7	57	28	28	2.50	25	9
March	24.0	42.9	27.7	32.2	45.0	19.4	60	7	25.6	46	14	31	0.40	4	3
April	26.5	47.5	28.9	35.4	50.4	20.5	65	—12	29.9	55	8	30	0.55	55	12
May	43.0	66.2	40.7	50.5	68.5	32.5	85	21	35.9	54	0	10	0.30	.....	2
June	56.1	77.5	48.6	60.3	79.7	41.5	97	33	38.2	54	0	0	1.00	.....	6
July	55.8	80.0	53.2	62.1	82.8	41.3	95	33	41.5	56	0	0	1.60	.....	5
August	50.5	79.0	50.5	60.5	80.8	40.3	93	33	40.5	57	0	0	0.20	.....	2
September	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
October	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
November	25.1	43.7	27.6	33.5	46.7	30.3	68	3	26.4	44	12	27	T	2	2
December	17.5	33.8	20.6	22.9	35.1	10.7	55	—27	21.4	41	25	31	0.40	4	3
Average	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Normal	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

TABLE XVIII.

SUMMARY AT MR. GEO. A. BARNES', PINKHAMPTON, NORTH PARK, COLORADO.

Elevation, 8,400 feet.

FOR 1900.

MONTH	Mean Temp. ½ (7 A.+7 P.)	Av. Temp. 7 A. M.	Av. Temp. 12 M.	Av. Temp. 7 P. M.	Highest	Lowest	Mean Range	Greatest Range	No. Days Av. Below 32°	No. Days Minimum Below 32°	Precipitation	Snowfall	No. of Stormy Days
January	22.9	36.1	9.7	.....	48	—19	26.4	48	25	28	1.00	10.0	6
February	22.8	33.1	12.5	.....	51	—23	20.6	48	23	27	3.00	30.0	10
March	35.4	49.3	21.5	.....	74	9	27.9	54	10	25	1.20	12.0	7
April	43.4	59.0	27.8	.....	78	2	31.2	58	3	13	1.65	46.5	12
May	52.4	67.0	37.7	.....	82	29	29.3	44	0	3	0.79	....	6
June	62.9	80.0	45.8	.....	94	37	34.2	48	0	0	0.85	....	3
July	63.5	81.1	46.0	.....	94	32	35.2	54	0	0	0.09	....	2
August	60.7	78.6	42.7	.....	88	34	35.9	50	0	0	0.43	....	6
September	54.6	71.3	37.9	.....	92	25	33.3	58	0	7	0.71	....	4
October	43.3	57.6	28.9	.....	69	11	28.7	46	3	19	0.69	....	4
November	34.0	45.8	22.2	.....	61	—2	23.6	48	8	23	0.84	....	2
December	22.2	33.6	10.8	.....	50	—30	22.8	54	24	31	0.80	8.0	5
Average	43.2	57.7	28.6	.....	94	—30	29.1	58	96	176	146.5	106.5	67
Normal	.....	.....	.....	.....	....	.....	.....	....	....	....	.....	....	.....

TABLE XIX.

PRECIPITATION, 1900.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept	Oct.	Nov.	Dec.	Year
Pinkhampton	1.00	3.00	1.20	4.65	0.79	0.85	0.09	0.43	0.71	0.69	0.84	0.80	14.65
Lamb's	0.18	0.82	0.35	6.34	0.55	0.80	0.48	0.17	1.83	1.04	0.32	0.62	13.50
Shetland ranch	0.30	2.90	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Waterdale	0.19	0.86	0.97	9.21	1.76	0.45	1.05	0.57	1.72	0.18	0.12	0.22	17.30
Fort Collins	0.25	1.12	1.07	10.56	1.75	0.82	1.14	0.16	1.92	0.24	0.07	0.11	19.21
Rocky Ford	T	0.52	0.37	7.15	2.28	1.47	1.77	1.05	0.08	0.60	0.06	0.24	15.59
Cheyenne Wells	0.03	0.67	0.56	9.95	0.80	2.47	2.02	0.30	1.31	0.22	T	0.18	18.51
Gleneyre	1.20	2.50	0.40	4.40	0.20	1.00	1.60	0.20	.....	.....	T	0.40	.....

TABLE XX.

WEEKLY MEANS OF SOIL TEMPERATURES, SET A, IN AN IRRIGATED PLAT NEAR THE COLLEGE BUILDING. (In Degrees Fahrenheit.)

FOR 1900.

WEEK ENDING	DEPTH					WEEK ENDING	DEPTH				
	3 in.	6 in.	1 ft.	2 ft.	3 ft.		3 in.	6 in.	1 ft.	2 ft.	3 ft.
Jan. 6	30.0	31.2	32.3	35.8	39.3	July 14	72.9	72.5	71.4	68.6	66.5
Jan. 13	29.7	30.9	32.0	35.3	38.7	July 21	70.5	70.7	70.3	68.7	67.2
Jan. 20	31.5	31.9	32.7	35.4	38.4	July 28	70.2	70.2	69.7	67.9	66.
Jan. 27	30.0	31.4	32.6	35.5	38.4	Aug. 4	71.6	71 3	70.6	68 3	67.0
Feb. 3	29.6	30.5	31.5	34.7	37.8	Aug. 11	71 0	70.8	70.2	68.5	67.4
Feb. 10	29.4	30.6	31.6	34.5	37.4	Aug. 18	69.0	69 3	68.9	67.9	67.2
Feb. 17	28.6	29.6	31.0	34.2	37.2	Aug. 25	67.7	68.7	69.1	68.2	67.6
Feb. 24	30.4	30.5	30.8	33.6	36.6	Sept. 1	67.1	67.4	67.4	66.8	66.6
Mar. 3	32.1	32.1	32.7	34.5	36.8	Sept. 8	65.9	66.6	66.9	66 6	66.4
Mar. 10	36.1	35.8	35.7	36.2	37.8	Sept. 15	64.5	65.6	66.2	63 8	61.2
Mar. 17	39.8	40.4	40.4	40.0	40.4	Sept. 22	58.0	59 8	61.7	63.6	64 7
Mar. 24	40.1	40.3	40.0	40.0	41.2	Sept. 29	54.0	55.9	57.9	60.7	62.4
Mar. 31	40.2	40.8	41.1	41.5	42.4	Oct. 6	52.8	54.2	55.7	57.7	59.7
Apr. 7	42.2	42.6	42.5	42.4	43.1	Oct. 13	48.6	50.5	52.5	55.7	58.0
Apr. 14	41.7	42.1	42.1	42.1	43.2	Oct. 20	51.8	52.8	53.9	55.3	57.0
Apr. 21	45.7	45.4	44.5	43.3	43.8	Oct. 27	49.0	50.5	52.1	54.3	56.3
Apr. 28	48.7	49.1	48.6	46.8	46.1	Nov. 3	45.4	47.5	49.5	52.5	54.8
May 5	49.5	49.3	48.5	47.2	47.2	Nov. 10	42 9	45.0	46.9	50.3	52.9
May 12	56.7	55.9	54.5	51.3	49.6	Nov. 17	40.2	42.3	44.1	47.8	50.8
May 19	57.1	57.0	56.4	54.2	52.4	Nov. 24	38.0	40.0	42.2	45.8	49 0
May 26	61.3	60.3	58.6	55.5	53.9	Dec. 1	36.6	38.5	40.4	44.1	47.3
June 2	67.3	66.3	64.2	59.7	56.9	Dec. 8	37.2	38.6	40.0	42.9	45.9
June 9	67.5	66.0	64.4	61.0	59.0	Dec. 15	33.0	35.3	37.2	41.5	44.9
June 16	65.6	65.6	64.7	62.0	60.2	Dec. 22	34.9	36.2	37.4	40.2	43.5
June 23	72.5	71.1	68.6	63.9	61.5	Dec. 29	31.8	34.0	36.0	39.7	42.9
June 30	72.7	72.2	70.8	66.9	64.5	Average	49.84	50.47	50.80	51.21	51.99
July 7	71.3	71.1	70.4	68.0	65.9						

TABLE XXI.

WEEKLY READINGS (NOT AVERAGES) OF SOIL THERMOMETERS, SET C, ON UNIRRIGATED GROUND.

FOR 1900.

DATE	DEPTH				DATE	DEPTH			
	6 in.	1 ft.	2 ft.	3 ft.		6 in.	1 ft	2 ft.	3 ft.
Jan. 4	30.4	30.7	34.3	36.6	June 28	71.5	67.8	62.9	59.2
Jan. 11	29.0	29.8	33.6	35.8	July 5	68.0	66.1	63.5	60.5
Jan. 18	30.9	31.1	33.7	35.5	July 12	71.5	68 2	64.6	61.3
Jan. 25	29.6	30.1	33.3	35.2	July 19	67.3	67.1	65.1	62.2
Feb. 1	28.2	28.5	32.0	34.2	July 26	69.2	66.7	64.4	62.0
Feb. 8	27.7	28.4	32.0	34.1	Aug. 4	71.4	68.5	65.7	62.9
Feb. 15	28.7	28.9	31.7	33.8	Aug. 9	71.4	68.7	66.1	63.3
Feb. 22	29.7	29.2	31.3	33.1	Aug. 16	70.0	67.7	65.9	63.5
Mar. 1	31.2	31.1	32.5	33.8	Aug. 23	68.4	66.7	66.0	63.8
Mar. 8	31.9	31.5	33.1	34.1	Sept. 1	70.7	68.1	66.0	63.8
Mar. 15	34.1	33.1	34.0	34.6	Sept. 13	66.6	65 2	65.4	63.9
Mar. 22	37.7	35.7	35.7	35.6	Sept. 20	60.7	60.0	62.1	61.8
Mar. 29	37.1	36.8	37.9	37.5	Sept. 27	52.1	54.4	59.3	59.8
Apr. 5	39.2	39.7	40.3	39.2	Oct. 4	55.8	54.4	56.3	57.0
Apr. 12	38.2	37.7	39.3	39.2	Oct. 11	51.6	50.9	54.2	55.4
Apr. 19	44.6	41.1	40.6	39.8	Nov. 8	43.0	44.4	48.6	50.3
Apr. 26	48.2	45.4	44.2	42.4	Nov. 15	40.1	41.3	45.8	48 1
May 3	50.1	47.5	44.7	43.4	Nov. 22	39.6	39.5	43.6	46.3
May 12	57.2	53.8	50.3	46.5	Nov. 28	37.2	38.2	42.7	44.9
May 17	56.7	54.3	51.5	48.8	Dec. 6	37.2	37.5	41.1	43 2
May 24	57.8	55.5	52.5	49.9	Dec. 13	32.9	34 4	39.3	41.9
June 1	62.2	59.7	56.3	52.8	Dec. 20	35.1	33 6	38.0	40.4
June 9	64.7	61.2	57.7	54.7	Dec. 27	32 9	33.6	37.4	39.7
June 14	63.1	60.4	58.2	55.4	Average	48.77	47.68	48.23	47.88
June 21	68.5	64.3	60.5	56.8					

This set of thermometers is placed on a knoll near the farm barn, unirrigated.

TABLE XXII.

DATES OF EXTREME TEMPERATURES AT DIFFERENT DEPTHS FROM READINGS AT 7 A. M. AND 7 P. M. SET A.

YEAR	DEPTH											
	3 Inches				6 Inches				12 Inches			
	Date	Max.	Date	Min	Date	Max.	Date	Min.	Date	Max	Date	Min.
1889	June 30	87.7	Jan. 9	16.0	July 1	81.2	Jan. 9	21.0	June 30	76.8	Jan. 21-22	26.0
1890	July 1	86.2	Jan. 2	14.5	July 1	81.2	Jan. 2	20.0	July 16	72.5	Jan. 24	25.5
1891	July 24	84.0	Feb. 9	17.8	July 11	80.6	Feb. 2	21.9				
1892	Aug. 24	84.2	Jan. 13	16.3	Aug. 14	80.8	Jan. 11	20.7	Aug. 15	72.5		
1893	June 28 to July 4	87.5	Jan. 18	21.3	July 5	83.9	Jan. 18	26.0	July 5	76.1	Jan. 21	30.3
1894	June 12	78.6	Dec. 28	14.7	July 27	76.1	Dec. 28	21.4	July 27	71.5	Dec. 28	24.3
1895	July 6	83.2	Jan. 15	8.5	July 6	78.8	Jan. 15	13.0	July 29	71.6	Jan. 15	19.2
1896	July 13	90.8	Jan. 4	18.8	July 13	86.1	Jan. 4	22.7	July 13	77.1	Jan. 4	27.9
1897	July 7	78.2	Jan. 5	18.9	Aug. 12	77.3	Jan. 5	23.9	Aug. 12	77.0	Jan. 5	29.5
1898	July 15	85.4	Dec. 14	20.0	July 17	82.2	Jan. 27 to Dec. 14	24.7	July 19	77 7	Jan. 27	28.0
1899	June 28	84.3	Jan. 10	18.8	June 28	79.2	Feb. 8	21.6	¶ July 24	73.9	Feb. 7	25.3
1900	June 23	84.3	Feb. 17	21.4	June 23	78.7	Feb. 17	26.6	Aug. 20	73.0	Feb. 18	28.7

¶ 74 June 29, after watering grass.

TABLE XXII—Concluded.

DATES OF EXTREME TEMPERATURES AT DIFFERENT DEPTHS FROM READINGS AT 7 A. M. AND 7 P. M. SET A.

YEAR	DEPTH											
	2 Feet				3 Feet				6 Feet			
	Date	Max.	Date	Min.	Date	Max.	Date	Min.	Date	Max.	Date	Min.
1889	July 18	67.3	Jan. 28	30.9	Aug. 19	64.6	Jan. 29-31	33.3	Sept. 5-10	60.0	Mar. 3	39.2
1890	July 17-28 Aug. 7	66.9	Feb. 11	30.6	Aug. 21	64.6	Jan. 29	33.3	Sept. 1-12	60.0	Feb. 18	39.4
1891	July 26	68.7	Feb. 14-16-17	32.1	Aug. 16, 17 to Aug. 19, 20	65.6	Feb. 19, 22 to Feb. 23, 26	34.0	Sept. 17	63.8	Mar. 12-23	39.0
1892	Aug. 17	68.7	Jan. 24-25	31.4	Aug. 18	65.5	Feb. 28	33.6	Sept. 1	60.2	Feb. 24-26	39.6
1893	*July 6	75.3	Jan. 22	32.6	July 24	67.6	Jan. 23-27 to Feb. 11	34.8	†July 6	67.4	Feb. 21, 22-25	40.2
1894	June 28	69.8	Feb. 25	31.5	°June 28	69.7	Feb. 27-28	33.5	‖June 28	64.4	Mar. 15	38.5
1895	Aug. 2	°68.0	Jan. 16	27.5	Aug. 7-8	65.9	Jan. 18	32.8	Aug. 30 to Sept. 19	61.0	Mar. 1	39.3
1896	Aug. 15-17	71.9	Jan. 6	31.6	Aug. 16-17	69.5	Jan. 8, 17, 18	35.5	Aug. 24-25	62.8	Feb. 17-22	41.0
1897	Aug. 12	‡76.1	Feb. 2	32.4	‡Aug. 17	73.6	Feb. 2-10	35.5	‡Aug. 16	75.5	Mar. 24 to Apr. 2	41.0
1898	July 30	73.0	Jan. 28 to Feb. 12	33.0	Sept. 1	70.6	Feb. 7-20	36.5	Sept. 5-6	67.5	Apr. 10	43.4
1899	July 26-28	69.1	Feb. 15	30.9	July 28	67.2	Feb. 23 to Mar. 4	34.0	----------	----	----------	-----
1900	July 15	69.2	Feb. 19	33.1	Aug. 20	68.9	Feb. 19-24	36.5	----------	----	----------	-----

* Water applied to lawn, 69.2, July 31, was probably highest otherwise.
† Water applied to lawn, 62.6, September 11-13.
‡ July 31, 68.5, unaffected by water.
° August 22, 66.7.
‖ September 2, 62.5.
‡ Affected by irrigation.
Observations made at 2 and 9 p. m. before July 1, 1889. Six-feet thermometer broken September 10, 1898.

TABLE XXIII.

EVAPORATION FROM WATER SURFACE, TANK 3x3x3 FEET, FLUSH WITH GROUND, AT FT. COLLINS, COLORADO. (In Inches.)
Latitude, 40° 34'. Longitude, 105 + W. Elevation, 4,980 feet.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1887	2.46	3.23	4.60	5.55	5.19	5.75	5.23	4.24	4.12	3.26	1.48	1.60	46.71
1888	.....	.....	.....	.....	4.45	*7.70	*7.00	4.06	3.94	2.17	1.35	0.99	.....
1889	1.08	1.03	2.75	4.06	3.72	4.34	5.20	5.15	5 19	3.28	0.62	1.42	37.84
1890	0.86	2.36	3.58	3.50	4.32	5.71	5.44	5.76	3.69	2.71	1.32	1.10	40.25
1891	*1.89	1.90	2.23	2.24	5.03	4.97	5.72	4.91	4.12	3.62	1.74	0.75	39.12
1892	2.51	‡2.15	2.78	3.58	3.49	4.20	4.69	5.64	5.11	3.33	1.93	1.13	40.54
1893	¶	*1.52	3.79	5.40	5.12	6.12	6.41	4.73	5.04	3.79	1.05	1.88	.....
1894	†1.14	†1.15	1.95	4.61	4.66	5.01	5.74	4.88	3.77	3.75	1.64	1.22	39.52
1895	†1.19	†1.19	¶	4.91	4.27	4.13	4.57	4.52	4.06	2.24	1.53	1.68	.....
1896	2.64	2.25	2.39	4.71	5.91	5.09	5.23	5.80	3.34	2.94	1.62	1.25	43.17
1897	1.80	2.20	¶	3.33	4.13	4.26	4.64	4.76	3.97	2.88	1.47	0.94	.....
1898	1.12	*1.31	2.53	4.65	3.90	5.67	7.33	6.57	5.57	4.64	1.36	0.67	45.32
1899	‡1.51	‡1.39	‡1.54	3.79	5.35	6.37	5.38	5.86	5.04	2.87	1.86	1.15	42.11
1900	0.96	1.55	2.32	3.12	4.53	5.51	6.26	5.43	4.55	3.74	2.10	1.54	41.61
Average	1.43	1.79	2.77	4.07	4.58	5.35	5.63	5.17	4.39	3.23	1.51	1.24	41.16

*Based on record for part of month.
†From record of two months.
‡From record from February 17th.
¶Tank punctured. Record lacking.
‡From record of three months.

TABLE XXIV.

RAINFALL AT THE AGRICULTURAL COLLEGE, FT. COLLINS, COLORADO.

YEAR	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1872	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.02	0.20	.....
1873	0.25	0.16	0.00	1.20	2.30	1.50	1.30	0.85	0.75	0.42	0.20	0.17	9.10
1874	0.06	0.43	1.29	0.77	2.95	0.65	3.15	0.25	0.00	1.00	0.02	0.00	10.40
1879	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.75	0.15	0.60	.....
1880	0.72	1.09	0.38	0.94	0.60	0.86	1.80	0.37	1.47	2.07	.....	0.10	.....
1881	1.10	0.55	1.45	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1882	.....	.....	0.17	.....	4.67	3.07	1.76	0.89	2.51	0.82	0.29	.....	.....
1883	1.00	1.50	0.68	.....	2.51	3.18	.....	1.78	1.00	1.29	T	1.33	.....
1884	1.10	0.70	1.15	3.94	4.84	.....	.....	.....	.....	0.10	1.80	0.35	.....
1885	1.77	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1886	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.69	1.18	0.33	.....
1887	0.86	0.23	0.25	1.10	1.23	1.96	3.05	2.12	0.54	0.43	0.15	0.00	12.12
1888	0.29	0.36	0.73	1.23	3.39	0.47	0.60	1.01	0.29	0.88	0.38	0.16	9.79
1889	0.21	0.34	0.65	2.07	3.39	2.06	0.79	0.95	0.42	3.16	0.43	0.01	14.48
1890	0.13	0.21	0.22	3.92	1.19	0.12	1.27	3.14	0.07	0.70	0.32	0.12	13.58
1891	2.32	0.16	1.21	2.14	4.07	1.30	0.17	2.05	1.01	0.20	0.60	0.46	15.69
1892	0.60	1.29	1.52	1.60	4.83	2.42	1.32	0.22	0.14	0.93	0.23	0.01	15.45
1893	0.02	0.54	0.14	1.66	1.92	0.26	0.64	0.92	0.18	0.16	0.55	0.12	7.11
1894	0.25	0.60	0.67	0.89	3.09	0.42	1.72	1.53	2.29	T	0.14	0.76	12.36

TABLE XXIV—Concluded.

RAINFALL AT THE AGRICULTURAL COLLEGE, FT. COLLINS, COLORADO.

YEAR	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1895	0.24	1.52	0.54	1.36	3.62	3.65	3.75	1.45	0.47	1.06	0.40	0.01	18.07
1896	0.43	0.03	1.73	1.26	1.68	3.05	3.05	2.20	1.55	0.49	0.05	0.24	15.76
1897	0.18	0.54	2.15	1.39	2.06	1.69	2.65	1.74	0.75	0.75	0.67	0.67	15.24
1898	0.14	0.08	0.50	1.08	3.65	1.37	0.50	0.98	0.50	0.82	1.24	0.17	11.03
1899	0.66	1.04	1.50	1.10	1.01	1.03	4.95	0.99	0.21	3.23	T	0.47	16.19
1900	0.25	1.12	1.07	10.56	1.75	0.82	1.14	0.16	1.92	0.24	0.07	0.11	19.21
Normal	0.60	0.62	0.86	2.12	2.74	1.57	1.87	1.24	0.85	0.96	0.40	0.31	14.14

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