

(107)

TEXAS AGRICULTURAL EXPERIMENT STATION.

BULLETIN NO. 17.

AUGUST, 1891.

GENERAL INFORMATION

RELATING TO THE

Texas Agricultural Experiment Station:

LAWS AUTHORIZING ESTABLISHMENT; ORGANIZATION AND OFFICERS; RESULTS TO DATE; WORK UNDER WAY; INVENTORY OF PROPERTY; FINANCIAL STATEMENTS BY YEARS; LIST OF PUBLICATIONS.

AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS.

All Bulletins of this Station are issued free. Any one interested in any branch of agriculture may have his name placed on our permanent mailing list, and secure future numbers, by application to

GEO. W. CURTIS, DIRECTOR.
College Station, Brazos Co. Tex.

In requesting Bulletins, write name and address plainly.



BRYAN, TEXAS:
COX, "THE NEAT PRINTER,"
1891.

TEXAS AGRICULTURAL EXPERIMENT STATION

OFFICERS AND STAFF.

GOVERNING BOARD.

BOARD OF DIRECTORS A. AND M. COLLEGE.

MAJ. A. J. ROSE, President.....	Salado.
HON. JNO. E. HOLLINGSWORTH. State Com. Agr.....	Austin.
HON. W. R. CAVITT.....	Bryan.
DR. J. D. FIELDS.....	Manor.
HON. JNO. ADRIANCE.....	Columbia.

TREASURER.

PRESIDENT L. S. ROSS,.....	College Station.
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STATION STAFF.

GEO. W. CURTIS, M. S. A.....	Agriculturist, Director.
H. H. HARRINGTON, M. Sc.	Chemist.
M. FRANCIS, D. V. M.	Veterinarian.
.....	Horticulturist.
D. ADRIANCE, M. S.....	Meteorologist, Asst. Chemist.
J. W. CARSON,.....	Assistant to Director.
J. M. CARSON.....	Assistant Agriculturist.
P. S. TILSON, B. S. A.....	Assistant in Chemistry.

TEXAS AGRICULTURAL EXPERIMENT STATION.

GENERAL INFORMATION.

(GEO. W. CURTIS, M. S. A.)

OFFICERS AND ORGANIZATION.

The station was established during the winter of 1887-8, in accordance with

THE HATCH ACT,

an act of the Congress of the United States, approved by the President, as follows:

AN ACT to establish agricultural experiment stations in connection with the colleges established in the several States under the provisions of an act approved July second, eighteen hundred and sixty-two, and of the acts supplementary thereto.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That in order to aid in acquiring and diffusing among the people of the United States useful and practical information on subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and applications of agricultural science, there shall be established, under direction of the college or colleges or agricultural departments of colleges in each State or Territory established, or which may hereafter be established, in accordance with the provisions of an act approved July second, eighteen hundred and sixty-two, entitled "An act donating public lands to the several States and Territories which may provide colleges for the benefit of agriculture and the mechanic arts," or any of the supplements to said act, a department to be known and designated as an "agricultural experiment station;" Provided, That in any State or Territory in which two such colleges have been or may be established the appropriation hereinafter made to such State or Territory shall be equally divided between such colleges, unless the legislature of such State or Territory shall otherwise direct.

SEC. 2. That it shall be the object and duty of said experiment stations to conduct original researches or verify experiments on the physiology of plants and animals; the diseases to which they are severally subject, with the remedies for the same; the chemical composition of useful plants at their different stages of growth; the comparative advantages of rotative cropping as pursued under a varying series of crops; the capacity of new plants or trees for acclimation; the analysis of soils and water; the chemical combination of manures, natural or artificial, with experiments designed to test their comparative effects on crops of different kinds; the adaptation and value of grasses and forage plants; the composition and digestibility of the different kinds of food for domestic animals; the scientific and economic questions involved in the production of butter and cheese; and such other researches or experiments bearing directly on the agricultural industry of the United States as may in each case be deemed advisable, having due regard to the varying conditions and needs of the respective States or Territories.

SEC. 3. That in order to secure, as far as practicable, uniformity of methods and results in the work of said stations, it shall be the duty of the United States Commissioner of Agriculture to furnish forms, as far as practicable, for the tabulation of results of investigation or experiments; to indicate, from time to time, such lines of inquiry as to him shall seem most important; and, in gen-

eral, to furnish such advice and assistance as will best promote the purposes of this act. It shall be the duty of each of said stations, annually, on or before the first day of February, to make the governor of the State or Territory in which it is located, a full and detailed report of its operations, including a statement of receipts and expenditures, a copy of which report shall be sent to each of said stations, to the said Commissioner of Agriculture, and to the Secretary of the Treasury of the United States.

SEC. 4. The bulletins or reports of progress shall be published at said stations at least once in three months, one copy of which shall be sent to each newspaper in the States or Territories in which they are respectively located, and to such individuals actually engaged in farming as may request the same, and as far as the means of the stations will permit. Such bulletins or reports and the annual reports of said stations shall be transmitted in the mails of the United States free of charge for postage, under such regulations as the Postmaster-General may from time to time prescribe.

SEC. 5. That for the purpose of paying the necessary expenses of conducting investigations and experiments and printing and distributing the results as hereinbefore prescribed, the sum of fifteen thousand dollars per annum is hereby appropriated to each State, to be specially provided for by Congress in the appropriations from year to year, and to each territory entitled under the provisions of section eight of this act, out of any money in the treasury proceeding from the sales of public lands, to be paid in equal quarterly payments, on the first days of January, April, July and October in each year, to the treasurer or other officer duly appointed by the governing boards of said colleges to receive the same, the first payment to be made on the first day of October, eighteen hundred and eighty-seven; *Provided, however,* that out of the first annual appropriation so received by any station an amount not exceeding one-fifth may be expended in the erection, enlargement or repair of a building or buildings necessary for carrying on the work of such station; and thereafter an amount not exceeding five per-centum of such annual appropriation may be so expended.

SEC. 6. That whenever it shall appear to the Secretary of the Treasury from the annual statement of receipts and expenditures of any of said stations that a portion of the preceding annual appropriation remains unexpended, such amount shall be deducted from the next succeeding annual appropriation to such station, in order that the amount of money appropriated to any station shall not exceed the amount actually and necessarily required for its maintenance and support.

SEC. 7. That nothing in this act shall be construed to impair or modify the legal relation existing between any of the said colleges and the government of the States or Territories in which they are respectively located.

SEC. 8. That in States having colleges entitled under this section to the benefits of this act and having also agricultural experiment stations established by law separate from said colleges, such State shall be authorized to apply such benefits to experiments at stations so established by such States; and in case any State shall have established under the provisions of said act of July second aforesaid, an agricultural department or experimental station, in connection with any university, college or institution not distinctively an agricultural college or school, which shall have connected therewith an experimental farm or station, the legislature of such State may apply in whole or in part the appropriation by this act made, to such separate agricultural college or school, and no legislature shall by contract, express or implied, disable itself from so doing.

SEC. 9. That the grants of money authorized by this act are made subject to the legislative assent of the several States and Territories to the purposes of said grants; *Provided,* That payment of such installments of the appropriation herein made as shall become due to any State before the adjournment of the regular session of its legislature meeting next after the passage of this act shall be made upon the assent of the governor thereof duly certified to the Secretary of the Treasury.

SEC. 10. Nothing in this act shall be held or construed as binding the United States to continue any payments from the Treasury to any or all the States or institutions mentioned in this act, but Congress may at any time amend, suspend, or repeal any or all the provisions of this act.

Approved March 2, 1887.

See also the following supplemental acts to make operative the provisions of the foregoing:

[Fiftieth Congress, first session, Chapter 5, Statutes of the United States, Vol. 25, Page 32.]

An Act making an appropriation to carry into effect the provisions of an act approved March second, eighteen hundred and eighty-seven, entitled "An act to establish agricultural experiment stations in connection with the colleges established in the several states under the provisions of an act approved July second, eighteen hundred and sixty-two, and of acts supplementary thereto."

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That to carry into effect the provisions of an act approved March second, eighteen hundred and eighty-seven, entitled "An act to establish agricultural experiment stations in connection with the colleges established in the several States, under the provisions of act approved July second, eighteen hundred and sixty-two, and of the acts supplementary thereto," the sum of five hundred and eighty-five thousand dollars, or so much thereof as may be necessary, is hereby appropriated, out of any money in the treasury not otherwise appropriated, for the fiscal year ending June thirtieth, eighteen hundred and eighty-eight.

Approved February 1, 1888.

[Fiftieth Congress, first session, Statutes of the United States, Vol. 25, Page 176.]

Chapter 373. An act to amend an act entitled "An act to establish agricultural stations in connection with the colleges established in the several states under the provisions of an act approved July second, eighteen hundred and sixty-two, and of the acts supplementary thereto."

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the grant of money authorized by the act of Congress entitled, "An act to establish agricultural experiment stations in connection with the colleges established in the several States under the provisions of an act approved July second, eighteen hundred and sixty-two, and of acts supplementary thereto," are subject, as therein provided, to the legislative assent of the States and Territories to be affected thereby; but as to such installments of the appropriations as may be now due or may hereafter become due when the legislature may not be in session, the Governor of said State or Territory may make the assent therein provided, and, upon a duly certified copy thereof to the Secretary of the Treasury, he shall cause the same to be paid in the manner provided in the act of which this is amendatory until the termination of the next regular session of the Legislature of such State or Territory.

Approved June 7, 1888.

See also following extract from rulings of the Treasury Department as to the Construction of the Act of Congress of March 2, 1887, establishing Agricultural Experiment Stations. Sections 1 and 8. February 15, 1888:

(1.) When an agricultural college or station has been established under the act of July 2, 1862, each college is entitled to the benefits of the provisions of said act, (*i. e.*, of March 2, 1887.)

(2.) In a State where an agricultural college has been established under the act of July 2, 1862, and agricultural stations have also been established, either under the act of July 2, 1862, or by State authority, before March 2, 1887, the Legislature of such State may determine which one of said institutions, or how many of them, shall receive the benefits of the act of March 2, 1887.

(3.) If the Legislature of any State in which an agricultural college has been established under the act of July 2, 1862, desires to establish an agricultural station which shall be entitled to the benefits of said act, it must establish such station in connection with said college.

The Twentieth Legislature of the State of Texas accepted the provisions of the Hatch act, as shown by following transcript from the General Laws of Texas, Twentieth Legislature, 1887:

AGRICULTURAL EXPERIMENT STATIONS.

SEC. 1. Assenting to purposes of grant by Congress.

SEC. 2. Emergency clause.

CHAP. 121. [S. B. No. 349.] An act to give the assent of the State of Texas to the purposes of a grant of money authorized and appropriated by an act of Congress of the United States, approved March 2nd, A. D. 1887, and entitled "An Act to establish agricultural experiment stations in connection with the colleges established in the several States under the provisions of an act approved July 2nd, A. D. 1862, and of the acts supplementary thereto."

Whereas, the Congress of the United States, by an act approved March 2nd, 1887, and entitled "An Act to establish agricultural experiment stations in connection with colleges established in the several States under the provisions of an act approved July 2nd, 1862, and of the acts supplementary thereto," has granted to each of the States and Territories of the United States an appropriation of fifteen thousand dollars for the purposes indicated in the title of said act, and fully set forth in the body thereof; and whereas, said act, in section 9 thereof, provides that the grants of money therein authorized are made subject to the legislative assent of the several States and Territories to the purposes of said grant; Therefore,

SEC. 1. *Be it enacted by the Legislature of the State of Texas,* That the State of Texas does hereby assent to the purposes of said grant.

SEC. 2. That the near approach of the close of the present session of the Legislature renders it impracticable to read this bill on three several days, and the importance of the subject matter hereof, creates an imperative public necessity demanding the suspension of the constitutional rule requiring bills to be read on three several days, and the same is accordingly so suspended.

Approved April 2, 1887.

An amendment to the foregoing passed by the Twenty-first Legislature of the State of Texas designated the place of location of the Texas Agricultural Experiment Station, as shown by the following transcript from the General laws of Texas—Twenty-first Legislature, 1889.

AGRICULTURAL EXPERIMENT STATIONS.

SEC. 1. Assent of the State.

SEC. 2. Emergency clause.

CHAP. 58. [H. B. No. 520.] An Act to amend an act to give the assent of the State of Texas to the purpose of a grant of money authorized and appropriated by an act of the Congress of the United States, approved March 2d, A. D. 1887, and entitled "An Act to establish agricultural experiment stations in connection with the colleges established in the several States under the provisions of an act approved July 2d, A. D. 1862, and of the acts supplementary thereto."

Whereas, The Congress of the United States, by an act approved March 2d, A. D. 1887, and entitled "An Act to establish agricultural experiment stations in connection with the colleges established in the several States under the provisions of an act approved July 2d, 1862, and of the acts supplementary thereto, has granted to each of the States and Territories of the United States an appropriation of fifteen thousand dollars for the purposes indicated in the title of said act and fully set forth in the body thereof; and whereas, said act, in section 9 thereof, provides that the grants of money therein authorized are made subject to the legislative assent of the several States and Territories to the purpose of said grants; Therefore,

SEC. 1. *Be it enacted by the Legislature of the State of Texas,* That the State of Texas does hereby assent to the purposes of said grant, and designates the Agricultural and Mechanical College of Texas as such station.

SEC. 2. The fact that no further benefit from the grant made by Congress to the several States for experiments in agriculture can be had until the State designates the beneficiary of such grant in this State, creates an imperative necessity requiring the suspension of the constitutional rule requiring bills to be read on three several days, and that this bill take effect from and after its passage, and it is so enacted.

NOTE.—The foregoing act originated in the House, and passed the same March 19, A. D. 1889; and passed the Senate by a vote of 26 yeas, no nays.

Approved April 3, 1889.

At the thirty-eighth meeting of the Board of Directors of the A. and M. College of Texas, January 24, 1888, formal provision was made for the organization of the Experiment Station in accordance with the foregoing laws.

The organization of the Station at first provided for a Station Council, composed of the Chairman of the Faculty of the College, the Agent of the Board of Directors and the Director of the Station, the Council to have full control over Station work, the Professors of Agriculture, Horticulture, Veterinary Science and Chemistry in the College being also engaged as staff workers in the Experiment Station under the direction of the Station Council.

The officers and staff of the Station as first organized were as follows:

BOARD OF DIRECTORS A. AND M. COLLEGE.

C. C. Garrett, Esq.,	Brenham, Texas.
Hon. L. L. Foster, State Commissioner Agriculture,	Austin, Texas.
W. R. Cavitt, Esq.,	Bryan, Texas.
George M. Dilley, Esq.,	Palestine, Texas.
Maj. A. J. Rose,	Salado, Texas.
Prof. L. L. McInnis, Secretary,	College Station, Texas.

EXPERIMENT STATION COUNCIL.

L. L. McInnis,	Chairman of Faculty.
T. M. Scott,	Agent of the Board.
F. A. Gulley,	Director of the Station.

STATION STAFF.

F. A. Gulley, M. Sc.,	Director.
Geo. W. Curtis, M. S. A.,	Agriculturist.
H. H. Harrington, M. Sc.,	Chemist.
T. L. Brunk, B. Sc.,	Horticulturist.
J. H. Kinealy, D. E.,	Meteorologist.
M. Francis, D. V. M.,	Veterinarian.
W. Wipprecht, B. S. A.,	Assistant Chemist.
J. W. Carson,	Assistant to Director.
D. Adriance,	Assistant to Chemist.
J. F. Duggar, M. Sc.,	Assistant to Agriculturist.
J. F. McKay, B. S.,	Assistant to Horticulturist.

At the June meeting of the Board of Directors in 1890, the "Experiment Station Council" was abolished and the immediate management, under the Board of Directors as "Governing Board" of the Experiment Station, vested in the Director, the Station workers having jurisdiction, each in his own department or line of Experimental work.

The monies received from the United States Hatch Fund and all other sources are, by the direction of the "Governing Board," received by the Treasurer of the Texas Experiment Station and by him placed to the credit of the Station account. Bills are paid by the Treasurer after being audited as "correct" by the Director of the Station, who specifies at the same time the distributing account against which the bills in question shall be entered. This latter plan of organization is the one now in force, the officers and staff as given below (with the exception of the Horticulturist) being the same as elected at the time of reorganization in 1890:

GOVERNING BOARD.

Board of Directors A. and M. College.

Maj. A. J. Rose, President,	Salado, Texas.
Hon. John E. Hollingsworth, State Commissioner Agriculture, ..	Austin, Texas.
Hon. W. R. Cavitt,	Bryan, Texas.
Dr. D. J. Fields,	Manor, Texas.
Hon. John Adriance,	Columbia, Texas.

TREASURER.

President L. S. Ross, College Station, Texas.

STATION STAFF.

Geo. W. Curtis, M. S. A.,	Agriculturist, Director.
H. H. Harrington, M. Sc.,	Chemist.
M. Francis, D. V. M.,	Veterinarian.
.....	Horticulturist.
D. Adriance, M. S.,	Meteorologist, Assistant Chemist.
J. W. Carson,	Assistant to Director.
J. M. Carson,	Assistant Agriculturist.
P. S. Tilton, B. S. A.,	Assistant in Chemistry.

NOTE.—The authority of President L. S. Ross as Treasurer to receive and receipt for all monies accruing to the benefit of the Experiment Station is found in the following resolution passed by the Board of Directors of the A. and M. College of Texas, at meeting February 10, 1891:

“Whereas, Provision has been made by Congress for the establishment of an Agricultural Experiment Station at the several Agricultural and Mechanical Colleges throughout the United States, and

Whereas the Board of Directors of the Agricultural and Mechanical College of the State of Texas has organized and established such station at this college, Therefore, Be it Resolved:

First, That L. S. Ross, President and Treasurer of said college, be, and he is hereby, designated and appointed to receive and receipt for and have custody of the monies that have been or may hereafter be appropriated for the aforesaid purposes as provided in Section 5 of said act, and all subsequent amendments thereto, making the same available. * * * * ”

RESULTS TO DATE.

The results already reached in experimental work appear in the publications of the Station. There have been issued already numbers 1 to 16 inclusive, not counting numbers 1 to 5 inclusive, “old series,” issued by the Agricultural department of the college prior to the organization of the Hatch station in 1887.

The work reported on in these Bulletins covers briefly: Feeding value of corn cob and shuck in cattle feeding; chemical analyses of fertilizers and food stuffs; value and relative hardness of the different grasses for Texas cultivation; discussion of the creamery problem for Texas, with warning against expensive plants—plans and specifications in detail for cheap and effective creamery outfit, and condensed points regarding butter making in this latitude; relative value of different rations and food stuffs; cause and prevention of cotton blight or root rot; general report on variety tests and other work in horticulture; special report on pear stocks and parasitic fungi; effect of cotton seed and cotton seed meal in the dairy ration on churnability of milk, including effect on churn temperature, effect on quality and quantity of butter and the facility with which cream may be separated by gravity and by centrifugal force; the quality of sweet cream butter as compared with butter made from acid cream;

life-history and ravages of the so-called "screw worm fly" with treatment for wounds caused by the worm; the value of sorghum for forage and ensilage with comparative analyses of different varieties and at different stages of growth; food effect on creaming milk, and value of separator in creaming, influence of climate on composition of corn; digestibility of Southern food stuffs; effect of tile drainage with clay subsoil on Irish potatoes, cabbage and strawberries, and other matters of minor consequence.

Of the findings from our work thus far, the most important may be stated as follows: in feeding cotton seed or cotton seed meal to dairy cows, the butter product in creaming by gravity is increased on an average from 8 per-cent to 14 per-cent under best conditions, and from 20 per-cent to 30 per-cent under conditions less favorable. By the use of cotton seed and cotton seed meal in the dairy ration the proper churn temperature is considerably elevated, being, without cotton seed or cotton seed meal, summer temperature 60 to 64 degrees, winter temperature 63 to 67 degrees with acid cream, 55 to 57 degrees according to food conditions with sweet cream, while with cotton seed or cotton seed meal the best churn temperature was found to be, for summer 65 to 68 degrees, for winter 70 to 78 degrees Fahr., for acid cream; 57 to 59 degrees, according to food conditions, for sweet cream. The difference between summer and winter temperature, as noted above, is due, not to the influence of season, but to the fact that in winter the food is mostly dry, while in spring and summer it is largely made up of green stuff, which has long been known to favor the churnability of milk, or, in other words, lower the proper churn temperature. It was also demonstrated that the feeding of cotton seed and cotton seed meal results in much firmer butter, a point of great importance in this latitude, on account of standing heat in shipping, and that the quality of butter, although lighter in color, is not injured unless a too large proportion of cotton seed or cotton seed meal be used. It was further shown by numbered samples submitted to several butter experts, that with equally skillful handling there is no practical difference in the quality of sweet cream butter and butter made from acid cream. The results of our later tests prove conclusively that effectiveness in gravity creaming is limited to the milk from cows comparatively fresh in milk. With cows advanced in milk more than three or four months since calving the gravity method, even under so-called "best" conditions, setting in cans surrounded by water at 45 degrees Fahr., failed to secure the cream closely. Our tests and practical experience have shown conclusively that no man who keeps as many as twelve to fifteen cows constantly in milk can afford to be without a hand separator. The extra amount of butter obtained in a single year from its use over that by gravity will nearly or quite pay for the machine. Its effectiveness is limited to no particular "conditions" of food or length of time since calving, but when properly handled it takes out the butter fat uniformly and to within a very small per-cent—practically all.

We were satisfied that the Joint Stock Creamery Companies organized in Texas were putting altogether too much money into expensive plants for handling a small business. Our Bulletin No. 5 gave spe-

cial warning to parties who contemplated investing in such enterprises and gave at the same time full and explicit instructions regarding cheap and effective creamery plant with detail drawings, specifications and carefully estimated cost. The warning thus sent out and the opinions then expressed proved particularly timely and correct in every respect, as shown by the fact that almost without exception the larger, expensive plants organized and carried on against our advice have since failed and have either been sold at nominal figure for private use or are standing idle to-day.

In feeding steers for beef the most satisfactory method for feeding in small compass was found to be dehorning and running loose in small pens under shelter. The best food rations for this latitude under conditions noted were found to be cotton seed meal and hulls and cotton seed and ensilage, the latter giving the cheapest food per pound gain, while the former gave the greatest gain without regard to cost. The addition to the cotton seed meal and hulls ration of either corn meal, hay, ensilage or cheap molasses increased the total gain over cotton seed meal and hulls alone—molasses giving the best results. After feeding for some time on a certain ration a change of feed gave much better results, both as to total gain and cost per pound. The use of corn meal with ensilage was not profitable, much better results being reached by using boiled cotton seed or cotton seed meal with ensilage.

The disease of cotton commonly known as "cotton root rot" or "cotton blight" was found to be caused by a fungoid parasitic growth known to botanists as *Ozonium auricomum*: it is infectious and the only remedy thus far known to be effective is rotation of crops.

It was found that the LeConte and Keiffar pear trees do better on their own roots. The LeConte especially does better in well drained clay land, and either of these varieties is little subject to blight when grown on well drained land. If the LeConte be grown on the French Stock at shallow depth the stock invariably outgrows the scion and forms an ugly excrescence at the point of union downward. If set deep enough either of these varieties will throw out roots from the scion to support itself and eventually kill and throw off entirely the French Stock depending on its own roots instead.

It was found that the best treatment for wounds caused by the larvæ of the so-called "screw worm fly" (*Comptosmyia macellaria*) is the free use of Cresylic ointment or some similar preparation, killing the "worms" and healing the wound without trouble except in serious cases.

In regard to sorghum for forage it was found better to let it mature before cutting. The saccharine varieties are much better than the non-saccharine. Sorghum removes more mineral matter from the soil than either corn or wheat, but it is an excellent soiling crop, especially for cows in milk and compares favorably in its digestibility with corn except in albuminoids. As ensilage sorghum is also excellent although not so good a crop for this purpose as corn. Good sorghum ensilage we rank second to corn ensilage only, for practical feeding and for soiling purposes we place sorghum first beyond question. It was also found by comparative analyses that

there is little difference between the several varieties of saccharine sorghum.

Our work regarding the influence of climate on the composition of corn, while continued but one year, indicates without proving that Southern grown corn is richer in albuminoids and fats than that Northern grown.

In the digestion experiments it was found that cotton seed hulls have an average digestibility of the dry matter of about 42.4 per-cent distributed as follows: fat 73.8 per-cent, fiber 51.8 per-cent, carbohydrates 31.8 per-cent, protein 5 per-cent. The digestibility of corn fodder was found to be 59.7 per-cent for dry matter distributed as follows: Fat 71.2 per-cent, fiber 71.4 per-cent, carbohydrates 62.2 per-cent, protein 55.4 per-cent. It was found that tile drainage for cabbage and Irish potatoes on land with heavy clay sub-soil gives results strongly in favor of drainage. The cost was found to be per linear rod of drain, using standard two-inch round tile, costing on track at our station \$22.00 per M.:

At 20 inches deep.....	\$0 88
At 30 " "	1 12
At 48 " "	2 17

WORK UNDER WAY.

The work at present under way covers the following subjects: The feeding of cotton seed and its products to hogs—noting the effect on health, rapidity of gain and cost per pound; with tests as to best method of preparation for feeding—especially with reference to the comparatively new method of roasting the seed which has lately been so strongly advocated. While we are not yet ready to publish results, the following warning has been furnished the agricultural press as a matter of common protection pending further trial:

“ * * * * * Let me say to all who intend feeding cotton seed meal to hogs—look out for spoiled meal. Just what it is that causes the trouble we have not yet determined, but the fact remains that we have succeeded this winter in killing hogs very effectively by feeding a very moderate ration of cotton seed meal mixed with corn meal and skim milk, and the hogs allowed an additional weight of shelled corn each day equal to the combined weight of the cotton seed meal and the corn meal. The only trouble that we could see with the meal is that it is ‘off color’ just a trifle—and certainly not enough to be rejected for spoiled meal, by any means.

We are working on the question in all its phases and results will be made known through our Bulletins. I may also state that *we have this winter killed hogs by feeding roasted cotton seed.* I make the statement at this time in order that your readers may be apprised of a certainly possible danger in feeding roasted seed to hogs. * * * ”

We are further working on methods of preventing or curtailing the ravages of the weevil in corn and the boll and leaf worms in cotton; investigation of plant diseases, especially of cotton blight or root rot, and methods of preventing same; investigation of animal diseases, especially splenic fever and the damage done by the internal parasite known as “liver fluke;” study of effect on composition of corn of the practices of pulling and topping for fodder, with accurate figures regarding actual cost of labor and value of total product obtained in each case; fertilizer tests on cotton and corn; rotation of crops as compared with single successive cropping; practical investigation of simple methods of exterminating Johnson grass and simi-

lar plants; study of cost and benefits of tile drainage; feeding value of ensilage and soiling crops as compared with dry or cured forage; further study of food effect on milk and butter and the separation of cream and churning; systematic study of soils of the different geologic formations of the State; variety tests of all kinds of fruit and vegetables, prevention of rust in grain; mulching as compared with shallow clean cultivation for summer; comparative values of the different food rations for milk, beef and pork; study of wools of the different breeds of sheep with food effect thereon; limit to which the use of commercial fertilizers may be profitably carried on the ordinary farm; retention of fertilizing elements by different soils; chemical analyses of certain grasses and forage plants at different stages of growth; early compared with late planting for corn and cotton; continuous cultivation during summer for cotton as compared with the practice of cultivating only after rain; variety tests of grains and fiber plants, and other matters incidental to the foregoing which it is not necessary to enumerate.

INVENTORY OF PROPERTY.

The improvements of a permanent nature, as shown by inventories on file in the Treasurer's office, are as follows:

Three silos and engine room, valued at.....	\$1500 00
Cattle sheds and yards, "	500 00
Half interest in the creamery, "	600 00
" " " conservatory "	300 00
Two laborers' cottages, "	350 00
Addition to mule barn, "	250 00
Permanent drainage, "	500 00
Cistern at barn, "	250 00
Shed for hogs, "	150 00
Part of bull barn, "	100 00
Pasture fence, "	150 00
<hr/>	
Total valuation of permanent improvements,....	\$4650 00
Machinery, tools, etc., valued at.....	\$ 1508 50
Live stock (including work stock).....	2505 00
Fertilizers and foodstuff on hand.....	140 25
Office fixtures and supplies.....	459 50
One-half interest in creamery equipment.....	542 25
Drain tile on hand.....	65 00
Veterinary apparatus and supplies.....	220 71
Chemical apparatus and supplies.....	695 00
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Total valuation of station property.....	\$10,786 21

FINANCIAL STATEMENTS BY YEARS.

The money received from the Hatch fund and all other sources has been expended year by year, as shown by the Treasurer's statements published in the Annual Reports of the Director of the Experiment station, as follows:

1887-88.

Texas Agricultural Experiment Station in account with United States Treasury Department, for the year ending June 30, 1888.

May 26 to cash from U. S. government.....	\$ 7500 00	
April 28 to cash from U. S. government.....	3750 00	
July 24 to cash from U. S. government.....	3750 00	
“ by cash for labor.....		\$ 717 85
“ “ for seeds and plants.....		342 42
“ “ for fertilizers.....		653 35
“ “ for equipment.....		4210 80
“ “ for office supplies.....		650 14
“ “ for expense.....		120 88
“ “ for printing.....		35 00
“ “ for salaries.....		2256 01
“ “ for drainage.....		253 10
“ “ for fencing.....		321 46
“ “ for live stock.....		2673 76
“ “ for buildings.....		2960 23
“ “ for student labor.....		32 50
Balance.....		227 50
		<u>\$15,227 50</u>
		<u>\$15,227 50</u>

1888-9

Texas Agricultural Experiment Station, in Account with U. S. Treasury Department, for the Year ending June 30, 1889.

June 30, 1888—By balance.....		\$227 50
March 1, 1889—To amt. received from A. and M. College, balance.....	\$227 50	
	<u>\$227 50</u>	<u>\$227 50</u>
Oct. 3, 1888—To cash, U. S. apportionment.....	\$ 3750 00	
Jan. 3, 1888—To cash, U. S. apportionment.....	3750 00	
Apr. 1, 1888—To cash, U. S. apportionment.....	3750 00	
July 4, 1888—To cash, U. S. apportionment.....	3750 00	
By cash for labor.....		\$ 2018 75
“ equipment.....		521 86
“ seeds and plants.....		329 48
“ fertilizers.....		10 24
“ office supplies.....		10 52
“ expense.....		143 56
“ printing.....		479 89
“ salaries.....		9131 37
“ drainage.....		54 10
“ live stock.....		607 62
“ buildings.....		533 02
“ student labor.....		109 05
“ forage.....		965 24
“ Veterinary Department.....		85 30
	<u>\$15,000 00</u>	<u>\$15,000 00</u>

1889-90

*Texas Agricultural Experiment Station in Account with Treasury Department for
Year Ending June 30, 1890.*

	Dr.	Cr.
To Cash United States appropriation.....	\$15,000 00	
Cash sundry receipts.....	3,396 01	
<i>Balance</i>	186 53	
By balance July, 1889.....		\$ 530 96
By cash for labor.....		2567 25
" seeds and plants.....		74 85
" fertilizers.....		44 56
" equipment.....		1105 10
" office supplies.....		13 50
" expense.....		961 70
" printing.....		220 81
" salaries.....		8637 50
" forage.....		1910 69
" live stock.....		1596 00
" buildings.....		55 21
" student labor.....		21 80
" Horticultural Department.....		262 65
" Veterinary Department.....		101 00
" Agricultural Department.....		34 20
" branch stations.....		59 70
" grass station.....		72 61
" sugar station.....		312 45
	<u>\$18,582 54</u>	<u>\$18,582 82</u>

1890-91

*Texas Agricultural Experiment Station in account with United States Treasury De-
partment for the year ending June 30, 1891.*

To cash United States appropriation.....	\$15,000 00	
" Sundry receipts.....	2,168 61	
By balance July 1, 1890.....		\$ 186 53
By cash for labor.....		2543 92
" seeds and plants.....		208 82
" fertilizers.....		301 07
" equipment.....		589 89
" office supplies.....		134 06
" expense.....		635 57
" printing.....		1289 64
" salaries.....		6697 68
" drainage.....		147 07
" live stock.....		2833 44
" buildings.....		178 76
" chemicals.....		140 89
" Texas fever experiments.....		902 31
" cotton root rot investigations.....		51 40
<i>By balance</i>		327 26
	<u>\$17,168 61</u>	<u>\$17,168 61</u>

It has been the policy of the Station authorities to extend the field of work in legitimate investigation as fast as funds would permit, and branch stations have been started at each of the following places on an economical scale: McGregor, McLennan county, Prairie View, Waller county, and Harlem, Fort Bend county. On account

of lack of funds it became necessary to drop the work temporarily at all of these branches except the McGregor station where work is now under way and will be carefully watched and reported on.

The Station workers are active in their efforts to curtail the losses and increase the profits in all branches of legitimate farming and the hearty co-operation of all progressive, thinking farmers is most earnestly invited. We are glad to hear from farmers and stockmen of the State, and can assure those who may wish to write regarding matters of local or extended interest that their suggestions are frequently of very great value to us in our work.



LIST OF PUBLICATIONS TO AUGUST, 1891.

Bulletins issued since receiving benefit of Hatch Fund.

(Mailed free on application.)

- BULLETIN No. 1. March, 1888.—Plan of organization. (A number on hand.)
- BULLETIN No. 2. May, 1888.—Cattle feeding; value of cob and shuck in feeding corn, cob and shuck ground together. Analyses of food-stuffs and fertilizers. Statements of Director, Horticulturist and Meteorologist. (A number on hand.)
- BULLETIN No. 3. October 1888.—Grasses and forage plants; descriptive notes. (Edition exhausted.)
- BULLETIN No. 4. December, 1888.—Root rot of cotton, or "Cotton blight;" preliminary Bulletin. (Edition exhausted.)
- BULLETIN No. 5. March, 1889.—Creameries for Texas; plans and specifications in full for cheap and effective creamery building and outfit. Some points in butter making. (A number on hand.)
- BULLETIN No. 6. June, 1889.—Cattle feeding; effects of dehorning, shelter and different rations. Analyses of ensilage. (A number on hand.)
- BULLETIN No. 7. November, 1889.—Cotton root rot (cotton blight), concluded from Bulletin No. 4. (A large number on hand.)
- BULLETIN No. 8. December, 1889.—Diseases of grapes. Notes on varieties: grapes, strawberries, blackberries and grasses. Best varieties of fruits for the different sections of the state. List of fruits grown on Experiment Grounds. (A large number on hand.)
- BULLETIN No. 9. May, 1890.—Pear stocks. Illustrations showing manner of growth and union of scion and stock. Some parasitic fungi of Texas. (Edition exhausted.)
- BULLETIN No. 10. May, 1890.—Cattle feeding; comparison of different rations for profitable feeding. Continuation of the work reported in No. 6. (A number yet on hand.)
- BULLETIN No. 11. August, 1890.—Effect of cotton seed and cotton seed meal on butter product. Quality of sweet cream butter as compared with butter made from acid cream. (Edition exhausted.)
- BULLETIN No. 12. September, 1890.—The screw worm; life-history, description and illustrations of the insect in all stages, and treatment for wounds. (A number on hand.)
- BULLETIN No. 13. December, 1890.—Sorghum for forage; digestibility, different varieties, analyses at different stages of growth, etc. Teosinte. Miscellaneous analyses. (A number on hand.)
- BULLETIN No. 14. March, 1891.—Effect of cotton seed and cotton seed meal in the dairy ration on gravity and centrifugal creaming of milk. (A number on hand.)
- BULLETIN No. 15. May, 1891.—Influence of climate on composition of corn. Digestibility of Southern food-stuffs, as cotton seed hulls and corn fodder. Analyses of ash and of roasted cotton seed. (Edition exhausted.)
- BULLETIN No. 16. June, 1891.—Drainage experiments with cabbage, Irish potatoes, and strawberries. Forest trees succeeding in this section of the state. (A limited number on hand.)

NOTE.—The "Old Series" of Bulletins issued by the Agricultural Department of the College prior to the establishment of the Experiment Station in 1888, comprises: No. 1, Preliminary statements; No. 2, Pig feeding, tests of age and breed, dairy tests; No. 3, Effect of salt in pig feeding, notes on grasses; No. 4, Acclimating cattle (Texas fever); No. 5, Acclimating cattle, fertilizer tests, feeding cooked vs. uncooked food for cows and hogs.

Of these Nos. 2 and 4 are practically exhausted, but there is yet on hand a limited number, each, of Nos. 1, 3 and 5—copies of which will be mailed on receipt of postage—one cent for each copy requested.