BULLETIN NO. 5. NEW SERIES.

Agricultural Experiment Station,

OF THE

Agricultural and Mechanical College,

Auburn, Ala., - - - April, 1889.

Contents:

BROWN PRINTING CO., Montgomery, Ala.

BULLETIN NO. 5,

Agricultural Experiment Station,

Agricultural and Mechanical College,

AUBURN, ALA. - - - - - - APRIL, 1889.

BOARD OF VISITORS.

COMMITTEE OF TRUSTEES ON EXPERIMENT STATION:

HON. J. G. GILCHRIST,....HON. R. F. LIGON,....HON. J. B. MITCHELL.

BOARD OF DIRECTION.

W. L. BROUN.....President
J. S. NEWMAN.....Director and Agriculturist
N. T. LUPTON.....Vice-Director and Chemist
†P. H. MELL.....Botanist
‡———— .....Biologist

ASSISTANTS:

ISAAC ROSS....1st Assistant Agriculturist, charge of Live Stock & Dairy
JAS. CLAYTON.....Second Assistant Agriculturist
J. T. ANDERSON, PH. D .....First Assistant Chemist
L. W. WILKINSON, M. SC.....Second Assistant Chemist
P. L. HUTCHISON.....Third Assistant Chemist
T. D. SAMFORD, B. SC.....Assistant Botanist

†Prof. Mell has also charge of Meteorological Observations.
‡To be filled.

COTTON—Experiments with Fertilizers—Comparison of Varieties—on different Soils.

J. S. NEWMAN, Agriculturist.

The object of the several sets of experiments with cotton, which follow, was to inquire how much reserve force remained from previous applications of commercial manures to sandy soil which has no retentive clay within three feet of the surface.

Cotton was planted in 1888, *without manure*, upon plats to which different elements and combinations of elements of plant-food had been applied in 1886 and 1887. Comparison of results of 1888 with those of 1886 and 1887 can be made only in the seed cotton, since facilities for ginning the plots separately were not secured until 1888. It will be observed that the principal loss in seed cotton occurred where the different sources of nitrogen were applied.

No difference in the per cent. of lint worthy of comment occurs, except where kainit had been applied and where no manure was used in 1887.

EXPERIMENTS WITH COTTON. OBJECT: To compare effects of different Fertilizers.

No. of Plat.	FERTILIZERS APPLIED IN 1886 AND 1887.	Results in 1888.			1886	1887
		Yield of seed cotton per acre in pounds.	Yield of lint cotton per acre in pounds.	% Lint.	Yield of seed cotton in 1886 in pounds.	Yield of seed cotton in 1887 in pounds.
1	420 lb E. S. Phosphate	301.87	98 31	32.57	240.62	422.30
2	420 lb Kainit	319.37	120.21	37.64	373.97	363.20
3	210 lb Nitrate of Soda	345.62	110.39	31.94	288.75	420 00
4	140 lb Sulphate of Ammonia	385.00	118.15	30.95	424.37	522.13
5	105 lb Muriate of Potash	520 62	157.48	30.25	352 10	450 10
6	420 lb Cotton Seed Meal	376.25	118.10	31.39	411.25	667.30
7	210 lb Blood	297.50	100.61	33.82	315.00	448.70
8	420 lb E. S. Phosphate and 420 lb C. S. Meal	371.87	115.83	31.15	402.50	603.1
9	420 lb E. S. Phosphate, 420 lb C. S. Meal, and 105 lb Muriate of Potash	424 37	131.21	30 9-	402.50	599.60
10	420 lb E. S. Phosphate and 105 lb Muriate of Potash	315.00	99.38	31 55	297.50	380.10
11	No manure	328.12	63.32	19.30	227.50	163.12

INQUIRY AS TO PROPER RATIO BETWEEN PHOS. ACID AND NITROGEN.

In this experiment the quantities of phos. acid and potash are constant, while the nitrogen varies so as to give the following ratios between the nitrogen and phosphoric acid, from the two sources, dried blood and cotton seed meal:

The ratios are—

1	lb.	nitrogen	to 1	lb.	phos. acid.
1	"	"	to 2	"	"
1	"	"	to 4	"	"
1	"	"	to 6	"	"
1	"	"	to 8	"	"

The smaller quantity of nitrogen applied seemed to furnish as much as the plant with its environments could take up, and the plant seemed indifferent as to the sources from which it derived it. There seemed to be a certain degree of cumulative force in 1887, which was lost by failure to renew by additional applications in 1888. The quantity of nitrogen applied seems not to have affected the relations between the weight of seed and that of the lint.

See tabulated statement on next page.

RATIO BETWEEN NITROGEN AND PHOS. ACID.

No. of Plat.	Fertilizers Applied in 1886 and 1887.	Results in 1888			1886	1887
		Yield of seed cotton per acre in pounds.	Yield of lint cotton per acre in pounds.	% of Lint.	Yield of seed cotton per acre in pounds.	Yield of seed cotton per acre in pounds.
1	420 lb E. S. Phosphate, and 105 lb Muriate of Potash	472.50	104 32	22.08	402 50	531.90
2	420 lb E. S. Phosphate, 350 lb Blood, and 105 lb Muriate of Potash	520.62	129.01	24.7-	376.25	706.90
3	420 lb E. S. Phosphate, 280 lb Blood, and 105 lb Muriate of Potash	425.00	133.57	31.43	411.25	592 13
4	420 lb E. S. Phosphate, 210 lb Blood, and 105 lb Muriate of Potash	389.37	124.67	32.02	345.62	557.13
5	420 lb E. S. Phosphate, 140 lb Blood, and 105 lb Muriate of Potash	393.12	126.31	32.13	354.37	529.60
6	420 lb E. S. Phosphate, 70 lb Blood, and 105 lb Muriate of Potash	393.75	127.89	32.48	332.50	463.12
7	420 lb E. S. Phosphate, 840 lb C. S. Meal, and 105 lb Muriate of Potash	433.12	141.06	32.57	459 37	680 50
8	420 lb E. S. Phosphate, 560 lb C. S. Meal, and 105 lb Muriate of Potash	281.37	88.58	31.15	367.50	573.20
9	420 lb E. S. Phosphate, 420 lb C. S. Meal, and 105 lb Muriate of Potash	450 62	141.72	31 45	329.52	599.60
10	420 lb E. S. Phosphate, 280 lb C. S. Meal, and 105 lb Muriate of Potash	288.75	84.17	29.15	321.47	517.80
11	420 lb E. S. Phosphate, 140 lb C. S. Meal, and 105 lb Muriate of Potash	385.00	76.53	19.88	297.50	612.80

THREE FORMS OF PHOSPHORIC ACID.

In 1886 each of the forms of phosphoric acid was applied to two adjacent plats without nitrogen.

In 1887 the same quantities of the phosphoric acid in the three forms, viz: Acid soluble (insoluble), citrate soluble (reduced), and water soluble (soluble), were applied each to one plat, and nitrogen, in cotton seed meal, applied to each of the other plats.

In 1888 all of the plats were planted without manure.

These results indicate very little leaching of the phosphoric acid and a cumulative effect of the floats.

The results in 1888, without additional application, uniformly exceed those of 1886, when the phosphates were first applied, and in No. 1, to which only floats have been applied, yielded more as the effect of the reserve force than in either previous year.

PHOSPHORIC ACID SET.

	Fertilizers Applied in 1887.	Results in 1888.			1886	1887
		Yield of seed cotton in lbs.	Yield of lint cotton in lbs.	% of Lint.	Yield of seed cotton in lbs.	Yield of seed cotton in lbs.
1	420 lbs. Floats	476.87	151.88	31.85	271 25	395.50
2	420 lbs. Floats and 420 lbs. C. S. Meal	472 50	153.09	32.40	336.87	710 50
3	420 lbs. Reduced Phosphate	494.37	120.28	24.33	446.25	568.12
4	420 lbs. Reduced Phosphate and 420 lbs. C. S. Meal	363.12	*55.63	*15.32	354.62	376.40
5	420 lbs. E. S. Phosphate	328.12	118.72	36.00	328.75	363.20
6	420 lbs. E. S. Phosphate and 420 lbs. C. S. Meal	380.62	102.69	26.98	266.87	435.15
7	420 lbs. Floats and 420 lbs. air-slaked Lime	389.37	108 12	27.77	266.87	374.10
8	420 lbs. Floats and 420 lbs. C. S. Meal	341.25	87.49	25 64	280.00	465.50
9	No manure	310 62	66.66	21.46	231 87	282 30

*Evident error.

WILL LIME INCREASE THE EFFICIENCY OF THE PHOSPHATES?

Several years since the opinion was expressed by several agricultural experimenters of national reputation, that the addition of air-slaked lime would increase the activity of acid phosphates. This opinion seemed to be in conflict with the fact that the phosphates have not been uniformly profitable upon calcarious soils. To make practical inquiry into the matter, air-slaked lime was mixed in the drill with both Floats (powdered raw phosphate) and acid phosphate. This was commenced in 1886, repeated in 1887, and cotton planted on the plats without addition of manure in 1888. Note results of plat 7 in the last tabulated statement, where the lime was used with floats, and compare with plat 1 in the same table. Below are results of its use with acid phosphates. It seems not to have produced the effect claimed for it.

AIR-SLAKED LIME AND PHOSPHATE.

	Fertilizers Applied in 1886 and 1887.	Results in 1883. Yield of seed cotton in lbs.	Yield of lint cotton in lbs.	% of lint.	1886 Yield of seed cotton in lbs.	1887 Yield of seed cotton in lbs.
1	420 lbs. E. S. Phosphate and 420 lbs. air-slaked Lime	328.12	58.96	17.97	266.25	266.14
2	240 lbs. E. S. Phosphate	354.37	77.50	21.87	240.62	258.20

FLOATS WITH DIFFERENT SOURCES OF NITROGEN.

	Fertilizers Applied in 1887.	Results in 1888. Yield in seed cotton per acre in lbs.	Yield in lint cotton in lbs.	% of Lint.	1886 Yield in seed cotton in lbs.	1887 Yield in seed cotton in lbs.
1	420 lbs. Floats and 210 lbs. Nitrate of Soda	166.25	49 16	29.57	202.50	413.70
2	420 lbs. Floats and 140 lbs. Sulph. of Ammonia	170.62	50.21	29 43	262.50	367.80
3	420 lbs. Floats and 210 lbs. Blood	205.62	63.33	30.80	262.50	361.40
4	420 lbs. Floats and 420 lbs. C. S. Meal	188 12	55.64	29.58	236.26	405.15

FLOATS AND ACID PHOSPHATE COMPARED IN COMBINATION WITH NITROGEN AND POTASH.

	Fertilizers Applied in 1886 and 1887.	Results in 1888.			1886	1887
		Yield of seed cotton per acre in lbs.	Yield of lint cotton per acre in lbs.	% of Lint.	Yield of seed cotton in lbs.	Yield of seed cotton in lbs.
38	420 lbs. Gossypium	227.50	76 46	33.61	371.87	306.40
39	420 lbs. Floats and 420 lbs. Kainit	253.75	78.73	31.03	240 62	280.00
40	420 lbs. Floats and 420 lbs. C. S. Meal	350.00	111.47	31.85	350.00	387.30
41	420 lbs. Floats, 420 lbs. C. S. Meal and 420 lbs. Kainit	297.50	95.02	31.94	428.75	519.10
42	420 lbs. E. S. Phosphate and 420 lbs C. S. Meal	358.75	74 36	20 73	433.12	461.90
43	840 lbs. Compost	122.50	40.42	33.00	236.25	445.10
44	No manure	175.00	54.60	31.20	93 75	161.14

CAN IMPROVED METHODS AND THE USE OF FERTILIZERS INCREASE THE PROFITS OF COTTON CULTURE UPON VERY POOR SANDY LANDS?

By order of the Board of Trustees this inquiry was made upon ten acres in a body, taken without regard to topography of the land or quality of the soil. These were thoroughly prepared, well fertilized and carefully cultivated. The fertilizers applied were 1,000 lbs. of compost of cotton seed, stable manure and phosplate and two hundred lbs. of cotton seed meal and acid phosphate, equal parts of each, per acre, at a cost of seven dollars per acre. These were applied in the drill. One acre of the same average quality as the ten, and adjoining the latter, was planted without manure, for comparison. The cotton on the ten acres grew off beautifully, but in consequence of heavy leaching rains upon the coarse deep sand it began to blight in June and was dead upon nine acres early in August. About one acre lying near a branch continued to fruit until September.

In consequence of the blight, not only did production cease in August, but many bolls already formed failed to mature. The unmanured acre being later was not so early nor so seriously affected.

Both were cultivated entirely with heel scrape. Owing to the frequency of rains, the cotton was plowed once oftener than usual.

An examination of the statements which follow will reveal the fact that the difference in value over cost of production per acre on manured and unmanured land is $5.96, which is attributable to the use of the manure, which cost seven dollars per acre, just three times the usual cost,—and yet we find here the increase resulting from the use of the manure pays 85 per cent. profit upon its cost.

TEN ACRE COTTON EXPERIMENT.

[STATEMENT OF EXPENSE AND PROFIT.]

Cost of breaking land	$ 8 75
" opening and bedding land	13 12
" planting cotton	2 50
" first plowing	5 00
" second plowing	5 00
" third plowing	5 00
" fourth plowing	2 50
" chopping cotton	8 00
" second hoeing	6 00
" fertilizer	70 00
" scattering fertilizer	7 00
" picking cotton	29 01
Total expense	$161 88
Total yield of seed cotton	7,253 lbs.
Value of entire crop	$241 76

Summary:

Value of entire crop	$241 76
Total cost of production	161 88
Profit	$ 79 88

Profit on cost, 49 per cent.

ONE ACRE COTTON EXPERIMENT.

[STATEMENT OF EXPENSE AND PROFIT.]

Cost of bedding land	$1 25
" opening and covering seed	0 69
" planting seed	0 20
" first plowing	0 62½
" second plowing	0 62½
" third plowing	0 62½
" fourth plowing	0 62½
" fifth plowing	0 18½
" chopping cotton	0 80
" second hoeing	0 60
" picking cotton	1 12
Total expense	$7.345
Yield of seed cotton	281 lbs.
Value of crop	$9.366

Summary:

Value of crop	$9.366
Total cost of production	7.345
Profit	$2.021

Profit on cost, 27 per cent.

VARIETIES OF COTTON.

Eleven distinct varieties of cotton were planted for the purpose of comparing their productiveness, quality of lint, &c. As full stands were not secured upon some of the plats, the yield is given per plat and per hill. It was planted in hills 3 by 4 feet. One hundred bolls were picked and weighed at four different times from each variety, the average of which is given in the table. The product of each variety was weighed in the seed, carefully ginned and the lint weighed.

A sample of the lint of each variety was reserved and carefully wrapped and sent to Mr. C. E. Porter of Opelika, who is an expert classifier of cotton. The names of the varieties were not given Mr. Porter, but the samples merely numbered. Mr. Porter's report, in connection with the following tabulated statement of results, will convey very clearly the comparative merits of the varieties.

VARIETIES OF COTTON.

No. of Plat.	NAMES OF VARIETIES.	Average weight of 100 bolls in lbs.	No. of hills to plat.	Yield of seed cotton per plat in lbs.	% of Lint.	Average yield per hill in lbs.
1	Truit	1.83	32	32.00	30.46	1.00
2	Cherry's Cluster	1.50	109	89.25	31.09	0.81
3	Hawkins' Improved	1.41	110	87.00	30.74	0.79
4	Welborn's Pet	1.41	84	75.00	29.66	0.89
5	Jones' Improved	1.58	102	80.50	31.05	0.78
6	King's Improved Prolific	1.41	112	92.00	31.52	0.82
7	Okra Cotton	1.33	122	79.50	30.81	0.65
8	Peerless	1.41	78	72.00	39.58	0.92
9	Rameses	1.41	99	86 50	28.61	0.87
10	Barnett	1.83	110	92 00	30.71	0.83
11	Zellner	1.50	101	75.50	30.46	0 74

OPELIKA, ALA., March 23d, 1889.

COL. J. S. NEWMAN, AUBURN, ALA.:

Dear Sir—Yours of 22d, also samples, received. I send you classification by the New York standard types.

No. 1 (Rameses) classes Strict Middling. Staple one-half to five-eighths inch, fibre very weak and irregular.

No. 2 (Truit) classes Middling. Staple thirteen-sixteenths inch, strong but some little waste.

No. 3 (Barnett) classes Strict Low Middling. Staple seven-eighths inch, strong and regular. Excellent spinning cotton.

No. 4 (Jones' Improved) classes Strict Low Middling. Staple one-half to three-fourths inch, irregular but good spinning cotton.

No. 5 (Zellner) classes Strict Middling. Staple three-fourths inch, strong but a little irregular, with some waste.

No. 6 (Okra) classes Strict Low Middling. Staple one-

half to thirteen-sixteenths inch, very irregular, weak and a good deal of waste.

No. 7 (King's Improved Prolific) classes Strict Low Middling. Staple seven-eighths inch and strong; fibre is very fine, but has some small cracked leaf and some waste.

No. 8 (Cherry's Cluster) classes Middling. Staple three-fourths inch, very regular and strong, not much waste, good spinning cotton.

No. 9 (Hawkins' Improved) classes Middling. Staple thirteen-sixteenths inch, rather weak but fibre is regular; sample has a flimsy appearance.

No. 10 (Peerless) classes Strict Middling. Staple thirteen-sixteenths to seven-eighths inch, fibre is fine and regular but not very strong.

No. 11 (Welborn's Pet) classes Strict Middling. Staple three-fourths inch, not strong, rather irregular and some waste.

All of these samples are very well ginned, and well matured, good white cotton.

Yours truly,

C. E. PORTER.

STUDY OF THE SOILS OF THE STATE.

For the purpose of studying the needs of the various typical soils of the State, a dozen sacks of the soil and subsoil from localities representing large areas of the State were collected and subjected to chemical and plant analysis.

Samples of both soil and subsoil were furnished the chemist, the analyses of which will be found in the report of Dr. N. T. Lupton, chemist, in this Bulletin. Bins were prepared 18 inches broad and wide and 12 inches deep, eight for each soil. In these the subsoil was first deposited and the box then filled with soil, thus restoring somewhat the natural conditions.

Different elements and combinations of elements of plant food were applied to seven of these bins, the eighth receiving nothing, as shown in the tabulated statements appended.

A cotton plant was grown in each bin and careful observations made of their development and production. All of the soils were not in place until the second week in June, when the seed were planted.

Owing to the lateness of the planting a few bins on which the seed failed could not be reported upon, as the second plantings were too late to fruit.

The results show very marked differences in the effects of the manures, and valuable *suggestions* are made by them, but *conclusions* should not be drawn from a single experiment.

Attention is invited to the results in the set in which the Thomas Scoria is used. This is a cheap source of phosphoric acid, which is a by-product from the manufacture of iron. Attention is also invited to the similar effects produced by the fertilizers upon the sandy soils of the State.

No. of Bin.	Soil from Pike County, Ala.	Date of first blossom.	Date first boll opened.	No. of open bolls to plant.	No. of unopen bolls to plant.	% open.	Total weight from each bin in ozs.	Average weight per boll in ozs.
1	¼ oz. Sulphate of Ammonia	Aug. 30.	Nov. 20	2	0	100	0.085	0.0425
2	¼ oz. Cotton Seed Hull Ash (No stand)	.....	.....	....	....	.....	....	....
3	1 oz. Acid Phosphate	Aug. 14.	Oct. 17.	8	0	100	0.818	0.101
4	¼ oz. Sulph. Ammo. and ¼ oz. C. S. H. Ash	Aug. 28.	Nov. 10.	6	1	85.7	0.712	0.118
5	¼ oz. Sulph. Ammo., ¼ oz. C. S. H. Ash, and 1 oz. Acid Phosphate	Aug. 18.	Oct. 31.	12	2	85 7	1.45	0.120
6	¼ oz. Sulph. Ammo. and 1 oz. Acid Ph.os	Aug. 20.	Nov. 12.	15	1	93.7	1 95	0.130
7	1 oz. Acid Phos. and ¼ oz. C. S. H. Ash	Aug. 16.	Oct. 29.	7	0	100	1.04	0.148
8	No manure (No stand)	.....	.....	..	..	...	.....	....

No. of Bin.	Soil from Talladega County, Ala.	Date of first bloom.	Date first boll opened.	No. of open bolls to plant.	No. of unopen bolls to plant.	% Open.	Total weight from each bin in ozs.	Average weight per boll in ozs.
1	¼ oz. Sulphate of Ammonia	Aug. 9.	Oct. 6.	20	0	100	2.294	0.114
2	¼ oz. Cotton Seed Hull Ash.	Aug. 13.	Oct. 14.	9	0	100	0.927	0.103
3	1 oz. Acid Phosphate	Aug. 12.	Oct. 2.	20	0	100	2.46	0.123
4	¼ oz. Sulph. Ammo. and ¼ oz. C. S. H. Ash.	Aug. 15.	Oct. 18.	14	0	100	2.13	0.152
5	¼ oz. Sulph. Ammo., ¼ oz. C. S. H. Ash, and 1 oz. Acid Phosphate.	Aug. 10.	Oct. 23.	15	0	100	2.10	0.140
6	¼ oz. Sulph. Ammo. and 1 oz. Acid Phosphate.	Aug. 17.	Oct. 30.	16	0	100	2.291	0.143
7	1 oz. Acid Phos. and ¼ oz. C. S. H. Ash.	Aug. 14.	Oct. 9.	16	0	100	1.70	0.106
8	No manure.	Aug. 19.	Oct. 26.	12	0	100	1.77	0.147

No. of Bin.	Soil from near Livingston, Sumter Co., Ala.	Date of first bloom.	Date first boll opened.	No. of open bolls to plant.	No. of unopen bolls to plant,	% Open.	Total weight from each bin in ozs.	Av'rage w'ght per boll in ozs.
1	¼ oz. Sulphate of Ammonia	Aug. 6.	Sept. 28.	12	0	100	2.04	0.170
2	¼ oz. Cotton Seed Hull Ash	Aug. 9.	Oct. 8.	7	0	100	0.809	0.1155
3	1 oz. Acid Phosphate	Aug. 9.	Oct. 8.	9	0	100	1.37	0.1522
4	¼ oz. Sulph. Ammo. and ¼ oz. C. S. H. Ash	Aug. 15.	Oct. 14.	13	0	100	2.19	0.168
5	¼ oz. Sulph. Ammo., ¼ oz. C. S. H. Ash, and 1 oz. Acid Phos	Aug. 9.	Oct. 8.	14	0	100	2.06	0.147
6	¼ oz. Sulph. Ammo. and 1 oz. Acid Phosphate	Aug. 1.	Sept. 26.	32	1	96.9	4.13	0.129
7	1 oz. Acid Phosphate and ¼ oz. C. S. H. Ash	Aug. 5.	Sept. 27.	22	0	100	4.16	0.189
8	No manure	Aug. 7.	Oct. 3.	33	0	100	4.20	0.127

No. of Bin.	Sandy Soil from near Citronelle, Mobile Co., Ala.	Date of first bloom.	Date first boll opened.	No. of open bolls to plant.	No. of unopen bolls to plant.	% Open.	Total weight from each bin in ozs.	Average w'ght per boll in ozs.
1	¼ oz. Sulphate of Ammonia.....(Failed to get a stand)	.....	.....	....	....	.....	.....	.....
2	¼ oz. Cotton Seed Hull Ash.	Aug. 22.	Nov. 3.	3	0	100	0.283	0.0943
3	1 oz. Acid Phosphate	Aug. 15.	Oct. 18.	7	0	100	0.748	0.1068
4	¼ oz. Sulph. Ammo. and ¼ oz. C. S. H. Ash.	Aug. 14.	Oct. 19.	5	0	100	0.720	0.144
5	¼ oz. Sulph. Ammo., ¼ oz. C. S. H. Ash, and 1 oz. Acid Phosphate.	Aug. 5.	Sept. 29.	20	0	100	2 98	0.149
6	¼ oz. Sulph. Ammo. and 1 oz. Acid Phosphate	Aug. 16.	Oct. 30	7	0	100	0.739	0.1055
7	1 oz. Acid Phosphate and ¼ oz. C. S. H. Ash.	Aug. 8.	Oct. 1.	8	0	100	1.28	0.160
8	No manure.....(Failed to get a stand)	.....	.....	....	....	.....	.....	.....

No. of Bin.	"Worn Soil" from near Auburn, Ala.	Date of first bloom.	Date first boll opened.	No. of open bolls to plant.	No. of unopen bolls to plant.	% Open.	Total weight from each bin in ozs.	Average w'ght per boll in ozs.
1	¼ oz. Sulphate of Ammonia	Aug. 14.	Oct. 14.	12	0	100	1.33	0.1108
2	¼ oz. Cotton Seed Hull Ash.	Aug. 6.	Oct. 10.	6	0	100	0.561	0.0935
3	1 oz. Acid Phosphate	Aug. 20.	Oct. 31.	6	0	100	1.02	0.170
4	¼ oz. Sulph. Ammo. and ¼ oz. C. S. H. Ash	Aug. 16.	Oct. 29.	18	0	100	2.55	0.141
5	¼ oz. Sulph. Ammo., ¼ oz. C. S. H. Ash, and 1 oz. Acid Phosphate	Aug. 17.	Oct. 16.	5	0	100	0 721	0.144
6	¼ oz. Sulph. Ammo. and 1 oz. Acid Phosphate	Aug. 18.	Oct. 16.	4	0	106	0.673	0.168
7	1 oz. Acid Phosphate and ¼ oz. C. S. H. Ash	Aug. 7.	Sept. 29.	21	0	100	3.18	0.151
8	No manure	Aug. 14.	Oct. 8.	8	1	88.8	0.920	0.115

No. of Bin.	Virgin Soil from near Auburn, Ala.	Date of first bloom.	Date first boll opened.	No. of open bolls to plant.	No. of unopen bolls to plant.	% Open.	Total weight from each bin in ozs.	Average w'ght per boll in ozs.
1	¼ oz. Sulphate of Ammonia	Aug. 18.	Oct. 18.	6	0	100	0.568	0.0946
2	¼ oz. Cotton Seed Hull Ash..	Aug. 8.	Oct. 7.	4	1	80	0.383	0 0957
3	1 oz. Acid Phosphate	Aug. 10.	Sept. 27.	10	0	100	0.965	0 0965
4	¼ oz. Sulph. Ammo. and ¼ oz. C. S. H. Ash	Aug. 17.	Oct. 7.	9	0	100	0.989	0.109
5	¼ oz. Sulph. Ammo., ¼ oz. C. S. H. Ash, and 1 oz. Acid Phosphate	Aug. 9.	Sept. 28.	11	0	100	0.660	0.060
6	¼ oz. Sulph. Ammo. and 1 oz. Acid Phosphate.	Aug. 9.	Sept. 25.	11	0	100	1.01	0.0909
7	1 oz. Acid Phosphate and ¼ oz. C. S. H. Ash.	Aug. 7.	Oct. 7.	3	0	100	0.854	0.184
8	No manure	Aug. 15	Oct. 9.	4	0	100	0.440	0.110

No. of Bin.	Red Soil from near Dadeville, Tallapoosa Co., Ala.	Date of first bloom.	Date first boll opened.	No. of open bolls to plant.	No. of unopen bolls to plant.	% Open.	Total weight from each bin in ozs.	Average w'ght per boll in ozs.
1	¼ oz. Sulphate of Ammonia	Aug. 15.	Oct. 18.	5	0	100	0.663	0.132
2	¼ oz. Cotton Seed Hull Ash	Aug. 10.	Oct. 6	9	0	100	0.909	0.101
3	1 oz. Acid Phosphate	Aug. 5.	Oct. 6	15	0	100	1.93	0.128
4	¼ oz. Ammo. Sulph. and ¼ oz. C. S. H. Ash	Aug. 9.	Oct. 3.	13	0	100	2.21	0.170
5	¼ oz. Ammo. Sulph., ¼ oz. C. S. H. Ash, and 1 oz. Acid Phosphate	Aug. 3.	Sept. 27.	18	0	100	2.61	0.145
6	¼ oz. Ammo. Sulph. and 1 oz. Acid Phosphate.	Aug. 8.	Sept. 27.	21	0	100	3.29	0.156
7	1 oz. Acid Phosphate and ¼ oz. C. S. H. Ash.	Aug. 3.	Sept. 27.	22	1	95.6	2.78	0.126
8	No manure	Aug. 15.	Oct. 14.	10	0	100	1.06	0.106

No. of Bin.	SANDY SOIL FROM NEAR DADEVILLE, TALLAPOOSA CO., ALA.	Date of first bloom.	Date first boll opened.	No. of open bolls to plant.	No. of unopen bolls to plant.	% Open.	Total weight from each bin in ozs.	Average w'ght per boll in ozs.
1	¼ oz. Sulphate of Ammonia.....(Failed to get a stand.)	.....	.....	....	....	.....	.....	.....
2	¼ oz. Cotton Seed Hull Ash.	Aug. 14.	Nov. 10.	5	2	74.1	0.885	0.177
3	1 oz. Acid Phosphate	Aug. 11.	Oct. 15.	6	0	100	0.619	0.124
4	¼ oz. Ammo. Sulph. and ¼ oz. C. S. H. Ash.....	Aug. 9.	Oct. 7.	25	0	100	3.05	0.122
5	¼ oz. Ammo. Sulph., ¼ oz. C. S. H. Ash, and 1 oz. Acid Phosphate	Aug. 11.	Oct. 18.	18	1	94.7	2.05	0.114
6	¼ oz. Ammo. Sulph. and 1 oz. Acid Phosphate.....	Aug. 12.	Oct. 10.	12	1	92.3	1.28	0.107
7	1 oz. Acid Phosphate and ¼ oz. C. S. H. Ash.	Aug. 4.	Oct. 6.	21	0	100	3.07	0.141
8	No manure.....	Aug. 18.	Nov. 3.	3	1	75	0.298	0 099

No. of Bin.	Soil from near Uniontown, Perry Co., Ala.	Date of first bloom.	Date first boll opened.	No. of open bolls to plant.	No. of unopen bolls to plant.	Per cent. open.	Total weight from each bin in ozs.	Average weight per boll in ozs.
1	¼ oz. Sulphate of Ammonia	Aug. 9.	Oct. 8.	9	0	100	1.05	0.116
2	¼ oz. Cotton Seed Hull Ash	Aug. 12.	Oct. 10.	4	0	100	0.395	0.0987
3	1 oz. Acid Phosphate	Aug. 10.	Oct. 8.	8	0	100	0 634	0.0792
4	¼ oz. Ammo. Sulph. and ¼ oz. C. S. H. Ash	Aug. 8.	Oct. 3	11	0	100	1.27	0.115
5	¼ oz. Ammo. Sulph., ¼ oz. C. S. H. Ash, and 1 oz. Acid Phosphate	Aug. 7.	Oct. 6	10	0	100	1 01	0.101
6	¼ oz. Ammo. Sulph. and 1 oz. Acid Phosphate	Aug. 11.	Oct. 1.	11	0	100	0.875	0.0795
7	1 oz. Acid Phosphate and ¼ oz. C. S. H. Ash	Aug. 7.	Sept. 29.	28	0	100	4.12	0.147
8	No manure	Aug. 6.	Sept. 30.	18	0	100	2.11	0.117

No. of Bin.	Six Mixed Soils from Butler County, Ala.	Date of first bloom.	Date first boll opened.	No. of open bolls to plant.	No. of unopen bolls to plant.	Per cent. open.	Total weight from each bin in ozs.	Average weight per boll in ozs.
1	¼ oz. Sulphate of Ammonia	Aug. 17.	Oct. 24.	9	0	100	0.793	0.0891
2	¼ oz. Cotton Seed Hull Ash	Aug. 19.	Oct. 21.	9	4	69.2	1.72	0.191
3	1 oz. Acid Phosphate	Aug. 7.	Oct. 18	35	3	92.1	4.68	0.133
4	¼ oz. Sulph. Ammo. and ¼ oz. C. S. H. Ash	(No stand)						
5	¼ oz. Sulph. Ammo., ¼ oz. C. S. H. Ash, and 1 oz. Acid Phosphate	Aug. 13	Oct. 10.	23	0	100	2 73	0 118
6	¼ oz. Sulph. Ammo. and 1 oz. Acid Phosphate	Aug. 11.	Oct. 15.	29	5	85.2	3.71	0.127
7	1 oz. Acid Phosphate and ¼ oz. C. S. H. Ash	Aug. 7.	Oct. 10.	26	0	100	3.38	0.130
8	No manure	Aug. 19.	Oct. 29.	15	0	100	2 30	0.153

Note.—For description and analysis of these soils, see report of Chemist in this Bulletin.

No. of Bin.	Worn Soil from Auburn, Ala.	Date of first bloom.	Date first boll opened.	No. of open bolls to plant.	No. of unopen bolls to plant.	Per cent. open.	Total weight from each bin in ozs.	Average weight per boll in ozs.
1	1 oz. Thomas Scoria.	Aug. 16.	Oct. 15.	9	0	100	0.591	0.0656
2	1 lb. Marl	Sept. 5.	Oct. 2.	2	0	100	0.203	0.1015
3	1 lb. Marl and ¼ oz. Ammonium Sulphate	Sept. 7.	Oct. 5.	3	0	100	0.333	0.111
4	1 oz. Thomas Scoria and ¼ oz. Sulph. Ammo.	Aug. 24.	Nov. 4.	3	0	100	0.422	0.1406
5	1 oz. Thomas Scoria and ¼ oz. Cotton Seed Meal..	Sept. 3.	Nov. 26	7	0	100	0.909	0 1296
6	No manure.	Sept. 3.	.....	0	7	000	.....	.....

FEEDING PIGS FOR PORK PRODUCTION.

Six Essex pigs, 12 to 14 months old, that had grown fat upon field peas, ground peas and sweet potatoes, gleaned from the fields, were put into separate pens on the 17th December, 1888, and each given as much corn as he would eat, as a preparatory period to detect individual peculiarities and to learn accurately the producing power of whole corn fed wet. The pigs were already fat enough when put up, and by the second period, in which each was fed differently as shown in the accompanying tabulated statement, were excessively fat.

This being true, their capacity for laying on additional fat was reduced.

The gradually diminishing ratio of increase from the first to the last period indicates that the profits of feeding diminish with increased fatness. This is especially shown in No. 1, which was fed continuously upon corn. It would not be just to make any charge for the ground peas, field peas, sweet potatoes or buttermilk, since these as ordinarily consumed by hogs on the farm are waste products, which would be largely lost if not consumed by swine. This is especially true of the ground peas, sweet potatoes and field peas which are gleaned from the fields by swine and converted into pork.

The condition of the pigs when fed upon these products renders a repetition of the experiment upon pigs not so far advanced in fatness. A box with a trap door at each end, and a sliding door to each pen, rendered weighing very convenient without unnecessary excitement to the pig. An attempt was made in the second period to feed cotton seed meal, but the pig refused to eat it.

The pigs were butchered 21st January. Gross and net weight of each is given in the tabulated statement. To ascertain the loss sustained in curing, the hams from each pig were weighed before salting, when taken up for hanging, and 28th March, after being smoked for 34 days, with results shown in accompanying table.

EXPERIMENTS WITH SWINE,

TO COMPARE EFFECTS OF DIFFERENT FEED STUFFS.

Hog No.	Food Eaten.	Weight of Hogs at beginning of period.	Weight of Hogs at end of period.	Gain of Pork.	Pounds of food to one of Pork.	Gross weight of Hogs at end of experiment.	Net weight at end of experiment.	Net per cent.
	First Period—15 days.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	
1	119.2 lbs. Corn.....	183	221	38	3.13	250	200	80.0
2	119.2 "	188	222.5	34.5	3.45	238	186.75	78.4
3	134.8 "	161 5	196	34.5	3 90	210	167	79.5
4	119.2 "	173	202	29	4.11	217	167.25	77.0
5	134.8 "	207	247	40	3 37	284	232.50	81.8
6	119.2 "	174	200	26	4.58	218	176	80.7
	Second Period—15 days.							
1	116 lbs. corn.....	221	246	25	4.64	.....	.....	....
2	79 " peas.....	222.5	236	13.5	5.85	.....	.....	....
3	246 " potatoes.....	196	211	15	16.44	.....	.....	....
4	92 " ground peas.....	202	212	10	9.20	.....	.....	....
5	42 " gr. peas, 81 lbs. corn.	247	276	29	3.24	.....	.....	....
6	129 lbs. potatoes, 264 butt'rmilk	200	212	12	32.75	.....	.....	....

EXPERIMENTS WITH SWINE—TO COMPARE EFFECTS OF DIFFERENT FEED STUFFS—Continued.

Hog No.	Food Eaten. Third Period—(6 Days.)	Weight of Hogs at beginning of period.	Weight of Hogs at end of period.	Gain of Pork.	Pounds of Food to one of Pork.	Weight of Hams. Green.	When hung for smoking.	After smoking, 28th March.	Loss in Curing.
		lbs.	lbs.	lbs.	lbs.	lb. oz.	lb. oz.	lb. oz.	lb. oz.
1	48 lbs. corn	246	250	4	12	17 8	16 4	15 4	2 4
2	36 " peas	236	238	2	18	15 6	15 0	13 10	1 12
3	120 " potatoes	211	210	1 loss.	.....	13 8	13 0	12 0	1 8
4	36 " ground peas	212	217	5	42.4	14 2	13 6	12 6	1 12
5	24 " ground peas and 36 lbs. corn	276	284	8	34.5	21 0	20 2	18 5	2 11
6	60 " potatoes and 120 lbs. buttermilk	212	218	6	35.33	14 6	13 12	13 0	1 6

TURNIPS.

KEEPING QUALITIES OF VARIETIES.

Twenty-five varieties of turnips, grown last fall, were gathered and banked in the open ground December, 1888, covered with pine straw, corn stalks and earth, as sweet potatoes are banked.

All were opened 28th March, 1889, and the following notes made after a careful examination:

VARIETIES.	CONDITION.
Amber Globe Strap-leaf	Partly rotted and pithy.
Aberdeen, or Scotch Yellow	" " "
Cow Horn	Sound but pithy.
Early White Egg	Sound, brittle and sweet.
Early Snowball	Rotted.
Early Flat Dutch Strap-leaf	Sound but very pithy.
Earliest Bloomsdale Red-top	Sound but slightly pithy.
Golden Rose	Sound but very pithy.
Landreth's Snow White Globe	Pithy and commencing to rot.
Large Early Red-top Globe	Badly rotted.
Milan Strap-leaf	Pithy but sound.
Norfolk	Rotted.
Purple-top Strap-leaf	Very pithy but sound.
Purple-top Munich	Sound but very pithy.
Pomerarian White Globe Strap-leaf	Rotted.
White Globe Strap-leaf	Pithy and beginning to rot.
White Globe	Rotted.
White Stone	Rotted.
RUTA BAGAS.	
Bloomsdale Swede Imp'd Purple	Pithy and beginning to rot.
Champion Swede	Sound but pithy.
Improved Yellow Purple-top	Sound and brittle—perfect.
Long French	" " "
Prussian	" " "
Sweet German	" " "
White flesh'd Purple-top White Swede	" " "

The yield of these varieties was reported in Bulletin No. 3, New Series.

DESCRIPTION OF BARNS AND DAIRY—FEEDING EXPERIMENTS.

By Isaac Ross, First Assistant Agriculturist, in Charge of Dairy and Live Stock.

This being the first report since the establishment of this department, I deem it not amiss to give to the public a short description of the plan of the Barn, Dairy, Ice House, &c.

The barn for the cattle is built of yellow pine, 40 by 60 feet, 9 feet from floor to joist; through the middle and running the long way is an alley, or passage, 8 feet wide and floored. On the right, as you enter the barn from the front, is an office 10 by 12 feet, furnished with desk, table, chairs, clock, stove, etc., on the left, a room of the same size, containing three feed-bins with tight covers, and scales for weighing milk. This room is also used for the milkers to prepare themselves for milking.

On either side of the alley there are nine stalls 4 ft. wide; in rear of, and running the entire length of the stalls, is a waste trough to catch both liquid and solid manure, and by the use of an absorbent all is saved.

At the end of the alley is a large comfortable box-stall for calving cows.

The floor is of cement from outer walls to feed trough, and sliding glass windows are on both sides. There are two large doors in the back end of the barn through which the cattle enter, and double doors in front with ventilator overhead, thus securing plenty of fresh air during summer, and warm stable during the winter. The building is neatly painted.

The dairy is built of same material as barn, except in the rear where cutting into the side of a hill rendered a brick wall necessary. It is 16 by 20 feet, 10 feet from floor to ceiling, with partition across the long way, thus dividing the building into two rooms. The front room is used for churn-

ing, working butter, moulding and shipping; the other and smaller room is used for the creamer and vat, and in one end of this apartment is the cold storage room for butter.

The walls of the dairy have a six-inch dead air space, lined on inside with two thicknesses of plank, with building-paper between; floor cemented, and a terra cotta drain-pipe running fifty feet off. The double doors and windows are covered with wire gauze.

Adjoining the dairy is the brick ice house, with the capacity of a car load of ice. The walls are 20 inches thick with dead air space.

The dairy is supplied with all the latest improved dairy apparatus for butter making. On the outside and near the west wall is a number one well of pure clear water, with pump, water tank and pipes connecting the same with creamer on inside. Like the barn, this building is neatly painted. Total cost of cattle barn, dairy and ice house is $800.

At a convenient distance from the cattle barn are located the feed grinding and cutting rooms, 50 by 60 feet. In one end is the Silo of 35 tons capacity. The entire machinery is run by steam power.

Next in order comes the cattle, 27 head—13 A. J. C. C. Jersey cows of the best butter blood grace the barn. Two Jersey bulls, one Holstein bull calf, with Jersey calves and yearlings, constitute the remainder. The first bull, Ida's Stoke Pogis 2d, is sired by Ida's Stoke Pogis, out of Duchess of Bloomfield 2d, a daughter of the great Tormentor. He is closely related to every cow with an *official* test of 30 pounds of butter in 7 days—a combination through the best butter channels of St. Lambert and Coomasse. The second bull is Signal Ransom, sired by Dunraven (a son of Tenella), out of Edwina 2d, a daughter of Edwina. As his name indicates, he is an inbred Signal, and, judging from his calves, he is the equal of his breeding.

The practical work of the dairy began on December 1st, 1888, beginning with 10 cows, 3 coming fresh since; two of the herd are heifers with first calves, two now being dried

off, two more to calve in May. Young calves born since December 1st fed principally upon whole milk. The change incident to moving the cattle from one farm to another placed the herd at a very great disadvantage for the first 30 days. Jersey cows are extremely sensitive to any sudden change, as all great dairy cows should be, and are possessed of a nervous temperament. The output of the dairy has been within a small fraction of a pound of butter per day for each cow; apparently a small yield, but one half the herd has been doing the greater part of it; no forcing, but good feed and proper care of the animals. All are and have been in most excellent condition, and their almost silken coats in midwinter must be largely due to the 3 lbs. of cotton seed meal each is getting per day. In addition to this, we are now feeding daily one-third each of ground oats, corn meal and bran, or 10 lbs. per day (by weight)—15 to 20 lbs. of ensilage and 4 to 6 lbs. of hay, divided into two feeds. Three cows now undergoing an experiment are fed differently.

Our experience in creaming milk as between the Cooley Creamer and DeLaval Separator is limited, the Separator having been in use only for a short while. After the few trials that have been made, I can see but little difference in the results. I am aware that in all the great dairy centers where large quantities of milk are gathered, and from many of the different breeds of dairy cattle, the superiority of machine creaming is unquestioned, or that the place for the machine is at the butter factory. For the small farmer or dairyman, those more particularly who are so fortunate as to have on their farms cold springs of running water the year round, and where the cow and the creamer being very near each other, the milk set to the best advantage—which is warm,—thus situated and under these conditions, I do not think as yet that the question has been decided in favor of the Separator. Here at the Station we shall strive to give each system or method during the year a fair and impartial test—side by side, and after *repeated* trials (one or two being of no value), we will be much better prepared to

give an opinion than at present. We do not know which is the superior, or the most profitable.

Experiments with Prof. Short's method of determining the butter fats in milk are in progress, and will be reported in the next Bulletin.

The following summary of the work of the dairy may be of interest to dairymen:

Month.	Pounds Milk.	Pounds Butter.	lbs. Milk to make lb. of Butter.	Cost of Feed per day.	Butter sold per pound.	$ cts.
1888.						
December.....	4,113½	275	14.94	19c.	35c. net.	96 25
1889.						
January.....	5,201	302¾	17.17	"	"	105 96
February.....	4,831½	301¾	16.01	"	"	105 61

Ten cows in dairy from December 1st to February 20th, and since then thirteen; two of which are heifers with their first calves; two cows being dried off, and two due to calve in May; and the whole herd have been bred and are believed to be safe in calf. All skim-milk not fed to the calves sold at 15 cents per gallon; buttermilk not fed to the hogs sold at 10 cents per gallon at the dairy.

EXPERIMENTS IN CATTLE FEEDING, AS ORDERED BY THE DIRECTOR.

COWS—Food consumed in Fourteen Days. Yield of Milk and Butter.

First Period.	No. Days.	lbs. Bran.	lbs. Ground Oats.	lbs. Corn Meal.	lbs. Ensilage.	lbs. Collards.	lbs. Rye.	lbs. Milk.	Butter. lbs.	Butter. oz.
No. 1. Hattie Signal 2d	14	46⅔	46⅔	46⅔	238	.....	.....	263	14	13
2. Kate Hazen	14	46⅔	46⅔	46⅔	.....	448	.....	240	15	5
3. Lady Toorner	14	46⅔	46⅔	46⅔	.....	.....	308	142	10	4

COWS—Food consumed in Fourteen Days. Yield of Butter and Milk.

Second Period.	No. Days.	lbs. Bran.	lbs. Ground Oats.	lbs. Corn Meal.	lbs. Cotton Seed Meal.	lbs. Ensilage.	lbs. Johnson Grass.	lbs. Clover.	lbs. Milk.	lbs. Butter. lbs.	lbs. Butter. oz.
No. 1. Hattie Signal 2d	14	46⅔	46⅔	46⅔	42	364	.....	.....	288	16	6
2. Kate Hazen	14	46⅔	46⅔	46⅔	42	.....	.....	154	252	16	11
3. Lady Toorner	14	46⅔	46⅔	46⅔	42	.....	84	.....	143	8	4

For analysis of feed stuffs see report of Chemist in this Bulletin.

FEEDING EXPERIMENT.

A preparation period of seven days preceded each feeding experiment, during which no note was made of yield, this period being intended to bring the animal under the influence of the new food and insure exemption from the effects of the previous food.

During the first seven days all of the cows were fed upon the same food and subjected to the same environments in every respect, for the purpose of detecting individual peculiarities.

The food being tested was increased or diminished in quantity given, as the appetite of the cows seem to require.

In the first period each cow ate 140 lbs. of bran, ground oats and corn meal mixed, or 10 lbs. per day. In addition to this, No. 1 was fed 238 lbs. ensilage, No. 2, 448 collards, and No. 3. 308 lbs. rye.

In second period the grain ration was continued as above, and added to this 42 lbs. cotton seed meal to each cow; for No. 1 the ensilage was continued, but increased to 364 lbs., and for Nos. 2 and 3 clover hay and Johnson grass was substituted in place of collards and rye. See table.

Cows Nos. 1 and 2 four years old; No. 3 two year old heifer with first calf.

REPORT OF THE CHEMIST.

The work in the Chemical Laboratory during the present quarter has embraced a variety of commercial fertilizers, feed stuffs, dairy products, and miscellaneous substances, with results as given below.

The methods of analysis adopted at the fifth annual convention of the Association of Official Agricultural Chemists, held at the United States Department of Agriculture August 9th and 10th, 1888, have been strictly followed.

The rates of valuation for commercial fertilizers in Alabama, as fixed for the present season, are as follows:

Water Soluble Phosphoric Acid,	7½	cents per pound.
Citrate " " "	"	"
Nitrogen, - - - -	19½	" "
Potash, - - - -	5	" "

Relative commercial values are intended as indicators to farmers and planters of the comparative agricultural and practical values of different fertilizers, and they will be found to be a safe guide in making purchases.

PHOSPHATES WITH NITROGEN AND POTASH.

No. Station.	NAME OF FERTILIZER.	BY WHOM SENT.	PHOSPHORIC ACID.			Nitrogen.	Potash.	Commercial value.
			Water Soluble.	Citrate Soluble.	Acid Soluble.			
1135.	Guanaco Guano	N. H. Holmes, Montgomery, Ala	8.08	0.79	2.49	1.96	1.75	$22.60
1136.	Etiwan Guano	Etiwan Phos. Co., Charleston, S. C	4.94	4.07	5.38	1.96	1.77	22.92
1138.	Plow Brand Rawbone Superphosphate	Walton, Whann & Co., Wilmington, Del.	4.80	4.62	4.40	2.10	2.39	24.71
1139.	Reliance Am. Superphosphate	" " " "	5.39	4.00	4.95	1 82	1.88	23.25
1140.	Etiwan Am. Superphosphate	Etiwan Phos. Co., Charleston, S. C	5.52	4 50	4.90	1.54	1.91	22 94
1141.	Clark's Soluble Guano	Southern Phos. Co., Atlanta, Ga	8 58	0.82	0 65	2.31	2.89	25 99
1142.	Southern Am. Dis. Bone	" " "	8.87	0.18	0.95	2.69	2.48	26.56
1143.	Old Dominion Guano	" " "	8.44	1.26	0.74	2.24	2.48	25.72
1145.	Potent Pacific Guano	" " "	8.42	1.00	0.72	2.41	2.79	26.32
1146.	Samana Guano	" " "	8.73	1.03	0.70	2.31	2 45	26.09
1153.	Plow Brand	W. F. Vandiver & Co., Montgomery, Ala	4.70	5.10	4.40	2.17	2.15	25.31
1154.	Am. Dis. Bone	" "	6.33	5.89	4.21	1.54	2.04	26.37

1155.	Reliance	" "	4.76	4.44	3.76	3.08	1.67	27.48
1157.	Lister's Harvest Queen	Lister's Ag. & Ch. Works, Baltimore, Md.	8.21	2.39	1.74	1.68	1.79	24.24
1158.	Lister's Standard Phosphate	" "	8.25	3.81	1.36	2.17	1.58	28.14
1159.	Lister's A. D. Bone	" "	8.08	3.40	1.46	1.96	1.65	26.51
1160.	Lister's Celebrated Ground Bone	" "	0.64	9.44	3.93	2.73	0.53	26.29
1161.	Perfect Guano	Troy Fertilizer Co., Troy, Ala.	7.02	1.32	3.50	2.31	1.50	23.01
1164.	Crown Guano	Treadwell, Abbott & Co., Atlanta, Ga.	4.60	5.00	4.97	2.31	2.17	25.57
1170.	Ground Am. Bone	N. H. Holmes, Montgomery, Ala.	.....	2.53	7.37	4.20	0.34	20.51
1172.	"Fertilizer"	J. J. Woodall, Hartselle, Ala.	2.49	1.21	0.14	1.61	6.09	17.91
1173.	Harvest Queen	John T. Davis, Jr., Columbia, Ala.	9.63	1.59	0.83	1.82	2.11	21.03
1174.	Am. Dis. Bone	" "	8.98	4 17	0.88	1.91	2.46	29.62
1175.	Am. Guano	Rasin Fertilizer Co., Baltimore, Md.	8.04	2.61	3.05	2.13	2.30	26.57
1176.	Soluble Pacific Guano	Frank S. Roberts, Mobile, Ala.	6.14	3.10	2.83	2.03	1.98	23.75
1179.	Magnet Soluble Guano	Davis, Marshall & Co., Mobile, Ala.	3.82	3:34	3.36	2 66	2.29	25.40
1181.	Am. Dis. Bone	Treadwell, Abbott & Co., Atlanta, Ga.	5.28	3.93	1.27	1.82	1.46	22.36
1184.	Georgia State Stan. Am. Superphosphate	Hammond, Hull & Co., Port Royal, S. C.	7.14	1.43	2.95	1.75	2.40	22.55
1186.	Am. Dis. Bone	" "	9.38	1.36	1.91	1.61	1.46	23.84
1187.	Hammond, Hull & Co's Animal Bone	" "	8.08	4.88	1.61	5.39	5.32	45.78

PHOSPHATES WITH NITROGEN AND POTASH—Continued.

No. Station.	NAME OF FERTILIZER.	BY WHOM SENT.	PHOSPHORIC ACID.			Nitrogen.	Potash.	Commercial value.
			Water Soluble.	Citrate Soluble.	Acid Soluble.			
1209.	Fertilizer (light color)	Frank P. Kelly, Troy, Ala	2.16	2.52	1.04	0.35	0.43	$ 8.80
1210.	" (dark color)	" "	1.01	2.99	0.66	0.28	0.27	7.44
1211.	Pike County Guano	Ed. F. McKinnon, Inverness, Ala	3.80	5.73	1.95	2.48	1.58	25.54
1212.	Eddystone Guano	" "	5.43	5.15	1.57	2.62	1.90	28.00
1213.	Fertilizer	Frank P. Kelly, Troy, Ala	3.10	3.01	1.98	0.77	0.96	13.11
1214.	Coweta High Grade	Coweta Fertilizer Co., Newnan, Ga	10.31	0.98	0.67	2.59	1.65	28.68
1215.	Aurora Am. Phosphate	" "	8.98	1.05	1.83	2.24	2.06	25.83
1224.	Fertilizer	Ed. F. McKinnon, Inverness, Ala	3.26	4.95	4.07	2.80	1.50	24.73
1225.	Georgia State Grange Fertilizer	O. W. Cooper & Co., Oxford, Ala	9.17	1.77	2.71	1.92	2.16	26.07
1226.	Eutaw Fertilizer	Ashepoo Phosphate Co., Charleston, S. C.	4.68	2.76	3.72	2.20	1.61	24.61
1227.	Fertilizer	G. W. Braswell, Perote, Ala	1.97	4.28	1.43	1.40	0.74	15.57
1229.	Baugh's Rawbone Phosphate	O. W. Cooper & Co., Oxford, Ala	7.73	3.28	3.83	2.38	0.51	25.30

ACID PHOSPHATES.

No. Station.	NAME OF FERTILIZER.	BY WHOM SENT.	PHOSPHORIC ACID.			Commercial value.
			Water Soluble.	Citrate Soluble.	Acid Soluble.	
1137..	XX Acid Phosphate.....	Etiwan Phos. Co., Charleston, S. C.....	11.69	2.30	3.23	$21.73
1144..	Southern Acid Phosphate.....	Southern Phosphate Co., Atlanta, Ga.....	14.55	0.74	1.35	22.93
1162..	Acid Phosphate.....	Troy Fertilizer Co., Troy, Ala.....	11.04	3.17	4.72	21.31
1166..	"Fertilizer".....	J. W. Hamvil, Troy, Ala.....	7.36	3.37	3.43	16.23
1167..	"Phosphate".....	M. T. Traywick, Opelika, Ala.....	10.26	2.72	3.58	19.47
1168..	"Phosphate".....	" "	10.46	2.19	3.47	19.02
1180..	Phosphate Gossippia.....	Troy Fertilizer Co., Troy, Ala.....	9.17	2.28	5.02	17.19
1185..	Georgia State Stan. Acid Phos.....	Hammond, Hull & Co., Port Royal, S. C.....	12.36	0.06	2.09	19.44
1193 ..	Phosphate No. 1.....	C. D. Worman, Montgomery, Ala.....	10.36	2.96	0.33	20.08
1194..	" No. 2 (wet).....	" "	9.48	2 34	0.12	17.73
1195..	English Acid Phosphate.....	Harmony Alliance, Skelton, Ala.....	11.94	2.23	0.23	21.25
1196..	" "	A. G. Miller, Skelton, Ala.....	12.26	1.71	0.25	20.95

ACID PHOSPHATES—Continued.

No. Station.	NAME OF FERTILIZER.	BY WHOM SENT.	PHOSPHORIC ACID.			Commercial value.
			Water Soluble.	Citrate Soluble.	Acid Soluble.	
1207..	Phosphate	S. B. Shivers, Selma, Ala	.....	1.00	4.32	.....
1208..	Phosphatic Nodules in Rotten Limestone	J. F. Wiatt, Coatopa, Ala	.....	.....	12.63	.....
1218..	Phosphate	L. D. Cox, Tuskegee, Ala	11.05	2.91	2.72	$20.94
1219..	Phosphatic rock	S. B. Shivers & Co., Selma, Ala	.....	.....	6.13	.....
1221..	Phosphatic rock (brown)	Columbus Fertilizer Co., Columbus, Ga	.....	.....	18.41	.....
1222..	" " (blue)	" "	.....	.....	24.16	.....
1228..	Acid Phosphate	O. W. Cooper & Co., Oxford, Ala	3.99	5.99	3.90	14.97
1230..	Keystone Concentrated Phosphate	W. F. Vandiver & Co., Montgomery, Ala	.....	24.72	21.79	37.08
1231..	Acid Phosphate	S. A. Lowery, Evergreen, Ala	12.72	1.44	0 62	21.24
1232..	Raw Phosphate	W. H. Newman, Uniontown, Ala	.....	.....	4 08	.....

MISCELLANEOUS FERTILIZERS.

No. Station.	NAME OF FERTILIZER.	BY WHOM SENT.	Nitrogen.	PHOSPHORIC ACID.			Potash.	Commercial value.
				Water Soluble.	Citrate Soluble.	Acid Soluble.		
1147	Ammonium Sulphate	J. S. Newman, Auburn, Ala.	20.44					
1148	Sodium Nitrate	" "	13.51					
1149	Muriate of Potash	" "					48.77	
1150	Kainit No. 1	" "					12.38	
1151	" No. 2	" "					11.36	
1152	China Berries	" "	1.61			0.43	1.19	
1156	Swan Island Guano	Davis, Marshall & Co., Mobile, Ala		0.37	14.75	7.61		
1163	Phosphatic Rock	Troy Fertilizer Co., Troy, Ala				27.78		
1165	Cotton Seed Meal	N. H. Holmes, Montgomery, Ala	7.00			3.44	1.88	
1169	Kainit	Davis, Marshall & Co., Mobile, Ala.					11.75	
1171	Phosphatic Marl	Tinsley Fertilizer Co., Selma, Ala.				9 96		
1182	Kainit	Hammond, Hull & Co., Port Royal, S. C.					12.68	

MISCELLANEOUS FERTILIZERS—Continued.

No. Station.	NAME OF FERTILIZER.	BY WHOM SENT.	Nitrogen.	PHOSPHORIC ACID.			Potash.	Commercial value.
				Water Soluble.	Citrate Soluble.	Acid Soluble.		
1188	Swan Island Guano	Frank S. Roberts, Mobile, Ala.		0.94	14.49	6.20		
1190	Cotton Seed Hull Ash	Zimmerman Bros., Mobile, Ala.				10.04	23.73	
1205	Bat Manure	Hon. R. F. Kolb, Montgomery, Ala.	8.82			5.20	2.12	
1206	Natural Phosphate	" "	0.35			13.01	2.12	
1220	Marl	G. W. Creagh, Suggsville, Ala.				0.11		9.52 Carb. Lime
1223	Shell Marl	W. F. Vandiver & Co., Montgomery, Ala.				0.23		27.65 " "
1233	Kainit	W. H. Newman, Uniontown, Ala.					11.00	
1234	Cotton Seed Meal	" "	7.14			3.23	1.69	
1235	Cotton Seed Hull Ash	" "				10.96	28.17	

MISCELLANEOUS FERTILIZERS—Continued.

Station No. 1189—Land Plaster, W. F. Vandiver & Co., Montgomery, Ala.

Moisture and Water of Combination	21.15 per cent.
Calcium Oxide (Lime)	32 82 "
Sulphuric Acid (S. Oz.)	45.95 "
Total	99.92

Station Nos. 1198-1204—Phosphatic Nodules, J. M. Carter, Olustee, Pike County, Ala.

	No. 1.	2.	3.	4.	5.	6.	7.
Phosphoric Acid	6.57	0.34	18.88	1.67	0.18	0.08	13.38

Numbers 1, 2 and 7 consist of Shells and Phosphatic Nodules, which are quite valuable if found in large quantities.

ANALYSES OF FEED STUFFS FROM THE EXPERIMENT STATION.

	Ground pea.	Field pea.	C. S. Meal.	Oats.	Bran.	Corn Chops.	Sweet Potatoes.	Johnson Grass.	Ensilage.	Green Rye.	Collards.
Water	7.015	13.965	8.477	10.555	12.808	14.148	61.250	11 564	60.932	71.518	85.764
Ash	1.824	2.937	6.475	3.122	5.492	1.202	0.997	8.398	2.430	1 286	1.550
Ether Extract (Fats and Oils)	42 587	1.290	8.218	4.668	4 174	3 788	0.521	1.279	1.818	1.257	0.749
Crude Protein (Albuminoids)	26.698	21.025	47.719	14.406	17.275	10 362	3.444	6.037	3.215	4.606	5.744
Crude Fibre	2.490	5.351	7.278	10.453	8.024	1.676	1.009	34.411	13 766	7.083	1.812
Nitrogen Extract (Starch, etc.)	19.386	55.432	21.833	56.796	52.227	68.824	32.779	38.311	17.839	14 250	4.381
Total	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000
Nitrogen.. Total	4.272	3.361	7.634	2.305	2.764	1 658	0.551	0.966	0.553	0.737	0.919
Nitrogen.. Albuminoid	4.048	2.209	7.362	2 026	2.673	1.658	0.551	0.966	0.553	0.736	0.460

The above-mentioned feed stuffs when received for analysis were in the usual condition of such materials as they are fed to stock during the winter. It may be well to state a few particulars in regard to each, as follows:

1. The ground peas, of the Virginia variety, were carefully freed from hulls before analysis.
2. The shelled field pea was of the usual Clay variety.
3. The cotton seed meal was analyzed as it came from the mill. An attempt was made to separate and determine the actual amount of hull contained in the meal, but the results were not satisfactory. The quality of the sample used was very good.
4. The specimen of oats was a northern variety, with small white grain.
5. The bran was of good quality.
6. The sweet potatoes were what is generally known as the "Red Burmuda" variety, grown for stock feeding.
7. The corn came from the northwest, and was coarsely ground.
8. The ensilage was made of Indian corn, cut and placed in the silo just after it had passed the roasting-ear condition.
9. The Johnson grass came from Mr. M. C. Scott near Montgomery, and was well cured.
10. The rye was sown in drills in September and used for green soiling during the winter.
11. The collards were transplanted in October and fed during February and March.

RESULTS OF ANALYSES OF AIR-DRIED SOILS AND SUBSOILS FROM VARIOUS LOCALITIES IN ALABAMA.

Locality	Experiment Station, Auburn.		Experiment Station, Auburn.		Butler Co.		Talladega Co.		Pike County.	
Variety	Virgin soil. Sandy Drift.		Worn soil. Sandy Drift.		Gray pine land.		Gray loam.		Ridge Land. ash gray color.	
Soil marked	Soil. 1 (a)	Subsoil 1 (b)	Soil. 2 (a)	Subsoil 2 (b)	Soil. 8 (a)	Subsoil 8 (b)	Soil. 9 (a)	Subsoil 9 (b)	Soil. 10 (a)	Subsoil 10 (b)
Station number	1001.	1002.	1003.	1004.	1129.	1130.	1131.	1132.	1133.	1134.
Moisture	3.686	1.535	0.981	0.512	2.559	2.469	3.676	3.670	0.817	1.267
Insoluble silica	82.131	88.718	89.713	91.602	78.379	68.586	66.126	68.159	92.931	85.507
Hydrated silica	2 253	2.173	1.909	2.161	4.759	11.084	8.627	7.280	2.118	5.417
Soluble silica	0.194	0.115	0 307	0.067	0.105	0.198	0.153	0.175	0.067	0.102
Sesquioxide of iron (F_2O_3)	1 432	0 505	0.813	1.028	1.864	3.584	3.942	4.128	0.812	1.601
Alumina (Al_2O_3)	3.028	3.140	1.867	2.590	4.562	9.684	8.007	8.020	1.609	4 472
Phosphoric acid (P_2O_5)	0.059	0.093	0 056	0.060	0.029	0 020	0.150	0.174	0 032	0.035
Lime (Ca. O.)	0.091	0.031	0.086	0.034	0.275	0.176	0 289	0.255	0.039	0.050
Magnesia (Mg. O.)	0.058	0.023	0 072	0.012	0 293	0 409	0.633	0.654	0.062	0.081
Potash (K_2O.)	0.062	0.090	0.034	0.092	0.182	0.194	0.903	0.992	0 149	0.174

Soda (Na_2O)	0.184	0.718	0.440	0.281	0.550	0.410	0.391	0.287	0.350	0.293
Sulphuric acid (SO_3)	0.101	0.041	0.056	0.021	0.103	0.068	0.233	0.177	0.127	0.153
Chlorine	0.009	0.011	0.015	0.014	0.006	0.008	0.056	0.039	0.009	0.008
Carbonic acid (CO_2)	0.180	0.058	0.106	0 095	0.133	0.046	0.114	0.154	0.066	0.088
Volatile and organic matter	5.838	2.064	3.208	1.112	5.462	3.219	5.969	6.089	1.553	1.603
Total	99.308	100.315	99.663	99.681	99.361	100.155	99.369	100.253	100.741	100.851
Nitrogen	0.370	0.274	0 293	0.253	0.260	0.239	0.260	0.280	0.109	0.087
The air-dried soil contains—										
Coarse gravel	31.20	22.11	26.18	18.13	8 50	6.91	9.81	12.49	1.50	1 92
Fine material	68.80	77.89	73.82	81.87	91.58	93.09	90.19	87.51	98.50	98.08

RESULTS OF ANALYSES OF AIR-DRIED SOILS AND SUBSOILS FROM VARIOUS LOCALITIES IN ALABAMA.

Locality...	Citronelle.		Sumter Co.		Perry Co.		Tallapoosa County.			
Variety...	Sandy Gray Land.		Light Prairie Soil.		Cultivated Slough Bottom.		Pine Land. Gray-Sandy.		Hickory land Red.	
Soil marked...	Soil. 3 (a)	Subsoil 3 (b)	Soil. 4 (a)	Subsoil 4 (b)	Soil. 5 (a)	Subsoil 5 (b)	Soil. 6 (a)	Subsoil 6 (b)	Soil. 7 (a)	Subsoil 7 (b)
Station Number...	1023	1024.	1025.	1026.	1027.	1028.	1029.	1030.	1031.	1032.
Moisture...	1.297	1.127	2.367	1.494	7.468	8.803	3.530	1.753	3.676	2.699
Insoluble silica...	87.644	81.926	80.628	84.958	39.437	36.585	72.576	84.654	62.896	61.929
Hydrated silica...	2.964	5.958	4.561	4.338	19.784	22.374	4.570	3.019	8.272	10.283
Soluble silica...	0.062	0.080	0.126	0.084	0.062	0.311	0.236	0.116	0.115	0.323
Sesquioxide of iron (F_2O_3)...	1.075	2.031	1.912	2.175	5.448	6.857	1.792	1.744	7.168	7.789
Alumina (Al_2O_3)...	2.568	5.877	4.128	4.183	12.158	15.981	4.007	3.978	8.393	10.753
Phosphoric acid (P_2O_5)...	0.037	0.027	0.196	0.134	0.207	0.152	0.050	0.050	0.052	0.085
Lime (Ca. O.)...	0.066	0.073	0.386	0.158	3.742	1.256	0.186	0.116	0.517	0.056
Magnesia (Mg. O.)...	0.005	0.018	0.014	0.017	0.212	0.671	0.009	0.115	0.362	0.514
Potash (K_2O.)...	0.130	0.158	0.183	0.171	0.866	0.621	0.232	0.233	0.348	0.389

Soda (Na_2O)	0.254	0.273	0.393	0.376	0.909	0.876	0.447	0.443	0.760	0.503
Sulphuric acid (So_3)	0.038	0.029	0.089	0 033	0.120	0.069	0.053	0.051	0.096	0.122
Chlorine	0.009	0.012	0.021	0.011	0.015	0.020	0.006	0.124	0.006	0.017
Carbonic acid ($C. O_2$)	0 136	0.044	0.137	0.134	0.938	0.213	0.249	0.075	0.214	0.140
Volatile and organic matter	3.792	2.330	4 942	1.856	7.345	5.466	12 053	3.759	7.248	4.149
Total	100.077	99.963	100.080	100.122	99.771	100.253	100.002	100.220	100.132	99.751
Nitrogen	0.295	0.294	0.195	0.087	0.282	0.087	0.245	0.087	0.260	0.195
Air-dried soil contains—Coarse gravel	2.229	1.373	4.539	3.903	.....	.....	11.412	11.906	20.849	13.407
Fine material	97.771	98.627	95.461	96.097	100.000	100.000	88.588	88.094	79.151	86.593

The above results of soil analyses, published in the Bulletins of last year, are here brought together and republished for more convenient reference. The methods of analysis, as detailed in Bulletin No. 10 issued from the U. S. Department of Agriculture in 1886, have been strictly followed.

The following particulars in regard to these soils are of interest:

1. The soils from the Experiment Station, about three-fourths of a mile south of Auburn, represent virgin and worn soils. The forest is of long-leaf pine, interspersed with an occasional oak, hickory, black gum, etc.

2. The soil from Butler county, sent by Mr. D. G. Dunklin, is a gray sandy soil from the lands of Mr. Geo. Lazenby, sixteen miles northeast of Greenville, representing, as stated in his letter, gray pine lands of the county. The growth on the red lands consists of post oak, red oak, hickory, dogwood, etc.; on the sandy lands pine, oak and hickory.

3. The soil from Talladega county, sent by Mr. E. T. McEldery, was taken from the farm of Mr. Hugh McEldery, nine miles east of Talladega. Depth of soil reported to be from 12 to 14 inches; growth, water oak, white oak, hickory, ash, elm, alder, walnut, sweet gum, poplar, sycamore and mulberry—trees tall and from one and a half to three feet in diameter. This soil is commonly known as "gray land." It represents the valley lands of the county.

4. Hon. T. J. Carlisle writes that the soil sent by him from Pike county was gotten from the land of Mr. T. D. Connell, about ten miles southeast of Troy. It represents ridge land, is a fine soil, of ash color; growth, oak and hickory, with occasional chestnut and short-leaf pine. The timber is tall.

5. The soil from Citronelle, near Mobile, was sent by Prof. J. P. Stelle, and represents the gray sandy pine lands from that portion of the State.

6. The soil from Sumter county, sent by Prof. J. W. A. Wright, was taken from land cultivated by Judge DeLoach, about one mile north of Livingston. It is known as "light brown" soil, aud was taken from an undisturbed forest of hickory, black-jack, oak, etc., the trees being from eight to fifteen inches in diameter.

7. Perry county soil, sent by Mr. H. G. Smith, was taken from a cultivated slough bottom on the Canebrake Experiment Station.

8. The soils from Tallapoosa county, sent by Hon. J. P. Oliver, represent the red and the gray lands of that section. The red soil, says Mr. Oliver, is about four inches deep, with growth of oak and hickory principally, interspersed with dogwood, black gum, oak from two and a half to four feet, and hickory from one to two and a half feet in diameter. The sample of red soil came from Col. Oliver's land about one-half mile northwest of Dadeville. The gray soil was taken from the farm of Mr. W. A. Wynn, three miles northwest of Dadeville, and represents a thickness of from two to two and a half inches of soil with accompanying subsoil. The original growth is pine, with undergrowth of oak and hickory. The largest pines measure from three and a half to four feet in diameter.

The following are results of analyses of Jersey milk produced by the herd now on the Station. The ration consisted of three and one-third pounds each of corn meal, ground oats, and bran, three pounds of cotton seed meal, twenty pounds of ensilage and four pounds of crab grass hay, in two feeds per day.

No.	Date.	Water.	Fat.	Casein.	Sugar.	Ash.
1	Febuary 19	86.321	4.151	3 345	5.468	0.775
2	"	85.142	5.119	3 900	5.088	0.751
3	"	85 940	4.229	3 432	5 639	0 760
4	" 21	83 316	6.205	4.501	5.044	0 834
5	"	84.547	5.500	3 925	5 210	0.818
6	"	82.812	6.422	4.322	5 592	0.852
7	" 25	84.948	5.026	3 652	5 592	0.782
8	"	83.823	5 712	4.254	5.412	0.799
9	"	85.384	4 578	3.465	5.762	0 811
10	" 26	84.498	5.071	3.006	6 721	0.704
11	"	83.734	5.093	3.714	6.764	0 695
12	"	84 076	6.250	3.643	5.262	0 769
13	March 4	83.551	5 693	3.621	6.306	0.829

MEAN TEMPERATURE OF SOILS AT DIFFERENT DEPTHS,

FOR JANUARY, FEBRUARY AND MARCH, 1889.

P. H. MELL. T. D. SAMFORD, Assistant.

SET I—(On top of hill.)

	Jan.	Feb.	Mar.		Jan.	Feb.	Mar.
1 inch.....	47.1	47.1	5.75	24 inches.....	49.5	48.2	54.4
3 "	47.0	46.9	5.72	36 "	50.9	48.9	53.2
6 "	46.6	46.3	56.	48 "	52.3	50.2	53.1
9 "	46.4	45 9	55.	60 "	53.1	50.9	53.6
12 "	46.6	45.9	54.4				

SET II—(On top of hill.)

	Jan.	Feb.	Mar.		Jan.	Feb.	Mar.
1 inch.....	47.4	47.0	56.7	36 inches.....	50.8	48.9	53.1
3 "	47.3	46.8	56.4	48 "	52.5	50.3	53.2
6 "	47.3	46.7	55.8	60 "	53.6	51.6	53.3
9 "	46.8	46.0	54.7	72 "	54.7	52.4	53.3
12 "	46.7	45.8	53.5	84 "	55.9	53.4	54.
24 "	49.2	47.7	53.4	96 "	57.5	55.0	54.8

SET III—(In bottom.)

	Jan.	Feb.	Mar.		Jan.	Feb.	Mar.
1 inch.....	47.5	46.2	55.2	24 inches.....	50.8	49.4	54.4
3 "	47.6	46.1	54.7	36 "	52.0	50.2	53.9
6 "	48.2	46.7	54.6	48 "	53.4	51.6	54.3
9 "	47.9	46.3	53.8	60 "	54.6	52.6	54.2
12 "	48.2	46.7	53 8				

DATA FROM OTHER INSTRUMENTS.

ALTITUDE 826—LAT. N. 32.40—LONG. W. 85.30.

ATMOSPH'IC PRES. (in inches.)	Jan.	Feb.	Mar.	PRECIPITATION.	Jan.	Feb.	Mar.
Monthly mean..	29.960	30.180	29 930	Total in inches..	9.48	5.72	2.81
Highest	30.400	30 56	30 250	Greatest daily...	.....	.....	1.31
date.....	22	20	30	date.....	.....	.....	2
Lowest	29.64	29.710	29.48	No. of rainy days	11	11	5
date.....	8	17	18	No, cloudy days.	15	11	5
Monthly range..	.760	.850	0.770	No. of fair days.	11	14	18
TEMPERT.(°Farh.)				No. of clear days.	5	3	8
Monthly mean..	46.9	46.3	54 7	WIND.			
Mean of maxm..	55.1	54.4	64.8	Prev'g dir't'n f'm	W.	N.W.	N.W.
Mean of minim..	38.7	38.3	44.7	Total monthly			
Highest dur'g m.	67.	75.	76.	mov'm't (in miles	5,876	5,590	6,261
date.	16	17	17	Average daily			
Lowest during m.	23.	16.5	30	mov'm't(in miles	189.5	199.6	202
date.	29	7	10	Greatest daily			
Monthly range..	44.	58.5	46.	mov'm't (in miles	400.0	502.0	398
Mean daily range	16.4	16.1	20.7	date	5, 9	18	20

NOTE.—In the meteorological report concerning soil thermometers in Bulletin No. 3 of this Station, typographical errors occur as to the dates of the "*greatest daily range*" and of the "*least daily range*" of all the thermometers below twelve inches. Where the figure "8" occurs a * should be inserted to signify that the range was the same on several different dates.