

The land was old, had never been much manured and was nearly exhausted; nevertheless the cotton grew off splendidly and continued to do well until after the heavy rains in July, when it began to rust or stop growth. Such effects are produced by high manuring on thin lands. I calculated early in July upon at least 1,000 pounds seed cotton to the acre. The yield was 500 pounds. Where 1,000 pounds Fertilizer were applied, the land was fresh and in good heart, and the yield was 1,400 pounds seed cotton.

On another portion of my farm, I applied the Fertilizer, 320 pounds to the acre, where I applied last year 300 pounds to the acre, with extraordinary result, (I say extraordinary, for the increase was 150 fold); through this I left some unmanured rows. The difference between the rows could not be detected.

From the above experiments and their results, I have reached some conclusions which may prove of interest to others:

First, That Peruvian Guano, which has been considered the standard for comparison for all commercial fertilizers, fails to produce as much cotton, as a fertilizer claiming to contain no ammonia at all—the Etiwan No. 1.

Second, That neither the Peruvian or the unmixd Superphosphate Etiwan 1, produce so well as a combination of the two, or as a commercial fertilizer, containing both Superphosphate and Ammonia, like the Carolina Fertilizer, which has produced better results for me than any other commercial fertilizer.

Third, That commercial fertilizers as general or special manures may yet be greatly improved, so as to meet the wants of any crop, upon all soils. For instance, by the combination of Peruvian Guano, Etiwan No. 1, Potash and Soda, not only was the crop increased considerably over other fertilizers, but what is more important still, there was no rust where this combination was applied, which was on two separate fields, distant apart, and where I had more rust than on any other portion of the farm. These rows maintained their greenness, both bolls and limbs, till frost; while the surrounding cotton was dead and black months before. I do not presume that the proportions of the ingredients was just what analysis or further experience may decide to be best; nor do I believe it would be universally applicable; but some such combination, perhaps improved by the addition of Sulphate of Magnesia, would prove a manure for the cotton plant on most soils. A kind of special manure. Agricultural Chemistry tells us that potash and magnesia are found in sufficient quantity in clay soils, for the proper development of plants, especially the cotton plant. This may be true, but practically they are not available. Any soil of the stiffest red clay, may be permanently improved, as I know by the application of ashes, where commercial fertilizers and ordinary composts were of but poor, temporary advantage.

Fourth, That the Charleston Fossil Phosphates, properly prepared, are more than equal to the Raw Bone Superphosphates, as instanced in the yield from the Carolina Fertilizer and Baugh's Raw Bone, which is everywhere conceded to be the best and most honestly made up of its class.

Fifth, That Peruvian Guano is the best, or most profitable source of ammonia, or nitrogen, for combining with superphosphates, as instanced in the greater productiveness of Peruvian and Etiwan No. 1, over all the commercial fertilizers, the source of whose ammonia is generally fish or meat scrap. I admit this may be owing to the presence of other valuable salts in the Peruvian.

Sixth, That the amount of soluble phosphate in a manure makes a great difference in its value. Instance the different yields of Etiwan No. 1, Pacific Acid Phosphate and Comp., and the Palmetto Acid Phosphate; neither of which latter, I presume, claim near so high a per centage. In other words, I believe that 100 lbs., containing 25 per cent. of soluble phosphate, will produce about the same results, at any rate the first year, as 200 lbs. of a manure containing only 12 to 15 per cent.

Seventh, That possibly fine ground phosphates might prove remunerative to the planter. I presume no sulphuric acid is used in the manipulation of Wilcox & Gibbs' Manipulated; yet, it produces as good results as Baugh's Raw Bone Superphosphate. The main source of its phosphate (the Wilcox & Gibbs') must be the finely divided Phoenix Guano.

Eighth, That on poor soils a moderate application of commercial manures will prove most remunerative. That better soils may be more highly manured with profitable results.

Ninth, That some soils soon get a sufficiency of phosphates; and that others require much more to sufficiently saturate them for their best productiveness.

Tenth, That on some soils good results are obtained for two years from one application of superphosphates. I had an increase of 100 per cent. this year from application of the Carolina last year.

Eleventh, That some very poor soils may be rapidly brought to fair productiveness by the use of superphosphates alone.

Twelfth, That subsoiling barely pays such years as this has proved—so much rain.

Meteorological conditions must have influenced all the results very considerably. We had no rain sufficient to bring up corn or cotton from 10th April to 27th May; consequently the stand of all late planted cotton was imperfect. From the last date to the 18th June it rained almost every day. So wet was it that it was almost impossible to plough, even on the hills, for bogging. Notwithstanding this, my Journal says: "1st July—The cotton crop is growing and more advanced than at the same date last year. 2d, 3d, 4th, 5th and 6th July—Cotton in full bloom, but impossible to plough, on account of wet." Indeed, this was the wettest time we had—the rains were almost deluges. I finished ploughing cotton the last week of July. Rust made its appearance about the 1st of August, on the most highly manured spots, and extended quite rapidly.

Marion, S. C., December 5, 1870. ED. B. SMITH, M. D.

FERTILIZERS—A LETTER TO DR. EDWARD B. SMITH.

[Extract from the Rural Carolinian.]
ETIWAN WORKS, CHARLESTON, February 2, 1871.

Dr. Edward B. Smith, Marion, S. C.

DEAR SIR: Every manufacturer of fertilizers is indebted to you for your well conducted experiments reported in THE RURAL CAROLINIAN of February. In manufacturing the Etiwans, we desire to produce as complete a fertilizer as possible; and the details of your experiments will materially assist us. We find that your experience corresponds with the deductions of our chemist, and had you known that the Etiwan No. 2, contains the mixture with Peruvian Guano and Mariae of Potash, which your experiments has proved to be most successful, you would have been able to find at hand, the very fertilizer which was wanted. Heretofore, we have offered in market Etiwan Nos. 1 and 2—the former as you justly say without ammonia; the latter being a mixture of the No. 1 with Peruvian Guano and Potash Salts.

We have found that these two Guanos with the same name caused confusion; we have, therefore, continued the name Etiwan only for that which was sold as No. 2; and the other is offered at a lower price than the Etiwan, under the commercial name of Dissolved Bone. This difference in price is produced by the absence of the Peruvian Guano and Potash Salts contained in the Etiwan.

Your experiments have settled two important points upon which our inferences have been verified by your experience.

1. That a high grade of Soluble Phosphate is the most essential element in a fertilizer.

2. That one-half the quantity of a fertilizer of a high grade, will go as far as double the quantity of a low.

Our Company has, therefore, insisted on as high a grade as from eighteen to twenty per cent., both for its Dissolved Bone and for its Acid Phosphate.

If the planter sees fit to apply either of these alone to his crop, he saves one-half the quantity by purchasing this high grade, and if he makes a compost, he has a large margin for foreign material. Thus, for instance, should he compost with cotton-seed for the purpose of supplying ammonia, inasmuch as only three per cent. of the cotton-seed is available for this purpose, the remaining ninety-seven per cent. must reduce by nearly one half the grade of the mixture. Hence, if the acid compost, as it comes from the manufacturer, contains twenty per cent. of Soluble Phosphate, the mixture will be as high as ten per cent., while, if the original grade be only eight or ten

per cent., the mixture to be used for the crop will only contain four or five per cent. Soluble Phosphate. Your second fact would now become operative, and the planter would have to double the quantity of his manure to obtain the same result as in the first case.

There is another fact which, in this connection, it would be well to bring to the attention of a careful observer like yourself. It is that in superphosphate fertilizers of a high grade, there exists phosphoric acid in a free state, and when placed in the soil, it will seize on materials contained therein, and render soluble some of the essential elements. Thus, in clay soils, the silicic acid would be displaced and the potash entering into combination with the phosphoric acid, would become soluble as phosphate of potash.

There are two other matters mentioned in your experiments of very great interest, to which we would renew your attention: first, as to the effect of fertilizers on rust; second, as to dispensing with some particular ingredient which the soil may supply.

1. Upon the first point, you remark, "that by the combination of Peruvian Guano, Etiwan No. 1, potash and soda, not only was the crop increased considerably over other fertilizers, but, what is more important still, there was no rust where this combination was applied, which was on two separate fields, distant apart, and where I had more rust than on any other portion of the farm." Now, it is a most important enquiry, to ascertain to which of these ingredients this excellent result is due. Our Etiwan being manufactured with those precise ingredients recommended in your letter, would enable you to repeat the experiment without difficulty, and the result reported by you as to the superior product of cotton on your land by Etiwan No. 1 over Peruvian Guano, would seem to prove that your soil in some way furnishes ammonia, and thus might save you a very expensive ingredient.

2. And this opens the second subject. If you will refer to the pamphlet circular issued by our Company, you will see there detailed from Professor Vill'a's experiments, a mode of ascertaining what elements are in the soil and what it wants. If there should be any ingredient in the soil of Marion, which would supply nitrogen, it would be a most valuable fact to know; or if (as from one of your experiments it seems likely) there should be some compound of potash which these manures may disengage, it would be well worth knowing.

Allow me in conclusion to bring one fact more to your notice, which may account somewhat for the improvement of soil to which you allude in subsequent years from the use of our native phosphatic manures.

The reduction of the phosphate of lime contained in our phosphate rocks by sulphuric acid, results in two combinations, one in releasing the phosphoric acid and thereby making a soluble super-phosphate, the other in combining the sulphuric acid with the lime which has been released and thus making sulphate of lime or gypsum. The residue, therefore, of a fertilizer, manufactured from Carolina phosphates, by means of large portions of sulphuric acid; over and above the superphosphate, consists of an excellent manure, which, from year to year becomes disintegrated, combines with the soil, and renders it permanently more productive.

With these explanations before you, we trust that you will continue your well conducted experiments for at least another year, and acquaint the public with the results. We would very cordially offer to supply you with our material for experiment; but, in that case, it might be objected that the material was selected and might not be a just average sample. So, that the better plan is certainly, that which you seem to have pursued, of taking your own samples from the general market.

With much respect, your obedient servant,
C. G. MEMMINGER,
President of the Sulphuric Acid and Superphosphate Company.

AN EXPERIMENT WITH FERTILIZERS.

Editor of the Rural Carolinian:

By the direction of the Colleton Agricultural Society, at its meeting on the 2d day of January, I have been requested to prepare and forward to you the enclosed report of "Experiments with Fertilizers;" with the request that you will insert the same in the next number of your magazine.

WM. STOKES.

Colleton County, January 12, 1871.

The Committee on Cultivation and Improved Fertilizers, having, in accordance with the request of the Society, procured small quantities of the Fertilizers below named, through the kindness of parties in Charleston representing the same; tested them on a piece of very poor, level sandy land, that had been under cultivation for a number of years, but on which compost had been pretty freely used each year, beg leave to submit the following as the result of their experiment:

	No. lbs. Fertilizer per acre.	No. lbs. picked					Aggregate.
		1st Picking.	2d Picking.	3d Picking.	4th Picking.	5th Picking.	
1. Wm. Crichton & Son, Ammo. Superphosphate Lime.....	668	42	122	340	46	9	559
2. Nothing.....		80	140	140	20	2	382
3. Carolina Fertilizer.....	668	240	248	356	100	10	954
4. Etiwan.....	668	263	340	298	107	11	1015
5. Sardy's Phospho. Peruvian Guano.....	668	152	348	248	156	6	810
6. Nothing.....		60	130	140	70	2	402
7. Sardy's Ammo. Sol. Pacific Guano.....	668	160	200	220	32	6	618
8. Cotton Food.....	668	348	352	270	100	7	1079
9. Nothing.....		75	80	140	70	2	367
10. Ammoniated Bones.....	668	168	260	220	100	6	754
11. E. Frank Coe's Fertilizer.....	671.8-7	214	257	157	70	7	706
12. Nothing.....		60	90	150	80	2	382
13. Whann's Fertilizer.....	668	243	267	198	83	6	792
14. Wilcox, Gibbs & Co., Guano, Salt and Plaster Compound.....	668	216	231	284	100	6	837
15. Nothing.....		50	70	150	80	3	353
16. Wilcox, Gibbs & Co., Manipulated Guano.....	668	216	228	233	83	6	766

The land selected for this purpose had been planted in cotton the previous year, with the rows three and a half feet apart; on the last of March these rows were opened with a six-inch turning plough to the depth of about three inches, and on the 14th April another furrow was run in the one previously opened, making a furrow about five or six inches deep. Not desiring to place the fertilizers so deep, a small turning plough was run on one side of this, filling it about two-thirds, on this the fertilizers were distributed at the rate of about twenty dollars per acre, on the 14th of April, and covered immediately by lapping two furrows on it with a turning plough, except No. 1, Crichton & Son, which was applied in the hill with the seed at the time of planting, at the suggestion of the party representing it. The seeds coming in contact with the fertilizer, were destroyed, and there was no stand on this slip until after it was planted over, after a heavy rain on the 25th May. The cotton was planted on the 21st April, when there was apparently sufficient moisture in the land to bring it up, but not more than a half stand was obtained from this planting, and owing to the protracted drouth, which lasted until the 25th May, some of that died out. A stand was not obtained until early in June, and the rust taking the cotton in August, it can be readily seen that the experiment was not a fair test of the merits of the different fertilizers, especially as it was a noticeable fact that those slips on which the best stand was obtained, from the first planting, invariably yielded the most.

The cultivation was done very thoroughly by running the sweep through, shallow and often, and following with the hoe.

COLUMBIA, S. C., November 10, 1870.

To Messrs. R. O'Neale & Son, Columbia, S. C.:

GENTLEMEN: We examined to-day a field of cotton on the place of J. M. Crawford, of this city, on which he had experimented with various fertilizers, and without hesitation pronounce the acre on which Etiwan No. 2 had been used, to be the best acre of cotton we have ever seen. Mr. Crawford informed us that he had already gathered about 3,000 pounds from it, and it was his and our opinion that he would gather from 1,200 to 1,500 pounds more. The land did not appear to us to be superior cotton land, being low and damp,

but had been highly cultivated. The plant, where the Etiwan No. 2 had been used, was free from rust, green and full of fruit whilst that where the Wando and Carolina had been used, was, in places, badly rusted, and the stalks dead. The yield being much less than that where the Etiwan No. 2 had been used.

Respectfully,
JAMES M. BAXTER,
J. N. COCHRAN. J. G. McKISSICK,
ROBERT BEATY. A. R. TAYLOR.

COLUMBIA, S. C., November 10, 1870.

Messrs. R. O'Neale & Son, Agents for Etiwan Fertilizer:

GENTLEMEN: In reply to your question as to how I am pleased with the Etiwan Guano, I give below a statement of my experience with Etiwan, Stable Manure, Wando, Cotton Seed, Compost, and broadcast manuring, which speaks for itself. I have also tried the Carolina and Pacific Guano, and find that the Etiwan is far superior to either.

Yours, truly,
J. M. CRAWFORD.

3,140 lbs. cotton picked off 1 acre—	450 lbs. Etiwan.
1,020 " " " " "	60 lbs. Wando.
2,870 " " " " "	30 cart loads Compost.
1,800 " " " " "	30 Compost broadcast.
1,580 " " " " "	Cotton Compost.

My estimate that I have yet to pick from—Etiwan, 1,000 lbs.
" " " " " " Wando, 550 lbs.
" " " " " " Compost, 600 lbs.
" " " " " " Broadcast, 600 lbs.
" " " " " " Cotton Seed Compost, 700 lbs.

QUITMAN, GA., October 17, 1870.

DEAR SIR: I closed yesterday the picking of my experiment rows with the different guanos I used. I endeavored to put a moneyed value of two dollars per acre on each as nearly as possible. I did not weigh the cotton myself, it was done by my overseer:

Merryman.....	2 rows..	81 pounds.
Nothing.....	2	30 "
Dickson Compound of my own making.....	2	92 "
Nothing.....	2	33 "
Etiwan, No. 2.....	2	61 "
Nothing.....	2	37 "
Etiwan, No. 1.....	2	62 1/2 "
Nothing.....	2	34 "
Pendleton's.....	2	63 "
Nothing.....	2	28 "
Wilcox, Gibbs & Co.....	2	56 "
Nothing.....	2	31 "

C. S. GAULDEN.

WINNSBORO', S. C., January 4th, 1871.

To Messrs. W. C. Bee & Co., Charleston, S. C.:

I don't hesitate to pronounce Etiwan Guano No. 2 a most superior fertilizer for cotton. I planted about 60 acres of land in cotton the past year, and gathered therefrom about sixty-four thousand pounds of seed cotton. Most of the land is disintegrated granite, and would not in all probability have made without this or some other equally as good a fertilizer, one-half of what it did make. In other words, I think my crop was improved at least 100 per cent. by the use of the Etiwan Guano No. 2. I applied 300 pounds of it to every acre.

W. R. ROBERTSON.

96 DEPOT, GREENVILLE AND COLUMBIA R. R.

To Messrs. W. C. Bee & Co.:

GENTS: Owing to a great deal of trouble I have neglected too long to make my report to you. We were very unfortunate in this neighborhood, owing to drouth. Our cotton did not come up until June. At one time it looked splendid, full of squares and bolls, but the want of rain caused the forms to fall off.

Below you will find the result of my experiment, although it is a failure, yet you will perceive your fertilizers are superior to the others. I can't account for the fact that the No. 1 surpassed the No. 2. Yours, respectfully,
H. W. LELAND.

No Manure.....	326 lbs.
Etiwan No. 1, (400 lbs.).....	532 "
Etiwan, ".....	512 "
Soluble Pacific, ".....	422 "
Wando, ".....	480 "

CHARLESTON, S. C., January 6th, 1871.

Messrs. W. C. Bee & Co.:

GENTS: I regret the delay that has occurred in answering your favor of 15th October, but I have waited until I could give you the entire results.

I used three tons of Etiwan No. 2 last season on cotton, using it on the most of the crop at the rate of 200 lbs. to the acre, and was much pleased with the results. The cotton grew rapidly and matured well, and while cotton manured with other fertilizers, showed signs of rust; that manured with the Etiwan was green and flourishing, and yielded on an average about 800 lbs. seed cotton to the acre.

I applied it to two acres, as an experiment, at the rate of 400 lbs. to the acre, and from these two acres, I picked 4,360 lbs. of seed cotton, while two acres immediately adjacent, manured with Pacific Guano, at the rate of 400 lbs. to the acre, only yielded 2,740 lbs. of seed cotton, and four acres in the same field, on the other side, heavily manured with stable manure, yielded 7,120 lbs. seed cotton.

Etiwan No. 2, 400 lbs. to acre, made 2,180 lbs. seed cotton to acre.
Pacific, 400 lbs. " " 1,370 lbs. " " "
Stable Manure, very heavy " 1,780 lbs. " " "

I intend using Etiwan No. 2 exclusively this year.
Yours, respectfully,
J. ADGER SMYTH.

PENDLETON, S. C., October 21, 1870.

Messrs. W. C. Bee & Co.:

In answer to your request, I give my experience with the Etiwan Guano. I used the guano on cotton alongside of some on which there was no fertilizer. The land is exactly the same quality, and in the same field, being a very poor sandy soil with stiff clay subsoil. I used one sack (200 pounds) of Etiwan No. 2 per acre. The cotton was all worked alike. I will gather at least 500 pounds of cotton per acre off the land the guano was used upon, and am confident I will not get more than 150 pounds per acre off that without any fertilizer. I do not consider the guano fairly tested on account of the drouth.

Respectfully,
J. B. SIMPSON.

ALEXANDRIA, CALHOUN CO., ALA., September 17, 1870.

Mr. Chas. Pratt:

DEAR SIR: I used this year 300 lbs. Etiwan Guano—200 lbs. No. 2, and 100 lbs. No. 1. I used it on an old sedge field, which had not been cultivated for several years, at the rate of 200 lbs. per acre. The Etiwan has increased the yield of the natural land from 150 to 200 per cent. This is shown by land unmanured, between and on each side of the Etiwan's. Up to the 1st of August the No. 2 was from 15 to 20 per cent. better than No. 1, but now I can see no difference in the two. I shall use the Etiwan more largely another year.

(Signed) Very truly yours,
WM. PELHAM.

ANDERSON COUNTY, S. C., October 11, 1870.

Messrs. W. C. Bee & Co., Charleston, S. C.:

GENTS: I have used the Etiwan No. 2 on cotton this season, at the rate of 150 lbs. to the acre; and by comparison with rows of cotton in the same field, on the same kind of land, without any manure, I find that it has increased the yield at least 100 per cent. However, owing to the great reduction in the price of cotton, I do not think it will be a profitable investment for next season, unless the price of the manure can be reduced so as to correspond with the present price of cotton.

Very respectfully,
C. S. MATTISON.

WM. C. BEE & CO.,
General Agents, Adger's Wharf,
Charleston, S. C.