Analyses of commercial fertilizers and other substances useful to agriculture

William Carter Stubbs
SECOND SERIES.
No. 1.

BULLETIN
OF THE
AGRICULTURAL EXPERIMENT STATION.
WM. C. STURBS, Ph. D., Director and Official State Chemist.

ANALYSES OF
COMMERCIAL FERTILIZERS
AND
OTHER SUBSTANCES USEFUL TO AGRICULTURE.
ISSUED BY THE BUREAU OF AGRICULTURE.

T. S. ADAMS, Commissioner.

BATON ROUGE.
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Secretary.

The bulletins and reports will be sent free of charge to all farmers, by applying to Capt. T. S. ADAMS, Commissioner of Agriculture, Baton Rouge, La.
OFFICE BUREAU OF AGRICULTURE,  
Baton Rouge, La., Sept. 1, 1890; 

To His Excellency Francis T. Nicholls, Governor of Louisiana and President of the State Bureau of Agriculture; 

SIR: 

In compliance with the provisions of Act 54, of 1889, herein please find the analyses made by Dr. W. C. Stubbs, Director and Official Chemist; also a list of the Commercial Fertilizers sold in the State during the season of 1888-89, their guaranteed analyses, names of the dealers to whom licenses have been issued, etc. The demand for fertilizers during the last season has decidedly increased. The general character of the article offered for sale has been fairly within the guarantee given. The costs of the different brands have varied but little from that of the previous season, and indications are that no material changes can be expected this season. There is also included in this report analyses of an agricultural nature made for the benefit of the public, which I am sure will prove instructive to the farmers and planters of this State. 

Respectfully, 
T. S. ADAMS,  
Commissioner Bureau of Agriculture. 

LOUISIANA STATE UNIVERSITY AND A. AND M COLLEGE,  
OFFICE OF EXPERIMENT STATIONS, BATON ROUGE, LA.;  

Captain T. S. Adams, Commissioner of Agriculture, Baton Rouge, La.: 

Dear Sir—I hand herewith the Analyses of Commercial Fertilizers made since our last report, together with the Fertilizer Law, with the request that you publish same as Bulletin No. 1, 2nd Series. I have also included other analyses of an agricultural character made in the Station Laboratory, which may be of public interest. 

Respectfully submitted,  
WM. C. STUBBS, Director. 

308173
REPORT OF THE DIRECTOR.

The analyses contained in the report are of four kinds:

1. Of samples selected at the discretion of the Commissioner of Agriculture.

2. Of samples drawn by the purchaser, under regulations prescribed by the Commissioner of Agriculture.

   The above are required by law.

3. Of samples used by the Stations.

4. Of samples sent by private parties.

While the Station is not required by law to work for private parties, yet all samples sent by individual citizens of the State will be analyzed without charge; provided, the means of the Station will permit; and provided, always, that in the discretion of the Director such analyses will be conducive to public welfare.

The Fertilizer Law is herein inserted for the guidance of the public. Under it, every citizen of the State is amply protected from fraud and imposition by unscrupulous dealers, and there exists absolutely no cause for distrust in the purchase of commercial fertilizers, if the farmer will but claim the protection afforded him. The sellers of good wares are also protected, as ample facilities are afforded them of properly advertising their goods.

Only cotton-seed meal, land plaster, salt, ashes, lime, and bones not specially treated, are exempt from the provisions of this law.

Bones ground to a powder by machinery, as well as bones treated with acid, are included in the law, since they have been specially treated.

The following is the law:

Sec. 2. Be it further enacted, etc., That it shall be the duty of any manufacturer or dealer in commercial fertilizers, before the same are offered for sale in this state, or submit to the Commissioner of Agriculture a written to printed statement setting forth: First—The name and brand under which said fertilizer is to be sold, the number of pounds contained or to be contained
in the package in which it is to be put upon the market for sale, and the name or names of the manufacturers, and the place of manufacture; Second—A statement setting forth the amount of the named ingredients which they are willing to guarantee said fertilizer to contain: (1) Nitrogen, (2) Soluble Phosphoric Acid, (3) Reverted Phosphoric Acid, (4) Insoluble Phosphoric Acid, (5) Potash. Said statement, so to be furnished, shall be considered as constituting a guarantee to the purchaser that every package of such fertilizer contains not less than the amount of each ingredient set forth in the statement. This shall, however, not preclude the party making the statement from setting forth any other ingredient which his fertilizer may contain, which additional ingredient shall be considered as embraced in the guarantee above stated.

SEC. 3. Be it further enacted, etc., That every person proposing to deal in commercial fertilizers shall, after filing the statement above provided for, with the commissioner of Agriculture, receive from the said Commissioner of Agriculture a certificate stating that he has complied with the foregoing section, which certificate shall be furnished by the Commissioner without any charge therefor.

That the said certificate, when furnished, shall authorize the party receiving the same to manufacture for sale, in this State, or to deal in this State in commercial fertilizers. That no person who has failed to file the statement aforesaid and to receive the certificate of authority aforesaid, shall be authorized to manufacture for sale in this State, or to deal in this State in commercial fertilizers. And any person so manufacturing for sale, in this State, or so dealing, without having filed the aforesaid statement, and received the certificate aforesaid, shall be liable for each violation to a fine not exceeding one thousand dollars, which fine shall be recoverable before any court of competent jurisdiction, at the suit of the Commissioner of Agriculture or of any citizen, and shall be disposed of as hereafter provided.

SEC. 4. Be it further enacted, etc., That it shall be the duty of the Board of Agriculture or its Commissioners, at the opening of each season, to issue and distribute circulars, setting forth the brands of fertilizers sold in this State, their analyses as claimed
by their manufacturers or dealers, and their relative, and, if known, their commercial value.

SEC. 5. Be it further enacted, etc., That it shall be the duty of the Commissioner of Agriculture, under the regulations of the said Bureau, to cause to be prepared tags of suitable material with proper fastenings for attaching the same to packages of fertilizers, and to have printed thereon the word "guaranteed," with the year or season in which they are to be used and a facsimile of the signature of said Commissioner. The said tags shall be furnished by said Commissioner to any dealer in or manufacturer of commercial fertilizers, who shall have complied with the foregoing provisions of this act, upon the payment by said dealer or manufacturer, to the said Commissioner, of fifty cents for a sufficient number of said tags to tag a ton of such commercial fertilizer.

SEC. 6. Be it further enacted, etc., That it shall be the duty of every person, before offering for sale any commercial fertilizers in this State, to attach or cause to be attached, to each bag, barrel or package thereof, one of the tags herein before described, designating the quantity of the fertilizer in the bag, barrel or package to which it is attached. Any person who shall sell or offer for sale, any package of commercial fertilizer which has not been tagged as herein provided, shall be guilty of a misdemeanor and on conviction thereof, shall be fined in the sum of two hundred and fifty dollars for each offense, and the said person shall be, besides, liable to a penalty of one hundred and fifty dollars for each omission, which penalty may be sued for either by the commissioner of Agriculture or by any other person for the uses hereinafter declared. Any person who shall counterfeit or use a counterfeit of the tag, prescribed by this act, knowing the same to be counterfeited, or who shall use them the second time, shall be guilty of a misdemeanor, and on conviction thereof shall be fined in a sum not exceeding five hundred dollars, one-half of which fine shall be paid to the informer, which fine may be doubled or trebled at each second or third conviction, and so on progressively, for subsequent convictions.

SEC. 7. Be it further enacted, etc., That all fertilizers or chemicals for manufacturing or composting the same, offered for
sale or distribution in this State, shall have printed upon, or attached to each bag, barrel or package, in such a manner as the Commissioner of Agriculture may, by regulation, establish, the true analysis of such fertilizer or chemical as claimed by the manufacturer, showing the per cent of valuable ingredients such fertilizers or chemicals contain.

SEC. 8. Be it further enacted, etc., That the Commissioner of Agriculture may obtain, or cause to be obtained, at his discretion, fair samples of all fertilizers sold, or offered for sale in this State, from manufacturers or dealers, and shall have them analyzed by the official chemist, and shall publish the analysis for the information of the public.

SEC. 9. Be it further enacted, etc., That it shall be the duty of every person who sells a lot or package of commercial fertilizer, upon the request of the purchaser, to draw from same, and in the presence of the purchaser or his agent, a fair and correct sample, in such a manner as the Commissioner of Agriculture may, by regulation, establish.

SEC. 10. Be it further enacted, etc., That the copy of the official chemist’s analysis of any fertilizer or chemical, certified to by him, shall be admissible as evidence in any court of this State, on the trial of any issue involving the merits of said fertilizer.

SEC. 11. Be it further enacted, etc., That the Bureau of Agriculture shall adopt needful rules and regulations providing for the collection of the money arising from the sale of tags, or from fines imposed under this act, and shall require the same to be deposited with the Treasurer of the State, and only to be drawn therefrom upon the warrants issued by the Auditor of the State upon the requisition of the Commissioner of Agriculture, made in pursuance of such rules and regulations; and the said Commissioner of Agriculture shall be entitled to receive no fees for collecting or disbursing said money, except his salary as provided for by law; but he shall be allowed a clerk at the salary to be fixed by the said bureau and payable out of the fertilizer funds, and all sums of money arising from the provisions of this act shall be known as the “Fertilizer Fund,” and shall be kept by the Treasurer separate from other public funds, and shall be exclusively used, as far as they may go, to defray the expenses of developing agriculture by making practical and scientific ex-
periments in relation thereto.

SEC. 12. Be it further enacted, etc., That for the purpose of making practical and scientific tests or experiments, it shall be the duty of said Commissioner, subject to the approval of said Bureau, to enter into contracts specifying the duration and conditions thereof with a competent chemist and expert in experimental agriculture, to perform the duties of official chemist and to carry on and to conduct the experimental station established by said Bureau at Baton Rouge; and with the Louisiana Scientific Agricultural Association, having an experimental station in the Parish of Jefferson, and in making such contracts, the said commissioner shall provide that experiments be made for the development and benefit of agriculture, especially in relation to the standard crops of the State, such as cotton, sugar, rice, corn, the cereals and grasses, and the like.

SEC. 13. Be it further enacted, etc., That as compensation for the conduct of such experiments the Commissioner of Agriculture, be and he is hereby authorized to apply the net result from the sale of tags, and from fines or penalties imposed for violations of the terms of this act, to the two said stations, and, if necessary, parts of other sums that may be appropriated by law, and subject to the control of himself or said Bureau; provided, That said contract shall not give more than one-half of the result of the sale of tags, and fines, to any one of said stations; and provided further, That the said stations undertake to perform for and on behalf of the Commissioner of Agriculture, under such regulations as may be agreed on, all analysis required under this act free of any charge whatsoever.

SEC. 14. Be it further enacted, etc., That the Director of the State Experiment Station shall be considered as the official chemist of the Bureau of Agriculture. He shall also attend such chemical and agricultural conventions as may be necessary; the traveling expenses incident to such attendance shall be chargeable and collectable from the revenues derived from the sale of tags.

SEC. 15. Be it further enacted, etc., That the Commissioner of Agriculture shall keep a correct and faithful account of all tags received and sold by him, showing the number sold, to whom sold, and, as far as practicable, for what fertilizers they were intended to be used, and the amount of money collected.
therefore, and all money arising from fines, under this act.

SEC. 16. Be it further enacted, etc., That the terms “commercial fertilizers,” or “fertilizers,” where the same are used in this act shall not be held to include lime or land-plaster, cotton seed meal, ashes or common salt, or raw bone, not specially treated.

The following taken from a previous Bulletin, is herein inserted as explanatory of the terms to be subsequently used.

COMMERCIAL FERTILIZERS.

The ingredients which give value to all commercial fertilizers are, 1st, Nitrogen (Ammonia); 2d, Phosphoric Acid; 3d, Potash. A fertilizer may contain one, two, or all of these ingredients. When all are present, the compound is usually styled a “complete manure”; when only one or two are present, it is a “partial manure.”

Partial manures may consist of: (1) Nitrogen Ammonia alone; (2) Phosphoric Acid alone; (3) Potash alone; (4) Nitrogen (Ammonia) and Phosphoric Acid; (5) Phosphoric Acid and Potash; (6) Nitrogen (Ammonia) and Potash. No. 6 is rarely found in Southern markets; the others are common wares.

(1.) NITROGEN MANURES.

Nitrogen is the most costly ingredient in manures. It is offered to the trade in three forms.

a.—Mineral Nitrogen—in Nitrate of Soda and Sulphate of Ammonia.

b.—Animal Nitrogen—in Dried Blood, Tankage, Azotin, Ammonite, Fish, Scrap and Leather.

c.—Vegetable Nitrogen—in Cotton Seed, Cotton Seed Meal, Linseed Meal, Castor Pomace and Peat.

Blood Tankage, Fish Scraps and Oil Meals are highly active fertilizers, while Leather and Peat are slowly available. The result of decomposition of organic forms of Nitrogen is either Ammonia or Nitrid Acid; fourteen parts of Nitrogen yielding seventeen parts of Ammonia, or twenty-eight parts of Nitrogen forming, by nitrification, one hundred and eight parts Nitric Acid. The mineral forms of Nitrogen are highly prized in the North and England; but in the South, on account of the ease with which they are washed from the soil, they should be used with great care.

Cotton Seed Meal contains, besides Nitrogen, small amounts:
of Phosphoric Acid and Potash. A fair sample of meal, *free from hulls*, should yield 7 per cent. Nitrogen, 3 per cent. Phosphoric Acid, and 2 per cent. Potash. This is a cheap source of Nitrogen, and experiments have demonstrated that it is, perhaps the best form for Southern Agriculture. In buying it, however, *caution* is necessary to see that it is well decorticated, i. e., free from hulls. Samples containing 30 per cent. of hulls have been found on the market.

(2.) PHOSPHORIC ACID MANURES.

These are generally phosphatic rocks treated with Sulphuric Acid. Sometimes pure bones or bone black, or bone ash, are treated with the same acid, and the resulting mixtures styled Dissolved Bones or Superphosphates. When made from phosphatic rock, bone black or bone ash, they contain only Phosphoric Acid. When pure bones are used, 3 to 5 per cent. of Ammonia is also found. These phosphatic manures usually contain their Phosphoric Acid in different forms. Some of it is readily soluble in water, and is highly available as plant food; some of it is only soluble in acids, and is, therefore, only slowly, if at all, available to plants, while another portion is intermediate in solubility between the water soluble and the acid soluble.

The chemist uses Citrate of Ammonia to dissolve this form; and hence it is denominated as Citrate Soluble Phosphoric Acid. It is believed by many that this form of Phosphoric Acid has resulted from a chemical action of the water soluble upon the acid soluble, and hence it is often called "reverted," "reduced," etc. The water soluble is readily available on all soils and by all plants; the citrate soluble in soils containing vegetable matter is believed to be available to many plants, while the acid soluble is immediately useful only to certain plants and upon certain soils. The water soluble and citrate soluble are usually taken together and called Available Phosphoric Acid. In buying phosphatic manures, preference should be given, first to the water soluble, then to the citrate soluble. If there is much acid Soluble Phosphoric Acid present, inquiry should be at once made as to its origin, for the Insoluble Phosphoric Acid from bones is more easily transferred into plant food than that from rock. These three forms of Phosphoric Acid are usually called "soluble," "reduced" and "insoluble."
(3.) POTASH MANURES.

These are now obtained almost exclusively from Leopoldshall and Strassfurth, Germany, and are largely sold in this country as (a) Kainite, which is a crude product of the mines, and consists of Potash, Magnesia, Soda, Sulphuric Acid and Chlorine. This form of Potash is now extensively used in the South, either in the compost of stable manure, cotton seed and Acid Phosphate, or mixed with Acid Phosphate and cotton seed meal to form a complete manure. Whether our soil needs Potash can only be determined experimentally. After careful experimentation the right quantities can be easily determined. It is a cheap and excellent source of Potash.

(b) Sulphate of Potash, a refined product containing a large amount of Potash in a very desirable form, is extensively used in some countries, upon certain crops, notably tobacco and Irish potatoes.

c) Muriate of Potash, another refined product containing a large percentage of Potash. This salt furnishes Potash in the cheapest form.

(4.) NITROGEN AND PHOSPHORIC ACID.

Formerly bones, treated with Sulphuric Acid, were frequently found upon our market; recently, however, Potash, in some form, has always been added to them. Whether this addition has been made by the demands of the soil or by the inclination of the manufacturers, is yet to be determined. Potash is the cheapest ingredient in fertilizers, and any demand for it is readily met. At present we find on our markets a manure of this class which is being extensively used under sugar cane, viz: Tankage. This is a variable goods, containing usually, from 5 to 12 per cent. of Nitrogen, and from 6 to 20 per cent. Phosphoric Acid. This latter is in the insoluble form; but, being of animal origin, upon certain soils is slowly available.

(5.) PHOSPHORIC ACID AND POTASH.

To make Acid phosphates suitable for composting, many dealers have recently added Potash. This addition necessarily
lowers the percentage of Phosphoric Acid. Manufacturers in
and around Charleston, S. C., have adopted the custom of calling
this class of goods "Acid Phosphates," and those which contain
no Potash "Dissolved Bones." These are extensively used for
the compost of stable manure and cotton seed.

(6.) NITROGEN AND POTASH.

The great and crying want of Southern soils is Phosphoric
Acid; hence no manure without it has hitherto met with favor.
Accordingly this class of manures is wanting in the South.

COMPLETE MANURES.

Are those which contain Nitrogen, Phosphoric Acid and Potash.
For different crops these ingredients should exist in different
proportions. Before purchasing any fertilizer, the farmer should
study well the wants of his soil and his crop, and buy accord-
ingly.

Before buying, get from the dealer replies to the following
questions:

- How much Soluble Phosphoric Acid do you guarantee?
- How much Reverted Phosphoric Acid do you guarantee?
- How much Ammonia do you guarantee?
- How much Potash do you guarantee?

In a plain Acid Phosphate at least 12 per cent. available
Phosphoric Acid should be guaranteed. In cane fertilizers, 3
per cent. Ammonia and 7 per cent. Phosphoric Acid, and in
cotton fertilizers 2 per cent. Ammonia and 8 per cent. of Phos-
phoric Acid should be found.

EXPLANATION OF ANALYSES.

Nitrogen, Phosphoric Acid and Potash are the three ingre-
dients which give value to commercial fertilizers, and are the
only ones determined in official analyses.

Nitrogen is the most costly as well as the most valuable fer-
tilizing ingredient. It occurs as Organic Nitrogen in animal
and vegetable matters—easily decomposed and quickly available in
blood and meat, slowly disintegrated, and of doubtful value in
leather or peat unless specially treated.
IN ONE TON WE HAVE.

3 per cent. Nitrogen------------------ 60 lbs at 19½ cents $11 70
6 per cent. Soluble Phosphoric Acid 120 lbs at 7½ cents 9 00
4 per cent. Reverted Phosphoric Acid 80 lbs at 7½ cents 6 00
2 per cent. Potash---------------------- 40 lbs at 5 cents 2 00

Commercial value, per ton------------------ $28 70

By comparing the above with the amount paid, the consumer can easily calculate whether he has paid to much.

The work done in the Laboratory of the Station, since our last report, September 1, 1889, may be classified as follows:

18 Special Manures.
  3 Ammoniated Superphosphates and Guanos.
23 Acid Phosphates.
  6 Cotton Seed Meal.
  5 Tankage.
  4 Bone Meals.
  1 Bat Manure.
10 Natural Phosphates.
  1 Marl.
  1 Water.
 10 Paris Greens.
  2 Coals.

SPECIAL MANURES.

These are prepared by manufacturers for special crops upon certain class of soils, from formulas furnished either by the planters, the Experiment stations, or some agricultural chemist. It is quite fashionable now, to prepare manures for every crop that is extensively grown, and it is claimed by the manufacturers that in so doing a vast saving is insured the agriculturist by furnishing him the right ingredients in the proper proportions for the crop to be cultivated. Such a practice, however, looks only to the requirements of the crop grown and ignores the natural capacity of the soil, to which it is to be applied. It is entirely irrational but in the absence of a knowledge on the part of the farmer of the contents of his soil and the requirements of his
plants, it is to be recommended over the usual habit of buying one fertilizer for all kinds of crops.

SPECIAL MANURES.

Station No. 70.—Sugar Cane Fertilizer—sent by J. J. Martin, New Orleans, La.

Station No. 73.—Cane and Corn Fertilizer—made and sent by Caddo Fertilizer Co., Shreveport, La.

Station No. 74.—Cotton Fertilizer—made and sent by Caddo Fertilizer Co., Shreveport, La.

Station No. 80.—Cotton Fertilizer—made and sent by Planters’ Fertilizer Co., New Orleans, La.

Station No. 81.—Sugar Cane Fertilizers—made and sent by Planters’ Fertilizer Co., New Orleans, La.

Station No. 82.—Sugar Cane Fertilizer—\( \frac{1}{2} \) Cotton Seed Meal and \( \frac{1}{2} \) Acid Phosphate—made and sent by Planters’ Fertilizer Co., New Orleans, La.

Station No. 83.—Cotton Fertilizer—made and sent by Capital City Oil Mills, Baton Rouge, La.

Station No. 106.—Cotton Fertilizer—made and sent by Caddo Fertilizer Co., Shreveport, La.

Station No. 107.—Cane and Corn Fertilizer—made and sent by Caddo Fertilizer Co., Shreveport, La.

Station No. 108.—Red Land Fertilizer—made and sent by Caddo Fertilizer Co., Shreveport, La.

Station No. 109.—Vegetable Fertilizer—made and sent by Caddo Fertilizer Co., Shreveport, La.

Station No. 116.—Sugar Cane Fertilizer—sent by Messrs. Shattuck & Hoffman, Baldwin, La.

Station No. 117.—Sugar Cane Fertilizer—sent by Messrs. Shattuck & Hoffman, Baldwin, La.

Station No. 118.—Sugar Cane Fertilizer—sent by Messrs. Shattuck & Hoffman, Baldwin, La.

Station No. 119.—Sugar Cane Fertilizer—sent by Messrs. Shattuck & Hoffman, Baldwin, La.

Station No. 121.—Sugar Cane Fertilizer—made and sent by Messrs. H. Studniczka & Co., New Orleans, La.

Station No. 140.—Sugar Cane Fertilizer—sent by Mr. F. M. Ames, Melladon Plantation, La.
Station No. 100.—Sugar Cane Fertilizer—sent by Mr. L. M. Soniat, Dorceyville, La.

### ANALYSIS OF SPECIAL MANURES

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<td>6.29</td>
<td>6.50</td>
<td>6.28</td>
<td>2.88</td>
<td>10.18</td>
<td>.51</td>
<td>33.34</td>
</tr>
<tr>
<td>160</td>
<td>3.01</td>
<td>3.05</td>
<td>6.88</td>
<td>2.47</td>
<td>2.94</td>
<td>12.29</td>
<td>1.73</td>
<td>27.49</td>
</tr>
</tbody>
</table>

### AMMONIATED SUPERPHOSPHATES AND GUANOS

Ammoniated Superphosphates and Guanos constitute the bulk of the fertilizers sold in our markets. They contain all three of the chief fertilizing ingredients and are then really complete fertilizers, though the proportions of these ingredients are by no means constant, varying according to the manufacturer’s ideas of what constitutes a suitable fertilizer for our leading crops. Hence we find them varying largely in chemical contents and commercial value.

### AMMONIATED SUPERPHOSPHATES AND GUANOS

Station No. 68.—Fertilizer—sent by Mr. Marchand, Franklin, La.
Station No. 84.—Fertilizer—sent by Mr. H. Addison, New Orleans, La.

Station No. 120.—Fertilizer—sent by Messrs. Glassel & Rives, Shreveport, La.

### ANALYSES OF AMMONIATED SUPERPHOSPHATES AND GUANOS.

<table>
<thead>
<tr>
<th>Station Number</th>
<th>Nitrogen</th>
<th>Ammonia</th>
<th>Soluble Phosphoric Acid</th>
<th>Reverted Phosphoric Acid</th>
<th>Insoluble Phosphoric Acid</th>
<th>Total Phosphoric Acid</th>
<th>Potaash</th>
<th>Relative Commercial Value per ton</th>
</tr>
</thead>
<tbody>
<tr>
<td>68</td>
<td>3.82</td>
<td>4.64</td>
<td>1.38</td>
<td>5.50</td>
<td>.74</td>
<td>7.62</td>
<td>8.82</td>
<td>$34.06</td>
</tr>
<tr>
<td>84</td>
<td>1.78</td>
<td>2.16</td>
<td>6.53</td>
<td>.09</td>
<td>1.06</td>
<td>7.68</td>
<td>1.62</td>
<td>18.49</td>
</tr>
<tr>
<td>120</td>
<td>1.70</td>
<td>2.06</td>
<td>7.76</td>
<td>3.02</td>
<td>1.25</td>
<td>12.03</td>
<td>1.95</td>
<td>24.75</td>
</tr>
</tbody>
</table>

### ACID PHOSPHATES

Are phosphates made soluble by treatment with Sulphuric Acid, and contain usually only one ingredient, viz: Phosphoric Acid. This ingredient should be in a soluble or available form. There is a current belief that Phosphoric Acid from Bone is more valuable than that from rock. This is true only in regard to the insoluble forms of Phosphoric Acid. Soluble and reverted Phosphates are of equal agricultural value, whether from rock or Bone; and a good Acid Phosphate, whatever its source, should contain little or no Insoluble Phosphates.

### ACID PHOSPHATES

Station No. 69.—Acid Phosphate—sent by J. J. Capdeville, Baton Rouge, La.

Station No. 71.—Acid Phosphate—sent by Mr. Richard McCall, McCall P. O., La.

Station No. 72.—Caddo Acid Phosphate—prepared and sent by Caddo Fertilizer Co., Shreveport, La.

Station No. 78.—English Acid Phosphate—sent by Planters Fertilizer Co., New Orleans.

Station No. 79.—English Acid Phosphate—sent by Planters Fertilizer Co., New Orleans.

Station No. 105.—Acid Phosphate—sent by Caddo Fertilizer Co., Shreveport, La.

Station Nos. 112, 113, 114, 127, 128, 129, 150, 151, 152, 153.

Station No. 154.—Acid Phosphate—sent by North Louisiana Experiment Station, Calhoun, La.

Station No. 157.—Acid Phosphate—sent by Mr. B. Wither- 

Station No. 158.—Above Acid Phosphate (No. 157) sifted

Station No. 159.—Coarse lumps of Phosphate sifted from

### ANALYSES OF ACID PHOSPHATES.

<table>
<thead>
<tr>
<th>Station Number</th>
<th>Soluble Phosphoric Acid</th>
<th>Reverted Phosphoric Acid</th>
<th>Insoluble Phosphoric Acid</th>
<th>Total Phosphoric Acid</th>
<th>Relative Commercial value per ton of 2000 pounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>69</td>
<td>11.90</td>
<td>.99</td>
<td>.61</td>
<td>13.50</td>
<td>$19.33</td>
</tr>
<tr>
<td>71</td>
<td>11.97</td>
<td>3.92</td>
<td>.45</td>
<td>15.74</td>
<td>22.93</td>
</tr>
<tr>
<td>72</td>
<td>11.14</td>
<td>1.66</td>
<td>1.54</td>
<td>14.34</td>
<td>19.20</td>
</tr>
<tr>
<td>78</td>
<td>12.10</td>
<td>1.79</td>
<td>.32</td>
<td>14.21</td>
<td>20.83</td>
</tr>
<tr>
<td>79</td>
<td>11.72</td>
<td>1.13</td>
<td>.13</td>
<td>15.49</td>
<td>22.27</td>
</tr>
<tr>
<td>105</td>
<td>10.31</td>
<td>2.77</td>
<td>1.25</td>
<td>14.33</td>
<td>19.62</td>
</tr>
<tr>
<td>112</td>
<td>8.24</td>
<td>3.32</td>
<td>3.74</td>
<td>15.30</td>
<td>17.34</td>
</tr>
<tr>
<td>113</td>
<td>8.19</td>
<td>3.42</td>
<td>3.30</td>
<td>14.91</td>
<td>17.41</td>
</tr>
<tr>
<td>114</td>
<td>8.32</td>
<td>3.94</td>
<td>3.52</td>
<td>14.78</td>
<td>16.89</td>
</tr>
<tr>
<td>127</td>
<td>8.56</td>
<td>4.04</td>
<td>3.01</td>
<td>15.61</td>
<td>18.90</td>
</tr>
<tr>
<td>128</td>
<td>11.52</td>
<td>2.85</td>
<td>2.51</td>
<td>16.38</td>
<td>20.80</td>
</tr>
<tr>
<td>129</td>
<td>10.16</td>
<td>3.25</td>
<td>3.04</td>
<td>16.47</td>
<td>20.11</td>
</tr>
<tr>
<td>130</td>
<td>8.24</td>
<td>5.26</td>
<td>2.69</td>
<td>16.19</td>
<td>20.25</td>
</tr>
<tr>
<td>131</td>
<td>12.32</td>
<td>2.85</td>
<td>2.30</td>
<td>17.47</td>
<td>22.75</td>
</tr>
<tr>
<td>132</td>
<td>12.64</td>
<td>1.12</td>
<td>1.98</td>
<td>15.74</td>
<td>20.64</td>
</tr>
<tr>
<td>133</td>
<td>12.00</td>
<td>2.15</td>
<td>2.49</td>
<td>16.64</td>
<td>21.22</td>
</tr>
<tr>
<td>134</td>
<td>11.20</td>
<td>2.85</td>
<td>2.72</td>
<td>16.77</td>
<td>21.07</td>
</tr>
<tr>
<td>135</td>
<td>11.84</td>
<td>1.64</td>
<td>2.65</td>
<td>16.13</td>
<td>20.22</td>
</tr>
<tr>
<td>136</td>
<td>12.80</td>
<td>1.67</td>
<td>2.30</td>
<td>16.77</td>
<td>21.70</td>
</tr>
<tr>
<td>137</td>
<td>12.16</td>
<td>2.82</td>
<td>3.8</td>
<td>15.38</td>
<td>22.37</td>
</tr>
<tr>
<td>138</td>
<td>12.08</td>
<td>2.68</td>
<td>1.06</td>
<td>13.82</td>
<td>22.14</td>
</tr>
<tr>
<td>139</td>
<td>8.36</td>
<td>3.46</td>
<td>1.06</td>
<td>14.88</td>
<td>18.63</td>
</tr>
<tr>
<td>154</td>
<td>5.96</td>
<td>2.24</td>
<td>1.57</td>
<td>9.73</td>
<td>12.24</td>
</tr>
</tbody>
</table>

### COTTON SEED MEAL.

This is our cheapest and best source of Nitrogen. It is largely used all over Louisiana as a fertilizer. Being a feed stuff, it is excluded from the fertilizer law. Hence, great care is necessary in its purchase, to see that it is well decorticated, i.e. free from hulls. Pure, undamaged meal should be dry, pulverulent, and of
a bright yellow color. Hulls in the meal can easily be detected by close examination, or by running a small quantity of meal through a common kitchen sifter, when the hulls will separate. Damaged meal has a dark color and while it is probably unfit for cattle food, it is rarely injured as a fertilizer. The commercial value of cotton seed meal, reckoned by our tariff, is far in excess of the actual value in New Orleans.

Station Nos. 87 and 88.—Cotton Seed Meals, sent by Messrs. Trosclair & Robichaux, Thibodaux, La.

Station No. 111.—Cotton Seed Meal, sent by Capt. J. N. Pharr, Berwick, La.

Section No. 115.—Cotton Seed Meal—Sent by Messrs. Shattuck & Hoffman, Baldwin, La.

Station No. 141.—Cotton Seed Meal, sent by Mr. F. M. Ames, Milladon Plantation, La.

Station No. 153.—Cotton Seed Meal, sent by North Louisiana Experiment Station, Calhoun La.

<table>
<thead>
<tr>
<th>Station Number</th>
<th>Nitrogen</th>
<th>Ammonia</th>
<th>Total Phosphoric Acid</th>
<th>Potash</th>
</tr>
</thead>
<tbody>
<tr>
<td>87</td>
<td>6.92</td>
<td>8.11</td>
<td>3.95</td>
<td>1.68</td>
</tr>
<tr>
<td>88</td>
<td>6.98</td>
<td>8.48</td>
<td>3.58</td>
<td>1.62</td>
</tr>
<tr>
<td>111</td>
<td>7.38</td>
<td>8.96</td>
<td>2.98</td>
<td>1.37</td>
</tr>
<tr>
<td>115</td>
<td>7.15</td>
<td>8.68</td>
<td>3.09</td>
<td>Not determined</td>
</tr>
<tr>
<td>141</td>
<td>7.39</td>
<td>8.98</td>
<td>3.04</td>
<td>1.48</td>
</tr>
<tr>
<td>153</td>
<td>6.69</td>
<td>8.13</td>
<td>3.32</td>
<td>1.58</td>
</tr>
</tbody>
</table>

A good meal should contain 7 per cent Nitrogen, 3 per cent Phosphoric Acid and 1\(\frac{1}{2}\) to 2 per cent Potash.

TANKAGE.

This fertilizer is growing in popularity in this State, and its extending use attests its supposed profitable results. It varies greatly in composition, as the analyses below will show. It is a refuse product of the slaughter house, and consists essentially of bone and meat which collects at the bottom of tanks in which the wastes of slaughter houses are cooked to extract the grease. When bone predominates, the Phosphoric Acid content is large.
and the Nitrogen small and the action of both is slow. When meat is the chief ingredient, the per cent. of Nitrogen is large and the Phosphoric Acid low, and the action (especially of Nitrogen) is quite satisfactory.

Station No. 36.—Tankage, sent by Dr. N. S. Lupton, State Chemist, Auburn, Ala.

Station No. 77.—Tankage, sent by Mr. J. C. Morris, New Orleans, La.

Station No. 99.—Tankage, sent by Messrs. B. Lemann & Co. Donaldsonville, La.

Station No. 110.—Tankage, sent by Messrs. Glassell & Rives, Shreveport, La.


ANALYSES OF TANKAGE.

<table>
<thead>
<tr>
<th>Station Number</th>
<th>Nitrogen</th>
<th>Ammonia</th>
<th>Total Phosphoric Acid</th>
<th>Reverted Phosphoric Acid</th>
<th>Insoluble Phosphoric Acid</th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
<td>7.07</td>
<td>8.58</td>
<td>8.96</td>
<td></td>
<td></td>
</tr>
<tr>
<td>77</td>
<td>5.41</td>
<td>6.57</td>
<td>15.84</td>
<td>14.08</td>
<td></td>
</tr>
<tr>
<td>99</td>
<td>6.46</td>
<td>7.85</td>
<td>16.70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>110</td>
<td>5.78</td>
<td>7.02</td>
<td>8.47</td>
<td>12.99</td>
<td>5.31</td>
</tr>
<tr>
<td>122</td>
<td>6.97</td>
<td>8.47</td>
<td>17.02</td>
<td>16.00</td>
<td>28.80</td>
</tr>
</tbody>
</table>

BONE MEAL.

Bones ground to a powder are largely used in some countries as a fertilizer, and are held in high esteem. They are not popular in the South. The more finely ground they are, the higher their commercial value. Hence, in estimating their value, both a mechanical and chemical analysis are necessary.

Station No. 85.—Raw Bone, sent by
Station No. 86.—Raw Bone, sent by
Station Nos. 175 and 176.—Bone Meals, prepared and sent by Messrs. H. Studniezka & Co., New Orleans, La.

ANALYSES OF BONE MEAL.

<table>
<thead>
<tr>
<th>Station Number</th>
<th>Nitrogen</th>
<th>Ammonia</th>
<th>Total Phosphoric Acid</th>
</tr>
</thead>
<tbody>
<tr>
<td>85</td>
<td>3.01</td>
<td>3.65</td>
<td>17.02</td>
</tr>
<tr>
<td>86</td>
<td>1.64</td>
<td>1.99</td>
<td>16.00</td>
</tr>
<tr>
<td>175</td>
<td>2.51</td>
<td>3.05</td>
<td>28.80</td>
</tr>
<tr>
<td>176</td>
<td>4.84</td>
<td>5.87</td>
<td>22.27</td>
</tr>
</tbody>
</table>
**BAT MANURE.**

The ordure of Bats often accumulates in large quantities in caves, roofs of houses, etc. When pure it is an excellent manure but is often mixed with sand and other adulterants. The supply too is always limited.

The sample analyzed was taken from the attic of one of the buildings formerly used as U. S. Barracks, at Baton Rouge, La.

ANALYSES OF BAT MANURE:

<table>
<thead>
<tr>
<th>Station No</th>
<th>Description</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Soluble Phosphoric Acid</td>
<td>2.37</td>
</tr>
<tr>
<td></td>
<td>Reverted Phosphoric Acid</td>
<td>1.24</td>
</tr>
<tr>
<td></td>
<td>Insoluble Phosphoric Acid</td>
<td>1.45</td>
</tr>
<tr>
<td></td>
<td>Total Phosphoric Acid</td>
<td>4.06</td>
</tr>
<tr>
<td></td>
<td>Nitrogen</td>
<td>8.75</td>
</tr>
<tr>
<td></td>
<td>Ammonia</td>
<td>10.62</td>
</tr>
<tr>
<td></td>
<td>Potash</td>
<td>1.39</td>
</tr>
<tr>
<td></td>
<td>Commercial Value</td>
<td>$40.78</td>
</tr>
</tbody>
</table>

**NATURAL PHOSPHATES.**

Under this head are included all of the natural phosphates found on the small islands in the Caribbean Sea and elsewhere. They are deposits made by birds in a rainy climate, therefore the Nitrogen and soluble phosphates have been removed, leaving only the less soluble phosphates. Upon soils rich in vegetable matter, these phosphates may economically supplant the soluble phosphates, but for annual crops upon most of the soils of the South, the latter are to be preferred. The following have been analysed:

Station No. 23.—Swan Island Guano, sent by Sugar Experiment Station, New Orleans.

Station No. 48.—Concentrated Keystone Phosphate, sent by Dr. N. T. Lupton, Auburn, Alabama.

Station Nos. 75 and 76.—Natural Phosphates, sent from Florida.

Station No. 102.—Natural Phosphate, found in Iberia parish.

Station No. 142.—Natural Phosphate, sent by Planters' Fertilizer Co., New Orleans, La.

Station No. 171.—Natural Phosphate, sent by Planters' Fertilizer Co., New Orleans, La.

Station No. 172.—Natural Phosphate, sent by Planters' Fertilizer Co., New Orleans, La.
Station No. 173.—Natural Phosphate, sent by Planters' Fertilizer Co., New Orleans, La.

Station No. 174.—Natural Phosphate, sent by Planters' Fertilizer Co., New Orleans, La.

ANALYSES OF NATIONAL PHOSPHATE.

<table>
<thead>
<tr>
<th>STATION NUMBER</th>
<th>PHOSPHORIC ACID</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>39.55</td>
</tr>
<tr>
<td>76</td>
<td>34.05</td>
</tr>
<tr>
<td>102</td>
<td>.47</td>
</tr>
<tr>
<td>142</td>
<td>.77</td>
</tr>
<tr>
<td>171</td>
<td>39.99</td>
</tr>
<tr>
<td>172</td>
<td>29.31</td>
</tr>
<tr>
<td>173</td>
<td>24.70</td>
</tr>
<tr>
<td>174</td>
<td>31.23</td>
</tr>
</tbody>
</table>

Station No. 23—
Soluble Phosphoric Acid...........................................1.02
Reverted Phosphoric Acid............................................16.14
Insoluble Phosphoric Acid...........................................7.42
Total Phosphoric Acid................................................24.58

Station No. 48—
Insoluble Phosphoric Acid...........................................16.20
Reverted Phosphoric Acid............................................28.32
Total Phosphoric Acid................................................44.52

MARL.

Is a mixture of sand and clay with carbonate of lime. Sometimes it contains notable quantities of phosphoric acid and potash which greatly enhances its value as a fertilizer. Unless these substances are present in goodly quantities, it will rarely pay to transport any distance. Marl containing only carbonate of lime, must be used in large quantities to produce much effect; therefore it is rarely economical to haul even very short distances.

Station No. 27.—Marl from Bienville Parish, sent by Col. Hammet, of Gibbs, La.

ANALYSES OF MARL.

<table>
<thead>
<tr>
<th>Sand and Insoluble Matter</th>
<th>26.72</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phosphoric Acid</td>
<td>.49</td>
</tr>
<tr>
<td>Lime</td>
<td>36.10</td>
</tr>
<tr>
<td>Equivalent to Carbonate of Lime</td>
<td>64.46</td>
</tr>
</tbody>
</table>

This marl can be used in the neighborhood where it is found providing the expense of excavating be not too great. Its content of Phosphoric Acid and Lime would justify local use.
however must be supplied in large quantities per acre, say 50 to 100 bushels per acre, and it is best applied in connection with a pea crop, the latter to be turned under.

**WATER.**

Mr. T. H. Jones sent from Reserve Plantation, a sample of water which had not seemed to agree with stock drinking it. The analysis condemned it for such use, as well as for boiler purposes.

**ANALYSES OF WATER.**

Station No. 161.

<table>
<thead>
<tr>
<th>Substance</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mineral suspended matter</td>
<td>1.98 grains per gallon</td>
</tr>
<tr>
<td>Total dissolved solids</td>
<td>131.37</td>
</tr>
<tr>
<td>Organic dissolved solids</td>
<td>15.16</td>
</tr>
<tr>
<td>Mineral dissolved solids</td>
<td>116.21</td>
</tr>
<tr>
<td>Soluble Silica</td>
<td>1.63</td>
</tr>
<tr>
<td>Lime</td>
<td>31.03</td>
</tr>
<tr>
<td>Alumina</td>
<td>1.40</td>
</tr>
<tr>
<td>Magnesia</td>
<td>12.25</td>
</tr>
</tbody>
</table>

The bases were combined with sulphuric, hydrochloric and carbonic acids, together with a trace of phosphoric acid. Potash and soda were also present.

**PARIS GREEN.**

This chemical is largely used in this State as an insecticide. The cotton caterpillar so injurious some years, can be completely destroyed by the proper application of this poison. So great has been the demand for this poison, that unscrupulous dealers have already begun the nefarious practice of adulteration. To protect the farmers and planters against spurious articles, the last legislature passed a Paris Green Act No. 151, which fully protects every farmer or planter in the State. The necessity for such a law, is evident from the Station finding samples offered for sale in this State without even a trace of arsenic in it.

Since the Bill to regulate the sale of Paris Green was introduced into the Legislature, the following samples have been received by the Station for analysis.


Station No. 146.—Manufactured and sent by Messrs. C. T.
Station No. 147.—Sent by Messrs. N. Gregg & Sons, Shreveport, La.
Station No. 148.—Manufactured and sent by Messrs. Sondheim, Alsberg & Co., New York.
Station No. 149.—Sent by Messrs. Finlay & Brunswig, New Orleans, La.
Station No. 160.—Sent by Hon. G. W. Bolton, Rapides Parish, La.
Station No. 169.—Sent by Messrs Finlay & Brunswig, New Orleans, La.
Station No. 170.—Sent by Messrs. Finlay & Brunswig, New Orleans, La.

ANALYSIS OF PARIS GREEN.

<table>
<thead>
<tr>
<th>STATION NUMBER</th>
<th>ARSENIC ACID</th>
</tr>
</thead>
<tbody>
<tr>
<td>145</td>
<td>56.40</td>
</tr>
<tr>
<td>146</td>
<td>41.28</td>
</tr>
<tr>
<td>147</td>
<td>55.91</td>
</tr>
<tr>
<td>148</td>
<td>57.06</td>
</tr>
<tr>
<td>149</td>
<td>53.74</td>
</tr>
<tr>
<td>150</td>
<td>50.16</td>
</tr>
<tr>
<td>151</td>
<td>55.72</td>
</tr>
<tr>
<td>160</td>
<td>55.18</td>
</tr>
<tr>
<td>169</td>
<td>50.26</td>
</tr>
<tr>
<td>170</td>
<td>49.82</td>
</tr>
</tbody>
</table>

COAL,

Station No. 3.—Coal sent by Hon. E. W. Sutherlin, Mansfield, La.
Station No. 11.—Coal, sent by an unknown party in Mansfield, La.

ANALYSES OF BITUMINOUS COAL.

<table>
<thead>
<tr>
<th>Station Number</th>
<th>Water</th>
<th>Combustible matter</th>
<th>Coke</th>
<th>Ash</th>
<th>Sulphur</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>17.79</td>
<td>38.29</td>
<td>36.57</td>
<td>7.35</td>
<td>1.81</td>
</tr>
<tr>
<td>11</td>
<td>19.53</td>
<td>38.45</td>
<td>37.62</td>
<td>4.20</td>
<td>0.92</td>
</tr>
</tbody>
</table>