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NORTH CAROLINA  
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BOTANICAL  
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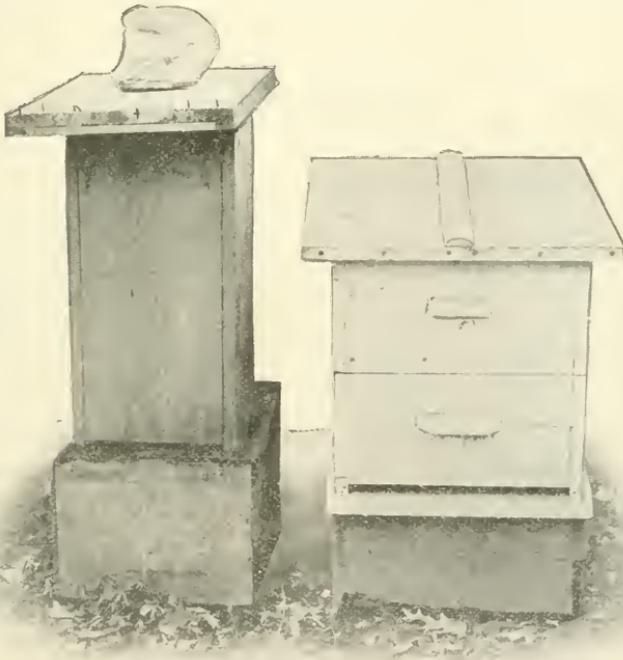
JANUARY, 1908.

Number 1.

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BEE-KEEPING IN NORTH CAROLINA.



The crude, plain box hive, as shown at the left, produces each year an average of 27½ pounds of honey, worth \$2.60.

The frame hive with super, shown at the right, produces each year an average of 37½ pounds of honey, worth \$4.13. Therefore, USE FRAME HIVES. (Photo by Prof. Hutt). (See page 18).

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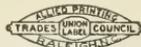
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## SUMMARY.

THE MORE IMPORTANT FACTS BROUGHT OUT IN THIS BULLETIN ARE AS FOLLOWS: FROM A CAREFUL STUDY OF DETAILED REPORTS FROM 360 BEE-KEEPERS OWNING A TOTAL OF OVER 10,400 COLONIES, WE FIND THAT ON THE WHOLE, THE BEE-KEEPING INDUSTRY IS MUCH MORE LARGELY DEVELOPED IN THE EASTERN THAN IN THE MIDDLE OR WESTERN SECTIONS OF THE STATE, THOUGH THE ACTUAL YIELD OF HONEY SEEMS TO BE ABOUT THE SAME IN ALL SECTIONS. THE ITALIAN BEES ARE DECIDEDLY SUPERIOR TO EITHER THE HYBRIDS OR THE BLACKS, BOTH AS TO HONEY PRODUCED AND AS TO RESISTANCE TO BEE-MOTH AND OTHER ENEMIES, BUT (IN THE EASTERN PART OF THE STATE ESPECIALLY) IT IS NECESSARY TO FREQUENTLY IMPORT FERTILIZED QUEENS TO KEEP THE STOCK PURE. THERE ARE THREE HONEY-PLANTS WHICH ARE FAR AHEAD OF ALL OTHERS, THESE BEING: 1. SOURWOOD; 2. POPLAR OR TULIP-TREE; 3. CLOVERS OF ALL VARIETIES. SOURWOOD, WHERE IT OCCURS, OUTRANKS ALL OTHER PLANTS IN QUALITY AND QUANTITY OF HONEY PRODUCED, AND ALSO COMMANDS THE BEST PRICE PER POUND. THOSE WHO DEAL IN LIQUID HONEY WOULD DO WELL TO USE MODERN EXTRACTORS RATHER THAN TO "SQUEEZE" THE HONEY OUT BY HAND. THE MODERN HIVES, MADE WITH MOVABLE FRAMES, YIELD MUCH MORE HONEY, WHICH ALSO SELLS AT A HIGHER PRICE, THAN EITHER THE CRUDE BOX HIVES OR HOLLOW-LOG "GUMS." BEE-MOTH IS ESPECIALLY DESTRUCTIVE IN LOG "GUMS," BUT MUCH LESS TROUBLESOME IN FRAME HIVES. THE DISEASE KNOWN AS FOUL-BROOD HAS BEEN TWICE REPORTED BUT NOT CONFIRMED, AND IT IS OF HIGHEST IMPORTANCE THAT OUR BEE-KEEPERS SHOULD WATCH FOR THIS DISEASE AND REPORT THE FACTS IF FOUND. THERE IS SOME SENTIMENT IN FAVOR OF A STATE BEE-KEEPERS' ASSOCIATION, BUT THE MATTER SHOULD BE VERY CAREFULLY CONSIDERED BEFORE ATTEMPTING TO ORGANIZE. A LIST OF THE LEADING BEE-KEEPERS OF THE STATE IS GIVEN IN THE LATTER PART OF THE BULLETIN.

# BEE-KEEPING IN NORTH CAROLINA.

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## A STUDY OF SOME STATISTICS ON THE INDUSTRY, WITH SUGGESTIONS AND CONCLUSIONS.

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By FRANKLIN SHERMAN, JR., Entomologist.

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### INTRODUCTION.

Bee-keeping is an old industry in this State—so old that it has been allowed in some cases to settle into ruts, which are not only unprofitable, but hard to get out of. There is perhaps no other industry in the State of equal importance and with equal opportunities for development which is so disorganized, so disconnected and suffering so badly from lack of careful attention and better methods as is the bee-keeping business. We make this remark as applying to the State as a whole, for there are some individuals who are conducting their apiaries along modern and profitable lines.

There is no State organization in which our bee-keepers meet to exchange views; there is no system of inspection by which the apiaries may be brought to a higher standard; the bee-keeping magazines have but a limited circulation with us, and there is nowhere in the State a practical bee-keeper whose special duty it is to encourage or protect this industry.

In order to see if we could reach any of the fundamental facts underlying this industry in the State, the writer—though not an actual bee-keeper—began an inquiry into the industry in the summer of 1905, which has been continued (with interruptions) to the present time. A carefully prepared sheet of questions was sent out, and all data received in reply have been carefully recorded. We have left out of account any who have less than ten colonies of bees, so that the data which we have is from actual commercial bee-keepers. We have on record replies from about 360 persons, representing a total of 10,450 colonies, located in seventy-eight counties—an average of 134 colonies for each county heard from, or an average of nearly 108 colonies for each and every county in the entire State. We feel that with such an amount of data we are warranted in deducting some conclusions regarding the industry in the State as a whole.

Of course we have not heard from anywhere near all of the commercial bee-keepers. We know positively of several from whom we have not heard. Doubtless some of the counties from which we have

heard little or nothing, have as well-developed a honey industry as any. For instance, in Madison County, on the west, we have record of 23 bee-keepers, with a total of 646 hives, while in the neighboring county of Mitchell, which is presumably just as well fitted for the industry and with perhaps as many colonies, we have record of only one man, who has 10 colonies. In the east we find Martin County with eight bee-keepers on record, owning a total of 716 colonies (average,  $89\frac{1}{2}$  each), while the neighboring county of Pitt has only one bee-keeper, with 15 colonies, on our records. We mention these instances to show that, while we have been successful in collecting much data from various parts of the State, it is probably by no means complete for all or, indeed, for any of the counties.

The list of questions which we sent out is as follows:

1. How many colonies of bees have you?
2. What race or variety of bees do you keep?
3. What is your average honey yield per hive each year?
4. What are your highest and lowest prices for honey per pound?
5. What are your principal honey plants?
6. What plant, in your opinion, yields the best *quality* of honey?
7. What plant, in your opinion, yields the largest *quantity* of honey?
8. What kind of gum, box or hive do you use?
9. Are your bees troubled with Foul-brood, Bee-moth, Paralysis, or other enemies?
10. What bee-keeping journals, if any, do you take?

This BULLETIN is based entirely on the answers to these questions, sent, as we have said, by 360 bee-keepers, representing 10,450 colonies of bees. The writer makes no pretense to any knowledge of bee-keeping, except such as he has learned from these contributors. But the inquiry is sufficiently broad and has been responded to sufficiently well, so that many facts and deductions can be positively stated, after full consideration of them all.

The author desires to acknowledge valuable assistance rendered by the numerous bee-keepers, and wishes also to express special thanks to Prof. W. N. Hutt for taking the several photographs with which THE BULLETIN is illustrated; to Mr. T. B. Parker for valuable suggestions in preparing the manuscript, and to Mr. Burton N. Gates, Expert in Apiculture, United States Department of Agriculture, for correcting some technical errors and for suggestions.

#### PRINCIPAL HONEY SECTIONS OF THE STATE.

Probably the first question that would naturally arise is, Which is the leading bee-keeping county? Or, Which section of the State is in the lead? This is not easy to answer, and several different conclusions may be reached, according to the point of view. Martin County leads in the total number of colonies on record; Washington leads in the average number of colonies owned by each bee-keeper, while

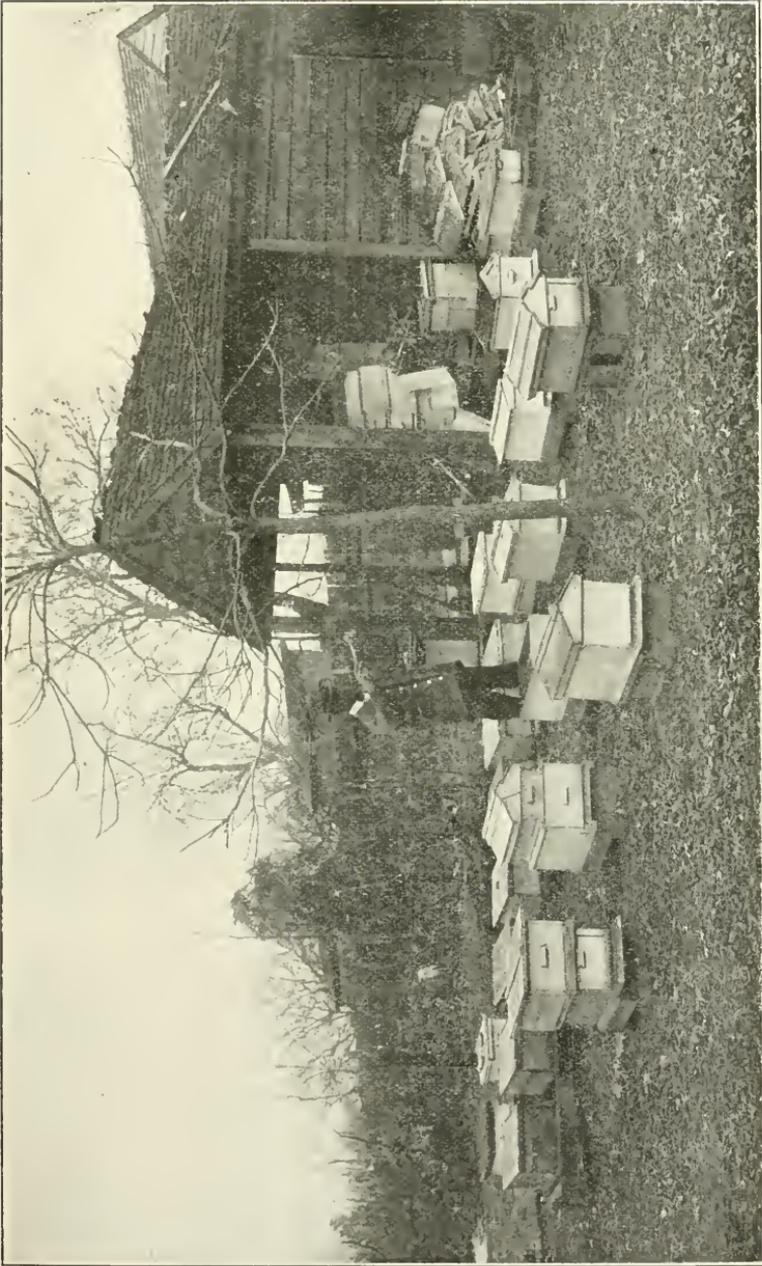


FIG. 1.—Apiary on a city lot. Home experimental apiary of Mr. W. L. Womble, Raleigh, N. C. (Photo by Prof. Hutt).

Madison leads in the total number of bee-keepers. Taking into account only those counties which have on record 250 colonies or over, we present the following table:

LEADING BEE-KEEPING COUNTIES.

County.	Section of State.	Total Colonies of Bees Reported.	Number of Bee-keepers Reporting.	Average Number Colonies Per Bee-keeper.
Beaufort -----	East -----	421	12	35
Bladen -----	East -----	353	11	32
Duplin -----	East -----	445	10	44½
Iredell -----	Central -----	325	13	25
Madison -----	West -----	646	23	28
Martin -----	East -----	716	8	89½
McDowell -----	Central -----	262	11	24
Onslow -----	East -----	484	13	37
Robeson -----	East -----	374	14	27
Washington -----	East -----	300	3	100

We see, therefore, that, so far as our records go, they show decidedly that at present the leading honey-producing region of the State is the southeastern and eastern parts, which is explained by the fact that there are in those sections thousands of acres of swamp land which never have been and perhaps never will be cultivated, but in which a number of excellent honey plants (gallberry, huckleberry, etc.) grow to perfection. All this section may, therefore, be considered as one (the eastern) region. Leaving this region, we pass across a wide belt of country in which there are no specially favored bee-keeping sections, until we get to the upper piedmont and mountain counties, where the mixed forests, wild clovers, and best of all, the famous sourwood flourish. Here the opportunities for bee-keeping are only limited by the clearing of the land for crops which are not honey producers. So far as the writer is able to judge, a skillful bee-keeper will do about as well in one of these sections as the other, with this difference: that in the piedmont and western counties, on account of colder climate, more care is needed in wintering the bees, and the favorable locations, where the best plants grow, are somewhat more restricted than in the east. To offset this disadvantage, it may be said that all bee-keepers, wherever the sourwood grows, rank it first among the honey plants, and this queen of honey producers is most abundant in the upper piedmont and lower mountain sections.

In this connection it is proper to attempt to determine where the honey yield is greatest. To attempt this for each individual county

could serve no real purpose, since in many cases the difference would be accounted for by other conditions than that of the honey flow. But if we take three typical counties, representing, respectively, the eastern, the piedmont and the western sections, we should derive some sound conclusions, since the honey plants in these three sections are decidedly different, and such differences in returns as exist are likely due to the honey flow. For this calculation we have taken the counties of Onslow, Iredell and Madison. Eliminating a number of reports which, for various reasons, cannot be used in this estimate, we construct the following table from those that are available, and, though it is based on too few reports to be absolutely conclusive, it shows about what we would judge to be the true comparison:

HONEY YIELD IN DIFFERENT SECTIONS.

County.	Location in State.	Number of Reports.	Average Yield Per Hive.
Onslow -----	East -----	-----4-----	36½ pounds.
Iredell -----	Piedmont-----	-----5-----	42½ pounds.
Madison-----	West -----	-----17-----	38 pounds.

## RACES OR VARIETIES OF BEES.

The Italian (in its various strains) is the leading bee for this State. To determine the relative desirability of the kinds, we must take into account the honey yield which each produces. The leading varieties are: Italians, Blacks, and Hybrids (or mixed), which are derived from the crossing of Italians with the Blacks. About 100 of our bee-keepers gave no estimate of their yearly yield per colony, and in other cases we have been obliged to make averages between the high and low yields which the same bee-keeper often reports. It is only the most careful bee-keepers who actually keep accurate record of the yield.

One person who keeps Carnolians reports an average yield of 64 pounds per hive; three who have Italians crossed with Carnolians report an average yield of 30 pounds per hive; but in both these instances the number reporting is too small to warrant any conclusions as to the merits of these breeds. It is only when we have a large number of reports that we can expect the general average to give an accurate idea of the true conditions. For the Italians, Blacks, and Hybrids we have a sufficient number of reports so that we can feel some confidence in the averages which they show. We have reports from 89 persons who keep Italians, 88 who keep the common Blacks, and 83 who have the Hybrid bees. A number give the yield

in gallons (extracted honey), but the majority report it in pounds (comb honey). Bringing all these reports together and averaging them, we find the following:

HONEY YIELD FROM DIFFERENT RACES OF BEES.

Race of Bees.	Total Bee-keepers Reporting.	Yield in Gallons.		Yield in Pounds.	
		Number Reporting.	Average Yield Per Hive.	Number Reporting.	Average Yield Per Hive.
Italians -----	89	4	4 gallons.	85	40½ pounds.
Hybrids -----	83	11	4 gallons.	72	34½ pounds.
Blacks -----	88	20	3½ gallons.	68	26½ pounds.

From the above we see that the Italians lead the Hybrids by an average of 6 pounds per hive each season, while the Hybrids in turn lead the Blacks by an average of 8 pounds. This puts the Italians 14 pounds ahead of the Blacks in average yield per hive each season. In these cases, also, there is a sufficient number reporting to give reliability, and they demonstrate the advantage of the Italians over the others. As regards gallons of extracted honey, there are too few reporting to give so reliable a comparison, but here we find the Italians and Hybrids standing together with an average yield of 4 gallons, while the Blacks follow at 3½ gallons. It is to be noted that only four of the 89 persons who keep Italians report the yield in gallons, eleven of those with Hybrids report in gallons, and twenty of those who keep Blacks give the yield in gallons. The Italians have an advantage in the care given them, for most of those keeping Italians use some improved type of hive, while fully half of those who keep the Blacks keep them in old hollow-log "gums." In the east, where, as already mentioned, there are interminable swamps and forests of fine bee pasturage, and where there are countless swarms of wild bees in the forests, we find the Black bees predominating in the apiaries, and this largely accounts for the low average yield. Considering, now, only the larger bee-keepers, those having fifty or more colonies, we find:

DISTRIBUTION OF ITALIAN, BLACK AND HYBRID BEES IN APIARIES OF FIFTY OR MORE COLONIES.

Section of State.	Number Keeping Italians.	Number Keeping Hybrids.	Number Keeping Blacks.
East -----	5	10	17
Piedmont -----	6	3	none.
West -----	5	none.	3

From this we see that in the east the tendency is to make use of the wild Black bee as found in the native forest, or, even when Italians are introduced, they mingle with the wild Black, producing a Hybrid. It seems to be much more difficult to keep the Italians pure in the eastern section, necessitating frequent introduction of fertilized Italian queens from other apiaries. In the middle and the mountain sections there seems to be less difficulty along this line. In the region where the sourwood abounds the Italian is the decided favorite, for of the nine large bee-keepers on record in this (the piedmont) region six keep the pure Italians, while the other three have Hybrids in which there is Italian blood.

Thus we see, taking a view of the matter from all sides, that the Italian is in the lead throughout the State as a whole, though outstripped in numbers by the Blacks in the east. The Italians also have a decided lead in the yield of honey, and are especially preferred in the sections where the finest quality of honey is made. *When a bee-keeper gets to the point of working up a fancy trade in high-priced honey, he is likely to abandon the Black bees and log "gums" and stock up with pure Italians in modern frame hives, in which the marketable honey is stored in pound sections, or in frames from which it can be easily extracted.* The main objection to this lies in the difficulty of keeping the stock pure, and the expense of continually introducing new queens; but, in view of the higher average yield from the Italians, as shown in these pages, it would seem that they more than compensate for this trouble and expense.

#### PRICES FOR HONEY.

*Comb Honey.*—There is, of course, a wide range in the prices paid for honey, depending upon the demand and supply, and also depending upon the distance to the larger towns, the source from which the honey is derived, its color, etc. The prices mentioned for comb honey (with 215 persons reporting) range from 5 to 20 cents per pound, the bulk being sold, however, at from 10 to 15 cents. Averaging all the reports for 215 persons, we get a fraction less than 12 cents as the average price for comb honey throughout the State as a whole. An effort to determine in which section of the State the highest prices prevail is only partially successful, owing to the fact that we have not enough reports from representative counties in all sections to warrant conclusions. Six persons reporting from Onslow show an average price of exactly 12 cents per pound; nine from Iredell report an average of a fraction more than 12 cents, while twenty reporting from Madison show an average of a fraction less than 13 cents per pound. This puts the three sections (east, central, and west) on practically the same basis, so far as price is concerned. But here again we find the sourwood showing the superiority of its

honey, when it is abundant enough to give a fair yield. This plant grows well in the Brushy Mountains, in northern Iredell, in Alexander and in southern Wilkes counties; and the remarks of two of the bee-keepers of this region with regard to honey prices are significant. One says: "Dark honey, 10 to 12 cents; sourwood, 15 to 20 cents"; the other reports: "Red honey, 10 cents; sourwood, 20 cents." (The sourwood produces a light or "white" honey). While the general

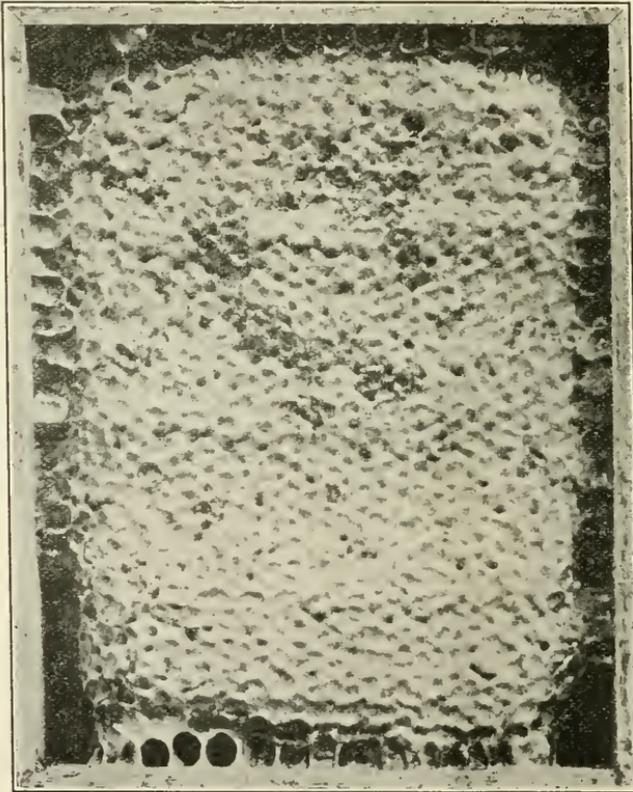


FIG. 2.—A well-filled pound section, usually retailing at 18 to 20 cents. About three-fourths actual size. (Photo by Prof. Hutt).

average of prices in the sourwood section may not be above that of other sections, yet those who take full advantage of the flow from this plant realize a better price from its honey than from any other. Some bee-keepers make a practice of taking away all surplus when the sourwood comes on, and taking it again at the close of the sourwood season, so as to have that honey pure for the fancy trade at highest prices.

In some instances the price for honey seems to be very uniform for a whole county. For instance, in Johnston County, out of seven reporting, five mention only one figure—10 cents per pound—while of the other two, one gives his usual prices as from 10 to 12½ cents, and the other gives 10 to 15 cents.

*Extracted Honey.*—The majority of our bee-keepers sell the comb honey, but in the east a great deal is extracted (often by the crudest methods) and sold. As none of our questions related directly to the extracted honey, and as even the question of price was based on comb honey, we have only very incomplete data as to the extent that extracting is practiced and the prices secured for the extracted honey, and no data whatever as to the prices secured for the wax. Most of those who reported on extracted honey are in the east, particularly in Bladen, Onslow, Duplin and neighboring counties. From these, fifteen persons report an average price of 52½ cents per gallon for extracted honey. This is a low price, and is apparently the result of several causes. The methods of extracting are often crude and cannot fail to reduce the price, resulting as they do in much sediment and foreign matter being left in the honey. The process known as “squeezing” consists simply in forcing the honey from the comb by hand into an open tub or trough, and, added to the unpleasant thought that the honey has all run over the hands and fingers of some one, is the certain fact that, while this is going on, more or less dust, fine particles of trash, etc., are blown in. Then, again, when old hollow-log “gums” or plain box hives are used, there is not that clear and certain distinction between the brood, bee-bread, and surplus honey that there is when modern hives are used; consequently, “squeezed” honey may contain bits of comb, bee-bread and an occasional wing, leg, head or body of a bee—all of which tends to depress the price. Modern extractors, by which the honey is cleanly and thoroughly removed from the combs, are not nearly so commonly used as they should be.

It seems certain to the writer that in our eastern section, where there is such endless bee pasturage, either comb or extracted honey should be capable of very profitable production, and some do produce both profitably; but surely something could be gained by using hives in which the honey is stored in frames, which then fit into a regular extractor, from which the honey is quickly and thoroughly extracted without waste, at the same time keeping it pure and appetizing. Some improvement in the methods at present employed is very desirable.

There is another point to be remembered in regard to the sale of comb and extracted honey. Recent investigations, both in this State and in other States, show that there is on the markets a great amount of adulterated and imitation food products of all sorts. Extracted honey can be adulterated, and at least one case has been discovered by

Mr. W. M. Allen, Food Chemist in our Department, where a material supposed to be extracted honey was found, when analyzed, to consist entirely of syrups, flavors, etc., which had been derived from other sources. It was purely an imitation honey, yet floating about in this

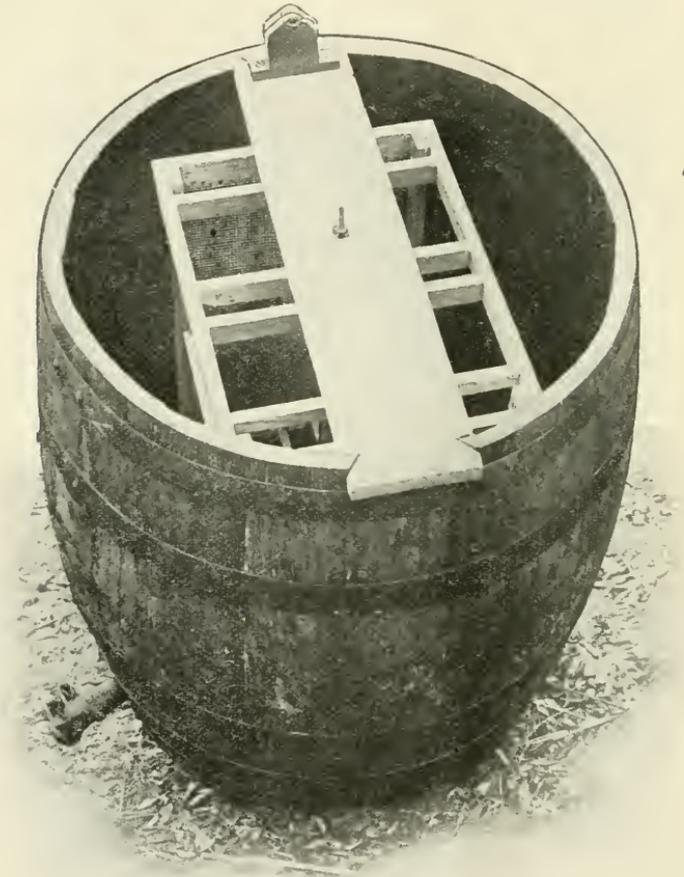


FIG. 3.—A home-made extractor. The frames filled with honey, after being uncapped with a knife, are placed in this machine and the honey thrown out by rapid turning with a crank. The honey is then drawn out by means of the spigot at bottom of the extractor. (Photo by Prof. Hutt).

material was a leg of a bee, or a wing, or a tiny bit of comb, to make the deception complete! The honest bee-keeper who sells extracted honey must sell in competition with these fraudulent and adulterated products, and he is thereby put to a disadvantage, and accordingly

gets a lower price, since everything that is sold under the name of extracted honey falls under suspicion unless the bee-keeper has a fixed trade and has the full confidence of his customers. On the other hand, comb honey cannot be imitated, so that it does not suffer so keenly from this unfair competition. The only way to adulterate comb honey is by the well-known process of feeding the bees with syrup, which is, of course, necessary at times, but should not otherwise be practiced, for the reason that it is costly at best, and impairs the quality of the product, to the detriment of the price.

#### LEADING HONEY PLANTS.

North Carolina is well supplied with native honey plants, especially in the eastern section. Three of the questions sent out by the writer bear on this subject, and the answers give an excellent view of the matter for the entire State. Of course each bee-keeper may have his own preferences or prejudices as to which plant yields the best quality of honey, but the *averages* derived from a large number of replies are likely to be near the truth. We have been over all the reports, so as to reach some definite conclusions as to the order in which our principal honey plants should be ranked. Taking the State as a whole, sourwood, poplar (sometimes called tulip tree) and the clovers (all kinds) are the three leaders. As one of the main sources of honey, the sourwood is mentioned 167 times, to 162 for poplar, and 157 for the clovers. As to quality of honey, sourwood is mentioned 121 times, to 30 for poplar, and 65 for the clovers. For quantity of honey, the sourwood is mentioned 48 times, to 57 for poplar and 39 for the clovers. Of these three leaders the poplar is the most widely distributed, and is prominently mentioned in all sections, from east to west. The sourwood is principally confined to the piedmont section, though reported also from the lower mountain localities and from the western border of the eastern region. The clovers are found in all parts, though more abundant in the mountain and piedmont sections. Next to these three we find the gallberry (*Vaccinium sp.*) and black-gum, both taking high rank and both found principally in the east. Persimmon ranks sixth and is reported chiefly from the east, several mentioning it as irregular in yield and lasting but a short time, but doing well for the short period. The basswood, or linden, comes seventh and is reported only from the west. Holly and huckleberry (low and high) are next in order, both being in the east. Buckwheat follows and is confined to the west. Ironweed (so-called, really a species of aster), while reported almost entirely from the piedmont, and especially from Mecklenburg, Cabarrus and neighboring counties, taking relatively high rank both for quality and quantity of honey produced, grows over larger areas in the piedmont and

eastern parts of the State, especially on the stiffer soils. Bringing together all these reports and tabulating them for more easy reference, we find that our twenty-four leading honey plants are as follows:

TWENTY-FOUR LEADING BEE PASTURAGE PLANTS.

PLANT. Common Name as Used in this State.	Section of State Where Most Common.	Times Mentioned as Source of Honey.	Times Mentioned for Quality of Honey.	Times Mentioned for Quantity of Honey.
1. Sourwood -----	Piedmont; little East and West ---	167	121	48
2. Poplar (Tulip tree) -----	All sections-----	162	30	57
3. Clovers (all varieties) -----	West and Piedmont; little in East -	157	63	39
4. Gallberry -----	East -----	66	28	29
5. Black-gum-----	East -----	62	21	22
6. Persimmon -----	East and Piedmont -----	55	14	7
7. Basswood (Linden, Linn) -----	West -----	38	13	8
8. Holly -----	East -----	37	11	12
9. Huckleberry -----	East -----	36	11	13
10. Buckwheat -----	West -----	27	9	12
11. Ironweed (Aster)-----	Piedmont -----	21	13	14
12. Locust (Black Locust)-----	West and Piedmont -----	19	7	2
13. Aster -----	All sections-----	14	1	10
14. Cotton -----	East and Piedmont -----	15	6	--
15. Stickweed -----	-----	9	3	4
16. Fruit trees (all kinds) -----	All sections-----	46	2	1
17. Peas (Cow-peas)-----	Piedmont and East -----	13	1	3
18. Sumac -----	-----	11	1	2
19. Nut trees (including oak) -----	All sections-----	8	--	4
20. Golden-rod -----	All sections-----	13	--	2
21. Rattan-----	East -----	7	2	1
22. Blackberry -----	All sections-----	13	--	--
23. Maple (all varieties)-----	All sections-----	11	--	--
24. Alfalfa -----	Locally grown -----	4	2	1

*Botanical.*—For the sake of technical accuracy we give herewith, so far as we can ascertain, the scientific names of our honey-plants, numbered to correspond to the above list. 1, *Oxydendron arboreum*; 2, *Liriodendron tulipifera*; 3, *Trifolium* sp.; 4, *Ilex* sp.; 5, *Nyssa* sp.; 6, *Diospyros virginiana*; 7, *Tilia* sp.; 8, *Ilex opaca*; 9, *Vaccinium* sp. and *Gaylussacia* sp.; 10, *Polygonum fagopyrum*; 11,

*Aster sp.*; 12, *Robinia pseudacacia*; 13, *Aster sp.*; 14, *Gossypium herbaceum*; 15, *Bidens sp.*; 16, . . . ; 17, *Vigna catjang*; 18, *Rhus sp.*; 19, . . . ; 20, *Soldago sp.*; 21, probably *Berchemia scandens*; 22, *Rubus sp.*; 23, *Acer sp.*; 24, *Medicago sp.*

Of the above-named plants it is probable that fruit trees, sumac, nut trees, golden-rod, blackberry, and maple are visited by the bees principally for the purpose of gathering pollen or to get honey merely for brood-rearing. A large number of other plants receive mention only a few times, indicating that they are worked by the bees only very little or under circumstances of need.

The first fourteen plants named (down to and including cotton) may be regarded as our real leaders in producing honey, and include the main dependence of our bee-keepers of all sections. Of these fourteen we find that the eastern section gets a full share of eight, the piedmont gets the benefit of eight, though the cotton does not grow throughout all the section, and clover, persimmon and ironweed are rather limited, and the western section has six. This showing gives the east a decided advantage, especially when we consider that several of the leading honey producers (gallberry, black-gum, and persimmon) are chiefly confined to the east. Tabulating these facts to show the plants with which each section is favored, we find these fourteen leading plants distributed as follows:

FOURTEEN LEADING HONEY PLANTS.

Eastern Section.	Piedmont Section.	Western Section.
Poplar.	Sourwood.	Poplar.
Gallberry.	Poplar.	Clovers.
Black-gum.	Clovers (limited).	Basswood.
Persimmon.	Persimmon (limited).	Buckwheat (limited).
Holly (limited).	Ironweed (limited).	Locust.
Huckleberry.	Locust.	Aster.
Aster.	Aster.	
Cotton.	Cotton (limited).	

Here we see that, while the piedmont section has as many of these plants as the east, they are more limited, so that the east really takes the lead in abundance and variety of honey plants. While the mountain section has basswood and buckwheat peculiar to itself, the piedmont, with its famous sourwood, can still hold its own, at least in all the localities where this plant is found.

TYPES OF HIVES. (SEE ILLUSTRATION ON FRONT OF BULLETIN).

In the studies under the headings "Races or Varieties of Bees" and "Prices for Honey" we have already referred to the matter of hives for bees, since it seemed in each case to be relevant to the subject under discussion. But here we wish to refer to the matter directly and by itself. A study of the reports shows that the old hollow-log "gums" are in much more common use in the east than in either the piedmont or the west, as shown by the following table:

TYPES OF HIVES, "GUMS," ETC., IN USE.

Section of State.	Number Persons Using Frame Hives, Bought or Homemade.	Number Persons Using Old Log "Gums."	Number Persons Using Plank Hives, Boxes, etc., of Crude Make.
East -----	63-----	40-----	43-----
Piedmont -----	144-----	8-----	24-----
West -----	36-----	6-----	1-----

The next step is to find out which of these types of hives actually brings in the most money to the bee-keeper. Since the east is the only section which uses enough of all three types of hives to render a fair judgment possible, we will confine our calculation to that section. It is a long calculation, but, when carefully compiled and put in tabulated form to show the average of yield, price, and total cash return from each type, we get the following:

RELATIVE RESULTS FROM DIFFERENT HIVES.

(Based on comb honey only, and only on data from eastern counties).

Type of Hive.	Number Reporting.	Average Yield.	Average Price Per Pound in Cents.	Value.
Log "Gums" -----	3-----	13½ pounds-----	9 (less) -----	\$1.11-----
Plank boxes, etc.-----	16-----	27½ pounds-----	10 (less) -----	2.60-----
Frame hives-----	40-----	37½ pounds-----	11 (more) -----	4.13-----

The majority of those who use the log "gums" either report the yield in gallons or do not know the yield, so that we were able to get the desired figures in only three instances. This is too small a number to give conclusive results, but, so far as they go, they show that the average yield of comb honey obtained from the "gums" is 13½ pounds; that it is worth a little less than 9 cents per pound, giving an average value of \$1.11 worth of honey per year for each log "gum." The roughly made square plank boxes—often with a re-

movable cap on top—do better, yielding, according to sixteen reports, an average of  $27\frac{1}{3}$  pounds, worth a little less than 10 cents, making a value of \$2.60 per box. The frame hives, which have a super with movable frames, do much better yet, for an average of forty reports shows a yield of  $37\frac{1}{2}$  pounds, worth a little over 11 cents per pound, making a return of \$4.13 per hive. These figures speak emphatically, and, as between the crude plank box hives and the frame hives, the number of reports is large enough to render the record quite reliable. The log “gums” rank lowest in yield, and the honey brings the lowest price. The crude plank box hives yield twice as much, and the honey commands a better price, while the frame hives exceed the box hives by ten pounds in yield, and the honey commands a still higher price. Clearly it is a mistake for any one who keeps bees for profit to depend either on the “gums” or the plain boxes, for the difference in yield, accentuated by a difference in price, makes a very decided and striking difference in the value of the honey crop that is gathered and sold. The difference in price is based upon the fact that honey is regarded as a luxury rather than a necessity, and the consumer would rather pay a higher price for the sake of having it pure and in neat shape. Hence, the *low price* for honey from “gums,” the *higher price* for honey from the rough plank boxes, and the *best price* for the honey that is made in the extracting frames in the “super” of a frame hive. And the very highest price of all is paid for it when in the little one-pound sections, which are a neat and handy table size, and especially if taken off as soon as the cells are filled and capped, before the combs are discolored.

It has already been pointed out, under the discussion of “Races or Varieties of Bees,” that the three races most used in this State differ in their yield of honey, and it would be a very nice thing to figure out the exact difference for each race of bees in each kind of hive, but this is too fine a point for the records now in our hands to justify. *Enough to know that on the whole the Italians do best, and that the bees of all races do best in the movable frame hives with super.*

It is no part of the purpose of this BULLETIN to say that any one make of frame hive is better than others, nor is it even necessary in all cases for a bee-keeper to buy a complete stock of any of the patented hives. Many of our bee-keepers make their own hives and frames, and often they invent certain little modifications which render them different from any and all other makes. It is always advisable for a bee-keeper who makes his own hives to have one standard model hive after which all others are made of precisely same dimensions so that frames or supers can be exchanged from one hive to another without difficulty. We venture to say that, if we could call

together in one mass-meeting all the bee-keepers of this State and attempt to solve the question, Which is the best bee-hive for North Carolina bee-keepers? the meeting might stay in session for a month, with no satisfactory conclusion reached. Probably a dozen different hives would have good backing, with perhaps another dozen kinds developed by individual bee-keepers, each, of course, claiming certain advantages for his own hive. *But the point is this—that the bees do better in the frame hives, where they store the honey in a super with frames or pound sections, and it is money in your pocket to get your swarms into that kind of a hive. The actual yield in pounds is greater from such hives, so that the rule holds good that the frame hives should be used, whether you sell the honey in the comb or extracted.* (See the illustration on front cover of this BULLETIN, and the explanation below it).

#### BEE-MOTH AND OTHER ENEMIES.

The question on this subject was intended to show (when considered in connection with the questions regarding the race of bees

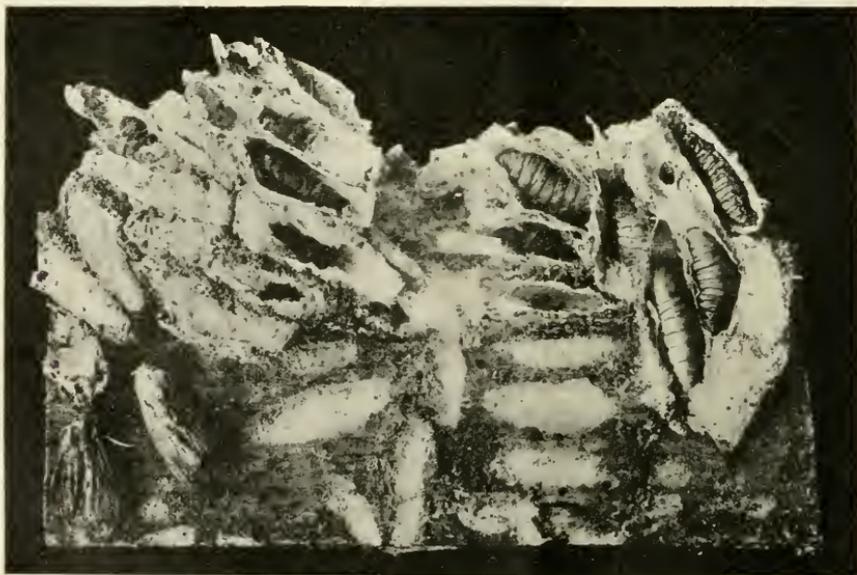


FIG. 4.—Showing different stages of the Bee-moth, and the webs which the larvæ make in the hive. Two of the adult insects are shown in the lower left-hand corner. (Photo by Prof. Hutt).

kept and the hives used) just what enemies are most serious and under what circumstances they are most destructive, so that we might from these facts reach some conclusion as to avoiding or

reducing the damage. All told, twelve different enemies were mentioned, as follows:

	<i>Number Reports.</i>
Bee-moth, reported by various names.....	211
Roaches .....	10
Paralysis .....	8
Ants .....	7
Mice .....	6
Foul-brood (perhaps erroneously reported).....	2

Also, "worthless bees," "robbers," "birds," "toads," "dysentery," and "picklebrood" were each reported once.

From this it appears that bee-moth is the one really important and formidable enemy, the others being relatively unimportant or easily controlled, although the possibilities of damage by such epidemics as paralysis, dysentery, and foul-brood (if this disease is really present in this State) are very great. So far as we know nothing is now positively known concerning foul-brood or other brood-diseases in this State. If they do exist it is of great importance that they be discovered at once, and the extent of their spread ascertained. Bee-keepers who suspect the presence of these diseases should correspond with Dr. E. F. Phillips, Bureau Entomology, U. S. Department Agriculture, Washington, D. C. But we will omit detailed discussion of the other troubles in order to do full justice to a discussion of the bee-moth.

The bee-moth is so familiar to bee-keepers as to make any introduction or description unnecessary. While most bee-keepers know it familiarly by its proper name of bee-moth, yet a number reported it under other names, such as "worms," "moth," web-worm," "weevil," "bee-worms," "fly," etc. Going carefully over all the reports of this pest, and tabulating them in connection with the race of bees kept and the type of hive used, we find that we must drop a large number because they fail to answer one or another of these questions, or, in cases where they use several types of hives, it is not possible to tell which is most to blame. Leaving out all these doubtful or incomplete records, and confining ourselves strictly to clear and positive reports (of which we have enough to make our conclusions safe), we get the following result:

BEE-MOTH AS AFFECTING DIFFERENT RACES OF BEES IN DIFFERENT KINDS OF HIVES.

Race of Bees and Hives.	Number Reporting Serious Damage.	Number Reporting Slight or No Damage.
Italians, in frame hives -----	31	37
Hybrids, in frame hives-----	42	22
Blacks, in frame hives -----	23	8
Blacks, in plank boxes, etc. -----	17	3
Blacks, in log "gums" -----	20	1

In the case of all three races of bees the bee-moth is much less destructive in the frame hives than in either boxes or log "gums"; also, it is less destructive in the boxes than in the gums, though it is only in case of the Blacks that we have enough reports to thoroughly establish the fact. A study of the table shows clearly and convincingly that Italian bees in the frame hives are least hurt by the bee-moth; Hybrids in frame hives are hurt more, while the Blacks (in the frame hives) suffer much more than either of the others. With the Blacks we carry the study further and find that they suffer worse in the plank-box hives than in the frame hives, while the ones who suffer most of all are the Blacks in the log "gums." We have seen in our studies under "Races of Bees" that the Italians produce the most honey, the Hybrids second, and the Blacks third; and here we find that, with regard to resistance to bee-moth, they take the same rank. We also found in our study of "Types of Hives" that the frame hives rank first in value of honey yield, the plank-box hives second, and the log "gums" last; and here we find that, with regard to resistance to bee-moth, they take the same rank. *Nothing is plainer than that the best combination, both for profits and for resistance to bee-moth, is to keep Italian bees in frame hives. It is equally plain that the poorest combination, both with regard to profits and bee-moth, is to keep the common Black bees in log "gums."*

It is plain, from the tables and discussion just preceding, that Italian bees in the frame hives are the least subject to the ravages of the bee-moth; but there are other very important factors not included in our questions which were repeatedly stated by bee-keepers in their replies. Most important among these is the fact that strong colonies, with vigorous queens and a full number of workers, are not usually much troubled; but if the colony becomes weak or depleted from any cause, the bee-moth is likely to gain a foothold and keep the colony weak until it may kill out the swarm entirely. Freezing, long rainy spells, poor honey flow, being queenless for a time, too severe robbing—all these things tend to deplete the colony so that the bee-moth takes possession. Most of our keen, active bee-keepers are fully aware of these facts, but every now and again we receive a mournful complaint from some one who is much worried by the bee-moth, when, likely as not, he is keeping the Black bees in old log "gums," the very conditions which enable the bee-moth to do its greatest destruction.

In order to further emphasize the points brought out in reference to the injury by bee-moth, and the methods of avoiding it, we quote from the reports of several of our North Carolina bee-keepers on the

subject. Over thirty persons made just such remarks as these, and they fit the case exactly and give a good idea of the facts:

- "Weak colonies troubled with bee-moth."
- "Bee-moth; lost six or seven weak colonies."
- "Bee-moth, in bad seasons."
- "Bee-moth, when they lose the queens."
- "Sometimes bothered with moth during winter."
- "No moths if kept strong."
- "Bee-moth bad in wet seasons."
- "No trouble unless bees get weak."
- "Bee-moth, but Italians are free if kept strong."
- "Bee-moth in log gums, but not in hives."
- "Bee-moth, after robbing."
- "Weak bees killed out; strong ones no trouble."

*The final advice with regard to bee-moth is, get Italians, keep them in frame hives, and use every effort to keep the colony populous and strong.*

#### BEE-KEEPING JOURNALS.

The last question on the list which we sent out related to journals or papers devoted especially to bee-keeping. A number mentioned that they secured information concerning bees from their farm papers, and several mentioned one or more books which they have on the subject. Out of about 340 persons who answered the question at all, 118 take one or more bee-keeping journals. Considering the fact that all of these people have at least ten colonies of bees, it seems to us that the number who are subscribers is smaller than it should be. Here, again, as with regard to hives for bees, it is a delicate matter to recommend any one above others; but, since our bee-keepers should at least be given an opportunity to know what the journals are, we give below some convenient information regarding each of the bee-keeping journals which are taken by our bee-keepers.

"*Gleanings in Bee Culture*" is published every two weeks by The A. T. Root Co., Medina, Ohio; \$1 per year.

"*American Bee Journal*" is published monthly at \$1 per year. Address 118 W. Jackson, Chicago, Ill.

"*American Bee-keeper*" is published monthly at Falconer, N. Y. Subscription, 50 cents per year; 3 years for \$1.

"*Bee-keeper's Review*" is published monthly at Flint, Mich; \$1 per year.

#### SUMMARY OF BEE-KEEPING IN THE STATE.

North Carolina is well adapted to bee-keeping, but the industry has not been well developed along the best lines. Each of the three great sections (east, piedmont, and west) has certain splendid honey plants. Our bee-keepers, especially in the east, have relied too much

on the wild Black bees, and have not been so particular about the introduction of Italians as would have been best. We are also too prone to use the old log "gun" or crude plank box hive instead of the modern frame hives. In consequence of these facts our yield of honey is smaller than need be, the price received is lower than should be, and the colonies are more easily destroyed by bee-moth than should be. These difficulties will disappear or be gradually overcome with a little closer attention to the details and fine points of the business and with more general reading and study along these lines. *Whether the bee-keeper sells comb honey or extracted honey, his best interests will be served if he will Italianize his swarms, keep them in hives with movable frames, and keep them in strong condition.*

#### WHAT ENCOURAGEMENT CAN BE GIVEN THE INDUSTRY?

The writer is not a bee-keeper and does not claim to be able to advise in bee-keeping matters, except in such general matters as are discussed in this BULLETIN. Indeed, he knows nothing about the business, except what he has learned in conducting this inquiry and in averaging and tabulating the results. When we began this work several bee-keepers at once expressed satisfaction that an effort was being made by our Department to aid the bee-keepers, and from time to time inquiries have come, which we have answered as best we could. Fortunately, most of these were about the bee-moth, the remedies for which are well known. But the bee-keeping industry never has been, and is not now, sufficiently well organized, or sufficiently important, or, at least, has not made itself sufficiently felt, to bring about the employment of a skilled and experienced man to especially aid and protect the industry; and until the industry can successfully do away with these obstacles, the employment of such a man is not probable.

Recently the State Department of Agriculture has added to its staff of workers Mr. T. B. Parker, well known to the farmers of the State. Mr. Parker has in the past been a practical bee-keeper, and at the time was an exceptionally close student of bee-keeping matters. Although he is now employed for other lines of work, our bee-keepers can in future benefit by his knowledge when they send inquiries to us. We realize that this is not providing as fully and as satisfactorily for the bee-keepers as we should like, but it is the best that can be done in the present state of the industry.

The United States Department of Agriculture at Washington has recently increased its work in apiculture, and our bee-keepers can at all times feel free to call on that Department for reasonable advice or for publications on this subject. The man in charge of this work is Dr. E. F. Phillips, Apiculturist, Bureau of Entomology, U. S. Department of Agriculture, Washington, D. C.

Several bee-keepers have suggested that a State bee-keepers' association should be organized. If there is a *large enough number* of bee-keepers who are *deeply enough interested* to actually go down in their pockets to pay dues, to buy tickets, pay hotel bills, etc., to the extent of a few dollars each year, so as to maintain such an organization and attend its meetings, then there can be no doubt that it could succeed and could eventually be a powerful factor in developing a large and profitable honey industry. But it is to be remembered that no matter where a meeting is held, it would be a long distance from some of the members, and some plan of holding the meetings in different places from year to year would be necessary. We give in the last pages of this BULLETIN a list of all bee-keepers in the State known to us who have fifty or more colonies of bees. If there is a real sentiment for a State bee-keepers' association these bee-keepers will be able to find it out among themselves. The writer stands ready to assist and encourage in any reasonable way, will give further lists of bee-keepers known to us, etc., but we cannot undertake to work up the sentiment and bring the organization into being; that is for the bee-keepers themselves. So many efforts at organization either fail utterly or are only partially successful that our bee-keepers should think carefully before attempting to form an organization. There is plenty of good work for such an organization to do, provided it has two essentials—*numbers* and *enthusiasm*—the real enthusiasm that is willing to pay something in cash even without hope of actually getting it back again, but for the purpose of furthering a worthy industry in the State.

#### LEADING BEE-KEEPERS OF THE STATE.

We give below a list of all the bee-keepers of whom we have record who have as many as fifty or more colonies of bees. There are no doubt a good many others, for, as was pointed out in the beginning of this BULLETIN, our records must be far from complete; but we feel that this list should be of some interest and use. Records of all the rest of the 360 bee-keepers (all having ten colonies or more) who have furnished information to us are in this office, available for any proper use, but it does not seem desirable to publish them all here.

## LEADING BEE-KEEPERS OF THE STATE.

County.	Section of State.	Name.	Address.	Number Colonies.
Beaufort	East	Marion Allen	Pungo	50
"	"	J. R. Pinkham	R. F. D. 4, Washington	50
"	"	Owen Warren	Bonnerton	125
Bertie	"	J. S. Holloman	Aulander	65
Bladen	"	P. S. Porter	Kelly	100
"	"	R. M. Squires	Natmore	85
Buncombe	West	Geo. I. Elmore	Alexander	120
Caswell	Piedmont	A. Yancey Kerr	Yanceyville	160
Cherokee	West	H. M. Collett	Andrews	50
"	"	J. M. Mosteller	"	55
Columbus	East	A. B. Pridgen	Cronly	100
Duplin	"	A. W. Alderman	Wallace	90
"	"	S. W. Clement	"	100
"	"	H. M. Middleton	Warsaw	100
Edgecombe	"	John W. Day	Tarboro	50
Greene	"	J. L. Newborn	Shine	65
Haywood	West	C. C. Moody	Dellwood	66
Henderson	"	Mrs. E. W. Gurley	R. F. D. 5, Hendersonville	75
Hertford	East	James Cotton	Harrellsville	55
"	"	J. W. Holloman	"	75
Hyde	"	J. A. Dunbar	Leechville	250
Iredell	Piedmont	J. W. Hager	Statesville	100
Lenoir	East	H. O. Hyatt	Kinston	100
"	"	R. E. Pittman	Grifton	70
Madison	West	Chas. L. Sams	Mars Hill	153
Martin	East	M. W. Ballard	R. F. D. 3, Williamston	90
"	"	S. D. Matthews	Hamilton	291
"	"	William Powell	Parnele	75
"	"	U. T. Riddick	Williamston	80
Martin	East	W. R. White	Williamston	100
McDowell	Piedmont	A. L. Beach	Old Fort	60
Mecklenburg	"	Thomas Donaldson	Charlotte	50
"	"	George M. Phifer	"	60
Onslow	East	J. E. Floyd	Catherine Lake	96
"	"	E. H. Morton	Verona	108
"	"	John Thompson	Marines	80
Pamlico	"	G. T. Farnell	Bayboro	200
"	"	W. J. Parker	Merritt	64

## LEADING BEE-KEEPERS OF THE STATE—continued.

County.	Section of State.	Name.	Address.	Number Colonies.
Pamlico -----	East -----	W. P. Robinson -----	Oriental -----	60
Pender -----	“ -----	D. G. Kelly -----	Canetuck -----	75
Robeson -----	“ -----	W. P. Burns -----	Maxton -----	50
“ -----	“ -----	J. W. Faircloth -----	Rowland -----	50
“ -----	“ -----	N. W. Goddy -----	R. F. D. 3, Rowland -----	75
Sampson -----	“ -----	W. R. McBride -----	R. F. D. 2, Parkersburg -----	65
Scotland -----	“ -----	Wm. Carmichael -----	Johns Station -----	50
Surry -----	Piedmont -----	Miss Ella Greenwood -----	Mount Airy -----	65
Wake -----	“ -----	W. L. Womble -----	Raleigh -----	100
Warren -----	“ -----	W. H. Pridgen -----	Creek -----	80
Washington -----	East -----	Grisbourne V. Lewis -----	Roper -----	100
“ -----	“ -----	B. R. Marriner -----	“ -----	100
“ -----	“ -----	T. T. Woodley -----	Cherry -----	100
Watauga -----	West -----	H. A. Davis -----	R. F. D. 1, Moretz -----	50
“ -----	“ -----	A. J. McBride -----	Mast -----	50
Yadkin -----	Piedmont -----	Mrs. Emma Shugart -----	Jonesville -----	194

**REPORT FROM LEAF TOBACCO WAREHOUSES FOR MONTH OF  
DECEMBER, 1907.**

Pounds sold for producers, first hand.....	12,562,597
Pounds sold for dealers.....	428,175
Pounds resold for warehouse.....	641,950
Pounds resold for other warehouses.....	13,977
Total.....	<u>13,646,699</u>

**REPORT FROM LEAF TOBACCO WAREHOUSES FOR MONTH OF  
JANUARY, 1908.**

Pounds sold for producers, first hand.....	9,144,246
Pounds sold for dealers.....	399,800
Pounds resold for warehouse.....	473,293
Pounds resold for other warehouses.....	14,353
Total.....	<u>10,031,692</u>

THE BULLETIN  
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- I. VARIETY AND DISTANCE TESTS OF CORN.
- II. VARIETY AND DISTANCE TESTS OF COTTON.
- III. FERTILIZATION AND CULTIVATION OF CORN AND COTTON.
- IV. COMPOST AND COMPOSTING.
- V. FERTILIZERS FOR TOBACCO.



CORN AND COTTON PLATS—EDGECOMBE TEST FARM.

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# EIGHTH (PARTIAL<sup>1</sup>) REPORT OF THE WORK ON THE DEPARTMENT TEST FARMS FOR SEASON 1907,<sup>2</sup>

INCLUDING

## VARIETY AND DISTANCE TESTS OF CORN AND COTTON.

---

E. W. KILGORE, STATE CHEMIST, FIELD CROPS.

---

BY

G. M. MACNIDER, SOIL WORK,

AND

R. W. SCOTT, JR., SUPERINTENDENT EDGECOMBE TEST FARM,

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R. W. COLLETT, SUPERINTENDENT TRANSYLVANIA TEST FARM.

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On the following pages are recorded the results of this year's work with the variety and distance tests of corn and cotton on the Department's Test Farms. The testing of these two factors in the production of cotton and corn is of the most fundamental importance, as is evidenced by the difference in yield of different varieties and of different distancing when grown side by side in the same field, on the same type of soil, with identical cultivation and fertilization. Its importance is further emphasized when it is considered that 64.7 per cent (17.5 per cent to cotton and 47.2 per cent to corn) of the cultivated lands of North Carolina are devoted to these two crops, with the small average annual yields of 215 pounds of lint cotton and 12.8 bushels shelled corn per acre. If by carefully conducted experiments through a number of years the most advantageous distancing and most prolific varieties of corn and cotton on the different types of soil for an average season can be ascertained, and farmers generally be induced to use the best varieties and distances in growing these crops, material assistance will have been rendered in increasing the total amounts per acre of these crops grown in the State. Increasing the average yield of corn one bushel and seed cotton fifty pounds per acre will, according to the census of 1900, increase the annual profits of the farmers of North Carolina by about \$3,650,000, allowing sixty cents per bushel for shelled corn and three and one-half cents per pound for seed cotton. This does not appear, with the hearty co-operation of farmers, such a far-distant possibility, in the light of results obtained during the past seven

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<sup>1</sup>The main portion of the work for 1902, 1903, 1904, 1905, 1906 and 1907 is reserved for publication later, when the results of our tests, which have now been running some six or seven years, will be brought together, with the view of drawing such conclusions as may be warranted on the subjects covered by the experiments.

<sup>2</sup>Thanks are due Mr. C. B. Williams, Director of the Agricultural Experiment Station, West Raleigh, for valuable assistance in the preparation of this bulletin.

<sup>3</sup>The results at the Edgecombe farm are taken for these comparisons because, it being the oldest farm, we have data for a greater number of years.

years in our testing of varieties of corn and cotton. Take, for example, the results of our variety tests at the Edgewcombe farm<sup>3</sup> during this time. In comparative variety tests of corn, with the number of varieties in the different tests varying from eight to thirty-six, we have found the differences between the one yielding the highest and the one the lowest amount of shelled corn per acre in the individual test to range from 6.2 to 26.6 bushels. With cotton the range of difference in the different tests has been all the way from 530 to 915 pounds of seed cotton per acre, when from seven to twenty-six varieties were used in the different tests. It must not be forgotten that the best distancing of any crop is principally dependent upon soil fertility, while yield of variety is governed largely by soil fertility and adaptability and by the rigidity with which selection of seed of desirable characteristics has been made.

#### LOCATION AND CHARACTER OF SOILS OF TEST FARMS.

*Edgewcombe Farm.*—This farm is located in Edgewcombe County, about midway between the towns of Tarboro and Rocky Mount, and about two miles from Kingsboro, a station on the Atlantic Coast Line Railway. The soil of this farm consists, principally, of sandy loam, with moderately fine sand, underlain by a rather tenacious sandy clay subsoil at a depth, generally, of from 8 to 12 inches. The subsoil is a moderately good sandy clay, such as is found under the larger portion of the lands of the eastern part of the State. This type of soil responds very rapidly in remunerative crops to proper fertilization and cultivation, and represents a large and important part of the coastal plain formation, which comprises something like forty per cent of the total area of the State. The types of soil on this farm are designated by the Bureau of Soils of the United States Department of Agriculture as Norfolk sandy loam and Norfolk fine sandy loam.

*Red Springs Farm.*—This farm is located in the coastal plain region, about one mile east of the corporate limits of the town of Red Springs, in Robeson County. The soil is a rather deep phase of Norfolk sandy loam, a gray medium sandy loam underlain at from 12 to 15 inches by a yellow sandy clay subsoil. This type of soil is found in considerable areas in the middle-eastern and southeastern portions of the State, and being of a dry nature and warming up early in the spring, it is especially adapted to the growth of truck and other crops where early maturity is an important consideration. Although this soil is not as strong as that found on the Edgewcombe farm, it will produce good yields under liberal fertilization and proper cultivation and rotation of crops.

*Iredell Farm.*—This farm, located in the Piedmont section of the State, lies about one and one-half miles northwest of the corporate limits of Statesville, and is bisected by the Statesville and Western Division of the Southern Railway. The soils consist of Cecil clay and Cecil sandy loam, which are the predominant types throughout the Piedmont Plateau. The surface soil of the Cecil sandy loam is a grayish brown sandy loam, while that of the Cecil clay is a deep red tenacious clay. Both are underlain by a heavy red clay subsoil. These soils are naturally strong and are susceptible of high productivity under judicious fertilization and proper cultural management. They are especially adapted to the growth of grains, grasses and clover.

*Transylvania Farm.*—This farm is located at Blantyre, on the west side of the French Broad River, twelve miles directly west of Hendersonville, and is situated on both sides of the Hendersonville and Lake Toxaway Branch of the Asheville and Spartanburg Division of the Southern Railway. The farm embraces both valley and mountain-side soils. The valley soil consists of a dark, heavy loam, containing organic matter and a liberal supply of plant-food constituents; it is known as Toxaway loam. This soil, which is typical of large areas of soil in the French Broad Valley, is deep and fertile, and generally produces large yields when not subject to too great overflows during the growing season. The mountain-side soil consists of a grayish to dark red loam, underlain at from 6 to 12 inches by a stiff clay loam; it is known as Porter's loam. Both soil and subsoil contain some rock fragments. This is one of the typical soils of the mountains of western North Carolina. It washes badly if not covered by forest or carefully looked after when cultivated. This soil, when not too steep, is devoted to some extent to general farming and fruit growing.

#### I. VARIETY, VARIETY-DISTANCE AND DISTANCE TESTS OF CORN.

*Preparation and Cultivation.*—The plats were all broke alike with a two-horse turning plow 8 to 10 inches deep and harrowed. Soon after the rows were run 4 to 5 inches deep and 4 feet apart in variety tests and the several distances in the distance tests. The stalks in the variety tests were reduced to a stand of  $2\frac{1}{2}$  feet in the row.

The fertilizer materials were applied uniformly in these drills and covered, the application being at the following rate per acre in all tests:

Three hundred pounds of a mixture of acid phosphate, dried blood and manure salt,<sup>1</sup> which contained 7 per cent available phosphoric acid,  $11\frac{1}{2}$  per cent potash and 3 per cent nitrogen (equal to 3.64 per cent ammonia), costing \$3.12, were used.

The slight ridges formed in covering the fertilizer were opened and the corn planted a little below the level, all tests of the same kind at the same farm being given the same treatment as to time of planting and otherwise. All cultivations were as nearly level as possible and rather deep early in the season, with the small hoes of the Planet Jr. Cultivator, but became shallower, using the large hoes as the season advanced and the roots extended towards the middle of the rows and nearer the surface. This system of cultivation afforded pretty thorough breaking of the land early in the season and prevented the disturbance of the root systems of the plants later. An effort was made to cultivate every ten or twelve days, as far as the weather would permit, and especially immediately after rains, in order to produce a fine dust mulch with the shallow-running plows, to retard the evaporation of the recently added moisture.

The varieties of corn were harvested and shocked on September 16 at the Edgecombe farm, on September 14 at the Iredell farm, but were not husked until December 3 and 4 at Edgecombe, November 7 at Iredell.

#### RESULTS OF VARIETY TESTS OF CORN.

The results of these tests are contained in the following tables:

<sup>1</sup>Manure salt is a potash compound containing about 20 per cent potash, principally in the form of muriate.

TABLE I—RESULTS OF

EDGECOMBE

Rank in Productivity.	Varieties Tested.		Number Stalks per Plat.		Date of Tasseling.	Average Height in Inches at Maturity.		Number of Ears per Plat.	Average Number of Ears per Stalk.	Yield per Plat.	
	Shelled Corn.	Stover.	For Perfect Stand.	By Actual Count.		Stalks.	Ears.			Large Ears—Pounds.	Nubbins—Pounds.
1	14	Wyatt's Improved Yellow -----	196	178	July 25	112.0	53.0	182	1.02	70.50	13.50
2	13	Cocke's Prolific-----	196	172	" 27	108.0	49.0	232	1.34	69.75	12.75
3	6	Weekley's Improved -----	196	219	" 25	105.0	50.0	291	1.32	66.50	13.00
4	20	Marlboro Prolific -----	196	188	" 25	102.0	42.0	243	1.29	73.25	6.00
5	1	Jarvis' Improved -----	196	162	" 20	110.0	50.0	180	1.11	67.75	7.75
6	21	Biggs' Seven Ear -----	196	195	" 27	106.0	46.0	306	1.56	64.00	14.75
7	29	American Queen -----	196	162	" 27	99.0	43.0	236	1.45	63.75	10.75
8	24	Pool's -----	196	184	" 25	96.0	36.0	217	1.17	58.00	11.75
9	23	Boone County White -----	196	165	" 20	102.0	42.0	171	1.03	66.50	5.50
9	31	Six Ear Corn -----	196	158	" 27	108.0	52.0	225	1.42	66.50	5.50
10	34	Boone County White -----	196	171	" 22	99.0	40.0	154	.90	45.00	24.00
10	18	Hickory King -----	196	176	" 24	97.0	39.0	200	1.13	54.00	11.00
11	7	Cocke's Prolific -----	196	202	" 24	107.0	47.0	252	1.24	53.00	15.00
12	30	Reid's Yellow Dent -----	196	158	" 20	97.0	39.0	142	.89	55.25	10.50
13	33	Riley's Favorite-----	196	184	" 18	95.0	34.0	173	.94	60.50	6.00
14	8	Williams'-----	196	177	" 26	108.0	51.0	150	.84	60.75	10.00
15	16	Hickory King -----	196	204	" 23	93.0	40.0	217	1.06	53.50	9.50
16	26	Wilson's Success -----	196	160	" 26	113.0	52.0	208	1.30	57.25	9.75
17	28	Parker's Cocke's Prolific -----	196	156	" 25	96.0	41.0	204	1.30	56.25	7.25
18	19	Sanders' Improved -----	196	147	" 28	106.0	49.0	169	1.14	52.75	5.25
18	17	Sharber's-----	196	161	" 22	97.0	44.0	186	1.15	55.50	8.75
18	9	Marlboro Prolific -----	196	151	" 25	106.0	49.0	212	1.40	50.00	11.50
19	10	Southern Beauty -----	196	173	" 24	104.0	46.0	156	.90	50.50	9.25
20	3	Fry's Improved -----	196	189	" 25	110.0	53.0	166	.87	50.50	8.50
20	32	Farmers' Favorite -----	196	131	" 22	109.0	45.0	132	1.00	52.50	8.00
21	12	Brake's -----	196	160	" 25	109.0	47.0	139	.86	41.25	15.00
22	5	Holt's Strawberry-----	196	193	" 26	109.0	51.0	164	.85	45.50	12.50
22	27	Selection 77 -----	196	180	" 23	97.0	39.0	170	.94	51.00	6.75
22	15	McMackin's Gourd Seed -----	196	182	" 24	104.0	47.0	163	.89	46.50	10.25
23	4	Iowa Silver Mine -----	196	143	" 23	72.0	28.0	126	.88	44.50	11.75
24	23	Leaming Yellow -----	196	164	" 20	90.0	35.0	160	.97	49.50	7.50
25	25	Boone County Special-----	196	173	" 22	97.0	37.0	159	.91	49.25	6.00
26	7	Hastings' Prolific -----	196	211	" 30	109.0	51.0	254	1.20	38.00	15.00
27	22	Bradbury's Improved -----	196	179	" 26	103.0	47.0	172	.90	40.25	11.00
28	2	Henry Grady -----	196	172	" 25	118.0	58.0	165	.95	44.50	8.25
29	11	Mosby's Prolific -----	196	196	" 28	104.0	53.0	191	.97	37.00	9.00

## VARIETY TEST OF CORN.

## FARM.

Yield per Acre.		Number Ears to Shell One Bushel.	Pounds Ears (Grain and Cob) to Shell One Bushel.	Ears.		Shelling Capacity.		Total Weight.		Stover per Acre—Pounds.	Weight in Pounds of Measured Bushel of Shelled Corn.	Source of Seed.
Ears—Pounds.	Shelled Corn—Bushels.			Average Length—Inches.	Average Circumference—Inches.	Grain—Per Cent.	Cob—Per Cent.	Ears—Per Cent.	Stover—Per Cent.			
1864.8	27.0	106	71.5	8.70	6.90	81.1	18.9	54.1	45.9	1576	58.00	North Carolina.
1831.5	26.5	156	79.5	8.00	6.60	81.1	18.1	53.2	46.8	1610	64.50	Tennessee.
1764.9	26.2	166	71.5	7.50	6.00	83.2	16.8	45.4	54.6	2120	59.50	Iredell Test Farm.
1769.3	25.7	170	73.0	7.50	5.90	82.1	17.9	56.8	43.1	1384	60.00	South Carolina (B.P.I.)
1076.1	25.2	104	68.0	8.10	7.20	84.5	15.5	43.1	56.9	2909	57.50	North Carolina.
1748.2	24.8	206	74.0	6.25	5.37	79.5	20.5	60.5	39.5	1338	58.50	North Carolina.
1653.9	24.1	168	74.5	7.20	6.30	81.8	18.2	59.5	40.5	1121	61.00	North Carolina.
1548.4	24.0	154	73.5	6.90	5.80	87.0	13.0	55.8	44.2	1227	64.00	Georgia.
1598.4	23.6	110	70.0	8.70	7.20	82.8	17.2	55.3	44.7	1287	58.00	Tennessee.
1598.4	23.6	110	70.0	8.70	7.20	82.8	17.2	60.0	40.0	1066	58.00	Georgia.
1531.8	22.9	108	72.0	8.60	7.00	84.0	16.0	65.7	34.3	799	60.50	Indiana.
1443.0	22.9	150	70.0	6.70	6.00	89.2	10.8	50.0	50.0	1443	62.50	Virginia.
1509.6	22.4	162	77.5	7.50	5.80	83.2	16.8	43.8	56.2	1931	64.50	Edgecombe Test Farm.
1459.6	22.2	116	69.0	8.30	5.60	85.5	14.5	57.1	42.9	1093	59.00	Illinois.
1476.3	22.0	132	68.0	8.00	6.50	83.8	16.2	63.3	36.7	855	57.00	Indiana.
1570.6	21.8	114	74.5	8.80	6.90	77.8	22.2	45.6	54.4	1870	58.00	North Carolina.
1398.6	21.5	136	65.5	7.70	6.10	86.2	13.8	48.4	51.6	1487	56.50	Tennessee.
1487.4	21.2	174	70.5	7.66	5.75	80.1	19.9	53.6	46.4	1176	56.50	Virginia.
1409.7	20.1	162	70.0	7.50	6.60	80.0	20.0	55.2	44.8	1143	56.00	North Carolina.
1287.6	19.8	136	69.0	7.10	7.20	86.2	13.8	48.3	51.7	1376	59.50	Georgia.
1426.3	19.8	114	74.5	7.60	6.75	77.8	22.2	49.4	50.6	1460	58.00	North Carolina.
1365.3	19.8	154	73.5	6.80	6.05	81.6	18.4	42.4	57.6	1854	60.00	South Carolina.
1326.4	19.5	84	65.5	7.80	7.80	82.4	17.6	42.2	55.8	1671	54.00	North Carolina.
1309.8	19.4	114	74.0	8.25	6.90	83.2	16.8	33.7	66.3	2575	62.00	Georgia.
1343.1	19.4	112	72.5	9.20	6.60	81.3	18.7	57.6	42.4	988	59.00	North Carolina.
1248.7	19.1	130	72.0	7.50	6.80	86.1	13.9	43.2	56.8	1637	62.00	North Carolina.
1287.6	19.0	96	71.0	8.40	7.60	83.0	17.0	36.2	63.8	2264	59.00	Virginia.
1282.0	19.0	128	66.0	7.90	6.60	83.3	16.7	52.5	47.5	1159	55.00	Ohio.
1259.8	19.0	96	65.5	7.00	7.50	84.7	15.3	45.4	54.6	1515	55.50	Tennessee.
1248.7	18.9	120	74.0	8.00	6.90	85.1	14.9	34.0	66.0	2414	63.00	Illinois.
1265.4	18.8	130	70.0	8.10	6.60	83.5	16.5	49.7	50.3	1287	58.50	Ohio.
1226.5	18.0	112	65.5	7.90	6.90	82.4	17.6	50.2	49.8	1215	54.00	Illinois.
1176.6	17.9	192	73.0	6.80	5.90	85.6	14.4	37.8	62.2	1931	62.50	Georgia.
1137.7	17.4	112	68.5	7.40	7.00	86.1	13.9	46.5	53.5	1304	59.00	Georgia.
1171.0	17.2	96	62.0	7.30	7.60	82.2	17.8	31.0	69.0	2603	51.00	Georgia.
1021.2	15.7	152	66.5	7.20	6.00	86.4	13.6	38.3	61.7	1642	57.50	Mississippi.

TABLE I—RESULTS OF VARIETY

IREDELL

Rank in Productivity.		Varieties Tested.	Number Stalks per Plat.		Date of Tasseling.	Average Height in Inches at Maturity.		Number of Ears per Plat.	Average Number of Ears per Stalk.		Yield per Plat.	
Shelled Corn.	Stover.		For Perfect Stand.	By Actual Count.		Stalks.	Ears.		Large Ears—Pounds.	Nubbins—Pounds.		
1	21	Biggs' Seven Ear	218	128	July	26	114.0	60.0	264	2.06	138.50	20.00
2	25	American Queen	218	128	"	25	130.0	54.0	237	1.85	142.00	12.00
3	11	Southern Beauty	218	133	"	24	130.0	48.0	157	1.18	133.00	6.00
4	20	Pool's	218	141	"	18	114.0	54.0	201	1.42	126.50	11.00
5	22	Boone County White	218	146	"	18	108.0	54.0	140	.95	129.50	5.00
6	7	Cocke's Prolific	218	132	"	24	126.0	72.0	266	2.01	125.50	11.00
7	15	Marlboro Prolific	218	129	"	25	108.0	48.0	221	1.70	120.00	18.00
8	19	Selection 77	218	123	"	18	116.0	51.0	143	1.16	118.50	8.00
9	23	Goodman's Prolific	218	102	"	26	102.0	48.0	222	2.17	117.00	5.00
10	16	Jarvis' Improved	218	148	"	22	124.0	54.0	137	.92	110.00	14.50
10	10	Wilson's Success	218	108	"	20	108.0	60.0	217	2.00	122.50	16.00
11	2	Henry Grady	218	137	"	20	125.0	66.0	150	1.94	118.00	15.00
12	31	Parker's Cocke's Prolific	218	123	"	20	120.0	66.0	220	1.78	122.00	9.00
13	3	Brake's	218	149	"	20	122.0	60.0	125	.83	108.50	15.00
13	26	Boone County Special	218	138	"	18	116.0	66.0	137	.99	108.50	12.00
14	13	Hickory King	218	148	"	18	97.0	60.0	156	1.05	119.00	2.00
15	9	Weekley's Improved	218	130	"	25	114.0	60.0	206	1.58	105.00	18.00
15	6	Cocke's Prolific	218	119	"	20	124.0	60.0	169	1.42	103.00	18.00
16	18	Sanders' Improved	218	168	"	22	120.0	72.0	180	1.70	109.50	8.00
17	4	Fry's Improved	218	129	"	20	130.0	72.0	142	1.10	104.50	17.00
18	14	McMackin's Gourd Seed	218	162	"	20	100.0	60.0	138	.85	107.50	10.00
19	1	Holt's Strawberry	218	138	"	20	126.0	66.0	122	.88	114.00	6.00
20	24	Wyatt's Improved	218	126	"	25	120.0	60.0	137	1.87	114.50	8.00
21	30	Currituck	218	138	"	22	116.0	60.0	135	.97	104.50	12.00
22	28	Sharber's	218	138	"	20	122.0	66.0	133	.95	105.50	7.50
23	27	Boone County White	218	122	"	22	102.0	60.0	126	1.83	109.50	8.00
24	12	Hickory King	218	128	"	22	120.0	60.0	163	1.27	103.00	7.00
25	29	Iowa Silver Mine	218	143	"	15	99.0	48.0	143	1.00	103.00	7.00
26	8	Williams'	218	132	"	26	124.0	66.0	123	.93	106.50	11.00
27	23	Farmers' Favorite	218	119	"	18	120.0	72.0	123	1.03	106.00	6.00
28	21	Bradbury's Improved	218	118	"	25	120.0	72.0	145	1.22	92.50	11.00
29	32	Leaming Yellow	218	129	"	15	106.0	60.0	133	1.03	98.00	9.00
30	5	Mosby's Prolific	218	128	"	25	106.0	60.0	178	1.39	85.00	12.00
31	17	Six Ear Corn	218	115	"	26	114.0	66.0	230	2.00	75.50	19.00
32	15	Hastings' Prolific	218	124	"	26	127.0	72.0	180	1.45	81.00	12.00
33	32	Reid's Yellow Dent	218	123	"	18	111.0	48.0	129	1.04	88.00	4.00
34	34	Riley's Favorite	218	130	"	15	120.0	72.0	135	1.03	74.00	3.00

## TEST OF CORN—CONTINUED.

FARM.

Ears—Pounds.	Shelled Corn—Bushels.	Number Ears to Shell One Bushel.	Pounds Ears (Grain and Cob) to Shell One Bushel.	Ears.		Shelling Capacity.		Total Weight.		Stover per Acre—Pounds.	Weight in Pounds of Measured Bushel of Shelled Corn.	Source of Seed.
				Average Length—Inches.	Average Circumference—Inches.	Grain—Per Cent.	Cob—Per Cent.	Ears—Per Cent.	Stover—Per Cent.			
3170.0	46.9	210	67.5	7.00	5.75	83.0	17.0	53.7	46.3	2730	-----	North Carolina.
3180.0	45.1	183	63.2	7.00	6.00	82.0	18.0	55.0	45.0	2520	-----	North Carolina.
2880.0	43.7	118	65.9	8.00	6.75	85.0	15.0	47.2	52.8	3220	-----	North Carolina.
2750.0	43.2	162	63.6	9.00	6.00	88.0	12.0	46.2	53.8	2750	-----	Georgia.
2690.0	40.3	117	66.7	9.00	6.75	84.0	16.0	49.8	50.2	2710	-----	Indiana.
2730.0	39.6	199	68.9	8.25	6.00	81.0	19.0	43.3	55.7	3470	-----	Edgecombe Farm.
2763.0	39.4	193	70.0	7.00	6.25	80.0	20.0	44.6	55.4	3140	-----	South Carolina.
2530.0	38.9	125	65.0	8.25	6.75	86.0	14.0	47.7	52.3	2770	-----	Ohio.
2440.0	33.7	156	63.0	8.25	5.75	89.0	11.0	48.8	51.2	2560	-----	North Carolina.
2490.0	38.2	119	58.1	7.50	7.50	86.0	14.0	44.1	55.9	3110	-----	North Carolina.
2770.0	38.2	111	72.5	8.00	6.00	81.0	19.0	46.1	53.1	3230	-----	Virginia.
2630.0	38.0	114	70.0	9.25	7.00	80.0	20.0	39.1	60.9	4140	-----	Georgia.
2620.0	37.8	168	69.3	7.50	6.75	81.0	19.0	53.2	41.8	1880	-----	North Carolina.
2470.0	37.0	112	68.7	7.50	6.75	84.0	16.0	37.4	62.6	4130	-----	North Carolina.
2410.0	37.0	119	65.1	8.75	7.25	86.0	14.0	49.1	50.9	2490	-----	Illinois.
2420.0	36.7	108	65.9	8.00	6.00	85.0	15.0	43.2	56.8	3180	-----	Tennessee.
2460.0	36.4	140	67.5	8.50	6.50	83.0	17.0	42.0	57.6	3340	-----	Iredell Farm.
2520.0	36.4	163	68.1	9.25	6.25	81.0	19.0	39.6	60.4	3680	-----	Tennessee.
2350.0	36.0	164	65.2	7.50	6.00	86.0	14.0	45.1	54.9	2850	-----	Georgia.
2430.0	35.5	122	68.4	8.25	6.00	82.0	18.0	37.3	62.7	4070	-----	Georgia.
2350.0	35.2	122	66.7	8.25	7.00	84.0	16.0	42.6	57.4	3150	-----	Tennessee.
2400.0	35.1	120	63.3	9.25	7.50	82.0	18.0	35.2	64.8	4400	-----	Virginia.
2450.0	35.0	117	70.0	8.75	6.50	80.0	20.0	49.0	51.0	2550	-----	North Carolina.
2330.0	34.9	122	66.7	7.00	6.75	84.0	16.0	54.1	45.9	1970	-----	North Carolina.
2260.0	34.7	169	65.1	7.00	6.25	86.0	14.0	50.2	49.8	2240	-----	North Carolina.
2350.0	34.4	120	68.3	8.00	6.75	82.0	18.0	50.0	50.0	2350	-----	Tennessee.
2200.0	33.7	120	65.2	8.00	5.75	86.0	14.0	47.0	52.6	3200	-----	Virginia.
2200.0	33.0	133	66.6	8.00	7.50	84.0	16.0	52.3	47.7	2000	-----	Illinois.
2350.0	32.7	117	71.8	9.00	6.50	78.0	22.0	45.1	54.9	3450	-----	North Carolina.
2240.0	32.0	112	70.0	9.75	6.00	80.0	20.0	46.6	53.4	2560	-----	North Carolina.
2070.0	31.7	151	65.3	7.50	7.25	86.0	14.0	43.1	56.9	2730	-----	Georgia.
2140.0	31.3	136	68.3	7.50	7.00	82.0	18.0	54.9	45.1	1760	-----	Ohio.
1940.0	30.1	164	64.4	8.00	5.75	87.0	13.0	33.4	66.6	3860	-----	Mississippi.
1890.0	28.6	229	63.6	7.00	6.00	85.0	15.0	31.4	68.6	2920	-----	Georgia.
1860.0	28.2	200	65.9	7.25	6.00	85.5	15.0	37.2	62.8	3140	-----	Georgia.
1840.0	27.9	121	65.9	8.00	6.75	85.0	14.5	51.1	48.9	1760	-----	Illinois.
1540.0	21.3	128	72.3	7.75	6.75	84.0	16.0	48.1	51.9	1660	-----	Indiana.

TABLE II—COMPILED RESULTS OF VARIETY TESTS OF CORN.

## EDGECOMBE FARM.

Varieties Tested.	1900.		1901.		1902.		1903.		1904.		1905.		1906.		1907.		Averages.	
	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.		
Cocke's Prolific (Edgecombe.)	20.0	2	28.1	2	35.2	1	24.4	1	30.3	5	35.9	1	59.3	1	22.4	11	31.9	1
Cocke's Prolific (Tenn.)							19.9	7	26.4	12	26.8	14	41.9	9	26.5	2		
Weekley's Improved	19.4	3	29.5	1	33.5	2	19.5	10	25.5	13	35.5	2	53.1	2	26.2	3	30.2	2
Pool's					26.1	5	19.7	8			31.5	5			24.0	8		
Craig's Prolific Strawberry					29.1	3	16.1	16	27.8	8								
Sander's Improved	17.8	4	27.0	3	27.1	4	15.3	17	31.0	3	31.8	4	44.2	4	19.8	18	26.7	3
Holt's Strawberry	22.4	1	25.7	6	24.9	6	16.2	15	18.6	25	30.6	7	42.7	6	19.0	22	25.0	4
Craig's Prolific White					24.6	7	14.9	18	27.1	10	24.1	21						
Champion White Pearl.					21.6	8												
Cooley's Red Cob	17.2	6			20.6	10												
Improved Golden Dent.			22.5	7														
Champion Dent			22.2	8														
Hickory King (Tenn.)			21.4	9			20.1	6			31.2	6	40.9	11	21.5	15		
Mosby's Prolific	17.4	5							23.4	18	23.9	22	37.7	17	15.7	29		
Tatum's Choice	17.0	7																
Shaw's Improved	16.2	8																
Tennessee Yellow			26.6	5														
Killebrew's (Native)			26.9	4	21.4	9	22.4	2										
Leaming Yellow					20.0	12	21.1	4	24.6	15	24.1	21	33.6	29	18.8	24		
Brake's					20.5	11	13.7	19	28.5	7	26.9	13	40.4	13	19.1	21		
Marlboro Prolific (B. P. I.)							17.6	13	32.3	2	27.9	11	42.1	8	19.8	18		
Biggs' Seven Ear							21.4	3	32.4	1			52.2	3	24.8	6		
Iowa Silver Mine							17.3	14	25.2	14	22.3	24	36.6	21	18.9	23		
Reid's Yellow Dent							17.8	12	23.4	18	23.3	23	35.3	24	22.2	12		
Riley's Favorite							19.6	9	22.8	20	24.6	18	35.2	25	22.0	13		
Boone County White (Ind.)							19.4	11	26.8	11	23.3	23	37.6	18	22.9	10		
Boone County White (Tenn.)							17.6	13	23.9	17	28.9	9	34.5	28	23.6	9		
Number 167							16.2	15										
Selection 77							20.2	5	24.5	16	29.5	8	37.0	20	19.0	22		
Cocke's Prolific (Pou)									32.3	2								
Williams'									30.5	4	24.1	21	40.7	12	21.8	14		
Square Deal									29.6	6	25.0	17						

TABLE II—COMPILED RESULTS OF VARIETY TESTS OF CORN—CON.

EDGECOMBE FARM.

Varieties Tested.	1900.		1901.		1902.		1903.		1904.		1905.		1906.		1907.		Averages.	
	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.		
Boone County Special	---	---	---	---	---	---	---	---	27.3	9	25.2	16	34.6	27	18.0	25	---	---
McMackin's Gourd Seed.	---	---	---	---	---	---	---	---	23.3	19	25.9	15	43.2	5	19.0	22	---	---
Horse-tooth	---	---	---	---	---	---	---	---	22.3	21	---	---	---	---	---	---	---	---
Currituck	---	---	---	---	---	---	---	---	21.4	22	23.3	23	40.9	11	---	---	---	---
Thomas' Improved	---	---	---	---	---	---	---	---	20.6	23	32.4	3	32.7	30	---	---	---	---
Chester County Mammoth.	---	---	---	---	---	---	---	---	20.3	24	---	---	---	---	---	---	---	---
Hickory King (Va.)	---	---	---	---	---	---	---	---	---	---	28.1	10	34.8	26	22.9	10	---	---
Eureka	---	---	---	---	---	---	---	---	---	---	27.7	12	42.5	7	---	---	---	---
Peele's Prolific	---	---	---	---	---	---	---	---	---	---	24.6	18	37.4	19	---	---	---	---
Shellem's Prolific	---	---	---	---	---	---	---	---	---	---	24.5	19	40.2	14	---	---	---	---
Native	---	---	---	---	---	---	---	---	---	---	24.2	20	---	---	---	---	---	---
American Queen	---	---	---	---	---	---	---	---	---	---	---	---	41.1	10	24.1	7	---	---
Hastings' Prolific	---	---	---	---	---	---	---	---	---	---	---	---	39.6	15	17.9	26	---	---
Southern Beauty	---	---	---	---	---	---	---	---	---	---	---	---	38.0	16	19.5	19	---	---
Farmers' Favorite	---	---	---	---	---	---	---	---	---	---	---	---	35.8	22	19.4	20	---	---
Wilson's Success	---	---	---	---	---	---	---	---	---	---	---	---	35.7	23	21.2	16	---	---
Battle's Prolific	---	---	---	---	---	---	---	---	---	---	---	---	35.2	25	---	---	---	---
Wyatt's Improved Yellow.	---	---	---	---	---	---	---	---	---	---	---	---	---	27.0	1	---	---	---
Marlboro Prolific	---	---	---	---	---	---	---	---	---	---	---	---	---	25.7	4	---	---	---
Jarvis' Improved	---	---	---	---	---	---	---	---	---	---	---	---	---	25.2	5	---	---	---
Six Ear Corn	---	---	---	---	---	---	---	---	---	---	---	---	---	23.6	9	---	---	---
Parker's Cocke's Prolific.	---	---	---	---	---	---	---	---	---	---	---	---	---	20.1	17	---	---	---
Sharber's	---	---	---	---	---	---	---	---	---	---	---	---	---	19.8	18	---	---	---
Fry's Improved	---	---	---	---	---	---	---	---	---	---	---	---	---	19.4	20	---	---	---
Bradbury's Improved	---	---	---	---	---	---	---	---	---	---	---	---	---	17.4	27	---	---	---
Henry Grady	---	---	---	---	---	---	---	---	---	---	---	---	---	17.2	28	---	---	---

TABLE II—COMPILED RESULTS OF VARIETY TESTS OF CORN—CON.  
RED SPRINGS FARM.

Varieties Tested.	1900.		1901.		1902.		1903.		Averages.	
	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.
Native -----	22.4	1	14.1	4					18.3	1
Coman's Best -----	16.6	2								
Mosby's Prolific -----	15.4	3								
Bradbury's Improved -----	15.0	4								
Cocke's Prolific -----	14.4	5	15.3	3					14.9	2
Blount's Prolific -----	10.2	6								
Improved Golden Dent -----	10.0	7	14.1	5					12.1	4
Clarke's Mastodon -----	9.0	8								
Holt's Strawberry -----	8.4	9	17.3	2					12.9	3
Weekley's Improved -----			19.0	1						
Sanders' Improved -----			14.0	6						
Tennessee Yellow -----			13.5	7						
Hickory King (Tenn.) -----			12.4	8						
Champion Dent -----			11.3	9						



TABLE II—COMPILED RESULTS OF VARIETY TESTS OF CORN—CON.

## IREDELL FARM.

Varieties Tested.	1900.		1901.		1902.		1903.		1904.		1905.		1906.		1907.		Averages.
	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	Yield in Bushels Shelled Corn per Acre.	Rank in Productivity of Shelled Corn.	
Square Deal									20.8	21	30.6	23					
Hickory King (Va.)											33.8	11			33.7	24	
Goodman's Prolific											32.3	16			38.7	9	
Peele's Prolific											32.0	17	34.8	17			
American Queen											39.2	3	40.8	2	45.1	2	
Eureka											29.5	26	32.0	23			
Farmers' Favorite													40.5	3	32.0	27	
Battle's Prolific													38.7	10			
Southern Beauty													36.6	13	43.7	3	
Hastings' Prolific													32.7	21	28.2	32	
Jarvis' Improved															38.2	10	
Wilson's															38.2	10	
Henry Grady															38.0	11	
Parker's Cocke's Prolific.															37.8	12	
Fry's Improved															35.5	17	
Wyatt's Improved															35.0	20	
Sharber's															34.7	22	
Bradbury's Improved.															31.7	28	
Six Ear Corn															28.6	31	

TABLE III—SHOWING RELATIVE EARLINESS, YIELDS, SIZE OF EARS, HEIGHT OF STALKS AND EARS, AND PERCENTAGE OF GRAIN, COB, EARS AND STOVER OF VARIETIES OF CORN TESTED IN 1907.

EDGECOMBE FARM.

Varieties.	Rank According to the Following Characters.													
	Yield of Shelled Corn in Bushels per Acre.	Yield of Ear Corn in Pounds per Acre.	Yield of Stover in Pounds per Acre.	Percentage of Grain.	Percentage of Cob.	Largeness of Ears.	Percentage of Ears.	Percentage of Stover.	Smallness in Lbs. of Ear Corn Required to Shell Bushel of Corn.	Prolificacy of Ears per Stalk.	Earliness as Shown by Date of Silking.	Height of Stalks.	Height of Ears.	Weight of Bushel of Shelled Corn.
Wyatt's Improved -----	1	1	14	24	5	4	12	24	11	18	4	3	2	12
Cocke's Prolific (Tenn.) -----	2	2	13	24	9	18	14	22	19	5	7	6	6	1
Weekley's Improved -----	3	3	6	15	15	20	23	12	11	6	5	9	5	9
Marlboro Prolific (B. P. I.) -----	4	4	20	20	10	22	8	28	14	8	4	12	12	8
Jarvis' Improved -----	5	6	1	10	20	3	26	8	5	15	3	4	5	13
Biggs' Seven Ear -----	6	5	21	27	2	25	3	33	16	1	9	8	8	11
American Queen -----	7	7	29	21	8	21	5	31	17	2	7	13	11	6
Pool's -----	8	10	24	2	28	16	9	27	15	11	3	15	17	2
Boone County White (Tenn.) -----	9	8	23	17	13	6	10	26	8	17	2	12	12	12
Six-Ear Corn -----	9	8	31	17	13	6	4	32	8	3	7	6	3	12
Boone County White (Ind.) -----	10	11	34	11	19	5	1	35	12	24	3	13	14	7
Hickory King (Va.) -----	10	16	18	1	29	15	17	19	8	14	3	14	15	4
Cocke's Prolific (Edgecombe) -----	11	12	7	15	15	19	24	10	18	9	7	7	7	1
Reid's Yellow Dent -----	12	15	30	7	23	9	7	29	7	25	4	14	15	10
Riley's Favorite -----	13	14	33	12	18	13	2	34	5	22	3	16	19	14
Williams' -----	14	9	8	28	1	8	22	13	17	30	6	6	4	12
Hickory King (Tenn.) -----	15	19	16	4	26	14	19	16	2	16	3	17	14	15
Wilson's Success -----	16	13	26	25	4	23	13	23	9	7	7	2	3	15
Parker's Cocke's Prolific -----	17	18	28	26	3	19	11	25	8	7	5	15	13	16
Sander's Improved -----	18	24	19	4	26	14	20	15	7	13	7	8	6	9
Sharber's -----	18	17	17	28	1	8	18	17	17	12	4	14	10	12
Marlboro Prolific -----	18	20	9	22	7	17	27	7	15	4	5	8	6	8
Southern Beauty -----	19	22	10	18	12	1	28	11	2	24	5	10	8	19
Fry's Improved -----	20	23	3	15	15	8	33	2	16	27	8	4	2	5
Farmers' Favorite -----	20	21	32	23	6	7	6	30	13	19	3	5	9	10
Brake's -----	21	28	12	5	25	12	25	9	12	28	5	5	7	5
Holt's Strawberry -----	22	24	5	16	14	2	31	4	10	29	6	5	4	10
Selection 77 -----	22	25	27	14	16	11	15	21	3	22	3	14	15	18
McMackin's Gourd Seed -----	22	27	15	9	21	2	23	12	2	25	5	10	7	17

TABLE III—SHOWING RELATIVE EARLINESS, YIELDS, SIZE OF EARS, HEIGHT OF STALKS AND EARS, AND PERCENTAGE OF GRAIN, COB, EARS AND STOVER OF VARIETIES OF CORN TESTED IN 1907—CON.

EDGECOMBE FARM.

Varieties.	Rank According to the Following Characters.													
	Yield of Shelled Corn in Bushels per Acre.	Yield of Ear Corn in Pounds per Acre.	Yield of Stover in Pounds per Acre.	Percentage of Grain.	Percentage of Cob.	Largeness of Ears.	Percentage of Ears.	Percentage of Stover.	Smallness in Lbs. of Ear Corn Required to Shell Bushel of Corn.	Prolificacy of Ears per Stalk	Earliness as Shown by Date of Silking.	Height of Stalks.	Height of Ears.	Weight of Bushel of Shelled Corn.
Iowa Silver Mine-----	23	28	4	8	22	10	32	3	16	26	3	19	20	3
Leaming Yellow-----	24	26	23	13	17	12	17	18	8	20	1	18	18	11
Boone County Special-----	25	29	25	18	12	7	16	20	2	23	3	14	16	19
Hastings' Prolific-----	25	30	7	6	24	24	30	5	14	10	9	5	4	4
Bradbury's Improved-----	27	32	22	5	25	7	21	14	6	24	8	11	7	10
Henry Grady-----	28	31	2	19	11	2	34	1	1	21	8	1	1	20
Mosby's Prolific-----	29	33	11	3	27	16	29	6	4	20	9	10	2	13

TABLE III—SHOWING RELATIVE EARLINESS, YIELDS, SIZE OF EARS, HEIGHT OF STALKS AND EARS, AND PERCENTAGE OF GRAIN, COB, EARS AND STOVER OF VARIETIES OF CORN TESTED IN 1907—CON.

IREDELL FARM.

Varieties.	Rank According to the Following Characters.													
	Yield of Shelled Corn in Bushels per Acre.	Yield of Ear Corn in Pounds per Acre.	Yield of Stover in Pounds per Acre.	Percentage of Grain.	Percentage of Cob.	Largeness of Ears.	Percentage of Ears.	Percentage of Stover.	Smallness in Lbs. of Ear Corn Required to Shell Bushel of Corn.	Prolificacy of Ears per Stalk.	Earliness as Shown by Date of Silking.	Height of Stalks.	Height of Ears.	Weight of Bushel of Shelled Corn.
Biggs' Seven Ear -----	1	2	21	8	5	26	5	32	12	2	10	9	3	----
American Queen -----	2	1	25	9	4	22	2	35	14	7	8	1	4	----
Southern Beauty -----	3	3	11	6	7	7	16	20	9	16	8	1	5	----
Poole's -----	4	6	20	2	11	17	18	17	3	12	4	9	4	----
Boone County White (Ind.) -----	5	8	22	7	6	5	10	27	11	25	3	13	4	----
Cocke's Prolific (Edgecombe) -----	6	7	7	10	3	24	23	14	17	3	9	3	1	----
Marlboro Prolific -----	7	5	15	11	2	23	21	15	19	9	8	13	5	----
Selection 77 -----	8	11	19	4	9	12	15	22	5	17	3	8	4	----
Goodman's Prolific -----	9	17	23	1	12	18	13	24	2	1	9	15	5	----
Jarvis' Improved -----	10	13	16	4	9	8	22	13	1	27	6	5	4	----
Wilson's Success -----	10	4	10	10	3	2	19	19	22	4	5	13	3	----
Henry Grady -----	11	9	2	11	2	4	29	7	19	5	4	4	2	----
Parker's Cocke's Prolific -----	12	10	31	10	3	20	1	36	18	8	5	7	2	----
Brake's -----	13	14	3	7	6	3	30	6	11	30	5	6	3	----
Boone County Special -----	13	20	26	4	9	8	11	26	6	23	3	8	2	----
Hickory King (Tenn.) -----	14	19	13	6	7	1	24	12	9	19	3	18	3	----
Weekley's Improved -----	15	15	9	8	5	16	27	9	12	10	9	9	3	----
Cocke's Prolific (Tenn.) -----	15	12	6	10	3	18	28	8	13	12	6	5	3	----
Sanders' Improved -----	16	22	18	4	9	19	20	16	7	9	7	7	1	----
Fry's Improved -----	17	18	4	9	4	11	31	5	16	18	5	1	1	----
McMackin's Gourd Seed -----	18	22	14	7	6	11	26	10	11	29	5	16	3	----
Holt's Strawberry -----	19	21	1	9	4	9	33	3	15	28	5	3	2	----
Wyatt's Improved -----	20	16	24	11	2	5	12	25	19	6	8	7	3	----
Currituck -----	21	23	30	7	6	11	4	33	11	24	7	8	3	----
Sharber's -----	22	24	28	4	9	21	8	29	6	25	5	6	2	----
Boone County White (Tenn.) -----	23	22	27	9	4	9	9	28	15	21	5	15	3	----
Hickory King (Va.) -----	24	26	12	4	9	9	17	21	7	14	5	7	3	----
Iowa Silver Mine -----	25	26	29	7	6	14	6	31	10	22	2	17	5	----
Williams' -----	26	22	8	12	1	5	20	16	20	26	10	5	2	----
Farmers' Favorite -----	27	25	23	11	2	3	17	18	19	21	4	7	1	----

TABLE III—SHOWING RELATIVE EARLINESS, YIELDS, SIZE OF EARS, HEIGHT OF STALKS AND EARS, AND PERCENTAGE OF GRAIN, COB, EARS AND STOVER OF VARIETIES OF CORN TESTED IN 1907—CON.

IREDELL FARM.

Varieties.	Rank According to the Following Characters.													
	Yield of Shelled Corn in Bushels per Acre.	Yield of Ear Corn in Pounds per Acre.	Yield of Stover in Pounds per Acre.	Percentage of Grain.	Percentage of Cob.	Largeness of Ears.	Percentage of Ears.	Percentage of Stover.	Smallness in Lbs. of Ear Corn Required to Shell Bushel of Corn.	Prolificacy of Ears per Stalk.	Earliness as Shown by Date of Silking.	Height of Stalks.	Height of Ears.	Weight of Bushel of Shelled Corn.
Bradbury's Improved -----	28	28	21	4	9	17	25	11	8	15	8	7	1	---
Leaming Yellow -----	29	27	32	9	4	15	3	34	15	21	1	14	3	---
Mosby's Prolific -----	30	29	5	3	10	19	34	2	4	13	8	14	3	---
Six-Ear Corn -----	31	30	17	6	7	27	35	1	3	4	10	9	2	---
Hastings' Prolific -----	32	30	15	5	7	25	32	4	9	11	10	2	1	---
Reid's Yellow Dent -----	33	31	32	6	8	10	7	30	9	20	3	12	5	---
Riley's Favorite -----	34	32	33	7	6	13	14	23	21	21	2	7	1	---

TABLE IV—COMPILED RESULTS OF VARIETY TESTS OF CORN, SHOWING RELATIVE EARLINESS, YIELDS, SIZE OF EARS, HEIGHT OF STALKS AND EARS, AND PERCENTAGE OF GRAIN, COB, EARS AND STOVER.

## EDGECOMBE FARM.

Varieties.	Number of Years Tested.	Rank According to the Following Characters.												
		Yield of Shelled Corn in Bushels per Acre.	Yield of Ear Corn in Pounds per Acre.	Yield of Stover in Pounds per Acre.	Percentage of Grain.	Percentage of Cob.	Largeness of Ears.	Percentage of Ears.	Percentage of Stover.	Smallness in Pounds of Ear Corn Required to Shell Bushel Corn.	Prolificacy of Ears per Stalk. <sup>1</sup>	Earliness as Shown by Date of Silking. <sup>1</sup>	Height of Stalks. <sup>2</sup>	Height of Ears. <sup>2</sup>
Holt's Strawberry-----	5	8	9	3	11	4	2	14	2	10	13	6	2	1
Marlboro Prolific-----	5	5	4	7	13	2	14	12	4	12	3	4	4	7
Sanders' Improved-----	5	3	5	8	1	14	10	10	6	1	5	7	6	4
Cocke's Prolific (Edgcombe)-----	5	1	1	2	13	2	12	7	8	15	2	7	7	5
Brake's-----	5	7	10	4	4	11	4	13	3	5	9	6	3	3
Boone County White (Ind.)-----	5	6	7	13	10	5	1	2	13	11	11	3	11	10
Cocke's Prolific (Tenn.)-----	5	4	3	6	12	3	11	11	6	14	4	7	1	6
Weekley's Improved-----	5	2	2	5	9	6	15	9	7	9	1	5	8	8
Iowa Silver Mine-----	5	11	14	10	3	12	8	12	5	7	10	3	15	14
Leaming Yellow-----	5	10	13	12	5	10	7	5	10	3	11	1	14	13
Selection 77-----	5	6	8	11	7	8	5	4	11	4	12	3	10	9
Boone County White (Tenn.)-----	5	7	6	9	14	1	3	6	9	13	8	2	9	10
Reid's Yellow Dent-----	5	10	12	14	6	9	6	3	12	6	7	4	12	11
Mosby's Prolific-----	5	12	15	1	2	13	13	15	1	2	6	8	5	2
Riley's Favorite-----	5	9	11	15	8	7	9	1	14	8	8	3	13	12

<sup>1</sup>Results in this column are from data of 1907 only.

<sup>2</sup>Results in these columns are from data of 1905, 1906 and 1907.

TABLE IV—COMPILED RESULTS OF VARIETY TESTS OF CORN, SHOWING RELATIVE EARLINESS, YIELDS, SIZE OF EARS, HEIGHT OF STALKS AND EARS, AND PERCENTAGE OF GRAIN, COB, EARS AND STOVER—CON.

## IREDELL FARM.

Varieties.	Rank According to the Following Characters.													
	Number of Years Tested.	Yield of Shelled Corn in Bushels per Acre.	Yield of Ear Corn in Pounds per Acre.	Yield of Stover in Pounds per Acre.	Percentage of Grain.	Percentage of Cob.	Largeness of Ears.	Percentage of Ears.	Percentage of Stover.	Smallness in Pounds of Ear Corn Required to Shell Bushel Corn.	Prolificacy of Ears per Stalk.	Earliness as Shown by Date of Silking.	Height of Stalks.	Height of Ears, <sup>1</sup>
Cocke's Prolific (Tenn.) -----	5	3	2	4	10	2	11	9	4	11	3	6	2	4
Weekley's Improved -----	5	1	1	2	9	3	10	10	3	8	1	8	3	3
Mosby's Prolific -----	5	10	12	3	3	10	9	11	2	3	4	8	5	2
Boone County White (Tenn.) -----	5	5	4	6	9	4	4	6	7	7	9	4	8	5
Holt's Strawberry -----	5	6	6	1	11	1	1	12	1	9	11	7	1	1
Riley's Favorite -----	5	11	10	12	7	6	6	1	12	10	8	5	10	12
Sanders' Improved -----	5	3	7	5	1	12	8	8	5	1	2	7	4	8
Selection 77 -----	5	4	5	9	5	8	4	4	9	5	5	3	6	6
Reid's Yellow Dent -----	5	9	11	8	2	11	3	7	6	2	6	3	9	9
Leaming Yellow -----	5	7	8	10	4	9	7	3	10	4	7	2	11	10
Iowa Silver Mine -----	5	8	9	11	6	7	5	2	11	6	8	1	12	11
Boone County White (Ind.) -----	5	2	3	7	8	5	2	5	8	7	10	4	7	7

<sup>1</sup>Results in this column are from data of 1904, 1905, 1906 and 1907.

## COMMENTS ON VARIETY TESTS OF CORN.

The variety tests were conducted this year at the Edgecombe and Iredell farms. The land at the Edgecombe farm devoted to this test was good general farm land, while at Iredell a fine brownish clay soil with a red clay subsoil was used. To eliminate all inequalities in the character of the land, if any, the designated varieties at the different farms were planted each in separate rows, arranged consecutively, and this plan was repeated from two to four times, varying with the length of the rows, in order to give the desired acreage to each variety. The varieties are arranged in Table I in the order of their productivity of shell corn per acre; also the rank of stover per acre is indicated in the second column. In Table II are brought together the results of varietal tests obtained at the Edgecombe farm during 1900, 1901, 1902, 1903, 1904, 1905, 1906 and 1907; at Red Springs in 1900 and 1901, and at Iredell during 1903, 1904, 1905, 1906 and 1907. Results from the testing of varieties of corn were obtained at the Transylvania during 1906 only. The vigorousness in growth, prolificacy, largeness of ears, percentages of grain and stover, yields, etc., of all varieties tested at the different farms are shown in Tables I, II, III and IV.

By consulting Table II it will be seen that the differences in yield of shelled corn per acre on the different farms during the period covered by the tests between the variety yielding the highest and the one the lowest in the individual tests have ranged all the way from 6.2 to 26.6 bushels of shelled corn at the Edgecombe farm during the past eight years, with the number of varieties in the different tests varying from eight to thirty-six; from 7.7 to 14 bushels at Red Springs, when using nine varieties for each of two years; from 12.1 to 13.5 bushels during five years at Iredell, where from nineteen to thirty-seven varieties were employed; and a difference of 24.8 bushels at Transylvania during 1906, where thirty-four varieties were planted.

Tables III and IV will be found to contain much valuable data, in plain, compact form, relative to the different characters of corn when grown under widely varying soil and climatic conditions. A careful study of these tables should be made by every corn-growing reader.

Table II also gives the average standing of all the varieties, at each farm, that have been tested continuously since the beginning of the work in the different localities. The varieties which have averaged the highest yields of shelled corn at the different farms are: At Edgecombe, during eight years, Cocke's Prolific, Weekley's Improved, Sanders' Improved and Holt's Strawberry; at Red Springs, during two years, Native, Cocke's Prolific, Holt's Strawberry and Weekley's Improved; at Iredell, Weekley's Improved, Sanders' Improved, Cocke's Prolific and Boone County White.

NOTES ON VARIETIES OF CORN TESTED IN 1907.<sup>1</sup>

*Cocke's Prolific*, from Edgecombe-grown seed, ranked second in 1900, 1901 and 1904, first in 1902, 1903, 1905 and 1906, and eleventh in 1907, at the Edgecombe farm; at Red Springs it stood fifth in 1900 and third in 1901; at Iredell, from Edgecombe-grown seed, sixth in 1904, first in 1905, seventh in 1906, and sixth in 1907; at Transylvania, second in 1906. The yield from Tennessee-grown seed of this variety at Edgecombe was seventh in 1903, twelfth in 1904, fourteenth in 1905, ninth in 1906, and second in 1907; fourteenth in 1904, tenth in 1905, twenty-first in 1906, and fifteenth in 1907 at Iredell; twenty-eighth in 1906 at Transylvania. From Experiment Station-grown seed, originally from Edgecombe farm, *Cocke's Prolific* ranked twenty-fourth in 1906 at Transylvania. The results of comparative varietal tests conducted during the past eight years on the test farms indicate this to be a most substantial and reliable variety; in fact, one of the best varieties thus far tested for growth on the sandy loam soils of the eastern portion of the State. One defect, however, with this variety is that the grains are too short.

*Weekley's Improved* is a very good variety, having ranked first and second at the Iredell and Edgecombe farms as an average of four and seven years' trials, respectively. It is fairly early in maturity, and can be grown with more safety than most of the other varieties when only a short growing season is afforded. At the Edgecombe farm it ranked in 1900 third, in 1901 first, in 1902, 1905 and 1906 second, but in 1903 and 1904 it fell down to tenth and thirteenth places, respectively, and in 1907 ranked third. In 1901 it was first at Red Springs; in 1903 sixth, in 1904 tenth, in 1905 second, in 1906 first, and in 1907 fifteenth at Iredell; and in 1906 fifth at Transylvania. This variety has a little smaller ear and cob than *Cocke's Prolific*.

*Sanders' Improved*, from Georgia-grown seed, ranked fourth in 1900, third in 1901, fourth in 1902 and in 1906, seventeenth in 1903, third in 1904, fourth in 1905, and eighteenth in 1907 at the Edgecombe farm; sixth in 1901 at Red Springs; and tenth in 1903, ninth in 1904, thirteenth in 1905, fifteenth in 1906, and sixteenth in 1907 at Iredell; and third in 1906 at Transylvania. This variety produces an ear about the size of *Cocke's Prolific*, but contains a smaller cob by about three to six per cent, and consequently requires about three to five pounds less of corn on the ear, as shown by an average of the result of the past eight years, to shell a bushel of corn.

*Holt's Strawberry* occupied first place in 1900, sixth in 1901, 1902 and 1906, fifteenth in 1903, twenty-fifth in 1904, seventh in 1905, and twenty-second in 1907 at the Edgecombe farm; ninth in 1900 and second in 1901 at Red Springs; eighth in 1903, sixteenth in 1904, nineteenth in 1905 and 1907, and twenty-fourth in 1906 at

<sup>1</sup>The basis of rank in these notes is according to the yield of bushels of shelled corn per acre.

Iredell; and second in 1906 at Transylvania. It has a much larger ear than Cocks's Prolific, and produces a large percentage of stover.

*Brake's*, as the result of the tests in Edgecombe, the home of the variety, ranked eleventh in 1902, nineteenth in 1903, seventh in 1904, thirteenth in 1905 and 1906, and twenty-first in 1907. At Iredell it occupied first place in the tests of 1904, seventh in 1905, fifth in 1906, and thirteenth in 1907; and twentieth at Transylvania in 1906. This variety has a short, large ear.

*Leaming Yellow* ranked twelfth in 1902, fourth in 1903, fifteenth in 1904, twenty-first in 1905, twenty-ninth in 1906, and twenty-fourth in 1907 at the Edgecombe farm; and twelfth in 1903, fourteenth in 1904, twenty-first in 1905 and 1906, and twenty-ninth in 1907 at Iredell; and thirty-second at Transylvania in 1906. This is a yellow corn that has a strong tendency to produce only one large ear per stalk. It has yielded excellent results in Indiana, Iowa and Illinois in comparison with other varieties.

*Selection 77*, from Ohio-grown seed, ranked fifth, sixteenth, eighth, twentieth and twenty-second at Edgecombe, and eleventh, twelfth, twenty-fifth, sixteenth and eighth at Iredell in 1903, 1904, 1905, 1906 and 1907, respectively; and twenty-fifth in 1906 at Transylvania. This corn has a larger ear and a slightly greater percentage of shelling capacity than Cocks's Prolific.

*Riley's Favorite*, from Indiana-grown seed, ranked ninth, eighteenth, twenty-fifth and thirteenth at the Edgecombe farm; eighth, twenty-second, twenty-seventh, twelfth and thirty-fourth at Iredell in 1903, 1904, 1905, 1906 and 1907, respectively; and twenty-ninth in 1906 at Transylvania. This is a yellow corn, with fairly small and narrow grains. It has a somewhat larger ear than Cocks's Prolific. This is an early maturing variety.

*Boone County White*, from Indiana-grown seed, stood in 1903, 1904, 1906 and 1907 eleventh, twenty-third, eighteenth and tenth at Edgecombe, and fifteenth in 1903, eighth in 1904, fourteenth in 1905, nineteenth in 1906 and fifth in 1907 at Iredell; and eighteenth in 1906 at Transylvania; while from Tennessee-grown seed it ranked thirteenth, seventeenth, ninth, twenty-eighth and ninth at Edgecombe in 1903, 1904, 1905, 1906 and 1907; seventh in 1904, thirteenth in 1905, fourteenth in 1906 and twenty-third in 1907 at Iredell; and twenty-third in 1906 at Transylvania. This is a large, white-eared variety.

*Reid's Yellow Dent*, from Illinois-grown seed, ranked twelfth in 1903, eighteenth in 1904, twenty-third in 1905, twenty-fourth in 1906 and twelfth in 1907 at Edgecombe; twelfth in 1903, nineteenth in 1904, twentieth in 1905, twenty-second in 1906 and thirty-third in 1907 at Iredell; and thirty-third in 1906 at Transylvania. This is a yellow variety of corn that has done well in the Northwestern States, but has a strong tendency, when grown under Southern conditions, as indicated by our variety tests, to produce only one large

ear per stalk and smaller yields per acre than the two-eared varieties. It is medium early in maturity.

*Marlboro Prolific*, from South Carolina-grown seed, from Bureau of Plant Industry, ranked thirteenth in 1903, second in 1904, eleventh in 1905, eighth in 1906 and eighteenth in 1907 at the Edgecombe farm; third in 1903, twelfth in 1905, sixth in 1906 and seventh in 1907 at Iredell; and seventh in 1906 at Transylvania. From South Carolina-grown seed, from Excelsior Seed Farm, Marlboro Prolific ranked fourth in 1907 at the Edgecombe farm. This variety has an ear a little larger in size than Coker's Prolific, and has a decidedly strong tendency to bear more than one ear to each stalk.

*Iowa Silver Mine*, from Illinois seed, ranked fourteenth at both Edgecombe and Iredell farms in both 1903 and 1904, twenty-fourth at both in 1905, twenty-first in 1906, and twenty-third in 1907 at Edgecombe, and twenty-sixth in 1906, twenty-fifth in 1907 at Iredell; and thirty-first in 1906 at Transylvania. This is a white, large-eared corn that has a smaller percentage of cob to grain than Coker's Prolific. Its grains are well shaped, showing the effect of prolonged and intelligent breeding and selection. This is one of the earliest varieties which the Department has tested.

*Mosby's Prolific*, from Mississippi-grown seed, ranked fifth in 1900, twelfth in 1903, eighteenth in 1904, twenty-second in 1905, seventeenth in 1906 and twenty-ninth in 1907 at Edgecombe; third in 1900 at Red Springs; seventh in 1903, eighteenth in 1904, thirty-first in 1905, twenty-sixth in 1906 and thirteenth in 1907 at Iredell; and twenty-seventh in 1906 at Transylvania. It has a large proportion of stalk to ear, as it has a large stalk.

*Williams'* ranked in 1904 fourth and fifteenth, in 1905 twenty-first and fifth, in 1906 twelfth and fourth, and in 1907 fourteenth and twenty-sixth at Edgecombe and Iredell, respectively; and thirteenth in 1906 at Transylvania. This variety has a large, tall stalk and large ears that contain a medium high percentage of cob, especially when grown at Iredell. It seems better suited to bottom than up land.

*Boone County Special* stood ninth and sixteenth in 1904, sixteenth and fifteenth in 1905, twenty-seventh and twenty-seventh in 1906, and twenty-fifth and thirteenth in 1907, respectively, at the Edgecombe and Iredell farms; and thirteenth in 1906 at Transylvania. The ears are rather below the medium in size.

*McMackin's Gourd Seed* ranked nineteenth, fifteenth, fifth and twenty-second at Edgecombe; twentieth, twenty-eighth, twenty-fifth and eighteenth at Iredell in 1904, 1905, 1906 and 1907, respectively, and eighth in 1906 at Transylvania. Medium in date of maturity.

*Currituck*, which is grown rather extensively in some sections of the Piedmont Plateau of North Carolina, ranked twenty-second in 1904, eleventh in 1905 and twenty-second in 1906 at Edgecombe;

twenty-third in 1904, eleventh in 1905, eighteenth in 1906 and twenty-first in 1907 at Iredell; and seventeenth in 1906 at Transylvania. Its ears are large and contain a medium high percentage of cob to grain.

*Shellem's Prolific* ranked at Iredell seventeenth in 1904, tenth in 1905 and twelfth in 1906; at Edgecombe, nineteenth in 1905 and fourteenth in 1906; and fifteenth at Transylvania in 1906. It has a small ear and is early when grown in western North Carolina.

*Eureka* ranked twelfth in 1905 and seventh in 1906 at Edgecombe; twenty-sixth in 1905 and twenty-third in 1906 at Iredell; and fourth in 1906 at Transylvania. This variety has a white ear, with a comparatively high percentage of cob to grain.

*Hickory King*, from Tennessee-grown seed, ranked ninth in 1901, sixth in 1903 and 1905, eleventh in 1906 and fifteenth in 1907 at Edgecombe; thirteenth in 1903, sixth in 1905, eighth in 1906 and fourteenth in 1907 at Iredell; eighth in 1901 at Red Springs; and first in 1906 at Transylvania. From Virginia-grown seed it stood tenth in 1905, twenty-sixth in 1906 and tenth in 1907 at Edgecombe; eleventh in 1905 and twenty-fourth in 1907 at Iredell; and twenty-first in 1906 at Transylvania. This is a prolific variety, with small ears and broad and shallow grains.

*Thomas' Improved* ranked fourteenth in 1904, fourth in 1905 and eleventh in 1906, third in 1905 and thirteenth in 1906 at Edgecombe; and fourteenth in 1906 at Transylvania. This is a vigorous, rank-growing variety that matures rather late.

*Peele's Prolific* stood eighteenth in 1905 and nineteenth in 1906 at Edgecombe; seventeenth in 1905 and 1906 at Iredell; and ninth in 1906 at Transylvania.

*American Queen* occupied third place in 1905, second in 1906 and second in 1907 at Iredell; tenth in 1906 and seventh in 1907 at Edgecombe; and twelfth in 1906 at Transylvania.

*Square Deal*, in 1904 and 1905, ranked sixth and seventh at Edgecombe, and twenty-first and twenty-third at Iredell.

*Hastings' Prolific* ranked fifteenth in 1906 and twenty-sixth in 1907 at Edgecombe; twenty-first in 1906 and thirty-second in 1907 at Iredell; and twenty-second in 1906 at Transylvania.

*Southern Beauty* ranked sixteenth in 1906 and nineteenth in 1907 at Edgecombe; thirteenth in 1906 and third in 1907 at Iredell; and sixth in 1906 at Transylvania.

*Farmers' Favorite* ranked twenty-second in 1906 and twentieth in 1907 at Edgecombe; third in 1906 and twenty-seventh in 1907 at Iredell; and sixteenth in 1906 at Transylvania.

*Biggs' Seven Ear* ranked third in 1903, first in 1904, third in 1906 and sixth in 1907 at Edgecombe; first in 1903, second in 1904, ninth in 1906 and first in 1907 at Iredell; and tenth in 1906 at Transylvania.

*Wilson's Success* ranked twenty-third in 1906 and sixteenth in 1907 at Edgecombe, and tenth in 1907 at Iredell.

*Battle's Prolific* stood twenty-fifth in 1906 at Edgecombe, and tenth in 1906 at Iredell, and eleventh in 1906 at Transylvania.

*Hamilton* (native) ranked twenty-sixth in 1906 at Transylvania.

*Merrill* (native) ranked nineteenth in 1906 at Transylvania.

*Jarvis' Improved* ranked this year fifth at Edgecombe and tenth at Iredell.

*Wyatt's Improved* ranked first at Edgecombe this year, and twentieth at Iredell.

*Pool's*, from Georgia-grown seed, ranked eighth this year at Edgecombe, and fourth at Iredell.

*Six-Ear Corn* ranked ninth this year at Edgecombe, and thirty-first at Iredell.

*Parker's Cocke's Prolific* ranked seventeenth this year at Edgecombe, and twelfth at Iredell.

*Sharber's* ranked eighteenth this year at Edgecombe, and twenty-second at Iredell.

*Fry's Improved* ranked twentieth this year at Edgecombe, and seventeenth at Iredell.

*Bradbury's Improved* ranked twenty-seventh this year at Edgecombe, and twenty-eighth at Iredell.

*Henry Grady* ranked twenty-eighth this year at Edgecombe, and eleventh at Iredell.

*Goodman's Prolific* ranked ninth this year at Iredell.

#### STUDY OF COMPILED RESULTS OF VARIETY TESTS OF CORN.

During the past eight years on the test farms of the Department something over fifty varieties of corn have been studied in comparative field tests. The number of varieties in the different tests has ranged all the way from eight in 1900 to thirty-seven in 1907. The different tests of varieties at the several farms were grown as nearly under the same conditions of soil, fertilization and cultivation as it was possible to provide. To eliminate all inequalities in the character of the land, if any, the varieties at the different farms were planted each in separate rows, arranged consecutively, and this plan was repeated from three to four times, varying with the length of the rows, in order to give the desired acreage to each variety. By taking these precautions the results obtained should be reliable and highly valuable.

#### WHAT IS A VARIETY?

A variety is supposed to represent in a general way a class of plants with one or more distinguishing characteristics, but with a cereal like corn, which crosses so readily, variety does not signify much unless proper precautions have been exercised in its growth.

Take some variety of corn, say Cocke's Prolific, that has been bred carefully and intelligently through a number of years for high yield of shelled corn per stalk, and grow it continuously in or adjacent to a field of inferior corn, and in a very short time, especially if proper seed selection is not practiced, it will give much smaller yields, when grown under the same conditions, than the original pure-bred corn; this being due to the fact that you no longer have pure Cocke's Prolific, but a mixture of "scrub" and Cocke's Prolific corn. This fact emphasizes the importance of securing seed from reliable parties.

#### EARLY MATURING VARIETIES.

Iowa Silver Mine, Riley's Favorite, Leaming Yellow, Reid's Yellow Dent, Boone County Special and Boone County White are six of the earliest varieties in maturing that have thus far been tested on the farms of the Department. These were all originated in the northern-central States, where they have been accustomed to a comparatively short growing season, which accounts largely for their inherent tendency to early maturity when grown under North Carolina conditions. Earliness, however, we do not consider an important requisite with corn for this climate, except, possibly, where corn is grown in the mountainous section of the State, or where corn, of necessity, has to be planted late, after the maturity of some crop like Irish potatoes or other truck crop. Under these circumstances it may be well to use one of the varieties mentioned above, especially if experience has taught the farmer that local varieties do not thoroughly mature before frost.

#### MEDIUM MATURING VARIETIES.

Biggs' Prolific, Craig's Prolific White, Cocke's Prolific and Craig's Prolific Strawberry mature at a medium date in the fall, and some of these are our most prolific varieties. All these will mature on the different types of soil of the State if planted before July 1.

#### LATE MATURING VARIETIES.

It has been found that Holt's Strawberry, Marlboro Prolific, Sanders' Improved, Weekley's Improved and Mosby's Prolific are the latest maturing varieties tested during the past five years. These varieties generally produce a large and tall stalk when grown under conditions as represented by the Iredell farm, *i. e.*, the results of the past five years' tests at that place indicate as much.

#### VARIETIES ADAPTED TO THE EAST SECTION.

A study of the results of the variety tests conducted at the Edgecombe farm during the past seven years indicates that the varieties of corn best suited to the fine loamy soils of the eastern and south-

western parts of the State are Cocke's Prolific, Biggs' Seven Ear, Weekley's Improved, Marlboro Prolific, Craig's Prolific Strawberry, Sanders' Improved and Holt's Strawberry, in about the order in which they are arranged. Cocke's Prolific and Biggs' Seven Ear have proven exceedingly promising varieties. All these varieties, except Holt's Strawberry and Craig's Prolific Strawberry, are white and prolific, and produce medium to small ears.

#### VARIETIES ADAPTED TO PIEDMONT AND MOUNTAIN SECTIONS.

It has been found from a testing of thirty-eight varieties during the past five years at the Iredell farm, located in the Piedmont section, that Weekley's Improved, Biggs' Seven Ear, Craig's Prolific White, Cocke's Prolific, Sanders' Improved, Hickory King, Holt's Strawberry, Boone County White, Leaming Yellow and Reid's Yellow Dent are the largest yielders of shelled corn per acre of all the varieties thus far tested. These, too, are all white varieties and are medium to medium late in maturity. The best of the varieties tested at the western farm are almost the same as for the east, but the order of prolificacy is somewhat different.

#### CORRELATION OF CHARACTERS OF VARIETIES OF CORN.

One of the purposes of our detailed study of varieties of corn, exhibited in Tables I, II, III and IV, is to ascertain what characters, being mutually helpful and hence conducive of greater yields, may be expected to be found combined in the same variety, and what ones, being generally antagonistic, seldom or never occur in the same plant or group of plants. This knowledge is of the most fundamental importance in the proper production of not only corn, but all other agricultural crops, as one being familiar with these facts will be better enabled to originate, improve or select varieties best adapted to different localities, soils and purposes. It is also felt that a more correct interpretation can be placed on the results obtained in variety tests.

In Table IV are brought together the average results of the work of five years (1903-'04-'05-'06-'07) at the Edgecombe and Iredell farms, separately. From a detailed study of this table, supplemented by field observations, the following tentative inductions are made with reference to varieties of corn studied when they are grown under conditions of soil and climate as represented by these two farms:

*Antagonistic Characters.*—(1) Earliness in maturity, other things being equal, is not generally conducive to large yields of grain and stover. (2) Large-eared varieties usually have a low percentage of grain to cob, and are as a rule less productive of shelled corn per acre. (3) Ears with very small cob have poorly shaped kernels, and give a small amount of shelled corn per ear, and *vice versa*. (4) Kernels of low vitality do not tend to the growth of plants of maximum yields.

*Associated Characters.*—(1) Earliness, other things being equal, usually tends to high percentage of ear to stover, and *vice versa*, although this ratio is more or less modified by season, soil, fertilization and breeding. (2) Varieties producing two ears per stalk are generally more productive of shelled corn per acre than those bearing only one ear, although it may be a large one. (3) Medium maturity, other things being equal, tends to increase yields per acre of grain. (4) Small kernels usually possess low vitality. (5) Kernels with small germs (chits) contain a small percentage of oil or fat. (6) Varieties with good root and leaf development are usually the most resistant ones to drought and disease and insect ravages.

#### SELECTING SEED FOR IMPROVEMENT.

In the improvement of corn by seed selection an endeavor should be made to start with the best variety as ascertained by actual tests in the field through a sufficient number of years to eliminate weather conditions. It must be borne in mind that in all plant improvement the same principles and practices that have been employed with such striking results in the improvement of the different breeds of animals must be followed.

For corn there are three general methods of improvement: First, by importation of seed from some reputable breeder or grower; second, by the careful selection of seed corn from one's own field or from a neighbor's; third, by careful selection and growing of seed corn in a field isolated something like four or five hundred yards from any other corn field.

The characters that should be taken into account in the improvement of corn by selection are:

(1) Selection of ears from stalk bearing two or more ears, as it has been demonstrated time and again that a variety that bears two medium-sized ears per stalk will generally give higher yields of shelled corn per acre than a variety bearing one large ear to the stalk.

(2) The stalk should be large at the base and tapering gradually towards the tassel, for two reasons—first, because it will be better enabled to withstand drought, and, second, because it will stand up better in windstorms.

(3) The ears should by all means be of a cylindrical form, with both butts and tips filled out, as this is the form that gives the highest percentage of yield of shelled corn per ear, other things being equal.

(4) The best-shaped kernel is a medium wedge, as this fills out the space on the cob most completely. Also, the distance between the rows of grains should be small, while the number of rows should be large and run parallel the full length of the cob, with little or no diminution in size, either at the butts or tips. The percentage of grains should be from 80 to 90 and should be held rigidly by the cob. It should also possess a high (90 to 95 per cent) germinating power, and great resisting power to disease and insect ravages.

It should be kept clearly in mind that, with varieties of corn, selection should be made particularly with reference to total yield of shelled corn and the characters which tend to give this and an improved quality of grains. If it is to be used in feeding growing animals, or to be ground into meal for human consumption, it should be high in flesh and muscle-forming material (protein); if for fattening stock, high in fat, and if to manufacture whiskey, alcohol or starch, high in starch, sugar, etc. (carbohydrates).

#### SOURCES OF VARIETIES OF CORN TESTED.

The seed used in the variety tests of corn at the Edgecombe and Iredell farms this year were obtained from the following sources:

American Queen.....	R. P. Dalton, Winston, N. C.
Boone County Special (Illinois).....	Bureau of Plant Industry, Washington, D. C.
Boone County White (Tennessee).....	Bureau of Plant Industry, Washington, D. C.
Boone County White (Indiana).....	Bureau of Plant Industry, Washington, D. C.
Brake's.....	Joe L. Brake, Rocky Mount, N. C.
Bradbury's Improved.....	J. E. Bradbury, Jr., Athens, Ga.
Biggs' Seven Ear.....	Noah Biggs, Scotland Neck, N. C.
Cocke's Prolific.....	Edgecombe Test Farm, Rocky Mount, N. C.
Cocke's Prolific (Tennessee).....	Bureau of Plant Industry, Washington, D. C.
Currituck.....	T. L. Jarvis, Moyock, N. C.
Farmers' Favorite.....	A. Cannon, Horse Shoe, N. C.
Fry's Improved.....	H. C. Fry, Clarksville, Ga.
Goodman's Prolific.....	J. K. Goodman, Mount Ulla, N. C.
Hastings' Prolific.....	H. G. Hastings & Co., Atlanta, Ga.
Hickory King (Virginia).....	A. O. Lee, Hickory, Va.
Hickory King (Tennessee).....	Bureau of Plant Industry, Washington, D. C.
Holt's Strawberry.....	T. W. Wood & Sons, Richmond, Va.
Henry Grady.....	W. G. Headden, Austill, Ga.
Iowa Silver Mine (Illinois).....	Bureau of Plant Industry, Washington, D. C.
Jarvis' Improved.....	T. L. Jarvis, Moyock, N. C.
Leaming Yellow (Ohio).....	Bureau of Plant Industry, Washington, D. C.
Marlboro Prolific (S. Carolina).....	Bureau of Plant Industry, Washington, D. C.
Marlboro Prolific.....	Excelsior Seed Farm, Cheraw, S. C.
McMackin's Gourd Seed (Tenn.).....	Bureau of Plant Industry, Washington, D. C.
Mosby's Prolific (Miss.).....	Bureau of Plant Industry, Washington, D. C.
Parker's Cocke's Prolific.....	T. B. Parker, Raleigh, N. C.
Poole's.....	J. C. Poole, Marion, N. C.
Reid's Yellow Dent (Illinois).....	Bureau of Plant Industry, Washington, D. C.
Riley's Favorite (Indiana).....	Bureau of Plant Industry, Washington, D. C.
Sanders' Improved (Georgia).....	Bureau of Plant Industry, Washington, D. C.
Selection 77 (Ohio).....	Bureau of Plant Industry, Washington, D. C.
Sharber's.....	M. D. Dozier, Camden, N. C.
Six-Ear Corn.....	Alexander Seed Co., Augusta, Ga.
Southern Beauty.....	L. A. Strupe, Tobaccoville, N. C.
Weekley's Improved.....	Iredell Test Farm, Statesville, N. C.
Williams'.....	C. S. Williams, Franklinton, N. C.
Wilson's Success.....	F. D. Wilson, Chase City, Va.
Wyatt's Improved.....	Job P. Wyatt, Raleigh, N. C.

#### RESULTS OF VARIETY-DISTANCE TESTS OF CORN.

The results of these tests are included in the following tables:

TABLE V—RESULTS OF TESTS OF THREE LEADING VARIETIES OF CORN AT DIFFERENT SPACING IN THE ROWS IN 1907.

EDGECOMBE FARM.

Varieties.	Yield, Height of Stalks and Ears at Different Spacing of Stalks in Four-foot Rows.														
	20 Inches.			24 Inches.			30 Inches.			35 Inches.			40 Inches.		
	Height of Stalks in Inches at Maturity.	Height of Ears in Inches at Maturity.	Yield in Bushels of Shelled Corn per Acre.	Height of Stalks in Inches at Maturity.	Height of Ears in Inches at Maturity.	Yield in Bushels of Shelled Corn per Acre.	Height of Stalks in Inches at Maturity.	Height of Ears in Inches at Maturity.	Yield in Bushels of Shelled Corn per Acre.	Height of Stalks in Inches at Maturity.	Height of Ears in Inches at Maturity.	Yield in Bushels of Shelled Corn per Acre.	Height of Stalks in Inches at Maturity.	Height of Ears in Inches at Maturity.	Yield in Bushels of Shelled Corn per Acre.
Cocke's Prolific -----	112	49	24.1	107	47	23.3	105	44	19.1	104	44	16.8	99	43	16.7
Holt's Strawberry -----	112	53	23.9	111	52	17.1	112	53	17.3	107	50	15.3	107	49	14.4
Weekley's Improved -----	107	51	22.1	101	42	15.7	104	47	19.9	101	45	17.9	105	49	12.8

TABLE V—RESULTS OF TESTS OF THREE LEADING VARIETIES OF CORN AT DIFFERENT SPACING IN THE ROWS IN 1907.

IREDELL FARM.

Varieties.	Yield, Height of Stalks and Ears at Different Spacing of Stalks in Four-foot Rows.														
	20 Inches.			24 Inches.			30 Inches.			36 Inches.			40 Inches.		
	Height of Stalks in Inches at Maturity.	Height of Ears in Inches at Maturity.	Yield in Bushels of Shelled Corn per Acre.	Height of Stalks in Inches at Maturity.	Height of Ears in Inches at Maturity.	Yield in Bushels of Shelled Corn per Acre.	Height of Stalks in Inches at Maturity.	Height of Ears in Inches at Maturity.	Yield in Bushels of Shelled Corn per Acre.	Height of Stalks in Inches at Maturity.	Height of Ears in Inches at Maturity.	Yield in Bushels of Shelled Corn per Acre.	Height of Stalks in Inches at Maturity.	Height of Ears in Inches at Maturity.	Yield in Bushels of Shelled Corn per Acre.
Cocke's Prolific -----	108	60	33.3	100	48	32.5	106	66	35.7	96	54	37.7	106	48	36.8
Holt's Strawberry -----	103	60	23.4	108	60	27.5	104	54	27.8	96	54	33.0	120	64	29.4
Weekley's Improved -----	108	60	27.8	106	60	21.1	120	60	38.2	104	60	36.1	124	72	23.4

TABLE VI—COMPILED RESULTS OF THREE YEARS' TESTS OF THREE LEADING VARIETIES OF CORN AT DIFFERENT SPACING IN THE ROWS.<sup>1</sup>

EDGECOMBE FARM.

Varieties.	Yield, Height of Stalks and Ears at Different Spacing of Stalks in Four-foot Rows.														
	20 Inches.			24 Inches.			30 Inches.			36 Inches.			40 Inches.		
	Height of Stalks in Inches at Maturity.	Height of Ears in Inches at Maturity.	Yield in Bushels of Shelled Corn per Acre.	Height of Stalks in Inches at Maturity.	Height of Ears in Inches at Maturity.	Yield in Bushels of Shelled Corn per Acre.	Height of Stalks in Inches at Maturity.	Height of Ears in Inches at Maturity.	Yield in Bushels of Shelled Corn per Acre.	Height of Stalks in Inches at Maturity.	Height of Ears in Inches at Maturity.	Yield in Bushels of Shelled Corn per Acre.	Height of Stalks in Inches at Maturity.	Height of Ears in Inches at Maturity.	Yield in Bushels of Shelled Corn per Acre.
Cocke's Prolific -----	116.0	55.2	25.7	111.0	56.0	29.4	115.4	55.9	28.7	113.4	53.9	21.9	112.2	50.7	23.4
Holt's Strawberry -----	119.2	58.4	20.8	120.6	58.0	20.3	121.6	59.9	19.8	118.3	56.9	19.3	118.0	58.0	20.0
Weekley's Improved-----	107.4	52.0	25.3	110.9	52.5	24.2	113.4	55.9	29.3	113.0	55.7	28.3	112.0	53.9	23.7

IREDELL FARM.

Cocke's Prolific -----	115.0	57.0	39.1	117.3	56.0	33.7	115.3	58.0	38.0	115.0	55.0	36.9	116.3	52.0	35.2
Holt's Strawberry -----	121.0	64.0	28.8	119.0	64.0	29.6	116.6	61.0	32.4	111.0	62.0	30.7	120.0	63.3	30.2
Weekley's Improved-----	122.0	63.0	31.4	119.0	61.0	30.1	127.0	62.0	38.0	116.6	57.0	35.3	121.0	62.0	30.6

<sup>1</sup>Results in this table for the Edgcombe farm were obtained from data of 1905 and 1907.

These tests were conducted at both the Edgcombe and Iredell farms this year. The land devoted to this test at the Edgcombe farm was good general farm land, while that at the Iredell farm was a deep, red, rather open clay soil, underlain by a tenacious red clay subsoil. Both soil and subsoil contain some rock fragments. The tests were planned and put out in 1905, and continued this year to ascertain if the claim made by some that if distance is given the large one-eared varieties they will produce larger yields of shelled corn per acre than those producing or tending to produce two small or medium-sized ears per stalk. For the test, as seen above, two well-known prolific varieties—Cocke's Prolific and Weekley's Improved—are being compared with Holt's Strawberry, one of the best one-eared varieties. It will be noted that both Cocke's Prolific and Weekley's Improved have each, as an average of three years' results at Iredell and two years' results at Edgcombe, made larger yields than Holt's Strawberry, at both farms, and at all the different distancing of the hills in the rows that were tried.

At the Edgcombe farm, as an average of the results of 1905 and 1907, Cocks's Prolific produced the following increase of bushels of shelled corn over Holt's Strawberry: At 20 inches, 4.9; at 24 inches, 9.1; at 30 inches, 8.9; at 36 inches, 2.6; at 40 inches, 3.4 bushels; while at Iredell the increased yields of Cocks's Prolific over Holt's Strawberry, as an average of the results for 1905, 1906 and 1907, were: At 20 inches, 10.3; at 24 inches, 4.1; at 30 inches, 5.6; at 36 inches, 6.2; at 40 inches, 5.0 bushels.

Weekley's Improved increased yields over Holt's Strawberry, as an average for 1905 and 1907 at the Edgcombe farm, were: At 20 inches, 4.5; at 24 inches, 3.9; at 30 inches, 9.5; at 36 inches, 9.0; at 40 inches, 3.7 bushels; while at the Iredell farm, as an average of three years' tests, 1905, 1906, 1907, the increases of Weekley's Improved over Holt's Strawberry were: at 20 inches, 2.6; at 24 inches, 0.5; at 30 inches, 5.6; at 36 inches, 4.6; at 40 inches, 0.4 bushels.

In the light of these results, coupled with six years' variety tests, it is evident that the largest yields of shelled corn per acre on any type of soil are going to result generally from the use of more prolific varieties, because they will produce more shelled corn per stalk, and, as the stalks are generally smaller and can be planted closer in the row, will contain more stalks per acre.

When the corn is planted wide apart in the row, and in wide-apart rows—matters not if the best one-eared varieties are used—the land will not "turn out" the maximum yield which it is capable of producing, for the reason that there are not enough stalks per acre.

In 1905 Cocks's Prolific and Weekley's Improved, at both the Edgcombe and Iredell farms, produced their largest yields in these tests at the distancing centering about 30 to 36 inches, while Holt's Strawberry did best at the greatest distancing. At the most favorable distancing (40 inches) Holt's Strawberry at the Edgcombe and Iredell farms yielded less by 12.6 and 4.2 bushels of shelled corn per acre, respectively, than Cocks's Prolific at the distancing best suited to it, which was 30 and 36 inches, respectively. Weekley's Improved, with its best distancing at Edgcombe, yielded 13 bushels more than Holt's Strawberry at 40-inch distancing; while at Iredell Weekley's Improved, with the stalks 36 inches in the row, produced 4.2 bushels more per acre than Holt's Strawberry at its optimum distancing (40 inches) in the row.

In 1906, being a year in which excessive amounts of rain fell during the growing period, all three varieties produced largest yields at a distancing of 20 inches in the row; while the next best yields for all were at 30 inches in the row. This year seemed to be especially favorable to the production of maximum yields of all the large one-eared varieties, and at the Iredell farm Holt's Strawberry outyielded Weekley's Improved at both 20 and 30 inches between the hills in four-foot rows.

In 1907, at the Edgcombe farm, all three varieties attained their highest yields at a distancing of 20 inches in the row. At this distancing Cocke's Prolific slightly exceeded Holt's Strawberry, and Holt's Strawberry exceeded Weekley's Improved by 1.8 bushels shelled corn per acre. At the Iredell farm all three varieties made the best yields at a distancing of 36 inches in the row. At this distancing Cocke's Prolific exceeded Holt's Strawberry by 4.7, and Weekley's Improved exceeded Holt's Strawberry by 3.1 bushels shelled corn per acre.

## DISTANCE TESTS OF CORN.

The results of the distance tests of corn are brought together in Tables VII and VIII, which follow:

TABLE VII—COMPILED RESULTS OF DISTANCE TESTS OF CORN.

## EDGECOMBE FARM.

Rank According to Yield of Shelled Corn per Acre.	Distance Between Stalks.	Distance Between Stalks in Row.	No. Stalks per Plat. *		Number Ears per Plat.	Average Height of Stalks in Inches at Maturity.	Yield per Plat in Pounds.				Total Bushels Shelled Corn per Acre.	Pounds Shelled Corn per Stalk.	Stover per Acre—Pounds.
			For Perfect Stand.	By Actual Count.			Large Ears.	Nubbins.	Total Corn on Cob.	Stover.			
7	Three and one-half feet.	Four feet-----	250	248	365	106.0	112.75	10.25	123.00	92.00	19.6	.41	1140
2	Three and one-half feet.	Three feet-----	333	364	410	108.0	149.25	14.00	163.25	161.75	26.1	.37	2005
5	Three and one-half feet.	Two and one-half feet.	400	371	478	107.0	130.00	17.75	147.75	162.25	22.3	.33	2011
1	Three and one-half feet.	Two feet-----	500	498	631	109.0	177.25	15.50	192.75	112.25	30.8	.32	1391
4	Four feet-----	Four feet-----	250	284	464	110.0	165.00	12.75	177.75	142.25	24.7	.52	1536
3	Four feet-----	Three feet-----	333	287	440	100.0	174.50	10.50	185.00	150.00	25.7	.53	1620
6	Four feet-----	Two and one-half feet.	400	404	472	111.0	132.25	18.00	150.25	154.75	20.8	.30	1671
8	Four feet-----	Two feet-----	500	449	494	109.0	124.50	14.50	139.00	176.00	19.3	.25	1900
9	Five feet-----	Four feet-----	250	292	458	110.0	145.75	16.75	162.50	162.50	18.2	.46	1413
11	Five feet-----	Three feet-----	333	395	404	107.0	126.75	11.00	137.75	97.25	15.4	.29	846
10	Five feet-----	Two feet-----	500	379	490	109.0	145.00	13.50	158.50	136.50	17.7	.40	1187
12	Five feet-----	One and one-half feet.	666	471	487	106.0	117.75	16.50	134.25	150.75	15.0	.23	1311

TABLE VII—COMPILED RESULTS OF DISTANCE TESTS OF CORN.

IREDELL FARM.

Rank According to Yield of Shelled Corn per Acre.	Distance Between Stalks.	Distance Between Stalks in Row.	No. Stalks per Plat.		Number of Ears per Plat.	Average Height of Stalks in Inches at Maturity.	Yield per Plat in Pounds.				Total Bushels Shelled Corn per Acre.	Pounds Shelled Corn per Stalk.	Stover per Acre—Pounds.
			For Perfect Stand.	By Actual Count.			Large Ears.	Nubbins.	Total Corn on Cob.	Stover.			
6	Three and one-half feet.	Four feet-----	187	353	96.0	82.5	3.5	85.1	119.0	29.1	.38	2725	
2	Three and one-half feet.	Three feet-----	218	384	102.0	88.0	4.0	92.0	153.0	31.2	.35	3503	
5	Three and one-half feet.	Two and one-half feet.	233	405	100.0	84.0	4.0	88.0	137.0	29.8	.31	3137	
4	Three and one-half feet.	Two feet-----	241	430	100.0	79.0	3.0	82.0	148.0	30.7	.28	3389	
11	Four feet-----	Four feet-----	201	382	94.0	81.0	3.0	84.0	141.0	24.8	.34	2820	
7	Four feet-----	Three feet-----	231	427	108.0	88.0	9.0	97.0	133.0	28.7	.34	2660	
10	Four feet-----	Two and one-half feet	216	399	100.0	79.0	10.0	89.0	146.0	26.3	.34	2920	
9	Four feet-----	Two feet-----	243	452	102.0	78.0	13.0	91.0	149.0	26.9	.31	2980	
3	Four feet-----	One and one-half feet.	231	527	94.0	91.0	14.0	105.0	175.0	31.1	.31	3500	
12	Five feet-----	Four feet-----	198	364	90.0	95.0	5.0	100.0	80.0	23.7	.41	1280	
11	Five feet-----	Three feet-----	214	503	96.0	94.0	11.0	105.0	135.0	24.8	.40	2160	
8	Five feet-----	Two feet-----	243	478	110.0	111.0	10.0	121.0	174.0	28.6	.41	2784	
1	Five feet-----	One and one-half feet.	301	590	102.0	118.0	15.0	133.0	202.0	31.5	.36	3232	

TABLE VIII—COMPILED RESULTS OF DISTANCE TESTS OF CORN.

## EDGECOMBE FARM.

Year.	Yield of Shelled Corn in Bushels per Acre at Different Distancing.																
	3½ feet by 2 feet.	3½ feet by 2½ feet.	3½ feet by 3 feet.	3½ feet by 3½ feet.	3½ feet by 4 feet.	4 feet by 1½ feet.	4 feet by 2 feet.	4 feet by 2½ feet.	4 feet by 3 feet.	4 feet by 3½ feet.	4 feet by 4 feet.	5 feet by 1½ feet.	5 feet by 2 feet.	5 feet by 3 feet.	5 feet by 4 feet.		
1901						25.6	28.4	24.4	22.5	24.3	23.0						
1902			18.8	16.1	14.6		17.6	16.1	16.2					13.0	13.6		
1903			22.0		26.8	23.7		27.4	23.0	25.0			24.6	19.5	18.7		
1904			36.8	35.8	37.4		37.4	35.8	33.7	35.8	40.1		30.2	32.7	32.8	31.9	
1905			16.1	12.7	22.7		29.6	12.7	18.1	18.3	15.8		17.6	26.1	20.4	20.6	
1906																	
1907			30.8	22.3	26.1		19.6		19.3	20.8	25.7		24.7	15.0	17.7	15.4	18.2
Averages																	

## RED SPRINGS FARM.

1901				9.2		10.0		10.7		16.2		20.0	17.9	18.3
1902				14.8		11.9		14.4		11.4		12.2	11.3	10.9
1903				17.8		18.3		16.5		18.2		17.6	19.2	14.4
1904				23.3						21.8		23.6	20.8	
Averages				16.3								18.4	17.3	

## IREDELL FARM.

1903	15.8	21.9	18.0	22.9	14.5	16.4	17.1	15.4	19.8	20.5	19.8		
1904	42.4	39.3	40.6	36.4	35.1	39.3	35.4	41.0	46.9	37.2	31.0		
1905	31.4	38.0	39.1	37.0	34.1	37.2	34.5	34.8	46.9	35.0	33.9		
1906	27.8	26.9	27.2	24.3	20.5	28.8	25.9	24.3	28.8	23.8	17.5	18.4	
1907	30.7	29.8	31.2	29.1	31.1	26.9	26.3	28.7	24.8	31.5	28.6	24.8	23.7
Averages	29.6	31.5	30.2	26.2	29.6	28.3		28.0	33.2	27.0	25.3		

## COMMENTS ON DISTANCE TESTS.

These tests were conducted this year at the Iredell and Edgecombe farms—seed of Cocke's Prolific having been used at Edgecombe and Weekley's Improved at Iredell for planting the different tests during all the years. The distancing best suited to the soil of the Edgecombe farm in its present state of fertility, as indicated by an average of six years' results, is 4 feet by 3 feet; at Iredell and Red Springs, as an average of three and five years' results, respectively, 5 feet by 2 feet. It will require a number of repetitions of this test to arrive at a fair idea of the best width of rows and distance in rows for planting corn on the types of soil used in the experiments. This will no doubt vary with the different kinds of corn, soil and season.

In Table VIII is presented in concise form the results of all distance tests with corn that have been conducted at the Edgecombe farm during six years, and the Red Springs farm during four years, and the Iredell farm during five years.

## II. VARIETY AND DISTANCE TESTS OF COTTON.

*Preparation and Cultivation.*—All plats devoted to these tests were broke 8 to 10 inches deep during March at Edgecombe, and in April at Iredell, with a two-horse turning plow, followed by a thorough disking during the middle of April. Just before laying off the rows, which was during the last of April, the ground was gone over with a smoothing harrow. The rows were run 5 to 7 inches deep,  $3\frac{1}{3}$  feet apart, with an 8-inch shovel, and the fertilizer materials applied in the drill, at the following rate per acre in all tests:

Four hundred pounds of a mixture of acid phosphate, manure salt and dried blood, which contained 7 per cent available phosphoric acid,  $2\frac{1}{2}$  per cent potash and  $2\frac{1}{2}$  per cent nitrogen (equal to 3.04 per cent ammonia), costing \$3.95, were used.

The cultivation was level, with cultivators, being moderately deep at the beginning of the season and shallower as the root zone increased. The cultivator was never run more than twice to the row at a time, as this more than covered the middle, and an effort was made to work over the plats as quickly as possible immediately after rains to break the crust formed by the showers and leave a dust mulch to check evaporation. The cultivator was run about  $1\frac{1}{2}$  to 2 inches deep toward the close of the season. It was attempted to cultivate every ten days, which had to be changed, of course, to suit the season. The cotton was reduced to a stand of 15 inches at Edgecombe and 16 inches at Iredell between the hills in the rows with the variety tests.

## RESULTS OF VARIETY TESTS OF COTTON.

The results of these tests are included in the following tables:

TABLE IX—RESULTS OF  
EDGECOMBE

Rank According to Selling Price of Total Products (Lint and Seed).	Varieties Tested.	Number of Stalks per Plat.			Yield of Seed Cotton in Pounds per Plat at the Several Pickings.				
		For Perfect Stand.	By Actual Count.	Average Height of Stalks in Inches at Maturity.	First Picking— November 1.	Second Picking— February 13.	Third Picking.	Fourth Picking.	Total Pickings.
1	Cleveland's Big Boll	555	308	43.0	36.50	29.75			66.25
2	Shine's Extra Early Prolific	555	236	44.0	36.50	30.00			63.50
3	Sugar Leaf	555	376	40.0	46.25	10.50			56.75
4	Brown's No. 1	555	407	43.0	31.00	20.50			51.50
5	Russell's Big Boll	555	256	43.0	26.50	32.25			58.75
6	Cook's Improved	555	377	41.0	20.25	30.00			50.25
7	Bigham's Improved	555	348	45.0	43.50	13.50			57.00
8	Simpkins' Prolific	555	298	33.0	28.50	19.75			48.25
9	Webb	555	365	40.0	49.50	3.75			53.25
10	Braswell's Cluster	555	346	45.0	46.75	4.75			51.50
11	Culpepper's Re-Improved	555	253	43.0	23.50	26.00			49.50
12	King's Improved	555	271	37.0	31.50	13.50			45.00
13	Culpepper's Improved	555	306	37.0	27.25	20.75			48.00
14	Morgan's Climax	555	430	46.0	45.50	3.50			49.00
15	Hodge	555	272	39.0	42.50	2.25			44.75
16	Edgeworth	555	207	45.0	38.50	7.00			45.50
17	Dozier's Improved	555	211	42.0	33.75	10.00			43.75
18	Wilson's Matchless	555	307	43.0	36.00	8.00			44.00
19	Layton's Improved	555	245	44.0	33.50	5.00			38.50
20	Moss' Improved	555	286	41.0	10.50	26.25			36.75
21	Pullnot	555	323	40.0	22.50	16.75			39.25
22	Alexander Money-Maker	555	275	43.0	17.25	18.75			36.00
23	Excelsior Prolific	555	293	43.0	34.50	3.50			38.00
24	Cluster	555	278	48.0	28.50	12.50			41.00
25	Peterkin's Improved	555	276	47.0	28.50	6.75			35.25
26	Mortgage Lifter	555	113	44.0	11.50	22.00			33.50
27	Black Texas Wood	555	266	50.0	9.50	17.50			27.50

## VARIETY TESTS OF COTTON.

FARM.

Total Pounds Seed Cotton per Acre.	Number of Bolls Required to Yield One Pound of Seed Cotton.	Number of Seed in One Pound of Seed Cotton.	Pounds of Lint in 100 Pounds of Seed Cotton.	Pounds of Seed in 100 Pounds of Seed Cotton.	Pounds of Lint per Acre.	Pounds of Seed per Acre.	Value of Lint per Acre at 11 Cents per Pound.	Value of Seed per Acre at \$1.00 per 100 Pounds or 30 Cents per Bushel.	Total Value of Lint and Seed per Acre.	Source of Seed.
1278.63	54	2000	35.14	64.86	449.3	829.3	\$49.42	\$ 8.29	\$57.71	Georgia.
1225.55	69	2676	32.68	67.32	400.5	825.0	44.05	8.25	52.30	North Carolina.
1095.28	87	2825	36.28	63.72	397.3	697.9	43.70	6.97	50.67	North Carolina.
993.95	58	2312	38.49	61.51	382.5	611.4	42.08	6.11	48.19	Georgia.
1134.88	54	2000	31.95	68.05	362.5	772.3	39.87	7.72	47.59	Edgecombe Farm.
969.82	61	2353	38.61	61.39	374.4	595.4	41.18	5.95	47.13	Georgia.
1100.10	63	2567	32.90	67.10	361.9	438.2	39.80	4.38	44.18	North Carolina.
981.23	79	2812	36.68	63.32	341.5	589.7	37.56	5.90	43.46	North Carolina.
1027.73	83	2862	32.73	67.27	330.3	697.4	36.33	6.97	43.30	North Carolina.
993.95	76	2839	33.51	66.49	333.0	660.9	36.63	6.60	43.23	North Carolina.
955.35	54	2150	33.19	66.81	317.0	638.3	34.87	6.38	41.25	Georgia.
868.50	86	2921	37.40	62.60	324.8	543.7	35.72	5.44	41.16	Iredell Farm.
926.40	61	1959	33.80	66.18	313.3	613.1	34.46	6.13	40.59	Edgecombe Farm.
945.70	59	2331	31.51	68.49	297.9	647.8	32.76	6.48	39.24	South Carolina.
863.68	77	2630	35.00	65.00	302.2	561.4	33.24	5.61	38.85	North Carolina.
878.15	58	2199	32.81	67.19	288.1	590.0	31.69	5.90	37.59	Georgia.
844.38	71	2707	33.51	66.49	282.9	561.4	31.11	5.61	36.72	North Carolina.
849.20	69	2535	32.88	67.12	279.2	570.0	30.71	5.70	36.41	North Carolina.
743.05	71	2921	38.55	61.45	286.4	456.6	31.50	4.57	36.07	South Carolina.
709.28	74	3102	39.26	60.74	278.4	430.8	30.62	4.31	34.93	South Carolina.
757.53	58	2031	35.93	64.07	272.1	485.4	29.93	4.85	34.78	Georgia.
694.80	73	2966	38.80	61.20	269.5	425.3	29.65	4.25	33.90	Georgia.
733.40	74	2812	36.21	63.79	265.5	467.9	29.20	4.68	33.88	South Carolina.
791.30	76	2911	32.61	67.39	258.0	533.3	28.38	5.33	33.71	North Carolina.
680.33	72	3002	37.36	62.64	254.1	426.2	27.95	4.26	32.21	South Carolina.
646.55	56	1864	30.10	69.90	194.6	451.9	21.40	4.52	25.92	Georgia.
521.10	76	3215	36.57	63.43	190.5	330.6	20.95	3.30	24.25	North Carolina.

TABLE IX—RESULTS OF VARIETY

IREDELL

Rank According to Selling Price of Total Products (Lint and Seed).	Varieties Tested.	Number of Stalks per Plat.			Yield of Seed Cotton in Pounds per Plat at the Several Pickings.				
		For Perfect Stand.	By Actual Count.	Average Height of Stalks in Inches at Maturity.	First Picking— October 11.	Second Picking— November 27.	Third Picking.	Fourth Picking.	Total Pickings.
1	Pullnot -----	520	434	30.0	39.14	32.50	-----	-----	71.64
2	King's Improved -----	520	523	40.0	52.21	15.00	-----	-----	67.21
3	Cook's Improved -----	520	465	36.0	30.31	27.00	-----	-----	57.31
4	King's Improved (native) -----	520	525	33.0	47.17	13.25	-----	-----	60.42
5	Brown's No. 1 -----	520	431	40.0	30.30	25.00	-----	-----	55.30
6	Sugar Leaf -----	520	497	36.0	46.30	10.00	-----	-----	56.30
7	Cleveland Big Boll -----	520	429	35.0	37.06	21.00	-----	-----	58.06
8	Simpkin's Prolific -----	520	442	42.0	41.25	12.25	-----	-----	53.50
9	Culpepper's Re-Improved -----	520	407	44.0	25.10	30.50	-----	-----	55.60
10	Mortgage Lifter -----	520	435	45.0	26.16	29.00	-----	-----	55.10
11	Wilson's Matchless -----	520	472	48.0	32.65	21.50	-----	-----	54.15
12	Alexander Money-Maker -----	520	478	32.0	24.21	26.50	-----	-----	50.71
13	Moss' Improved -----	520	436	40.0	19.35	26.50	-----	-----	45.85
14	Bigham's Improved -----	520	450	32.0	39.30	14.00	-----	-----	53.30
15	Williams' -----	520	490	33.0	37.61	10.00	-----	-----	47.61
16	Drake's Defiance -----	520	402	34.0	28.87	24.00	-----	-----	52.87
17	Excelsior Prolific -----	520	492	42.0	24.38	24.00	-----	-----	48.38
18	Dozier's Improved -----	520	423	30.0	39.20	11.00	-----	-----	50.20
19	Shine's Extra Early Prolific -----	520	426	36.0	31.21	18.25	-----	-----	49.46
20	Edgeworth -----	520	542	30.0	19.19	23.00	-----	-----	42.19
21	Cluster -----	520	442	44.0	17.25	24.00	-----	-----	41.25
22	Black Texas Wood -----	520	445	42.0	15.72	21.25	-----	-----	36.97
23	Webb -----	520	478	32.0	17.62	17.00	-----	-----	34.62
24	Braswell's Cluster -----	520	550	30.0	14.15	20.00	-----	-----	34.15

## TESTS OF COTTON—CONTINUED.

FARM.

Total Pounds Seed Cotton per Acre.	Number of Bolls Required to Yield One Pound of Seed Cotton.	Number of Seed in One Pound of Seed Cotton.	Pounds of Lint in 100 Pounds of Seed Cotton.	Pounds of Seed in 100 Pounds of Seed Cotton.	Pounds of Lint per Acre.	Pounds of Seed per Acre.	Value of Lint per Acre at 11 Cents per Pound.	Value of Seed per Acre at \$1.00 per 100 Pounds or 30 Cents per Bushel.	Total Value of Lint and Seed per Acre.	Source of Seed.
1432.80	61	1950	38.69	61.31	554.3	878.5	60.97	8.79	69.76	Georgia.
1344.20	83	2811	37.92	62.08	509.7	834.5	56.06	8.36	64.42	Iredell Test Farm.
1146.20	63	2221	39.71	60.29	455.0	691.2	50.05	6.91	56.96	Georgia.
1208.40	85	2665	36.36	63.64	439.3	769.1	48.32	7.69	56.01	North Carolina.
1106.00	76	2267	39.58	60.42	438.0	668.0	48.18	6.68	54.86	Georgia.
1126.00	95	2811	38.54	61.46	434.0	692.0	47.74	6.92	54.66	North Carolina.
1161.20	63	1904	36.94	63.06	429.0	732.2	47.19	7.32	54.51	Georgia.
1070.00	79	2902	37.61	62.39	402.4	667.6	44.26	6.68	50.94	North Carolina.
1112.00	62	2086	34.69	65.31	385.7	726.3	42.42	7.26	49.68	Edgecombe Test Farm.
1102.00	60	2176	35.06	64.94	386.3	715.7	42.49	7.16	49.65	Georgia.
1083.00	71	2528	34.99	65.01	379.0	704.0	41.69	7.04	48.73	North Carolina.
1014.20	82	2964	37.24	62.76	378.0	636.2	41.58	6.36	47.88	Georgia.
917.00	73	3079	41.15	58.85	377.3	539.7	41.50	5.40	46.90	South Carolina.
1066.00	76	2584	33.80	66.20	363.3	705.7	39.63	7.06	46.69	North Carolina.
952.20	89	2502	38.98	61.02	371.2	581.0	40.83	5.81	46.64	North Carolina.
1057.40	73	2584	33.90	66.10	358.4	699.0	39.42	6.99	46.41	Georgia.
967.60	72	2312	37.09	62.91	359.0	608.6	39.49	6.09	45.58	North Carolina.
1004.00	82	2779	34.45	65.55	346.0	658.0	38.06	6.58	44.60	North Carolina.
989.20	82	2457	34.56	65.44	342.1	647.1	37.63	6.47	44.10	North Carolina.
848.80	69	2539	37.21	62.79	314.0	529.0	34.54	5.29	39.83	Georgia.
825.00	79	2856	34.87	65.13	287.6	537.4	31.63	5.37	37.00	North Carolina.
739.40	82	3174	37.12	62.88	274.4	465.0	30.18	4.65	34.83	North Carolina.
692.40	88	2766	34.70	65.30	240.2	452.2	26.42	4.52	30.94	North Carolina.
683.00	86	2811	35.05	64.95	239.3	443.7	26.32	4.44	30.76	North Carolina.



TABLE X—COMPILED RESULTS OF VARIETY TESTS OF COTTON—CON.

## EDGECOMBE FARM.

Varieties Tested.	1900.		1901.		1902.		1903.		1904.		1905.		1906.		1907.		Averages.	
	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.
Wilson's Matchless											1678.2	16	1242.4	12	849.2	18		
Jackson Limbless (Wilt Resistant).											1535.4	12						
Jackson Limbless (No. 128-1-29-1-11).											1181.1	23						
Dozier's Improved											1387.8	20	1193.7	11	844.4	17		
Berry's Big Boll											1496.6	22						
Layton's Improved											1535.4	13			743.1	19		
Gold Standard											1643.7	14						
Braswell's Cluster											1520.7	19	1268.8	3	993.9	10		
Butler's Early Prolific.											1845.5	11	1030.3	19				
Brown's No. 1													1252.9	2	993.9	4		
Broadwell's Double-jointed.													1243.7	5				
Bigham's Improved													1303.0	6	1100.1	7		
Double-header													1281.9	7				
Drake's Defiance													1196.3	9				
Simpkin's Prolific													952.6	18	931.2	8		
Improved Russell's Big Boll.													984.2	22				
Mortgage Lifter													961.8	23	646.6	26		
Little's Improved													876.1	24				
Red Rust Proof													797.1	25				
Cleveland's Big Boll															1278.6	1		
Sugar Loaf															1095.3	3		
Culpepper's Re-Improved.															954.4	11		
Morgan's Climax															945.7	14		
Pullnot															757.5	21		
Alexander Money-Maker.															694.8	22		
Cluster															791.3	24		

TABLE X—COMPILED RESULTS OF VARIETY TESTS OF COTTON—CON.  
RED SPRINGS FARM.

Varieties Tested.	1900.		1901.		1902.		1903.		1904.		Averages.	
	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton Per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.
Russell's Big Boll -----	675.0	3	496.3	1	1070.0	3	887.9	7	557.6	5	737.4	4
Culpepper's Improved (Edgecombe).	734.4	1	477.0	2	1218.5	1	897.2	4			831.8	1
Culpepper's Improved (Red Springs).							915.9	3	635.2	2		
Peterkin's Improved ----	660.0	2	440.0	4	982.5	2	915.9	2	441.4	10	688.0	5
Daughty's Excelsior ----	655.0	4										
Allen's Long Staple ----	635.0	7										
Excelsior Prolific ----	635.0	6			895.0	5	943.9	1	548.0	3	755.5	2
Texas Burr -----	630.0	5										
Groveton -----	605.0	7										
Native -----	530.0	8										
Griffin's Improved ----			473.1	3								
Hawkins' Extra Prolific.			448.3	5								
Moss' Improved ----			417.0	6					334.5	17		
Sea Island -----			255.0	7								
King's Improved ----					910.0	4	813.1	6	500.5	6	741.2	3
Peterkin's Improved (Craig's).									347.7	19		
Truitt's Improved ----							411.2	8				
Edgeworth -----							925.2	5	491.0	9		
Cook's Improved ----									680.4	1		
Tool's Early Prolific ----									490.1	4		
Webb -----									503.2	7		
Hodge -----									494.9	8		
Speight's Prolific ----									431.0	11		
Shine's Extra Early Prolific.									452.6	12		
Black Texas Wood ----									413.6	13		
Brown Texas Wood ----									382.5	14		
Missionary -----									396.4	15		
Texas Big Boll ----									392.7	16		
White's Long Staple ----									383.7	18		
Florodora -----									312.1	20		

TABLE X—COMPILED RESULTS OF VARIETY TESTS OF COTTON—CON.

## IREDELL FARM.

Varieties Tested.	1900.		1901.		1902.		1903.		1904.		1905.		1906.		1907.		Averages.	
	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.
King's Improved (Native).							750.0	1	900.0	2	985.4	1	865.0	3	1208.40	4	941.6	2
King's Improved.							655.0	2	1005.0	1	765.2	11	960.0	1	1344.20	2	945.8	1
Russell's Big Boll.							640.0	3	835.0	7								
Culpepper's Improved.							630.0	5	790.0	8	974.0	4	560.0	16				
Edgeworth.							605.0	4	760.0	11	873.0	12	670.0	13	848.80	20	751.3	3
Excelsior Prolific.							475.0	6	790.0	6	801.6	10			967.60	17		
Garrard's Improved Prolific.							410.0	7										
Truitt's Improved							360.0	9			750.6	22						
Peterkin's Improved.							290.0	8	495.0	21	743.4	20						
Webb.									920.0	3	946.5	5	680.0	11	692.40	23		
Hodge.									805.0	4	1082.0	2						
Tool's Early Prolific.									575.0	17	816.6	13						
Cook's Improved.									695.0	10	938.0	3			1146.20	3		
Missionary.									745.0	9								
Speight's Prolific.									660.0	13								
Shine's Extra Early Prolific.									825.0	5	926.6	7	720.0	4	989.20	19		
Texas Big Boll.									635.0	16			540.0	17				
Black Texas Wood.									525.0	20	805.8	15	600.0	14	739.40	22		
Peterkin's Improved (Craig).									670.0	15	784.6	21						
Moss' Improved.									500.0	19	706.2	18	595.0	7	917.00	13		
White's Long Staple.									525.0	24								
Brown Texas Wood.									615.0	12			505.0	18				
Florodora.									440.0	25								
Jackson Limbless.									465.0	23								
Mebane's Triumph.									460.0	22								
Jones' Improved.									600.0	18								
Excelsior.									650.0	14								
Wilson's Matchless.											965.6	6	690.0	5	1083.00	11		
Jackson Limbless (Wilt Resistant)											720.2	19						
Jackson Limbless (No. 128-1-29-1-11)											558.4	23						
Dozier's Improved											890.8	9	685.0	8	1004.00	18		

TABLE X—COMPILED RESULTS OF VARIETY TESTS OF COTTON—CON.

IREDELL FARM.

Varieties Tested.	1900.		1901.		1902.		1903.		1904.		1905.		1906.		1907.		Averages.	
	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.	Yield in Pounds Seed Cotton per Acre.	Rank According to Value of Total Products.
Berry's Big Boll											909.6	17						
Layton's Improved.											791.2	14						
Gold Standard											787.2	16						
Butler's Early Prolific.											894.6	8						
Broadwell's Doublejointed.													900.0	2				
Bigham's Improved.													650.0	6	1066.00	14		
Drake's Defiance													690.0	9	1057.40	16		
Improved Russell's Big Boll.													700.0	10				
Brown's No. 1													600.0	12	1106.00	5		
Hawkins' Extra Prolific.													560.0	15				
Mortgage Lifter													545.0	15	1102.00	10		
Double-header													530.0	19				
Pullnot															1432.80	1		
Sugar Loaf															1126.00	6		
Cleveland Big Boll.															1161.20	7		
Simpkin's Prolific															1070.00	8		
Culpepper's Re-improved.															1112.00	9		
Alexander Money-Maker.															1014.00	12		
Williams'															952.20	15		
Cluster															825.00	21		
Braswell's Cluster															683.00	24		

TABLE XI—SHOWING RELATIVE EARLINESS, VALUE, YIELD, AND SIZE OF BOLLS, SEED, AND STALKS OF VARIETIES OF COTTON TESTED IN 1907.

EDGECOMBE FARM.

Varieties.	Percentage of Cotton Open at the Several Pickings.			Rank According to the Following Characters.								
	First Picking—November 1.	Second Picking—February 19.	Third Picking.	Earliness as Shown by Percentage Open at First Picking.	Value of Total Products (Lint and Seed).	Yield of Lint per Acre—Pounds.	Yield of Seed per Acre—Pounds.	Percentage of Lint.	Percentage of Seed.	Largeness of Bolls.	Largeness of Seed.	Height of Stalks.
Cleveland's Big Boll-----	55.09	44.91	----	19	1	1	1	13	14	1	3	7
Shines's Extra Early Prolific-----	54.87	45.13	----	20	2	2	2	22	5	7	13	6
Sugar Loaf-----	81.49	18.51	----	9	3	3	4	10	17	17	16	10
Brown's No. 1-----	60.19	39.81	----	15	4	4	10	5	22	3	7	7
Russell's Big Boll-----	45.10	54.90	----	23	5	6	3	24	3	1	3	7
Cook's Improved-----	40.29	57.71	----	24	6	5	11	3	24	5	9	9
Bigham's Improved-----	76.31	26.69	----	12	7	7	22	18	9	6	11	5
Simpkins' Prolific-----	59.06	40.94	----	16	8	8	13	8	19	14	15	12
Webb-----	92.95	7.05	----	2	9	10	5	21	6	15	18	10
Braswell's Cluster-----	90.77	9.23	----	5	10	9	6	16	11	12	17	5
Culpepper's Re-Improved-----	47.47	52.53	----	22	11	12	8	17	10	1	5	7
King's Improved-----	70.00	30.00	----	13	12	11	16	6	21	16	20	13
Culpepper's Improved-----	56.77	43.23	----	18	13	13	9	15	12	5	2	13
Morgan's Climax-----	92.85	7.15	----	3	14	15	7	25	2	4	8	4
Hodge-----	94.97	5.03	----	1	15	14	15	14	13	13	12	11
Edgeworth-----	84.61	15.39	----	7	16	16	12	20	7	3	6	5
Dozier's Improved-----	77.14	22.86	----	11	17	18	15	16	11	8	14	8
Wilson's Matchless-----	81.81	18.19	----	8	18	19	14	19	8	7	10	7
Layton's Improved-----	87.01	12.99	----	6	19	17	20	4	23	8	20	6
Moss' Improved-----	28.57	71.43	----	27	20	20	23	1	26	11	23	9
Pullnot-----	57.32	42.68	----	17	21	21	18	12	15	3	4	10
Alexander Money-Maker-----	47.91	52.09	----	21	22	22	26	2	25	10	21	7
Excelsior Prolific-----	90.78	9.22	----	4	23	23	19	11	16	11	15	7
Cluster-----	69.51	30.49	----	14	24	24	17	23	4	12	19	2
Peterkin's Improved-----	80.85	19.15	----	10	25	25	25	7	20	9	22	3
Mortgage Lifter-----	34.32	65.68	----	26	26	26	21	26	1	2	1	6
Black Texas Wood-----	35.18	64.82	----	25	27	27	24	9	18	12	24	1

TABLE XI—SHOWING RELATIVE EARLINESS, VALUE, YIELD, AND SIZE OF BOLLS, SEED, AND STALKS OF VARIETIES OF COTTON TESTED IN 1907—CON.

IREDELL FARM.

Varieties.	Percentage of Cotton Open at the Several Pickings.			Rank According to the Following Characters.								
	First Picking— October 2.	Second Picking— November 16.	Third Picking.	Earliness as Shown by Percentage Open at First Picking.	Value of Total Products (Lint and Seed).	Yield of Lint per Acre—Pounds.	Yield of Seed per Acre—Pounds.	Percentage of Lint.	Percentage of Seed.	Largeness of Bolls.	Largeness of Seed.	Height of Stalks.
Pullnot-----	54.63	45.37	---	12	1	1	1	5	20	2	2	11
King's Improved-----	77.68	22.32	---	5	2	2	2	7	18	12	16	5
Cook's Improved-----	52.88	47.12	---	14	3	3	11	2	22	4	5	6
King's Improved (Native)-----	78.06	21.94	---	4	4	4	3	14	11	13	13	9
Brown's No. 1-----	54.79	45.21	---	11	5	5	12	3	23	9	6	5
Sugar Loaf-----	82.23	17.77	---	1	6	6	10	6	19	17	16	6
Cleveland Big Boll-----	63.83	36.17	---	8	7	7	4	13	12	4	1	7
Simpkin's Prolific-----	77.10	22.90	---	6	8	8	13	8	17	10	18	4
Culpepper's Re-Improved-----	45.14	54.86	---	20	9	10	5	20	5	3	3	3
Mortgage Lifter-----	47.47	52.53	---	18	10	9	6	15	10	1	4	2
Wilson's Matchless-----	60.29	39.71	---	10	11	11	8	17	8	6	10	1
Alexander Money-Maker-----	47.74	52.26	---	17	12	12	16	9	16	11	18	10
Moss' Improved-----	42.20	57.80	---	22	13	13	19	1	24	8	19	5
Bigham's Improved-----	73.73	26.27	---	7	14	15	7	24	1	9	12	10
Williams'-----	78.99	21.01	---	2	15	14	18	4	21	16	9	9
Drake's Defiance-----	54.60	45.30	---	13	16	17	9	23	2	8	12	8
Excelsior Prolific-----	50.39	49.61	---	16	17	16	17	12	13	7	7	4
Dozier's Improved-----	78.08	21.92	---	3	18	18	14	22	3	11	15	11
Shine's Extra Early Prolific-----	63.10	36.90	---	9	19	19	15	21	4	11	8	6
Edgeworth-----	45.48	54.52	---	19	20	20	21	10	15	5	11	11
Cluster-----	41.81	58.19	---	23	21	21	20	18	7	10	17	3
Black Texas Wood-----	42.52	57.48	---	21	22	22	22	11	14	11	19	4
Webb-----	50.89	49.11	---	15	23	23	23	19	6	15	14	10
Brasswell's Cluster-----	41.43	58.57	---	24	24	24	24	16	9	14	16	11

TABLE XII—COMPILED RESULTS OF VARIETY TESTS OF COTTON, SHOWING RELATIVE EARLINESS, VALUE, YIELDS, AND SIZE OF BOLLS, AND STALKS.<sup>1</sup>

## EDGECOMBE FARM.

Varieties.	Number of Years Tested.	Rank According to the Following Characters.								
		Value of Total Products—Seed and Lint.	Yield of Lint per Acre—Pounds.	Yield of Seed per Acre—Pounds.	Percentage of Lint.	Percentage of Seed.	Largeness of Bolls.	Largeness of Seed. <sup>2</sup>	Earliness as shown by Percentage of Bolls Open at First Picking. <sup>3</sup>	Height of Stalks. <sup>4</sup>
Russell's Big Boll -----	4	3	3	1	6	2	1	1	6	3
Culpepper's Improved -----	4	2	2	2	4	4	2	4	4	4
Edgeworth -----	4	5	4	5	5	3	4	2	2	1
Cook's Improved -----	4	1	1	6	1	7	3	3	5	6
Webb -----	4	4	5	4	3	5	6	6	1	5
Shine's Extra Early Prolific -----	4	6	6	3	7	1	5	5	3	2
Black Texas Wood -----	4	7	7	7	2	6	6	7	7	3

## RED SPRINGS FARM.

Russell's Big Boll -----	2	5	6	2	5	1	1	1	5	6
Edgeworth -----	2	3	5	3	4	2	3	3	1	5
Culpepper's Improved -----	2	2	2	1	3	3	2	2	2	2
Peterkin's Improved -----	2	6	3	5	2	4	4	5	4	3
King's Improved -----	2	1	4	6	1	5	6	6	6	4
Excelsior Prolific -----	2	4	1	4	2	4	5	4	3	1

## IREDELL FARM.

King's Improved (Native) -----	5	2	2	1	2	2	2	3	1	2
King's Improved -----	5	1	1	2	1	3	2	1	2	1
Edgeworth -----	5	3	3	3	3	1	1	2	3	1

<sup>1</sup>The comparisons of varieties in this table are the average of results of tests of 1903, 1904, 1905, 1906 and 1907 at Iredell; of 1904, 1905, 1906 and 1907 at Edgewcombe; and of 1903 and 1904 at Red Springs.

<sup>2</sup>Results in this column for Red Springs farm were obtained from data of 1904 only.

<sup>3</sup>Results in this column for the Iredell and Edgewcombe farms were obtained from data of 1904, 1905, 1906 and 1907 at former, and 1904, 1905 and 1907 at the latter.

<sup>4</sup>Results in this column for the Edgewcombe farm were obtained from data of 1906 and 1907.

## COMMENTS ON VARIETY TESTS OF COTTON.

The varieties tested this year at the Edgecombe and Iredell farms are arranged in Table IX in the order of their selling price of "total products," when lint is selling at 11 cents per pound and seed at 30 cents per bushel. This order may not be the order of productivity of seed cotton, as is shown in the tests this year at both the Edgecombe and Iredell farms. For example, at the Edgecombe farm, although Russell's Big Boll produced more seed cotton than Brown's No. 1 and Sugar Loaf, each ranked higher in value of total products. The same was true of Cleveland's Big Boll, when compared with Brown's No. 1 and Cook's Improved at the Iredell farm.

The reason for some varieties with smaller yields of seed cotton producing more lint and hence greater selling price per acre than some others with a larger amount of seed cotton per acre, is due to the former varieties producing a higher percentage of lint to seed.

To eliminate inequalities in the land, if any, the different varieties at the separate farms were planted each in separate rows, arranged consecutively, and this plan repeated a sufficient number of times to give the designated acreage. It is absolutely essential, in order to eliminate soil and weather conditions as much as possible, to continue work of this kind for some years on different types of soils before attempting to draw definite conclusions.

The yields for this year are presented in Table IX, while the average rank in value of total products of the several varieties tested during the past seven years is shown in Table X. Taking the whole variety test at the Edgecombe farm, the stand was very irregular and poor. The late, cold spring was largely the cause of this defect in stand. It should not be overlooked, however, that all the varieties were planted in the same way, on the same day, on uniform land, and given the same fertilization and cultural treatment, hence the results are valuable as showing the ability of certain varieties to withstand adverse seasonal conditions and produce paying yields, which is a matter of considerable importance. At the Iredell farm the stand of the different varieties was considerably better than at the Edgecombe, but the yields at both farms were comparatively small, as an unusually early frost in the fall cut off the crop from one-third to one-half. Two pickings were made of the varieties this year at both the Edgecombe and Iredell farms. Of the varieties that have been tested continuously at the different farms since the inauguration of variety testing at them, as seen by Table X, Russell's Big Boll and Culpepper's Improved, as an average of eight years' tests, have ranked as the best varieties at the Edgecombe farm; Culpepper's Improved, Excelsior Prolific, King's Improved and Russell's Big Boll were best at Red Springs as an average of five years' tests; while King's Improved, King's Improved Native and Edgeworth were highest at the Iredell farm as an average of five years' testing.

In this connection it is interesting to note that in the several tests of cotton on the different farms the differences between the one yielding the highest amount of seed cotton per acre and the one the lowest in the individual tests ranged from 530 to 915 pounds of seed cotton at Edgecombe, with the number of varieties ranging from seven to twenty-seven during the past eight years; at Red Springs, 204 to 533 pounds during five years, with from five to twenty varieties; and at Iredell, from 455 to 565 pounds when using from nine to twenty-five varieties in the different tests during the past five years.

These results speak in no uncertain terms as to the importance and value of good seed which are adapted to the different soils and localities of the State.

In Table XI is given the rank of the varieties tested this year according to certain characteristics; while Table XII shows the average ranking of three years at Edgecombe, two at Red Springs and five at Iredell. Both of these tables will be found to contain much information, compiled in compact form.

#### NOTES ON VARIETIES OF COTTON TESTED IN 1907.

*Russell's Big Boll* is a hardy, large-bolled and vigorous-growing variety that yields well, especially on a loamy or sandy soil in the eastern part of the State, and is very popular with pickers. In value of total products (lint and seed) it stood third in 1900 and 1905, first in 1901 and 1902, seventh in 1903, fourth in 1904, twentieth in 1906 and fifth in 1907 at the Edgecombe farm; third in 1900 and 1902, first in 1901, seventh in 1903 and fifth in 1904 at Red Springs; third in 1903 and seventh in 1904 at Iredell. In ordinary seasons this variety is not only prolific, but fairly reliable, especially on the well-drained sandy or loamy soil of the east. This season it was greatly cut off by an early frost.

*Culpepper's Improved* is a large-bolled variety, yielding generally a little less per boll than *Russell's Big Boll*. It ranked fourth in 1900, third in 1901, fifth in 1902, ninth in 1903, seventeenth in 1904, second in 1905, thirteenth in 1906 and 1907 at the Edgecombe farm; first in 1900, second in 1901, first in 1902, third from Red Springs seed and fourth from Edgecombe seed in 1903, second from Red Springs seed in 1904 at the Red Springs farm; fifth, eighth, fourth and sixteenth in 1903, 1904, 1905 and 1906, respectively, at Iredell. This variety is earlier by about ten days and seems to be more subject to variation than *Russell's Big Boll*, but, notwithstanding this last defect, is considered a good, reliable variety. Being a late-maturing variety, and having a short growing season this year, it was cut off some by frost. It has a large-sized weed, with spreading limbs, well bolled, and holds cotton well.

*King's Improved* has a boll a little smaller than Peterkin's Improved, but does not generally yield quite as high percentage of lint. It has a rather small stalk, with spreading limbs. This and Dozier's Improved are two of the earliest-maturing varieties thus far tested. It occupied seventh place in 1902, third in 1903 and 1904, sixteenth in 1906 and twelfth in 1907 at Edgcombe; fourth in 1902, sixth in 1903 and 1904 at Red Springs; second in 1903, first in 1904 and 1906, eleventh in 1905 and second in 1907 at Iredell.

*Edgeworth* stood first in 1903, tenth in 1904 and 1905, eighth in 1906 and sixteenth in 1907 at Edgcombe; fifth in 1903 and ninth in 1904 at Red Springs; fourth in 1903, eleventh in 1904, twelfth in 1905, thirteenth in 1906 and twentieth in 1907 at Iredell. It has a rather heavy stalk, large leaves and short stems, and is ordinarily a rather late-maturing variety.

*Moss' Improved* stood first in 1900, sixth in 1901, seventeenth in 1904, eighth in 1905, tenth in 1906 and twentieth in 1907 at Edgcombe; sixth in 1901 and seventeenth in 1904 at Red Springs; nineteenth in 1904, eighteenth in 1905, seventeenth in 1906 and thirteenth in 1907 at Iredell. This variety possessed as high percentage of lint as any other variety tested during the past three years.

*Cook's Improved* ranked second in 1904, fifth in 1905, first in 1906 and sixth in 1907 at Edgcombe; tenth in 1904, third in 1905 and third in 1907 at Iredell. It is a medium early maturing variety.

*Webb* occupied eighth and seventeenth places at Edgcombe in 1904 and 1905, fourth in 1906 and ninth in 1907; seventh at Red Springs in 1904; and third, fifth, eleventh and twenty-third in 1904, 1905, 1906 and 1907 at Iredell. Has rather small bolls and seeds.

*Shine's Extra Early Prolific* ranked eleventh in 1904, fifteenth in 1905, twenty-first in 1906 and second in 1907 at Edgcombe; twelfth at Red Springs in 1904; and fifth in 1904, seventh in 1905, fourth in 1906 and nineteenth in 1907 at Iredell. Our tests of three years indicate this to be a rather early maturing variety.

*Black Texas Wood* ranked fifteenth in 1904 and 1906, ninth in 1905 and twenty-seventh in 1907 at Edgcombe; thirteenth at Red Springs in 1904; twentieth in 1904, fifteenth in 1905, fourteenth in 1906 and twenty-second in 1907 at Iredell. This is a late-maturing variety.

*King's Improved* (native) stood first in 1903 and 1905, second in 1904, third in 1906 and fourth in 1907 at the Iredell farm.

*Wilson's Matchless* ranked sixteenth in 1905, twelfth in 1906 and eighteenth in 1907 at Edgcombe; sixth in 1905, fifth in 1906 and eleventh in 1907 at Iredell.

*Dozier's Improved* ranked twentieth in 1905, eleventh in 1906 and seventeenth in 1907 at Edgcombe; ninth in 1905, eighth in 1906 and eighteenth in 1907 at Iredell. This is a small-bolled and very early maturing variety.

*Brown's No. 1* ranked second in 1906 and fourth in 1907 at Edgecombe; twelfth in 1906 and fifth in 1907 at Iredell.

*Braswell's Cluster* ranked nineteenth in 1905, third in 1906 and tenth in 1907 at Edgecombe; and twenty-fourth at Iredell in 1907.

*Bigham's Improved* ranked sixth in 1906 and seventh in 1907 at Edgecombe; and sixth in 1906 and fourteenth in 1907 at Iredell.

*Drake's Defiance* ranked ninth in 1906 at Edgecombe; and ninth in 1906 and sixteenth in 1907 at Iredell.

*Simpkins' Prolific* ranked eighteenth in 1906 and eighth in 1907 at Edgecombe; and eighth in 1907 at Iredell.

*Mortgage Lifter* ranked twenty-third in 1906 and twenty-sixth in 1907 at Edgecombe; and fifteenth in 1906 and tenth in 1907 at Iredell.

*Cleveland's Big Boll* ranked first at Edgecombe and seventh at Iredell in this year's tests.

*Hodge* ranked fifth in 1904, fourth in 1905 and fifteenth in 1907 at Edgecombe; and fourth in 1904 and second in 1905 at Iredell.

*Peterkin's Improved* ranked second in 1901 and 1902, fourth in 1903, sixteenth in 1904, sixth in 1905 and twenty-fifth in 1907 at Edgecombe; eighth in 1903, twenty-first in 1904 and twentieth in 1905 at Iredell.

*Excelsior Prolific* ranked second in 1903, seventh in 1904, first in 1905 and twenty-third in 1907 at Edgecombe; sixth in 1903 and 1904, tenth in 1905 and seventeenth in 1907 at Iredell.

*Alexander Money Maker* ranked twenty-second at Edgecombe and twelfth at Iredell in this year's tests.

*Morgan's Climax* ranked fourteenth at Edgecombe in this year's tests.

*Culpepper's Re-Improved* ranked eleventh at Edgecombe and ninth at Iredell in this year's tests.

*Layton's Improved* ranked thirteenth in 1905 and nineteenth in 1907 at Edgecombe, and fourteenth in 1905 at Iredell.

*Pullnot* ranked twenty-first at Edgecombe and first at Iredell in this year's tests.

*Sugar Loaf* ranked third at Edgecombe and sixth at Iredell in this year's tests.

*Cluster* ranked twenty-fourth at Edgecombe and twenty-fourth at Iredell in this year's tests.

*Williams'* ranked fifteenth at Iredell in this year's tests.

#### STUDY OF COMPILED RESULTS OF VARIETY TESTS OF COTTON.

Eight years ago the Department of Agriculture, by means of its test farms, began comparative tests of varieties of cotton, with the purpose, primarily, of ascertaining, if possible, the varieties that are most prolific of seed cotton per acre when grown under our conditions of

soil and climate. During this time tests have been made of seven varieties in 1900 to twenty-seven in 1907 in the tests on the different farms. It is felt from these accumulated data of eight years' tests that some very reliable and valuable information has been derived, especially if taken and intelligently applied by the individual farmers of the State in their farming operations.

#### VARIATION IN YIELD OF VARIETIES.

In our variety tests we have had some variety or varieties to yield 700 to 900 pounds of seed cotton per acre more than other varieties in the same tests and grown under identical conditions of soil, fertilization and cultivation. This variation in yield has been no uncommon occurrence in our experience. Take, for instance, the results at the Edgecombe farm during the past eight years. In 1900, in a test of eight varieties, the difference between the variety yielding the largest amount of seed cotton per acre and the one the smallest was 565 pounds; in 1901 and 1902, in tests of seven varieties each, the differences were 530 and 790 pounds, respectively; in 1903, 663 pounds, when nine varieties were incorporated, 724 pounds in 1904 with twenty-one varieties, 576 pounds in 1905 with twenty-three varieties, 915 pounds in 1906 with twenty-six varieties, and 758 pounds in 1907 with twenty-seven varieties. The average of these differences is more than the average annual yield per acre of seed cotton in North Carolina. To grow cotton cheaply per pound, more must be produced per acre than is at present done on an average. To do this, better varieties must be planted, more thorough preparation and cultivation be given to the land, and more intelligent fertilization, either directly or indirectly, must be practised. It costs no more to cultivate a prolific variety of cotton than one that has few bolls to the stalk or has a larger number of stalks missing in the row, due to imperfect germination of the seed, or some other avoidable or unavoidable cause.

#### WHAT A VARIETY SHOULD BE.

A variety of cotton should be a group of plants having some special excellencies, such as total yield of lint per acre, resistance to disease and insect pests, etc., and the seed of which should be able to transmit to their progeny, with certainty and without diminution, the excellent qualities of the parent plants. If the designated group of plants does not have these qualities, then it is not worthy to be styled a variety. Neither should the same variety have two names.

#### EARLY MATURING VARIETIES.

The earliest varieties, judged from the percentage of total cotton open at first picking in the past three or four years' tests at the test farms of the Department, are Dozier's Improved, King's Improved,

Hodge, Shine's Extra Early Prolific, and Webb. The first two named are probably the earliest maturing varieties we have thus far tested. They are especially adapted for growth in regions where cotton is liable to be cut off by frost, mattering not whether the prolonged growth be due to climate or soil.

#### MEDIUM MATURING VARIETIES.

Culpepper's Improved, Cook's Improved, Excelsior Prolific, Peterkin's Improved, and Edgeworth are varieties that matured during the past year at a medium date.

#### LATE MATURING VARIETIES.

Russell's Big Boll, Black Texas Wood, and Moss' Improved were the latest varieties tested. Some of these are good yielding varieties when grown where the season is long enough for complete development of their bolls before frost.

#### VARIETIES WITH HIGH PERCENTAGE OF LINT.

Of the varieties tested, Moss' Improved, King's Improved, Brown Texas Wood, Peterkin's Improved, Cook's Improved, Tool's Early Prolific, Hodge, Excelsior Prolific, Brown's No. 1, Edgeworth, and Mortgage Lifter are the ones that have yielded the highest percentage of lint to seed. With these varieties in 1904 the percentage of lint to seed varied from 35.42 per cent with Excelsior Prolific at the Edgecombe farm to 43.03 per cent with Moss' Improved at Iredell. The percentage yield of lint alone of a variety is frequently an unsafe guide in selecting a variety that will produce a large amount of lint cotton per acre.

#### VARIETIES WITH LARGE BOLLS.

Russell's Big Boll, Culpepper's Improved, Edgeworth, Double-header, and Brown's No. 1 are the five varieties thus far tested that possess the largest-sized bolls as well as seed. As an average of four years' tests at the Edgecombe farm and three years' each at the Red Springs and Iredell farms, it has required the following number of bolls to yield a pound of seed cotton: Russell's Big Boll, at Edgecombe, 53; at Red Springs, 64, and at Iredell, 72. Culpepper's Improved, at Edgecombe, 60; at Red Springs, 71, and at Iredell, 74. Edgeworth, at Edgecombe, 66; at Red Springs, 77, and at Iredell, 79. These are late varieties and heavy producers of both lint and seed when planted upon soils that will mature them before frost.

VARIETIES ADAPTED TO THE EASTERN AND SOUTHEASTERN SECTIONS  
OF THE STATE.

After a study of our results with varieties obtained at the Edgecombe and Red Springs farms during the past six or seven years, it is found that of the varieties of cotton thus far tested, Excelsior Prolific, Edgeworth, Culpepper's Improved, King's Improved, Russell's Big Boll, and Peterkin's Improved have yielded the largest amounts of seed cotton per acre on an average. In the eastern part of the State, on the stiffer clayey soils, bottom lands, poorly drained lands and lands near the northern border of the State, it will generally be found advisable to use the best of the earlier maturing varieties, such as King's Improved, Edgeworth, and Excelsior Prolific; while on the more open, sandy and loamy soils of the east and southeast the larger-bolled and more vigorously growing varieties, such as Culpepper's Improved and Russell's Big Boll, will generally yield most satisfactory returns.

## VARIETIES ADAPTED TO PIEDMONT SECTION OF THE STATE.

With reference to varieties of cotton suited to this portion of the State, we cannot assert with the same degree of certainty as we can for the eastern part of the State, as our experiments have only been conducted in Iredell for four years, and with some of the varieties for only the past season. So, with reference to this portion of the State, on a red-clay soil, we would recommend, tentatively, guided by our results, the use of either King's Improved, Culpepper's Improved, Edgeworth, or Excelsior Prolific as the best suited. King's Improved has, in our experiments at the Iredell farm, proved to be the earliest and decidedly the most prolific variety thus far tested there, where the growing season for cotton is comparatively short. There are other promising varieties being tested, but data for a sufficient number of years are not yet in hand to justify anything like definite statements in reference to them and their adaptability to different localities.

## CORRELATION OF CHARACTERS OF VARIETIES OF COTTON.

With cotton, as with corn, it is of the highest importance for farmers, and imperative for all those who are studying or trying to improve varieties, to know what characters are usually antagonistic and what ones are mutually helpful in their economic development. In Table XII are compiled, in concise form, the results of four years' tests at Edgecombe, five at Iredell and two at Red Springs. From this compilation, supplemented by observation in the field and at the gin, the following tentative inferences are made in reference to the varieties of upland cotton tested, when grown under the conditions of climate and soil as represented by these three farms:

*Antagonistic Characters.*—(1) Earliness in maturity is not usually conducive to large yields, although in areas where a short growing period is afforded the earlier maturing varieties often give the greater yields (but these are not large generally), as is shown by King's Improved, which, during the past five years, has proven the most prolific of seed cotton at the Iredell farm, where the growing period for cotton during an average season is comparatively short. (2) Varieties that have large seed generally yield a small percentage of lint to seed. (3) Late-maturing varieties do not generally produce seed cotton that yields a high percentage of lint, although the number of pounds of lint per acre may be large. (4) Small-bolled varieties are not generally easily picked, and hence are unpopular with pickers.

*Associated Characters.*—(1) Varieties that mature early tend to the production of seed cotton that contains a high percentage of lint to seed. (2) Varieties with short staple usually have a high percentage of lint, and *vice versa*. (3) Varieties with large bolls generally have large seed and small percentage of lint. (4) The larger the yield of seed cotton per acre, through proper fertilization or favorable seasonal conditions, the lower the percentage of lint to seed, even of the same variety. (5) Good root and leaf development of a variety tends to increase power of resistance to drought, insect and disease ravages.

#### PROPER PLACE TO SELECT SEED.

With cotton, as with any other staple crop, the place to select seed for the next year's planting is in the field—selecting with reference to total yield of seed cotton, percentage of lint, date of maturity, vigor, hardiness, form and size of bolls, leaves, stalks, limbs, and resistance to disease and insect ravages. By selecting from stalks that bear a large number of bolls per stalk, the tendency will be in the progeny to give an increased yield over the average of the patch, which is the seed obtained when one waits to secure his seed at random from the gin. Another objection to securing seed from the gin in the usual way is that it is usually deferred until late in the fall, and thereby, generally, seed from the last picking are obtained, which are not the best seed. The best seed, as a rule, are from the middle picking.

In selecting a variety one must not be guided entirely by total yield of seed cotton, for often between two varieties producing about the same quantity per acre the one with the smaller yield should be chosen because of its production of a larger amount of lint and higher selling price of total products (lint and seed). It should be remembered that lint sells for from eight to fifteen times as much per pound as seed.

Other things being equal, preference should be given to the larger-bolled varieties, with a large number of locks per boll, as they are much easier picked, and hence are most popular with pickers.

A few hours spent in the fall in selecting and gathering separately the seed cotton from stalks that have a large number of bolls well distributed over the stalks and with other desirable characters, will pay as well or better than any other form of farm work. The seed cotton thus gathered should be ginned separately and the seed carefully saved in some secure place for the next year's planting. Every one who has been through a cotton field in the fall has surely noticed the great difference in the same field, in the form, shape and number of bolls on different stalks, as well as in the characteristics of the stalks themselves. Now, remembering that the law of heredity is as strong and constant in plants as in animals will help to emphasize the great importance of selecting seed of the short staple cotton only from those stalks that bear the largest amount of lint cotton per stalk. Of course, this latter statement does not apply to long-staple cottons in comparison with the short-staple ones, for a long-staple cotton may produce less lint per acre than a short-staple one, yet this smaller number of pounds may sell for more on the market, on account of its higher selling price per pound.

#### BUYING COTTON SEED.

Seed of cotton, as well as all other crops, should be purchased only from the most reliable sources, for frequently seeds advertised in extravagant superlatives are inferior. It is not always the cheapest seed that are secured for the smallest outlay; nor, on the other hand, are all expensive seed of superior quality; so the only safe plan to follow is to buy from the most reliable parties. It might be said, however, that if seed are properly selected they will have to bring a good price to compensate the seedsman or grower for his extra care and expense. The seed should possess strong vitality, for seed of low vitality produce a poor stand of stunted plants that do not produce as large yields as good seed when grown under identical conditions of soil, fertilization and cultivation. It will be remembered, however, that stunted cotton will give larger proportional yields than will corn. It is common to see cotton only a few inches high bearing one, two or more small bolls per stalk, while corn that only reaches three or four or five feet high will frequently produce not much more than a spindling stalk, small shuck and cob.

#### SOURCES OF VARIETIES OF COTTON TESTED.

The seed used in the variety tests of cotton at the Edgecombe and Iredell farms this year were received from the following sources:

Alexander Money Maker.....	Alexander Seed Co., Augusta, Ga.
Bigham's Improved.....	J. N. Bigham, R. F. D. No. 5, Charlotte, N. C.
Black Texas Wood.....	Martin McKinnon, Red Springs, N. C.
Braswell's Cluster.....	J. R. Pitt, Rocky Mount, N. C.
Brown's No. 1.....	M. L. Brown, Decatur, Ga.
Cook's Improved.....	J. R. Cook, Schley, Ga.

Culpepper's Re-Improved.....	J. E. Culpepper, Luthersville, Ga.
Cluster.....	Martin McKimmon, Red Springs, N. C.
Cleveland's Big Boll.....	J. R. Cleveland, Decatur, Ga.
Culpepper's Improved, Edgecombe Test Farm, Rocky Mt., N. C. (R. F. D. No. 5)	
Dozier's Improved.....	W. D. Dozier, Camden, N. C.
Drake's Defiance.....	Drake Brothers, Philomath, Ga.
Edgeworth.....	J. C. Little, Louisville, Ga.
Excelsior Prolific.....	Excelsior Seed Farm, Cheraw, S. C.
Hodge.....	C. N. Allen, Auburn, N. C.
King's Improved.....	Iredell Test Farm, Statesville, N. C.
King's Improved (native).....	J. W. Sherrill, Statesville, N. C.
Layton's Improved.....	R. D. Layton, St. Matthews, S. C.
Mortgage Lifter.....	H. G. Hastings & Co., Atlanta, Ga.
Moss' Improved.....	B. D. Moss, Norway, S. C.
Morgan's Climax.....	J. W. Morgan, Glendale, S. C.
Pullnot.....	J. E. Brabury, Athens, Ga.
Peterkin's Improved.....	J. N. Peterkin, Fort Motte, S. C.
Russell's Big Boll... Edgecombe Test Farm, Rocky Mt., N. C. (R. F. D. No. 5).	
Sugar Leaf.....	C. S. Williams, Franklinton, N. C.
Shine's Extra Early Prolific.....	J. A. Shine, Faison, N. C.
Simpkins' Prolific.....	W. A. Simpkins, Raleigh, N. C.
Williams'.....	C. S. Williams, Franklinton, N. C.
Webb.....	Dr. C. L. Killbrew, Rocky Mount, N. C.
Wilson's Matchless.....	F. D. Wilson, Littleton, N. C.

RESULTS OF DISTANCE TESTS OF COTTON.

These results are found in Tables XIII and XIV, which follow:

TABLE XIII—RESULTS OF DISTANCE TESTS OF COTTON.

IREDELL FARM—1907.

Rank According to Value of Total Products (Lint and Seed).	Distance Between Rows.	Distance Between Stalks in Rows.	Number Stalks per Plat	Yield Seed Cotton in Pounds per Plat at the Several Pickings.				Yield Seed Cotton per Acre.	Pounds of Lint per Acre.	Pounds of Seed per Acre.	Value of Lint per Acre at 11 Cents per Pound.	Value of Seed per Acre at \$1.00 per Hundred Pounds or 30 Cents per Bushel.	Total Value of Lint and Seed per Acre.		
				For Perfect Stand.	By Actual Count.	Average Height of Stalks in Inches at Maturity.	First Picking—October 11.							Second Picking—October 29.	Third Picking—December 17.
4	3½ feet ---	12 inches..	651	495	36.0	20.00	13.50	10.50	44.00	880.00	333.7	546.3	\$36.70	\$ 5.46	\$42.16
3	3½ feet ---	16 inches..	489	511	36.0	21.50	14.00	13.50	49.00	980.00	371.6	608.4	40.87	6.08	46.95
5	3½ feet ---	20 inches..	390	502	40.0	17.50	13.25	13.00	43.75	875.00	331.8	543.2	36.49	5.43	41.92
2	3½ feet ---	24 inches..	324	488	40.0	25.00	18.00	13.50	56.50	1030.00	390.6	639.4	42.96	6.39	49.35
1	4 feet -----	12 inches..	651	476	38.0	33.00	20.25	13.00	66.25	1093.12	415.5	678.6	45.70	6.79	52.49
6	4 feet -----	16 inches..	489	442	38.0	22.00	15.50	14.25	51.75	853.87	323.8	530.1	35.61	5.30	40.90
8	4 feet -----	20 inches..	390	353	40.0	14.00	12.50	12.00	38.50	635.25	240.9	394.4	26.49	3.94	30.43
7	4 feet -----	24 inches..	327	368	40.0	23.00	13.00	10.00	46.00	759.00	287.8	471.2	31.65	4.71	36.36

TABLE XIV—COMPILED RESULTS OF DISTANCE TESTS OF COTTON.

## EDGECOMBE FARM.

Year.	Yield Seed Cotton in Pounds per Acre at Different Distancing.								
	3½ Feet by 12 Inches.	3½ Feet by 16 Inches.	3½ Feet by 20 Inches.	3½ Feet by 24 Inches.	4 Feet by 12 Inches.	4 Feet by 15 Inches.	4 Feet by 16 Inches.	4 Feet by 20 Inches.	4 Feet by 24 Inches.
1901 -----	1286.0	1384.0	1410.0	1063.0	964.0	-----	-----	893.0	-----
1903 -----	1507.1	1507.1	1342.9	1342.9	1506.3	-----	1331.1	1306.3	1312.5
1904 -----	1541.2	1751.9	1632.4	1746.0	1723.3	-----	1828.9	1646.6	1861.1
Averages -----	1444.7	1547.6	1461.7	1383.9	1397.8	-----	-----	1281.9	-----

Year.	3½ Feet by 12 Inches.	3½ Feet by 16 Inches.	3½ Feet by 20 Inches.	3½ Feet by 24 Inches.	4 Feet by 12 Inches.	4 Feet by 15 Inches.	4 Feet by 16 Inches.	4 Feet by 20 Inches.	4 Feet by 24 Inches.
1905 -----	1593.8	1457.7	1214.2	1683.4	1896.7	-----	2019.1	1577.1	1493.4

## RED SPRINGS FARM.

Year.	3½ Feet by 12 Inches.	3½ Feet by 16 Inches.	3½ Feet by 20 Inches.	3½ Feet by 24 Inches.	4 Feet by 12 Inches.	4 Feet by 15 Inches.	4 Feet by 16 Inches.	4 Feet by 20 Inches.	4 Feet by 24 Inches.
1901 -----	284.0	288.0	359.0	447.8	566.9	-----	634.7	-----	-----
1902 -----	1258.6	1310.3	1340.5	1428.9	1229.3	-----	1153.2	1051.4	1165.8
1903 -----	831.8	897.2	906.5	757.0	883.1	-----	997.6	842.2	727.7
Averages -----	791.4	831.7	868.6	877.9	893.1	-----	928.5	-----	-----

Year.	3½ Feet by 12 Inches.	3½ Feet by 16 Inches.	3½ Feet by 20 Inches.	3½ Feet by 24 Inches.	4 Feet by 12 Inches.	4 Feet by 15 Inches.	4 Feet by 16 Inches.	4 Feet by 20 Inches.	4 Feet by 24 Inches.
1904 -----	857.5	750.0	675.0	860.0	767.5	-----	815.0	727.5	622.5

TABLE XIV—COMPILED RESULTS OF DISTANCE TESTS OF COTTON.  
CONTINUED.

IREDELL FARM—1907.

Year.	3½ Feet by 12 Inches.	3¼ Feet by 16 Inches.	3½ Feet by 20 Inches.	3¼ Feet by 24 Inches.	4 Feet by 12 Inches.	4 Feet by 15 Inches.	4 Feet by 16 Inches.	4 Feet by 20 Inches.	4 Feet by 24 Inches.
1903 -----	743.2	743.2	630.6	750.8	612.5	700.0	675.0	862.5	791.7
1904 -----	845.0	795.0	810.0	835.0	845.8	-----	812.5	779.2	762.5
1905 -----	975.0	1100.0	1035.0	1110.0	1340.0	-----	1280.0	1170.0	1325.0
1906 -----	1190.0	1785.0	1585.0	1280.0	1215.3	-----	937.5	720.5	612.0
1907 -----	850.0	980.0	875.0	1030.0	1093.1	-----	853.9	635.3	759.0
Averages -----	926.6	1080.6	987.1	1001.1	1021.3	-----	911.7	833.5	850.0

## COMMENTS ON DISTANCE TESTS OF COTTON.

The average results of the distance tests conducted at the Edgecombe and Red Springs farms during the past four years indicate that the best distancing of cotton for the Edgecombe section is somewhere about 3½ feet by 16 inches, while at Red Springs it centers closely around 4 feet by 16 inches. As the average of five years' tests at the Iredell farm, the best distancing was 3¼ feet by 16 inches.

The general deductions above should be accepted tentatively, as here, as with other tests, it will require a number of repetitions to arrive at a fair idea of the best width of rows and distance in rows for planting cotton on the types of soils on which these tests were made.

The plats at the four farms were arranged in lateral series, with each test occupying from three to five rows.

As the results of this test are likely to vary somewhat with different varieties, Culpepper's Improved seed were used at Red Springs, Russell's Big Boll at Edgecombe, and King's Improved<sup>1</sup> at Iredell.

In Table XIV is presented a summary of five years' tests at Edgecombe and at Red Springs, and five at Iredell.

## III. FERTILIZATION AND CULTIVATION OF CORN AND COTTON.

## CORN.

*Culture.*—It unquestionably pays well to thoroughly break and broadcast-harrow land for corn. Using a two-horse plow and running it 8 to 10 inches deep, and afterwards harrowing with large smoothing harrow, puts the land in nice condition. It is also well to run a small-tooth harrow or weeder across corn rows about the time the plants are coming up, and even after they are several inches high,

<sup>1</sup>Culpepper's Improved was used in the test of 1903.

slanting the teeth of the harrow backward. Harrowing in this way saves after-cultivation, and is a quick and comparatively inexpensive way of getting over the land. The land being thoroughly broken before the corn is put in the ground, only shallow, level cultivation with some one of the considerable number of good cultivators need be given the crop during the growing season. The one-horse cultivators cover corn rows in two or three furrows, and the two-horse ones at a single trip. The cultivation should be frequent—about every ten to twelve days—and, if possible, just after rains, so as to break any crust formed by showers, leaving a dust mulch to retard the loss of moisture added to the soil by previous rains. Toward the end of the growing season the cultivators should only be run one to one and a half inches deep, so as to disturb as little as possible the roots of the plants, which, by that time, are well into the middle of the rows.

*Fertilizers for Corn.*—The experimental work on the sandy soils of the east, reports of which have been made previously, has progressed far enough, we feel, to draw some conclusions in reference to the best amounts and proportions of nitrogen, phosphoric acid and potash for corn. As the results of the past five years' work have not yet been published, the following formulas, based on the results of the first two years' tests, and tests in other States with similar soil and climatic conditions, are given as good ones for corn:

*For Corn on Land in Fair Condition.*

No. 1—

Acid phosphate, 14 per cent phosphoric acid.....	900 pounds
Cotton-seed meal, 6.59 <sup>2</sup> per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	960 pounds
Kainit, 12.5 per cent potash.....	140 pounds
	2,000 pounds

This mixture will contain: available phosphoric acid, 7.5 per cent; potash, 1.6 per cent; nitrogen, 3.2 per cent (equal to ammonia, 3.9 per cent).

No. 2—

Acid phosphate, 14 per cent phosphoric acid.....	1,045 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	520 pounds
Nitrate of soda, 15 per cent nitrogen.....	225 pounds
Kainit, 12.5 per cent potash.....	210 pounds
	2,000 pounds

In this formula one-half of the nitrogen is supplied by nitrate of soda and the other one-half by cotton-seed meal. This mixture will contain: available phosphoric acid, 8.0 per cent; potash, 1.7 per cent; nitrogen, 3.4 per cent (equal to ammonia, 4.0 per cent).

<sup>2</sup>6.59 per cent nitrogen equals 8 per cent ammonia.

## No. 3—

Acid phosphate, 14 per cent phosphoric acid.....	965 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	750 pounds
Nitrate of soda, 15 per cent nitrogen.....	110 pounds
Kainit, 12.5 per cent potash.....	175 pounds
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	2,000 pounds

In this formula one-fourth of the nitrogen is supplied by nitrate of soda and the other three-fourths by cotton-seed meal. This mixture will contain: available phosphoric acid, 7.7 per cent; potash, 1.7 per cent; nitrogen, 3.3 per cent (equal to ammonia, 4.0 per cent).

## No. 4—

Acid phosphate, 16 per cent phosphoric acid.....	835 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	1,010 pounds
Kainit, 12.5 per cent potash.....	155 pounds
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	2,000 pounds

This mixture will contain: available phosphoric acid, 7.9 per cent; potash, 1.7 per cent; nitrogen, 3.3 per cent (equal to ammonia, 4.0 per cent).

## No. 5—

Acid phosphate, 14 per cent phosphoric acid.....	860 pounds
Fish scrap, 8.25 per cent nitrogen and 6.0 per cent phosphoric acid .....	850 pounds
Kainit, 12.5 per cent potash.....	290 pounds
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	2,000 pounds

This mixture will contain: available phosphoric acid, 8.6 per cent; potash, 1.8 per cent; nitrogen, 3.5 per cent (equal to ammonia, 4.3 per cent).

## No. 6—

Acid phosphate, 16 per cent phosphoric acid.....	800 pounds
Fish scrap, 8.25 per cent nitrogen and 6.0 per cent phosphoric acid .....	900 pounds
Kainit, 12.5 per cent potash.....	300 pounds
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	2,000 pounds

This mixture is more concentrated than preceding ones, on account of the use of higher-grade materials, and will contain: available phosphoric acid, 9.1 per cent; potash, 1.9 per cent; nitrogen, 3.7 per cent (equal to ammonia, 4.5 per cent).

## No. 7—

Acid phosphate, 14 per cent phosphoric acid.....	960 pounds
Fish scrap, 8.25 per cent nitrogen and 6.0 per cent phosphoric acid .....	960 pounds
Muriate of potash, 50 per cent potash.....	80 pounds
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	2,000 pounds

This mixture, too, is more concentrated than the preceding ones, on account of the use of a high-grade potassic material, muriate of potash, and will contain: available phosphoric acid, 9.6 per cent; potash, 2.0 per cent; nitrogen, 4.0 per cent (equal to ammonia, 4.8 per cent).

No. 8—

Acid phosphate, 14 per cent phosphoric acid.....	950 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	1,015 pounds
Muriate of potash, 50 per cent potash.....	35 pounds
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	2,000 pounds

This mixture will contain: available phosphoric acid, 7.9 per cent; potash, 1.6 per cent; nitrogen, 3.3 per cent (equal to ammonia, 4.0 per cent).

No. 9—

Acid phosphate, 16 per cent phosphoric acid.....	900 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	1,060 pounds
Muriate of potash, 50 per cent potash.....	40 pounds
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	2,000 pounds

This mixture will contain: available phosphoric acid, 8.5 per cent; potash, 1.8 per cent; nitrogen, 3.5 per cent (equal to ammonia, 4.3 per cent).

No. 10—

Acid phosphate, 14 per cent phosphoric acid.....	1,365 pounds
Dried blood, 13 per cent nitrogen.....	555 pounds
Muriate of potash, 50 per cent potash.....	80 pounds
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	2,000 pounds

This mixture is a concentrated one, on account of high-grade nitrogenous and potassic materials being used, and will contain: available phosphoric acid, 9.6 per cent; potash, 2.0 per cent; nitrogen, 3.6 per cent (equal to ammonia, 4.4 per cent).

No. 11—

Acid phosphate, 16 per cent phosphoric acid.....	1,310 pounds
Dried blood, 13 per cent nitrogen.....	600 pounds
Muriate of potash, 50 per cent potash.....	90 pounds
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	2,000 pounds

This mixture is quite concentrated, on account of the high-grade phosphatic and potassic materials used, and will contain: available phosphoric acid, 10.5 per cent; potash, 2.3 per cent; nitrogen, 3.9 per cent (equal to ammonia, 4.7 per cent).

No. 12—

Bone meal, 22.5 per cent phosphoric acid and 3.7 per cent nitrogen .....	950 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	975 pounds
Muriate of potash, 50 per cent potash.....	75 pounds
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	2,000 pounds

This mixture is a concentrated one, on account of the high-grade phosphatic and potassic materials used, and will contain: available phosphoric acid, 11.9 per cent; potash, 2.6 per cent; nitrogen, 5.0 per cent (equal to ammonia, 6.0 per cent).

No. 13—

Acid phosphate, 14 per cent phosphoric acid.....	585 pounds
Cotton seed, 3.1 per cent nitrogen, 1.3 per cent phosphoric acid and 1.2 per cent potash.....	1,375 pounds
Kainit, 12.5 per cent potash.....	40 pounds
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	2,000 pounds

This mixture will contain: available phosphoric acid, 5.0 per cent; potash, 1.1 per cent; nitrogen, 2.1 per cent (equal to ammonia, 2.6 per cent).

*Cotton Seed.*—Cotton seed may replace the meal in preceding formulas containing meal by allowing 2 pounds of seed for one of meal.

*Nitrate of Soda.*—This material is quick-acting, because of its easy solubility in water. For this reason, when used in a considerable quantity in fertilizers at time of planting, especially on light sandy land, there is considerable danger of its being leached beyond the reach of the roots of the plants before they can use it. On clay lands and loams having good subsoils to them this danger does not exist, certainly not to the extent that it does on light soils. A small amount of nitrate of soda in the mixture will give the crop a quick start and make its cultivation easier and more economical. Formula No. 3 has been arranged with this idea in view, and in No. 2 one-half the nitrogen comes from nitrate of soda. On light lands it would likely be better to omit the nitrate from the mixture and apply it as a top dressing, between the 10th and last of June, on early corn. Nitrate of soda may take the place of a portion of the other nitrogen-furnishing materials in any of the formulas, one pound of nitrate being equal in its content of nitrogen to 2.2 pounds of cotton-seed meal, 2 pounds of fish scrap, 1.2 pounds of dried blood. Nitrate of soda is frequently used as a top dressing for corn, and is a very valuable material for use in this way. A good application is 50 to 75 pounds per acre, distributed along the side of the row or dropped beside the plants and three or four inches from them, or else, where there is a ridge in the center, it may be distributed on this, and when it is thrown out the nitrate will be thrown to the two sides of the row.

*Application of Fertilizers to Corn.*—On clay lands and loams having good subsoil the fertilizer should be applied in the drill, at or just before planting, at the rate of 200 to 400 pounds per acre. On light sandy lands it is best to use 50 to 100 pounds in the drill at time of planting, to give the crop a good start, and the balance of the fertilizer as a side dressing when the corn has begun to grow well.

*Fertilizers for Corn Following Peas and Other Legumes.*

The best and most profitable yields of corn in our experimental work were where the corn followed velvet beans, bur clover, cow-peas, crimson clover and other leguminous crops. These crops, with acid phosphate and kainit, or some other potash salt, are the best previous treatment and fertilization for corn. Where light crops of peas have been grown in corn, or cut from the land and the stubble left, it would be safest to add some nitrogenous material in the fertilizer mixture. In cases of this kind it is suggested that the nitrogen-furnishing material in any of the preceding formulas be reduced one-half. Where corn is to follow good crops of velvet beans, peas, bur and crimson clover or soja beans, especially where the entire crops have been left on the soil, no further application of nitrogen need be made, but it is advised that 200 to 300 pounds per acre of the following mixture, in the drill, be used just before planting:

Acid phosphate .....	200 pounds
Kainit .....	100 pounds

## COTTON.

*Culture.*—The remarks regarding the preparation and cultivation of corn also apply with equal force to cotton, unless it be the part regarding breaking-the land well before planting. Some doubt the necessity of this for cotton. Cotton is generally grown on ridges. This is necessary on wet soils, but on all fairly well drained upland and sandy soils we are convinced that level and frequent shallow cultivation, as was indicated for corn, is the best and most economical method to follow in growing cotton. Ridge culture may give better results in very wet years, but, taking the seasons as they come, the advantage will lie, we think, with flat culture.

*Fertilizers for Cotton.*—The preliminary remarks regarding fertilizers for corn also apply to cotton, the following formulas being offered tentatively and as the result of our best judgment, after studying the best obtainable data on this subject:

*For Cotton on Land in Fair Condition.*

No. 1—

Acid phosphate, 14 per cent phosphoric acid.....	895 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	790 pounds
Kainit, 12.5 per cent potash.....	315 pounds
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	2,000 pounds

This mixture will contain: available phosphoric acid, 7.2 per cent; potash, 2.6 per cent; nitrogen, 2.6 per cent (equal to ammonia, 3.2 per cent).

## No. 2—

Acid phosphate, 14 per cent phosphoric acid.....	1,015 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	415 pounds
Nitrate of soda, 15 per cent nitrogen.....	180 pounds
Kainit, 12.5 per cent potash.....	390 pounds
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	2,000 pounds

In this formula one-half of the nitrogen is supplied by nitrate of soda and the other one-half by cotton-seed meal. This mixture will contain: available phosphoric acid, 7.6 per cent; potash, 2.7 per cent; nitrogen, 2.7 per cent (equal to ammonia, 3.3 per cent).

## No. 3—

Acid phosphate, 14 per cent phosphoric acid.....	955 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	605 pounds
Nitrate of soda, 15 per cent nitrogen.....	90 pounds
Kainit, 12.5 per cent potash.....	350 pounds
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	2,000 pounds

In this formula one-fourth of the nitrogen is supplied by nitrate of soda and the other three-fourths by cotton-seed meal. This mixture will contain: available phosphoric acid, 7.4 per cent; potash, 2.6 per cent; nitrogen, 2.6 per cent (equal to ammonia, 3.1 per cent).

## No. 4—

Acid phosphate, 16 per cent phosphoric acid.....	830 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	830 pounds
Kainit, 12.5 per cent potash.....	340 pounds
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	2,000 pounds

This mixture will contain: available phosphoric acid, 7.7 per cent; potash, 2.7 per cent; nitrogen, 2.7 per cent (equal to ammonia, 3.3 per cent).

## No. 5—

Acid phosphate, 14 per cent phosphoric acid.....	850 pounds
Fish scrap, 8.25 per cent nitrogen and 6.0 per cent phosphoric acid.....	690 pounds
Kainit, 12.5 per cent potash.....	460 pounds
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	2,000 pounds

This mixture will contain: available phosphoric acid, 8.0 per cent; potash, 2.9 per cent; nitrogen, 2.9 per cent (equal to ammonia, 3.5 per cent).

## No. 6—

Acid phosphate, 16 per cent phosphoric acid.....	790 pounds
Fish scrap, 8.25 per cent nitrogen and 6.0 per cent phosphoric acid.....	730 pounds
Kainit, 12.5 per cent potash.....	480 pounds
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	2,000 pounds

This mixture is more concentrated than the foregoing ones, on account of the higher-grade materials used, and will contain: available phosphoric acid, 8.5 per cent; potash, 3.0 per cent; nitrogen, 3.0 per cent (equal to ammonia, 3.6 per cent).

No. 7—

Acid phosphate, 14 per cent phosphoric acid.....	1,020 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	890 pounds
Muriate of potash, 50 per cent potash.....	90 pounds
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	2,000 pounds

This mixture will contain: available phosphoric acid, 8.3 per cent; potash, 2.9 per cent; nitrogen, 2.9 per cent (equal to ammonia, 3.5 per cent).

No. 8—

Acid phosphate, 16 per cent phosphoric acid.....	965 pounds
Cotton-seed meal, 6.59 per cent nitrogen, 2.5 per cent phosphoric acid and 1.5 per cent potash.....	940 pounds
Muriate of potash, 50 per cent potash.....	95 pounds
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	2,000 pounds

This mixture is a concentrated one, on account of the high-grade phosphatic and potassic materials used, and will contain: available phosphoric acid, 8.9 per cent; potash, 3.1 per cent; nitrogen, 3.1 per cent (equal to ammonia, 3.8 per cent).

No. 9—

Acid phosphate, 14 per cent phosphoric acid.....	1,045 pounds
Fish scrap, 8.25 per cent nitrogen and 6.0 per cent phosphoric acid .....	820 pounds
Muriate of potash, 50 per cent potash.....	135 pounds
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	2,000 pounds

This mixture will contain: available phosphoric acid, 9.8 per cent; potash, 3.4 per cent; nitrogen, 3.4 per cent (equal to ammonia, 4.1 per cent).

No. 10—

Acid phosphate, 16 per cent phosphoric acid.....	975 pounds
Fish scrap, 8.25 per cent nitrogen and 6.0 per cent phosphoric acid .....	880 pounds
Muriate of potash, 50 per cent potash.....	145 pounds
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	2,000 pounds

This mixture is considerably more concentrated than the others, on account of the high-grade materials used, and will contain: available phosphoric acid, 10.4 per cent; potash, 3.6 per cent; nitrogen, 3.6 per cent (equal to ammonia, 4.4 per cent).

No. 11—

Acid phosphate, 14 per cent phosphoric acid.....	1,355 pounds
Dried blood, 13 per cent nitrogen.....	510 pounds
Muriate of potash, 50 per cent potash.....	135 pounds
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	2,000 pounds

This mixture will contain: available phosphoric acid, 9.5 per cent; potash, 3.4 per cent; nitrogen, 3.3 per cent (equal to ammonia, 4.0 per cent).

No. 12—

Acid phosphate, 16 per cent phosphoric acid.....	1,295 pounds
Dried blood, 13 per cent nitrogen.....	560 pounds
Muriate of potash, 50 per cent potash.....	145 pounds
	2,000 pounds

This mixture will contain: available phosphoric acid, 10.4 per cent; potash, 3.6 per cent; nitrogen, 3.6 per cent (equal to ammonia, 4.4 per cent).

No. 13—

Acid phosphate, 14 per cent phosphoric acid.....	630 pounds
Cotton seed, 3.1 per cent nitrogen, 1.3 per cent phosphoric acid and 1.2 per cent potash.....	1,190 pounds
Kainit, 12.5 per cent potash.....	180 pounds
	2,000 pounds

This mixture will contain: available phosphoric acid, 5.2 per cent; potash, 1.8 per cent; nitrogen, 1.8 per cent (equal to ammonia, 2.2 per cent).

*Cotton Seed and Nitrate of Soda.*—The remarks under “Corn” regarding these two fertilizing materials apply also to cotton, as do the suggestions concerning the change in the quantity of nitrogen-supplying materials in the formulas, should cotton follow peas or any other leguminous crop. In Formula No. 3 one-fourth of the nitrogen is supplied by nitrate of soda, with the view of giving the crop a quick start, and in No. 2 one-half of the nitrogen comes from this source. On light lands it will be good practice to omit this nitrate from the mixture and apply it as a side dressing about the middle of June. Good results come from the use of it in this way on heavy types of land. Where land does not produce a good stalk of cotton, and fertilizers are used which contain only a moderate amount of nitrogen or ammonia, good results are obtained from a side dressing of 50 to 100 pounds of nitrate of soda per acre. The nitrate should be distributed along one side of the row, or, where there is a ridge in the middle, it may be put on this, and when the ridge is thrown out the nitrate will be thrown on two sides of the row.

*Application of Fertilizer to Cotton.*—The fertilizer should be applied in the drill at or just before planting. The quantity used for cotton varies from 200 to 1,000 pounds per acre; 400 to 600 pounds are the more common quantities used of the grade of Formula No. 1. Some of the mixtures in this BULLETIN are much more concentrated than No. 1, and when they are used the quantity may be reduced proportionately.

## IV. COMPOSTS AND COMPOSTING.

*Compost for General Use.*—Frequent requests are made for compost formulas, and the following one, with barnyard manure, rich dirt, or woods mould, or all, and acid phosphate and kainit, is well suited for general use:

Barnyard manure, rich dirt or woods mould.....	1,750 pounds
Acid phosphate .....	200 pounds
Kainit .....	50 pounds
	2,000 pounds

With average barnyard manure the above compost would contain: phosphoric acid, 1.7 per cent; potash, .7 per cent; and ammonia, .6 per cent. One ton of this compost is worth between 500 and 600 pounds of the average fertilizer containing 8 per cent of available phosphoric acid, 2 per cent of potash and 2 per cent of ammonia. It should be applied at the rate of 600 to 1,600 pounds per acre in the drill, 1,400 pounds of the compost being about equal to an application of 400 pounds of the 8-2-2 fertilizer.

The compost may be made under shelter or out of doors. In either case select a place where the soil is compact, and arrange it so that the water that may run through the heap will not drain from it. Put down the materials in alternate layers—first, a layer 3 to 6 inches thick, according to the size of the compost to be made, of the manure, woods mould or rich dirt, then sprinkle upon this layers of acid phosphate and kainit, and continue in this way to put down alternate layers of the materials till the compost is complete. If dry, the manure, mould, etc., should be moistened by sprinkling with water, and the heap should be brought to a conical or wedge shape, covered with dirt, preferably rich dirt, and thoroughly compacted to prevent undue entrance of air, which brings about heating and injurious fermentation of the heap. The compost must be watched, and if it becomes hot a hole should be made in the side and towards the top and water poured in to cool it. Heating is likely to occur if made under shelter, while if made out of doors in the winter and early spring the rains are apt to be sufficient to keep it moist, but here there is danger of loss, especially of the very soluble potash and phosphoric acid, from leaching, and the heaps made out of doors need careful watching to see that they do not get too hot just after making and between rains, and more especially to see that they are thoroughly covered with dirt and compacted, so as to make the water run mostly off the sides instead of through the heap and draining off with the most valuable part of the manure. The heap should remain 40 to 60 days, and may stay longer. Before using, it should be thoroughly cut up and mixed by means of hoes and shovels. If the manure, woods mould and dirt are

reasonably free from litter and trash, the mixture may be put through a sand screen and be in condition to drill as other fertilizers are. This will require care in selecting the manure, mould and dirt.

Unquestionably, there is great advantage, if it is not, indeed, an absolute necessity, to save scrupulously all the manure and other waste material on and around the farm to assist in maintaining or increasing its productiveness. One way to do this is to use the compost in some way similar to that suggested in the foregoing. Another and perhaps somewhat cheaper way, unless the compost is made at a time when the farm labor is not profitably occupied with other work, is to apply the manure and woods mould, etc., broadcast where there are large quantities of them, or in the drill when the amounts are limited and less than 1,500 to 2,000 pounds to the acre, and drill the acid phosphate and kainit or other materials on them. This saves the cost of mixing. Each plan has its advantages, and each farmer can decide for himself which best suits his individual case and which will enable him to save to best advantage these exceedingly important and valuable fertilizer materials on and about the farm, and which go to waste, or partial waste, in far too many instances.

*Compost with Cotton Seed.*—Frequently cotton seed are used as a fertilizer. One difficulty in the way of their use is the killing of the germs of the seed so as to prevent them from sprouting and growing. A common custom is to pile the seed in the field early in the spring and allow them to become wet and afterwards heat. They are then put in the drill as other fertilizers, or sometimes broadcast. They are also killed by composting, and the following compost with cotton seed is a well-balanced and rich one for general farm crops:

Acid phosphate .....	300 pounds
Cotton seed, 13½ bushels.....	400 pounds
Kainit .....	75 pounds
Barnyard manure, etc.....	1,225 pounds
	<hr/>
	2,000 pounds

This compost will contain: phosphoric acid, 2.6 per cent; potash, .9 per cent; ammonia, 1.1 per cent. One ton of it is worth between 800 and 900 pounds of the average fertilizer containing 8 per cent available phosphoric acid, 2 per cent ammonia and 2 per cent potash, and a good application for cotton would be 600 to 1,200 pounds in the drill, and for corn 400 to 800 pounds in the drill.

*Compost with Cotton-seed Meal.*—Cotton-seed meal may replace the seed in the preceding compost. In fact, it is much better to use some of the insoluble forms of nitrogen or ammonia in composts rather than nitrate of soda or sulphate of ammonia, which are already in easily soluble condition and ready to feed plants. Besides, there is not the same danger of loss when materials like cotton seed, cotton-

seed meal, etc., are used as when nitrate of soda and sulphate of ammonia are employed. The following compost with cotton-seed meal is some richer than the one with seed given above:

Acid phosphate .....	325 pounds
Cotton-seed meal .....	200 pounds
Kainit .....	100 pounds
Barnyard manure, etc.....	1,375 pounds
	2,000 pounds

This mixture will contain: phosphoric acid, 2.8 per cent; potash, 1.0 per cent; ammonia, 1.2 per cent. One ton of this is equal in fertilizing value to about one-half ton of a mixed fertilizer containing 8 per cent available phosphoric acid, 2 per cent ammonia and 2 per cent potash. A good application of it for cotton would be 400 to 800 pounds in the drill, and for corn 300 to 600 pounds in the drill.

*Use Lime in the Compost.*—Where lime is used at all in the making of compost, it should not be put in contact with either the barnyard manure or acid phosphate, as it has an injurious action on both of these, endangering the loss of ammonia from the manure by setting it free and enabling it to pass off in the air, and changing the phosphoric acid of the acid phosphate into an insoluble form. Where sour muck or black soil is used, the lime mixed with these would correct their acidity or sourness and prove beneficial.

## V. FERTILIZERS FOR TOBACCO.

There are few products whose quality and quantity are more affected by the kind of soil and fertilizer used than is tobacco. For bright tobacco, the main kind grown in this State, the fine and deep, sandy loam with yellow-colored sandy clay subsoil is the type of land most largely used, and the one which grows the best grade of this character of tobacco. Generally, the kind of soil that is suited to the production of tobacco is better understood than the fertilizer that should be used on it. Evidence of this is seen in the great variation in the composition of fertilizers sold in the State, especially for use on the tobacco crop. In 1901 there were registered with the Department of Agriculture one hundred and eight (108) special fertilizers for tobacco. It is interesting in this connection to note the wide variation as well as the average composition of these fertilizers. The highest amount of available phosphoric acid guaranteed in any of them was 9.25 per cent, the lowest 5 per cent, and the average 8.12 per cent. The highest amount of ammonia guaranteed was 10 per cent, the lowest 2 per cent, and the average 2.73 per cent. The highest amount of potash guaranteed was 5 per cent, the lowest 1 per cent, and the average 2.64 per cent. These wide variations in the amounts of the valuable fertilizing constituents indicate that the fertilizers themselves must have had very varying effects on the quality and quantity of the tobacco crop.

A study of the experiments in tobacco growing, and a consideration of the experiences of good tobacco growers, show that the amounts of ammonia and potash in the average tobacco fertilizers, as stated above, are not as large as are needed to give the best results. It would appear that the largest amount of ammonia (10 per cent) in any of these "specials" is greater than is required for bright tobacco, while the maximum quantity of potash (5 per cent) in any of the 108 brands is less than is used by numbers of our best bright tobacco growers, especially in the eastern part of the State. A considerable number of these growers either mix their own tobacco fertilizers or else have them put up according to formulas of their suggestion. Below are given eight formulas for mixing fertilizers for tobacco. The grade of those fertilizers will be higher and they will, of course, cost more than the goods that are generally used in the State on tobacco, but we feel confident that the increased yield will more than justify the additional expense. In THE BULLETIN of the Department of Agriculture, and in our correspondence with farmers, we have been recommending formulas of about the composition of these for a number of years, and evidence is accumulating which shows that the character of tobacco fertilizers is undergoing quite a considerable change.

## No. 1—

Acid phosphate, 14 per cent.....	750 pounds
Cotton-seed meal .....	900 pounds
Nitrate of soda.....	100 pounds
Sulphate of potash, high grade.....	250 pounds
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	2,000 pounds

This mixture will contain: available phosphoric acid, 6.3 per cent; potash, 6.9 per cent; nitrogen, 3.7 per cent (equal to ammonia, 4.5 per cent).

## No. 2—

Acid phosphate .....	1,065 pounds
Dried blood, high grade.....	500 pounds
Nitrate of soda.....	125 pounds
Sulphate of potash, high grade.....	310 pounds
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	2,000 pounds

This mixture will contain: available phosphoric acid, 7.4 per cent; potash, 7.7 per cent; nitrogen, 4.3 per cent (equal to ammonia, 5.2 per cent).

## No. 3—

Acid phosphate .....	875 pounds
Fish scrap .....	725 pounds
Nitrate of soda.....	100 pounds
Sulphate of potash, high grade.....	300 pounds
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	2,000 pounds

This mixture will contain: available phosphoric acid, 7.2 per cent; potash, 7.5 per cent; nitrogen, 3.8 per cent (equal to ammonia, 4.6 per cent).

## No. 4—

Acid phosphate .....	1,000 pounds
Dried blood .....	500 pounds
Nitrate of soda.....	100 pounds
Sulphate of potash, high grade.....	400 pounds
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	2,000 pounds

This mixture will contain: available phosphoric acid, 7 per cent; potash, 10 per cent; nitrogen, 4.1 per cent (equal to ammonia, 5 per cent).

## No. 5—

Acid phosphate .....	900 pounds
Cotton-seed meal .....	700 pounds
Nitrate of soda.....	100 pounds
Sulphate of potash, high grade.....	300 pounds
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	2,000 pounds

This mixture will contain: available phosphoric acid, 7.2 per cent; potash, 7.7 per cent; nitrogen, 3.1 per cent (equal to ammonia, 3.8 per cent).

## No. 6—

Acid phosphate .....	745 pounds
Cotton-seed meal .....	1,140 pounds
Sulphate of potash, high grade.....	115 pounds
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	2,000 pounds

This mixture will contain: available phosphoric acid, 6.6 per cent; potash, 3.7 per cent; nitrogen, 3.8 per cent (equal to ammonia, 4.6 per cent).

## No. 7—

Acid phosphate .....	885 pounds
Dried blood .....	575 pounds
Nitrate of soda.....	170 pounds
Sulphate of potash, high grade.....	370 pounds
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	2,000 pounds

In this formula one-fourth of the nitrogen is derived from nitrate of soda and the other three-fourths from dried blood. This mixture will contain: available phosphoric acid, 6.2 per cent; potash, 9.2 per cent; nitrogen, 5.2 per cent (equal to ammonia, 6.2 per cent).

## No. 8—

Acid phosphate .....	874 pounds
Cotton-seed meal .....	782 pounds
Nitrate of soda.....	116 pounds
Sulphate of potash, high grade.....	228 pounds
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	2,000 pounds

In this formula one-fourth of the nitrogen is derived from nitrate of soda, and the other three-fourths from cotton-seed meal. This mixture will contain: available phosphoric acid, 4.2 per cent; potash, 6.3 per cent; nitrogen, 4.2 per cent (equal to ammonia, 5.1 per cent).

Five hundred and seventy-five pounds of No. 8 is equivalent to 600 pounds of a mixture analyzing 4 per cent available phosphoric acid, 6 per cent potash and 4 per cent ammonia.

Three hundred and fifty to one thousand pounds of these mixtures should be used to the acre.

The mixtures made from Formulas Nos. 2 and 3 are somewhat more concentrated than that from No. 1, on account of cotton-seed meal containing less ammonia than fish scrap and dried blood. The three formulas are given to enable the use of any one of the three main organic nitrogenous materials—dried blood, fish scrap and cotton-seed meal. In the coastal sections fish scrap and meal are both easily obtained; some distance inland meal is more accessible, while in the more western end of the tobacco belt it will be found convenient to use dried blood. All three are good sources of ammonia for tobacco. The other materials—nitrate of soda, sulphate of potash, and acid phosphate—are the same for all mixtures.

Occasional requests are made for formulas furnishing as much as 10 per cent of potash, and No. 4 has been arranged to meet needs of this nature. It is known that excellent tobacco, in quality and quantity, is grown by the use of fertilizers of this class, and some of our farmers greatly prefer them to others containing less potash. It takes considerable observation and experimentation to determine the best practice in matters of this kind.

Formula No. 7, in 1905, in some tobacco experiments conducted on the bright-leaf soils of Granville County, gave very promising results. Three hundred and eighty-eight pounds per acre of this mixture were used, which was equal to an application of 600 pounds of a mixture analyzing 4 per cent available phosphoric acid, 6 per cent potash and 4 per cent ammonia.

A limited quantity of stable manure is very beneficial to tobacco, and it succeeds well after peanuts. These materials add ammonia to the soil, and where heavy applications of fertilizers are to be made in connection with manure, and on peanut land, it would be well not to have so much ammonia in the fertilizers as is used in the ones employed on land not having other ammoniated materials put on them. Formula No. 5 is destined to meet cases of this kind. A good many eastern tobacco growers plant tobacco after peanuts, and some of them grow peas between the hills of tobacco, planting them with hoes and putting six to ten peas in a place, the latter part of June or early in July. This improves the soil for after-crops, but tobacco grown after tobacco and peas is said not to be of good quality, though, as would be expected, the growth is very large.

Good results will come from the use of high-grade fertilizers, such as are suggested above, or similar ones, and we believe that when once tried there will be no inclination to go back to the lower-grade ones, now so largely used.



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I. ANALYSES OF FERTILIZERS—FALL SEASON, 1907.

II. REGISTRATION OF FERTILIZERS.

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## I. ANALYSES OF FERTILIZERS—FALL SEASON, 1907.

BY B. W. KILGORE, STATE CHEMIST.

The analyses presented in this BULLETIN are of samples collected by the fertilizer inspectors of the Department, under the direction of the Commissioner of Agriculture, during the fall months of 1907. They should receive the careful study of every farmer in the State who uses fertilizers, as by comparing the analyses in the BULLETIN with the claims made for the fertilizers actually used, the farmer can know by, or before, the time fertilizers are put in the ground whether or not they contain the fertilizing constituents in the amounts they were claimed to be present.

### TERMS USED IN ANALYSES.

*Water-soluble Phosphoric Acid.*—Phosphate rock, as dug from the mines, mainly in South Carolina, Florida and Tennessee, is the chief source of phosphoric acid in fertilizers.

In its raw, or natural, state the phosphate has three parts of lime united to the phosphoric acid (called by chemists tri-calcium phosphate). This is very insoluble in water and is not in condition to be taken up readily by plants. In order to render it soluble in water and fit for plant food, the rock is finely ground and treated with sulphuric acid, which acts upon it in such a way as to take from the three-lime phosphate two parts of its lime, thus leaving only one part of lime united to the phosphoric acid. This one-lime phosphate is what is known as water-soluble phosphoric acid.

*Reverted Phosphoric Acid.*—On long standing some of this water-soluble phosphoric acid has a tendency to take lime from other substances in contact with it, and to become somewhat less soluble. This latter is known as reverted or gone-back phosphoric acid. This is thought to contain two parts of lime in combination with the phosphoric acid, and is thus an intermediate product between water-soluble and the original rock.

Water-soluble phosphoric acid is considered somewhat more valuable than reverted, because it becomes better distributed in the soil as a consequence of its solubility in water.

*Available Phosphoric Acid* is made up of the water-soluble and reverted; it is the sum of these two.

*Water-soluble Ammonia*.—The main materials furnishing ammonia in fertilizers are nitrate of soda, sulphate of ammonia, cotton-seed meal, dried blood, tankage, and fish scrap. The first two of these (nitrate of soda and sulphate of ammonia) are easily soluble in water and become well distributed in the soil where plant roots can get at them. They are, especially the nitrate of soda, ready to be taken up by plants, and are therefore quick-acting forms of ammonia. It is mainly the ammonia from nitrate of soda and sulphate of ammonia that will be designated under the heading of water-soluble ammonia.

*Organic Ammonia*.—The ammonia in cotton-seed meal, dried blood, tankage, fish scrap, and so on, is included under this heading. These materials are insoluble in water, and before they can feed plants they must decay and have their ammonia changed, by the aid of the bacteria of the soil, to nitrates, similar to nitrate of soda.

They are valuable then as plant food in proportion to their content of ammonia, and the rapidity with which they decay in the soil, or rather the rate of decay, will determine the quickness of their action as fertilizers. With short season, quick-growing crops, quickness of action is an important consideration, but with crops occupying the land during the greater portion, or all, of the growing season, it is better to have a fertilizer that will become available more slowly, so as to feed the plant till maturity. Cotton-seed meal and dried blood decompose fairly rapidly, but will last the greater portion, if not all, of the growing season in this State. While cotton seed and tankage will last longer than meal and blood, none of these act so quickly, or give out so soon, as nitrate of soda and sulphate of ammonia.

*Total Ammonia* is made up of the water-soluble and organic; it is the sum of these two.

The farmer should suit, as far as possible, the kind of ammonia to his different crops, and a study of the forms of ammonia as given in the tables of analyses will help him to do this.

#### VALUATIONS.

To have a basis for comparing the values of different fertilizer materials and fertilizers, it is necessary to assign prices to the three

valuable constituents of fertilizers—ammonia, phosphoric acid, and potash. These figures, expressing relative value per ton, are not intended to represent crop-producing power, or agricultural value, but are estimates of the commercial value of ammonia, phosphoric acid and potash in the materials supplying them. These values are only approximate (as the costs of fertilizing materials are liable to change, as other commercial products are), but they are believed to fairly represent the cost of making and putting fertilizers on the market. They are based on a careful examination of trade conditions, wholesale and retail, and upon quotations of manufacturers.

*Relative value per ton*, or the figures showing this, represents the prices on board the cars at the factory, in retail lots of five tons or less, for cash.

To make a complete fertilizer the factories have to mix together in proper proportions materials containing ammonia, phosphoric acid and potash. This costs something. For this reason it is thought well to have two sets of valuations—one for the raw or unmixed materials, such as acid phosphate, kainit, cotton-seed meal, etc., and one for mixed fertilizers.

The values used last season were:

VALUATIONS FOR 1907.

*In Unmixed or Raw Materials.*

For phosphoric acid in acid phosphate. . . . .	4	cents per pound.
For phosphoric acid in bone meal, basic slag and Peruvian guano. . . . .	3½	cents per pound.
For ammonia . . . . .	15½	cents per pound.
For potash . . . . .	5	cents per pound.

*In Mixed Fertilizers.*

For phosphoric acid . . . . .	4½	cents per pound.
For ammonia . . . . .	16½	cents per pound.
For potash . . . . .	5½	cents per pound.

HOW RELATIVE VALUE IS CALCULATED.

In the calculation of relative value it is only necessary to remember that so many per cent means the same number of pounds per hundred, and that there are twenty hundred pounds in one ton (2,000 pounds).

With an 8—2—2 goods, which means that the fertilizer contains available phosphoric acid 8 per cent, potash 2 per cent, and ammonia 2 per cent, the calculation is made as follows:

Percentage of Lbs. in 100 Lbs.	Value Per 100 Lbs.	Value Per Ton, 2,000 Lbs.
8 pounds available phosphoric acid at $4\frac{1}{2}$ cents -----	$0.36 \times 20 =$	\$7.20
2 pounds potash at $5\frac{1}{2}$ -----	$0.11 \times 20 =$	2.20
2 pounds ammonia at $16\frac{1}{2}$ cents -----	$0.33 \times 20 =$	6.60
Total value -----	$0.80 \times 20 =$	<u>\$16.00</u>

Freight and merchant's commission must be added to these prices. Freight rates from the seaboard and manufacturing centers to interior points are given in the following table:

FREIGHT RATES FROM THE SEABOARD TO INTERIOR POINTS.—From the Published Rates of the Associated Railways of Virginia and the Carolinas. In car-loads, of not less than ten tons each, per ton of 2,000 pounds. Less than car-loads, add 20 per cent.

Destination.	From Wilmington, N. C.	From Norfolk and Portsmouth, Va.	From Charleston, S. C.	From Richmond, Va.
Advance	\$3.20	\$3.20	\$3.40	\$3.20
Apex	2.70		3.80	3.00
Ashboro	3.20	3.20	3.60	3.20
Asheville	4.00	4.00	4.00	4.00
Chapel Hill	2.95	3.20	3.90	3.20
Charlotte	2.65	3.20	2.85	3.20
Clayton	2.48	2.86	3.63	2.80
Cherryville	3.85	3.60	3.40	3.6E
Clinton	1.60	3.00	3.20	3.00
Creedmoor	3.00	3.00	3.80	3.00
Cunningham	3.00	2.40	4.00	2.40
Dallas	3.00	3.60	3.40	3.60
Davidson College	3.00	3.20	2.20	3.20
Dudley	1.70	3.00	3.20	3.00
Dunn	2.00	2.80	3.20	2.80
Durham	2.80	2.83	3.20	2.83
Elkin	3.60	3.20	3.60	3.20
Elm City	2.10	2.60	3.20	2.60
Fair Bluff	1.60	3.80	2.40	3.80
Fayetteville	1.80	3.00	3.00	3.00
Forestville	2.85	3.00	3.80	3.06
Gastonia	3.12	3.25	3.12	3.25
Gibson	2.10	3.50	2.10	3.50
Goldsboro	1.80	2.80	3.20	2.80
Greensboro	2.95	3.00	3.40	3.00
Hamlet	2.00	3.00	3.60	3.00
Henderson	3.00	2.83	3.55	2.83
Hickory	3.20	3.60	3.20	3.60
High Point	3.00	3.08	3.40	3.08
Hillsboro	2.88	2.88	2.68	2.88
Kernersville	3.00	3.00	3.40	3.00
Kinston	2.10	2.80	3.50	2.80
Laurel Hill	1.90	2.40	3.80	3.40
Laurinburg	1.90	3.40	3.80	3.40
Liberty	2.72	3.60	3.80	3.60
Louisburg	2.95	3.00	3.80	3.00
Lumberton	1.60	3.60	3.70	3.60
Macon	3.05	3.00	3.85	3.00
Madison	3.00	3.00	3.40	3.00
Matthews	2.60	3.20	3.20	3.20
Maxton	1.80	3.40	2.70	3.40
Milton	3.44	2.40	4.00	2.40
Mocksville	3.36	3.20	3.40	3.20
Morven	2.55	3.60	2.50	3.60
Mount Airy	2.20	3.40	3.80	3.40
Nashville	2.30	2.90	3.40	2.90
New Bern	1.25	1.75	3.95	1.75
Norwood	3.68	3.20	3.20	2.23
Oxford	3.04	2.83	3.55	2.83
Pineville	2.77	3.25	3.00	3.20
Pittsboro	2.60	3.30	4.10	3.30
Polkton	2.40	3.00	2.20	3.00
Raleigh	2.56	2.83	3.40	2.83
Reidsville	3.00	2.96	3.40	2.36
Rockingham	2.10	3.00	3.80	3.00
Rocky Mount	2.20	2.50	3.40	2.50
Ruffin	3.28	2.80	3.40	2.20
Rural Hall	3.28	3.20	3.60	3.20
Rutherfordton	3.05	3.65	3.05	3.65
Salisbury	3.25	3.20	3.20	3.20
Sanford	2.10	3.00	3.40	3.00
Selma	2.10	2.80	3.20	2.80
Shelby	2.90	3.60	3.90	3.60
Siler City	2.60	3.60	3.80	3.60
Smithfield	2.20	2.80	3.20	2.80
Statesville	3.50	3.20	3.60	3.20
Stem	2.95	2.83	3.80	2.83
Tarboro	2.30	2.40	3.00	2.40
Waco	2.90	3.60	3.40	3.60
Wadesboro	2.30	3.00	2.50	3.00
Walnut Cove	3.00	3.00	3.40	3.00
Warrenton	3.05	3.25	4.10	3.25
Warsaw	1.50	3.00	3.20	3.00
Washington	2.65	1.75	2.25	1.50
Weldon	2.55	1.90	3.85	1.90
Wilson	2.00	2.60	3.20	2.60
Winston-Salem	3.00	3.00	3.40	3.00

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Mechanical Condition.	Percentage Composition or Parts per 100.							Total Ammonia.	Total Potash.	Relative Value per Ton at Factory.
					Water-soluble Phosphate Acid.	Reverted Phosphate Acid.	Available Phosphate Acid.	Water-soluble Ammonia.	Organic Ammonia.	Total Ammonia.				
<b>MIXED FERTILIZERS.</b>														
<b>Brands claiming</b>														
6276	Baugh & Sons Co., Norfolk, Va.	Baugh's Double Eagle Phosphate.	Gibsonville	R	4.38	3.59	8.00	.82	1.34	2.00	1.00	\$14.90		
6207	Piedmont-Mt. Airy Guano Co., Baltimore, Md.	Piedmont Guano for Wheat	Elkins	R	5.90	2.07	7.97	.66	1.34	2.00	2.17	16.16		
6186	Va.-Car. Chemical Co., Richmond, Va.	A. & A.'s Star Brand Guano	Durham	R	5.08	2.76	7.84	.92	1.20	2.12	1.00	15.15		
6187	do	Travers & Co.'s Beef, Blood and Bone.	Durham	R	5.45	2.59	8.04	.82	1.82	2.34	1.77	16.90		
6191	Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s Raw Bone Superphosphate.	Wilson	S	5.60	2.57	8.17	.26	1.24	2.50	1.76	17.53		
6288	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Eli Ammoniated Fertilizer	Statesville	D	2.78	2.77	8.00	1.18	1.58	2.00	2.00	16.00		
6303	Columbia Guano Co., Norfolk, Va.	Columbia Soluble Guano	Ayden	S	6.98	1.52	8.50	.92	.98	1.90	1.97	16.08		
6281	Farmers Guano Co., Raleigh, N. C.	State Standard Guano	Siler City	R	4.83	2.54	7.37	1.10	1.50	2.60	.96	17.36		
6284	Listers' Agricultural Chemical Works, Newark, N. J.	Listers' Success Fertilizer	Liberty	R	5.00	3.02	8.02	1.02	1.18	2.20	2.36	17.07		
6301	Navassa Guano Co., Wilmington, N. C.	Navassa Guano Fertilizer	Norwood	D	5.63	2.59	8.22	1.00	1.28	2.28	1.94	17.06		
6286	do	Navassa Grain	Taylorsville	N	5.90	2.55	8.45	1.52	.90	2.42	2.36	18.18		
6305	do	do	Newton	R	5.45	2.35	7.80	.76	1.74	2.50	2.18	17.66		
6300	Ober, G., & Sons Co., Baltimore, Md.	Ober's Soluble Ammoniated Superphosphate.	Albemarle	R	8.50	1.00	9.50	.88	1.28	2.16	2.23	18.13		
6223	Patapasco Guano Co., Baltimore, Md.	Sea Gull	Mooreville	S	4.80	3.38	8.18	.92	1.32	2.24	2.08	17.04		
6206	Swift's Fertilizer Works, Atlanta, Ga.	Swift's Red Steer Standard Grade Guano.	Wilkesboro	R	7.15	2.05	9.20	.88	.90	1.78	2.14	16.50		
6194	Union Guano Co., Winston, N. C.	Old Homesty Guano	Burlington	R	6.20	2.00	8.20	.64	1.36	2.00	2.16	16.35		
6200	Va.-Car. Chemical Co., Richmond, Va.	A. & A.'s Anchor Brand Fertilizer.	Walnut Cove	R	4.68	3.38	8.01	1.24	1.00	2.24	2.28	17.10		
6193	do	Durham Fertilizer Co.'s Genuine Bone and Peruvian Guano.	Burlington	R	6.70	1.95	8.65	.62	1.38	2.00	1.88	16.45		
6201	do	Old Dominion Guano Co.'s Soluble Guano.	Winston	R	6.48	1.73	8.21	.96	1.14	2.10	2.18	16.71		



## ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1907.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.										Relative Value per Ton at Factory.
				Mechanical Condition.	Water-soluble Phosphate Acid.	Reverted Phosphate Acid.	Available Phosphate Acid.	Water-soluble Ammonia.	Organic Ammonia.	Total Ammonia.	Total Potash.			
6255	Va.-Car. Chemical Co., Richmond, Va.	Old Dominion Miller's Special Wheat Mixture.	Kernersville	R	4.40	3.45	7.55	4.14					4.14	\$ 11.34
6253	do	Southern Chem. Co.'s Click's Special Wheat Compound.	Wilkesboro	R	5.30	2.78	8.08	4.96					4.96	12.72
6241	Brand claiming Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s Great Wheat and Corn Grower.	Burlington	R	8.03	2.07	10.10	1.50					1.56	10.80
6226	Brands claiming Armour Fertilizer Works, Wilmington, N. C.	Armour's Phosphate and Potash Works.	Winston	D	7.65	1.90	9.55	2.00					2.00	11.20
6273	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Electric Bone and Potash Mixture.	Ashboro	R	8.20	3.26	11.46	1.93					1.93	12.43
6312	Columbia Guano Co., Norfolk, Va.	Columbia Bone and Potash Mixture.	Hickory	S	8.53	1.16	9.69	1.99					1.99	10.91
6278	Farmers' Guano Co., Raleigh, N. C.	Century Bone and Potash Mixture	Siler City	R	6.15	3.62	9.77	2.25					2.25	11.26
6209	Patapsco Guano Co., Baltimore, Md.	Patapsco Soluble Bone and Potash.	Siloam	R	5.55	4.60	10.15	1.85					1.85	11.16
6255	do	do	Mebane	D	5.55	4.78	10.33	1.98					1.98	11.47
6260	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Bone and Potash Mixture.	Burlington	S	7.03	3.16	10.19	1.50					1.50	10.82
6228	Swift Fertilizer Works, Atlanta, Ga	Standard Grade Field and Farm Phosphate and Potash.	Winston	R	8.30	1.86	10.16	2.27					2.27	11.64
6252	do	Standard Grade Wheat Grower Union Bone and Potash.	Hillsboro	R	8.68	2.58	11.26	1.84					1.84	12.15
6289	Union Guano Co., Winston, N. C.	Union Bone and Potash.	Statesville	R	7.80	2.70	10.50	1.90					1.90	11.54
6234	Va.-Car. Chemical Co., Richmond, Va	A. & A.'s B. P. Potash Mixture	Walnut Cove	R	5.80	4.08	9.88	2.20					2.20	11.31
6290	do	Durham Fertilizer Co.'s Blue Ridge Wheat Grower.	Statesville	R	6.50	4.05	10.55	1.70					1.70	11.36
6236	do	Old Dominion Guano Co.'s High Grade Alkaline Bone.	Winston	R	5.03	4.59	9.62	2.23					2.23	11.11
6239	do	Powers, Gibbs & Co.'s Dissolved Bone and Potash.	Winston	R	5.70	3.60	9.30	1.87					1.87	10.42

## MIXED FERTILIZERS.

6237	---do	Southern Chemical Co.'s Mammoth Wheat and Grass Grower Grain Mixture.	Kernersville	R	5.78	3.97	9.75	2.03	11.00
6254	---do	Southern Chemical Co.'s Winner Travers & Co.'s Capital Bone and Potash.	Mebane	R	7.75	3.05	10.80	3.50	13.57
6258	---do	Winston Bone and Potash Compound.	Graham	D	7.95	2.56	10.51	2.18	11.85
6240	---do	Winston Bone and Potash Compound.	Winston	R	4.93	4.38	9.31	1.80	10.35
	<b>Brand claiming</b>								
6266	Va.-Car. Chemical Co., Richmond, Va.	Old Dominion Guano Co.'s Planters' Bone and Potash Mixture.	Ashboro	D	7.10	2.69	10.00	3.00	12.30
								3.29	12.42
6225	<b>Brands claiming</b>	Armour's Superphosphate and Potash Fertilizer.	Charlotte	R	7.65	1.39	10.00	4.00	13.40
6308	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Special Caraleigh Bone and Potash Mixture.	Sanford	R	9.05	2.44	11.49	2.17	12.72
6287	Navassa Guano Co., Wilmington, N. C.	Navassa Wheat and Grass Guano.	Taylorsville	D	5.25	2.81	8.06	3.34	10.92
6230	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Bone and Potash Mixture.	Burlington	S	7.40	2.44	9.84	3.84	13.08
6285	Swift's Fertilizer Works, Wilmington, N. C.	High Grade Farmers' Home Phosphate and Potash.	Taylorsville	D	9.00	1.38	10.38	3.31	12.98
6272	Union Guano Co., Winston, N. C.	Quaker Grain Mixture.	Ashboro	D	5.80	3.70	9.50	3.35	12.23
6257	Va.-Car. Chemical Co., Richmond, Va.	V. C. Co.'s Special Potash Mixture.	Graham	D	7.88	2.51	10.39	3.91	13.65
6264	---do	Va. State Fertilizer Co.'s XX Potash Mixture.	Liberty	D	7.15	2.53	9.68	3.91	13.01
	<b>Brand claiming</b>								
6242	Va.-Car. Chemical Co., Richmond, Va.	Lynchburg Guano Co.'s Alpine Mixture.	Burlington	R	8.53	1.96	10.00	5.00	14.50
								4.25	14.11
6310	<b>Brand claiming</b>	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Asheville	R	7.08	2.62	11.00	5.00	15.40
6270	<b>Brands claiming</b>	Union Guano Co., Winston, N. C.	Liberty	R	7.88	2.37	12.00	3.00	14.10
6256	Va.-Car. Chemical Co., Richmond, Va.	Southern Chemical Co.'s Reaper Grain Application.	Graham	D	9.65	2.74	10.25	3.78	13.38
								3.58	15.08
6275	<b>Brand claiming</b>	Navassa Guano Co., Wilmington, N. C.	Wilmington	D	8.43	2.75	12.00	4.00	15.20
6309	Va.-Car. Chemical Co., Richmond, Va.	Goodman's Special Potash Mixture.	Kernersville	R	7.40	3.84	11.24	3.59	14.01
6243	<b>Brand claiming</b>	Union Guano Co., Winston, N. C.	Burlington	R	9.65	2.80	12.45	5.00	16.30
6192	<b>Brand claiming</b>	Formula 44, Va.-Car. Co.'s	Wilson	R	5.45	2.93	7.00	4.29	14.83
								2.62	17.40
								3.36	17.45
								3.47	18.95
								3.47	22.44

N—D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—damp; Y—lumpy; W—wet.

## ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1907.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.							Relative Value per Ton at Factory.	
				Mechanical Condition.	Water-soluble Phosphate Acid.	Reverted Phosphate Acid.	Available Phosphate Acid.	Water-soluble Ammonia.	Organic Ammonia.	Total Ammonia.		Total Potash.
<b>RAW OR UNMIXED FERTILIZER MATERIALS.</b>												
<b>Brands claiming</b>												
6214	Richmond Guano Co., Richmond, Va.	Old Homestead Dissolved Bone	Rural Hall	R	4.38	7.11	10.00	11.49	---	---	---	8.00
6215	Union Guano Co., Winston, N. C.	Union 10 Per Cent Acid Phosphate.	Rural Hall	D	5.85	4.20	10.05	---	---	---	---	8.04
<b>Brand claiming</b>												
6274	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Staple Acid Phosphate	Ashboro	R	10.28	2.95	12.00	13.23	---	---	---	9.60
6265	Va.-Car. Chemical Co., Richmond, Va.	Old Dominion Guano Co.'s Royster's High Grade Acid Phosphate.	Millboro	D	8.68	3.44	12.12	---	---	---	---	9.70
6217	-----do-----	Powers, Gibbs & Co.'s Almont Acid Phosphate.	Winston	D	6.40	5.21	11.61	---	---	---	---	9.29
6218	-----do-----	Travers & Co.'s Capital Dissolved S. C. Bone.	Winston	D	8.43	3.38	11.81	---	---	---	---	9.45
<b>Brands claiming</b>												
6198	Armour Fertilizer Works, Wilmington, N. C.	Armour's 13 Per Cent Acid Phosphate.	Winston	D	11.33	1.40	13.00	12.83	---	---	---	10.40
6212	Atlantic Chemical Co., Norfolk, Va.	Atlantic High Grade Dissolved Bone.	Elkins	D	10.75	3.42	14.17	---	---	---	---	11.33
6295	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Sterling High Grade Acid Phosphate.	Troy	D	11.05	2.32	13.37	---	---	---	---	10.69
6279	Farmers' Guano Co., Raleigh, N. C.	Farmers' High Grade Acid Phosphate.	Siler City	D	11.05	2.59	13.64	---	---	---	---	10.91
6210	Royster, F. S., Guano Co., Norfolk, Va.	Roysters' High Grade Dissolved Bone.	Elkins	D	9.58	2.54	12.12	---	---	---	---	9.69
6245	Va.-Car. Chemical Co., Richmond, Va.	A. & A.'s I. X. L. Acid Phosphate.	Durham	N	9.08	4.21	13.29	---	---	---	---	10.63
6298	-----do-----	Atlantic and Virginia Fert. Co.'s Crenshaw's Acid Phosphate.	Hickory	D	9.70	3.29	12.99	---	---	---	---	10.39
6249	Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s Double Bone Phosphate, Extra Strong.	Hillsboro	D	10.80	2.63	13.43	---	---	---	---	10.74
6293	-----do-----	Old Dominion Guano Co.'s High Grade Bone Phosphate.	Goldsboro	D	9.50	2.70	12.20	---	---	---	---	9.76

6221	<b>Brands claiming</b> American Fertilizer Co., Norfolk, Va. Armour Fertilizer Works, Wilmington, N. C.	High Grade Acid Phosphate Fertilizer.	Charlotte Winston	N D	11.73 11.45	2.35 2.62	14.08 14.07	11.20 11.26 11.25
6297	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Climax Dissolved Bone	Newton	D	11.05	3.37	14.42	11.53
6296	Columbia Guano Co., Norfolk, Va.	Columbia 14 Per Cent Acid Phosphate.	Hickory	R	11.00	3.19	14.19	11.35
6294	Pocomoke Guano Co., Norfolk, Va.	Ferless Acid Phosphate	Pittsboro	R	11.35	2.72	14.07	11.25
6261	Royster, F. S., Guano Co., Norfolk, Va.	Royster's 14 Per Cent Acid Phosphate.	Hillsboro	R	10.78	3.74	14.52	11.61
6247	Swift's Fertilizer Works, Atlanta, Ga.	Swift's Cultivator High Grade Acid Phosphate.	---do---	R	12.88	1.71	14.59	11.67
6269	Union Guano Co., Winston, N. C.	Union High Grade Acid Phosphate.	Siler City	N	10.28	3.75	14.03	11.22
6246	Va.-Car. Chemical Co., Richmond, Va.	Davie & Whittle's Owl Brand Acid Phosphate.	Henderson	R	11.00	4.25	15.25	12.20
6220	---do---	Durham Excelsior Dissolved Bone Phosphate.	Statesville	N	12.00	2.44	14.44	11.55
6219	---do---	Southern Chemical Co.'s Red Cross Acid Phosphate.	---do---	R	12.13	2.99	15.12	12.09
6262	---do---	Southern Chemical Co.'s Red Cross Acid Phosphate.	Graham	D	10.60	3.62	14.22	11.38
6263	---do---	V.-C. C. Co.'s 14 Per Cent Acid Phosphate.	---do---	D	10.85	3.30	14.15	11.32
6213	<b>Brands claiming</b> Armour Fertilizer Works, Wilmington, N. C.	Armour's 16 Per Cent Acid Phosphate.	Winston	D	14.38	1.96	16.34	12.80 13.07
6292	Imperial Co., Norfolk, Va.	Imperial High Grade Acid Phosphate.	Windsor	R	13.85	3.06	16.91	13.52
6248	<b>Brand claiming</b> Va.-Car. Chemical Co., Richmond, Va.	Genuine German Kamit	Durham	S				12.00 12.46 2.00
6197	<b>Brand claiming</b> Lee, A. S., Sons Co., Richmond, Va.	Lee's Prepared Agricultural Lime.	Wilkesboro	R				3.28 3.28
6232	<b>Brand claiming</b> Baugh & Sons Co., Norfolk, Va.	Baugh's Raw Bone Meal	Madison	R				4.50 4.46

\* Total Phosphoric Acid found, 21.38, valued at 3½ cents per pound.

N, D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows : N—fine; D—good; R—fair; S—coarse; B—very coarse; P—lumpy; Y—lumpy; W—wet.

## II. FERTILIZER BRANDS REGISTERED FOR 1908.

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>The Atlantic Chemical Corporation, Norfolk, Va.—</i>			
Nitrate of Soda.....	..	15.66	..
Sulphate of Potash.....	..	..	50.00
Muriate of Potash.....	..	..	48.00
Genuine German Kainit.....	..	..	12.00
Atlantic High Grade 16 Per Cent Acid Phosphate .....	16.00	..	..
Atlantic 14 Per Cent Acid Phosphate.....	14.00	..	..
Atlantic Dissolved Bone.....	13.00	..	..
Atlantic Acid Phosphate.....	12.00	..	..
Atlantic 10 and 4 Bone and Potash Mixture....	10.00	..	4.00
Atlantic Bone and Potash for Grain.....	10.00	..	3.00
Atlantic Bone and Potash Mixture.....	10.00	..	2.00
Atlantic 8 and 4 Bone and Potash Mixture.....	8.00	..	4.00
Atlantic 7 Per Cent Truck Guano.....	7.00	5.77	7.00
Atlantic Potato Guano.....	7.00	4.12	5.00
Atlantic Special Truck Guano.....	8.00	3.30	4.00
Atlantic High Grade Tobacco Guano.....	8.00	2.47	3.00
Atlantic Tobacco Grower.....	8.00	2.06	3.00
Atlantic Tobacco Compound.....	8.00	2.05	2.00
Atlantic Special Guano.....	9.00	1.65	1.00
Atlantic Cotton Grower.....	9.00	2.06	1.00
Atlantic Special Wheat Fertilizer.....	8.00	1.65	2.00
Atlantic Meal Compound.....	9.00	2.26	2.00
Atlantic High Grade Cotton Guano.....	8.00	2.47	3.00
Atlantic Soluble Guano.....	8.00	1.65	2.00
Apex Peanut Grower.....	8.00	.82	4.00
Perfection Peanut Grower.....	7.00	..	5.00
Oriental High Grade Guano.....	8.00	3.30	4.00
Paloma Tobacco Guano.....	8.00	3.30	4.00
<i>Geo. L. Arps &amp; Co., Norfolk, Va.—</i>			
Arps' Potato Guano.....	6.00	5.76	5.00
Arps' Standard Truck Guano.....	7.00	4.12	5.00
Arps' Scuppernong Guano for Trucks.....	6.00	4.12	7.00
Geo. L. Arps & Co.'s Big Yield Guano.....	8.00	1.65	2.00
14 Per Cent Acid Phosphate.....	14.00	..	..
Kainit .....	..	..	12.00
Arps' Premium Guano for Cotton, Tobacco and All Spring Crops.....	8.00	1.65	2.00
<i>Acme Manufacturing Co., Wilmington, N. C.—</i>			
Acme Acid Phosphate.....	12.00	..	..
Acme Bone and Potash.....	10.00	..	2.00
Acme Bone and Potash.....	10.00	..	3.00
Acme Bone and Potash.....	10.00	..	4.00
Acme Bone and Potash.....	8.00	..	4.00
Acme Bone and Potash.....	11.00	..	2.00
Acme High Grade Acid Phosphate.....	14.00	..	..
Acme Acid Phosphate.....	16.00	..	..
Acme Standard Guano.....	8.00	2.06	2.00
Acme High Grade.....	6.00	4.95	8.00
Acme Strawberry Top Dresser.....	8.00	1.65	4.00
Acme Truck Grower.....	6.00	3.30	8.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Acme Cotton Grower.....	9.00	2.27	2.00
Acme Special Grain.....	8.00	1.65	2.00
Acme Fertilizer for Tobacco.....	8.00	2.47	2.50
Acme Fertilizer .....	8.00	2.47	2.50
Acme Acid Phosphate.....	13.00	..	..
Gibson's Melon Grower.....	10.00	3.30	5.00
Corn Guano .....	5.00	2.47	3.00
Clark's Corn Guano.....	1.00	6.60	10.00
P. D. Special.....	8.00	2.47	3.00
Quickstep .....	8.00	3.30	4.00
Gem Fertilizer .....	8.00	1.65	2.00
Cotton Seed Meal Guano.....	8.00	1.65	2.00
Lattimer's Complete Fertilizer.....	8.00	2.06	2.00
Tiptop Crop Grower.....	8.00	2.06	3.00
Tiptop Tobacco Grower.....	8.00	2.06	3.00
Sulphate of Ammonia.....	..	20.62	..
Pure German Kainit.....	..	..	12.00
Nitrate of Soda.....	..	15.00	..
Sulphate of Potash.....	..	..	48.00
Muriate of Potash.....	..	..	48.00
Acme Bone and Potash.....	10.00	..	5.00
Muriate of Potash.....	..	..	55.00
<i>Ashepool Fertilizer Co., Charleston, S. C.—</i>			
High Grade Eutaw Acid Phosphate.....	14.00	..	..
High Grade Ashepool Acid Phosphate.....	14.00	..	..
High Grade Dissolved Phosphate.....	16.00	..	..
High Grade Superpotash Acid Phosphate.....	10.00	..	4.00
High Grade Ashepool Superpotash Acid Phosphate .....	10.00	..	4.00
High Grade Ashepool Vegetable Guano.....	5.00	4.12	5.00
High Grade Ashepool Truck Guano.....	7.00	4.12	5.00
High Grade Ashepool Farmers' Special.....	8.00	2.06	3.00
High Grade Ashepool Special Cotton Seed Meal Guano .....	8.00	2.46	2.00
High Grade Ashepool Ammoniated Superphosphate .....	8.00	2.46	2.00
High Grade Ashepool Bird and Fish Guano.....	8.00	2.46	3.00
High Grade Ashepool Meal Mixture.....	8.00	2.46	3.00
High Grade Ashepool X Tobacco Fertilizer.....	8.00	2.46	3.00
High Grade Ashepool Golden Tobacco Producer.....	8.00	2.46	3.00
High Grade Ashepool Guano.....	8.00	3.29	4.00
High Grade Ashepool Perfection Guano.....	8.00	3.29	6.00
High Grade Ashepool Fruit Grower.....	8.00	3.91	2.75
High Grade Ashepool Watermelon Guano.....	10.00	3.29	5.00
High Grade Eutaw X Golden Fertilizer.....	8.00	2.46	4.00
High Grade Eutaw Special Cotton Seed Meal Guano .....	8.00	2.46	4.00
High Grade Carolina XXX Guano.....	8.00	2.46	3.00
High Grade Taylor's Circle Guano.....	9.00	1.65	4.00
Standard Eutaw XX Acid Phosphate.....	12.00	..	..
Standard Eutaw XXX Acid Phosphate.....	13.00	..	..
Standard Eutaw Potash Acid Phosphate.....	11.00	..	1.00
Standard Eutaw Acid Phosphate and Potash...	12.00	..	1.00
Standard Eutaw Circle Guano.....	8.00	2.06	2.00
Standard Eutaw XX Guano.....	8.50	1.65	2.00
Standard Eutaw XXX Guano.....	9.00	1.65	2.00
Standard Eutaw Fertilizer.....	9.00	1.85	1.00
Standard Ashepool Fertilizer.....	9.00	1.85	1.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Standard Ashepoo Harrow Brand Raw Bone Superphosphate .....	9.00	1.65	2.00
Standard Ashepoo Wheat and Oats Special.....	9.50	1.65	1.00
Standard Ashepoo XXX Guano.....	8.65	1.65	2.00
Standard Ashepoo XX Guano.....	8.50	1.65	2.00
Standard Ashepoo Circle Guano.....	8.00	2.06	2.00
Standard Ashepoo Guano.....	8.50	2.06	1.00
Standard Ashepoo Special Fertilizer.....	8.00	1.65	2.00
Standard Ashepoo Acid Phosphate and Potash..	12.00	..	1.00
Standard Ashepoo Potash and Acid Phosphate..	11.00	..	1.00
Standard Ashepoo Potash Compound.....	10.00	..	3.00
Standard Ashepoo XXX Acid Phosphate.....	13.00	..	..
Standard Ashepoo Dissolved Bone.....	12.00	..	..
Standard Ashepoo XX Acid Phosphate.....	12.00	..	..
Standard Coomassie Acid Phosphate.....	12.00	..	..
Standard Coomassie Circle Fertilizer.....	8.00	1.65	2.00
Standard Carolina Guano.....	8.00	1.65	2.00
Standard Carolina Acid Phosphate.....	13.00	..	..
Standard Circle Bone.....	13.00	..	..
Standard Palmetto Potash Acid Phosphate.....	11.00	..	1.00
Standard Brownwood Acid Phosphate.....	8.00	..	4.00
Standard P. D. Fertilizer.....	8.00	1.65	2.00
German Kainit .....	..	..	12.00
Standard Enoree Acid Phosphate and Potash...	10.00	..	2.00
High Grade Ashepoo XXXX Acid Phosphate...	14.00	..	..
Taylor's XX Ammoniated Dissolved Fertilizer..	10.00	.82	1.00

*The Armour Fertilizer Works, Atlanta, Chicago and Wilmington—*

Top Dresser .....	5.00	8.25	2.00
10 Per Cent Trucker.....	5.00	8.25	3.00
Manure Substitute .....	6.00	3.30	4.00
7 Per Cent Trucker.....	6.00	5.78	5.00
General .....	8.00	1.65	2.00
Fruit and Root Crop Special.....	8.00	1.65	5.00
High Grade Potato.....	8.00	1.65	10.00
King Cotton No. 2.....	8.00	2.06	2.00
Champion .....	8.00	2.06	2.50
Gold Medal for Tobacco.....	8.00	2.06	3.00
Berry King .....	8.00	2.06	4.00
Cotton Special .....	8.00	2.47	3.00
Tobacco Special .....	8.00	2.47	3.00
Truck and Berry Special.....	8.00	2.47	10.00
All Soluble .....	8.00	2.88	4.00
Special Trucker .....	8.00	3.30	4.00
Bone, Blood and Potash.....	8.00	4.12	7.00
Bone and Dissolved Bone with Potash.....	9.00	1.65	3.00
African Cotton Grower.....	9.00	2.47	3.00
10 Per Cent Trucker.....	2.00	8.25	..
Dried Blood .....	..	13.20	..
Phosphoric Acid with Potash.....	10.00	..	5.00
Superphosphate and Potash.....	10.00	..	4.00
W. H. White & Co.'s Special Corn Mixture.....	10.00	..	2.00
Phosphate and Potash No. 2.....	8.00	..	5.00
Phosphate and Potash No. 1.....	10.00	..	2.00
17 Per Cent Acid Phosphate.....	17.00	..	..
16 Per Cent Acid Phosphate.....	16.00	..	..
13 Per Cent Acid Phosphate.....	13.00	..	..
12 Per Cent Acid Phosphate.....	12.00	..	..
Star Phosphate .....	14.00	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Nitrate of Soda.....	..	14.85	..
Kainit .....	..	..	12.00
King Cotton .....	8.00	2.66	2.00
Ammoniated Dissolved Bone with Potash.....	10.00	1.65	2.00
Muriate of Potash.....	..	..	48.00
Sulphate of Potash.....	..	..	50.00
Van Lindley's Special.....	8.00	4.12	2.50
Standard Cotton Grower.....	8.50	1.65	2.00
Armour's Slaughter House Fertilizer.....	8.00	1.65	2.00
<i>Anderson Phosphate and Oil Co., Anderson, S. C.—</i>			
Anderson's Special Formula.....	10.00	2.47	3.00
Anderson's Blood Guano.....	8.00	1.65	2.00
Anderson's Special Fertilizer.....	8.00	2.47	3.00
Anderson's Blood and Bone Guano.....	10.00	1.65	2.00
<i>American Fertilizer Co., Norfolk, Va.—</i>			
10 Per Cent Ammoniated Guano.....	7.00	8.24	2.50
Standard 7 Per Cent Ammonia Guano.....	7.00	5.76	5.00
American Irish Potato Grower.....	7.00	4.12	5.00
American 7-7-7 for Irish Potatoes.....	7.00	5.76	7.00
American Fish Scrap Guano.....	7.00	3.29	4.00
American Eagle Guano.....	8.00	2.47	3.00
American No. 1 Fertilizer.....	8.00	2.06	3.00
American No. 2 Fertilizer.....	8.00	1.65	2.00
American Cotton Compound.....	8.00	1.65	2.00
American Standard Cotton Grower.....	10.00	1.65	2.00
American Special Potash Mixture for Wheat...	8.00	..	4.00
American High Grade Acid Phosphate.....	16.00	..	..
Special Formula Guano for Yellow Leaf Tobacco,	9.00	2.88	5.00
Special Potato Guano.....	7.00	4.12	7.00
Special Potato Manure.....	6.00	4.12	7.00
Bone and Peruvian Guano.....	8.00	1.65	2.00
Bone and Peruvian Guano.....	8.75	1.65	2.00
A. L. Hanna's Special.....	8.00	1.65	2.00
Peruvian Mixture .....	8.50	1.65	1.50
Blood and Bone Compound.....	8.50	2.06	1.00
Bob White Fertilizer for Tobacco.....	8.00	2.06	2.50
J. G. Miller & Co. Yellow Leaf Fertilizer.....	8.00	2.47	3.00
Pitt County Special Fertilizer.....	9.00	2.88	5.00
N. C. and S. C. Cotton Grower.....	8.00	3.29	4.00
Peruvian Mixture Guano Especially Prepared for Sweet Potatoes.....	8.00	3.29	5.00
Kale, Spinach and Cabbage Guano.....	7.00	4.12	4.00
Stable Manure Substitute.....	7.00	2.47	4.00
Strawberry and Asparagus Guano.....	9.00	2.88	9.00
Ground Fish Scraps.....	..	8.24	..
Nitrate of Soda.....	..	15.65	..
Bone Meal .....	Total	3.71	..
Muriate of Potash.....	..	..	50.00
Sulphate of Potash.....	..	..	49.00
Genuine German Kainit.....	..	..	12.00
Eagle Brand Acid Phosphate.....	13.00	..	..
High Grade Acid Phosphate.....	14.00	..	..
Dissolved Bone and Potash for Corn and Wheat,	10.00	..	2.00
Double Dissolved Bone and Potash.....	10.00	..	4.00
Cooper's Genuine Eagle Island.....	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>American Agricultural Chemical Co., New York—</i>			
Holmes & Dawson Productive Cotton and Peanut Guano .....	9.00	22.70	2.00
Holmes & Dawson Triumph Soluble.....	8.00	1.65	2.00
Holmes & Dawson Gold Dust Guano.....	9.00	1.65	2.00
Savage Sons & Co. Purity Guano.....	8.00	1.65	2.00
Lazaretto Truckers' Favorite.....	6.00	5.76	5.00
Lazaretto Early Trucker.....	7.00	4.12	5.00
Lazaretto Challenge Fertilizer.....	8.00	2.47	3.00
Lazaretto Special for Tobacco and Potatoes....	8.00	2.47	3.00
Lazaretto Climax Plant Food.....	8.00	2.06	3.00
Lazaretto Universal Compound.....	8.00	2.06	2.00
Lazaretto Crop Grower.....	8.00	1.65	2.00
Lazaretto High Grade Dissolved Bone and Potash .....	12.00	..	5.00
Lazaretto Alkaline Bone Phosphate.....	12.00	..	3.00
Lazaretto Dissolved Bone and Potash.....	10.00	..	2.00
Lazaretto Acid Phosphate.....	14.00	..	..
Reese Pacific Guano.....	8.00	1.65	2.00
Reese Pacific Guano for Tobacco.....	8.50	2.47	2.50
Canton Chemical Truckers' Special 7 Per Cent..	6.00	5.76	5.00
Canton Chemical Excelsior Trucker.....	7.00	4.12	5.00
Canton Chemical Baker's Tobacco Fertilizer....	8.00	2.47	3.00
Canton Chemical Baker's Fish Guano.....	8.00	1.65	2.00
Canton Chemical Baker's Dissolved S. C. Bone..	14.00	..	..
Canton Chemical Baker's Standard High Grade Guano .....	8.00	2.06	3.00
Canton Chemical Gem Phosphate.....	12.00	..	..
Canton Chemical Soluble Bone and Potash.....	10.00	..	2.00
Canton Chemical Soluble Alkaline Bone.....	12.00	..	3.00
Canton Chemical Game Guano.....	8.00	1.65	2.00
Canton Chemical Virginia Standard High Grade Manure .....	8.00	2.06	2.00
Canton Chemical C. C. Special Compound.....	8.00	2.06	6.00
Canton Chemical Superior High Grade Fertilizer.	8.00	2.47	3.00
Detrick's Gold Basis.....	6.00	5.76	5.00
Detrick's Special Trucker.....	7.00	4.12	5.00
Detrick's Gold Eagle.....	6.00	2.47	3.00
Detrick's Quickstep Bone and Potash.....	8.00	2.47	4.00
Detrick's Special Tobacco Fertilizer.....	8.00	2.47	3.00
Detrick's Vegetator Ammoniated Superphosphate.	8.00	2.06	3.00
Detrick's Kangaroo Komplete Kompond.....	8.00	1.65	3.00
Detrick's Royal Crop Grower.....	8.00	1.65	2.00
Detrick's Fish Mixture.....	8.00	1.65	2.00
Detrick's Victory Alkaline Bone.....	12.00	..	5.00
Detrick's P. & B. Special.....	12.00	..	3.00
Detrick's Soluble Bone Phosphate and Potash..	10.00	..	2.00
Detrick's XXtra Acid Phosphate.....	14.00	..	..
Zell's 10 Per Cent Trucker.....	5.00	8.23	3.00
Zell's 7 Per Cent Potato and Vegetable Manure.	6.00	5.76	5.00
Zell's Truck Grower.....	7.00	4.12	5.00
Zell's Special Compound for Potatoes and Vegetables .....	8.00	2.47	4.00
Zell's Tobacco Fertilizer.....	8.00	2.47	4.00
Zell's Bright Tobacco Grower.....	8.00	2.47	3.00
Zell's Royal High Grade Fertilizer.....	9.00	2.06	2.00
Zell's Special Compound for Tobacco.....	8.00	1.65	2.00
Zell's Calvert Guano.....	8.00	1.65	2.00
Zell's Ammonia Bone Superphosphate.....	8.00	1.65	2.00
Zell's High Grade Potash Fertilizer.....	10.00	..	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Zell's Reliance High Grade Manure.....	8.00	2.47	3.00
Zell's Fish Guano.....	8.00	1.65	2.00
Zell's Dissolved Bone Phosphate.....	14.00	..	..
Zell's Electric Phosphate.....	10.00	..	2.00
Bull Head Potato and Vegetable Manure.....	6.00	4.12	7.00
Enterprise Alkaline Phosphate.....	8.00	..	5.00
Royal Alkaline Bone.....	10.00	..	4.00
Palmetto Alkaline Phosphate.....	8.00	..	4.00
Slingluff's Bright Mixture.....	8.00	2.06	2.50
Pure Ground Bone..... Total	45.00	3.29	..
Muriate of Potash.....	..	..	50.00
A. A. C. Co.'s 16 Per Cent Superphosphate.....	10.00	..	..
Detrick's Superior Animal Bone Fertilizer.....	9.00	1.86	4.00
Lazaretto Retriever Animal Bone Fertilizer....	9.00	1.86	4.00
Zell's Victoria Animal Bone Compound.....	9.00	1.86	4.00
Canton Chemical Bone Fertilizer.....	9.00	1.86	4.00
Canton Chemical Virginia Standard Manure....	8.00	2.06	2.00
Purity Guano—2-8-2—for S. S. & Co.....	8.00	1.65	2.00
<i>A. D. Adair &amp; McCarty Bros., Atlanta, Ga.—</i>			
Adair's Wheat and Grass Grower.....	10.00	..	4.00
Adair's Dissolved Bone.....	12.00	..	..
Adair's High Grade Dissolved Bone.....	14.00	..	..
Adair's High Grade Dissolved Bone.....	16.00	..	..
Adair's Formula .....	10.00	..	..
Adair's Special Potash Mixture.....	8.00	..	4.00
Adair's Ammoniated Dissolved Bone.....	8.00	1.65	2.00
Adair's High Grade Blood and Bone.....	10.00	2.47	3.00
Adair's Soluble Pacific Guano.....	10.00	1.65	2.00
McCarty's Cotton Special.....	10.00	.82	3.00
McCarty's Wheat Special.....	10.00	.82	3.00
McCarty's Corn Special.....	10.00	.82	3.00
McCarty's Soluble Bone.....	10.00	.82	1.00
McCarty's High Grade Corn Grower.....	10.00	1.65	2.00
McCarty's High Grade Cotton Grower.....	10.00	1.65	2.00
Planters' Soluble Fertilizer.....	8.00	1.65	2.00
Blood, Bone and Tankage.....	9.00	.82	2.00
High Grade Potash Compound.....	10.00	..	4.00
Golden Grain Compound.....	8.00	.82	3.00
A. & M. 13-4.....	13.00	..	4.00
David Harum High Grade Guano.....	10.00	3.30	4.00
<i>Asheville Packing Co., Asheville, N. C.—</i>			
Asheville Packing Co.'s Bone and Potash.....	10.00	..	2.00
Asheville Packing Co.'s 8-4 Fertilizer.....	8.00	..	4.00
Asheville Packing Co.'s 8-1-3 Fertilizer.....	8.00	.82	3.00
Asheville Packing Co.'s 8-2-2 Fertilizer.....	8.00	1.70	2.00
Asheville Packing Co.'s Potato Grower.....	10.00	..	6.00
Asheville Packing Co.'s 8-5-5 Special Garden Fer- tilizer .....	8.00	4.25	5.00
Asheville Packing Co.'s High Grade Potato, 8-2-10 .....	8.00	1.70	10.00
Asheville Packing Co.'s Special Fruit Grower...	8.00	1.70	5.00
Asheville Packing Co.'s 17 Per Cent Acid Phos- phate .....	17.00	..	..
Asheville Packing Co.'s 14 Per Cent Acid Phos- phate .....	14.00	..	..
Asheville Packing Co.'s 13 Per Cent Acid Phos- phate .....	13.00	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Asheville Packing Co.'s 12 Per Cent Acid Phosphate .....	12.00	..	..
Asheville Packing Co.'s Blood and Bone.....	8.00	2.47	3.00
<i>Baugh &amp; Sons Co., Phila., Pa., and Norfolk, Va.—</i>			
Baugh's 16 Per Cent Acid Phosphate.....	16.00	..	..
Baugh's 5-6-5 Guano.....	6.00	4.12	5.00
Baugh's New Process 10 Per Cent Guano.....	5.00	8.23	2.50
Baugh's Fish Mixture.....	8.00	1.65	2.00
Baugh's Fertilizer for Wheat and Grass.....	8.00	1.65	2.00
Baugh's Fish, Bone and Potash.....	8.00	3.30	4.00
Baugh's Animal Bone and Potash Compound for All Crops .....	8.00	1.65	2.00
Baugh's Complete Animal Bone Fertilizer.....	8.00	1.65	5.00
Baugh's Peruvian Guano Substitute for Potatoes and All Vegetables.....	6.00	4.12	7.00
Baugh's Grand Rapids High Grade Truck Guano,	8.00	2.47	3.00
Baugh's Special Tobacco Guano.....	8.00	2.47	5.00
Baugh's Fruit and Berry Guano.....	8.00	2.47	10.00
Baugh's 7 Per Cent Potato Guano.....	6.00	5.76	5.00
Baugh's Soluble Alkaline Superphosphate.....	10.00	..	2.00
Baugh's Special Manure for Melons.....	10.00	3.30	4.00
Baugh's Sweet Potato Guano.....	8.00	2.47	3.00
Baugh's Potato and Truck Special.....	7.00	2.88	7.00
Baugh's Special Potato Manure.....	5.00	1.65	10.00
Baugh's Fine Ground Fish.....	..	8.23	..
Baugh's Raw Bone Meal, Warranted Pure, Total	21.50	3.70	..
Baugh's High Grade Acid Phosphate.....	14.00	..	..
Baugh's High Grade Tobacco Guano.....	8.00	2.47	3.00
Baugh's High Grade Potash Mixture.....	10.00	..	4.00
Baugh's High Grade Cotton and Truck Guano..	10.00	1.65	2.00
Baugh's Pure Animal Bone and Muriate of Potash Mixture .....	15.00	2.47	5.00
Baugh's Pure Dissolved Animal Bone.....	13.00	2.06	..
Glover's Special Potato Guano.....	7.00	3.30	8.00
Fine Ground Blood.....	..	13.00	..
Genuine German Kainit.....	..	..	12.00
Sulphate of Ammonia.....	..	21.00	..
Muriate of Potash.....	..	..	48.00
High Grade Sulphate of Potash.....	..	..	48.00
Baugh's Excelsior Guano.....	8.00	.82	4.00
Randolph's Bone and Potash Mixture for All Crops .....	10.00	..	3.00
Nitrate of Soda.....	..	15.00	..
<i>The John L. Bailey Co., Elm City, N. C.—</i>			
Fairmont .....	8.00	2.47	3.00
Stag Brand .....	8.00	1.65	2.00
<i>J. A. Benton, Ruffin, N. C.—</i>			
North Carolina Bright Fertilizer.....	9.00	1.65	2.00
<i>C. J. Burton Guano Co., Baltimore, Md.—</i>			
Acid Phosphate .....	14.00	..	..
Burton's Butcher Bone.....	8.00	1.65	2.00
Burton's High Grade.....	8.00	2.06	3.00
Tobacco Queen .....	8.00	2.47	3.00
High Grade Tobacco.....	8.00	3.29	4.00
Burton's Best .....	8.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Best &amp; Thompson, Goldsboro, N. C.—</i>			
Pure German Kainit.....	..	..	12.00
<i>Blacksburg Guano Co., Inc., Blacksburg, Va.—</i>			
Red Letter for Tobacco.....	8.00	1.65	2.00
Jim Crow for Tobacco.....	8.00	2.47	2.00
Alliance for Tobacco.....	8.00	1.65	2.00
Red Letter .....	8.00	1.65	2.00
Alliance Guano .....	8.00	1.65	2.00
B. G. Co., Inc., Acid Phosphate.....	14.00	..	..
B. G. Co., Inc., Bone and Potash.....	10.00	..	2.00
Old Bellefonte .....	8.00	3.30	2.00
Red Warrior for Tobacco.....	9.00	2.47	3.00
Blackstone Special for Tobacco.....	9.00	2.47	3.00
Bellefonte for Tobacco.....	8.00	2.47	2.00
Hard Cash for Tobacco.....	8.00	2.06	2.00
<i>Bradley Fertilizer Co., Charleston, S. C.—</i>			
Standard Bradley's Palmetto Acid Phosphate..	12.00	..	..
Standard Bradley's XXX Acid Phosphate.....	13.00	..	..
Standard Bradley's Wheat Grower.....	10.00	..	2.00
Standard Bradley's Bone and Potash.....	10.00	..	2.00
Standard Bradley's Cereal Guano.....	8.00	1.65	2.00
Standard Bradley's X Guano.....	8.00	1.65	2.00
High Grade Bradley's Guano.....	8.00	2.46	3.00
High Grade Bradley's Circle Guano.....	8.00	3.29	4.00
High Grade Bradley's Acid Phosphate.....	14.00	..	..
Standard Bradley's Acid Phosphate.....	12.00	..	..
Standard Bradley's Ammoniated Dissolved Bone,	9.00	1.85	1.00
Standard Bradley's Patent Superphosphate....	9.00	1.85	1.00
Standard B. D. Sea Fowl Guano.....	9.00	1.85	1.00
Standard Eagle Ammoniated Bone Superphos- phate .....	9.00	1.85	1.00
German Kainit .....	..	..	12.00
<i>The Berkley Chemical Co., Norfolk, Va.—</i>			
Royal Truck Grower.....	6.00	5.76	5.00
Mascot Truck Guano.....	7.00	4.12	5.00
Victory Special Crop Grower.....	7.00	3.30	4.00
Advance Crop Grower.....	8.00	2.47	3.00
Berkley Tobacco Guano.....	8.00	2.47	3.00
Monitor Animal Bone Fertilizer.....	9.00	1.85	4.00
Select Crop Grower.....	8.50	2.06	2.50
Brandon Superphosphate .....	8.00	1.65	2.00
Berkley Plant Food.....	10.00	..	4.00
Berkley Bone and Potash Mixture.....	11.00	..	2.00
Berkley Acid Phosphate.....	14.00	..	..
Superior Bone and Potash.....	8.00	..	4.00
Laurel Potash Mixture.....	10.00	..	2.00
Resolute Acid Phosphate.....	16.00	..	..
Genuine German Kainit.....	..	..	12.00
Muriate of Potash.....	..	..	50.00
Nitrate of Soda.....	..	15.65	..
Long Leaf Tobacco Grower.....	8.00	1.65	2.00
<i>Bragaw Fertilizer Co., Washington, N. C.—</i>			
Chocovinity Special Tobacco Guano.....	5.00	3.29	6.00
Tuckahoe Tobacco Guano.....	8.00	2.06	3.00
Beaufort County Guano.....	8.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Old Reliable Premium Guano.....	8.00	1.65	2.00
Hanover Tobacco Guano.....	8.00	2.47	3.00
Palmetto Acid Phosphate.....	14.00	..	..
Long Acre Bone Phosphate.....	14.00	..	..
Pamlico Trucker .....	7.00	4.12	8.00
Riverview Potato Grower.....	6.00	5.76	5.00
Genuine German Kainit.....	..	..	12.00
Farmers' Union Meal Mixture.....	9.00	2.26	2.00

*Columbia Guano Co., Norfolk, Va.—*

Columbia High Grade 16 Per Cent Acid Phosphate .....	16.00	..	..
Columbia 14 Per Cent Acid Phosphate.....	14.00	..	..
Columbia Dissolved Bone.....	13.00	..	..
Columbia Acid Phosphate.....	12.00	..	..
Columbia 8 and 4 Bone and Potash Mixture....	8.00	..	4.00
Columbia 10 and 4 Bone and Potash Mixture...	10.00	..	4.00
Columbia Bone and Potash for Grain.....	10.00	..	3.00
Columbia Bone and Potash Mixture.....	10.00	..	2.00
Columbia 7 Per Cent Special Truck Guano.....	7.00	5.77	7.00
Columbia Special Truck Guano.....	8.00	2.30	4.00
Columbia Potato Guano.....	7.00	4.12	5.00
Columbia C. S. M. Special.....	9.00	2.27	2.00
Columbia Special 4-8-3.....	8.00	3.30	3.00
Columbia Special Wheat Fertilizer.....	8.00	1.65	2.00
Columbia Special Tobacco Guano.....	8.00	2.06	2.00
Olympia Cotton Guano.....	8.00	2.47	3.00
Columbia Soluble Guano.....	8.00	1.65	2.00
Crown Brand Peanut Guano.....	7.00	..	5.00
Our Best Meal Guano.....	8.00	2.47	3.00
Special Peanut Grower.....	8.00	.82	4.00
Crews' Special .....	5.85	4.49	10.00
Hayes' Special .....	8.00	3.30	3.00
McRae's Special .....	9.00	4.12	7.00
McRae's High Grade Guano.....	8.00	3.30	7.00
Hyc Tobacco Guano.....	8.00	2.47	3.00
Rex Brand Ammoniated Guano.....	9.00	2.06	1.00
Carolina Soluble Guano.....	9.00	1.65	1.00
Pelican Ammoniated Guano.....	8.00	3.30	4.00
Sulphate of Potash.....	..	..	50.00
Genuine German Kainit.....	..	..	12.00
Muriate of Potash.....	..	..	48.00
Nitrate of Soda.....	..	15.56	..
Trojan Tobacco Guano.....	8.00	3.30	4.00
Columbia 10-5 Bone and Potash Mixture.....	10.00	..	5.00

*Cumberland Bone and Phosphate Co., Portland, Me., and Charleston, S. C.—*

Standard Cumberland Bone and Superphosphate of Lime .....	9.00	1.85	1.00
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*The Coe-Mortimer Co., Charleston, S. C.—*

Genuine Peruvian Guano Ex. S. S. Planet Venus,	15.00	3.53	2.80
Genuine Peruvian Guano Ex. S. S. Celia Chincha Island .....	9.00	5.53	2.25
Genuine Peruvian Guano Ex. S. $\frac{3}{4}$ S. Celia Lobos Island .....	17.00	2.80	2.80
Nitrate of Soda.....	..	14.76	..
Kainit .....	..	..	12.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Thomas' Phosphate Big Slag.....	17.00	..	..
Sulphate of Potash.....	..	..	48.00
Muriate of Potash.....	..	..	49.00
<i>Calder Bros., Wilmington, N. C.—</i>			
Genuine German Kainit.....	..	..	12.00
Muriate of Potash.....	..	..	50.00
<i>Craven Chemical Co., New Bern, N. C.—</i>			
C. E. Foy High Grade Guano (Trade Mark)...	8.00	2.47	3.00
Jewel Acid Phosphate.....	14.00	..	..
Neuse Truck Grower.....	6.00	4.94	6.00
Pantego Potato Guano.....	7.00	4.12	7.00
Hanover Standard Guano.....	8.00	3.29	4.00
Elite Cotton Guano.....	8.00	1.65	2.00
Marvel Great Truck Grower.....	8.00	2.06	3.00
Duplin Tobacco Guano.....	8.00	2.47	3.00
Gaston High Grade Fertilizer.....	8.00	2.47	3.00
Trent Bone and Potash.....	10.00	..	2.00
Genuine German Kainit.....	..	..	12.00
Craven Chemical Co.'s Truck Guano, 5-10-21½..	5.00	8.24	2.50
<i>William H. Camp, Petersburg, Va.—</i>			
Lion and Monkey Bone and Potash.....	10.00	..	4.00
Camp's Red Head Chemicals.....	8.00	2.25	2.00
Camp's Green Head Chemicals, Irish Potato...	7.00	6.15	10.00
Camp's Yellow Head Chemicals.....	8.00	2.87	7.50
Lion and Monkey for Tobacco.....	8.00	2.46	3.00
<i>Clayton Oil Mill, Clayton, N. C.—</i>			
Clayton Guano .....	8.00	3.00	3.00
Cotton Queen .....	8.00	2.00	2.00
Summer Queen .....	8.00	2.00	2.00
<i>Cowell, Swan &amp; McCotter Co., Bayboro, N. C.—</i>			
Cowell, Swan & McCotter Co.'s Cabbage Guano,	5.00	8.25	2.50
Cowell, Swan & McCotter Co.'s Tobacco Guano,	8.00	2.47	3.00
Bone and Fish Guano.....	8.00	1.65	2.00
Crop Guano .....	8.00	1.65	2.00
Rust Proof Cotton Guano.....	8.00	1.65	3.00
Standard Cotton Grower.....	8.00	3.30	3.00
Quick Grower Guano.....	8.00	2.06	3.00
Great Cabbage and Potato Guano.....	7.00	5.77	7.00
Aurora Trucker .....	7.00	4.12	7.00
Oriental Trucker .....	7.00	4.12	8.00
High Grade Truck Guano.....	7.00	4.12	5.00
Potato Favorite Guano.....	7.00	3.30	7.00
Champion Guano .....	8.00	2.47	3.00
Bone Phosphate .....	14.00	..	..
14 Per Cent Acid Phosphate.....	14.00	..	..
German Kainit .....	..	..	12.00
Cowell's Great Tobacco Grower.....	8.00	2.47	3.00
<i>Combahee Fertilizer Co., Charleston, S. C.—</i>			
Combahee 16 Per Cent Dissolved Bone.....	16.00	..	..
Combahee 14 Per cent Dissolved Bone.....	14.00	..	..
High Grade Cotton.....	8.00	2.47	3.00
High Grade Cantaloupe.....	10.00	2.47	10.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
B. B. & P. ....	8.50	2.06	1.00
Nitrate of Soda.....	..	14.83	..
Combahee Kainit .....	..	..	12.00
Malloy's Special for Cotton.....	8.65	1.65	2.00
Special Mixture .....	8.00	1.65	2.00
10-4-5 Trucker .....	10.00	3.30	5.00
10-3-10 Trucker .....	10.00	2.47	10.00
Acid and Potash.....	8.00	..	4.00
<i>Chickamauga Fertilizer Works, Atlanta, Ga.—</i>			
Chickamauga Complete Fertilizer.....	8.00	1.65	2.00
Chickamauga High Grade Fertilizer.....	10.00	1.65	2.00
Chickamauga High Grade Plant Food.....	10.00	1.65	2.00
Chickamauga Wheat Special.....	10.00	.82	3.00
Chickamauga Corn Special.....	10.00	.82	3.00
Chickamauga Standard Corn Grower.....	8.00	1.65	2.00
Chickamauga Dissolved Bone.....	12.00	..	..
Chickamauga High Grade Dissolved Bone.....	14.00	..	..
Chickamauga High Grade Dissolved Bone No. 16,	16.00	..	..
Chickamauga Bone and Potash.....	10.00	..	2.00
Chickamauga Alkaline Bone.....	10.00	..	4.00
Georgia Home Guano.....	8.00	1.65	2.00
Special Corn Compound.....	10.00	1.65	4.00
Blood, Bone and Tankage.....	9.00	.82	2.00
Ben Hur High Grade Guano.....	10.00	2.47	3.00
Old Glory Mixture.....	10.00	.82	1.00
Chickamauga Wheat and Corn Grower.....	10.00	..	4.00
<i>Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.—</i>			
Horne & Son's High Grade Bone and Potash....	11.00	..	5.00
Special Bone and Potash Mixture.....	10.00	..	4.00
Buncombe Wheat Grower.....	8.00	..	4.00
Buncombe Corn Grower.....	8.00	..	4.00
Morris & Scarboro's Special Bone and Potash..	10.00	..	3.00
Electric Bone and Potash Mixture.....	10.00	..	2.00
16 Per Cent Acid Phosphate.....	16.00	..	..
Climax Dissolved Bone.....	14.00	..	..
Sterling Acid Phosphate.....	13.00	..	..
Staple Acid Phosphate.....	12.00	..	..
Genuine German Kainit.....	..	..	12.00
Sulphate of Potash.....	..	..	50.00
Muriate of Potash.....	..	..	50.00
Nitrate of Soda.....	..	15.65	..
Bone Meal .....	Total	20.00	3.91
Bone Meal .....	Total	26.00	2.14
Crown Ammoniated Guano.....	8.00	1.64	2.00
Ely Ammoniated Fertilizer.....	8.00	1.64	2.00
Eclipse Ammoniated Guano.....	8.00	2.06	2.00
Planters' Pride .....	8.00	2.06	3.00
Caraleigh Special Tobacco Guano.....	8.00	2.06	3.00
Pacific Tobacco and Cotton Grower.....	9.00	2.26	2.00
Horne's Best .....	8.00	2.47	3.00
Caraleigh Top Dresser.....	3.00	8.24	4.00
<i>Crow Fertilizer Co., Monroe, N. C.—</i>			
Kainit .....	..	..	12.00
14 Per Cent Acid Phosphate.....	14.00	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>W. B. Cooper, Wilmington, N. C.—</i>			
Muriate of Potash.....	..	..	46.00
Kainit .....	..	..	12.00
Sulphate of Potash.....	..	..	48.00
<i>Contentnea Guano Co., Wilson, N. C.—</i>			
Special Formula for Tobacco.....	8.00	3.28	4.00
Special Formula for Cotton.....	8.00	3.28	4.00
Contentnea Corn Special.....	5.00	1.64	5.00
Davis' Best Fertilizer.....	8.00	3.28	6.00
Special Formula for Tobacco.....	8.00	2.05	3.00
Special Formula Fertilizer, 9-2 $\frac{1}{2}$ -5.....	9.00	2.05	5.00
Special Formula for Tobacco.....	8.00	3.28	7.00
High Grade 14 Per Cent Acid.....	14.00	..	..
Pick Leaf .....	8.00	2.47	3.00
Top Notch .....	8.00	2.47	3.00
Blood and Bone Cotton Compound.....	8.00	1.65	2.00
<i>C. P. Dey, Beaufort, N. C.—</i>			
Ground Fish Scrap.....	..	8.25	..
<i>Etiwan Fertilizer Co., Charleston, S. C.—</i>			
Plow Brand Ammoniated Fertilizer.....	8.00	1.65	2.00
Plow Brand Special Tobacco Fertilizer.....	8.00	3.30	4.00
Plow Brand Acid Phosphate with Potash.....	11.00	..	1.00
Etiwan Potash Bone.....	10.00	..	4.00
Etiwan Special Potash Mixture.....	8.00	..	4.00
Etiwan Soluble Bone with Potash.....	10.00	..	3.00
Etiwan Acid Phosphate with Potash.....	11.00	..	1.00
Etiwan Dissolved Bone.....	13.00	..	..
Etiwan High Grade Acid Phosphate.....	14.00	..	..
Etiwan Superior Cotton Fertilizer.....	8.00	3.30	6.00
Etiwan Special Cotton Fertilizer.....	8.00	3.30	4.00
Etiwan Cotton Compound.....	8.00	2.47	3.00
Etiwan Ammoniated Fertilizer.....	8.00	1.65	2.00
Etiwan High Grade Cotton Fertilizer.....	8.00	2.47	2.00
Diamond Soluble Bone.....	13.00	..	..
X Diamond Soluble Bone with Potash.....	10.00	..	2.00
XX Acid Phosphate with Potash.....	10.00	..	2.00
Genuine German Kainit.....	..	..	12.00
Etiwan Blood and Bone Guano.....	9.00	2.06	1.00
Plow Brand Raw Bone Superphosphate.....	9.00	2.06	1.00
<i>Farmers Guano Co., Raleigh, N. C.—</i>			
Farmers' Formula .....	7.00	2.47	3.25
Special Bone and Potash Mixture.....	10.00	..	4.00
Century Bone and Potash Mixture.....	10.00	..	2.00
16 Per Cent Acid Phosphate.....	16.00	..	..
14 Per Cent Acid Phosphate.....	14.00	..	..
Farmers' Acid Phosphate.....	13.00	..	..
Genuine German Kainit .....	..	..	12.00
Muriate of Potash.....	..	..	50.00
Sulphate of Potash.....	..	..	50.00
Bone Meal .....	Total	20.00	3.91
Nitrate of Soda.....	..	15.65	..
Bone Meal .....	Total	26.00	2.14
State Standard Guano.....	8.00	1.64	2.00
Big Crop Guano.....	8.00	2.06	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Toco Tobacco Guano.....	8.00	2.06	3.00
Golden Grade Guano.....	8.00	2.47	3.00
Farmers' Top Dresser.....	3.00	8.24	4.00
<i>Fremont Oil Mills, Fremont, N. C.—</i>			
Up-to-date .....	8.00	1.65	2.00
Nahunta Special .....	8.00	2.47	3.00
Fremont Prolific Fertilizer.....	9.00	2.26	2.00
Yelverton Bros.' Plant Food.....	8.00	2.47	3.00
Fremont Standard Fertilizer.....	8.00	2.47	3.00
Home Run Guano.....	8.00	1.65	2.00
<i>Farmers Cotton Oil Co., Wilson, N. C.—</i>			
German Kainit .....	..	..	12.00
Sulphate of Ammonia.....	..	20.57	..
Muriate of Potash.....	..	..	50.00
Sulphate of Potash.....	..	..	50.00
Nitrate of Soda.....	..	15.63	..
Contentnea Acid Phosphate.....	13.00	..	..
Bonum Acid Phosphate.....	14.00	..	..
16 Per Cent Acid Phosphate.....	16.00	..	..
Xtra Good Bone and Potash.....	10.00	..	2.00
Crop King Guano.....	8.00	1.65	2.00
Farmers' Special Guano.....	8.00	1.65	2.00
Planters' Friend Guano.....	8.00	2.06	3.00
Carolina Choice Tobacco Guano.....	8.00	2.06	3.00
Wilson High Grade Guano.....	8.00	2.27	2.00
J. D. Farrior's Special Guano.....	8.00	2.47	3.00
Graves' Cotton Grower Guano.....	8.00	2.47	3.00
Golden Gem Guano.....	8.00	2.47	3.00
Regal Tobacco Guano.....	8.00	2.88	5.00
Dean's Special Guano.....	8.00	3.70	7.00
Perfect Top Dresser.....	2.00	8.23	5.00
Wilson Top Dresser.....	2.00	9.05	4.00
Washington's Corn Mixture Guano.....	10.00	.82	5.00
<i>W. S. Farmer &amp; Co., Baltimore, Md.—</i>			
Kainit .....	..	..	12.00
W. S. F. & Co.'s Dis. South Carolina.....	14.00	..	..
W. S. F. & Co.'s Fish Mixture.....	8.00	1.65	2.00
W. S. F. & Co.'s Hawk Eye.....	8.00	2.47	3.00
W. S. F. & Co.'s Tampico.....	7.00	4.12	5.00
Anne Arundel Trucker.....	8.00	3.70	7.00
<i>Germofert Manufacturing Co., Charleston, S. C.—</i>			
Germofert Patented Vegetable Fertilizer, Total,	25.00	3.29	6.00
<i>Grace &amp; Co., New York—</i>			
Nitrate of Soda.....	..	15.00	..
<i>Griffith &amp; Boyd Co., Baltimore, Md.—</i>			
High Grade Acid Phosphate.....	14.00	..	..
Spring Crop Grower.....	6.50	1.65	4.50
Ammoniated Bone and Potash.....	8.00	1.65	2.00
<i>Home Fertilizer and Chemical Co., Baltimore, Md.—</i>			
Sulphate of Potash.....	..	..	48.00
Muriate of Potash.....	..	..	50.00
Nitrate of Soda.....	..	15.67	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Sulphate of Ammonia.....	..	20.62	..
German Kainit .....	..	..	12.00
High Grade Acid Phosphate.....	14.00	..	..
Boykins' Alkaline Bone.....	10.00	..	2.00
Boykins' Cereal Fertilizer.....	8.00	1.65	2.00
Boykins' Dissolved Animal Bone.....	12.00	1.65	2.00
Boykins' Vegetable Fertilizer.....	6.00	4.12	6.00
Boykins' Home Potato Grower.....	6.00	3.30	4.00
Special Alkaline Mixture.....	10.00	..	5.00
Phoenix Crop Grower.....	8.00	2.48	2.00
Matchless Guano .....	8.00	1.65	4.00
Home Fertilizer .....	..	5.77	7.00
<i>Hadley, Harriss &amp; Co., Wilson, N. C.—</i>			
Hadley Bros. ....	8.00	2.25	2.50
German Kainit .....	..	..	12.00
Daisy Fish Mixture.....	8.00	1.64	2.00
John Hadley Special High Grade Plant Food...	8.00	1.64	2.00
Top Dressing .....	..	7.38	6.00
Golden Weed Tobacco Grower.....	8.00	2.46	3.00
<i>S. B. Harrell &amp; Co., Norfolk, Va.—</i>			
Harrell's Acid Phosphate.....	14.00	..	..
Harrell's Champion Cotton and Peanut Grower.	8.00	1.65	2.00
Harrell's Truck Guano.....	6.00	5.76	5.00
<i>Hardison &amp; Co., Wadesboro, N. C.—</i>			
Genuine German Kainit.....	..	..	12.00
<i>Hampton Guano Co., Norfolk, Va.—</i>			
Virginia Truck Grower.....	6.00	5.76	5.00
Reliance Truck Guano.....	7.00	4.12	5.00
Little's Favorite Crop Grower.....	7.00	3.30	4.00
P. P. P. (Princess Prolific Producer).....	8.00	2.47	3.00
Hampton Tobacco Guano.....	8.00	2.47	3.00
Arlington Animal Bone Fertilizer.....	9.00	1.85	4.00
Alpha Crop Grower.....	8.50	2.06	2.50
Shirley's Superphosphate .....	8.00	1.65	2.00
Hampton Crop Grower.....	10.00	..	4.00
Hampton Bone and Potash Mixture.....	11.00	..	2.00
Dauntless Potash Mixture.....	10.00	..	2.00
Hampton Acid Phosphate.....	14.00	..	..
Supreme Acid Phosphate.....	16.00	..	..
Muriate of Potash.....	..	..	50.00
Nitrate of Soda.....	..	15.65	..
Genuine German Kainit.....	..	..	12.00
Excelsior Bone and Potash.....	8.00	..	4.00
Extra Tobacco Guano.....	8.00	1.65	2.00
<i>M. P. Hubbard &amp; Co., Baltimore, Md.—</i>			
Hubbard's Bermuda Guano.....	7.00	5.74	7.00
Hubbard's Special Cotton and Corn Fertilizer..	7.00	1.64	5.00
<i>Hall &amp; Pearsall (Inc.), Wilmington, N. C.—</i>			
German Kainit .....	..	..	12.00
<i>The Imperial Co., Norfolk, Va.—</i>			
Imperial Bright Tobacco Guano.....	8.00	2.05	3.00
Imperial Cotton Grower.....	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Imperial 5-6-7 Potato Guano.....	6.00	4.11	7.00
Imperial Snowflake Cotton Grower.....	8.00	3.29	4.00
Imperial Peanut and Corn Guano.....	8.00	1.64	2.00
Imperial Champion Guano.....	8.00	1.64	2.00
Imperial X. L. O. Cotton Guano.....	8.00	2.47	3.00
Imperial Cisco Soluble Guano.....	8.00	1.64	2.00
Imperial Tobacco Guano.....	8.00	2.47	3.00
Imperial Laughinghouse Special Tobacco Guano.	4.00	3.29	6.00
Imperial Standard Premium.....	8.00	1.64	2.00
Imperial Cubanola Tobacco Guano.....	8.00	2.47	5.00
Imperial Martin County Special Crop Grower..	9.00	2.26	2.00
Imperial High Grade Acid Phosphate.....	14.00	..	..
Imperial Genuine German Kainit.....	..	..	12.00
Imperial Special 7 Per Cent Guano for Potatoes.	5.00	5.76	5.00
Imperial 10 Per Cent Guano.....	5.00	8.23	2.50
Imperial Sweet Potato Guano.....	6.00	1.64	6.00
Imperial Williams' Special Potato Guano.....	6.00	4.11	5.00
Imperial Fish and Bone.....	6.00	3.29	4.00
Imperial Lucky Strike Potato Guano.....	7.00	4.11	8.00
Imperial 7-7-7 Potash Guano.....	7.00	5.76	7.00
Imperial Bone and Potash.....	10.00	..	2.00
Imperial High Grade Irish Potato Guano.....	7.00	4.11	8.00
Imperial Tennessee Acid Phosphate.....	16.00	..	..
Muriate of Potash.....	..	..	50.00
Nitrate of Soda.....	..	15.63	..
Imperial Roanoke Crop Grower.....	7.00	2.47	2.00
17 Per Cent Acid Phosphate.....	17.00	..	..
Imperial Asparagus Mixture.....	6.00	4.11	7.00
Imperial Yellow Bark Sweet Potato Guano....	8.00	2.47	3.00
Dawson's Cotton Grower.....	7.00	2.67	2.75
Imperial 6-6-6 Crop Grower.....	6.00	4.92	7.00
<i>John King, Mt. Olive, N. C.—</i>			
Nitrate of Soda.....	..	15.00	..
<i>Laurinburg Oil Co., Laurinburg, N. C.—</i>			
Flora Dora .....	6.40	2.13	3.00
<i>Lister's Agricultural Chemical Works, Newark, N. J.—</i>			
Lister's Ammoniated Dissolved Bone Phosphate.	8.00	2.06	2.00
Lister's Success Fertilizer.....	8.00	1.65	2.00
Lister's Standard Pure Bone Superphosphate of Lime .....	9.00	1.65	2.00
American Agricultural Chemical Co.'s Buyers' Choice Acid Phosphate.....	14.00	..	..
Lister's Bone Meal.....Total	20.60	3.30	..
<i>A. S. Lee &amp; Sons Co. (Inc.), Richmond, Va.—</i>			
Lee's Plant Bed Fertilizer.....	8.00	2.00	2.00
Lee's Bone and Potash.....	9.00	..	4.00
Lee's Corn Fertilizer.....	10.00	..	2.00
<i>The J. J. Littlejohn Co., Jonesville, S. C.—</i>			
Littlejohn's Superior Cotton Fertilizer.....	10.00	1.65	3.00
<i>E. H. &amp; J. A. Meadows Co., New Bern, N. C.—</i>			
Hookerton Cotton Guano.....	8.00	1.64	2.00
Meadows' Cotton Guano.....	8.00	1.64	2.00
Meadows' All Crop Guano.....	8.00	2.05	2.50

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Meadows' Roanoke Guano.....	8.00	2.05	3.00
Meadows' Gold Leaf Tobacco Guano.....	8.00	2.47	3.00
Meadows' Lobos Guano.....	8.00	4.11	5.00
Meadows' Great Potato Guano.....	7.00	4.11	8.00
Meadows' Great Cabbage Guano.....	7.00	5.76	7.00
Meadows' 10 Per Cent Guano.....	6.00	8.23	2.50
Meadows' Sea Bird Guano.....	9.00	3.29	2.50
Meadows' Dissolved Bone and Potash Compound,	10.00	..	2.00
Meadows' German Kainit.....	..	..	12.00
Meadows' Diamond Acid Phosphate.....	14.00	..	..
Dixon's High Grade Tobacco Guano.....	8.00	2.47	3.00
Parker's Special Tobacco Guano.....	8.00	2.47	4.00
Meadows' Dissolved Bone and Potash Compound,	10.00	..	5.00
Brooks' Special Tobacco Grower.....	8.00	2.47	5.00

*The Miller Fertilizer Co., Baltimore, Md.—*

Special Tobacco Grower .....	8.00	1.65	4.00
Standard Phosphate .....	8.00	2.47	3.00
Ammoniated Dissolved Bone.....	8.00	1.65	2.00
High Grade Potato .....	6.00	4.12	7.00
Tobacco King .....	8.00	2.47	3.00
Profit .....	8.00	1.65	2.00
Standard Potato .....	8.00	2.47	3.00
Potato and Vegetable Guano.....	8.00	1.65	4.00
Trucker .....	8.00	4.12	5.00
Farmers' Profit .....	8.00	1.65	2.00
Harmony .....	8.00	2.06	3.00
Corn and Peanut Grower.....	10.50	..	2.25
No. 1 Potato and Vegetable Grower.....	8.00	3.71	7.00
Clinch .....	10.00	..	2.00
4 Per Cent Tobacco.....	8.00	3.29	4.00
Miller's 7 Per Cent.....	7.00	5.77	7.00
Miller's Irish Potato.....	8.00	3.29	4.00
Miller's 16 Per Cent Acid Phosphate.....	16.00	..	..
Kainit .....	..	..	12.00
Acid Phosphate .....	14.00	..	..
S. C. Rock.....	14.00	..	..
The Miller Fertilizer Co.'s 10 and 4 Per Cent...	10.00	..	4.00

*The Mapes Formula and Peruvian Guano Co., 143  
Liberty Street, New York—*

Mapes' Economical Potato Manure.....	4.00	3.29	8.00
Mapes' Vegetable or Complete Manure for Light Soils .....	6.00	4.94	6.00
Mapes' Corn Manure.....	8.00	2.47	6.00
Mapes' Complete Manure, "A" Brand.....	10.00	2.47	2.50

*C. F. Moore, Cheraw, S. C.—*

Muriate of Potash.....	..	..	49.00
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*John F. McNair, Laurinburg, N. C.—*

Genuine German Kainit.....	..	..	12.00
Nitrate of Soda.....	..	14.76	..

*D. B. Martin Co., Richmond, Va.—*

Martin's 7 Per Cent Guano.....	6.00	5.74	5.00
Martin's Early Truck and Vegetable Grower....	6.00	3.28	8.00
Martin's Claremount Vegetable Grower.....	7.00	2.46	5.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Martin's Red Star Brand.....	8.00	3.28	4.00
Martin's Bull Head Fertilizer.....	8.00	2.46	3.00
Martin's Tobacco Special.....	8.00	2.46	3.00
Martin's Carolina Cotton Fertilizer.....	8.00	1.65	2.00
Martin's Old Virginia Favorite.....	8.00	1.65	2.00
Martin's Corn and Cereal Special.....	8.00	1.65	2.00
Martin's Gilt Edge Potato Manure.....	7.00	2.46	10.00
Martin's Animal Bone Potato Guano.....	6.00	4.10	7.00
Martin's Animal Bone Potato Compound.....	16.00	1.65	2.50
Martin's Pure Dissolved Animal Bone.....	12.00	1.65	2.00
Martin's Pure Ground Bone.....Total	22.90	1.65	2.00
Martin's Raw Bone Meal.....Total	21.00	3.69	..
Martin's Animal Tankage, Ground.....Total	16.00	4.92	..
Martin's Acid Phosphate.....	16.00	..	..
Martin's Potash and Soluble Bone.....	12.00	..	5.00
Martin's High Grade Blood.....	..	13.94	..
Martin's Blood .....	..	12.30	..
Acid Phosphate .....	14.00	..	..
Potash and Soluble Bone.....	12.00	..	3.00
Potash and Soluble Bone.....	10.00	..	5.00
Potash and Soluble Bone.....	10.00	..	2.00
Nitrate of Soda.....	..	15.52	..
Sulphate of Ammonia.....	..	20.50	..
Blood .....	..	10.66	..
Blood .....	..	9.84	..
Blood .....	..	12.30	..
Genuine German Kainit.....	..	..	12.00
Sulphate of Potash .....	..	..	50.00
Muriate of Potash .....	..	..	50.00
Pure Ground Bone.....Total	22.90	2.46	..
<i>Marietta Fertilizer Co., Atlanta, Ga.—</i>			
Lion Power Guano.....	10.00	1.65	2.00
Lion Potash Compound.....	8.00	..	4.00
Lion High Grade Dissolved Bone.....	14.00	..	..
Lion Crop Producer.....	10.00	..	4.00
Lion Favorite Guano.....	8.00	1.65	2.00
<i>Marsh-Lee &amp; Co., Marshville, N. C.—</i>			
Marsh's High Grade Acid.....	14.00	..	..
Marsh's Cotton Fertilizer, 8-2-2.....	8.00	1.65	2.00
Marsh's Guano for Corn.....	8.00	1.65	2.00
Marsh's Special 8-3-3.....	8.00	2.50	3.00
Raven Brand .....	8.00	2.65	2.00
<i>J. W. McLaughlin Co., Raeford, N. C.—</i>			
Nitrate of Soda.....	..	15.00	..
<i>The MacMurphy Co., Charleston, S. C.—</i>			
Special 8-3-3 Guano .....	8.00	2.47	3.00
Special 8-2-2 Cotton and Corn Guano.....	8.00	1.65	2.00
Cotton and Corn Guano, 9-2-2.....	9.00	1.65	2.00
Wilcox & Gibbs Co.'s Manipulated Guano.....	9.00	2.26	2.00
Cotton and Corn Guano, 9-3-3.....	9.00	2.47	3.00
High Grade Acid Phosphate, 14 Per Cent.....	14.00	..	..
Pure German Kainit .....	..	..	12.00
Nitrate of Soda .....	..	14.82	..
Muriate of Potash .....	..	..	48.00
Acid Phosphate, 13 Per Cent.....	13.00	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>N. C. Cotton Oil Co., Wilmington, N. C.—</i>			
Wilmington High Grade .....	8.00	2.47	3.00
Wilmington Cotton Grower .....	8.00	1.65	2.00
Wilmington Standard .....	8.00	2.47	2.50
Wilmington Truck Grower .....	8.00	3.30	4.00
Wilmington Special .....	8.00	1.65	2.00
Carter's Lifter .....	8.00	2.47	3.00
Clark's Special .....	8.00	1.65	3.00
Wilmington Banner .....	8.00	1.65	3.00
<i>North Carolina Cotton Oil Co., Raleigh, N. C.—</i>			
Raleigh Standard Guano.....	8.00	2.26	2.00
<i>New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.—</i>			
Oriole Tobacco Grower.....	8.00	3.30	4.00
Greene County Standard Fertilizer.....	8.00	1.65	2.00
Jones County Premium Crop Grower.....	8.00	2.06	3.00
Ouslow Farmers' Reliance Guano.....	8.00	2.06	3.00
High Grade Fertilizer .....	8.00	2.47	3.00
Foy's High Grade Fertilizer.....	8.00	2.47	3.00
Pitt's Prolific Golden Tobacco Grower.....	8.00	2.47	3.00
Craven Cotton Guano .....	8.00	1.65	2.00
Lenoir Bright Leaf Tobacco Grower.....	8.00	2.47	3.00
Ives' Irish Potato Guano.....	7.00	4.13	7.00
Dunn's Standard Truck Grower.....	7.00	5.77	7.00
Panlico Electric Top Dresser.....	5.00	8.25	2.50
Special Corn and Peanut Grower.....	11.00	..	2.00
Carteret Bone and Potash.....	10.00	..	2.00
14 Per Cent Acid Phosphate.....	14.00	..	..
Genuine German Kainit .....	..	..	12.00
Sulphate of Potash .....	..	..	50.00
Muriate of Potash .....	..	..	48.00
Bogue Fish Scrap .....	..	7.42	..
Nitrate of Soda .....	..	15.67	..
Sulphate of Ammonia .....	..	20.62	..
Favorite Cotton Grower C. S. M.....	8.00	2.27	2.00
<i>Norfolk Fertilizer Co., Norfolk, Va.—</i>			
Oriana Cotton Guano.....	8.00	1.64	2.00
Oriana C. S. M. Special.....	9.00	2.26	2.00
Oriana Tobacco Guano.....	8.00	2.47	3.00
Oriana 3-8-3 for Cotton.....	8.00	2.47	3.00
Oriana Crop Grower.....	8.00	1.64	3.00
Oriana Bone and Potash.....	10.00	..	2.00
Oriana 14 Per Cent Acid Phosphate.....	14.00	..	..
Oriana 16 Per Cent Acid Phosphate.....	16.00	..	..
Genuine German Kainit .....	..	..	12.00
Iola Acid Phosphate.....	13.00	..	..
Oriana First Step Tobacco Guano.....	8.00	3.29	4.00
Oriana 4-4-6 High Grade Tobacco Guano.....	4.00	3.29	6.00
Pine Top Special Crop Grower.....	5.00	1.64	6.00
<i>Navassa Guano Co., Wilmington, N. C.—</i>			
Ammoniated Soluble Navassa Guano.....	8.00	2.06	2.00
Clarendon Tobacco Guano.....	8.00	2.47	3.00
Occoneechee Tobacco Guano.....	8.00	1.65	2.00
Coree Tobacco Guano.....	8.00	3.29	4.00
Harvest King Guano.....	8.00	1.65	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Mogul Guano .....	8.00	2.06	3.00
Kainit .....	..	..	12.00
Muriate of Potash.....	..	..	48.00
Sulphate of Potash .....	..	..	50.00
Nitrate of Soda.....	..	15.65	..
Sulphate of Ammonia.....	..	20.59	..
Orton Guano .....	8.00	2.47	4.00
Navassa Universal Fertilizer.....	8.50	2.06	1.00
Navassa Wheat Mixture.....	10.00	..	2.25
Navassa Wheat and Grass Grower.....	10.00	..	4.00
Navassa Special Wheat Mixture.....	12.00	..	4.00
Navassa Gray Land Mixture.....	12.00	..	4.00
Navassa Dissolved Bone with Potash.....	10.00	..	2.00
Navassa Acid Phosphate.....	12.00	..	..
Navassa Dissolved Bone.....	13.00	..	..
Navassa Acid Phosphate.....	14.00	..	..
Navassa Acid Phosphate.....	16.00	..	..
Navassa Special Trucker.....	8.00	3.29	4.00
Navassa Strawberry Top Dressing.....	8.00	2.06	4.00
Navassa Blood and Bone Meal Mixture.....	8.00	2.47	5.00
Navassa Creole Guano.....	6.00	4.12	7.00
Navassa Root Crop Fertilizer.....	7.00	4.12	7.00
Navassa Carib Guano.....	8.00	2.47	10.00
Navassa Guano for Tobacco.....	8.00	2.06	2.00
Navassa Grain Fertilizer.....	8.00	1.65	2.00
Navassa Fruit Growers' Fertilizer.....	8.00	1.65	6.00
Navassa Cotton Seed Meal Special 3 Per Cent Guano .....	8.00	2.47	2.00
Navassa Cotton Seed Meal Guano.....	8.00	1.65	2.00
Navassa Cotton Fertilizer.....	8.00	1.65	2.00
Navassa Complete Fertilizer.....	9.00	1.65	1.00
Navassa High Grade Guano.....	8.00	2.47	3.00
Navassa Acid Phosphate with Potash.....	8.00	..	4.00

*The Nitrate Agencies Co., Savannah, Ga.—*

Nitrate of Soda.....	..	15.00	..
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*G. Ober & Sons Co., Baltimore, Md.—*

Ober's Complete Fertilizer.....	6.00	4.12	6.00
Special High Grade Fertilizer.....	9.00	2.47	3.00
Ober's Special Compound for Tobacco.....	8.00	2.47	3.00
Ober's Standard Tobacco Fertilizer.....	8.00	1.65	2.00
Ober's Special Ammoniated Dissolved Bone.....	9.00	1.65	2.00
Ober's Special Cotton Compound.....	8.00	1.65	2.00
Ober's Soluble Ammoniated Superphosphate of Lime .....	8.00	1.65	2.00
Ober's Farmers' Mixture.....	9.00	.82	2.00
Ober's Dissolved Bone, Phosphate and Potash...	10.00	..	2.00
Ober's Acid Phosphate with Potash.....	8.00	..	2.00
Ober's Standard Potash Compound.....	12.00	..	5.00
Ober's High Grade Acid Phosphate.....	16.00	..	..
Ober's Dissolved Bone Phosphate.....	14.00	..	..
Nitrate of Soda.....	..	15.50	..
Muriate of Potash.....	..	..	48.00
Kainit .....	..	..	12.00
Cooper's Pungo Guano.....	8.00	2.06	2.00
Pure Raw Bone Meal.....Total	21.00	..	3.71

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>The Pocomoke Guano Co., Norfolk, Va.—</i>			
Garrett's Grape Grower.....	8.00	3.20	10.00
Coast Line Truck Guano.....	5.00	8.23	3.00
Freeman's 7 Per Cent Irish Potato Grower.....	6.00	5.76	5.00
Seaboard Popular Trucker.....	6.00	5.76	5.00
Standard Truck Guano.....	7.00	4.12	5.00
Faultless Ammoniated Superphosphate.....	7.00	3.30	4.00
Harvest High Grade Monarch.....	8.00	2.47	3.00
Monarch Tobacco Grower.....	8.00	2.47	3.00
Monticello Animal Bone Fertilizer.....	9.00	1.85	4.00
Cinco Tobacco Guano.....	8.50	2.06	2.50
Crescent Complete Compound.....	8.00	1.65	3.00
Hornthal's Tobacco Guano.....	8.00	1.65	3.00
L. P. H. Premium.....	8.00	1.65	2.00
Electric Crop Grower.....	8.50	1.65	2.00
Pamlico Superphosphate.....	8.00	1.65	2.00
Pocomoke Superphosphate.....	8.50	1.65	2.00
Pocomoke Bone and Potash Mixture.....	10.00	..	4.00
Pure Ground Bone.....	Total	20.00	3.70
10-2 Potash Mixture.....	10.00	..	..
Alkali Bone.....	11.00	..	2.00
Peerless Acid Phosphate.....	14.00	..	..
Superb Acid Phosphate.....	16.00	..	..
Genuine German Kainit.....	..	..	12.00
Muriate of Potash.....	..	..	50.00
Nitrate of Soda.....	..	15.65	..
Pocomoke Defiance Bone and Potash.....	8.00	..	4.00
Smith's Special Formula.....	4.00	3.30	6.00

*Pamlico Chemical Co., Washington, N. C.—*

Pamlico Favorite Guano.....	7.00	4.12	5.00
Pamlico Bone and Fish Guano.....	8.00	1.65	2.00
Pamlico Potato Guano.....	7.00	4.12	7.00
Pamlico Cotton Guano.....	8.00	1.65	2.00
Pamlico 7-7-7 Guano.....	7.00	5.77	7.00
Pamlico 16 Per Cent Acid Phosphate.....	16.00	..	..
Pamlico Bone and Potash.....	14.00	..	..
Cowell's Great Potato Grower.....	8.00	4.12	7.00
Cowell's Great Cabbage Grower.....	5.00	8.25	2.50
Tobacco Growers' Friend.....	8.00	2.47	3.00
Genuine German Kainit.....	..	..	12.00
Farmers' Best Guano.....	8.00	2.06	3.00
Farmers' Friend.....	8.00	2.47	3.00
Staton & Taylor's Special Grower.....	8.00	2.26	2.00
Prosperity Cotton Grower.....	9.00	2.26	2.00
Pamlico High Grade Tobacco Grower.....	8.00	2.47	5.00
Pamlico 8-4-4 Guano.....	8.00	3.30	4.00
Pamlico 6-3-6 Guano.....	6.00	2.45	6.00
Pamlico Bone and Potash.....	10.00	..	2.00

*Planters Fertilizer and Phosphate Co., Charleston, S. C.—*

Planters' Bright Tobacco Fertilizer.....	8.00	3.90	4.00
Planters' High Grade Cabbage Fertilizer.....	7.00	6.59	5.00
Planters' Fertilizer.....	8.00	2.06	2.00
Planters' Soluble Guano.....	8.00	2.47	3.00
Planters' Standard Guano.....	8.75	1.65	2.00
Nitrate of Soda.....	..	14.83	..
Planters' High Grade Acid Phosphate.....	14.00	..	..
Planters' Standard Fertilizer.....	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Planters' Soluble Bone.....	13.00	..	..
Sulphate of Potash .....	..	..	48.00
Planters' German Kainit .....	..	..	12.00
<i>Parsons &amp; Hardison, Wadesboro, N. C.—</i>			
Nitrate of Soda.....	..	14.85	..
<i>Z. V. Pate, Laurel Hill, N. C.—</i>			
Nitrate of Soda .....	..	14.76	..
<i>Pearsall &amp; Co., Wilmington, N. C.—</i>			
Kainit .....	..	..	12.00
<i>Pacific Guano Co., Charleston, S. C.—</i>			
Standard Soluble Pacific Guano.....	8.50	1.65	2.00
Standard Pacific Acid Phosphate.....	12.00	..	..
High Grade Pacific Fertilizer.....	8.00	2.46	3.00
<i>Powhatan Chemical Co., Richmond, Va.—</i>			
Powhatan Trucker .....	7.00	4.94	5.00
Powhatan Bone and Potash Mixture.....	8.00	..	4.00
Powhatan Acid Phosphate.....	13.00	..	..
Magic Dissolved Bone Phosphate.....	16.00	..	..
Magic Peanut Grower.....	8.00	..	4.00
Magic Grain and Grass Grower.....	8.00	..	4.00
Magic Bone and Potash Mixture.....	10.00	..	4.00
Magic Mixture .....	9.00	1.65	1.00
Magic Cotton Grower.....	8.00	1.65	2.00
Magic Special Fertilizer.....	8.00	1.65	2.00
Magic Tobacco Grower.....	8.00	1.65	2.00
King Brand Fertilizer.....	8.00	2.06	3.00
White Leaf Tobacco Fertilizer.....	8.00	2.06	3.00
Economic Cotton Grower.....	9.00	2.26	2.00
North State Special.....	8.00	3.29	4.00
Guilford Special .....	9.00	2.47	6.00
Pure Raw Bone Meal.....Total	20.00	3.29	..
Bone and Potash Mixture.....	10.00	..	2.00
Bone Meal .....	25.00	2.47	..
Nitrate of Soda .....	..	15.63	..
Sulphate of Ammonia .....	..	19.75	..
Sulphate of Potash .....	..	..	48.00
Muriate of Potash .....	..	..	50.00
Pure German Kainit .....	..	..	12.00
Virginia Dissolved Bone .....	12.00	..	..
High Grade Acid Phosphate.....	14.00	..	..
Uneda Acid Phosphate .....	15.00	..	..
P. C. Co.'s Hustle.....	8.00	2.47	3.00
Magic Corn Grower .....	10.00	.82	1.00
Magic Wheat Grower .....	9.00	.82	2.00
Johnson's Best Fertilizer.....	9.00	2.06	5.00
Holt's Magic Fertilizer .....	9.00	2.06	5.00
Magic Peanut Special .....	8.00	.82	4.00
Bone Mixture .....	10.00	.82	1.00
Magic Crop Grower .....	10.00	.82	1.00
<i>Patapsco Guano Co., Baltimore, Md.—</i>			
Patapsco Plant Food for Tobacco, Potatoes and Truck .....	8.00	2.47	5.00
Patapsco Soluble Bone and Potash.....	10.00	..	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Patapsco High Grade Bone and Potash.....	11.00	..	5.00
Patapsco 10 and 4 Potash Mixture.....	10.00	..	4.00
Patapsco 7-7-7 Truck Guano.....	7.00	5.77	7.00
Patapsco Potato Guano.....	6.00	4.12	7.00
Patapsco Top Dresser.....	4.00	3.30	4.00
Patapsco Trucker for Early Vegetables.....	7.00	4.12	5.00
Patapsco Tobacco Fertilizer.....	9.00	2.47	3.00
Patapsco Guano for Tobacco.....	9.25	2.06	2.00
Patapsco Guano .....	9.25	2.06	2.00
Patapsco Special Tobacco Mixture.....	8.00	2.06	3.00
Patapsco Fine Ground Bone.....Total	20.61	3.30	..
Patapsco Dissolved S. C. Phosphate.....	14.00	..	..
Coon Brand Guano.....	9.00	.83	3.00
Choctaw Guano .....	8.00	2.47	3.00
Planters' Favorite .....	8.00	1.65	2.00
Seagull Ammoniated Guano.....	8.00	1.65	2.00
Money Maker Guano.....	7.00	3.70	6.00
Unicorn Guano .....	8.00	2.06	3.00
Baltimore Soluble Phosphate.....	11.00	..	2.00
Florida Soluble Phosphate.....	16.00	..	..
Genuine German Kainit.....	..	..	12.00
Nitrate of Soda.....	..	15.64	..
Muriate of Potash.....	..	..	50.00
Ground Fish .....	..	8.23	..
Swanson's Gold Leaf Special.....	8.00	2.06	2.00

*Pocahontas Guano Co., Lynchburg, Va.—*

Imperial Dissolved S. C. Phosphate.....	14.00	..	..
Carrington's Superior Grain Compound.....	10.00	..	2.00
Wabash Wheat Mixture.....	10.00	..	4.00
Cherokee Grain Special.....	8.00	..	4.00
Farmers' Favorite Guano, Apex Brand.....	8.00	2.47	3.00
Blackhawk Brand .....	8.00	2.06	2.00
Spot Cash Tobacco Compound.....	8.00	2.06	3.00
Yellow Tobacco Special.....	9.00	1.65	2.00
High Grade 4 Per Cent Tobacco Compound, Mo- hawk King Brand.....	9.00	1.85	4.00
Standard Tobacco Guano, Old Chief Brand....	9.00	1.65	2.00
Pocahontas Special Tobacco Fertilizer.....	9.00	2.47	3.00
A. A. Complete Champion Brand.....	8.00	.82	3.00
Special Truck Grower, Eagle Mount Brand....	8.00	2.06	6.00
Indian Truck Grower.....	8.00	3.30	4.00
Pure Raw Bone Meal.....Total	22.00	3.71	..
Carrington's S. C. Phosphate, Waukesha Brand.	16.00	..	..
Carrington's Banner Brand Guano.....	8.00	1.65	2.00
Indian Tobacco Grower.....	8.00	2.46	4.00

*Piedmont-Mt. Airy Guano Co., Baltimore, Md.—*

Piedmont Cultivator Brand.....	8.00	1.65	2.00
Piedmont Bone and Peruvian Mixture.....	8.00	1.65	2.00
Piedmont Special Truck Fertilizer.....	6.00	5.77	5.00
Piedmont Early Vegetable Manure.....	6.00	4.12	7.00
Piedmont Vegetable Compound.....	6.00	3.30	8.00
Piedmont Essential Tobacco Compound.....	9.00	1.65	2.00
Piedmont Guano for Tobacco.....	8.00	2.06	3.00
Piedmont High Grade Ammoniated Bone and Potash .....	8.00	2.47	3.00
Piedmont High Grade S. C. Bone Phosphate..	14.00	..	..
Levering's Potashed Bone.....	10.00	..	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Levering's Reliable Tobacco Guano.....	8.00	2.47	3.00
Piedmont Special Potato Guano.....	6.00	4.94	7.00
Piedmont Red Leaf Tobacco Guano.....	8.00	1.65	2.00
Piedmont Guano for Cotton.....	9.00	1.65	1.00
Piedmont Early Trucker.....	6.00	4.12	5.00
Piedmont Potato Producer.....	5.00	2.47	6.00
Piedmont Farmers' Standard.....	9.00	1.65	2.00
Piedmont Guano for Wheat.....	9.00	1.65	1.00
Piedmont Special for Cotton, Corn and Peanuts,	8.00	1.65	2.00
Piedmont Special Farmers' Tobacco Guano.....	8.40	2.47	4.00
Piedmont Farmers' Bone and Potash.....	10.00	..	2.00
Piedmont High Grade Guano for Cotton.....	8.00	2.47	3.00
Haynes' Cultivator Guano.....	8.00	1.65	2.00
Piedmont Farmers' Favorite.....	8.00	.82	4.00
Piedmont Farmers' Cotton Grower.....	9.00	.82	3.00
German Kainit.....	..	..	12.00
Piedmont Star Bone and Potash.....	8.00	..	5.00
Piedmont Unexcelled Guano.....	8.00	3.29	4.00
Piedmont Bone Meal.....	Total	21.00	3.30
Ricks Bros.' Special Potato and Truck Guano..	6.00	4.12	7.00
Kaiser & Mauney's Special 2-8-2 Guano.....	8.00	1.65	2.00
Kaiser & Mauney's Special 3-8-3 Guano.....	8.00	2.47	3.00
Privott's 3-8-4 Guano.....	8.00	2.47	4.00
Piedmont Guano for All Crops.....	8.00	2.06	3.00
Piedmont Vegetable Manure.....	6.00	3.29	8.00
Nitrate of Soda.....	..	15.23	..
Privott's Standard Guano.....	8.00	2.06	3.00
Privott's Special Guano.....	8.00	1.65	6.00
Muriate of Potash.....	..	..	48.00
Sulphate of Potash.....	..	..	50.00
Sulphate of Ammonia.....	..	20.58	..
<i>The Quinnepiac Co., Charleston, S. C.—</i>			
Standard Quinnepiac Pine Island Ammoniated			
Superphosphate.....	9.00	1.85	1.00
Standard Quinnepiac Acid Phosphate.....	13.00	..	..
<i>F. S. Royster Guano Co., Norfolk, Va.—</i>			
Sulphate of Potash.....	..	..	50.00
Muriate of Potash.....	..	..	48.00
Genuine German Kainit.....	..	..	12.00
Farmers' Own Fertilizer.....	8.00	1.65	2.00
Bonanza Tobacco Guano.....	8.00	2.47	3.00
Orinoco Tobacco Guano.....	8.00	2.06	3.00
Special Tobacco Compound.....	8.00	2.06	2.00
Cobb's High Grade for Tobacco.....	8.00	3.30	5.00
Humphrey's Special for Tobacco.....	6.00	2.55	3.20
Eagle's Special Tobacco Guano.....	8.00	2.47	5.00
Royal Potato Guano.....	7.00	4.12	5.00
Royal Special Potato Guano.....	7.00	4.12	7.00
Ballentine's Potato Guano.....	6.00	5.77	7.00
Truckers' Delight.....	8.00	3.30	4.00
Special Compound.....	9.00	1.65	1.00
Tomlinson's Special.....	9.00	2.47	5.00
Williams' Special Guano.....	8.00	2.06	5.00
Magic Top Dresser.....	..	7.42	3.00
Royster's Special Sweet Potato Guano.....	8.00	2.47	3.00
Royster's Potato Guano.....	5.00	4.94	7.00
Royster's Special 7 Per Cent Truck Guano.....	7.00	5.77	7.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Royster's Early Truck Guano.....	7.00	4.12	8.00
Royster's Special 10 Per Cent Truck Guano....	5.00	8.24	3.00
Royster's Special 4-8-3.....	8.00	3.30	3.00
Royster's 4-9-5 Special.....	9.00	3.30	5.00
Royster's Special 1-9-2 Guano.....	9.00	.82	2.00
Royster's 2-6-5 Special.....	6.00	1.65	5.00
Royster's Meal Mixture.....	9.00	2.26	2.00
Royster's Special Wheat Fertilizer.....	8.00	1.65	2.00
Royster's H. G. 16 Per Cent Acid Phosphate...	16.00	..	..
Royster's 14 Per Cent Acid Phosphate.....	14.00	..	..
Royster's Dissolved Bone.....	13.00	..	..
Royster's XX Acid Phosphate.....	12.00	..	..
Royster's Bone and Potash Mixture.....	11.00	..	5.00
Royster's Bone and Potash Mixture.....	10.00	..	2.00
Royster's Bone and Potash for Grain.....	10.00	..	3.00
Royster's 8 and 4 Bone and Potash Mixture....	8.00	..	4.00
Royster's Peanut Special.....	7.00	..	5.00
Royster's Complete Guano.....	8.00	1.65	2.00
Royster's 10 and 4 Bone and Potash Mixture...	10.00	..	4.00
Royster's Best Guano.....	8.00	3.71	7.00
Royster's Harvey's Cabbage Guano.....	5.00	6.59	3.00
Royster's Marlborough High Grade Cotton Guano .....	8.00	2.47	3.00
Nitrate of Soda.....	..	15.66	..
Jumbo Peanut Grower.....	8.00	.82	4.00
Watkins' Special .....	9.00	2.06	5.00
Haynes' Special .....	9.00	2.06	3.00
Pure Raw Bone Meal.....Total	21.50	3.70	..
Milo Tobacco Guano.....	8.00	3.30	4.00
Royster's Soluble Guano.....	10.00	1.65	2.00
McDowell's Cotton Grower.....	6.00	2.30	2.50
Royster's 4-6-4 Special.....	6.00	3.30	4.00
Webb's Korn King.....	8.00	1.65	2.00

*J. H. Roberson & Co., Robersonville, N. C.—*

Roberson's Potato Guano.....	6.00	5.77	5.00
Roberson's Cotton Grower.....	9.00	2.26	2.00
Roberson's Special Potato Grower.....	7.00	5.77	7.00
Roberson's Bright Leaf Grower.....	8.00	2.06	3.00
Roberson's High Grade Acid Phosphate.....	14.00	..	..
Genuine German Kainit.....	..	..	12.00

*Richmond Guano Co., Richmond, Va.—*

10 Per Cent Cabbage Guano.....	6.00	8.23	2.00
Special High Grade for Truck.....	7.00	4.94	5.00
Southern Trucker .....	8.00	4.11	5.00
Perfection Special .....	8.00	3.29	4.00
Gilt Edge Fertilizer.....	8.00	2.47	3.00
Carolina Cotton Grower.....	9.00	2.26	2.00
Carolina Bright Special Tobacco Fertilizer....	8.00	2.26	2.50
Tip Top Fertilizer.....	8.00	2.06	3.00
Special Premium Brand for Tobacco.....	8.00	1.85	2.25
Special Premium Brand for Plants.....	8.00	1.85	2.25
Carolina Bright for Cotton.....	8.00	2.06	1.50
Benson's Special Fertilizer.....	8.00	1.65	6.00
Parker & Hunter's Special Fertilizer.....	8.00	1.65	2.00
Premium Tobacco Fertilizer.....	8.00	1.65	2.00
Premium Brand Fertilizer.....	8.00	1.65	2.00
Bone Mixture .....	9.00	1.65	1.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Clark's Special Formula.....	7.00	4.94	6.00
Carter's Special for Tobacco.....	4.00	2.47	6.00
Saunder's Special Formula for Bright Tobacco,	9.00	2.88	5.00
Burton's Special Tobacco Fertilizer.....	9.00	2.06	3.00
Hunter & Dunn's Special Ammoniated Fertilizer,	9.00	2.47	2.25
Hunter & Dunn's Ammoniated Fertilizer.....	8.00	1.65	2.00
Edgecombe Cotton Grower.....	8.00	1.65	2.00
Premium Bone and Potash Mixture.....	13.00	..	3.00
Rex Bone and Potash Mixture.....	10.00	..	4.00
Tip Top Bone and Potash Mixture.....	8.00	..	4.00
Winter Grain and Grass Grower.....	8.00	..	4.00
Premium Peanut Grower.....	8.00	..	4.00
Bone and Potash Mixture.....	10.00	..	2.00
Rex Dissolved Bone Phosphate.....	16.00	..	..
Regal Acid Phosphate.....	15.00	..	..
High Grade Acid Phosphate.....	14.00	..	..
High Grade Wheat and Grass Fertilizer.....	14.00	..	..
Premium Dissolved Bone .....	13.00	..	..
Dissolved S. C. Phosphate.....	12.00	..	..
Hunter & Dunn's Dissolved Bone.....	12.00	..	..
Pure German Kainit.....	..	..	12.00
Muriate of Potash.....	..	..	50.00
Sulphate of Potash.....	..	..	48.00
Sulphate of Ammonia.....	..	19.75	..
Nitrate of Soda.....	..	15.63	..
Pure Raw Bone meal.....Total	20.00	3.29	..
Bone Meal .....	25.00	2.47	..
Premium Corn Grower.....	10.00	.82	1.00
Premium Wheat Grower.....	9.00	.82	2.00
Cracker Jack Fertilizer.....	9.00	1.65	2.00
Premium Peanut Special.....	8.00	.82	4.00
Premium Cotton Grower.....	9.00	.82	3.00
Old Homestead Dissolved Bone.....	12.00	..	..

*Read Phosphate Co., Charleston, S. C.—*

Genuine German Kainit.....	..	..	12.00
Read's High Grade Acid Phosphate.....	14.00	..	..
Read's Bone and Potash.....	10.00	..	4.00
Read's Alkaline Bone.....	10.00	..	2.00
Read's Special Potash Mixture.....	8.00	..	4.00
Read's High Grade Tobacco Leaf.....	8.00	2.47	3.00
Read's Blood and Bone Fertilizer No. 1.....	8.00	1.65	2.00
Read's Soluble Fish Guano.....	8.00	1.65	2.00
Read's High Grade Cotton Grower.....	8.00	2.47	3.00

*Raisin-Monumental Co., Baltimore, Md.—*

Dixie Guano .....	9.00	1.65	2.00
Empire Guano .....	8.00	1.65	2.00
Raisin Premium Brand for Tobacco.....	8.00	2.46	3.00
Raisin Gold Standard.....	8.00	2.46	3.00
Raisin Special Bone and Potash.....	10.00	..	5.00
Raisin Bone and Potash.....	10.00	..	2.00
Raisin 13 Per Cent Acid Phosphate.....	13.00	..	..
Raisin 16 Per Cent Acid Phosphate.....	16.00	..	..
Raisin Acid Phosphate.....	14.00	..	..

*Reidsville Fertilizer Co., Reidsville, N. C.—*

Banner Fertilizer .....	8.00	1.65	2.00
Champion Guano .....	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Broad Leaf Tobacco Guano.....	8.00	1.85	2.50
Royal Fertilizer .....	8.00	2.47	3.00
Lion Brand Fertilizer.....	9.00	2.47	6.00
Bone and Potash.....	10.00	..	4.00
<i>Swift Fertilizer Works, Atlanta, Ga., and Wilming- ton, N. C.—</i>			
High Grade Swift's Strawberry Grower.....	8.00	2.47	10.00
High Grade Swift's Special Trucker.....	6.00	5.76	5.00
High Grade Swift's Special 10 Per Cent Blood and Bone Trucker .....	5.00	8.23	3.00
High Grade Swift's Carolina 7 Per Cent Special Trucker .....	7.00	5.76	7.00
High Grade Swift's Favorite Truck Guano.....	6.00	4.94	6.00
High Grade Swift's Special Irish Potato Grower,	7.00	4.12	8.00
High Grade Swift's Special Potato Grower.....	6.00	4.12	7.00
Standard Grade Swift's Red Steer Guano Stand- ard Grade .....	8.00	1.65	2.00
Swift's Plow Boy Guano.....	10.00	.82	1.00
Standard Grade Swift's Cotton Plant Standard Grade Guano .....	9.00	1.65	1.00
Standard Grade Swift's Golden Harvest Stand- ard Grade Guano.....	8.00	1.65	2.00
Swift's Eagle Standard Grade Guano.....	10.00	1.65	2.00
High Grade Swift's Farmers' Favorite High Grade Guano .....	9.00	1.65	3.00
High Grade Swift's Pioneer High Grade Guano Tobacco Grower .....	8.00	1.65	4.00
High Grade Swift's Early Trucker.....	7.00	4.12	5.00
High Grade Swift's Blood, Bone and Potash High Grade Guano.....	9.50	3.29	7.00
High Grade Swift's Corn and Cotton Grower High Grade Guano.....	10.00	2.47	3.00
High Grade Swift's Cotton King High Grade Guano .....	9.00	2.47	2.00
High Grade Swift's Ruralist High Grade Guano,	8.00	2.47	3.00
High Grade Swift's Special High Grade Guano..	9.50	4.12	3.00
High Grade Swift's Monarch Vegetable Grower High Grade Guano.....	8.00	3.29	4.00
High Grade Swift's Atlanta High Grade Guano,	12.00	..	4.00
High Grade Swift's Special High Grade Phos- phate and Potash.....	12.00	..	6.00
Standard Grade Swift's Plantation Standard Grade Phosphate and Potash.....	8.00	..	4.00
High Grade Swift's Farmers' Home High Grade Phosphate and Potash.....	10.00	..	4.00
Standard Grade Swift's Field and Farm Stand- ard Grade Phosphate and Potash.....	10.00	..	2.00
Standard Grade Swift's Wheat Grower Stand- ard Grade Phosphate and Potash.....	10.00	..	2.00
Standard Grade Swift's Harrow Standard Grade Acid Phosphate .....	13.00	..	..
High Grade Swift's No. 1 Ground Tankage....	6.00	8.24	..
Swift's Pure Bone Meal.....Total	25.00	2.47	..
High Grade Swift's Cultivator High Grade Acid Phosphate .....	14.00	..	..
High Grade Swift's Special High Grade Acid Phosphate .....	16.00	..	..
Standard Grade Swift's Chattahoochee Standard Grade Acid Phosphate.....	12.00	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
High Grade Swift's Ground Dried Blood.....	..	13.18	..
Swift's Pure Nitrate of Soda.....	..	14.82	..
Swift's Pure Raw Bone Meal.....Total	23.00	3.71	..
Swift's Muriate of Potash.....	..	..	50.00
Swift's German Kainit.....	..	..	12.00
Swift's Farmers' Favorite High Grade Guano...	9.00	1.65	3.00
Swift's Pioneer High Grade Guano.....	8.00	1.65	4.00
High Grade Swift's Eagle High Grade Guano...	10.00	1.65	2.00
Swift's Atlanta High Grade Phosphate and Potash .....	12.00	..	4.00
<i>Southern Chemical Co., Inc., Roanoke, Va.—</i>			
Our Favorite .....	8.00	1.64	2.00
Farmers' Joy .....	8.00	1.64	4.00
Our Leader .....	9.00	.82	2.00
Harvest King .....	8.00	.82	3.00
Southern Queen .....	8.00	2.46	10.00
Valley Chief .....	8.50	1.64	2.00
<i>Spartanburg Fertilizer Co., Spartanburg, S. C.—</i>			
Corn Formula .....	10.50	1.65	5.00
Gosnell's Plant Food .....	10.50	2.46	2.00
West's Potash Acid.....	13.00	..	3.00
Bold Buster .....	9.00	1.65	2.00
Potato Guano .....	7.00	2.46	7.00
Tiger Brand Acidulated Phosphate.....	14.00	..	..
<i>The Southern Exchange Co., Maxton, N. C.—</i>			
Melon Grower .....	8.00	4.12	7.00
McKimmon's Special Truck Formula.....	8.00	4.12	7.00
Two Fours Guano.....	7.00	3.30	4.00
That Big Stick Guano.....	8.00	2.47	4.00
Bull of the Woods Fertilizer.....	8.00	2.47	4.00
Jack's Best Fertilizer.....	8.00	2.47	3.00
Correct Cotton Compound.....	8.00	2.47	3.00
Juicy Fruit Fertilizer.....	9.00	1.85	4.00
The Walnut Fertilizer.....	8.50	2.06	2.50
The Racer Guano.....	8.00	1.65	3.00
The Coon Guano.....	8.00	1.65	2.00
R. M. C. Special Crop Grower.....	8.00	2.47	3.00
S. E. C. Bone and Potash Mixture.....	10.00	..	4.00
S. E. C. Bone and Potash Mixture.....	10.00	..	2.00
S. E. C. Acid Phosphate.....	16.00	..	..
S. E. C. Acid Phosphate.....	14.00	..	..
Genuine German Kainit.....	..	..	12.00
Muriate of Potash.....	..	..	50.00
Nitrate of Soda.....	..	15.65	..
<i>The Southern Cotton Oil Co., Charlotte District, Concord, Charlotte, Davidson, Madison, Shelby, and Gibson.—</i>			
Conqueror .....	8.00	3.28	4.00
Gloria .....	8.00	1.65	2.00
Peacock .....	8.00	2.46	3.00
Red Bull .....	8.00	2.05	2.00
Noon .....	8.00	2.46	3.00
King Bee .....	8.65	1.65	2.00
Gold Seal .....	14.00	..	..
Silver King .....	13.00	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Genuine German Kainit.....	..	..	12.00
Magnolia Bone and Potash.....	10.00	..	2.00
Conqueror Bone and Potash.....	10.00	..	4.00
Cotton Seed Meal.....	2.30	6.18	1.50
Choice .....	8.00	3.30	6.00
Genuine German Kainit.....	..	..	12.00
Magnolia B. and P.....	10.00	..	2.00
Conqueror B. and P.....	12.00	..	4.00
Southern Cotton Oil Co.'s 16 Per Cent Acid Phosphate .....	16.00	..	..
Razem .....	9.00	1.65	3.00

*Southern Cotton Oil Co., Goldsboro, Fayetteville  
Rocky Mount and Wilson.—*

Rocky Mount Oil Mill Standard.....	8.00	1.65	2.00
Fayetteville Oil Mill Standard.....	8.00	1.65	2.00
Goldsboro Oil Mill Standard.....	8.00	1.65	2.00
Wilson Oil Mill Standard.....	8.00	1.65	2.00
The Southern Cotton Oil Company Standard....	8.00	1.65	2.00
Fayetteville Oil Mill Special Cotton Grower....	8.00	2.47	3.00
Wilson Oil Mill Special Cotton Grower.....	8.00	2.47	3.00
Rocky Mount Oil Mill Special Cotton Grower...	8.00	2.47	3.00
Goldsboro Oil Mill Special Cotton Grower.....	8.00	2.47	3.00
Goldsboro Oil Mill High Grade.....	8.00	2.26	2.50
Rocky Mount Oil Mill High Grade.....	8.00	2.26	2.50
Fayetteville Oil Mill High Grade.....	8.00	2.26	2.50
Wilson Oil Mill High Grade.....	8.00	2.26	2.50
The Southern Cotton Oil Co. High Grade.....	8.00	2.26	2.50
Edgerton's Old Reliable.....	8.00	2.47	3.00
Hale's Special for Tobacco.....	8.00	2.47	4.00
Pine Level High Grade.....	8.00	2.47	3.00
Cotton Grower for all Crops.....	8.00	1.65	2.00
Best & Thompson's Special.....	9.00	2.26	2.00
The Southern Cotton Oil Co.'s Special Tobacco Grower .....	8.00	2.47	3.00
Echo .....	8.00	2.06	3.00
Morning Glory .....	8.00	2.47	3.00

*Tuscarora Fertilizer Co., Atlanta, Ga., and Wilming-  
ton, N. C.—*

Acid Phosphate .....	14.00	..	..
Acid Phosphate .....	13.00	..	..
Tuscarora Alkaline .....	10.00	..	5.00
Bone Potash .....	10.00	..	2.00
Champion .....	8.00	2.06	2.50
Manure Substitute .....	6.00	3.30	4.00
Tuscarora Trucker .....	8.00	4.12	7.00
Berry King .....	8.00	2.06	4.00
Tobacco Special .....	8.00	2.47	3.00
Tuscarora Fruit and Potato.....	8.00	1.65	10.00
Cotton Special .....	8.00	2.47	3.00
King Cotton .....	8.00	2.06	2.00
Big Four .....	7.00	1.65	4.00
Tuscarora Standard .....	8.00	1.65	2.00
Sulphate of Potash.....	..	..	50.00
Muriate of Potash.....	..	..	48.00
Kainit .....	..	..	12.00
Nitrate of Soda .....	..	14.85	..
Acid Phosphate .....	16.00	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Tide Water Fertilizer Co., Portsmouth, Va.—</i>			
Tide Water Acid Phosphate.....	14.00	..	..
Tide Water 12 Per Cent German Kainit.....	..	..	12.00
Acid Phosphate and Tankage.....	8.00	2.47	3.00
Tide Water High Grade Cotton.....	8.00	2.47	3.00
Tide Water Tobacco Special.....	8.00	2.47	3.00
Tide Water Very Best Cotton and Corn Guano..	8.00	1.65	2.00
<i>Union Guano Co., Winston-Salem, N. C.—</i>			
Union 8-5 Bone and Potash.....	8.00	..	5.00
Sulphate of Potash.....	..	..	48.00
Muriate of Potash.....	..	..	48.00
Genuine German Kainit.....	..	..	12.00
Union 12 Per Cent Acid Phosphate.....	12.00	..	..
Union Dissolved Bone.....	13.00	..	..
Union High Grade Acid Phosphate.....	14.00	..	..
Union 16 Per Cent Acid Phosphate.....	16.00	..	..
Union 12-3 Bone and Potash.....	12.00	..	3.00
Union 10-6 Bone and Potash.....	10.00	..	6.00
Union 10-5 Bone and Potash.....	10.00	..	5.00
Union 10-4 Bone and Potash.....	10.00	..	4.00
Union 8-5 Bone and Potash.....	8.00	..	5.00
Union 12-4 Bone and Potash.....	12.00	..	4.00
Union 12-5 Bone and Potash.....	12.00	..	5.00
Union Wheat Mixture.....	8.00	..	4.00
Union Bone and Potash.....	10.00	..	2.00
Quakers' Grain Mixture.....	10.00	..	4.00
Giant Phosphate and Potash.....	10.00	..	3.00
Liberty Bell Crop Grower.....	10.50	..	1.50
Roseboro's Special Potash Mixture.....	12.00	..	6.00
Union Potato Mixture.....	8.00	1.65	10.00
Union Dissolved Animal Bone.....	12.50	2.06	..
Union Vegetable Compound.....	7.00	4.12	8.00
Union Truck Guano.....	7.00	3.29	5.00
Union Premium Guano.....	8.00	3.29	4.00
Union Perfect Cotton Grower.....	9.00	2.26	2.00
Union Standard Tobacco Grower.....	8.00	2.06	2.00
Union Mule Brand Guano.....	10.00	1.65	2.00
Union Water Fowl Guano.....	8.00	2.06	3.00
Union Homestead Guano.....	8.00	2.37	3.00
Union Superlative Guano.....	8.00	.82	4.00
Union Special Formula for Cotton.....	10.00	2.47	3.00
Union Complete Cotton Mixture.....	9.00	1.65	3.00
Old Homestead Guano.....	8.00	1.65	2.00
Victoria High Grade Tobacco Guano.....	8.00	2.47	3.00
Sparger's Special Tobacco Grower.....	8.00	1.65	3.00
Old Homestead Tobacco Guano.....	8.00	1.65	2.00
Genuine Animal Bone Meal.....	Total	22.50	3.70
Nitrate of Soda.....	..	15.65	..
Quality and Quantity Guano.....	9.00	1.65	1.00
<i>R. L. Upshur, Norfolk, Va.—</i>			
Cotton Seed Meal Mixture.....	9.00	2.26	2.00
Nitrate of Soda.....	..	15.65	..
Quality and Quantity Guano.....	9.00	1.65	1.00
Nitrate of Soda.....	..	15.22	..
Muriate of Potash.....	..	..	50.00
Genuine German Kainit.....	..	..	12.00
Upshur's High Grade Acid Phosphate.....	14.00	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Upshur's Peanut Guano .....	8.00	1.65	2.00
Upshur's G., G. & C. (Grain, Grass and Cotton Guano) .....	8.00	1.65	2.00
Upshur's Wheat Compound .....	12.00	..	5.00
Upshur's F. F. V. (Favorite Fertilizer of Virginia) .....	8.00	1.64	2.00
Upshur's Bone and Potash Guano .....	10.00	..	2.00
Upshur's Norfolk Special 10 Per Cent Guano....	5.00	8.22	2.00
Upshur's 7 Per Cent Irish Potato Guano.....	6.00	5.76	5.00
Upshur's F. C. (Farmers' Challenge) Gnano ...	6.00	5.76	6.00
Upshur's 7 Per Cent Special Potato Guano.....	5.00	5.76	5.00
Upshur's Special Truck Guano .....	7.00	4.11	8.00
Upshur's F. F. (Farmers' Favorite).....	7.00	4.11	6.00
Upshur's 5 Per Cent Guano .....	5.00	4.11	5.00
Upshur's Fish, Bone and Potash Guano .....	8.00	1.64	4.00
Upshur's 8-3-3 Cotton Guano .....	8.00	2.47	3.00
Upshur's High Grade Tobacco Guano .....	8.00	2.47	3.00
Premo Cotton Guano .....	8.00	1.65	2.00
Upshur's Special 2½ 8-3 Guano .....	8.00	2.05	3.00
Upshur's 16 Per Cent Acid Phosphate.....	16.00	..	..
Upshur's 4-6-4 Guano .....	6.00	3.69	4.00

*Venable Fertilizer Co., Richmond, Va.—*

Venable's 10 Per Cent Trucker .....	6.00	8.23	2.00
Venable's 6-6-6 Manure .....	6.00	4.94	6.00
Venable's 5 Per Cent Trucker .....	8.00	4.11	5.00
Venable's 4 Per Cent Trucker .....	8.00	3.29	4.00
Venable's Ideal Manure .....	8.00	1.65	5.00
Venable's Alliance Tobacco Manure No. 1....	8.00	2.06	3.00
Venable's Alliance Tobacco Manure No. 2.....	8.00	1.65	2.00
Venable's B. B. P. Manure .....	9.00	1.65	1.00
Venable's Cotton Grower .....	8.00	2.06	3.00
Venable's Roanoke Special .....	8.00	2.06	3.00
Venable's Alliance Bone and Potash Mixture..	8.00	..	4.00
Venable's Peanut Grower .....	8.00	..	4.00
Venable's Best Acid Phosphate .....	16.00	..	..
Venable's Alliance Acid Phosphate .....	14.00	..	..
Venable's Dissolved Bone .....	13.00	..	..
Venable's Standard Acid Phosphate .....	12.00	..	..
Bone and Potash Mixture .....	10.00	..	2.00
High Grade Bone and Potash Mixture .....	10.00	..	4.00
Planters' Bone Fertilizer.....	8.00	1.65	2.00
Ballard's Choice Fertilizer .....	8.00	2.47	3.00
Roanoke Mixture .....	9.00	2.26	2.00
Roanoke Meal Mixture .....	9.00	2.26	2.00
Bone Meal .....	25.00	2.47	..
Pure Raw Bone.....Total	20.00	3.20	..
Muriate of Potash .....	..	..	50.00
Nitrate of Soda.....	..	15.63	..
Sulphate of Potash .....	..	..	48.00
Pure German Kainit .....	..	..	12.00
Venable's Corn, Wheat and Grass Fertilizer...	10.00	.82	1.00
Venable's Peanut Special .....	8.00	.82	4.00

*Virginia-Carolina Chemical Co., Richmond, Va.—*

V.-C. C. Co.'s Special High Grade Potash Mixture .....	12.00	..	6.00
V.-C. C. Co.'s 14 Per Cent Acid Phosphate.....	14.00	..	..
V.-C. C. Co.'s 16 Per Cent Acid Phosphate.....	16.00	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
V.-C. C. Co.'s Standard Bone and Potash.....	10.00	..	5.00
V.-C. C. Co.'s Special Crop Grower.....	12.00	..	3.00
V.-C. C. Co.'s Formula 4-4.....	7.00	2.55	3.20
V.-C. C. Co.'s Special Truck Guano.....	6.00	4.10	7.00
V.-C. C. Co.'s Special.....	8.00	3.28	4.00
V.-C. C. Co.'s Special Potash Mixture.....	10.00	..	4.00
V.-C. C. Co.'s Lion's High Grade Tobacco Fer- tilizer .....	8.00	2.46	4.00
V.-C. C. Co.'s Invincible High Grade Fertilizer..	6.00	4.10	7.00
V.-C. C. Co.'s High Grade Tobacco Fertilizer...	8.00	2.46	10.00
Great Texas Cotton Grower Soluble Guano....	9.00	2.46	4.00
Cock's Soluble High Grade Animal Bone.....	9.00	1.85	3.00
Truck Crop Fertilizer.....	7.00	4.10	7.00
Prolific Cotton Grower.....	9.00	2.26	2.00
Battle's Crop Grower.....	12.00	..	3.00
3 Per Cent Special C. S. M. Guano No. 3.....	8.00	2.46	2.00
Delta C. S. M.....	8.00	2.26	2.50
Winston Special for Cotton C. S. M.....	8.00	1.65	2.00
Diamond Dust C. S. M.....	8.00	1.65	2.00
Admiral .....	8.00	2.46	2.50
Blue Star C. S. M.....	8.00	2.05	3.00
Good Luck C. S. M.....	8.00	2.46	2.50
North State Guano C. S. M.....	9.00	1.65	1.00
Plant Food .....	8.00	1.65	2.00
Split Silk C. S. M.....	8.00	2.46	2.50
Superlative C. S. M. Guano.....	8.00	2.06	3.00
Farmers' Friend Favorite Fertilizer Special....	8.50	1.65	2.00
White Stem C. S. M.....	9.00	2.26	2.00
Special High Grade Tobacco Fertilizer C. S. M..	8.00	2.46	3.00
Wilson's Standard C. S. M.....	8.00	1.65	2.00
Adams' Special .....	8.00	2.46	3.00
Ajax C. S. M. Guano.....	8.00	1.65	2.00
Royal Crown .....	8.00	2.26	2.00
Farmers' Favorite Fertilizer C. S. M.....	8.00	1.65	2.00
Atlas Guano C. S. M.....	8.00	2.46	2.50
Blake's Best .....	8.00	2.46	3.00
Orange Grove .....	8.00	2.26	2.50
Carr's 8-4-4 Crop Grower.....	8.00	3.28	4.00
Ford's Wheat and Corn Guano.....	9.00	.82	2.00
Konqueror High Grade Truck Fertilizer.....	7.00	4.10	5.00
Goodman's Special Potash Mixture.....	12.00	..	5.00
Jones' Grain Special.....	8.00	..	4.00
Raw Bone Meal .....	22.50	3.70	..
Dissolved Animal Bone.....	12.50	2.05	..
Sludge Acid Phosphate.....	14.00	..	..
Manure Salts .....	..	..	20.00
Sulphate of Potash.....	..	..	50.00
Sulphate of Ammonia.....	..	20.59	..
Fish Scrap .....	..	8.25	..
Nitrate of Soda.....	..	15.68	..
Genuine German Kainit.....	..	..	12.00
Muriate of Potash.....	..	..	48.00
V.-C. C. Co.'s Grain Special.....	10.00	..	6.00
V.-C. C. Co.'s Dissolved Bone and Potash.....	10.00	..	2.00
Diamond Cotton Seed Meal Guano.....	8.00	2.47	3.00
Bold Buster Guano.....	10.00	1.65	2.00
Bigelow's Crop Guano.....	9.00	.82	3.00
V.-C. C. Co.'s 12-4 Grain Grower.....	12.00	..	4.00
Jeffreys' High Grade Guano.....	9.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
V.-C. C. Co.'s High Grade Top Dresser.....	4.00	6.18	2.50
V.-C. C. Co.'s 13 Per Cent Acid Phosphate.....	13.00	..	..
Haynes' Special Cotton Fertilizer.....	8.00	1.65	2.00
Parker & Hunter's Special.....	8.00	1.65	2.00
Allison & Addison's Star Brand Vegetable Guano .....	8.00	3.70	4.00
Allison & Addison's Star Special Tobacco Ma- nure .....	9.00	2.26	2.00
Allison & Addison's Anchor Brand Tobacco Fer- tilizer .....	8.50	2.26	2.00
Allison & Addison's Anchor Brand Fertilizer....	8.00	1.65	2.00
Allison & Addison's A. A. Guano.....	8.00	2.46	3.00
Allison & Addison's Old Hickory Guano.....	8.00	1.65	2.00
Allison & Addison's Star Brand Guano.....	9.00	1.65	1.00
Allison & Addison's B. P. Potash Mixture.....	10.00	..	2.00
Allison & Addison's McGavock's Special Potash Mixture .....	10.00	..	2.00
Allison & Addison's Fulton Acid Phosphate....	14.00	..	..
Allison & Addison's I. X. L. Acid Phosphate....	13.00	..	..
Allison & Addison's Standard Acid Phosphate..	12.00	..	..
Allison & Addison's Rocket Acid Phosphate....	12.00	..	..
Atlantic and Virginia Fertilizer Co.'s Eureka Acid Phosphate .....	16.00	..	..
Atlantic and Virginia Fertilizer Co.'s Crenshaw Acid Phosphate .....	13.00	..	..
Atlantic and Virginia Fertilizer Co.'s Valley of Virginia Acid Phosphate.....	14.00	..	..
Atlantic and Virginia Fertilizer Co.'s Our Acid Phosphate .....	12.00	..	..
Atlantic and Virginia Fertilizer Co.'s Eureka Bone and Potash Compound.....	10.00	..	2.00
Atlantic and Virginia Fertilizer Co.'s Eureka Ammoniated Bone Special for Tobacco.....	9.00	2.05	2.00
Atlantic and Virginia Fertilizer Co.'s Eureka Ammoniated Bone .....	8.00	1.65	3.00
Atlantic and Virginia Fertilizer Co.'s Carolina Truckers .....	7.00	5.74	7.00
Atlantic and Virginia Fertilizer Co.'s Virginia Truckers .....	8.00	4.10	5.00
Atlantic and Virginia Fertilizer Co.'s Orient Spe- cial for Tobacco.....	8.00	1.65	2.00
Atlantic and Virginia Fertilizer Co.'s Orient Complete Manure .....	9.00	1.65	2.00
Charlotte Oil and Fertilizer Co.'s King Cotton Grower .....	8.00	1.65	2.00
Charlotte Oil and Fertilizer Co.'s The Leader B. G.....	8.00	1.65	2.00
Charlotte Oil and Fertilizer Co.'s Groom's Spe- cial Tobacco Fertilizer.....	8.00	2.46	4.00
Charlotte Oil and Fertilizer Co.'s Charlotte Dis- solved Bone .....	12.00	..	..
Charlotte Oil and Fertilizer Co.'s Charlotte Am- moniated Guano B. G.....	8.00	2.05	1.50
Charlotte Oil and Fertilizer Co.'s Charlotte Am- moniated Guano C. S. M.....	8.00	2.05	1.50
Charlotte Oil and Fertilizer Co.'s Charlotte Acid Phosphate .....	13.00	..	..
Charlotte Oil and Fertilizer Co.'s Catawba Gu- ano B. G.....	8.00	2.46	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Charlotte Oil and Fertilizer Co.'s Catawba Acid Phosphate .....	14.00	..	..
Charlotte Oil and Fertilizer Co.'s Queen of the Harvest C. S. M.....	9.00	1.65	2.00
Charlotte Oil Fertilizer Co.'s Oliver's Perfect Wheat Grower .....	11.00	2.46	4.00
Charlotte Oil and Fertilizer Co.'s 10-2 Bone and Potash .....	10.00	..	2.00
Charlotte Oil and Fertilizer Co.'s 15 Per Cent Acid Phosphate .....	15.00	..	..
Charlotte Oil and Fertilizer Co.'s McCrary's Diamond Bone and Potash.....	8.00	..	4.00
Charlotte Oil and Fertilizer Co.'s Special 3 Per Cent Guano C. S. M.....	8.00	2.46	2.00
Charlotte Oil and Fertilizer Co.'s High Grade Special Tobacco Fertilizer.....	9.00	2.05	2.00
Davie & Whittle's Owl Brand Guano for Tobacco .....	8.00	2.46	3.00
Davie & Whittle's Owl Brand Special Tobacco Guano .....	9.00	2.05	2.00
Davie & Whittle's Owl Brand Truck Guano....	8.00	4.92	5.00
Davie & Whittle's Owl Brand Guano.....	8.00	1.65	2.00
Davie & Whittle's Owl Brand Acid Phosphate with Potash .....	10.00	..	2.00
Davie & Whittle's Owl Brand High Grade Dissolved Bone .....	14.00	..	..
Davie & Whittle's Owl Brand Dissolved Bone...	12.00	..	..
Davie & Whittle's Owl Brand High Grade Acid Phosphate .....	16.00	..	..
Davie & Whittle's Owl Brand High Grade 3 Per Cent Soluble Guano.....	9.00	2.05	3.00
Davie & Whittle's Owl Brand Acid Phosphate..	13.00	..	..
Davie & Whittle's Vinco Guano.....	8.00	1.65	2.00
Durham Fertilizer Co.'s Blacksburg Soluble Guano .....	8.00	1.65	2.00
Durham Fertilizer Co.'s Blacksburg Soluble Bone .....	13.00	..	..
Durham Fertilizer Co.'s Diamond Wheat Mixture .....	10.00	..	3.00
Durham Fertilizer Co.'s Standard Wheat and Corn Grower .....	10.00	..	2.00
Durham Fertilizer Co.'s Excelsior Dissolved Bone Phosphate .....	14.00	..	..
Durham Fertilizer Co.'s Double Bone Phosphate,	13.00	..	..
Durham Fertilizer Co.'s Blue Ridge Wheat Grower .....	10.00	..	2.00
Durham Fertilizer Co.'s Carr's Special Wheat Grower .....	8.00	..	4.00
Durham Fertilizer Co.'s Standard Guano.....	9.00	1.65	2.00
Durham Fertilizer Co.'s Best Potato Manure...	7.00	5.74	7.00
Durham Fertilizer Co.'s L. & N. Special.....	9.00	2.46	2.00
Durham Fertilizer Co.'s Special Plant and Truck Fertilizer .....	8.00	4.10	3.00
Durham Fertilizer Co.'s Golden Leaf Bright Tobacco Guano .....	8.00	2.46	3.00
Durham Fertilizer Co.'s Gold Medal Brand Guano .....	8.00	2.46	3.00
Durham Fertilizer Co.'s Durham Bone and Potash Mixture .....	10.00	..	2.00

Name and Address of Manufacturer and Name of Brand.	Avall. Phos. Acid.	Nitrogen.	Potash.
Durham Fertilizer Co.'s Genuine Bone and Peruvian Guano .....	8.00	1.65	2.00
Durham Fertilizer Co.'s Genuine Bone and Peruvian Tobacco Guano.....	8.00	1.65	2.00
Durham Fertilizer Co.'s Raw Bone Superphosphate .....	8.00	2.05	1.50
Durham Fertilizer Co.'s Raw Bone Superphosphate for Tobacco.....	8.00	2.05	2.00
Durham Fertilizer Co.'s N. C. Farmers' Alliance Official Guano .....	8.00	2.05	3.00
Durham Fertilizer Co.'s N. C. Farmers' Alliance Official Acid Phosphate.....	13.00	..	..
Durham Fertilizer Co.'s Standard High Grade Acid Phosphate .....	14.00	..	..
Durham Fertilizer Co.'s Great Potato and Corn Grower .....	10.50	..	1.50
Durham Fertilizer Co.'s Progressive Farmer Guano .....	8.00	1.65	2.00
Durham Fertilizer Co.'s Durham Ammoniated Fertilizer .....	9.00	1.65	1.00
Durham Fertilizer Co.'s Durham Best Acid Phosphate .....	13.00	..	..
Durham Fertilizer Co.'s Durham Acid Phosphate .....	12.00	..	..
Lynchburg Guano Co.'s New Era.....	8.00	1.65	2.00
Lynchburg Guano Co.'s Ironside Acid Phosphate,	16.00	..	..
Lynchburg Guano Co.'s Spartan Acid Phosphate,	12.00	..	..
Lynchburg Guano Co.'s Arvonnia Acid Phosphate,	13.00	..	..
Lynchburg Guano Co.'s S. W. Special Bone and Potash Mixture .....	10.00	..	4.00
Lynchburg Guano Co.'s Alpine Mixture.....	10.00	..	5.00
Lynchburg Guano Co.'s Dissolved Bone and Potash .....	10.00	..	2.00
Lynchburg Guano Co.'s Independent Standard..	8.50	1.65	2.00
Lynchburg Guano Co.'s Solid Gold Tobacco.....	8.00	2.26	4.00
Lynchburg Guano Co.'s Lynchburg High Grade Acid Phosphate .....	14.00	..	..
Lynchburg Guano Co.'s Lynchburg Soluble.....	8.00	1.65	2.00
Lynchburg Guano Co.'s Lynchburg Soluble for Tobacco .....	8.00	1.65	2.00
Norfolk and Carolina Chemical Co.'s Crescent Brand Ammoniated Fertilizer.....	8.00	1.65	2.00
Norfolk and Carolina Chemical Co.'s Cooper's Bright Tobacco .....	8.00	2.05	3.00
Norfolk and Carolina Chemical Co.'s Norfolk Trucker and Tomato Grower.....	8.00	4.10	5.00
Norfolk and Carolina Chemical Co.'s Genuine Slaughter House Bone.....	8.00	1.65	2.00
Norfolk and Carolina Chemical Co.'s Genuine Slaughter House Bone, Made Especially for Tobacco .....	8.00	2.05	2.00
Norfolk and Carolina Chemical Co.'s Amazon High Grade Manure.....	8.00	2.46	3.00
Norfolk and Carolina Chemical Co.'s Bright Leaf Tobacco Grower .....	8.00	2.46	3.00
Norfolk and Carolina Chemical Co.'s Norfolk Bone and Potash.....	10.00	..	2.00
Norfolk and Carolina Chemical Co.'s Norfolk Soluble Bone .....	12.00	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Norfolk and Carolina Chemical Co.'s Norfolk Best Acid Phosphate.....	13.00	..	..
Norfolk and Carolina Chemical Co.'s Norfolk Reliable Acid Phosphate.....	14.00	..	..
Old Dominion Guano Co.'s Standard Raw Bone Soluble Guano .....	8.00	1.65	2.00
Old Dominion Guano Co.'s Farmers' Friend High Grade Fertilizer .....	8.00	2.46	3.00
Old Dominion Guano Co.'s Farmers' Friend Fertilizer .....	8.00	1.65	2.00
Old Dominion Guano Co.'s Farmers' Friend Special Tobacco Fertilizer.....	8.00	2.46	3.00
Old Dominion Guano Co.'s Old Dominion Special Wheat Guano .....	8.00	1.65	2.00
Old Dominion Guano Co.'s Old Dominion Special Sweet Potato Guano.....	6.00	1.65	6.00
Old Dominion Guano Co.'s Old Dominion Soluble Tobacco Guano.....	8.00	1.65	2.00
Old Dominion Guano Co.'s Old Dominion Soluble Guano .....	8.00	1.65	2.00
Old Dominion Guano Co.'s Old Dominion Potato Manure .....	7.00	4.10	8.00
Old Dominion Guano Co.'s Old Dominion Raw Bone Soluble Guano.....	9.00	2.05	3.00
Old Dominion Guano Co.'s Old Dominion 6-7-5 Truck Guano .....	6.00	5.74	5.00
Old Dominion Guano Co.'s Old Dominion 7-7-7 Truck Guano .....	7.00	5.74	7.00
Old Dominion Guano Co.'s Old Dominion Alkaline Bone and Potash.....	10.00	..	2.00
Old Dominion Guano Co.'s Bullock's Cotton Grower .....	8.00	1.65	2.00
Old Dominion Guano Co.'s Osceola Tobacco Guano .....	8.00	2.05	3.00
Old Dominion Guano Co.'s Dissolved Bone and Potash .....	10.00	..	2.00
Old Dominion Guano Co.'s Millers' Special Wheat Mixture .....	8.00	..	4.00
Old Dominion Guano Co.'s Planters' Bone and Potash Mixture .....	10.00	..	3.00
Old Dominion Guano Co.'s Bone Phosphate.....	13.00	..	..
Old Dominion Guano Co.'s Royster's Acid Phosphate .....	12.00	..	..
Old Dominion Guano Co.'s High Grade Acid Phosphate .....	14.00	..	..
Powers, Gibb & Co.'s Almont Acid Phosphate..	12.00	..	..
Powers, Gibb & Co.'s Cotton Brand Best Acid Phosphate .....	13.00	..	..
Powers, Gibb & Co.'s Almont High Grade Acid Phosphate .....	14.00	..	..
Powers, Gibb & Co.'s Fulp's Acid Phosphate 13 Per Cent .....	13.00	..	..
Powers, Gibb & Co.'s Cotton Brand Acid Phosphate .....	12.00	..	..
Powers, Gibb & Co.'s Acid Phosphate and Potash .....	10.50	..	1.50
Powers, Gibb & Co.'s Almont Wheat Mixture...	10.00	..	3.00
Powers, Gibb & Co.'s Dissolved Bone and Potash,	10.00	..	2.00
Powers, Gibb & Co.'s Almont Soluble Ammoniated Guano .....	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Powers, Gibb & Co.'s Carolina Golden Belt Ammoniated Guano for Tobacco.....	8.00	2.05	3.00
Powers, Gibb & Co.'s Truck Farmers' Special Ammoniated Guano .....	8.00	3.28	5.00
Powers, Gibb & Co.'s Old Kentucky High Grade Manure .....	8.00	2.46	3.00
Powers, Gibb & Co.'s Cotton Seed Meal Standard Guano .....	9.00	2.46	2.00
Powers, Gibb & Co.'s Cotton Seed Meal Soluble Ammoniated Guano .....	8.00	1.65	2.00
Powers, Gibb & Co.'s Cotton Belt Ammoniated Guano .....	8.00	2.46	2.00
Powers, Gibb & Co.'s Eagle Island Ammoniated, Powers, Gibb & Co.'s Cotton Brand Ammoniated Dissolved Bone .....	8.00	1.65	2.00
Powers, Gibb & Co.'s Powers' Ammoniated Guano .....	8.00	3.28	4.00
Southern Chemical Co.'s Electric Tobacco Guano, Southern Chemical Co.'s Electric Standard Guano .....	8.00	2.05	1.50
Southern Chemical Co.'s Pilot Ammoniated Guano Special for Tobacco.....	8.00	1.65	2.00
Southern Chemical Co.'s George Washington Plant Bed Fertilizer for Tobacco.....	8.00	2.05	3.00
Southern Chemical Co.'s Sun Brand Guano....	8.00	2.46	2.50
Southern Chemical Co.'s Yadkin Complete Fertilizer .....	9.00	2.05	5.00
Southern Chemical Co.'s Solid South.....	8.00	1.65	2.00
Southern Chemical Co.'s Chick's Special Wheat Compound .....	10.00	..	6.00
Southern Chemical Co.'s Mammoth Wheat and Grass Grower .....	8.00	..	4.00
Southern Chemical Co.'s Winston Bone and Potash Compound .....	10.00	..	2.00
Southern Chemical Co.'s Winner Grain Mixture, Southern Chemical Co.'s Mammoth Corn Grower, Southern Chemical Co.'s Farmers' Pride Bone and Potash .....	10.00	..	2.00
Southern Chemical Co.'s Reaper Grain Application .....	10.00	..	3.00
Southern Chemical Co.'s Quickstep Bone and Potash .....	12.00	..	3.00
Southern Chemical Co.'s Tar Heel Acid Phosphate .....	11.00	..	5.00
Southern Chemical Co.'s Red Cross 14 Per Cent Acid Phosphate .....	12.00	..	..
Southern Chemical Co.'s Comet 16 Per Cent Acid Phosphate .....	14.00	..	..
Southern Chemical Co.'s Chick's 16 Per Cent Acid Phosphate .....	16.00	..	..
Southern Chemical Co.'s Chatham Acid Phosphate .....	16.00	..	..
Southern Chemical Co.'s Horseshoe Acid Phosphate .....	13.00	..	..
Southern Chemical Co.'s Victor Acid Phosphate, J. G. Tinsley & Co.'s Champion Acid Phosphate, J. G. Tinsley & Co.'s Dissolved S. C. Bone.....	12.00	..	..
J. G. Tinsley & Co.'s Powhatan Acid Phosphate,	13.00	..	..
	14.00	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
J. G. Tinsley & Co.'s Richmond Brand Guano..	8.00	2.46	3.00
J. G. Tinsley & Co.'s Lee Brand Guano.....	8.00	1.65	2.00
J. G. Tinsley & Co.'s Killickinick Tobacco Mix- ture .....	8.00	2.05	3.00
J. G. Tinsley & Co.'s Stonewall Brand Acid Phosphate .....	12.00	..	..
J. G. Tinsley & Co.'s Stonewall Brand Guano..	8.00	1.65	2.00
J. G. Tinsley & Co.'s Stonewall Tobacco Guano,	8.00	1.65	2.00
J. G. Tinsley & Co.'s Tinsley's Special Irish Potato Grower .....	6.60	5.74	6.00
J. G. Tinsley & Co.'s Tinsley's Bone and Potash Mixture .....	10.00	..	2.00
J. G. Tinsley & Co.'s Tinsley's Strawberry Grower .....	6.00	3.28	4.00
J. G. Tinsley & Co.'s Tinsley's 10 Per Cent Truck Guano .....	5.00	8.25	2.50
J. G. Tinsley & Co.'s Tinsley's Irish Potato Grower .....	6.00	4.92	6.00
J. G. Tinsley & Co.'s Tinsley's Tobacco Fertilizer.	8.00	3.28	2.50
J. G. Tinsley & Co.'s Tinsley's 7 Per Cent Am- moniated Guano for Beans, Peas, Cabbage, Strawberries, etc.....	6.00	5.74	6.00
S. W. Travers & Co.'s National Fertilizer.....	8.00	1.65	2.00
S. W. Travers & Co.'s National Special Tobacco Fertilizer .....	8.00	1.65	2.00
S. W. Travers & Co.'s Beef, Blood and Bone Fertilizer .....	8.00	1.65	2.00
S. W. Travers & Co.'s Standard Dissolved S. C. Bone .....	13.00	..	..
S. W. Travers & Co.'s Travers' Dissolved Bone Phosphate .....	14.00	..	..
S. W. Travers & Co.'s Capital Dissolved Bone...	12.00	..	..
S. W. Travers & Co.'s Capital Cotton Fertilizer.	8.00	2.05	2.00
S. W. Travers & Co.'s Capital Bone and Potash Compound .....	10.00	..	2.00
S. W. Travers & Co.'s Capital Truck Fertilizer..	8.00	3.28	3.00
S. W. Travers & Co.'s Capital Tobacco Fertilizer.	8.00	3.28	3.00
S. W. Travers & Co.'s Farmers' Special Wheat Compound .....	8.00	..	4.00
S. W. Travers & Co.'s Farmers' 7 Per Cent Truck Fertilizer .....	6.00	5.74	5.00
Virginia State Fertilizer Co.'s Virginia State Dissolved Bone and Potash.....	10.00	..	2.00
Virginia State Fertilizer Co.'s Virginia State Guano .....	8.00	1.65	2.00
Virginia State Fertilizer Co.'s Virginia State High Grade Tobacco Guano.....	8.00	2.46	3.00
Virginia State Fertilizer Co.'s Number One Sol- uble Guano .....	9.00	1.65	2.00
Virginia State Fertilizer Co.'s XX Potash Mix- ture .....	10.00	..	4.00
Virginia State Fertilizer Co.'s Mountain Top Bone and Potash .....	10.00	..	5.00
Virginia State Fertilizer Co.'s Peerless Tobacco Guano .....	8.00	2.46	3.00
Virginia State Fertilizer Co.'s Battle Axe To- bacco Guano .....	8.00	1.65	2.00
Virginia State Fertilizer Co.'s Dunnington's Spe- cial Formula for Tobacco.....	8.00	2.46	3.00

Name and Address of Manufacturer and Name of Brand.	Acid. Phos. Acid.	Nitrogen.	Potash.
Virginia State Fertilizer Co.'s Austrian Tobacco Grower .....	8.00	2.05	2.00
Virginia State Fertilizer Co.'s Buffalo Guano..	8.00	2.05	3.00
Virginia State Fertilizer Co.'s Gamecock Special for Tobacco .....	8.50	1.65	2.00
Virginia State Fertilizer Co.'s G. E. Special To- bacco Grower .....	8.00	2.05	2.00
Virginia State Fertilizer Co.'s Bull Dog Solu- ble Guano .....	8.00	2.46	3.00
Virginia State Fertilizer Co.'s Clipper Brand Acid Phosphate .....	13.00	..	..
Virginia State Fertilizer Co.'s Highland King...	9.00	1.65	1.00
Virginia State Fertilizer Co.'s Alps Brand Acid Phosphate .....	12.00	..	..
Virginia State Fertilizer Co.'s Bull Run Acid Phosphate .....	16.00	..	..
Virginia State Fertilizer Co.'s Larich Acid Phos- phate .....	12.00	..	..
Virginia State Fertilizer Co.'s Gilt Edge Brand Acid Phosphate .....	14.00	..	..
Virginia State Fertilizer Co.'s Gilt Edge Brand Dissolved Bone and Potash.....	8.00	..	4.00
<i>Williams &amp; Clark Fertilizer Co., Charleston, S. C.—</i>			
Standard American Ammoniated Bone Super- phosphate .....	9.00	1.85	1.00
<i>Winborne Guano Co., Tyner, N. C.—</i>			
King Tammany Guano.....	8.00	2.47	3.00
Farmers' Select Guano.....	8.00	2.06	3.00
Winborne's 7 Per Cent Guano.....	5.00	5.75	5.00
Winborne's Excelsior Guano .....	8.00	1.65	2.00
Winborne's Tobacco Guano.....	8.00	2.47	2.00
Winborne's Eureka Guano.....	8.00	1.65	2.00
Winborne's 3-8-4 Guano.....	8.00	2.47	4.00
Winborne's Triumph Guano.....	8.00	1.65	2.00
High Grade Acid Phosphate.....	14.00	..	..
Standard 16 Per Cent Acid Phosphate.....	16.00	..	..
Genuine German Kainit.....	..	..	12.00
<i>T. W. Wood &amp; Sons, Richmond, Va.—</i>			
Standard Grain and Grass Grower.....	8.00	1.65	2.00
Standard High Grade Trucker.....	8.00	4.94	6.00
Standard Potato Fertilizer.....	8.00	1.65	5.00
Standard Vegetable Fertilizer.....	8.00	2.47	3.00
Standard Tobacco Fertilizer.....	8.00	2.47	3.00
Standard High Grade Acid Phosphate.....	14.00	..	..
Standard Bone and Potash Mixture.....	10.00	..	2.00
Wood's Pure Animal Bone.....Total	23.00	2.47	..
Wood's Lawn Enricher.....	6.00	2.47	3.00
Nitrate of Soda.....	..	15.63	..



# THE BULLETIN

OF THE

## NORTH CAROLINA

### DEPARTMENT OF AGRICULTURE,

RALEIGH.

GEORGE ENGELMANN  
NEW YORK  
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I. ANALYSES OF FERTILIZERS—SPRING SEASON, 1908.

II. REGISTRATION OF FERTILIZERS.

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A. T. MCCALLUM.....	Red Springs .....	Sixth District.
J. P. McRAE.....	Laurinburg .....	Seventh District.
R. L. DOUGHTON.....	Laurel Springs .....	Eighth District.
W. A. GRAHAM.....	Machpelah .....	Ninth District.
A. CANNON .....	Horse Shoe.....	Tenth District.

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## OFFICERS AND STAFF.

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.....	Secretary.
B. W. KILGORE.....	State Chemist. Field Crops.
TAIT BUTLER .....	Veterinarian. Animal Husbandry.
FRANKLIN SHERMAN, JR.....	Entomologist.
W. N. HUTT.....	Horticulturist.
H. H. BRIMLEY.....	Naturalist and Curator.
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W. M. ALLEN.....	Food Chemist.
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C. D. HARRIS.....	Assistant Chemist and Microscopist, Stock Feeds.
W. G. HAYWOOD.....	Assistant Chemist.
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S. O. PERKINS.....	Assistant Chemist.
HAMPDEN HILL.....	Assistant Chemist.
S. C. CLAPP.....	Nursery and Orchard Inspector.
S. B. SHAW.....	Assistant Horticulturist.

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 F. T. MEACHAM, Superintendent Iredell Test Farm, Statesville, N. C.  
 JOHN H. JEFFERIES, Superintendent Pender Test Farm, Willard, N. C.  
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 Swannanoa, N. C.



# I. ANALYSES OF FERTILIZERS—SPRING SEASON, 1908.

BY B. W. KILGORE, STATE CHEMIST.

The analyses presented in this BULLETIN are of samples collected by the fertilizer inspectors of the Department, under the direction of the Commissioner of Agriculture, during the spring months of 1908. They should receive the careful study of every farmer in the State who uses fertilizers, as by comparing the analyses in the BULLETIN with the claims made for the fertilizers actually used, the farmer can know by, or before, the time fertilizers are put in the ground whether or not they contain the fertilizing constituents in the amounts they were claimed to be present.

## TERMS USED IN ANALYSES.

*Water-soluble Phosphoric Acid.*—Phosphate rock, as dug from the mines, mainly in South Carolina, Florida and Tennessee, is the chief source of phosphoric acid in fertilizers.

In its raw, or natural, state the phosphate has three parts of lime united to the phosphoric acid (called by chemists tri-calcium phosphate). This is very insoluble in water and is not in condition to be taken up readily by plants. In order to render it soluble in water and fit for plant food, the rock is finely ground and treated with sulphuric acid, which acts upon it in such a way as to take from the three-lime phosphate two parts of its lime, thus leaving only one part of lime united to the phosphoric acid. This one-lime phosphate is what is known as water-soluble phosphoric acid.

*Reverted Phosphoric Acid.*—On long standing some of this water-soluble phosphoric acid has a tendency to take lime from other substances in contact with it, and to become somewhat less soluble. This latter is known as reverted or gone-back phosphoric acid. This is thought to contain two parts of lime in combination with the phosphoric acid, and is thus an intermediate product between water-soluble and the original rock.

Water-soluble phosphoric acid is considered somewhat more valuable than reverted, because it becomes better distributed in the soil as a consequence of its solubility in water.

*Available Phosphoric Acid* is made up of the water-soluble and reverted; it is the sum of these two.

*Water-soluble Ammonia*.—The main materials furnishing ammonia in fertilizers are nitrate of soda, sulphate of ammonia, cotton-seed meal, dried blood, tankage, and fish scrap. The first two of these (nitrate of soda and sulphate of ammonia) are easily soluble in water and become well distributed in the soil where plant roots can get at them. They are, especially the nitrate of soda, ready to be taken up by plants, and are therefore quick-acting forms of ammonia. It is mainly the ammonia from nitrate of soda and sulphate of ammonia that will be designated under the heading of water-soluble ammonia.

*Organic Ammonia*.—The ammonia in cotton-seed meal, dried blood, tankage, fish scrap, and so on, is included under this heading. These materials are insoluble in water, and before they can feed plants they must decay and have their ammonia changed, by the aid of the bacteria of the soil, to nitrates, similar to nitrate of soda.

They are valuable then as plant food in proportion to their content of ammonia, and the rapidity with which they decay in the soil, or rather the rate of decay, will determine the quickness of their action as fertilizers. With short season, quick-growing crops, quickness of action is an important consideration, but with crops occupying the land during the greater portion, or all, of the growing season, it is better to have a fertilizer that will become available more slowly, so as to feed the plant till maturity. Cotton-seed meal and dried blood decompose fairly rapidly, but will last the greater portion, if not all, of the growing season in this State. While cotton seed and tankage will last longer than meal and blood, none of these act so quickly, or give out so soon, as nitrate of soda and sulphate of ammonia.

*Total Ammonia* is made up of the water-soluble and organic; it is the sum of these two.

The farmer should suit, as far as possible, the kind of ammonia to his different crops, and a study of the forms of ammonia as given in the tables of analyses will help him to do this.

#### VALUATIONS.

To have a basis for comparing the values of different fertilizer materials and fertilizers, it is necessary to assign prices to the three valuable constituents of fertilizers—ammonia, phosphoric acid, and

potash. These figures, expressing relative value per ton, are not intended to represent crop-producing power, or agricultural value, but are estimates of the commercial value of ammonia, phosphoric acid and potash in the materials supplying them. These values are only approximate (as the costs of fertilizing materials are liable to change, as other commercial products are), but they are believed to fairly represent the cost of making and putting fertilizers on the market. They are based on a careful examination of trade conditions, wholesale and retail, and upon quotations of manufacturers.

*Relative value per ton*, or the figures showing this, represents the prices on board the cars at the factory, in retail lots of five tons or less, for cash.

To make a complete fertilizer the factories have to mix together in proper proportions materials containing ammonia, phosphoric acid and potash. This costs something. For this reason it is thought well to have two sets of valuations—one for the raw or unmixed materials, such as acid phosphate, kainit, cotton-seed meal, etc., and one for mixed fertilizers.

The values used last season were:

VALUATIONS FOR 1907.

*In Unmixed or Raw Materials.*

For phosphoric acid in acid phosphate.....	4	cents per pound.
For phosphoric acid in bone meal, basic slag and Peruvian guano.....	3½	cents per pound.
For ammonia .....	15½	cents per pound.
For potash .....	5	cents per pound.

*In Mixed Fertilizers.*

For phosphoric acid .....	4½	cents per pound.
For ammonia .....	16½	cents per pound.
For potash .....	5½	cents per pound.

The valuations decided on this season, for reasons already given, are:

VALUATIONS FOR 1908.

*In Unmixed or Raw Materials.*

For phosphoric acid in acid phosphate.....	4	cents per pound.
For phosphoric acid in bone meal, basic slag and Peruvian guano .....	3½	cents per pound.
For nitrogen .....	18	cents per pound.

*In Mixed Fertilizers.*

For available phosphoric acid.....	41½ cents per pound.
For nitrogen .....	191½ cents per pound.
For potash .....	51½ cents per pound.

## HOW RELATIVE VALUE IS CALCULATED.

In the calculation of relative value it is only necessary to remember that so many per cent means the same number of pounds per hundred, and that there are twenty hundred pounds in one ton (2,000 pounds).

With an 8—2—1.65 goods, which means that the fertilizer contains available phosphoric acid 8 per cent, potash 2 per cent, and nitrogen 1.65 per cent, the calculation is made as follows:

Percentage, or Lbs. in 100 Lbs.	Value Per 100 Lbs.	Value Per Ton, 2,000 Lbs.
8 pounds available phosphoric acid at 4½ cents .....	0.36 × 20 =	\$7.20
2 pounds potash at 5½ cents .....	0.11 × 20 =	2.20
1.65 pounds nitrogen at 19½ cents .....	0.321 × 20 =	6.42
Total value .....	0.791 × 20 =	\$15.82

Freight and merchant's commission must be added to these prices. Freight rates from the seaboard and manufacturing centers to interior points are given in the following table:

FREIGHT RATES FROM THE SEABOARD TO INTERIOR POINTS.—From the Published Rates of the Associated Railways of Virginia and the Carolinas. In car-loads, of not less than ten tons each, per ton of 2,000 pounds. Less than car-loads, add 20 per cent.

Destination.	From Wilmington, N. C.	From Norfolk and Portsmouth, Va.	From Charleston, S. C.	From Richmond, Va.
Advance	\$3.20	\$3.20	\$3.40	\$3.20
Apex	2.70		3.80	3.00
Ashboro	3.20	3.20	3.60	3.20
Asheville	4.00	4.00	4.00	4.00
Chapel Hill	2.95	3.20	3.90	3.20
Charlotte	2.65	3.20	2.85	3.20
Clayton	2.48	2.86	3.63	2.80
Cherryville	3.85	3.60	3.40	3.63
Clinton	1.60	3.00	3.20	3.00
Creedmoor	3.00	3.00	3.80	3.00
Cunningham	3.00	2.40	4.00	2.40
Dallas	3.00	3.60	3.40	3.60
Davidson College	3.00	3.20	2.20	3.20
Dudley	1.70	3.00	3.20	3.00
Dunn	2.00	2.80	3.20	2.80
Durham	2.80	2.83	3.20	2.83
Elkin	3.60	3.20	3.60	3.20
Elm City	2.10	2.60	3.20	2.60
Fair Bluff	1.60	3.80	2.40	3.80
Fayetteville	1.80	3.00	3.00	3.00
Forestville	2.85	3.00	3.80	3.06
Gastonia	3.12	3.25	3.12	3.25
Gibson	2.10	3.50	2.10	3.50
Goldsboro	1.80	2.80	3.20	2.80
Greensboro	2.96	3.00	3.40	3.00
Hamlet	2.00	3.00	3.60	3.00
Henderson	3.00	2.83	3.55	2.83
Hickory	3.20	3.60	3.20	3.60
High Point	3.00	3.08	3.40	3.08
Hillsboro	2.88	2.88	2.68	2.88
Kernersville	3.00	3.00	3.40	3.00
Kinston	2.10	2.80	3.50	2.80
Laurel Hill	1.90	2.40	3.80	3.40
Laurinburg	1.90	3.40	3.80	3.40
Liberty	2.72	3.60	3.80	3.60
Louisburg	2.95	3.00	3.80	3.00
Lumberton	1.60	3.60	3.70	3.60
Macon	3.05	3.00	3.85	3.00
Madison	3.00	3.00	3.40	3.00
Matthews	2.60	3.20	3.20	3.20
Maxton	1.80	3.40	2.70	3.40
Milton	3.44	2.40	4.00	2.40
Mocksville	3.36	3.20	3.40	3.20
Morven	2.55	3.60	2.50	3.60
Mount Airy	2.20	3.40	3.80	3.40
Nashville	2.30	2.90	3.40	2.90
New Bern	1.25	1.75	3.95	1.75
Norwood	3.68	3.20	3.20	2.23
Oxford	3.04	2.83	3.55	2.83
Pineville	2.77	3.25	3.00	3.20
Pittsboro	2.60	3.30	4.10	3.30
Polkton	2.40	3.00	2.20	3.00
Raleigh	2.56	2.83	3.40	2.83
Reidsville	3.00	2.96	3.40	2.36
Rockingham	2.10	3.00	3.80	3.00
Rocky Mount	2.20	2.50	3.40	2.50
Ruffin	3.28	2.80	3.40	2.20
Rural Hall	3.28	3.20	3.60	3.20
Rutherfordton	3.05	3.65	3.05	3.65
Salisbury	3.25	3.20	3.20	3.20
Sanford	2.10	3.00	3.40	3.00
Selma	2.10	2.80	3.20	2.80
Shelby	2.90	3.60	3.90	3.60
Siler City	2.60	3.60	3.80	3.60
Smithfield	2.20	2.80	3.20	2.80
Statesville	3.50	3.20	3.60	3.20
Stem	2.95	2.83	3.80	2.83
Tarboro	2.30	2.40	3.00	2.40
Waco	2.90	3.60	3.40	3.60
Wadesboro	2.30	3.00	2.50	3.00
Walnut Cove	3.00	3.00	3.40	3.00
Warrenton	3.05	3.25	4.10	3.25
Warsaw	1.50	3.00	3.20	3.00
Washington	2.65	1.75	2.25	1.50
Weldon	2.55	1.90	3.85	1.90
Wilson	2.00	2.60	3.20	2.60
Winston-Salem	3.00	3.00	3.40	3.00

## ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1908.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.										Relative value per ton at Factory.	
				Mechanical Condition.	Water-soluble Phosphate.	Reverted Phosphate Acid.	Available Phosphate Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.			
<b>Brands claiming.</b>															
6430	Baugh & Sons Co., Norfolk, Va.	Baugh's Animal Bone and Potash Compound	Kinston.	R	7.30	1.67	8.00	.43	1.58	2.01	2.00	2.00	2.00	\$ 15.82	18.13
6383	do.	Baugh's Fish Scrap	Elizabeth City	S	6.25	2.22	8.47	.51	1.52	2.03	2.46	2.12	2.12	17.87	
6327	Columbia Guano Co., Norfolk, Va.	Columbia Soluble Guano.	New Bern.	S	7.38	.65	8.03	1.23	4.43	1.66	2.02	2.00	2.00	15.90	
6487	Imperial Company, Norfolk, Va.	Imperial Standard Guano.	Washington.	S	6.68	2.01	8.69	.61	1.14	1.75	2.12	2.04	2.04	16.88	
6469	do.	Imperial Standard Premium Guano.	Washington.	S	7.08	1.24	8.32	.78	1.12	1.90	2.30	2.12	2.12	17.23	
6416	Meadows, E. H. & J. A. Co., New Bern, N. C.	Meadows' Cotton Guano.	Kinston.	S	6.98	1.32	8.30	.35	1.30	1.65	2.00	2.20	2.20	16.32	
6355	Pocomoke Guano Co., Norfolk, Va.	Familco Superphosphate.	Herdorf.	S	5.13	1.74	8.12	.86	.92	1.78	2.16	2.05	2.05	16.50	
6325	Powhatan Chemical Co., Richmond, Va.	Standard Magic Cotton Grower.	New Bern.	R	5.13	3.69	8.82	1.36	.75	2.09	2.54	2.30	2.30	18.61	
6314	Royster, F. S. Guano Co., Norfolk, Va.	Farmers' Bone Fertilizer.	Greenville.	R	6.63	.82	7.56	1.63	1.20	1.83	2.22	2.30	2.30	16.56	
6316	do.	do.	New Bern.	S	7.30	.82	8.12	1.22	1.33	1.65	2.00	2.03	2.03	15.97	
6396	Va.-Car. Chemical Co., Richmond, Va.	Plant Food.	Kinston.	D	5.38	2.12	7.70	.28	1.53	1.81	2.20	2.38	2.38	16.60	
<b>Brands claiming.</b>															
6449	Home Fertilizer Chemical Co., Baltimore, Md.	Phoenix Crop Grower.	Greenville.	R	6.30	1.54	8.00	.63	2.07	2.70	3.28	2.61	2.61	20.63	
6398	Va.-Car. Chemical Co., Richmond, Va.	Charlotte Oil and Fertilizer Co.'s Special 3 Per Cent Guano.	Lumberton.	D	6.30	1.35	7.65	.85	1.88	2.73	3.32	2.25	2.25	20.00	
<b>Brand claiming.</b>															
6357	Baugh & Sons Co., Norfolk, Va.	Baugh's Excelsior Guano.	Edenton.	R	4.40	3.42	8.00	.42	.82	1.21	1.50	4.08	4.08	14.80	
<b>Brand claiming.</b>															
6380	Acme Mfg. Co., Wilmington, N. C.	Acme Fertilizer.	Lumberton.	R	6.60	1.59	8.00	1.04	1.55	2.47	3.00	2.50	2.50	19.58	
<b>Brands claiming.</b>															
6363	Armour Fertilizer Works, Wilmington, N. C.	Armour Colton Special Fertilizer.	Lumberton.	R	6.65	1.37	8.00	2.08	1.92	3.10	3.76	3.65	3.65	23.32	20.13
6384	Baugh & Sons Co., Norfolk, Va.	Baugh's Grand Rapid H. G. Truck Guano.	Elizabeth City.	R	6.70	1.45	8.15	1.30	1.14	2.44	2.96	3.25	3.25	20.42	
<b>Brands claiming.</b>															
6455	Carsleigh Phos. and Fert. Works, Raleigh, N. C.	Horne's Best.	Greenville.	R	5.90	1.65	7.55	.36	2.29	2.65	3.22	3.17	3.17	19.21	
6349	Columbia Guano Co., Norfolk, Va.	Olympia Cotton Guano.	Edenton.	R	0.95	1.04	7.99	1.30	1.35	2.68	3.22	3.35	3.35	21.20	
6436	Pamlico Chemical Co., Washington, N. C.	Farmers' Best Friend.	Washington.	R	6.75	2.22	8.97	2.06	.49	2.55	3.10	3.09	3.09	21.41	
6372	Richmond Guano Co., Richmond, Va.	Gilt Edge H. G. Fertilizer.	Edenton.	R	6.40	1.70	8.10	1.50	1.38	2.88	3.50	3.06	3.06	21.99	
6459	Swift Fertilizer Works, Atlanta, Ga.	Swift's Ruralist H. G. Guano.	Greenville.	R	7.33	1.79	9.12	.59	2.38	2.97	3.60	4.05	4.05	24.24	
6330	Va.-Car. Chemical Co., Richmond, Va.	Norfolk and Car. Chem Co.'s Amazon H. G. Manure.	New Bern.	R	5.45	2.07	7.52	.94	1.40	2.34	2.84	4.32	4.32	20.64	

6328	Va.-Car. Chemical Co., Richmond, Va.	V.-C. Co.'s Farmers' Friend H. G. Guano.	New Bern.	R	5.83	1.65	7.58	1.05	1.80	2.85	3.46	3.85	27.21
	<b>Brands claiming.</b>												
6450	Miller Fertilizer Co., Baltimore, Md.	Miller's Irish Potato.	Elizabeth City	R	4.70	2.29	6.99	1.96	1.75	3.71	4.50	4.14	24.33
6424	Powhatan Chemical Co., Richmond, Va.	High Grade North State Special.	Kinston.	R	6.83	1.66	8.49	2.31	1.17	3.48	4.22	4.08	25.46
6434	Va.-Car. Chemical Co., Richmond, Va.	Powers, Gibbs & Co.'s Truck Farmers' Special Ammoniated Guano.	Elizabeth City.	R	7.18	1.31	8.49	2.40	.78	3.18	3.86	5.19	25.75
	<b>Brand claiming.</b>												
6352	Armour Fertilizer Works, Baltimore, Md.	Bone, Blood and Potash.	Elizabeth City	S	5.78	2.61	8.39	2.75	1.86	4.12	5.00	7.00	30.96
	<b>Brand claiming.</b>												
6362	Bradley Fertilizer Co., Boston, Mass.	Sea Fowl Standard Guano.	Lumberton	D	5.85	3.70	9.05	.91	1.17	2.08	2.52	1.05	16.41
	<b>Brand claiming.</b>												
6388	American Agricultural Chemical Co., N. Y.	Gold Dust Guano.	Edenton.	S	7.00	1.76	8.76	.99	.82	1.85	2.00	2.00	16.75
	<b>Brand claiming.</b>												
6376	Imperial Co., Norfolk, Va.	Martin County Special Crop Grower	Edenton.	R	8.00	1.12	9.12	.34	2.16	2.50	3.04	2.40	20.59
	<b>Brand claiming.</b>												
6486	Roberson, J. H. & Co., Robersonville, N. C.	Roberson's Cotton Grower.	Robersonville	R	7.20	2.15	9.35	1.07	1.22	2.29	2.78	2.70	20.31
	<b>Brands claiming.</b>												
6422	American Fertilizing Co., Norfolk, Va.	American Irish Potato Grower.	do.	R	5.88	.89	6.77	3.72	1.29	5.01	6.08	5.27	31.42
6494	Berkeley Chemical Co., Norfolk, Va.	Mascot Truck Guano.	Bethel.	R	5.20	1.99	7.19	2.75	1.53	4.28	5.20	5.25	28.93
6343	Royster, F. S. Guano Co., Norfolk Va.	Royal Potato Guano.	do.	R	6.13	.91	7.04	2.47	1.65	4.12	5.00	5.16	28.08
	<b>Brand claiming.</b>												
6461	Pamlico Chemical Co., Washington, N. C.	Pamlico Potato Guano.	Washington	R	5.10	1.99	7.09	1.84	2.72	4.56	5.54	7.52	32.44
	<b>Brand claiming.</b>												
6458	Bragaw Fertilizer Co., Washington, N. C.	Pamlico Truckee.	do.	R	5.55	1.42	6.97	1.62	2.55	4.17	5.06	8.28	31.64
	<b>Brand claiming.</b>												
6381	Baugh & Sons Co., Norfolk, Va.	Glover's Special Potato Guano.	Elizabeth City	R	5.35	2.18	7.53	2.08	1.22	3.30	4.00	9.19	29.75
	<b>Brand claiming.</b>												
6382	Baugh & Sons Co., Norfolk, Va.	Baugh's 5-6-5 Guano.	do.	R	4.45	2.04	6.49	1.82	2.50	4.32	5.24	5.26	26.97
	<b>Brand claiming.</b>												
6448	Baugh & Sons Co., Norfolk, Va.	Baugh's Peruvian Guano Substitute for Potatoes and All Vegetables.	Kinston.	R	4.78	1.76	6.54	2.73	1.45	4.18	5.08	7.42	28.46
	<b>Brands claiming.</b>												
6451	Miller Fertilizer Co., Baltimore, Md.	High Grade Potato.	Elizabeth City	R	5.13	1.11	6.24	1.92	1.93	3.85	4.68	7.13	28.47
6353	Piedmont Mt. Airy Guano Co., Baltimore, Md.	Piedmont Early Vegetable Manure.	do.	R	4.15	3.88	8.03	2.74	1.58	4.32	5.24	7.68	32.52
	<b>Brands claiming.</b>												
6385	Baugh & Sons Co., Norfolk, Va.	Baugh's 7 Per Cent Potato Guano.	do.	R	4.73	1.99	6.72	3.11	2.47	5.58	6.78	5.00	33.58
6356	Pocomoke Guano Co., Norfolk, Va.	Seaboard Popular Truckee.	do.	R	4.30	2.13	6.43	4.20	1.65	5.85	7.10	5.20	34.32
	<b>Brand claiming.</b>												
6488	American Fertilizing Co., Norfolk, Va.	Dissolved Bone and Potash-for Corn and Wheat.	do.	R	5.13	5.06	10.19					2.20	11.59

N, D, R, S, B, P, Y, and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—lumpy; Y—lumpy; W—wet.

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1908.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Mechanical Condition.	Percentage Composition or Parts per 100.							Relative value per ton at Factory.
					Water-soluble Phosphate Acid.	Reverted Phosphate Acid.	Available Phosphate Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	
<b>Brands claiming</b>												
6345	American Agricultural Chemical Co., N. Y.	Lazaretto Dissolved Bone Phosphate	Edenton	R	8.93	4.95	14.00					\$ 11.20
6340	Baugh & Sons Co., Norfolk, Va.	Baugh's H. G. Acid Phosphate	do.	R	12.10	2.20	13.88					11.10
6340	Columbia Guano Co., Norfolk, Va.	Columbia Acid Phosphate	do.	R	10.28	2.54	12.82					10.25
6517	Hubbard Fertilizer Co., Baltimore, Md.	Hubbard's H. G. Acid Phosphate	do.	R	11.95	2.55	14.50					11.60
<b>Brands claiming</b>												
6401	American Agricultural Chemical Co., N. Y.	Genuine German Kainit	do.	S								12.00
6344	Baugh & Sons Co., Norfolk, Va.	do.	do.	S								12.46
6341	Columbia Guano Co., Norfolk, Va.	do.	do.	S								11.92
6409	Martin, D. B. Co., Richmond, Va.	do.	New Bern	R								12.92
6408	Meadows, E. H. & J. A. Co., New Bern, N. C.	do.	Kinston	S								12.78
6337	Pocomoke Guano Co., Norfolk, Va.	do.	Hertford	B								12.72
6334	Richmond Guano Co., Richmond, Va.	do.	Edenton	S								11.82
6319	Royster, F. S. Guano Co., Norfolk, Va.	do.	do.	R								13.36
6333	Va.-Car. Chemical Co., Richmond, Va.	do.	do.	S								12.10
6493	Winborne Guano Co., Tyner, N. C.	do.	Tyner	S								11.90
<b>Brand claiming</b>												
6343	Caraleigh Phos. & Fert. Works, Raleigh, N. C.	Muriate of Potash		R								50.00
<b>Brands claiming</b>												
6342	Caraleigh Phos. & Fert. Works, Raleigh, N. C.	Nitrate of Soda		B				15.65	19.00			49.32
6336	Richmond Guano Co., Richmond, Va.	do.		B				15.65	19.00			56.34
								15.89	19.28			57.20

N, D, R, S, B, P, Y, and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—damp; Y—lumpy; W—wet.

## II. FERTILIZER BRANDS REGISTERED FOR 1908.

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>The Atlantic Chemical Corporation, Norfolk, Va.—</i>			
Nitrate of Soda.....	..	15.66	..
Sulphate of Potash.....	..	..	50.00
Muriate of Potash.....	..	..	48.00
Genuine German Kainit.....	..	..	12.00
Atlantic High Grade 16 Per Cent Acid Phosphate .....	16.00	..	..
Atlantic 14 Per Cent Acid Phosphate.....	14.00	..	..
Atlantic Dissolved Bone.....	13.00	..	..
Atlantic Acid Phosphate.....	12.00	..	..
Atlantic 10 and 4 Bone and Potash Mixture....	10.00	..	4.00
Atlantic Bone and Potash for Grain.....	10.00	..	3.00
Atlantic Bone and Potash Mixture.....	10.00	..	2.00
Atlantic 8 and 4 Bone and Potash Mixture.....	8.00	..	4.00
Atlantic 7 Per Cent Truck Guano.....	7.00	5.77	7.00
Atlantic Potato Guano.....	7.00	4.12	5.00
Atlantic Special Truck Guano.....	8.00	3.30	4.00
Atlantic High Grade Tobacco Guano.....	8.00	2.47	3.00
Atlantic Tobacco Grower.....	8.00	2.06	3.00
Atlantic Tobacco Compound.....	8.00	2.06	2.00
Atlantic Special Guano.....	9.00	1.65	1.00
Atlantic Cotton Grower.....	9.00	2.06	1.00
Atlantic Special Wheat Fertilizer.....	8.00	1.65	2.00
Atlantic Meal Compound.....	9.00	2.26	2.00
Atlantic High Grade Cotton Guano.....	8.00	2.47	3.00
Atlantic Soluble Guano.....	8.00	1.65	2.00
Apex Peanut Grower.....	8.00	.82	4.00
Perfection Peanut Grower.....	7.00	..	5.00
Oriental High Grade Guano.....	8.00	3.30	4.00
Paloma Tobacco Guano.....	8.00	3.30	4.00
<i>Geo. L. Arps &amp; Co., Norfolk, Va.—</i>			
Arps' Potato Guano.....	6.00	5.76	5.00
Arps' Standard Truck Guano.....	7.00	4.12	5.00
Arps' Scuppernon Guano for Trucks.....	6.00	4.12	7.00
Geo. L. Arps & Co.'s Big Yield Guano.....	8.00	1.65	2.00
14 Per Cent Acid Phosphate.....	14.00	..	..
Kainit .....	..	..	12.00
Arps' Premium Guano for Cotton, Tobacco and All Spring Crops.....	8.00	1.65	2.00
<i>Acme Manufacturing Co., Wilmington, N. C.—</i>			
Acme Acid Phosphate.....	12.00	..	..
Acme Bone and Potash.....	10.00	..	2.00
Acme Bone and Potash.....	10.00	..	3.00
Acme Bone and Potash.....	10.00	..	4.00
Acme Bone and Potash.....	8.00	..	4.00
Acme Bone and Potash.....	11.00	..	2.00
Acme High Grade Acid Phosphate.....	14.00	..	..
Acme Acid Phosphate.....	16.00	..	..
Acme Standard Guano.....	8.00	2.06	2.00
Acme High Grade.....	6.00	4.95	8.00
Acme Strawberry Top Dresser.....	8.00	1.65	4.00
Acme Truck Grower.....	6.00	3.30	8.00
Acme Cotton Grower.....	9.00	2.27	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Acme Special Grain.....	8.00	1.65	2.00
Acme Fertilizer for Tobacco.....	8.00	2.47	2.50
Acme Fertilizer .....	8.00	2.47	2.50
Acme Acid Phosphate.....	13.70	..	..
Gibson's Melon Grower.....	10.00	3.30	5.00
Corn Guano .....	3.00	2.47	3.00
Clark's Corn Guano.....	1.00	6.60	10.00
P. D. Special.....	8.00	2.47	3.00
Quickstep .....	8.00	3.30	4.00
Gem Fertilizer .....	8.00	1.65	2.00
Cotton Seed Meal Guano.....	8.00	1.65	2.00
Lattimer's Complete Fertilizer.....	8.00	2.06	2.00
Tiptop Crop Grower.....	8.00	2.06	3.00
Tiptop Tobacco Grower.....	8.00	2.06	3.00
Sulphate of Ammonia.....	..	20.62	..
Pure German Kainit.....	..	..	12.00
Nitrate of Soda.....	..	15.00	..
Sulphate of Potash.....	..	..	48.00
Muriate of Potash.....	..	..	48.00
Acme Bone and Potash.....	10.00	..	5.00
Muriate of Potash.....	..	..	55.00

*Ashepool Fertilizer Co., Charleston, S. C.—*

High Grade Eutaw Acid Phosphate.....	14.00	..	..
High Grade Ashepool Acid Phosphate.....	14.00	..	..
High Grade Dissolved Phosphate.....	16.00	..	..
High Grade Superpotash Acid Phosphate.....	10.00	..	4.00
High Grade Ashepool Superpotash Acid Phosphate .....	10.00	..	4.00
High Grade Ashepool Vegetable Guano.....	5.00	4.12	5.00
High Grade Ashepool Truck Guano.....	7.00	4.12	5.00
High Grade Ashepool Farmers' Special.....	8.00	2.06	3.00
High Grade Ashepool Special Cotton Seed Meal Guano .....	8.00	2.46	2.00
High Grade Ashepool Ammoniated Superphosphate .....	8.00	2.46	2.00
High Grade Ashepool Bird and Fish Guano.....	8.00	2.46	3.00
High Grade Ashepool Meal Mixture.....	8.00	2.46	3.00
High Grade Ashepool X Tobacco Fertilizer.....	8.00	2.46	3.00
High Grade Ashepool Golden Tobacco Producer.....	8.00	2.46	3.00
High Grade Ashepool Guano.....	8.00	3.29	4.00
High Grade Ashepool Perfection Guano.....	8.00	3.29	6.00
High Grade Ashepool Fruit Grower.....	8.00	3.91	2.75
High Grade Ashepool Watermelon Guano.....	10.00	3.29	5.00
High Grade Eutaw X Golden Fertilizer.....	8.00	2.46	4.00
High Grade Eutaw Special Cotton Seed Meal Guano .....	8.00	2.46	4.00
High Grade Carolina XXX Guano.....	8.00	2.46	3.00
High Grade Taylor's Circle Guano.....	9.00	1.65	4.00
Standard Eutaw XX Acid Phosphate.....	12.00	..	..
Standard Eutaw XXX Acid Phosphate.....	13.00	..	..
Standard Eutaw Potash Acid Phosphate.....	11.00	..	1.00
Standard Eutaw Acid Phosphate and Potash...	12.00	..	1.00
Standard Eutaw Circle Guano.....	8.00	2.06	2.00
Standard Eutaw XX Guano.....	8.50	1.65	2.00
Standard Eutaw XXX Guano.....	9.00	1.65	2.00
Standard Eutaw Fertilizer.....	9.00	1.85	1.00
Standard Ashepool Fertilizer.....	9.00	1.85	1.00
Standard Ashepool Harrow Brand Raw Bone Superphosphate .....	9.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Standard Ashepoo Wheat and Oats Special.....	9.50	1.65	1.00
Standard Ashepoo XXX Guano.....	8.65	1.65	2.00
Standard Ashepoo XX Guano.....	8.50	1.65	2.00
Standard Ashepoo Circle Guano.....	8.00	2.06	2.00
Standard Ashepoo Guano.....	8.50	2.06	1.00
Standard Ashepoo Special Fertilizer.....	8.00	1.65	2.00
Standard Ashepoo Acid Phosphate and Potash..	12.00	..	1.00
Standard Ashepoo Potash and Acid Phosphate..	11.00	..	1.00
Standard Ashepoo Potash Compound.....	10.00	..	3.00
Standard Ashepoo XXX Acid Phosphate.....	13.00	..	..
Standard Ashepoo Dissolved Bone.....	12.00	..	..
Standard Ashepoo XX Acid Phosphate.....	12.00	..	..
Standard Coomassie Acid Phosphate.....	12.00	..	..
Standard Coomassie Circle Fertilizer.....	8.00	1.65	2.00
Standard Carolina Guano.....	8.00	1.65	2.00
Standard Carolina Acid Phosphate.....	13.00	..	..
Standard Circle Bone.....	13.00	..	..
Standard Palmetto Potash Acid Phosphate.....	11.00	..	1.00
Standard Brownwood Acid Phosphate.....	8.00	..	4.00
Standard P. D. Fertilizer.....	8.00	1.65	2.00
German Kainit .....	..	..	12.00
Standard Enoree Acid Phosphate and Potash...	10.00	..	2.00
High Grade Ashepoo XXXX Acid Phosphate...	14.00	..	..
Taylor's XX Ammoniated Dissolved Fertilizer..	10.00	.82	1.00
High Grade Ashepoo Nitrogenous Top Dressing.	3.00	7.00	2.00

*The Armour Fertilizer Works, Atlanta, Chicago and  
Wilmington—*

Top Dresser .....	5.00	8.25	2.00
10 Per Cent Trucker.....	5.00	8.25	3.00
Manure Substitute .....	6.00	3.30	4.00
7 Per Cent Trucker.....	6.00	5.78	5.00
General .....	8.00	1.65	2.00
Fruit and Root Crop Special.....	8.00	1.65	5.00
High Grade Potato.....	8.00	1.65	10.00
King Cotton No. 2.....	8.00	2.06	2.00
Champion .....	8.00	2.06	2.50
Gold Medal for Tobacco.....	8.00	2.06	3.00
Berry King .....	8.00	2.06	4.00
Cotton Special .....	8.00	2.47	3.00
Tobacco Special .....	8.00	2.47	3.00
Truck and Berry Special.....	8.00	2.47	10.00
All Soluble .....	8.00	2.88	4.00
Special Trucker .....	8.00	3.30	4.00
Bone, Blood and Potash.....	8.00	4.12	7.00
Bone and Dissolved Bone with Potash.....	9.00	1.65	3.00
African Cotton Grower.....	9.00	2.47	3.00
10 Per Cent Trucker.....	2.00	8.25	..
Dried Blood .....	..	13.20	..
Phosphoric Acid with Potash.....	10.00	..	5.00
Superphosphate and Potash.....	10.00	..	4.00
W. H. White & Co.'s Special Corn Mixture....	10.00	..	2.00
Phosphate and Potash No. 2.....	8.00	..	5.00
Phosphate and Potash No. 1.....	10.00	..	2.00
17 Per Cent Acid Phosphate.....	17.00	..	..
16 Per Cent Acid Phosphate.....	16.00	..	..
13 Per Cent Acid Phosphate.....	13.00	..	..
12 Per Cent Acid Phosphate.....	12.00	..	..
Star Phosphate .....	14.00	..	..
Nitrate of Soda.....	..	14.85	..

Name and Address of Manufacturer and Name of Brand.	Avall. Phos. Acid.	Nitrogen.	Potash.
Kainit .....	..	..	12.00
King Cotton .....	8.00	2.06	2.00
Ammoniated Dissolved Bone with Potash.....	10.00	1.65	2.00
Muriate of Potash.....	..	..	48.00
Sulphate of Potash.....	..	..	50.00
Van Lindley's Special.....	8.00	4.12	2.00
Standard Cotton Grower.....	8.50	1.65	2.00
Armour's Slaughter House Fertilizer.....	8.00	1.65	2.00
<i>Anderson Phosphate and Oil Co., Anderson, S. C.—</i>			
Anderson's Special Formula.....	10.00	2.47	3.00
Anderson's Blood Guano.....	8.00	1.65	2.00
Anderson's Special Fertilizer.....	8.00	2.47	3.00
Anderson's Blood and Bone Guano.....	10.00	1.65	2.00
<i>American Fertilizer Co., Norfolk, Va.—</i>			
10 Per Cent Ammoniated Guano.....	7.00	8.24	2.50
Standard 7 Per Cent Ammonia Guano.....	7.00	5.76	5.00
American Irish Potato Grower.....	7.00	4.12	5.00
American 7-7-7 for Irish Potatoes.....	7.00	5.76	7.00
American Fish Scrap Guano.....	7.00	3.29	4.00
American Eagle Guano.....	8.00	2.47	3.00
American No. 1 Fertilizer.....	8.00	2.06	3.00
American No. 2 Fertilizer.....	8.00	1.65	2.00
American Cotton Compound.....	8.00	1.65	2.00
American Standard Cotton Grower.....	10.00	1.65	2.00
American Special Potash Mixture for Wheat...	8.00	..	4.00
American High Grade Acid Phosphate.....	16.00	..	..
Special Formula Guano for Yellow Leaf Tobacco.	9.00	2.88	5.00
Special Potat <sup>o</sup> Guano.....	7.00	4.12	7.00
Special Potato Manure.....	6.00	4.12	7.00
Bone and Peruvian Guano.....	8.00	1.65	2.00
Bone and Peruvian Guano.....	8.75	1.65	2.00
A. L. Hanna's Special.....	8.00	1.65	2.00
Peruvian Mixture .....	8.50	1.65	1.50
Blood and Bone Compound.....	8.50	2.06	1.00
Bob White Fertilizer for Tobacco.....	8.00	2.06	2.50
J. G. Miller & Co. Yellow Leaf Fertilizer.....	8.00	2.47	3.00
Pitt County Special Fertilizer.....	9.00	2.88	5.00
N. C. and S. C. Cotton Grower.....	8.00	3.29	4.00
Peruvian Mixture Guano Especially Prepared for Sweet Potatoes.....	8.00	3.29	5.00
Kale, Spinach and Cabbage Guano.....	7.00	4.12	4.00
Stable Manure Substitute.....	7.00	2.47	4.00
Strawberry and Asparagus Guano.....	9.00	2.88	9.00
Ground Fish Scraps.....	..	8.24	..
Nitrate of Soda.....	..	15.65	..
Bone Meal .....	Total 20.00	3.71	..
Muriate of Potash.....	..	..	50.00
Sulphate of Potash.....	..	..	49.00
Genuine German Kainit.....	..	..	12.00
Eagle Brand Acid Phosphate.....	13.00	..	..
High Grade Acid Phosphate.....	14.00	..	..
Dissolved Bone and Potash for Corn and Wheat,	10.00	..	2.00
Double Dissolved Bone and Potash.....	10.00	..	4.00
Cooper's Genuine Eagle Island.....	8.00	1.65	2.00
<i>American Agricultural Chemical Co., New York—</i>			
Holmes & Dawson Productive Cotton and Pea- nut Guano .....	9.00	22.70	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Holmes & Dawson Triumph Soluble.....	8.00	1.65	2.00
Holmes & Dawson Gold Dust Guano.....	9.00	1.65	2.00
Savage Sons & Co. Purity Guano.....	8.00	1.65	2.00
Lazaretto Truckers' Favorite.....	6.00	5.76	5.00
Lazaretto Early Trucker.....	7.00	4.12	5.00
Lazaretto Challenge Fertilizer.....	8.00	2.47	3.00
Lazaretto Special for Tobacco and Potatoes....	8.00	2.47	3.00
Lazaretto Climax Plant Food.....	8.00	2.06	3.00
Lazaretto Universal Compound.....	8.00	2.06	2.00
Lazaretto Crop Grower.....	8.00	1.65	2.00
Lazaretto High Grade Dissolved Bone and Potash .....	12.00	..	5.00
Lazaretto Alkaline Bone Phosphate.....	12.00	..	3.00
Lazaretto Dissolved Bone and Potash.....	10.00	..	2.00
Lazaretto Acid Phosphate.....	14.00	..	..
Reese Pacific Guano.....	8.00	1.65	2.00
Reese Pacific Guano for Tobacco.....	8.50	2.47	2.50
Canton Chemical Truckers' Special 7 Per Cent..	6.00	5.76	5.00
Canton Chemical Excelsior Trucker.....	7.00	4.12	5.00
Canton Chemical Baker's Tobacco Fertilizer....	8.00	2.47	3.00
Canton Chemical Baker's Fish Guano.....	8.00	1.65	2.00
Canton Chemical Baker's Dissolved S. C. Bone..	14.00	..	..
Canton Chemical Baker's Standard High Grade Guano .....	8.00	2.06	3.00
Canton Chemical Gem Phosphate.....	12.00	..	..
Canton Chemical Soluble Bone and Potash.....	10.00	..	2.00
Canton Chemical Soluble Alkaline Bone.....	12.00	..	3.00
Canton Chemical Game Guano.....	8.00	1.65	2.00
Canton Chemical Virginia Standard High Grade Manure .....	8.00	2.06	2.00
Canton Chemical C. C. Special Compound.....	8.00	2.06	6.00
Canton Chemical Superior High Grade Fertilizer,	8.00	2.47	3.00
Detrick's Gold Basis.....	6.00	5.76	5.00
Detrick's Special Trucker.....	7.00	4.12	5.00
Detrick's Gold Eagle.....	6.00	2.47	3.00
Detrick's Quickstep Bone and Potash.....	8.00	2.47	4.00
Detrick's Special Tobacco Fertilizer.....	8.00	2.47	3.00
Detrick's Vegetator Ammoniated Superphosphate,	8.00	2.06	3.00
Detrick's Kangaroo Komplete Kompond.....	8.00	1.65	3.00
Detrick's Royal Crop Grower.....	8.00	1.65	2.00
Detrick's Fish Mixture.....	8.00	1.65	2.00
Detrick's Victory Alkaline Bone.....	12.00	..	5.00
Detrick's P. & B. Special.....	12.00	..	3.00
Detrick's Soluble Bone Phosphate and Potash..	10.00	..	2.00
Detrick's XXtra Acid Phosphate.....	14.00	..	..
Zell's 10 Per Cent Trucker.....	5.00	8.23	3.00
Zell's 7 Per Cent Potato and Vegetable Manure,	6.00	5.76	5.00
Zell's Truck Grower.....	7.00	4.12	5.00
Zell's Special Compound for Potatoes and Vegetables .....	8.00	2.47	4.00
Zell's Tobacco Fertilizer.....	8.00	2.47	4.00
Zell's Bright Tobacco Grower.....	8.00	2.47	3.00
Zell's Royal High Grade Fertilizer.....	9.00	2.06	2.00
Zell's Special Compound for Tobacco.....	8.00	1.65	2.00
Zell's Calvert Guano.....	8.00	1.65	2.00
Zell's Ammonia Bone Superphosphate.....	8.00	1.65	2.00
Zell's High Grade Potash Fertilizer.....	10.00	..	4.00
Zell's Reliance High Grade Manure.....	8.00	2.47	3.00
Zell's Fish Guano.....	8.00	1.65	2.00
Zell's Dissolved Bone Phosphate.....	14.00	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Zell's Electric Phosphate.....	10.00	..	2.00
Bull Head Potato and Vegetable Manure.....	6.00	4.12	7.00
Enterprise Alkaline Phosphate.....	8.00	..	5.00
Royal Alkaline Bone.....	10.00	..	4.00
Palmetto Alkaline Phosphate.....	8.00	..	4.00
Slingluff's Bright Mixture.....	8.00	2.06	2.50
Pure Ground Bone.....	Total	45.00	3.29
Muriate of Potash.....	..	..	50.00
A. A. C. Co.'s 16 Per Cent Superphosphate.....	10.00	..	..
Detrick's Superior Animal Bone Fertilizer.....	9.00	1.86	4.00
Lazaretto Retriever Animal Bone Fertilizer....	9.00	1.86	4.00
Zell's Victoria Animal Bone Compound.....	9.00	1.86	4.00
Canton Chemical Bone Fertilizer.....	9.00	1.86	4.00
Canton Chemical Virginia Standard Manure....	8.00	2.06	2.00
Purity Guano—2-8-2—for S. S. & Co.....	8.00	1.65	2.00
<i>A. D. Adair &amp; McCarty Bros., Atlanta, Ga.—</i>			
Adair's Wheat and Grass Grower.....	10.00	..	4.00
Adair's Dissolved Bone.....	12.00	..	..
Adair's High Grade Dissolved Bone.....	14.00	..	..
Adair's High Grade Dissolved Bone.....	16.00	..	..
Adair's Formula .....	10.00	..	..
Adair's Special Potash Mixture.....	8.00	..	4.00
Adair's Ammoniated Dissolved Bone.....	8.00	1.65	2.00
Adair's High Grade Blood and Bone.....	10.00	2.47	3.00
Adair's Soluble Pacific Guano.....	10.00	1.65	2.00
McCarty's Cotton Special.....	10.00	.82	3.00
McCarty's Wheat Special.....	10.00	.82	3.00
McCarty's Corn Special.....	10.00	.82	3.00
McCarty's Soluble Bone.....	10.00	.82	1.00
McCarty's High Grade Corn Grower.....	10.00	1.65	2.00
McCarty's High Grade Cotton Grower.....	10.00	1.65	2.00
Planters' Soluble Fertilizer.....	8.00	1.65	2.00
Blood, Bone and Tankage.....	9.00	.82	2.00
High Grade Potash Compound.....	10.00	..	4.00
Golden Grain Compound.....	8.00	.82	3.00
A. & M. 13-4.....	13.00	..	4.00
David Harum High Grade Guano.....	10.00	3.30	4.00
<i>Asheville Packing Co., Asheville, N. C.—</i>			
Asheville Packing Co.'s Bone and Potash.....	10.00	..	2.00
Asheville Packing Co.'s S-4 Fertilizer.....	8.00	..	4.00
Asheville Packing Co.'s S-1-3 Fertilizer.....	8.00	.82	3.00
Asheville Packing Co.'s S-2-2 Fertilizer.....	8.00	1.70	2.00
Asheville Packing Co.'s Potato Grower.....	10.00	..	6.00
Asheville Packing Co.'s S-5-5 Special Garden Fer- tilizer .....	8.00	4.25	5.00
Asheville Packing Co.'s High Grade Potato, S-2-10 .....	8.00	1.70	10.00
Asheville Packing Co.'s Special Fruit Grower...	8.00	1.70	5.00
Asheville Packing Co.'s 17 Per Cent Acid Phos- phate .....	17.00	..	..
Asheville Packing Co.'s 14 Per Cent Acid Phos- phate .....	14.00	..	..
Asheville Packing Co.'s 13 Per Cent Acid Phos- phate .....	13.00	..	..
Asheville Packing Co.'s 12 Per Cent Acid Phos- phate .....	12.00	..	..
Asheville Packing Co.'s Blood and Bone.....	8.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Baugh &amp; Sons Co., Phila., Pa., and Norfolk, Va.—</i>			
Baugh's 16 Per Cent Acid Phosphate.....	16.00	..	..
Baugh's 5-6-5 Guano.....	6.00	4.12	5.00
Baugh's New Process 10 Per Cent Guano.....	5.00	8.23	2.50
Baugh's Fish Mixture.....	8.00	1.65	2.00
Baugh's Fertilizer for Wheat and Grass.....	8.00	1.65	2.00
Baugh's Fish, Bone and Potash.....	8.00	3.30	4.00
Baugh's Animal Bone and Potash Compound for All Crops .....	8.00	1.65	2.00
Baugh's Complete Animal Bone Fertilizer.....	8.00	1.65	5.00
Baugh's Peruvian Guano Substitute for Potatoes and All Vegetables.....	6.00	4.12	7.00
Baugh's Grand Rapids High Grade Truck Guano.	8.00	2.47	3.00
Baugh's Special Tobacco Guano.....	8.00	2.47	5.00
Baugh's Fruit and Berry Guano.....	8.00	2.47	10.00
Baugh's 7 Per Cent Potato Guano.....	6.00	5.76	5.00
Baugh's Soluble Alkaline Superphosphate.....	10.00	..	2.00
Baugh's Special Manure for Melons.....	10.00	3.30	4.00
Baugh's Sweet Potato Guano.....	8.00	2.47	3.00
Baugh's Potato and Truck Special.....	7.00	2.88	7.00
Baugh's Special Potato Manure.....	5.00	1.65	10.00
Baugh's Fine Ground Fish.....	..	8.23	..
Baugh's Raw Bone Meal, Warranted Pure, Total	21.50	3.70	..
Baugh's High Grade Acid Phosphate.....	14.00	..	..
Baugh's High Grade Tobacco Guano.....	8.00	2.47	3.00
Baugh's High Grade Potash Mixture.....	10.00	..	4.00
Baugh's High Grade Cotton and Truck Guano..	10.00	1.65	2.00
Baugh's Pure Animal Bone and Muriate of Pot- ash Mixture .....	15.00	2.47	5.00
Baugh's Pure Dissolved Animal Bone.....	13.00	2.06	..
Glover's Special Potato Guano.....	7.00	3.30	8.00
Fine Ground Blood.....	..	13.00	..
Genuine German Kainit.....	..	..	12.00
Sulphate of Ammonia.....	..	21.00	..
Muriate of Potash.....	..	..	48.00
High Grade Sulphate of Potash.....	..	..	48.00
Baugh's Excelsior Guano.....	8.00	.82	4.00
Randolph's Bone and Potash Mixture for All Crops .....	10.00	..	3.00
Nitrate of Soda.....	..	15.00	..
<i>The John L. Bailey Co., Elm City, N. C.—</i>			
Fairmont .....	8.00	2.47	3.00
Stag Brand .....	8.00	1.65	2.00
<i>J. A. Benton, Ruffin, N. C.—</i>			
North Carolina Bright Fertilizer.....	9.00	1.65	2.00
<i>C. J. Burton Guano Co., Baltimore, Md.—</i>			
Acid Phosphate .....	14.00	..	..
Burton's Butcher Bone.....	8.00	1.65	2.00
Burton's High Grade.....	8.00	2.06	3.00
Tobacco Queen .....	8.00	2.47	3.00
High Grade Tobacco.....	8.00	3.29	4.00
Burton's Best .....	8.00	2.47	3.00
<i>Best &amp; Thompson, Goldsboro, N. C.—</i>			
Pure German Kainit.....	..	..	12.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Blacksburg Guano Co., Inc., Blacksburg, Va.—</i>			
Red Letter for Tobacco.....	8.00	1.65	2.00
Jim Crow for Tobacco.....	8.00	2.47	2.00
Alliance for Tobacco.....	8.00	1.65	2.00
Red Letter .....	8.00	1.65	2.00
Alliance Guano .....	8.00	1.65	2.00
B. G. Co., Inc., Acid Phosphate.....	14.00	..	..
B. G. Co., Inc., Bone and Potash.....	10.00	..	2.00
Old Bellefonte .....	8.00	3.30	2.00
Red Warrior for Tobacco.....	9.00	2.47	3.00
Blackstone Special for Tobacco.....	9.00	2.47	3.00
Bellefonte for Tobacco.....	8.00	2.47	2.00
Hard Cash for Tobacco.....	8.00	2.06	2.00
<i>Bradley Fertilizer Co., Charleston, S. C.—</i>			
Standard Bradley's Palmetto Acid Phosphate..	12.00	..	..
Standard Bradley's XXX Acid Phosphate.....	13.00	..	..
Standard Bradley's Wheat Grower.....	10.00	..	2.00
Standard Bradley's Bone and Potash.....	10.00	..	2.00
Standard Bradley's Cereal Guano.....	8.00	1.65	2.00
Standard Bradley's X Guano.....	8.00	1.65	2.00
High Grade Bradley's Guano.....	8.00	2.46	3.00
High Grade Bradley's Circle Guano.....	8.00	3.29	4.00
High Grade Bradley's Acid Phosphate.....	14.00	..	..
Standard Bradley's Acid Phosphate.....	12.00	..	..
Standard Bradley's Ammoniated Dissolved Bone,	9.00	1.85	1.00
Standard Bradley's Patent Superphosphate....	9.00	1.85	1.00
Standard B. D. Sea Fowl Guano.....	9.00	1.85	1.00
Standard Eagle Ammoniated Bone Superphos- phate .....	9.00	1.85	1.00
German Kainit .....	..	..	12.00
<i>The Berkley Chemical Co., Norfolk, Va.—</i>			
Royal Truck Grower.....	6.00	5.76	5.00
Mascot Truck Guano.....	7.00	4.12	5.00
Victory Special Crop Grower.....	7.00	3.30	4.00
Advance Crop Grower.....	8.00	2.47	3.00
Berkley Tobacco Guano.....	8.00	2.47	3.00
Monitor Animal Bone Fertilizer.....	9.00	1.85	4.00
Select Crop Grower.....	8.50	2.06	2.50
Brandon Superphosphate .....	8.00	1.65	2.00
Berkley Plant Food.....	10.00	..	4.00
Berkley Bone and Potash Mixture.....	11.00	..	2.00
Berkley Acid Phosphate.....	14.00	..	..
Superior Bone and Potash.....	8.00	..	4.00
Laurel Potash Mixture.....	10.00	..	2.00
Resolute Acid Phosphate.....	16.00	..	..
Genuine German Kainit.....	..	..	12.00
Muriate of Potash.....	..	..	50.00
Nitrate of Soda.....	..	15.65	..
Long Leaf Tobacco Grower.....	8.00	1.65	2.00
<i>Bragaw Fertilizer Co., Washington, N. C.—</i>			
Chocowinity Special Tobacco Guano.....	5.00	3.29	6.00
Tuckahoe Tobacco Guano.....	8.00	2.06	3.00
Beaufort County Guano.....	8.00	2.47	3.00
Old Reliable Premium Guano.....	8.00	1.65	2.00
Hanover Tobacco Guano.....	8.00	2.47	3.00
Palmetto Acid Phosphate.....	14.00	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Long Acre Bone Phosphate.....	14.00	..	..
Pamlico Trucker .....	7.00	4.12	8.00
Riverview Potato Grower.....	6.00	5.76	5.00
Genuine German Kainit.....	..	..	12.00
Farmers' Union Meal Mixture.....	9.00	2.26	2.00
<i>Columbia Guano Co., Norfolk, Va.—</i>			
Columbia High Grade 16 Per Cent Acid Phosphate .....	16.00	..	..
Columbia 14 Per Cent Acid Phosphate.....	14.00	..	..
Columbia Dissolved Bone.....	13.00	..	..
Columbia Acid Phosphate.....	12.00	..	..
Columbia 8 and 4 Bone and Potash Mixture....	8.00	..	4.00
Columbia 10 and 4 Bone and Potash Mixture...	10.00	..	4.00
Columbia Bone and Potash for Grain.....	10.00	..	3.00
Columbia Bone and Potash Mixture.....	10.00	..	2.00
Columbia 7 Per Cent Special Truck Guano....	7.00	5.77	7.00
Columbia Special Truck Guano.....	8.00	2.30	4.00
Columbia Potato Guano.....	7.00	4.12	5.00
Columbia C. S. M. Special.....	9.00*	2.27	2.00
Columbia Special 4-8-3.....	8.00	3.30	3.00
Columbia Special Wheat Fertilizer.....	8.00	1.65	2.00
Columbia Special Tobacco Guano.....	8.00	2.06	2.00
Olympia Cotton Guano.....	8.00	2.47	3.00
Columbia Soluble Guano.....	8.00	1.65	2.00
Crown Brand Peanut Guano.....	7.00	..	5.00
Our Best Meal Guano.....	8.00	2.47	3.00
Special Peanut Grower.....	8.00	.82	4.00
Crews' Special .....	5.85	4.49	10.00
Hayes' Special .....	8.00	3.30	3.00
McRae's Special .....	9.00	4.12	7.00
McRae's High Grade Guano.....	8.00	3.30	7.00
Hycob Tobacco Guano.....	8.00	2.47	3.00
Rex Brand Ammoniated Guano.....	9.00	2.06	1.00
Carolina Soluble Guano.....	9.00	1.65	1.00
Pelican Ammoniated Guano.....	8.00	3.30	4.00
Sulphate of Potash.....	..	..	50.00
Genuine German Kainit.....	..	..	12.00
Muriate of Potash.....	..	..	48.00
Nitrate of Soda.....	..	15.56	..
Trojan Tobacco Guano.....	8.00	3.30	4.00
Columbia 10-5 Bone and Potash Mixture.....	10.00	..	5.00
Columbia Top Dresser.....	..	7.42	3.00
<i>Cumberland Bone and Phosphate Co., Portland, Me., and Charleston, S. C.—</i>			
Standard Cumberland Bone and Superphosphate of Lime .....	9.00	1.85	1.00
<i>The Coe-Mortimer Co., Charleston, S. C.—</i>			
Genuine Peruvian Guano Ex. S. S. Planet Venus,	15.00	3.53	2.80
Genuine Peruvian Guano Ex. S. S. Celia Chinha Island .....	9.00	5.53	2.25
Genuine Peruvian Guano Ex. S. $\frac{3}{4}$ S. Celia Lobos Island .....	17.00	2.80	2.80
Nitrate of Soda.....	..	14.76	..
Kainit .....	..	..	12.00
Thomas' Phosphate Big Slag.....	17.00	..	..
Sulphate of Potash.....	..	..	48.00
Muriate of Potash.....	..	..	49.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Calder Bros., Wilmington, N. C.—</i>			
Genuine German Kainit.....	..	..	12.00
Muriate of Potash.....	..	..	50.00
<i>Craven Chemical Co., New Bern, N. C.—</i>			
C. E. Foy High Grade Guano (Trade Mark)...	8.00	2.47	3.00
Jewel Acid Phosphate.....	14.00	..	..
Neuse Truck Grower.....	6.00	4.94	6.00
Pantego Potato Guano.....	7.00	4.12	7.00
Hanover Standard Guano.....	8.00	3.29	4.00
Elite Cotton Guano.....	8.00	1.65	2.00
Marvel Great Truck Grower.....	8.00	2.06	3.00
Duplin Tobacco Guano.....	8.00	2.47	3.00
Gaston High Grade Fertilizer.....	8.00	2.47	3.00
Trent Bone and Potash.....	10.00	..	2.00
Genuine German Kainit.....	..	..	12.00
Craven Chemical Co.'s Truck Guano, 5-10-2½..	5.00	8.24	2.50
<i>William H. Camp, Petersburg, Va.—</i>			
Lion and Monkey Bone and Potash.....	10.00	..	4.00
Camp's Red Head Chemicals.....	8.00	2.25	2.00
Camp's Green Head Chemicals, Irish Potato....	7.00	6.15	10.00
Camp's Yellow Head Chemicals.....	8.00	2.87	7.50
Lion and Monkey for Tobacco.....	8.00	2.46	3.00
<i>Clayton Oil Mill, Clayton, N. C.—</i>			
Clayton Guano .....	8.00	3.00	3.00
Cotton Queen .....	8.00	2.00	2.00
Summer Queen .....	8.00	2.00	2.00
<i>Cowell, Swan &amp; McCotter Co., Bayboro, N. C.—</i>			
Cowell, Swan & McCotter Co.'s Cabbage Guano,	5.00	8.25	2.50
Cowell, Swan & McCotter Co.'s Tobacco Guano,	8.00	2.47	3.00
Bone and Fish Guano.....	8.00	1.65	2.00
Crop Guano .....	8.00	1.65	2.00
Rust Proof Cotton Guano.....	8.00	1.65	3.00
Standard Cotton Grower.....	8.00	3.30	3.00
Quick Grower Guano.....	8.00	2.06	3.00
Great Cabbage and Potato Guano.....	7.00	5.77	7.00
Aurora Trucker .....	7.00	4.12	7.00
Oriental Trucker .....	7.00	4.12	8.00
High Grade Truck Guano.....	7.00	4.12	5.00
Potato Favorite Guano.....	7.00	3.30	7.00
Champion Guano .....	8.00	2.47	3.00
Bone Phosphate .....	14.00	..	..
14 Per Cent Acid Phosphate.....	14.00	..	..
German Kainit .....	..	..	12.00
Cowell's Great Tobacco Grower.....	8.00	2.47	3.00
<i>Combahee Fertilizer Co., Charleston, S. C.—</i>			
Combahee 16 Per Cent Dissolved Bone.....	16.00	..	..
Combahee 14 Per cent Dissolved Bone.....	14.00	..	..
High Grade Cotton.....	8.00	2.47	3.00
High Grade Cantaloupe.....	10.00	2.47	10.00
B. B. & P. ....	8.50	2.06	1.00
Nitrate of Soda.....	..	14.88	..
Combahee Kainit .....	..	..	12.00
Malloy's Special for Cotton.....	8.65	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Special Mixture .....	8.00	1.65	2.00
10-4-5 Trucker .....	10.00	3.30	5.00
10-3-10 Trucker .....	10.00	2.47	10.00
Acid and Potash.....	8.00	..	4.00

*Chickamauga Fertilizer Works, Atlanta, Ga.—*

Chickamauga Complete Fertilizer.....	8.00	1.65	2.00
Chickamauga High Grade Fertilizer.....	10.00	1.65	2.00
Chickamauga High Grade Plant Food.....	10.00	1.65	2.00
Chickamauga Wheat Special.....	10.00	.82	3.00
Chickamauga Corn Special.....	10.00	.82	3.00
Chickamauga Standard Corn Grower.....	8.00	1.65	2.00
Chickamauga Dissolved Bone.....	12.00	..	..
Chickamauga High Grade Dissolved Bone.....	14.00	..	..
Chickamauga High Grade Dissolved Bone No. 16.	16.00	..	..
Chickamauga Bone and Potash.....	10.00	..	2.00
Chickamauga Alkaline Bone.....	10.00	..	4.00
Georgia Home Guano.....	8.00	1.65	2.00
Special Corn Compound.....	10.00	1.65	4.00
Blood, Bone and Tankage.....	9.00	.82	2.00
Ben Hur High Grade Guano.....	10.00	2.47	3.00
Old Glory Mixture.....	10.00	.82	1.00
Chickamauga Wheat and Corn Grower.....	10.00	..	4.00

*Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.—*

Horne & Son's High Grade Bone and Potash....	11.00	..	5.00
Special Bone and Potash Mixture.....	10.00	..	4.00
Buncombe Wheat Grower.....	8.00	..	4.00
Buncombe Corn Grower.....	8.00	..	4.00
Morris & Scarboro's Special Bone and Potash..	10.00	..	3.00
Electric Bone and Potash Mixture.....	10.00	..	2.00
16 Per Cent Acid Phosphate.....	16.00	..	..
Climax Dissolved Bone.....	14.00	..	..
Sterling Acid Phosphate.....	13.00	..	..
Staple Acid Phosphate.....	12.00	..	..
Genuine German Kainit.....	..	..	12.00
Sulphate of Potash.....	..	..	50.00
Muriate of Potash.....	..	..	50.00
Nitrate of Soda.....	..	15.65	..
Bone Meal .....	Total 20.00	3.91	..
Bone Meal .....	Total 26.00	2.14	..
Crown Ammoniated Guano.....	8.00	1.64	2.00
Ely Ammoniated Fertilizer.....	8.00	1.64	2.00
Eclipse Ammoniated Guano.....	8.00	2.06	2.00
Planters' Pride .....	8.00	2.06	3.00
Caraleigh Special Tobacco Guano.....	8.00	2.06	3.00
Pacific Tobacco and Cotton Grower.....	9.00	2.26	2.00
Horne's Best .....	8.00	2.47	3.00
Caraleigh Top Dresser.....	3.00	8.24	4.00

*Crow Fertilizer Co., Monroe, N. C.—*

Kainit .....	..	..	12.00
14 Per Cent Acid Phosphate.....	14.00	..	..

*W. B. Cooper, Wilmington, N. C.—*

Muriate of Potash.....	..	..	46.00
Kainit .....	..	..	12.00
Sulphate of Potash.....	..	..	48.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Contentnea Guano Co., Wilson, N. C.—</i>			
Special Formula for Tobacco.....	8.00	3.28	4.00
Special Formula for Cotton.....	8.00	3.28	4.00
Contentnea Corn Special.....	5.00	1.64	5.00
Davis' Best Fertilizer.....	8.00	3.28	6.00
Special Formula for Tobacco.....	8.00	2.05	3.00
Special Formula Fertilizer, 9-2½-5.....	9.00	2.05	5.00
Special Formula for Tobacco.....	8.00	3.28	7.00
High Grade 14 Per Cent Acid.....	14.00	..	..
Pick Leaf .....	8.00	2.47	3.00
Top Notch .....	8.00	2.47	3.00
Blood and Bone Cotton Compound.....	8.00	1.65	2.00
<i>C. P. Dey, Beaufort, N. C.—</i>			
Ground Fish Scrap.....	..	8.25	..
<i>Etiwan Fertilizer Co., Charleston, S. C.—</i>			
Plow Brand Ammoniated Fertilizer.....	8.00	1.65	2.00
Plow Brand Special Tobacco Fertilizer.....	8.00	3.30	4.00
Plow Brand Acid Phosphate with Potash.....	11.00	..	1.00
Etiwan Potash Bone.....	10.00	..	4.00
Etiwan Special Potash Mixture.....	8.00	..	4.00
Etiwan Soluble Bone with Potash.....	10.00	..	3.00
Etiwan Acid Phosphate with Potash.....	11.00	..	1.00
Etiwan Dissolved Bone.....	13.00	..	..
Etiwan High Grade Acid Phosphate.....	14.00	..	..
Etiwan Superior Cotton Fertilizer.....	8.00	3.30	6.00
Etiwan Special Cotton Fertilizer.....	8.00	3.30	4.00
Etiwan Cotton Compound.....	8.00	2.47	3.00
Etiwan Ammoniated Fertilizer.....	8.00	1.65	2.00
Etiwan High Grade Cotton Fertilizer.....	8.00	2.47	2.00
Diamond Soluble Bone.....	13.00	..	..
X Diamond Soluble Bone with Potash.....	10.00	..	2.00
XX Acid Phosphate with Potash.....	10.00	..	2.00
Genuine German Kainit.....	..	..	12.00
Etiwan Blood and Bone Guano.....	9.00	2.06	1.00
Plow Brand Raw Bone Superphosphate.....	9.00	2.06	1.00
<i>Farmers Guano Co., Raleigh, N. C.—</i>			
Farmers' Formula .....	7.00	2.47	3.25
Special Bone and Potash Mixture.....	10.00	..	4.00
Century Bone and Potash Mixture.....	10.00	..	2.00
16 Per Cent Acid Phosphate.....	16.00	..	..
14 Per Cent Acid Phosphate.....	14.00	..	..
Farmers' Acid Phosphate.....	13.00	..	..
Genuine German Kainit .....	..	..	12.00
Muriate of Potash.....	..	..	50.00
Sulphate of Potash.....	..	..	50.00
Bone Meal .....	Total	20.00	3.91
Nitrate of Soda.....	..	..	15.65
Bone Meal .....	Total	26.00	2.14
State Standard Guano.....	8.00	1.64	2.00
Big Crop Guano.....	8.00	2.06	3.00
Toco Tobacco Guano.....	8.00	2.06	3.00
Golden Grade Guano.....	8.00	2.47	3.00
Farmers' Top Dresser.....	3.00	8.24	4.00

Name and Address of Manufacturer and Name of Brand.	Avall. Phos. Acid.	Nitrogen.	Potash.
<i>Fremont Oil Mills, Fremont, N. C.—</i>			
Up-to-date .....	8.00	1.65	2.00
Nahunta Special .....	8.00	2.47	3.00
Fremont Prolific Fertilizer.....	9.00	2.26	2.00
Yelverton Bros.' Plant Food.....	8.00	2.47	3.00
Fremont Standard Fertilizer.....	8.00	2.47	3.00
Home Run Guano.....	8.00	1.65	2.00
Fremont Oil Mill Co.'s Special for Tobacco.....	8.00	2.47	5.00
<i>Farmers Cotton Oil Co., Wilson, N. C.—</i>			
German Kainit .....	..	..	12.00
Sulphate of Ammonia.....	..	20.57	..
Muriate of Potash.....	..	..	50.00
Sulphate of Potash.....	..	..	50.00
Nitrate of Soda.....	..	15.63	..
Contentnea Acid Phosphate.....	13.00	..	..
Bonum Acid Phosphate.....	14.00	..	..
16 Per Cent Acid Phosphate.....	16.00	..	..
Xtra Good Bone and Potash.....	10.00	..	2.00
Crop King Guano.....	8.00	1.65	2.00
Farmers' Special Guano.....	8.00	1.65	2.00
Planters' Friend Guano.....	8.00	2.06	3.00
Carolina Choice Tobacco Guano.....	8.00	2.06	3.00
Wilson High Grade Guano.....	8.00	2.27	2.00
J. D. Farrior's Special Guano.....	8.00	2.47	3.00
Graves' Cotton Grower Guano.....	8.00	2.47	3.00
Golden Gem Guano.....	8.00	2.47	3.00
Regal Tobacco Guano.....	8.00	2.88	5.00
Dean's Special Guano.....	8.00	3.70	7.00
Perfect Top Dresser.....	2.00	8.23	5.00
Wilson Top Dresser.....	2.00	9.05	4.00
Washington's Corn Mixture Guano.....	10.00	.82	5.00
<i>W. S. Farmer &amp; Co., Baltimore, Md.—</i>			
Kainit .....	..	..	12.00
W. S. F. & Co.'s Dis. South Carolina.....	14.00	..	..
W. S. F. & Co.'s Fish Mixture.....	8.00	1.65	2.00
W. S. F. & Co.'s Hawk Eye.....	8.00	2.47	3.00
W. S. F. & Co.'s Tampico.....	7.00	4.12	5.00
Anne Arundel Trucker.....	8.00	3.70	7.00
<i>Germofert Manufacturing Co., Charleston, S. C.—</i>			
Germofert Patented Vegetable Fertilizer, Total.	25.00	3.29	6.00
Germofert Patented Extra Special Cotton Grower .....	4.00	3.29	4.00
Germofert Patented Special Cotton Grower....	6.00	2.47	3.00
Germofert Patented Standard Cotton Grower...	8.00	1.65	2.00
<i>W. R. Grace &amp; Co., New York—</i>			
Nitrate of Soda.....	..	15.00	..
<i>Griffith &amp; Boyd Co., Baltimore, Md.—</i>			
High Grade Acid Phosphate.....	14.00	..	..
Spring Crop Grower.....	6.50	1.65	4.50
Ammoniated Bone and Potash.....	8.00	1.65	2.00
<i>Home Fertilizer and Chemical Co., Baltimore, Md.—</i>			
Sulphate of Potash.....	..	..	48.00
Muriate of Potash.....	..	..	50.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Nitrate of Soda.....	..	15.67	..
Sulphate of Ammonia.....	..	20.62	..
German Kainit .....	..	..	12.00
High Grade Acid Phosphate.....	14.00	..	..
Boykins' Alkaline Bone.....	10.00	..	2.00
Boykins' Cereal Fertilizer.....	8.00	1.65	2.00
Boykins' Dissolved Animal Bone.....	12.00	1.65	2.00
Boykins' Vegetable Fertilizer.....	6.00	4.12	6.00
Boykins' Home Potato Grower.....	6.00	3.30	4.00
Special Alkaline Mixture.....	10.00	..	5.00
Phoenix Crop Grower.....	8.00	2.48	2.00
Matchless Guano .....	8.00	1.65	4.00
Home Fertilizer .....	..	5.77	7.00
Cerealite Top Dressing.....	..	7.68	3.00
<i>Hadley, Harriss &amp; Co., Wilson, N. C.—</i>			
Hadley Bros. ....	8.00	2.25	2.50
German Kainit .....	..	..	12.00
Daisy Fish Mixture.....	8.00	1.64	2.00
John Hadley Special High Grade Plant Food...	8.00	1.64	2.00
Top Dressing .....	..	7.38	6.00
Golden Weed Tobacco Grower.....	8.00	2.46	3.00
<i>S. B. Harrell &amp; Co., Norfolk, Va.—</i>			
Harrell's Acid Phosphate.....	14.00	..	..
Harrell's Champion Cotton and Peanut Grower.	8.00	1.65	2.00
Harrell's Truck Guano.....	6.00	5.76	5.00
<i>Hardison &amp; Co., Wadesboro, N. C.—</i>			
Genuine German Kainit.....	..	..	12.00
<i>Hampton Guano Co., Norfolk, Va.—</i>			
Virginia Truck Grower.....	6.00	5.76	5.00
Reliance Truck Guano.....	7.00	4.12	5.00
Little's Favorite Crop Grower.....	7.00	3.30	4.00
P. P. P. (Princess Prolific Producer).....	8.00	2.47	3.00
Hampton Tobacco Guano.....	8.00	2.47	3.00
Arlington Animal Bone Fertilizer.....	9.00	1.85	4.00
Alpha Crop Grower.....	8.50	2.06	2.50
Shirley's Superphosphate .....	8.00	1.65	2.00
Hampton Crop Grower.....	10.00	..	4.00
Hampton Bone and Potash Mixture.....	11.00	..	2.00
Dauntless Potash Mixture.....	10.00	..	2.00
Hampton Acid Phosphate.....	14.00	..	..
Supreme Acid Phosphate.....	16.00	..	..
Muriate of Potash.....	..	..	50.00
Nitrate of Soda.....	..	15.65	..
Genuine German Kainit.....	..	..	12.00
Excelsior Bone and Potash.....	8.00	..	4.00
Extra Tobacco Guano.....	8.00	1.65	2.00
<i>M. P. Hubbard &amp; Co., Baltimore, Md.—</i>			
Hubbard's Bermuda Guano.....	7.00	5.78	4.00
Hubbard's Special Cotton and Corn Fertilizer...	7.00	1.65	5.00
<i>Hubbard Fertilizer Co., Baltimore, Md.—</i>			
Parker & Hunter's B. B. B.....	8.00	.82	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Hall &amp; Pearsall (Inc.), Wilmington, N. C.—</i>			
German Kainit .....	..	..	12.00
<i>L. Harvey &amp; Son Co., Kinston, N. C.—</i>			
Nitrate of Soda.....	..	15.50	..
<i>The Imperial Co., Norfolk, Va.—</i>			
Imperial Bright Tobacco Guano.....	8.00	2.05	3.00
Imperial Cotton Grower.....	8.00	1.65	2.00
Imperial 5-6-7 Potato Guano.....	6.00	4.11	7.00
Imperial Snowflake Cotton Grower.....	8.00	3.29	4.00
Imperial Peanut and Corn Guano.....	8.00	1.64	2.00
Imperial Champion Guano.....	8.00	1.64	2.00
Imperial X. L. O. Cotton Guano.....	8.00	2.47	3.00
Imperial Cisco Soluble Guano.....	8.00	1.64	2.00
Imperial Tobacco Guano.....	8.00	2.47	3.00
Imperial Laughinghouse Special Tobacco Guano,	4.00	3.29	6.00
Imperial Standard Premium.....	8.00	1.64	2.00
Imperial Cubanola Tobacco Guano.....	4.00	2.47	5.00
Imperial Martin County Special Crop Grower..	9.00	2.26	2.00
Imperial High Grade Acid Phosphate.....	14.00	..	..
Imperial Genuine German Kainit.....	..	..	12.00
Imperial Special 7 Per Cent Guano for Potatoes,	5.00	5.76	5.00
Imperial 10 Per Cent Guano.....	5.00	8.23	2.50
Imperial Sweet Potato Guano.....	6.00	1.64	6.00
Imperial Williams' Special Potato Guano.....	6.00	4.11	5.00
Imperial Fish and Bone.....	6.00	3.29	4.00
Imperial Lucky Strike Potato Guano.....	7.00	4.11	8.00
Imperial 7-7-7 Potash Guano.....	7.00	5.76	7.00
Imperial Bone and Potash.....	10.00	..	2.00
Imperial High Grade Irish Potato Guano.....	7.00	4.11	8.00
Imperial Tennessee Acid Phosphate.....	16.00	..	..
Muriate of Potash.....	..	..	50.00
Nitrate of Soda.....	..	15.63	..
Imperial Roanoke Crop Grower.....	7.00	2.47	2.00
17 Per Cent Acid Phosphate.....	17.00	..	..
Imperial Asparagus Mixture.....	6.00	4.11	7.00
Imperial Yellow Bark Sweet Potato Guano....	8.00	2.47	3.00
Dawson's Cotton Grower.....	7.00	2.67	2.75
Imperial 6-6-6 Crop Grower.....	6.00	4.92	7.00
<i>John King, Mt. Olive, N. C.—</i>			
Nitrate of Soda.....	..	15.00	..
<i>R. L. Kirkwood, Bennettsville, N. C.—</i>			
Nitrate of Soda.....	..	14.00	..
<i>Laurinburg Oil Co., Laurinburg, N. C.—</i>			
Flora Dora .....	6.40	2.13	3.00
<i>Lister's Agricultural Chemical Works, Newark, N. J.—</i>			
Lister's Ammoniated Dissolved Bone Phosphate.	8.00	2.06	2.00
Lister's Success Fertilizer.....	8.00	1.65	2.00
Lister's Standard Pure Bone Superphosphate of Lime .....	9.00	1.65	2.00
American Agricultural Chemical Co.'s Buyers' Choice Acid Phosphate.....	14.00	..	..
Lister's Bone Meal.....Total	20.60	3.30	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>A. S. Lee &amp; Sons Co. (Inc.), Richmond, Va.—</i>			
Lee's Plant Bed Fertilizer.....	8.00	2.00	2.00
Lee's Bone and Potash.....	9.00	..	4.00
Lee's Corn Fertilizer.....	10.00	..	2.00
<i>The J. J. Littlejohn Co., Jonesville, S. C.—</i>			
Littlejohn's Superior Cotton Fertilizer.....	10.00	1.65	3.00
<i>E. H. &amp; J. A. Meadows Co., New Bern, N. C.—</i>			
Hookerton Cotton Guano.....	8.00	1.64	2.00
Meadows' Cotton Guano.....	8.00	1.64	2.00
Meadows' All Crop Guano.....	8.00	2.05	2.50
Meadows' Roanoke Guano.....	8.00	2.05	3.00
Meadows' Gold Leaf Tobacco Guano.....	8.00	2.47	3.00
Meadows' Lobos Guano.....	8.00	4.11	5.00
Meadows' Great Potato Guano.....	7.00	4.11	8.00
Meadows' Great Cabbage Guano.....	7.00	5.76	7.00
Meadows' 10 Per Cent Guano.....	6.00	8.23	2.50
Meadows' Sea Bird Guano.....	9.00	3.29	2.50
Meadows' Dissolved Bone and Potash Compound.	10.00	..	2.00
Meadows' German Kainit.....	..	..	12.00
Meadows' Diamond Acid Phosphate.....	14.00	..	..
Dixon's High Grade Tobacco Guano.....	8.00	2.47	3.00
Parker's Special Tobacco Guano.....	8.00	2.47	4.00
Meadows' Dissolved Bone and Potash Compound.	10.00	..	5.00
Brooks' Special Tobacco Grower.....	8.00	2.47	5.00
<i>The Miller Fertilizer Co., Baltimore, Md.—</i>			
Special Tobacco Grower .....	8.00	1.65	4.00
Standard Phosphate .....	8.00	2.47	3.00
Ammoniated Dissolved Bone.....	8.00	1.65	2.00
High Grade Potato .....	6.00	4.12	7.00
Tobacco King .....	8.00	2.47	3.00
Profit .....	8.00	1.65	2.00
Standard Potato .....	8.00	2.47	3.00
Potato and Vegetable Guano.....	8.00	1.65	4.00
Trucker .....	8.00	4.12	5.00
Farmers' Profit .....	8.00	1.65	2.00
Harmony .....	8.00	2.06	3.00
Corn and Peanut Grower.....	10.50	..	2.25
No. 1 Potato and Vegetable Grower.....	8.00	3.71	7.00
Clinch .....	10.00	..	2.00
4 Per Cent Tobacco.....	8.00	3.29	4.00
Miller's 7 Per Cent.....	7.00	5.77	7.00
Miller's Irish Potato.....	8.00	3.29	4.00
Miller's 16 Per Cent Acid Phosphate.....	16.00	..	..
Kainit .....	..	..	12.00
Acid Phosphate .....	14.00	..	..
S. C. Rock.....	14.00	..	..
The Miller Fertilizer Co.'s 10 and 4 Per Cent...	10.00	..	4.00
<i>The Mapes Formula and Peruvian Guano Co., 143 Liberty Street, New York—</i>			
Mapes' Economical Potato Manure.....	4.00	3.29	8.00
Mapes' Vegetable or Complete Manure for Light Soils .....	6.00	4.94	6.00
Mapes' Corn Manure.....	8.00	2.47	6.00
Mapes' Complete Manure, "A" Brand.....	10.00	2.47	2.50

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>C. F. Moore, Cheraw, S. C.—</i>			
Muriate of Potash.....	..	..	49.00
<i>John F. McNair, Laurinburg, N. C.—</i>			
Genuine German Kainit.....	..	..	12.00
Nitrate of Soda.....	..	14.76	..
<i>D. B. Martin Co., Richmond, Va.—</i>			
Martin's 7 Per Cent Guano.....	6.00	5.74	5.00
Martin's Early Truck and Vegetable Grower....	6.00	3.28	8.00
Martin's Claremount Vegetable Grower.....	7.00	2.46	5.00
Martin's Red Star Brand.....	8.00	3.28	4.00
Martin's Bull Head Fertilizer.....	8.00	2.46	3.00
Martin's Tobacco Special.....	8.00	2.46	3.00
Martin's Carolina Cotton Fertilizer.....	8.00	1.65	2.00
Martin's Old Virginia Favorite.....	8.00	1.65	2.00
Martin's Corn and Cereal Special.....	8.00	1.65	2.00
Martin's Gilt Edge Potato Manure.....	7.00	2.46	10.00
Martin's Animal Bone Potato Guano.....	6.00	4.10	7.00
Martin's Animal Bone Potato Compound.....	16.00	1.65	2.50
Martin's Pure Dissolved Animal Bone.....	12.00	1.65	2.00
Martin's Pure Ground Bone.....Total	22.90	1.65	2.00
Martin's Raw Bone Meal.....Total	21.00	3.69	..
Martin's Animal Tankage, Ground.....Total	16.00	4.92	..
Martin's Acid Phosphate.....	16.00	..	..
Martin's Potash and Soluble Bone.....	12.00	..	5.00
Martin's High Grade Blood.....	..	13.94	..
Martin's Blood.....	..	12.30	..
Acid Phosphate.....	14.00	..	..
Potash and Soluble Bone.....	12.00	..	3.00
Potash and Soluble Bone.....	10.00	..	5.00
Potash and Soluble Bone.....	10.00	..	2.00
Nitrate of Soda.....	..	15.52	..
Sulphate of Ammonia.....	..	20.50	..
Blood.....	..	10.66	..
Blood.....	..	9.84	..
Blood.....	..	12.30	..
Genuine German Kainit.....	..	..	12.00
Sulphate of Potash.....	..	..	50.00
Muriate of Potash.....	..	..	50.00
Pure Ground Bone.....Total	22.90	2.46	..
Martin's Carolina Special.....	8.00	1.65	2.00
<i>Marietta Fertilizer Co., Atlanta, Ga.—</i>			
Lion Power Guano.....	10.00	1.65	2.00
Lion Potash Compound.....	8.00	..	4.00
Lion High Grade Dissolved Bone.....	14.00	..	..
Lion Crop Producer.....	10.00	..	4.00
Lion Favorite Guano.....	8.00	1.65	2.00
<i>Marsh-Lee &amp; Co., Marshville, N. C.—</i>			
Marsh's High Grade Acid.....	14.00	..	..
Marsh's Cotton Fertilizer, 8-2-2.....	8.00	1.65	2.00
Marsh's Guano for Corn.....	8.00	1.65	2.00
Marsh's Special 8-3-3.....	8.00	2.50	3.00
Raven Brand.....	8.00	2.65	2.00
<i>J. W. McLaughlin Co., Raeford, N. C.—</i>			
Nitrate of Soda.....	..	15.00	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>The MacMurphy Co., Charleston, S. C.—</i>			
Special 8-3-3 Guano .....	8.00	2.47	3.00
Special 8-2-2 Cotton and Corn Guano.....	8.00	1.65	2.00
Cotton and Corn Guano, 9-2-2.....	9.00	1.65	2.00
Wilcox & Gibbs Co.'s Manipulated Guano.....	9.00	2.26	2.00
Cotton and Corn Guano, 9-3-3.....	9.00	2.47	3.00
High Grade Acid Phosphate, 14 Per Cent.....	14.00	..	..
Pure German Kainit .....	..	..	12.00
Nitrate of Soda .....	..	14.82	..
Muriate of Potash .....	..	..	48.00
Acid Phosphate, 13 Per Cent.....	13.00	..	..
<i>N. C. Cotton Oil Co., Wilmington, N. C.—</i>			
Wilmington High Grade .....	8.00	2.47	3.00
Wilmington Cotton Grower .....	8.00	1.65	2.00
Wilmington Standard .....	8.00	2.47	2.50
Wilmington Truck Grower .....	8.00	3.30	4.00
Wilmington Special .....	8.00	1.65	2.00
Carter's Lifter .....	8.00	2.47	3.00
Clark's Special .....	8.00	1.65	3.00
Wilmington Banner .....	8.00	1.65	3.00
<i>North Carolina Cotton Oil Co., Raleigh, N. C.—</i>			
Raleigh Standard Guano.....	8.00	2.26	2.00
<i>North Carolina Cotton Oil Co., Charlotte, N. C.—</i>			
Majestic .....	8.00	1.65	2.00
<i>N. C. Cotton Oil Co., Henderson, N. C.—</i>			
Unedit Cotton Grower.....	8.00	1.65	2.00
Unedit Tobacco Fertilizer.....	9.00	2.47	3.00
Vance Cotton Grower.....	8.00	1.65	2.00
Pride of Vance.....	9.00	2.47	3.00
Henderson Cotton Grower.....	8.00	1.65	2.00
Henderson Tobacco Fertilizer.....	9.00	2.47	3.00
Franklin Cotton Grower.....	8.00	1.65	2.00
Franklin Tobacco Fertilizer.....	9.00	2.47	3.00
<i>New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.—</i>			
Oriole Tobacco Grower.....	8.00	3.30	4.00
Greene County Standard Fertilizer.....	8.00	1.65	2.00
Jones County Premium Crop Grower.....	8.00	2.06	3.00
Onslow Farmers' Reliance Guano.....	8.00	2.06	3.00
High Grade Fertilizer .....	8.00	2.47	3.00
Foy's High Grade Fertilizer.....	8.00	2.47	3.00
Pitt's Prolific Golden Tobacco Grower.....	8.00	2.47	3.00
Craven Cotton Guano .....	8.00	1.65	2.00
Lenoir Bright Leaf Tobacco Grower.....	8.00	2.47	3.00
Ives' Irish Potato Guano.....	7.00	4.13	7.00
Dunn's Standard Truck Grower.....	7.00	5.77	7.00
Pamlico Electric Top Dresser.....	5.00	8.25	2.50
Special Corn and Peanut Grower.....	11.00	..	2.00
Carteret Bone and Potash.....	10.00	..	2.00
14 Per Cent Acid Phosphate.....	14.00	..	..
Genuine German Kainit .....	..	..	12.00
Sulphate of Potash .....	..	..	50.00
Muriate of Potash .....	..	..	48.00
Bogue Fish Scrap .....	..	7.42	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Nitrate of Soda .....	..	15.67	..
Sulphate of Ammonia .....	..	20.62	..
Favorite Cotton Grower C. S. M.....	8.00	2.27	2.00

*Norfolk Fertilizer Co., Norfolk, Va.—*

Oriana Cotton Guano.....	8.00	1.64	2.00
Oriana C. S. M. Special.....	9.00	2.26	2.00
Oriana Tobacco Guano.....	8.00	2.47	3.00
Oriana 3-8-3 for Cotton.....	8.00	2.47	3.00
Oriana Crop Grower.....	8.00	1.64	3.00
Oriana Bone and Potash.....	10.00	..	2.00
Oriana 14 Per Cent Acid Phosphate.....	14.00	..	..
Oriana 16 Per Cent Acid Phosphate.....	16.00	..	..
Genuine German Kainit.....	..	..	12.00
Iola Acid Phosphate.....	13.00	..	..
Oriana First Step Tobacco Guano.....	8.00	3.29	4.00
Oriana 4-4-6 High Grade Tobacco Guano.....	4.00	3.29	6.00
Pine Top Special Crop Grower.....	5.00	1.64	6.00

*Navassa Guano Co., Wilmington, N. C.—*

Ammoniated Soluble Navassa Guano.....	8.00	2.06	2.00
Clarendon Tobacco Guano.....	8.00	2.47	3.00
Occoneechee Tobacco Guano.....	8.00	1.65	2.00
Coree Tobacco Guano.....	8.00	3.29	4.00
Harvest King Guano.....	8.00	1.65	3.00
Mogul Guano .....	8.00	2.06	3.00
Kainit .....	..	..	12.00
Muriate of Potash.....	..	..	48.00
Sulphate of Potash .....	..	..	50.00
Nitrate of Soda.....	..	15.65	..
Sulphate of Ammonia.....	..	20.59	..
Orton Guano .....	8.00	2.47	4.00
Navassa Universal Fertilizer.....	8.50	2.06	1.00
Navassa Wheat Mixture.....	10.00	..	2.25
Navassa Wheat and Grass Grower.....	10.00	..	4.00
Navassa Special Wheat Mixture.....	12.00	..	4.00
Navassa Gray Land Mixture.....	12.00	..	4.00
Navassa Dissolved Bone with Potash.....	10.00	..	2.00
Navassa Acid Phosphate.....	12.00	..	..
Navassa Dissolved Bone.....	13.00	..	..
Navassa Acid Phosphate.....	14.00	..	..
Navassa Acid Phosphate.....	16.00	..	..
Navassa Special Trucker.....	8.00	3.29	4.00
Navassa Strawberry Top Dressing.....	8.00	2.06	4.00
Navassa Blood and Bone Meal Mixture.....	8.00	2.47	5.00
Navassa Creole Guano.....	6.00	4.12	7.00
Navassa Root Crop Fertilizer.....	7.00	4.12	7.00
Navassa Carib Guano.....	8.00	2.47	10.00
Navassa Guano for Tobacco.....	8.00	2.06	2.00
Navassa Grain Fertilizer.....	8.00	1.65	2.00
Navassa Fruit Growers' Fertilizer.....	8.00	1.65	6.00
Navassa Cotton Seed Meal Special 3 Per Cent Guano .....	8.00	2.47	2.00
Navassa Cotton Seed Meal Guano.....	8.00	1.65	2.00
Navassa Cotton Fertilizer.....	8.00	1.65	2.00
Navassa Complete Fertilizer.....	9.00	1.65	1.00
Navassa High Grade Guano.....	8.00	2.47	3.00
Navassa Acid Phosphate with Potash.....	8.00	..	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>The Nitrate Agencies Co., Savannah, Ga.—</i>			
Nitrate of Soda.....	..	15.00	..
<i>G. Ober &amp; Sons Co., Baltimore, Md.—</i>			
Ober's Complete Fertilizer.....	6.00	4.12	6.00
Special High Grade Fertilizer.....	9.00	2.47	3.00
Ober's Special Compound for Tobacco.....	8.00	2.47	3.00
Ober's Standard Tobacco Fertilizer.....	8.00	1.65	2.00
Ober's Special Ammoniated Dissolved Bone....	9.00	1.65	2.00
Ober's Special Cotton Compound.....	8.00	1.65	2.00
Ober's Soluble Ammoniated Superphosphate of Lime .....	8.00	1.65	2.00
Ober's Farmers' Mixture.....	9.00	.82	2.00
Ober's Dissolved Bone, Phosphate and Potash...	10.00	..	2.00
Ober's Acid Phosphate with Potash.....	8.00	..	2.00
Ober's Standard Potash Compound.....	12.00	..	5.00
Ober's High Grade Acid Phosphate.....	16.00	..	..
Ober's Dissolved Bone Phosphate.....	14.00	..	..
Nitrate of Soda.....	..	15.50	..
Muriate of Potash.....	..	..	48.00
Kainit .....	..	..	12.00
Cooper's Pungo Guano.....	8.00	2.06	2.00
Pure Raw Bone Meal.....	21.00	..	3.71
<i>The Pocomoke Guano Co., Norfolk, Va.—</i>			
Garrett's Grape Grower.....	8.00	3.29	10.00
Coast Line Truck Guano.....	5.00	8.23	3.00
Freeman's 7 Per Cent Irish Potato Grower.....	6.00	5.76	5.00
Seaboard Popular Trucker.....	6.00	5.76	5.00
Standard Truck Guano.....	7.00	4.12	5.00
Faultless Ammoniated Superphosphate.....	7.00	3.30	4.00
Harvest High Grade Monarch.....	8.00	2.47	3.00
Monarch Tobacco Grower.....	8.00	2.47	3.00
Monticello Animal Bone Fertilizer.....	9.00	1.85	4.00
Cinco Tobacco Guano.....	8.50	2.06	2.50
Crescent Complete Compound.....	8.00	1.65	3.00
Hornthal's Tobacco Guano.....	8.00	1.65	3.00
L. P. H. Premium.....	8.00	1.65	2.00
Electric Crop Grower.....	8.50	1.65	2.00
Pamlico Superphosphate .....	8.00	1.65	2.00
Pocomoke Superphosphate .....	8.50	1.65	2.00
Pocomoke Bone and Potash Mixture.....	10.00	..	4.00
Pure Ground Bone.....	20.00	3.70	..
10-2 Potash Mixture .....	10.00	..	2.00
Alkali Bone .....	11.00	..	2.00
Peerless Acid Phosphate .....	14.00	..	..
Superb Acid Phosphate .....	16.00	..	..
Genuine German Kainit .....	..	..	12.00
Muriate of Potash .....	..	..	50.00
Nitrate of Soda.....	..	15.65	..
Pocomoke Defiance Bone and Potash.....	8.00	..	4.00
Smith's Special Formula.....	4.00	3.30	6.00
<i>Pamlico Chemical Co., Washington, N. C.—</i>			
Pamlico Favorite Guano.....	7.00	4.12	5.00
Pamlico Bone and Fish Guano.....	8.00	1.65	2.00
Pamlico Potato Guano.....	7.00	4.12	7.00
Pamlico Cotton Guano.....	8.00	1.65	2.00
Pamlico 7-7-7 Guano.....	7.00	5.77	7.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Pamlico 16 Per Cent Acid Phosphate.....	16.00	..	..
Pamlico Bone and Potash.....	14.00	..	..
Cowell's Great Potato Grower.....	8.00	4.12	7.00
Cowell's Great Cabbage Grower.....	5.00	8.25	2.50
Tobacco Growers' Friend.....	8.00	2.47	3.00
Genuine German Kainit.....	..	..	12.00
Farmers' Best Guano.....	8.00	2.06	3.00
Farmers' Friend.....	8.00	2.47	3.00
Staton & Taylor's Special Grower.....	8.00	2.26	2.00
Prosperity Cotton Grower.....	9.00	2.26	2.00
Pamlico High Grade Tobacco Grower.....	8.00	2.47	5.00
Pamlico 8-4-4 Guano.....	8.00	3.30	4.00
Pamlico 6-3-6 Guano.....	6.00	2.45	6.00
Pamlico Bone and Potash.....	10.00	..	2.00
<i>Planters Fertilizer and Phosphate Co., Charleston, S. C.—</i>			
Planters' Bright Tobacco Fertilizer.....	8.00	3.90	4.00
Planters' High Grade Cabbage Fertilizer.....	7.00	6.59	5.00
Planters' Fertilizer.....	8.00	2.06	2.00
Planters' Soluble Guano.....	8.00	2.47	3.00
Planters' Standard Guano.....	8.75	1.65	2.00
Nitrate of Soda.....	..	14.83	..
Planters' High Grade Acid Phosphate.....	14.00	..	..
Planters' Standard Fertilizer.....	8.00	1.65	2.00
Planters' Soluble Bone.....	13.00	..	..
Sulphate of Potash.....	..	..	48.00
Planters' German Kainit.....	..	..	12.00
<i>Parsons &amp; Hardison, Wadcsboro, N. C.—</i>			
Nitrate of Soda.....	..	14.85	..
<i>Z. V. Pate, Laurel Hill, N. C.—</i>			
Nitrate of Soda.....	..	14.76	..
<i>Pearsall &amp; Co., Wilmington, N. C.—</i>			
Kainit.....	..	..	12.00
<i>Pacific Guano Co., Charleston, S. C.—</i>			
Standard Soluble Pacific Guano.....	8.50	1.65	2.00
Standard Pacific Acid Phosphate.....	12.00	..	..
High Grade Pacific Fertilizer.....	8.00	2.46	3.00
<i>Powhatan Chemical Co., Richmond, Va.—</i>			
Powhatan Trucker.....	7.00	4.94	5.00
Powhatan Bone and Potash Mixture.....	8.00	..	4.00
Powhatan Acid Phosphate.....	13.00	..	..
Magic Dissolved Bone Phosphate.....	16.00	..	..
Magic Peanut Grower.....	8.00	..	4.00
Magic Grain and Grass Grower.....	8.00	..	4.00
Magic Bone and Potash Mixture.....	10.00	..	4.00
Magic Mixture.....	9.00	1.65	1.00
Magic Cotton Grower.....	8.00	1.65	2.00
Magic Special Fertilizer.....	8.00	1.65	2.00
Magic Tobacco Grower.....	8.00	1.65	2.00
King Brand Fertilizer.....	8.00	2.06	3.00
White Leaf Tobacco Fertilizer.....	8.00	2.06	3.00
Economic Cotton Grower.....	9.00	2.26	2.00
North State Special.....	8.00	3.29	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Guilford Special .....	9.00	2.47	6.00
Pure Raw Bone Meal.....Total	20.00	3.29	..
Bone and Potash Mixture.....	10.00	..	2.00
Bone Meal .....	25.00	2.47	..
Nitrate of Soda .....	..	15.63	..
Sulphate of Ammonia .....	..	19.75	..
Sulphate of Potash .....	..	..	48.00
Muriate of Potash .....	..	..	50.00
Pure German Kainit .....	..	..	12.00
Virginia Dissolved Bone .....	12.00	..	..
High Grade Acid Phosphate.....	14.00	..	..
Uneeda Acid Phosphate .....	15.00	..	..
P. C. Co.'s Hustle.....	8.00	2.47	3.00
Magic Corn Grower .....	10.00	.82	1.00
Magic Wheat Grower .....	9.00	.82	2.00
Johnson's Best Fertilizer.....	9.00	2.06	5.00
Holt's Magic Fertilizer .....	9.00	2.06	5.00
Magic Peanut Special .....	8.00	.82	4.00
Bone Mixture .....	10.00	.82	1.00
Magic Crop Grower .....	10.00	.82	1.00

*Patapsco Guano Co., Baltimore, Md.—*

Patapsco Plant Food for Tobacco, Potatoes and Truck .....	8.00	2.47	5.00
Patapsco Soluble Bone and Potash.....	10.00	..	2.00
Patapsco High Grade Bone and Potash.....	11.00	..	5.00
Patapsco 10 and 4 Potash Mixture.....	10.00	..	4.00
Patapsco 7-7-7 Truck Guano.....	7.00	5.77	7.00
Patapsco Potato Guano.....	6.00	4.12	7.00
Patapsco Top Dresser.....	4.00	3.30	4.00
Patapsco Trucker for Early Vegetables.....	7.00	4.12	5.00
Patapsco Tobacco Fertilizer.....	9.00	2.47	3.00
Patapsco Guano for Tobacco.....	9.25	2.06	2.00
Patapsco Guano .....	9.25	2.06	2.00
Patapsco Special Tobacco Mixture.....	8.00	2.06	3.00
Patapsco Fine Ground Bone.....Total	20.61	3.30	..
Patapsco Dissolved S. C. Phosphate.....	14.00	..	..
Coon Brand Guano.....	9.00	.83	3.00
Choctaw Guano .....	8.00	2.47	3.00
Planters' Favorite .....	8.00	1.65	2.00
Seagull Ammoniated Guano.....	8.00	1.65	2.00
Money Maker Guano.....	7.00	3.70	6.00
Unicorn Guano .....	8.00	2.06	3.00
Baltimore Soluble Phosphate.....	11.00	..	2.00
Florida Soluble Phosphate.....	16.00	..	..
Genuine German Kainit.....	..	..	12.00
Nitrate of Soda.....	..	15.64	..
Muriate of Potash.....	..	..	50.00
Ground Fish .....	..	8.23	..
Swanson's Gold Leaf Special.....	8.00	2.06	2.00

*Pocahontas Guano Co., Lynchburg, Va.—*

Imperial Dissolved S. C. Phosphate.....	14.00	..	..
Carrington's Superior Grain Compound.....	10.00	..	2.00
Wabash Wheat Mixture.....	10.00	..	4.00
Cherokee Grain Special.....	8.00	..	4.00
Farmers' Favorite Guano, Apex Brand.....	8.00	2.47	3.00
Blackhawk Brand .....	8.00	2.06	2.00
Spot Cash Tobacco Compound.....	8.00	2.06	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Yellow Tobacco Special.....	9.00	1.65	2.00
High Grade 4 Per Cent Tobacco Compound, Mo- hawk King Brand.....	9.00	1.85	4.00
Standard Tobacco Guano, Old Chief Brand....	9.00	1.65	2.00
Pocahontas Special Tobacco Fertilizer.....	9.00	2.47	3.00
A. A. Complete Champion Brand.....	8.00	.82	3.00
Special Truck Grower, Eagle Mount Brand....	8.00	2.06	6.00
Indian Truck Grower.....	8.00	3.30	4.00
Pure Raw Bone Meal.....Total	22.00	3.71	..
Carrington's S. C. Phosphate, Wankesha Brand, Carrington's Baumer Brand Guano.....	16.00	..	..
Indian Tobacco Grower.....	8.00	1.65	2.00
	8.00	2.46	4.00

*Piedmont-Mt. Airy Guano Co., Baltimore, Md.—*

Piedmont Cultivator Brand.....	8.00	1.65	2.00
Piedmont Bone and Peruvian Mixture.....	8.00	1.65	2.00
Piedmont Special Truck Fertilizer.....	6.00	5.77	5.00
Piedmont Early Vegetable Manure.....	6.00	4.12	7.00
Piedmont Vegetable Compound.....	6.00	3.30	8.00
Piedmont Essential Tobacco Compound.....	9.00	1.65	2.00
Piedmont Guano for Tobacco.....	8.00	2.06	3.00
Piedmont High Grade Ammoniated Bone and Potash .....	8.00	2.47	3.00
Piedmont High Grade S. C. Bone Phosphate..	14.00	..	..
Levering's Potashed Bone.....	10.00	..	4.00
Levering's Reliable Tobacco Guano.....	8.00	2.47	3.00
Piedmont Special Potato Guano.....	6.00	4.94	7.00
Piedmont Red Leaf Tobacco Guano.....	8.00	1.65	2.00
Piedmont Guano for Cotton.....	9.00	1.65	1.00
Piedmont Early Trucker.....	6.00	4.12	5.00
Piedmont Potato Producer .....	5.00	2.47	6.00
Piedmont Farmers' Standard.....	9.00	1.65	2.00
Piedmont Guano for Wheat.....	9.00	1.65	1.00
Piedmont Special for Cotton, Corn and Peanuts, Piedmont Special Farmers' Tobacco Guano....	8.00	1.65	2.00
	8.40	2.47	4.00
Piedmont Farmers' Bone and Potash.....	10.00	..	2.00
Piedmont High Grade Guano for Cotton.....	8.00	2.47	3.00
Haynes' Cultivator Guano.....	8.00	1.65	2.00
Piedmont Farmers' Favorite.....	8.00	.82	4.00
Piedmont Farmers' Cotton Grower.....	9.00	.82	3.00
German Kainit .....	..	..	12.00
Piedmont Star Bone and Potash.....	8.00	..	5.00
Piedmont Unexcelled Guano.....	8.00	3.29	4.00
Piedmont Bone Meal.....Total	21.00	3.30	..
Ricks Bros.' Special Potato and Truck Guano..	6.00	4.12	7.00
Kaiser & Mauney's Special 2-8-2 Guano.....	8.00	1.65	2.00
Kaiser & Mauney's Special 3-8-3 Guano.....	8.00	2.47	3.00
Privott's 3-8-4 Guano.....	8.00	2.47	4.00
Piedmont Guano for All Crops.....	8.00	2.06	3.00
Piedmont Vegetable Manure.....	6.00	3.29	8.00
Nitrate of Soda.....	..	15.23	..
Privott's Standard Guano.....	8.00	2.06	3.00
Privott's Special Guano.....	8.00	1.65	6.00
Muriate of Potash.....	..	..	48.00
Sulphate of Potash.....	..	..	50.00
Sulphate of Ammonia.....	..	20.58	..
Acidulated Rock and Bone Tankage.....	9.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>The Quinnepiac Co., Charleston, S. C.—</i>			
Standard Quinnepiac Pine Island Ammoniated Superphosphate .....	9.00	1.85	1.00
Standard Quinnepiac Acid Phosphate.....	13.00	..	..
<i>F. S. Royster Guano Co., Norfolk, Va.—</i>			
Sulphate of Potash.....	..	..	50.00
Muriate of Potash.....	..	..	48.00
Genuine German Kainit.....	..	..	12.00
Farmers' Own Fertilizer.....	8.00	1.65	2.00
Bonanza Tobacco Guano.....	8.00	2.47	3.00
Orinoco Tobacco Guano.....	8.00	2.06	3.00
Special Tobacco Compound.....	8.00	2.06	2.00
Cobb's High Grade for Tobacco.....	8.00	3.30	5.00
Humphrey's Special for Tobacco.....	6.00	2.55	3.20
Eagle's Special Tobacco Guano.....	8.00	2.47	5.00
Royal Potato Guano.....	7.00	4.12	5.00
Royal Special Potato Guano.....	7.00	4.12	7.00
Ballentine's Potato Guano.....	6.00	5.77	7.00
Truckers' Delight .....	8.00	3.30	4.00
Special Compound .....	9.00	1.65	1.00
Tomlinson's Special .....	9.00	2.47	5.00
Williams' Special Guano.....	8.00	2.06	5.00
Magic Top Dresser.....	..	7.42	3.00
Royster's Special Sweet Potato Guano.....	8.00	2.47	3.00
Royster's Potato Guano.....	5.00	4.94	7.00
Royster's Special 7 Per Cent Truck Guano.....	7.00	5.77	7.00
Royster's Early Truck Guano.....	7.00	4.12	8.00
Royster's Special 10 Per Cent Truck Guano....	5.00	8.24	3.00
Royster's Special 4-8-3.....	8.00	3.30	3.00
Royster's 4-9-5 Special.....	9.00	3.30	5.00
Royster's Special 1-9-2 Guano.....	9.00	.82	2.00
Royster's 2-6-5 Special.....	6.00	1.65	5.00
Royster's Meal Mixture.....	9.00	2.26	2.00
Royster's Special Wheat Fertilizer.....	8.00	1.65	2.00
Royster's H. G. 16 Per Cent Acid Phosphate...	16.00	..	..
Royster's 14 Per Cent Acid Phosphate.....	14.00	..	..
Royster's Dissolved Bone.....	13.00	..	..
Royster's XX Acid Phosphate.....	12.00	..	..
Royster's Bone and Potash Mixture.....	11.00	..	5.00
Royster's Bone and Potash Mixture.....	10.00	..	2.00
Royster's Bone and Potash for Grain.....	10.00	..	3.00
Royster's 8 and 4 Bone and Potash Mixture....	8.00	..	4.00
Royster's Peanut Special.....	7.00	..	5.00
Royster's Complete Guano.....	8.00	1.65	2.00
Royster's 10 and 4 Bone and Potash Mixture...	10.00	..	4.00
Royster's Best Guano.....	8.00	3.71	7.00
Royster's Harvey's Cabbage Guano.....	5.00	6.59	3.00
Royster's Marlborough High Grade Cotton Guano .....	8.00	2.47	3.00
Nitrate of Soda.....	..	15.66	..
Jumbo Peanut Grower.....	8.00	.82	4.00
Watkins' Special .....	9.00	2.06	5.00
Haynes' Special .....	9.00	2.06	3.00
Pure Raw Bone Meal.....	Total	21.50	3.70
Milo Tobacco Guano.....	8.00	3.30	4.00
Royster's Soluble Guano.....	10.00	1.65	2.00
McDowell's Cotton Grower.....	6.00	2.30	2.50
Royster's 4-6-4 Special.....	6.00	3.30	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Webb's Korn King.....	8.00	1.65	2.00
Royster's 10-5 Bone and Potash Mixture.....	10.00	..	5.00
<i>J. H. Roberson &amp; Co., Robersonville, N. C.—</i>			
Roberson's Potato Guano.....	6.00	5.77	5.00
Roberson's Cotton Grower.....	9.00	2.26	2.00
Roberson's Special Potato Grower.....	7.00	5.77	7.00
Roberson's Bright Leaf Grower.....	8.00	2.06	3.00
Roberson's High Grade Acid Phosphate.....	14.00	..	..
Genuine German Kainit.....	..	..	12.00
<i>Richmond Guano Co., Richmond, Va.—</i>			
10 Per Cent Cabbage Guano.....	6.00	8.23	2.00
Special High Grade for Truck.....	7.00	4.94	5.00
Southern Trucker .....	8.00	4.11	5.00
Perfection Special .....	8.00	3.29	4.00
Gilt Edge Fertilizer.....	8.00	2.47	3.00
Carolina Cotton Grower.....	9.00	2.26	2.00
Carolina Bright Special Tobacco Fertilizer.....	8.00	2.26	2.50
Tip Top Fertilizer.....	8.00	2.06	3.00
Special Premium Brand for Tobacco.....	8.00	1.85	2.25
Special Premium Brand for Plants.....	8.00	1.85	2.25
Carolina Bright for Cotton.....	8.00	2.06	1.50
Benson's Special Fertilizer.....	8.00	1.65	6.00
Parker & Hunter's Special Fertilizer.....	8.00	1.65	2.00
Premium Tobacco Fertilizer.....	8.00	1.65	2.00
Premium Brand Fertilizer.....	8.00	1.65	2.00
Bone Mixture .....	9.00	1.65	1.00
Clark's Special Formula.....	7.00	4.94	6.00
Carter's Special for Tobacco.....	4.00	2.47	6.00
Saunders's Special Formula for Bright Tobacco,	9.00	2.88	5.00
Burton's Special Tobacco Fertilizer.....	9.00	2.06	3.00
Hunter & Dunn's Special Ammoniated Fertilizer,	9.00	2.47	2.25
Hunter & Dunn's Ammoniated Fertilizer.....	8.00	1.65	2.00
Edgecombe Cotton Grower.....	8.00	1.65	2.00
Premium Bone and Potash Mixture.....	13.00	..	3.00
Rex Bone and Potash Mixture.....	10.00	..	4.00
Tip Top Bone and Potash Mixture.....	8.00	..	4.00
Winter Grain and Grass Grower.....	8.00	..	4.00
Premium Peanut Grower.....	8.00	..	4.00
Bone and Potash Mixture.....	10.00	..	2.00
Rex Dissolved Bone Phosphate.....	16.00	..	..
Regal Acid Phosphate.....	15.00	..	..
High Grade Acid Phosphate.....	14.00	..	..
High Grade Wheat and Grass Fertilizer.....	14.00	..	..
Premium Dissolved Bone .....	13.00	..	..
Dissolved S. C. Phosphate.....	12.00	..	..
Hunter & Dunn's Dissolved Bone.....	12.00	..	..
Pure German Kainit.....	..	..	12.00
Muriate of Potash.....	..	..	50.00
Sulphate of Potash.....	..	..	48.00
Sulphate of Ammonia.....	..	19.75	..
Nitrate of Soda.....	..	15.63	..
Pure Raw Bone meal.....Total	20.00	3.29	..
Bone Meal .....	25.00	2.47	..
Premium Corn Grower.....	10.00	.82	1.00
Premium Wheat Grower.....	9.00	.82	2.00
Cracker Jack Fertilizer.....	9.00	1.65	2.00
Premium Peanut Special.....	8.00	.82	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Premium Cotton Grower.....	9.00	.82	3.00
Old Homestead Dissolved Bone.....	12.00	..	..
Haw River Special Fertilizer.....	8.00	2.88	5.00
<i>Read Phosphate Co., Charleston, S. C.—</i>			
Genuine German Kainit.....	..	..	12.00
Read's High Grade Acid Phosphate.....	14.00	..	..
Read's Bone and Potash.....	10.00	..	4.00
Read's Alkaline Bone.....	10.00	..	2.00
Read's Special Potash Mixture.....	8.00	..	4.00
Read's High Grade Tobacco Leaf.....	8.00	2.47	3.00
Read's Blood and Bone Fertilizer No. 1.....	8.00	1.65	2.00
Read's Soluble Fish Guano.....	8.00	1.65	2.00
Read's High Grade Cotton Grower.....	8.00	2.47	3.00
<i>Raisin-Monumental Co., Baltimore, Md.—</i>			
Dixie Guano .....	9.00	1.65	2.00
Empire Guano .....	8.00	1.65	2.00
Raisin Premium Brand for Tobacco.....	8.00	2.46	3.00
Raisin Gold Standard.....	8.00	2.46	3.00
Raisin Special Bone and Potash.....	10.00	..	5.00
Raisin Bone and Potash.....	10.00	..	2.00
Raisin 13 Per Cent Acid Phosphate.....	13.00	..	..
Raisin 16 Per Cent Acid Phosphate.....	16.00	..	..
Raisin Acid Phosphate.....	14.00	..	..
<i>Reidsville Fertilizer Co., Reidsville, N. C.—</i>			
Banner Fertilizer .....	8.00	1.65	2.00
Champion Guano .....	8.00	1.65	2.00
Broad Leaf Tobacco Guano.....	8.00	1.85	2.50
Royal Fertilizer .....	8.00	2.47	3.00
Lion Brand Fertilizer.....	9.00	2.47	6.00
Bone and Potash.....	10.00	..	4.00
<i>Swift Fertilizer Works, Atlanta, Ga., and Wilming- ton, N. C.—</i>			
High Grade Swift's Strawberry Grower.....	8.00	2.47	10.00
High Grade Swift's Special Trucker.....	6.00	5.76	5.00
High Grade Swift's Special 10 Per Cent Blood and Bone Trucker .....	5.00	8.23	3.00
High Grade Swift's Carolina 7 Per Cent Special Trucker .....	7.00	5.76	7.00
High Grade Swift's Favorite Truck Guano.....	6.00	4.94	6.00
High Grade Swift's Special Irish Potato Grower,	7.00	4.12	8.00
High Grade Swift's Special Potato Grower.....	6.00	4.12	7.00
Standard Grade Swift's Red Steer Guano Stand- ard Grade .....	8.00	1.65	2.00
Swift's Plow Boy Guano.....	10.00	.82	1.00
Standard Grade Swift's Cotton Plant Standard Grade Guano .....	9.00	1.65	1.00
Standard Grade Swift's Golden Harvest Stand- ard Grade Guano.....	8.00	1.65	2.00
Swift's Eagle Standard Grade Guano.....	10.00	1.65	2.00
High Grade Swift's Farmers' Favorite High Grade Guano .....	9.00	1.65	3.00
High Grade Swift's Pioneer High Grade Guano Tobacco Grower .....	8.00	1.65	4.00
High Grade Swift's Early Trucker.....	7.00	4.12	5.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
High Grade Swift's Blood, Bone and Potash			
High Grade Guano.....	9.50	3.29	7.00
High Grade Swift's Corn and Cotton Grower			
High Grade Guano.....	10.00	2.47	3.00
High Grade Swift's Cotton King High Grade			
Guano .....	9.00	2.47	2.00
High Grade Swift's Ruralist High Grade Guano,	8.00	2.47	3.00
High Grade Swift's Special High Grade Guano..	9.50	4.12	3.00
High Grade Swift's Monarch Vegetable Grower			
High Grade Guano.....	8.00	3.29	4.00
High Grade Swift's Atlanta High Grade Guano,	12.00	..	4.00
High Grade Swift's Special High Grade Phos-			
phate and Potash.....	12.00	..	6.00
Standard Grade Swift's Plantation Standard			
Grade Phosphate and Potash.....	8.00	..	4.00
High Grade Swift's Farmers' Home High Grade			
Phosphate and Potash.....	10.00	..	4.00
Standard Grade Swift's Field and Farm Stand-			
ard Grade Phosphate and Potash.....	10.00	..	2.00
Standard Grade Swift's Wheat Grower Stand-			
ard Grade Phosphate and Potash.....	10.00	..	2.00
Standard Grade Swift's Harrow Standard Grade			
Acid Phosphate .....	13.00	..	..
High Grade Swift's No. 1 Ground Tankage....	6.00	8.24	..
Swift's Pure Bone Meal.....Total	25.00	2.47	..
High Grade Swift's Cultivator High Grade Acid			
Phosphate .....	14.00	..	..
High Grade Swift's Special High Grade Acid			
Phosphate .....	16.00	..	..
Standard Grade Swift's Chattahoochee Standard			
Grade Acid Phosphate.....	12.00	..	..
High Grade Swift's Ground Dried Blood.....	..	13.18	..
Swift's Pure Nitrate of Soda.....	..	14.82	..
Swift's Pure Raw Bone Meal.....Total	23.00	3.71	..
Swift's Muriate of Potash.....	..	..	50.00
Swift's German Kainit.....	..	..	12.00
Swift's Farmers' Favorite High Grade Guano...	9.00	1.65	3.00
Swift's Pioneer High Grade Guano.....	8.00	1.65	4.00
High Grade Swift's Eagle High Grade Guano...	10.00	1.65	2.00
Swift's Atlanta High Grade Phosphate and Pot-			
ash .....	12.00	..	4.00
<i>Southern Chemical Co., Inc., Roanoke, Va.—</i>			
Our Favorite .....	8.00	1.64	2.00
Farmers' Joy .....	8.00	1.64	4.00
Our Leader .....	9.00	.82	2.00
Harvest King .....	8.00	.82	3.00
Southern Queen .....	8.00	2.46	10.00
Valley Chief .....	8.50	1.64	2.00
<i>Spartanburg Fertilizer Co., Spartanburg, S. C.—</i>			
Corn Formula .....	10.50	1.65	5.00
Gosnell's Plant Food .....	10.50	2.46	2.00
West's Potash Acid.....	13.00	..	3.00
Bold Buster .....	9.00	1.65	2.00
Potato Guano .....	7.00	2.46	7.00
Tiger Brand Acidulated Phosphate.....	14.00	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>The Southern Exchange Co., Maxton, N. C.—</i>			
Melon Grower .....	8.00	4.12	7.00
McKimmon's Special Truck Formula.....	8.00	4.12	7.00
Two Fours Guano.....	7.00	3.30	4.00
That Big Stick Guano.....	8.00	2.47	4.00
Bull of the Woods Fertilizer.....	8.00	2.47	4.00
Jack's Best Fertilizer.....	8.00	2.47	3.00
Correct Cotton Compound.....	8.00	2.47	3.00
Juicy Fruit Fertilizer.....	9.00	1.85	4.00
The Walnut Fertilizer.....	8.50	2.06	2.50
The Racer Guano.....	8.00	1.65	3.00
The Coon Guano.....	8.00	1.65	2.00
R. M. C. Special Crop Grower.....	8.00	2.47	3.00
S. E. C. Bone and Potash Mixture.....	10.00	..	4.00
S. E. C. Bone and Potash Mixture.....	10.00	..	2.00
S. E. C. Acid Phosphate.....	16.00	..	..
S. E. C. Acid Phosphate.....	14.00	..	..
Genuine German Kainit.....	..	..	12.00
Muriate of Potash.....	..	..	50.00
Nitrate of Soda.....	..	15.65	..
<i>The Southern Cotton Oil Co., Charlotte District, Concord, Charlotte, Davidson, Madison, Shelby, and Gibson.—</i>			
Conqueror .....	8.00	3.28	4.00
Gloria .....	8.00	1.65	2.00
Peacock .....	8.00	2.46	3.00
Red Bull .....	8.00	2.05	2.00
Noon .....	8.00	2.46	3.00
King Bee .....	8.65	1.65	2.00
Gold Seal .....	14.00	..	..
Silver King .....	13.00	..	..
Genuine German Kainit.....	..	..	12.00
Magnolia Bone and Potash.....	10.00	..	2.00
Conqueror Bone and Potash.....	10.00	..	4.00
Cotton Seed Meal.....	2.30	6.18	1.50
Choice .....	8.00	3.30	6.00
Genuine German Kainit.....	..	..	12.00
Magnolia B. and P.....	10.00	..	2.00
Conqueror B. and P.....	12.00	..	4.00
Southern Cotton Oil Co.'s 16 Per Cent Acid Phosphate .....	16.00	..	..
Razem .....	9.00	1.65	3.00
<i>Southern Cotton Oil Co., Goldsboro, Fayetteville Rocky Mount and Wilson.—</i>			
Rocky Mount Oil Mill Standard.....	8.00	1.65	2.00
Fayetteville Oil Mill Standard.....	8.00	1.65	2.00
Goldsboro Oil Mill Standard.....	8.00	1.65	2.00
Wilson Oil Mill Standard.....	8.00	1.65	2.00
The Southern Cotton Oil Company Standard....	8.00	1.65	2.00
Fayetteville Oil Mill Special Cotton Grower...	8.00	2.47	3.00
Wilson Oil Mill Special Cotton Grower.....	8.00	2.47	3.00
Rocky Mount Oil Mill Special Cotton Grower...	8.00	2.47	3.00
Goldsboro Oil Mill Special Cotton Grower.....	8.00	2.47	3.00
Goldsboro Oil Mill High Grade.....	8.00	2.26	2.50
Rocky Mount Oil Mill High Grade.....	8.00	2.26	2.50

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Fayetteville Oil Mill High Grade.....	8.00	2.26	2.50
Wilson Oil Mill High Grade.....	8.00	2.26	2.50
The Southern Cotton Oil Co. High Grade.....	8.00	2.26	2.50
Edgerton's Old Reliable.....	8.00	2.47	3.00
Hale's Special for Tobacco.....	8.00	2.47	4.00
Pine Level High Grade.....	8.00	2.47	3.00
Cotton Grower for all Crops.....	8.00	1.65	2.00
Best & Thompson's Special.....	9.00	2.26	2.00
The Southern Cotton Oil Co.'s Special Tobacco Grower .....	8.00	2.47	3.00
Echo .....	8.00	2.06	3.00
Morning Glory .....	8.00	2.47	3.00

*Tuscarora Fertilizer Co., Atlanta, Ga., and Wilmington, N. C.—*

Acid Phosphate .....	14.00	..	..
Acid Phosphate .....	13.00	..	..
Tuscarora Alkaline .....	10.00	..	5.00
Bone Potash .....	10.00	..	2.00
Champion .....	8.00	2.06	2.50
Manure Substitute .....	6.00	3.30	4.00
Tuscarora Trucker .....	8.00	4.12	7.00
Berry King .....	8.00	2.06	4.00
Tobacco Special .....	8.00	2.47	3.00
Tuscarora Fruit and Potato.....	8.00	1.65	10.00
Cotton Special .....	8.00	2.47	3.00
King Cotton .....	8.00	2.06	2.00
Big Four .....	7.00	1.65	4.00
Tuscarora Standard .....	8.00	1.65	2.00
Sulphate of Potash.....	..	..	50.00
Muriate of Potash.....	..	..	48.00
Kainit .....	..	..	12.00
Nitrate of Soda .....	..	14.85	..
Acid Phosphate .....	16.00	..	..
Tuscarora Bone and Potash.....	8.00	..	4.00
Tuscarora Bone and Potash.....	10.00	..	4.00

*Tide Water Fertilizer Co., Portsmouth, Va.—*

Tide Water Acid Phosphate.....	14.00	..	..
Tide Water 12 Per Cent German Kainit.....	..	..	12.00
Acid Phosphate and Tankage.....	8.00	2.47	3.00
Tide Water High Grade Cotton.....	8.00	2.47	3.00
Tide Water Tobacco Special.....	8.00	2.47	3.00
Tide Water Very Best Cotton and Corn Guano..	8.00	1.65	2.00

*Union Guano Co., Winston-Salem, N. C.—*

Union 8-5 Bone and Potash.....	8.00	..	5.00
Sulphate of Potash.....	..	..	48.00
Muriate of Potash.....	..	..	48.00
Genuine German Kainit.....	..	..	12.00
Union 12 Per Cent Acid Phosphate.....	12.00	..	..
Union Dissolved Bone.....	13.00	..	..
Union High Grade Acid Phosphate.....	14.00	..	..
Union 16 Per Cent Acid Phosphate.....	16.00	..	..
Union 12-3 Bone and Potash.....	12.00	..	3.00
Union 10-6 Bone and Potash.....	10.00	..	6.00
Union 10-5 Bone and Potash.....	10.00	..	5.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Union 10-4 Bone and Potash.....	10.00	..	4.00
Union 8-5 Bone and Potash.....	8.00	..	5.00
Union 12-4 Bone and Potash.....	12.00	..	4.00
Union 12-5 Bone and Potash.....	12.00	..	5.00
Union Wheat Mixture.....	8.00	..	4.00
Union Bone and Potash.....	10.00	..	2.00
Quakers' Grain Mixture.....	10.00	..	4.00
Giant Phosphate and Potash.....	10.00	..	3.00
Liberty Bell Crop Grower.....	10.50	..	1.50
Roseboro's Special Potash Mixture.....	12.00	..	6.00
Union Potato Mixture.....	8.00	1.65	10.00
Union Dissolved Animal Bone.....	12.50	2.06	..
Union Vegetable Compound.....	7.00	4.12	8.00
Union Truck Guano.....	7.00	3.29	5.00
Union Premium Guano.....	8.00	3.29	4.00
Union Perfect Cotton Grower.....	9.00	2.26	2.00
Union Standard Tobacco Grower.....	8.00	2.06	2.00
Union Mule Brand Guano.....	10.00	1.65	2.00
Union Water Fowl Guano.....	8.00	2.06	3.00
Union Homestead Guano.....	8.00	2.37	3.00
Union Superlative Guano.....	8.00	.82	4.00
Union Special Formula for Cotton.....	10.00	2.47	3.00
Union Complete Cotton Mixture.....	9.00	1.65	3.00
Old Homestead Guano.....	8.00	1.65	2.00
Victoria High Grade Tobacco Guano.....	8.00	2.47	3.00
Sparger's Special Tobacco Grower.....	8.00	1.65	3.00
Old Homestead Tobacco Guano.....	8.00	1.65	2.00
Genuine Animal Bone Meal..... Total	22.50	3.70	..
Nitrate of Soda.....	..	15.65	..
Quality and Quantity Guano.....	9.00	1.65	1.00

*R. L. Upshur, Norfolk, Va.—*

Cotton Seed Meal Mixture.....	9.00	2.26	2.00
Nitrate of Soda.....	..	15.65	..
Quality and Quantity Guano.....	9.00	1.65	1.00
Nitrate of Soda.....	..	15.22	..
Muriate of Potash.....	..	..	50.00
Genuine German Kainit.....	..	..	12.00
Upshur's High Grade Acid Phosphate.....	14.00	..	..
Upshur's Peanut Guano.....	8.00	1.65	2.00
Upshur's G., G. & C. (Grain, Grass and Cotton Guano).....	8.00	1.65	2.00
Upshur's Wheat Compound.....	12.00	..	5.00
Upshur's F. F. V. (Favorite Fertilizer of Virginia).....	8.00	1.64	2.00
Upshur's Bone and Potash Guano.....	10.00	..	2.00
Upshur's Norfolk Special 10 Per Cent Guano....	5.00	8.22	2.00
Upshur's 7 Per Cent Irish Potato Guano.....	6.00	5.76	5.00
Upshur's F. C. (Farmers' Challenge) Guano....	6.00	5.76	6.00
Upshur's 7 Per Cent Special Potato Guano.....	5.00	5.76	5.00
Upshur's Special Truck Guano.....	7.00	4.11	8.00
Upshur's F. F. (Farmers' Favorite).....	7.00	4.11	6.00
Upshur's 5 Per Cent Guano.....	5.00	4.11	5.00
Upshur's Fish, Bone and Potash Guano.....	8.00	1.64	4.00
Upshur's 8-3-3 Cotton Guano.....	8.00	2.47	3.00
Upshur's High Grade Tobacco Guano.....	8.00	2.47	3.00
Premo Cotton Guano.....	8.00	1.65	2.00
Upshur's Special 2½ 8-3 Guano.....	8.00	2.05	3.00
Upshur's 16 Per Cent Acid Phosphate.....	16.00	..	..
Upshur's 4-6-4 Guano.....	6.00	3.69	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Venable Fertilizer Co., Richmond, Va.—</i>			
Venable's 10 Per Cent Trucker .....	6.00	8.23	2.00
Venable's 6-6-6 Manure .....	6.00	4.94	6.00
Venable's 5 Per Cent Trucker .....	8.00	4.11	5.00
Venable's 4 Per Cent Trucker .....	8.00	3.29	4.00
Venable's Ideal Manure .....	8.00	1.65	5.00
Venable's Alliance Tobacco Manure No. 1....	8.00	2.06	3.00
Venable's Alliance Tobacco Manure No. 2.....	8.00	1.65	2.00
Venable's B. B. P. Manure .....	9.00	1.65	1.00
Venable's Cotton Grower .....	8.00	2.06	3.00
Venable's Roanoke Special .....	8.00	2.06	3.00
Venable's Alliance Bone and Potash Mixture..	8.00	..	4.00
Venable's Peanut Grower .....	8.00	..	4.00
Venable's Best Acid Phosphate .....	16.00	..	..
Venable's Alliance Acid Phosphate .....	14.00	..	..
Venable's Dissolved Bone .....	13.00	..	..
Venable's Standard Acid Phosphate .....	12.00	..	..
Bone and Potash Mixture .....	10.00	..	2.00
High Grade Bone and Potash Mixture .....	10.00	..	4.00
Planters' Bone Fertilizer.....	8.00	1.65	2.00
Ballard's Choice Fertilizer .....	8.00	2.47	3.00
Roanoke Mixture .....	9.00	2.26	2.00
Roanoke Meal Mixture .....	9.00	2.26	2.00
Bone Meal .....	Total 25.00	2.47	..
Pure Raw Bone.....	Total 20.00	3.20	..
Muriate of Potash .....	..	..	50.00
Nitrate of Soda.....	..	15.63	..
Sulphate of Potash .....	..	..	48.00
Pure German Kainit .....	..	..	12.00
Venable's Corn, Wheat and Grass Fertilizer...	10.00	.82	1.00
Venable's Peanut Special .....	8.00	.82	4.00

*Virginia-Carolina Chemical Co., Richmond, Va.—*

V.-C. C. Co.'s Special High Grade Potash Mix- ture .....	12.00	..	6.00
V.-C. C. Co.'s 14 Per Cent Acid Phosphate.....	14.00	..	..
V.-C. C. Co.'s 16 Per Cent Acid Phosphate.....	16.00	..	..
V.-C. C. Co.'s Standard Bone and Potash.....	10.00	..	5.00
V.-C. C. Co.'s Special Crop Grower.....	12.00	..	3.00
V.-C. C. Co.'s Formula 4-4.....	7.00	2.55	3.20
V.-C. C. Co.'s Special Truck Guano.....	6.00	4.10	7.00
V.-C. C. Co.'s Special.....	8.00	3.28	4.00
V.-C. C. Co.'s Special Potash Mixture.....	10.00	..	4.00
V.-C. C. Co.'s Lion's High Grade Tobacco Fer- tilizer .....	8.00	2.46	4.00
V.-C. C. Co.'s Invincible High Grade Fertilizer..	6.00	4.10	7.00
V.-C. C. Co.'s High Grade Tobacco Fertilizer...	8.00	2.46	10.00
Great Texas Cotton Grower Soluble Guano....	9.00	2.46	4.00
Cock's Soluble High Grade Animal Bone.....	9.00	1.85	3.00
Truck Crop Fertilizer.....	7.00	4.10	7.00
Prolific Cotton Grower.....	9.00	2.26	2.00
Battle's Crop Grower.....	12.00	..	3.00
3 Per Cent Special C. S. M. Guano No. 3.....	8.00	2.46	2.00
Delta C. S. M.....	8.00	2.26	2.50
Winston Special for Cotton C. S. M.....	8.00	1.65	2.00
Diamond Dust C. S. M.....	8.00	1.65	2.00
Admiral .....	8.00	2.46	2.50
Blue Star C. S. M.....	8.00	2.05	3.00
Good Luck C. S. M.....	8.00	2.46	2.50

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
North State Guano C. S. M.....	9.00	1.65	1.00
Plant Food .....	8.00	1.65	2.00
Split Silk C. S. M.....	8.00	2.46	2.50
Superlative C. S. M. Guano.....	8.00	2.06	3.00
Farmers' Friend Favorite Fertilizer Special....	8.50	1.65	2.00
White Stem C. S. M.....	9.00	2.26	2.00
Special High Grade Tobacco Fertilizer C. S. M..	8.00	2.46	3.00
Wilson's Standard C. S. M.....	8.00	1.65	2.00
Adams' Special .....	8.00	2.46	3.00
Ajax C. S. M. Guano.....	8.00	1.65	2.00
Royal Crown .....	8.00	2.26	2.00
Farmers' Favorite Fertilizer C. S. M.....	8.00	1.65	2.00
Atlas Guano C. S. M.....	8.00	2.46	2.50
Blake's Best .....	8.00	2.46	3.00
Orange Grove .....	8.00	2.26	2.50
Carr's 8-4-4 Crop Grower.....	8.00	3.28	4.00
Ford's Wheat and Corn Guano.....	9.00	.82	2.00
Konqueror High Grade Truck Fertilizer.....	7.00	4.10	5.00
Goodman's Special Potash Mixture.....	12.00	..	5.00
Jones' Grain Special.....	8.00	..	4.00
Raw Bone Meal .....	Total 22.50	3.70	..
Dissolved Animal Bone.....	12.50	2.05	..
Sludge Acid Phosphate.....	14.00	..	..
Manure Salts .....	..	..	20.00
Sulphate of Potash.....	..	..	50.00
Sulphate of Ammonia.....	..	20.59	..
Fish Scrap .....	..	8.25	..
Nitrate of Soda.....	..	15.68	..
Genuine German Kainit.....	..	..	12.00
Muriate of Potash.....	..	..	48.00
V.-C. C. Co.'s Grain Special.....	10.00	..	6.00
V.-C. C. Co.'s Dissolved Bone and Potash.....	10.00	..	2.00
Diamond Cotton Seed Meal Guano.....	8.00	2.47	3.00
Bold Buster Guano.....	10.00	1.65	2.00
Bigelow's Crop Guano.....	9.00	.82	3.00
V.-C. C. Co.'s 12-4 Grain Grower.....	12.00	..	4.00
Jeffreys' High Grade Guano.....	9.00	2.47	3.00
V.-C. C. Co.'s High Grade Top Dresser.....	4.00	6.18	2.50
V.-C. C. Co.'s 13 Per Cent Acid Phosphate....	13.00	..	..
Haynes' Special Cotton Fertilizer.....	8.00	1.65	2.00
Parker & Hunter's Special.....	8.00	1.65	2.00
Allison & Addison's Star Brand Vegetable Guano .....	8.00	3.70	4.00
Allison & Addison's Star Special Tobacco Ma- nure .....	9.00	2.26	2.00
Allison & Addison's Anchor Brand Tobacco Fer- tilizer .....	8.50	2.26	2.00
Allison & Addison's Anchor Brand Fertilizer....	8.00	1.65	2.00
Allison & Addison's A. A. Guano.....	8.00	2.46	3.00
Allison & Addison's Old Hickory Guano.....	8.00	1.65	2.00
Allison & Addison's Star Brand Guano.....	9.00	1.65	1.00
Allison & Addison's B. P. Potash Mixture.....	10.00	..	2.00
Allison & Addison's McGavock's Special Potash Mixture .....	10.00	..	2.00
Allison & Addison's Fulton Acid Phosphate....	14.00	..	..
Allison & Addison's I. X. L. Acid Phosphate....	13.00	..	..
Allison & Addison's Standard Acid Phosphate..	12.00	..	..
Allison & Addison's Rocket Acid Phosphate....	12.00	..	..
Atlantic and Virginia Fertilizer Co.'s Eureka Acid Phosphate .....	16.00	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Atlantic and Virginia Fertilizer Co.'s Crenshaw Acid Phosphate .....	13.00	..	..
Atlantic and Virginia Fertilizer Co.'s Valley of Virginia Acid Phosphate.....	14.00	..	..
Atlantic and Virginia Fertilizer Co.'s Our Acid Phosphate .....	12.00	..	..
Atlantic and Virginia Fertilizer Co.'s Eureka Bone and Potash Compound.....	10.00	..	2.00
Atlantic and Virginia Fertilizer Co.'s Eureka Ammoniated Bone Special for Tobacco.....	9.00	2.05	2.00
Atlantic and Virginia Fertilizer Co.'s Eureka Ammoniated Bone .....	8.00	1.65	3.00
Atlantic and Virginia Fertilizer Co.'s Carolina Truckers .....	7.00	5.74	7.00
Atlantic and Virginia Fertilizer Co.'s Virginia Truckers .....	8.00	4.10	5.00
Atlantic and Virginia Fertilizer Co.'s Orient Special for Tobacco.....	8.00	1.65	2.00
Atlantic and Virginia Fertilizer Co.'s Orient Complete Manure .....	9.00	1.65	2.00
Charlotte Oil and Fertilizer Co.'s King Cotton Grower .....	8.00	1.65	2.00
Charlotte Oil and Fertilizer Co.'s The Leader B. G.....	8.00	1.65	2.00
Charlotte Oil and Fertilizer Co.'s Groom's Special Tobacco Fertilizer.....	8.00	2.46	4.00
Charlotte Oil and Fertilizer Co.'s Charlotte Dissolved Bone .....	12.00	..	..
Charlotte Oil and Fertilizer Co.'s Charlotte Ammoniated Guano B. G.....	8.00	2.05	1.50
Charlotte Oil and Fertilizer Co.'s Charlotte Ammoniated Guano C. S. M.....	8.00	2.05	1.50
Charlotte Oil and Fertilizer Co.'s Charlotte Acid Phosphate .....	13.00	..	..
Charlotte Oil and Fertilizer Co.'s Catawba Guano B. G.....	8.00	2.46	3.00
Charlotte Oil and Fertilizer Co.'s Catawba Acid Phosphate .....	14.00	..	..
Charlotte Oil and Fertilizer Co.'s Queen of the Harvest C. S. M.....	9.00	1.65	2.00
Charlotte Oil and Fertilizer Co.'s Oliver's Perfect Wheat Grower.....	11.00	2.46	4.00
Charlotte Oil and Fertilizer Co.'s 10-2 Bone and Potash .....	10.00	..	2.00
Charlotte Oil and Fertilizer Co.'s 15 Per Cent Acid Phosphate .....	15.00	..	..
Charlotte Oil and Fertilizer Co.'s McCrary's Diamond Bone and Potash.....	8.00	..	4.00
Charlotte Oil and Fertilizer Co.'s Special 3 Per Cent Guano C. S. M.....	8.00	2.46	2.00
Charlotte Oil and Fertilizer Co.'s High Grade Special Tobacco Fertilizer.....	9.00	2.05	2.00
Davie & Whittle's Owl Brand Guano for Tobacco .....	8.00	2.46	3.00
Davie & Whittle's Owl Brand Special Tobacco Guano .....	9.00	2.05	2.00
Davie & Whittle's Owl Brand Truck Guano....	8.00	4.92	5.00
Davie & Whittle's Owl Brand Guano.....	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Davie & Whittle's Owl Brand Acid Phosphate with Potash .....	10.00	..	2.00
Davie & Whittle's Owl Brand High Grade Dissolved Bone .....	14.00	..	..
Davie & Whittle's Owl Brand Dissolved Bone...	12.00	..	..
Davie & Whittle's Owl Brand High Grade Acid Phosphate .....	16.00	..	..
Davie & Whittle's Owl Brand High Grade 3 Per Cent Soluble Guano.....	9.00	2.05	3.00
Davie & Whittle's Owl Brand Acid Phosphate..	13.00	..	..
Davie & Whittle's Vinco Guano.....	8.00	1.65	2.00
Durham Fertilizer Co.'s Blacksburg Soluble Guano .....	8.00	1.65	2.00
Durham Fertilizer Co.'s Blacksburg Soluble Bone .....	13.00	..	..
Durham Fertilizer Co.'s Diamond Wheat Mixture .....	10.00	..	3.00
Durham Fertilizer Co.'s Standard Wheat and Corn Grower .....	10.00	..	2.00
Durham Fertilizer Co.'s Excelsior Dissolved Bone Phosphate .....	14.00	..	..
Durham Fertilizer Co.'s Double Bone Phosphate, Durham Fertilizer Co.'s Blue Ridge Wheat Grower .....	13.00	..	..
Durham Fertilizer Co.'s Carr's Special Wheat Grower .....	10.00	..	2.00
Durham Fertilizer Co.'s Standard Guano.....	8.00	..	4.00
Durham Fertilizer Co.'s Best Potato Manure...	9.00	1.65	2.00
Durham Fertilizer Co.'s L. & N. Special.....	7.00	5.74	7.00
Durham Fertilizer Co.'s Special Plant and Truck Fertilizer .....	9.00	2.46	2.00
Durham Fertilizer Co.'s Golden Leaf Bright Tobacco Guano .....	8.00	4.10	3.00
Durham Fertilizer Co.'s Golden Leaf Bright Tobacco Guano .....	8.00	2.46	3.00
Durham Fertilizer Co.'s Gold Medal Brand Guano .....	8.00	2.46	3.00
Durham Fertilizer Co.'s Durham Bone and Potash Mixture .....	10.00	..	2.00
Durham Fertilizer Co.'s Genuine Bone and Peruvian Guano .....	8.00	1.65	2.00
Durham Fertilizer Co.'s Genuine Bone and Peruvian Tobacco Guano.....	8.00	1.65	2.00
Durham Fertilizer Co.'s Raw Bone Superphosphate .....	8.00	2.05	1.50
Durham Fertilizer Co.'s Raw Bone Superphosphate for Tobacco.....	8.00	2.05	2.00
Durham Fertilizer Co.'s N. C. Farmers' Alliance Official Guano .....	8.00	2.05	3.00
Durham Fertilizer Co.'s N. C. Farmers' Alliance Official Acid Phosphate.....	13.00	..	..
Durham Fertilizer Co.'s Standard High Grade Acid Phosphate .....	14.00	..	..
Durham Fertilizer Co.'s Great Potato and Corn Grower .....	10.50	..	1.50
Durham Fertilizer Co.'s Progressive Farmer Guano .....	8.00	1.65	2.00
Durham Fertilizer Co.'s Durham Ammoniated Fertilizer .....	9.00	1.65	1.00
Durham Fertilizer Co.'s Durham Best Acid Phosphate .....	13.00	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Durham Fertilizer Co.'s Durham Acid Phosphate .....	12.00	..	..
Lynchburg Guano Co.'s New Era.....	8.00	1.65	2.00
Lynchburg Guano Co.'s Ironside Acid Phosphate,	16.00	..	..
Lynchburg Guano Co.'s Spartan Acid Phosphate,	12.00	..	..
Lynchburg Guano Co.'s Arvonla Acid Phosphate,	13.00	..	..
Lynchburg Guano Co.'s S. W. Special Bone and Potash Mixture .....	10.00	..	4.00
Lynchburg Guano Co.'s Alpine Mixture.....	10.00	..	5.00
Lynchburg Guano Co.'s Dissolved Bone and Potash .....	10.00	..	2.00
Lynchburg Guano Co.'s Independent Standard..	8.50	1.65	2.00
Lynchburg Guano Co.'s Solid Gold Tobacco.....	8.00	2.26	4.00
Lynchburg Guano Co.'s Lynchburg High Grade Acid Phosphate .....	14.00	..	..
Lynchburg Guano Co.'s Lynchburg Soluble.....	8.00	1.65	2.00
Lynchburg Guano Co.'s Lynchburg Soluble for Tobacco .....	8.00	1.65	2.00
Norfolk and Carolina Chemical Co.'s Crescent Brand Ammoniated Fertilizer.....	8.00	1.65	2.00
Norfolk and Carolina Chemical Co.'s Cooper's Bright Tobacco .....	8.00	2.05	3.00
Norfolk and Carolina Chemical Co.'s Norfolk Trucker and Tomato Grower.....	8.00	4.10	5.00
Norfolk and Carolina Chemical Co.'s Genuine Slaughter House Bone.....	8.00	1.65	2.00
Norfolk and Carolina Chemical Co.'s Genuine Slaughter House Bone, Made Especially for Tobacco .....	8.00	2.05	2.00
Norfolk and Carolina Chemical Co.'s Amazon High Grade Manure.....	8.00	2.46	3.00
Norfolk and Carolina Chemical Co.'s Bright Leaf Tobacco Grower .....	8.00	2.46	3.00
Norfolk and Carolina Chemical Co.'s Norfolk Bone and Potash.....	10.00	..	2.00
Norfolk and Carolina Chemical Co.'s Norfolk Soluble Bone .....	12.00	..	..
Norfolk and Carolina Chemical Co.'s Norfolk Best Acid Phosphate.....	13.00	..	..
Norfolk and Carolina Chemical Co.'s Norfolk Reliable Acid Phosphate.....	14.00	..	..
Old Dominion Guano Co.'s Standard Raw Bone Soluble Guano .....	8.00	1.65	2.00
Old Dominion Guano Co.'s Farmers' Friend High Grade Fertilizer .....	8.00	2.46	3.00
Old Dominion Guano Co.'s Farmers' Friend Fertilizer .....	8.00	1.65	2.00
Old Dominion Guano Co.'s Farmers' Friend Special Tobacco Fertilizer.....	8.00	2.46	3.00
Old Dominion Guano Co.'s Old Dominion Special Wheat Guano .....	8.00	1.65	2.00
Old Dominion Guano Co.'s Old Dominion Special Sweet Potato Guano.....	6.00	1.65	6.00
Old Dominion Guano Co.'s Old Dominion Soluble Tobacco Guano.....	8.00	1.65	2.00
Old Dominion Guano Co.'s Old Dominion Soluble Guano .....	8.00	1.65	2.00
Old Dominion Guano Co.'s Old Dominion Potato Manure .....	7.00	4.10	8.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Old Dominion Guano Co.'s Old Dominion Raw Bone Soluble Guano.....	9.00	2.05	3.00
Old Dominion Guano Co.'s Old Dominion 6-7-5 Truck Guano .....	6.00	5.74	5.00
Old Dominion Guano Co.'s Old Dominion 7-7-7 Truck Guano .....	7.00	5.74	7.00
Old Dominion Guano Co.'s Old Dominion Alkaline Bone and Potash.....	10.00	..	2.00
Old Dominion Guano Co.'s Bullock's Cotton Grower .....	8.00	1.65	2.00
Old Dominion Guano Co.'s Osceola Tobacco Guano .....	8.00	2.05	3.00
Old Dominion Guano Co.'s Dissolved Bone and Potash .....	10.00	..	2.00
Old Dominion Guano Co.'s Millers' Special Wheat Mixture .....	8.00	..	4.00
Old Dominion Guano Co.'s Planters' Bone and Potash Mixture .....	10.00	..	3.00
Old Dominion Guano Co.'s Bone Phosphate.....	13.00	..	..
Old Dominion Guano Co.'s Royster's Acid Phosphate .....	12.00	..	..
Old Dominion Guano Co.'s High Grade Acid Phosphate .....	14.00	..	..
Powers, Gibb & Co.'s Almont Acid Phosphate..	12.00	..	..
Powers, Gibb & Co.'s Cotton Brand Best Acid Phosphate .....	13.00	..	..
Powers, Gibb & Co.'s Almont High Grade Acid Phosphate .....	14.00	..	..
Powers, Gibb & Co.'s Fulp's Acid Phosphate 13 Per Cent .....	13.00	..	..
Powers, Gibb & Co.'s Cotton Brand Acid Phosphate .....	12.00	..	..
Powers, Gibb & Co.'s Acid Phosphate and Potash .....	10.50	..	1.50
Powers, Gibb & Co.'s Almont Wheat Mixture...	10.00	..	3.00
Powers, Gibb & Co.'s Dissolved Bone and Potash,	10.00	..	2.00
Powers, Gibb & Co.'s Almont Soluble Ammoniated Guano .....	8.00	1.65	2.00
Powers, Gibb & Co.'s Carolina Golden Belt Ammoniated Guano for Tobacco.....	8.00	2.05	3.00
Powers, Gibb & Co.'s Truck Farmers' Special Ammoniated Guano .....	8.00	3.28	5.00
Powers, Gibb & Co.'s Old Kentucky High Grade Manure .....	8.00	2.46	3.00
Powers, Gibb & Co.'s Cotton Seed Meal Standard Guano .....	9.00	2.46	2.00
Powers, Gibb & Co.'s Cotton Seed Meal Soluble Ammoniated Guano .....	8.00	1.65	2.00
Powers, Gibb & Co.'s Cotton Belt Ammoniated Guano .....	8.00	2.46	2.00
Powers, Gibb & Co.'s Eagle Island Ammoniated,	8.00	1.65	2.00
Powers, Gibb & Co.'s Cotton Brand Ammoniated Dissolved Bone .....	8.00	3.28	4.00
Powers, Gibb & Co.'s Gibb's Ammoniated Guano,	8.00	2.05	1.50
Powers, Gibb & Co.'s Powers' Ammoniated Guano .....	8.00	2.05	2.00
Southern Chemical Co.'s Electric Tobacco Guano,	8.00	1.65	2.00
Southern Chemical Co.'s Electric Standard Guano .....	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Southern Chemical Co.'s Pilot Ammoniated Guano Special for Tobacco.....	8.00	2.05	3.00
Southern Chemical Co.'s George Washington Plant Bed Fertilizer for Tobacco.....	8.00	2.46	2.50
Southern Chemical Co.'s Sun Brand Guano....	9.00	2.05	5.00
Southern Chemical Co.'s Yadkin Complete Fertilizer .....	8.00	1.65	2.00
Southern Chemical Co.'s Solid South.....	10.00	..	6.00
Southern Chemical Co.'s Chick's Special Wheat Compound .....	8.00	..	4.00
Southern Chemical Co.'s Mammoth Wheat and Grass Grower .....	10.00	..	2.00
Southern Chemical Co.'s Winston Bone and Potash Compound .....	10.00	..	2.00
Southern Chemical Co.'s Winner Grain Mixture,	10.00	..	4.00
Southern Chemical Co.'s Mammoth Corn Grower,	10.00	..	2.00
Southern Chemical Co.'s Farmers' Pride Bone and Potash .....	10.00	..	3.00
Southern Chemical Co.'s Reaper Grain Application .....	12.00	..	3.00
Southern Chemical Co.'s Quickstep Bone and Potash .....	11.00	..	5.00
Southern Chemical Co.'s Tar Heel Acid Phosphate .....	12.00	..	..
Southern Chemical Co.'s Red Cross 14 Per Cent Acid Phosphate .....	14.00	..	..
Southern Chemical Co.'s Comet 16 Per Cent Acid Phosphate .....	16.00	..	..
Southern Chemical Co.'s Chick's 16 Per Cent Acid Phosphate .....	16.00	..	..
Southern Chemical Co.'s Chatham Acid Phosphate .....	13.00	..	..
Southern Chemical Co.'s Horseshoe Acid Phosphate .....	12.00	..	..
Southern Chemical Co.'s Victor Acid Phosphate,	13.00	..	..
J. G. Tinsley & Co.'s Champion Acid Phosphate,	16.00	..	..
J. G. Tinsley & Co.'s Dissolved S. C. Bone.....	13.00	..	..
J. G. Tinsley & Co.'s Powhatan Acid Phosphate,	14.00	..	..
J. G. Tinsley & Co.'s Richmond Brand Guano..	8.00	2.46	3.00
J. G. Tinsley & Co.'s Lee Brand Guano.....	8.00	1.65	2.00
J. G. Tinsley & Co.'s Killickinick Tobacco Mixture .....	8.00	2.05	3.00
J. G. Tinsley & Co.'s Stonewall Brand Acid Phosphate .....	12.00	..	..
J. G. Tinsley & Co.'s Stonewall Brand Guano..	8.00	1.65	2.00
J. G. Tinsley & Co.'s Stonewall Tobacco Guano,	8.00	1.65	2.00
J. G. Tinsley & Co.'s Tinsley's Special Irish Potato Grower .....	6.00	5.74	6.00
J. G. Tinsley & Co.'s Tinsley's Bone and Potash Mixture .....	10.00	..	2.00
J. G. Tinsley & Co.'s Tinsley's Strawberry Grower .....	6.00	3.28	4.00
J. G. Tinsley & Co.'s Tinsley's 10 Per Cent Truck Guano .....	5.00	8.25	2.50
J. G. Tinsley & Co.'s Tinsley's Irish Potato Grower .....	6.00	4.92	6.00
J. G. Tinsley & Co.'s Tinsley's Tobacco Fertilizer,	8.00	3.28	2.50
J. G. Tinsley & Co.'s Tinsley's 7 Per Cent Ammoniated Guano for Beans, Peas, Cabbage, Strawberries, etc.....	6.00	5.74	6.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
S. W. Travers & Co.'s National Fertilizer.....	8.00	1.65	2.00
S. W. Travers & Co.'s National Special Tobacco Fertilizer .....	8.00	1.65	2.00
S. W. Travers & Co.'s Beef, Blood and Bone Fertilizer .....	8.00	1.65	2.00
S. W. Travers & Co.'s Standard Dissolved S. C. Bone .....	13.00	..	..
S. W. Travers & Co.'s Travers' Dissolved Bone Phosphate .....	14.00	..	..
S. W. Travers & Co.'s Capital Dissolved Bone. . .	12.00	..	..
S. W. Travers & Co.'s Capital Cotton Fertilizer,	8.00	2.05	2.00
S. W. Travers & Co.'s Capital Bone and Potash Compound .....	10.00	..	2.00
S. W. Travers & Co.'s Capital Truck Fertilizer..	8.00	3.28	3.00
S. W. Travers & Co.'s Capital Tobacco Fertilizer,	8.00	3.28	3.00
S. W. Travers & Co.'s Farmers' Special Wheat Compound .....	8.00	..	4.00
S. W. Travers & Co.'s Farmers' 7 Per Cent Truck Fertilizer .....	6.00	5.74	5.00
Virginia State Fertilizer Co.'s Virginia State Dissolved Bone and Potash.....	10.00	..	2.00
Virginia State Fertilizer Co.'s Virginia State Guano .....	8.00	1.65	2.00
Virginia State Fertilizer Co.'s Virginia State High Grade Tobacco Guano.....	8.00	2.46	3.00
Virginia State Fertilizer Co.'s Number One Sol- uble Guano .....	9.00	1.65	2.00
Virginia State Fertilizer Co.'s XX Potash Mix- ture .....	10.00	..	4.00
Virginia State Fertilizer Co.'s Mountain Top Bone and Potash .....	10.00	..	5.00
Virginia State Fertilizer Co.'s Peerless Tobacco Guano .....	8.00	2.46	3.00
Virginia State Fertilizer Co.'s Battle Axe To- bacco Guano .....	8.00	1.65	2.00
Virginia State Fertilizer Co.'s Dunnington's Spe- cial Formula for Tobacco.....	8.00	2.46	3.00
Virginia State Fertilizer Co.'s Austrian Tobacco Grower .....	8.00	2.05	2.00
Virginia State Fertilizer Co.'s Buffalo Guano..	8.00	2.05	3.00
Virginia State Fertilizer Co.'s Gamecock Special for Tobacco .....	8.50	1.65	2.00
Virginia State Fertilizer Co.'s G. E. Special To- bacco Grower .....	8.00	2.05	2.00
Virginia State Fertilizer Co.'s Bull Dog Solu- ble Guano .....	8.00	2.46	3.00
Virginia State Fertilizer Co.'s Clipper Brand Acid Phosphate .....	13.00	..	..
Virginia State Fertilizer Co.'s Highland King...	9.00	1.65	1.00
Virginia State Fertilizer Co.'s Alps Brand Acid Phosphate .....	12.00	..	..
Virginia State Fertilizer Co.'s Bull Run Acid Phosphate .....	16.00	..	..
Virginia State Fertilizer Co.'s Lurich Acid Phos- phate .....	12.00	..	..
Virginia State Fertilizer Co.'s Gilt Edge Brand Acid Phosphate .....	14.00	..	..
Virginia State Fertilizer Co.'s Gilt Edge Brand Dissolved Bone and Potash.....	8.00	..	4.00
Sun Tobacco Fertilizer.....	5.00	5.11	9.20

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Thomas Wakefield, Friendship, N. C.—</i>			
Bone Meal . . . . . Total	21.73	4.12	..
<i>Williams &amp; Clark Fertilizer Co., Charleston, S. C.—</i>			
Standard American Ammoniated Bone Super- phosphate . . . . .	9.00	1.85	1.00
<i>Winborne Guano Co., Tynor, N. C.—</i>			
King Tammany Guano . . . . .	8.00	2.47	3.00
Farmers' Select Guano . . . . .	8.00	2.06	3.00
Winborne's 7 Per Cent Guano . . . . .	5.00	5.75	5.00
Winborne's Excelsior Guano . . . . .	8.00	1.65	2.00
Winborne's Tobacco Guano . . . . .	8.00	2.47	2.00
Winborne's Eureka Guano . . . . .	8.00	1.65	2.00
Winborne's 3-8-4 Guano . . . . .	8.00	2.47	4.00
Winborne's Triumph Guano . . . . .	8.00	1.65	2.00
High Grade Acid Phosphate . . . . .	14.00	..	..
Standard 16 Per Cent Acid Phosphate . . . . .	16.00	..	..
Genuine German Kainit . . . . .	..	..	12.00
<i>T. W. Wood &amp; Sons, Richmond, Va.—</i>			
Standard Grain and Grass Grower . . . . .	8.00	1.65	2.00
Standard High Grade Truckee . . . . .	8.00	4.94	6.00
Standard Potato Fertilizer . . . . .	8.00	1.65	5.00
Standard Vegetable Fertilizer . . . . .	8.00	2.47	3.00
Standard Tobacco Fertilizer . . . . .	8.00	2.47	3.00
Standard High Grade Acid Phosphate . . . . .	14.00	..	..
Standard Bone and Potash Mixture . . . . .	10.00	..	2.00
Wood's Pure Animal Bone . . . . . Total	23.00	2.47	..
Wood's Lawn Enricher . . . . .	6.00	2.47	3.00
Nitrate of Soda . . . . .	..	15.63	..

### REPORT FROM LEAF TOBACCO WAREHOUSES FOR MONTH OF FEBRUARY, 1908.

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Pounds sold for producers, first hand.....	9,920,500
Pounds sold for dealers.....	454,164
Pounds resold for warehouse.....	528,791
Pounds resold for other warehouses.....	11,790
	<hr/>
Total .....	10,915,245

### REPORT FROM LEAF TOBACCO WAREHOUSES FOR MONTH OF MARCH, 1908.

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Pounds sold for producers, first hand.....	5,270,749
Pounds sold for dealers.....	369,092
Pounds resold for warehouse.....	307,895
Pounds resold for other warehouses.....	957
	<hr/>
Total .....	5,948,693





# THE BULLETIN

OF THE

## NORTH CAROLINA

### DEPARTMENT OF AGRICULTURE,

RALEIGH.

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Volume 29.

MAY, 1908.

Number 5.

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#### FARM DEMONSTRATION WORK.



Applying the Lime-Sulphur-Salt Wash with barrel spraying outfit in an orchard of 5,000 bearing pear trees.

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Swannanoa, N. C.



## FARM DEMONSTRATION WORK.

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Within recent years there has been inaugurated a method of extending agricultural knowledge known as *Agricultural Demonstration*. The purpose of this new educational work is not to displace or supplant any of the other established means of increasing and extending agricultural information, such as the Agricultural College, the Agricultural Experiment Stations and the Farmers' Institutes; but it is intended to supplement and assist all other means of bringing the actual tillers of the soil closer to those agricultural facts ascertained by the Experiment Stations and accumulated through long years of experience.

This demonstration method of teaching established agricultural facts to the farmer by operations on his own farm is but another evidence of the present tendencies of scientific methods of teaching. It is the approved modern laboratory method of instruction taken to the individual farm.

The operations already being conducted on the farm are used to demonstrate the value of a knowledge of the few general scientific principles underlying up-to-date farm practices, and that these practices are applicable to and of great value to this particular farm. With *farm crops* the value of better seed and more intelligent fertilization and of better preparation and cultivation of the land are demonstrated. In *fruit growing* the increase in the quantity and quality of the product resulting from better methods of orchard management and the value of more attention to preparing the fruit for market are shown. In *dairying* the unprofitable cows are detected, better methods of care and feeding put in operation, and the greater profits from placing a high-class product on the market proved.

The general method of conducting this farm demonstration work is to send a practical man, having a working knowledge of scientific agriculture and an intimate experience with the special line of work he has in charge, to the farms of the men who are to co-operate in carrying out the demonstration. These visits are made at regular intervals during the period of the demonstrations, in order to make certain that the farmer shall have such instruction and assistance as he may need in performing his part of the work.

When the demonstrator goes to a farm he endeavors to utilize such facilities as already exist there or may easily be obtained. No experiments are undertaken, but only such crops and practices as the value of which have been thoroughly demonstrated are advised. In short, it is demonstration and not experimental work that is contemplated.

The chief obstacle to progress and the introduction of improved methods and implements is that old practices are more easily and perfectly executed because of long practice in following them. A new practice, although in itself much more easily followed and, when well performed, much more effective, may at first be more difficult than the old way, and, for this reason, being less perfectly performed, may be less effective. The personal presence and assistance of the demonstrator in starting new methods and implements of known value removes this obstacle to their introduction and insures them a fair trial, which may lead to their permanent use in future farming operations.

The aim of this demonstration work is simply to assist the farmer to introduce such farm practices as have been proved of value, and thereby enable him to do better farming and get more for his labor. Incidentally, the farmer also obtains much valuable agricultural information.

With the full inauguration of this farm demonstration work the connection between the farmer and agricultural science will be complete. We have the Experiment Stations to verify old and ascertain new facts; the Agricultural Colleges to teach these facts to the few who go to college, and these few to teach the masses, through the medium of the Farmers' Institute, and show the accuracy of their teaching by means of farm demonstrations.

So fully impressed was the State Department of Agriculture with the importance of the work and its possibilities for direct good to agriculture, that, in September, 1907, a division of *Demonstration* was created and Mr. T. B. Parker elected to take charge of this important line of work.

If the fruit growers, truckers, dairymen or general farmers of any section or any individual desires assistance in any line of farm work, the State Department of Agriculture will be glad to co-operate with him and render all assistance possible to enable him to obtain better results from his labor, and, when necessary, a representative from the Department will visit any part of the State and assist in overcoming any agricultural difficulties encountered.

## DEMONSTRATION WORK AS APPLIED TO FARM CROPS.

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BY T. B. PARKER, IN CHARGE OF DEMONSTRATION WORK.

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So far, in North Carolina, demonstration work relating to farm crops has been confined to alfalfa, crimson clover, vetches, and improved varieties of corn and cotton. It was started about two years ago with alfalfa, in co-operation with the United States Department of Agriculture.

Through this co-operation effected with the Federal Department of Agriculture, we were last year able to send crimson clover and vetch to nearly seventy-five farmers living in more than twenty-five counties and embracing nearly every section of the State. These seed are not distributed indiscriminately. They are sent out for the specific purpose of finding out where they will succeed and under what conditions they do best, and to prove to the farmers their economic agricultural value. Each person receiving seed will also be required to keep a record of time of planting, the nature of the land, what crop occupied the land last year, if high land or low land, level land or hill land, the methods of cultivation, fertilization, etc., for which we furnish blanks to be filled out by the co-operator. With this data, covering every variety of soil in the State, different methods of cultivation, fertilization, etc., we can draw conclusions that must be helpful to the agricultural interests of the State. Follow this up a few years, until we have proved by the test of time the results of these farm tests, and we will have a fund of information that will be invaluable to the farmers of the State.

The value of alfalfa as a forage crop, as well as a soil improver, wherever it can be grown, is sufficient reason for the Department of Agriculture to encourage its cultivation, which we are doing on small areas in many parts of the State.

Crimson clover is another of the legumes that we are anxious to see grown all over the State, especially where red clover will not succeed. The Department feels justified in inducing our farmers to grow this crop. It is not only a fine soil improver, but is also a good hay plant.

The vetches also belong to the legume family and are valuable for soil improvement and for hay.

The great value of these plants has been proven at our test farms, and we are desirous of demonstrating to the farmers their value along these lines.

But few reports have as yet come in, but those that have are of a very encouraging nature and give evidence of an interest in these

crops. We have not yet been able to make any definite arrangements in regard to crimson clover and vetch to send out again this fall, but we are hoping to be able to send out even more than we did last season.

In addition to the above-named crops, the Division of Demonstration Work has this year (1908) sent improved seed corn to about 175 co-operators, and improved cotton seed to about an equal number, embracing every section of the State in which cotton is produced in appreciable quantities. Besides, in four counties we are co-operating with Dr. S. A. Knapp, of the United States Department of Agriculture, in demonstration work, the State Department of Agriculture furnishing the seed and Dr. Knapp the demonstrators.

With this nucleus of workers, demonstrators and co-operators scattered all over the State, we are expecting reports that will justify an extension of the work until every county in the State will be occupied.

It has been demonstrated at our test farms that the highest yielding variety of corn will produce almost twice as much corn per acre as the lowest yielding variety tested. Likewise with cotton. At the Edgcombe test farm last year (1907) the best yielding variety of cotton produced \$57.71 worth of lint and seed, while the lowest yielding variety tested produced only \$24.25 worth of lint and seed. If we can introduce the best variety of either corn or cotton in the field of a farmer who is planting the lowest yielding varieties, and let him compare the different varieties, he at once becomes a convert to improved seed. If it were possible to do this on every farm in the State, we would raise the yield per acre for both of these crops to a point that would mean a very greatly increased profit. But the Department of Agriculture cannot do these things alone. It must have the co-operation of the farmers. We are willing to send the seed as long as our supply will permit, and give any instructions or other information at our command, and the co-operators must do the balance.

We would like to have in this work as co-operators farmers who really believe there is a future for the farmers and who believe better seed and better methods of preparation and cultivation will result in increased yields, and who will be willing to keep a record of the work and report results for the benefit of his fellow farmer. We should be glad to correspond with those who are interested to this extent.

The field of demonstration work, or co-operative experiments, is wide and freighted with great possibilities. With the full and hearty co-operation of the State Department of Agriculture and the progressive farmers of the State, our crop yields can be made much larger and farm life much more enjoyable.

## ORCHARD DEMONSTRATIONS.

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BY W. N. HUTT, HORTICULTURIST.

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During February, 1908, several orchard demonstration institutes were held in the apple-growing regions of the State to show the best methods of pruning and spraying fruit trees. The meetings were held right out in the orchards, where the demonstrators could actually do the work and have the trees to illustrate what they were talking about.

The orchards in which the demonstrations were given were selected beforehand, on account of convenient and central location. The trees used in the demonstration were generally near a road, where they could be under observation throughout the season, so that the results of the demonstration could be noted.

Demonstrations were given in the following counties: Stokes, Surry, Alexander, Wilkes, Caldwell, Watauga, Henderson, Haywood, Jackson and Swain.

### PRUNING.

The demonstration of pruning proceeded about as follows:

1. The fruit growers present were taken through the orchard, and the best forms of trees for commercial orcharding were noted.
2. Those present picked out a tree which they desired to see pruned.
3. The demonstrator outlined the method of growth in trees and explained the reasons for pruning.
4. The origin of fruit buds and their development were explained.
5. Pruning tools of different kinds were shown and their uses explained by the demonstrator.
6. The tree was pruned and the principles of pruning and the why and wherefore of each step explained while the work was being done.
7. The pruned and unpruned trees were compared.
8. How to properly remove a limb and treat the resulting wound was demonstrated.
9. Different kinds of trees were pruned. For example, apple, pear, peach, plum, etc.
10. The pruning and training of a young tree was explained and demonstrated.
11. Methods of renovating old and neglected trees were shown.
12. Tools were distributed to those present and trees were pruned by them, under the direction of the demonstrator.
13. A general discussion of the subject of pruning followed these demonstrations, and questions were freely asked and answered.

## FUTURE DEMONSTRATIONS.

The coming fall it is purposed to visit the same orchards in which the pruning and spraying demonstrations were given this spring, and to call the orchardists together to note the results of the work done at the spring demonstration in improving the quality and increasing the quantity of fruit. It is the further purpose to pick this fruit and to demonstrate the most approved methods of commercial grading and packing of fruit for the wholesale market. By these demonstrations it is hoped to assist our fruit growers to make use of our splendid natural facilities and to encourage them in the development of a great commercial fruit industry.

## SPRAYING DEMONSTRATIONS.

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BY FRANKLIN SHERMAN, JR., ENTOMOLOGIST.

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At the conclusion of the pruning work described in the preceding pages a demonstration was given of the spraying of fruit trees, to prevent damage by insects and diseases, and to improve the quality of the fruit. The general method followed was similar to that of the pruning demonstration, and the trees which had already been pruned were used in the spraying demonstration.

1. A brief account was given of the most serious orchard insects which are combated by spraying, and when present these were pointed out in their actual natural location on the trees.

2. A complete barrel-spraying outfit for commercial orchards and a complete bucket outfit for family orchards were exhibited, explained and put together, ready for work.

3. The manner of measuring out and dissolving the ingredients for making the *Bordeaux Mixture* and *Paris Green* was explained and the mixtures prepared before the audience.

4. The trees were thoroughly sprayed, the process being fully explained in every detail. Members of the audience were encouraged to take part in the work.

5. Different nozzles and extension rods were used to show their adaptability to different uses.

6. A general discussion of the subject of spraying followed, with the asking and answering of questions.

Twice during the growing season a representative from this office has gone to these orchards again, each time giving another application of the same spraying mixture.

It would be very desirable to give more demonstrations of this kind in the future, not only in the western counties, but in the piedmont and eastern sections as well—particularly in counties where fruit is grown for distant shipment or to supply local markets, and where the methods of spraying are not now well understood.

Demonstrations of similar character, and using the same mixture, should be made with other crops, especially Irish potatoes, grapes and melons. With all of these it is fully established that spraying is profitable in average seasons, and it only remains to adequately demonstrate to the growers the methods and the value of the operation.

# DEMONSTRATION WORK IN ANIMAL HUSBANDRY.

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BY TAIT BUTLER, VETERINARIAN.

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## DAIRYING.

A uniformly high price for first-class dairy products and facilities for producing cheap forage are unquestionably two important factors in successful dairy husbandry. North Carolina has both of these, but, nevertheless, as at present conducted, dairying is not generally profitable in this State. Moreover, it is a demonstrated fact that where dairying is not now profitable it is chiefly due to a lack of personal attention to proper business management or a failure on the part of the dairyman to fully use in a practical way the large amount of dairy information available to any man who intelligently studies the business. In other words, where dairying is not now successful in this State it is usually the fault of the dairyman rather than the existing unfavorable dairy conditions beyond his control. To be more specific, dairy failures in North Carolina are chiefly due to a failure to study, know and follow the teachings of modern dairy science, and a lack of personal attention to business management.

Recognizing the foregoing facts, the Dairy Division of the United States Department of Agriculture began dairy demonstration work in this State nearly two years ago, with the direct purpose of assisting our dairymen to obtain better results. During this time the North Carolina State Department of Agriculture has, in a limited way, co-operated with the Federal workers, and at its last meeting the State Board of Agriculture made an appropriation for the support of this work, in order that the co-operation might be more effectual and complete.

### METHOD OF CONDUCTING THE WORK.

The method of conducting this work has been about as follows:

An expert dairyman of experience has been regularly employed, and during the summer, when the work was such that one man could not attend to it all, an additional man has been temporarily engaged. These men have visited the farms of dairymen in various parts of the State and endeavored to assist them in obtaining better results. At the first visit to a farm the entire plant is carefully looked over; the methods of conducting the business are inquired into; the manner of feeding is studied; the kind and quality of the products examined and the market prices learned.

After becoming familiar with the present workings of the dairy, the demonstrator is in a position to make suggestions for future im-

provements, but, unless the dairyman is willing to do his part and is fully interested and anxious to co-operate in the work, nothing of value will be accomplished.

If the dairyman is willing to do the extra work necessary to obtain sufficient information relative to the herd to enable the demonstrator to assist him, the work will be taken up in earnest and systematically conducted.

The work already done shows that in practically every herd there are many unprofitable cows, which largely consume the profits from the good ones. To find out which cows are unprofitable it is necessary to weigh the milk, test it and ascertain the amount of butter fat it contains, and weigh the feeds. When this is done for a few months, the data are obtained necessary to enable the dairyman to weed out his unprofitable cows.

To help the dairyman to obtain this necessary information, scales for weighing the milk are loaned him and blank milk-record sheets furnished. The time required to weigh the milk at each milking from each cow during an entire year would not equal the loss from feeding one unprofitable cow for that length of time. The feed should be weighed three or four times a month and all changes noted and record made of the same.

At first the samples of milk for testing for butter fat are taken by the demonstrator and the test made by him. The next and subsequent months the dairyman will take the milk samples for two days immediately preceding the regular monthly visits of the demonstrator, who will make the tests for butter fat.

The dairyman must keep these necessary records and is expected to assist in calculating the results.

In the handling of the dairy products the expert will give all the assistance possible, with a view of enabling the dairyman to put upon the market a first-class product.

#### BUILDING OF SILOS.

In feeding, the advice and assistance of the demonstrator is frequently of great value. As a rule, our dairymen do not produce their own feed to the extent they should, nor do they give sufficient care to the character of the feeds to obtain the best results. Silos are too rare, and yet succulence is essential in dairy feeding. All dairymen are advised to use silos, and those who wish to build them are assisted to do so.

The most desirable kind of silo for the conditions existing on the farm is determined, and plans and specifications furnished free of charge. When the materials are on the ground, the demonstrator will supervise the erection of the silo, and later will direct the filling of it, in order that the dairyman may run no risk from lack of experience in such matters.

## DAIRY BARN PLANS.

If a dairy barn is needed, the demonstrator will advise concerning its location and construction, even to the extent of furnishing plans, etc.

In all these and in many other ways the dairymen of the State may receive the assistance of an expert dairyman if they are sufficiently interested to do their part of the work, but no dairyman can be helped who will not help himself.

## ONE DAIRYMAN'S OPINION OF THE WORK.

The work already done in this State has fully demonstrated its value. One dairyman who has been visited by the demonstrator writes:

"We have been helped and will be glad if you will continue the visits.

"1. We have found that we only make one-half the butter from each cow that the best dairies do.

"2. We have found that we lose ten or fifteen per cent of the butter in skimming and churning.

"3. We have been induced by your agent to visit one of the best dairies in the State (about fifty miles distant), in his company, and we learned a lot of things there.

"4. I have a very high opinion of the good the dairy agents may do in this country."

## FEEDING BEEF CATTLE.

The work of the State Department of Agriculture on its test farms during the past three years has demonstrated that, with our cheapest available feeds and proper facilities for handling the animals, the feeding of beef cattle may be made profitable, at least, throughout the central and western parts of the State. It is a fact, however, that the feeding of beef cattle is not generally regarded as profitable in this State.

Good feeders are too scarce, freight rates too high, and the feeds generally used too high-priced to permit of the profitable feeding of beef cattle, especially if the full value of stable manure be ignored, as is very generally done in this State.

By using a ration consisting of corn silage and corn stover, both cheap feeds and readily produced on the farm, and cotton seed and cotton-seed meal, cattle feeding may be made profitable, if proper care and intelligence be given to the purchase and care of the feeders and a fair valuation given to the stable manure.

Silage is one of the best and cheapest feeds for beef cattle, and, in cases where it is not necessary to provide extra power to drive the machinery for filling the silo, it should be used by every feeder of

cattle. As is being done with the dairymen of the State, the Department of Agriculture will be pleased to furnish plans and assist in the erection of silos for any farmer in the State who contemplates erecting a silo for the feeding of beef cattle or other live stock.

The Department is anxious to encourage the feeding of more cattle for the building up of our worn and depleted soils, and would like to co-operate with every man in the State who expects to feed beef cattle in carload or half-carload lots next winter. If desired, an expert cattle man will be sent to the farm of the feeder and advise regarding the purchase of the cattle, the feeds to be used, and the care and marketing of the animals.

Any farmer in the State wishing the assistance of the Department in animal husbandry lines should write Dr. Tait Butler, Raleigh, N. C.

#### ASSISTANCE IN MAINTAINING THE HEALTH OF THE HERDS.

Since it is generally conceded that tuberculosis may be communicated from cattle to man through infected milk, no dairyman can afford to maintain a herd in which tuberculosis exists. He cannot afford to maintain in his herd animals suffering from disease of any kind. He cannot afford to do these things, because they are not right, and also because they are unprofitable. If tuberculosis exists in your herd to-day, you will lose animals from the disease regularly during the coming years, unless you eradicate it.

There is only one way to clear a herd of tuberculosis and keep it clear. That is, to tuberculin test every animal in the herd once a year, and test all animals brought into the herd before their introduction, and exclude all diseased animals.

The State Department of Agriculture will assist dairymen and cattle breeders to eradicate tuberculosis from their herds, and maintain them healthy, free of charge, on the following terms:

1. The owners must furnish the help and all other facilities necessary to enable one veterinarian to do the work.
2. All diseased animals must be disposed of, according to the direction of the State Veterinarian.
3. The owner of the herd must agree to and afford the proper facilities for retesting the herd once a year.
4. All new animals brought into the herd must be tested before their introduction, or isolated until the regular yearly test.

Any person complying with the conditions above stated and maintaining a herd free of disease may receive from the State Veterinarian a certificate stating these facts.

Any cattle breeder or owner of a herd of five or more animals may avail himself of this privilege by communicating with the State Veterinarian.



**REPORT FROM LEAF TOBACCO WAREHOUSES FOR MONTH  
OF APRIL, 1908.**

Pounds sold for producers, first hand.....	1,619,071
Pounds sold for dealers.....	120,044
Pounds resold for warehouse.....	81,554
Pounds resold for other warehouses.....	1,971
Total.....	<u>1,822,640</u>



THE BULLETIN  
OF THE  
NORTH CAROLINA  
DEPARTMENT OF AGRICULTURE,  
RALEIGH.

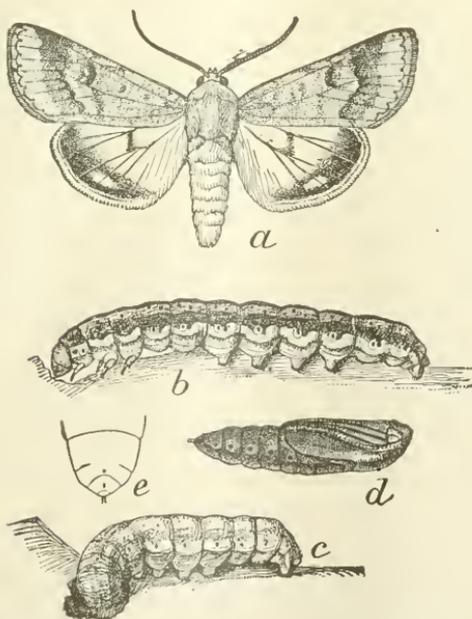
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INSECT ENEMIES OF COTTON.

BY  
FRANKLIN SHERMAN, JR., ENTOMOLOGIST.



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COTTON BOLL-WORM. A DESTRUCTIVE ENEMY OF CORN, COTTON, TOBACCO AND TOMATOES—  
A CONSPICUOUS PEST OF SOUTHERN AGRICULTURE.

(After Howard, Bur. Ent., U. S. Dept. Agr.)

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# INSECT ENEMIES OF COTTON.

BY FRANKLIN SHERMAN, JR., ENTOMOLOGIST.

## INTRODUCTION.

North Carolina produces approximately 600,000 bales of cotton each year. Allowing an average of 500 pounds per bale, and 10 cents per pound for the cotton, we have \$30,000,000 as the average yearly value of our cotton crop. In the acreage devoted to its production in the State, cotton is second only to corn, but as corn is largely grown in every county and as cotton is grown commercially in only about two-thirds of the counties, it is seen that cotton is overwhelmingly the most important money crop in those counties which are well within the cotton belt.

Insects are estimated to destroy approximately one-tenth of our total value of crop products each year. If cotton suffered its proportional one-tenth, of damage, the loss in this State would amount to \$3,000,000. But at present we do not believe that the damage amounts to this much, so to be conservative we will take away a million dollars from that estimate, and we have remaining the sum of \$2,000,000 which the cotton crop alone of North Carolina contributes each year to satisfy the appetite of its insect enemies, and we believe that the real and actual loss is fully equal to that sum.

At present the number of serious insect enemies of cotton in the State is not large, and usually their attacks are not especially noticeable, but each year brings to this office a number of inquiries and complaints concerning Cotton-lice, Boll-worms, Red Spider and others. Last year (1907) there was considerable complaint of Root-lice. Meanwhile the Cotton Boll-weevil has spread from Texas across Louisiana and is now in western Mississippi, and bids fair to continue its march until it occupies the entire cotton region, including North Carolina.

While the number of pests which are really serious is not large at present, there are a considerable number which under peculiarly favorable conditions might at any time become very much more destructive than they are now. Several which have attracted attention in the last few years were not previously on record in this State as pests of cotton at all. Several farmers, in making complaint of insect injury to cotton, have remarked that their loss from insects is growing heavier each year. We are fully convinced, therefore, that our estimate of \$2,000,000 damage to the cotton crop of the

State by insects is not too high, and we are also convinced that this loss is growing steadily greater, and will continue to do so until our cotton growers begin to take these enemies into consideration and plant and handle their crops in such a way as to reduce the loss.

How long the cotton growers of the State will be willing to calmly sacrifice this amount to insects, is largely for them to decide. While it is true that no grower, however energetic and earnest, can entirely prevent loss from this source, it is safe to say that at least one-third of this total loss could be prevented, at trivial expense, merely by the adoption of different methods of rotation or preparation of the crop, planting, etc. The object of this BULLETIN is to show where these losses to the cotton crop occur, to describe the insects responsible for them, and to set forth the remedies or methods which may be employed in preventing or avoiding these injuries.

#### GENERAL CONSIDERATIONS.

Cotton, like corn and other grains, is a crop of what we may call low commercial value. That is to say, the cash return from an acre devoted to cotton is low as compared to the return from some other crops. An acre devoted to strawberries may yield a net return of \$400, but an acre devoted to cotton will usually yield not over \$50. Thus, while one might profitably spend \$40 or \$50 per acre to combat insects on strawberries, the average farmer cannot spend more than a few dollars per acre at most to combat cotton insects, if he is to make a profit. With any crop which is grown in such large areas, and where there are so many individual plants, it is usually unprofitable to adopt any method which calls for the treatment of individual plants, unless such treatment is effective in preventing the spread of the trouble to other parts of the field. We must, therefore, depend mainly upon such methods of preparing the land, selection of seed and varieties, fertilization, cultivation, handling, etc., as will render the crop least liable to injury, or will enable it to quickly recover when attacked. Treatment for a pest must frequently be given before the pest actually appears, thus preventing its injuries, rather than to attempt a remedy after the damage has become evident.

#### CULTURAL CONSIDERATIONS.

It has already been stated that in combating insect pests of cotton we must largely depend on methods of managing the crop so that it shall be least subject to attack, or to make it grow so vigorously that it will quickly recover from injury. Such methods may be called *Cultural Methods* since they imply merely a changing or modification of the methods of ordinary culture already in common use.

**Rotation.**—Intelligent farmers everywhere are coming to see that some system of rotation is necessary to secure the best results with any crop. To grow any one crop continuously on the same land year

after year will surely result in wearing out the important elements of plant-food for that crop, as well as to deplete the supply of humus, which is so necessary to every soil. To grow the same crop continuously also gives every opportunity for the insect pests of that crop to multiply undisturbed until they become destructive enough to ruin it. Crops with different requirements should follow one another continuously so as to keep something growing on the land all the time.

In some respects cotton is unfortunate in regard to rotation for insect pests, for if we rotate in such a way as to avoid one, we are liable to play directly into the hands (so to speak) of another. If cotton follows a growth of weeds and grass, serious damage by Cut-worms may be expected, especially in our piedmont counties and on clay lands. If cotton follows cowpeas, it is liable to be damaged by the Cowpea-pod Weevil, while if cotton follows corn it is likely to be attacked by the Cotton Root-louse. The grower must, therefore, be sufficiently watchful and intelligent to *know what his serious pests are*, and must then choose such system as will give the least opportunity to his worst pests. Carefully studied out and used, the rotation of cotton with other crops can be made quite effectual in avoiding Cut-worms, Cowpea-pod Weevil, Root-louse and Red Spider (or Rust-mite), and to a lesser extent it may be helpful against the Cotton Leaf-louse.

**Plowing.**—In plowing the land preparatory to planting cotton, the soil should be broken deeply. Gradual deepening from year to year is better than to plow deeply all at once. The deepening of the soil furnishes more food for the plant and enables it to grow rapidly so that it does not succumb so quickly to insect attack. Deep plowing also destroys weeds and grass which may harbor Cut-worms, exposes and destroys the pupæ of the Boll-worm, and it disturbs any insects in the soil which may attack the plant beneath the surface.

*Deep Fall Plowing* may be used to bury the remnants of the crop as a check to the Red Spider, or perhaps, to disturb underground pests, such as the Root-louse, and to destroy the pupæ of the Boll-worm.

*Plowing in Winter or Early Spring* will leave the ground bare for a time before planting, which tends to drive away Cut-worms, and will also destroy many pupæ of Boll-worms.

**Preparation of Soil.**—If the soil be prepared deeply and finely so as to form a good seed bed the young plants will grow vigorously and will quickly recover from injuries which might otherwise kill them. Such careful preparation calls for much working over the soil before planting, plowing perhaps both ways, harrowing, dragging, etc. This is advisable merely for the sake of the crop itself even if there were no insects, but the same methods serve to reduce these pests also. Abundant working before planting will disturb and discourage

any underground insects which might attack the roots. If the ground is thus carefully worked and kept bare for a few weeks previous to planting many Cut-worms will be starved or driven out. The extra stimulus given to the plant by all this careful working enables it to resist or recover from the attacks of Cut-worms, Lice, Root-lice and Cowpea-pod Weevils.

**Varieties.**—North Carolina is the most northern of the large cotton-producing States, and as cotton is essentially a plant of warm countries, our seasons are sometimes a little shorter than is best for this crop, and makes it necessary for us to use early-maturing varieties which will make a crop before frost. The need of early varieties is still more evident when we remember that some insect pests are most destructive in the latter part of the season, for by that time an early variety may have its crop made, while the later-maturing variety may fall prey to the insects. The use of the very earliest varieties is advisable as a means of counteracting the Boll-worm, also to a lesser extent it is effective against the Red Spider, and in the States infested by Boll-weevil it is one of the principal means of escaping the ravages of that pest.

**Time of Planting.**—In respect to the time of planting we have to take our chances with certain pests no matter whether we plant early or late. *Early planting* tends to avoid damage by the Boll-worm, because it enables the crop to be made before that insect reaches its greatest abundance in the fall. On the other hand *late planting* helps to escape Cut-worms, Cowpea-pod Weevil, Root-louse and Leaf-louse and Lice, as these are all worse early in the season.

Since the shortness of our season has to be considered we believe the balance to be in favor of reasonably early planting, and especially is this the case in the more northern and western of our cotton counties, as in Rutherford, Catawba, Alexander, Davie, Granville and Warren. Some growers in these sections complain that the shortness of the season is their main difficulty and in such cases it is idle to delay planting after the conditions are once fit. But in the warmer counties like Mecklenburg, Union and Anson, where the season is suitably long, and where Cut-worms are regularly serious, it is certainly worth while to consider the advisability of later planting, especially when the cotton must follow directly after a crop of grass or weeds.

**Planting Excess of Seed.**—Injury by some insects, such as Cut-worms, Lice and Cowpea-pod Weevil, may be lessened by planting an increased quantity of seed so that there shall be enough plants to secure a stand even if some are destroyed by insects. If injury by these continues regularly after the cotton is chopped, it may be advisable to chop to a thicker stand, so as to allow for some being killed later. Any surplus can be gotten rid of if necessary by thinning

afterwards. The planting of excess seed need not often be resorted to, as the usual practice is to plant many more than actually needed and to thin the plants by chopping.

**Fertilization.**—What crop will not do better in a fertile soil than in an impoverished one? All that can be done to enrich the soil in an economical way so as to increase the vigor of the plants will not only help the cotton to outgrow and recover from insect injury, but will contribute largely toward a greatly increased crop, even aside from any consideration of insects. Injury by Cut-worms, Lice and Cowpea-pod Weevil are all rendered less severe by having the crop growing in a soil where there is an abundance of available plant food. So far as the insects are concerned it matters not whether this fertility is supplied by barnyard manure, by commercial fertilizers or by rotation of crops with legumes, etc., or by any combination of these methods. Good fertilization also tends to mature the crop early, thus escaping some of the injuries of the Boll-worm. An excess of phosphoric acid over the proportions generally used will hasten maturity.

**Cultivation.**—With a deep, thoroughly prepared soil, properly enriched, planted with proper varieties of cotton at the proper time, it yet remains to give the crop the most thorough and frequent *shallow* cultivations. This will stimulate growth in the plants, thus enabling them to recover from any slight injuries that they may receive from Cut-worms, Lice and the like, while the stirring of the soil close to the plants is an actual discomfort and discouragement to the Cut-worms and tends to drive them away.

**Destruction of Remnants.**—It is the common custom to leave the dead cotton stalks standing all fall and winter after the crop has been harvested. This has a tendency to increase certain pests, such as Boll-worm and Red Spider, which may continue to live on the latest-surviving leaves and bolls until actual winter sets in.

In Texas and Louisiana repeated experience has shown that in combating the Boll-weevil a great point is gained if the cotton stalks be disposed of as soon as the bulk of the crop is gathered, without waiting to get the last of the "top crop," and as the Boll-weevil will likely reach North Carolina sometime in the future, we may eventually be obliged to resort to this practice. In Currituck and other of our north-eastern counties the stalks are frequently gathered and burned, but as most of our soils are sadly lacking in humus, perhaps deep turning under by plowing would be the best practice for most of our cotton growers. But where a winter-growing crop (like crimson clover or vetch) is sown in the field before the cotton is picked we must let the stalks stand. The destruction of the stalks is not now of enough importance to justify us in giving up an already established and beneficial system of management, but when they can

be disposed of without disarranging the habitual methods of practice and without loss, then we consider it advisable, on account of insects and diseases, to plow them under.

All the foregoing culture considerations show that very much may be done to ward off insect injury by slight changes in the methods of culture which are already in common use, and, indeed, these are the remedies most to be relied upon. It costs but a trifle to put these methods to practice, and, as they are beneficial to the crop itself, aside from all consideration of the insects, it would seem that ordinary prudence would induce the intelligent cotton planter to at least have them in mind to be employed as his needs may require. All the good doctrine that has been taught to our farmers year in and year out in bulletins, in the agricultural papers, in correspondence and at the Farmers' Institutes, begging for wiser methods of plowing, preparation of lands, fertilization and cultivation, all these tend also to ward off serious insect injury.

#### REGARDING INSECTS AND THEIR NAMES.

In discussing the cotton insects in this BULLETIN we have given both the popular and the scientific name of the species, and have indicated the *order* and the *family* of insects to which each belongs. It should be remembered that the *Order* is the more comprehensive group, and each order is divided into a number of *Families*.

The great majority of our common insects may be grouped into seven orders, as follows:

1. The *Orthoptera* (Or-thop-tera), including the Grasshoppers, Katydid, Crickets, Roaches, etc.

2. *Hemiptera* (He-mip-tera), Bugs, such as Chinch Bug, Terrapin Bug, Lice, Plant-lice, Scale-insects, etc.

3. *Neuroptera* (Neu-rop-tera), Lace-wing Flies, Dobsons, Dragonflies, May-flies, Darning-needles, Mosquito-hawks, etc.

4. *Lepidoptera* (Lep-i-dop-tera), Butterflies, Skippers and Moths.

5. *Diptera* (Dip-tera), the true two-winged Flies, such as House-flies, Mosquitoes, Blow-flies, Horse-flies, etc.

6. *Coleoptera* (Co-le-op-tera), Beetles, such as Potato-beetle, Bill-beetle, Flea-beetle, June-beetle, Tumble-beetle, Tiger-beetle, etc.

7. *Hymenoptera* (Hy-men-op-tera), Bees, Ants and Wasps.

It is believed that this explanation and arrangement will be helpful to those who are interested in learning how to recognize the different orders of insects.

#### INSECT ENEMIES OF COTTON.

In the study of the cultural methods we found that many practices which are used in the control of the cotton insects merely require a change or modification of the ordinary methods of culture which are already in common use, and do not require any large expense.

But if the farmer is to know just what methods to adopt to avoid insect pests, he should be intelligent enough to know just what those insects are, and how they live, grow and change from one stage of life to another. This information we here give with regard to our most serious cotton insect pests.

### CUT-WORMS (Several Species).

Order *Lepidoptera*. Family *Noctuidæ*.

*Description*.—Rather stout-bodied, soft, brown, blackish or grayish caterpillars, which remain concealed during the day and do great injury at night by eating off young plants at or near the surface of the ground.

*Injury in North Carolina*.—Cut-worms are such a common and universal nuisance that they do not excite comment or complaint at all commensurate with the injuries which they actually inflict. When a farmer does complain of them it is usually in a general way as attacking all crops and not with regard to any one in particular, hence we have not had much specific complaint of Cut-worm injury to cotton, although it is a matter of common knowledge that such injury does occur. Recent inquiry into cotton growing conditions brings out the fact that Cut-worms are more serious to cotton in our piedmont counties than in the extreme east, the growers in Mecklenburg County making frequent mention of them as serious pests.

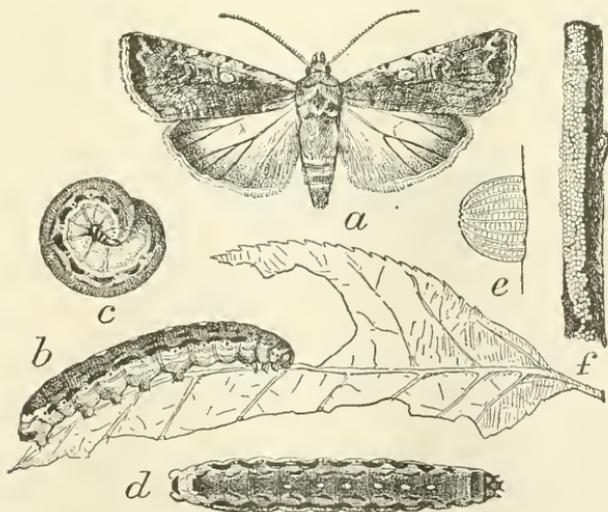


FIG. 1.—Variegated Cut-worm, showing adult at *a*; larva or Cut-worm (three views) at *b*, *c*, and *d*; egg (enlarged) at *e*, and eggs in natural position on grass-stalk at *f*. All about natural size, except *e*.  
(After Howard, Bur. Ent., U. S. Dept. Agr.)

Although Cut-worms are present and do more or less damage every season, the year of 1905 seems to have been one of special abundance and destruction by them in this State.

*Life-history and Habits.*—There are a number of distinct species of Cut-worms, but all are the caterpillar stage, or larvæ, of moths. The family *Noctuidæ* to which they belong contains some 2,000 species in North America, and probably 500 or more are found in North Carolina. It is likely, however, that our seriously destructive Cut-worms do not number more than 20 or 30 species. In some species the adult moth stage is reached in spring and early summer, while in others it is not reached until fall, hence in both cases the insects will be in the Cut-worm stage in early spring, while in late spring and summer only the later species will be in the Cut-worm stage.

Mr. C. S. Brimley of Raleigh, who has long been interested in collecting, rearing and studying insects, brought to maturity seven different species of Cut-worms during 1903-'04. Of these, four reached the moth stage in fall and two reached that stage in the spring, while another species was only seen once, in midsummer. From his observations it seems that at Raleigh for the spring species June, and for the fall species September and October, are the principal months of activity and egg-laying by the adult moths.

The details in the life-history of a species will vary somewhat according as it matures in the spring or in the fall, but the following will serve as a general account of the life of a Cut-worm.

The larvæ (destructive Cut-worm stage) pass the winter in the earth or on the surface under such shelter as they can find. At this time they are only partly grown. In warm spells of weather they may crawl about and feed on roots or green stems of grasses or hardy weeds. Their long fast or season of scarcity of food gives them ravenous appetites when the warm days of spring arouse them to activity, and they then feed on any green succulent young plants that they can find. Their greatest damage to cotton consists in eating off young plants at or near the surface of the ground. Sometimes they pull the severed end of the young stalk into the ground where they may feed upon it during the following day. They usually remain quiet during the day and feed only at night, but sometimes in cool weather or on cloudy days they will work all day. Cool weather in spring seems especially to sharpen their appetites and such weather makes the cotton backward so that it cannot readily recover from injury. When the larva (or Cut-worm) becomes grown (which varies according as the moth is to emerge in spring or fall), they change to the *pupa* stage in the earth, an inch or so under the surface. Those that are to emerge in spring or early summer change to the pupa state in the middle or latter part of May, and it is because these larvæ (Cut-worms) become mature at this season that they cease their injuries, and not because of any epidemic of disease among them. In the *pupa* state they have neither legs nor wings and take no food—it is simply a stage of change from the larva (Cut-

worm) to the adult moth. After a few weeks the adult moth breaks out from the pupa-shell, and after hardening and drying like a young chick just out of the egg, it is ready for an active flying life, which, however, lasts only a few days and allows for mating and the laying

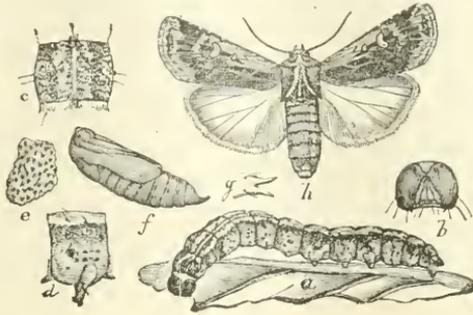


FIG. 2.—Granulated Cut-worm, showing larva at *a*, pupa at *f*, adult moth at *h*, and details of structure. (After Riley and Howard, Bur. Ent., U. S. Dept. Agr.)

of eggs to continue the species. Most of the Cut-worm moths are dull gray or brown in general color, and with the hind wings lighter, often of a pinkish hue. When the wings are expanded they measure from one to two inches from tip to tip. These moths fly mostly at night and are often attracted to bright lights and not infrequently enter houses and flutter about the lamps or walls. The females deposit their eggs on trash, grass or weeds, in sod or weedy lands. The flying moth does not develop to any other form, but dies soon after the eggs are laid.

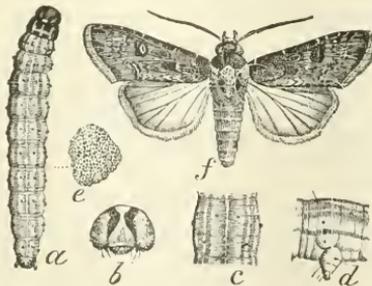


FIG. 3.—Cut-worm (*Feltia malefida*) showing larva or cut-worm stage at *a*, adult moth at *f*, and details of structure at *b*, *c*, *d*, and *e*.

(After Riley.)

*Natural Enemies.*—Almost every kind of insect is subject to the attacks of other insects, larger animals, or diseases, and fortunately for us Cut-worms are not exceptions to this rule. Among the birds the insect-eating kinds which spend much time on the ground are no doubt the most useful, especially the Bob White, Crow, Black

Birds, Meadow Lark (or Field Lark), Sparrows, Cat Bird, Mocking Bird, Brown Thrasher, Blue Bird and Robin. These, in the course of a season, and especially when rearing their young, pick up many a juicy Cut-worm. The common and much-despised toad is also a helper, for he comes forth from his hiding place at dusk and Cut-worms are one of the regular items in his bill of fare. Certain predaceous insects like the Ground-beetles also attack and devour Cut-worms. Parasitic flies sting and deposit their eggs within the bodies of Cut-worms and these eggs, hatching to maggots, eventually cause the death of the Cut-worm. There are also certain fungous and bacterial diseases which kill a considerable number.

All these natural enemies, while not by any means preventing all damage by Cut-worms, at least act as a check upon them, and we believe it proper that the cotton grower should know them.

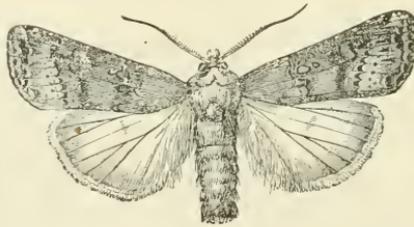


FIG. 4.—Adult moth of the Black Cut-worm. Natural size.  
(After Riley and Howard, Bur. Ent., U. S. Dept. Agr.)

*Summary.*—Cut-worms are the larvæ of night-flying moths. They pass the winter as larvæ, eat ravenously in the spring, become mature, pupate, and emerge as moths in early summer or fall. June, September and October seem to be the principal months for egg laying. Eggs are laid in weedy or grassy fields, after which the moths die. The larvæ pass the winter in a partly grown condition in the fields. With these points clearly understood it will be easy to comprehend the following remedial suggestions:

#### REMEDIES.

As the eggs are laid in weedy and sod lands, cotton planted on land just from sod or weeds will almost surely suffer, as the Cut-worms are already in the soil when the cotton is planted. Therefore the first consideration is to have cotton follow some cultivated crop. If cotton must come after a growth of grass or weeds, then, by plowing the land in the fall, many Cut-worms will be killed by exposure or starvation before the cotton is planted in spring. If the land be plowed before the fall moths have laid their eggs (before September 20th for example), then the moths will deposit their eggs in other fields, some cover crop could be sown in October or November which would cover the ground and prevent leaching, and the cotton crop

planted the following spring would be much less troubled than if the grass and weeds had stayed on all through the previous fall and winter. As a preventive of Cut-worms it would be better to have the ground bare all winter and plow it once or twice in the meantime, but that might not be good practice unless Cut-worms were exceptionally bad on the place, and we must so adapt our measures against the insects as to make them fit into a good scheme of farming. By delaying the planting until late in the spring, the early-maturing Cut-worms will be nearly or entirely grown and will, therefore, do less injury. Very late planting may not be advisable on account of short seasons, early frost, or on account of Boll-worm, which is worst late in the season, but it is one of the possible means of avoiding Cut-worms. Frequent cultivation will disturb the Cut-worms and tend to drive them away, and will cause the plant to grow rapidly and recover from injury, while good fertilization aids in the same direction.

But if we must put a piece of spring-plowed sod or weedy land into cotton, and wish to plant at the normal season, there is still a method (not always easy or entirely satisfactory perhaps) by which we may combat the Cut-worms. When the land is plowed in the spring much of their food is destroyed and they become hungry. It is then, after breaking and harrowing the land and before the cotton is planted, that it is possible to poison them. Clover or other green and succulent vegetation may be poisoned with Paris Green and distributed through the fields as a bait to the worms. The clover may be sprayed with poison as it stands and then cut; or perhaps the better and more thorough plan would be to cut it and dip it into a barrel of the poisoned solution. The Paris Green for this purpose should be thoroughly mixed with water at the rate of about one pound to the barrel (40 to 50 gallons) of water. Arsenate of lead may be used instead of Paris Green, at the rate of five or six pounds to the barrel. Paris Green and wheat bran have been used in gardens, at the rate of about one ounce of the poison to two or three pounds of the bran. A mash made of bran, Paris Green and water, and sweetened with molasses, has also been used by gardeners. But in field operations, with cotton grown on a large scale, the main practices to be relied upon are (1) the avoidance of cotton after sod or weeds, and (2) fall plowing (as early as convenient), if such land must be put into cotton in the spring. The poisoning methods will often be too expensive and too uncertain for use on a large scale in cotton fields.

For further discussion of the methods mentioned against Cut-worms the reader is referred to what is said under the head of Rotation (p. 4), Plowing (p. 5), Preparation of Soil (p. 5), Time of Planting (p. 6), Planting Excess of Seed (p. 6), Fertilization (p. 7), and Cultivation (p. 7).

COTTON LEAF-LOUSE (principally *Aphis gossypii* glov.)

Order Hemiptera. Family Aphidida.

*Description.*—A small green louse, often found in great numbers on the young leaves and tender growing part of young cotton, where they suck the sap from the plant. More destructive in cool seasons, and usually disappearing when settled hot weather comes in June and July. The same species of louse also infests melons, in which case it is called "Melon-louse."

*Injury in North Carolina.*—Injury by this Cotton-louse seems to be rather general throughout all the cotton-growing region of the State. But although it often causes some uneasiness early in the season while the weather is yet cool, it becomes reduced in numbers or entirely disappears when settled warm weather comes in June or July, the crop usually recovers, and the real ultimate damage is usually slight, or at least is not seriously noticeable. Recent inquiries indicate that it is regarded as an occasionally serious pest by over one-third of our growers in all sections where cotton is grown.

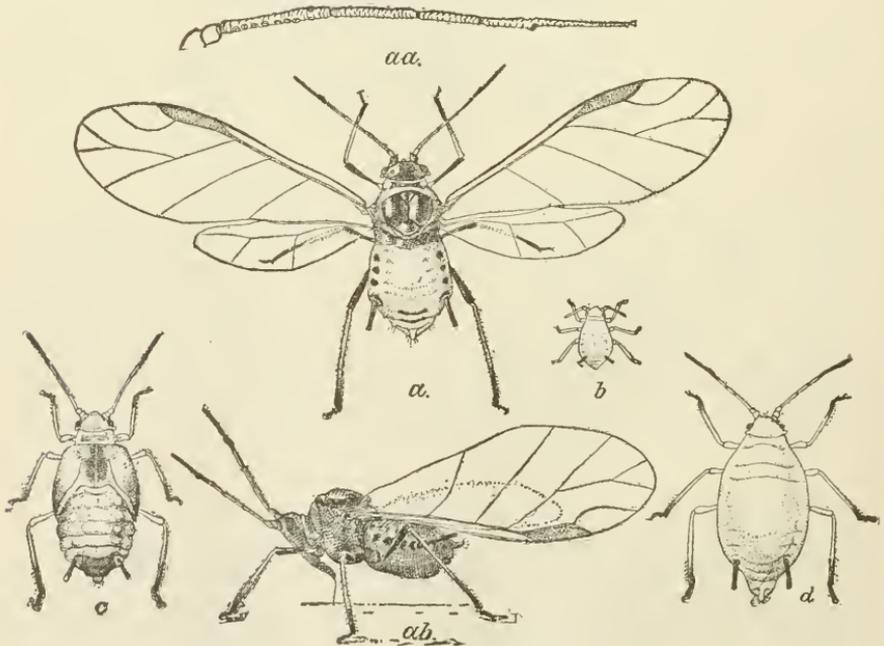


FIG. 5.—Cotton Leaf-louse. Adult winged female at *a*, side view of dark female at *ab*, young louse at *b*, young louse nearly grown at *c*, adult female of wingless form at *d*. All much enlarged.

(After Chittenden, Bur. Ent., U. S. Dept. Agr.)

*Life-history and Habits.*—The adult winged lice appear in the fields when the cotton is quite young. In the figure (Fig. 5, *ab*), is shown the side view of a winged female and it may be seen that there is a pointed beak attached to the under side of the head. With

this beak the insect punctures the stem or tissue of the leaf and sucks out the sap. The young lice are much like the grown ones in appearance, and are represented at *b* and *c* in the figure.

During cool, wet seasons the lice multiply rapidly and become quite destructive, causing the infested plants to become stunted and distorted. The insect also attacks melons, cucumbers, and no doubt a number of species of weeds. In hot, dry seasons a number of other insects, which feed upon the lice, become abundant and check them. The lice are, therefore, more abundant in cool seasons, not so much because such a season is more beneficial to them, but because a cool season is very unfavorable to the enemies which prey on the lice. The grown lice may be either winged or wingless, as shown in Fig. 5.

*Natural Enemies.*—As already indicated there are a number of other insects which prey on the Leaf-lice. Probably the most important of these are certain very small black four-winged flies (hardly as large as the gnats which often get into the eyes of persons) which sting the lice and lay their eggs in the bodies of the lice. These are known as *parasites*. In warm weather these parasites are very active and may be found running about on the leaves in search of suitable victims. If the farmer will notice closely he may often find a considerable number of dead lice on the leaves which are dry and brown and bloated in appearance. These have been killed by the growth of the young parasite within their bodies. These parasites are wholly unknown to, and unappreciated by, the average cotton farmer, yet it is largely on account of their activity that the lice disappear when hot weather comes on in early summer.

Frequently the farmer will notice on the louse-infested cotton a yellowish beetle with black spots. These beetles are about a fourth of an inch long, and crawl about among the louse-infested leaves. These are known as Lady-beetles, and the one most frequently found on lousy cotton is the Convergent Lady-beetle (*Hippodamia convergens*) shown in Fig. 6.

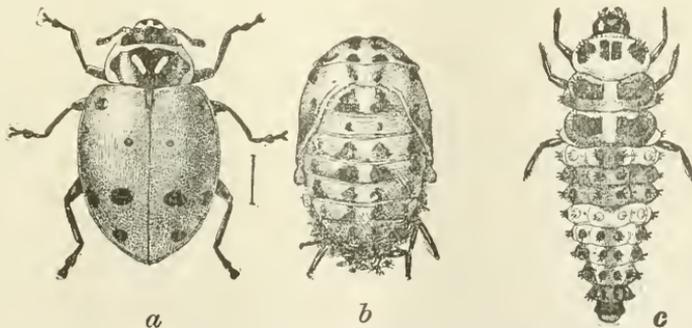


FIG. 6.—Convergent Lady-beetle. An important enemy of the Cotton Leaf-lice. Adult beetle at *a*, the young or larva at *c*, and the pupa at *b*.

(After Chittenden, Bur. Ent., U. S. Dept. Agr.)

At *a* is shown the adult beetle, the line to the right indicating its actual length. Farmers often suppose that these Lady-beetles are the parents of the louse, but in reality they are enemies to the louse (and are, therefore, friends to the farmer), for the reason that they feed on the lice. They lay their eggs on the leaf and these hatch to the larva as shown at *c*, and this larva, when grown, changes to the pupa, as shown at *b*, and from this pupa the adult beetle (*a*) emerges. The larva (*c*) of the Lady-beetle also feeds actively on the cotton lice. There are several other species of Lady-beetles that attack the Cotton-louse, but the one here mentioned is the most abundant and beneficial one.

There are a number of other insects which help to keep down the Cotton-louse, such as the Lace-wing Flies and Syrphus Flies, but they do not require detailed mention here. On the other hand, cotton (or any other plant) which is badly infested with lice is apt to be frequented by many insects which go there, not to attack the lice, but to get from the lice a sweetish substance called "honey-dew," which the lice secrete from their bodies. Ants, flies and wasps are fond of this substance and are frequently abundant on plants which are badly infested with the lice.

*Summary.*—The Cotton Leaf-louse is most abundant in cool, wet, late seasons and is sometimes destructive, but usually disappears or becomes much less evident when hot weather comes on, due principally to the activity of the parasites and other natural enemies. Parasitic four-winged Flies, the Convergent Lady-beetle, Lace-wing Flies and the Syrphus Flies are the most active of the natural enemies. Louse-infested cotton is also frequented by certain other insects which go there for the honey-dew and do not take part either in destroying or aiding the lice. The Cotton-louse has no stage of existence except that of a louse, though some are winged, as shown in the illustration.

#### REMEDIES.

Since the Cotton Leaf-louse does most of its destructive work early in the season, some of its injuries can be avoided by later planting so that the young cotton will come on in hot weather when the natural enemies of the louse are active and able to protect the crop. This is a point worth consideration on plantations where the louse is a serious pest every year, though perhaps not advisable for those who do not usually suffer severe injury from the louse. Good fertilization and frequent shallow cultivation will cause the crop to grow vigorously and soon be beyond the stage of serious injury.

When the Cotton-louse suddenly appears in great numbers in restricted spots in the field and threatens to spread over the entire area, it may pay to use a spray pump and thoroughly spray all the plants in the infested area. For this purpose use ordinary home-made or laundry soap, dissolved in water at the rate of 1½ pounds to

4 gallons. The soap is shaved in thin pieces and placed in a pail or kettle over a fire with enough water to dissolve it. When heated to boiling, stir vigorously and the soap will dissolve. Then remove from the fire and add the water required to bring it to the proper amount. A thorough application of this solution will be quite effectual, and one such treatment will usually check their spread and "tide over" the plants until hot weather comes, when the lice become unnoticeable.

See also what is said under the headings Time of Planting (p. 6), Fertilization (p. 7), Cultivation (p. 7), and Planting Excess of Seed (p. 6).

#### THE COTTON ROOT-LOUSE. (*Aphis maidi-radicis*.)

Order Hemiptera. Family Aphididae.

(Also called "Blue-bug.")

*Description.*—A small greenish or bluish plant-louse, attacking the roots of young cotton, causing it to be of slow, belated, stunted growth, or killing the plants entirely. Known also by the name of "Blue Bug."

*An Unrecognized Pest.*—Heretofore there has been no published record of this insect as an enemy of cotton, though it has long ranked as a serious enemy of corn in Illinois and adjacent States, where it is known as the "Corn Root-louse." It was recently reported to the United States Department of Agriculture at Washington, as attacking cotton roots in South Carolina, but it seems that it has never been recognized by entomologists as one of the standard cotton pests. Vague reports of its ravages had reached the State Department of Agriculture from time to time, always indicating that it was serious, but always these reports came at such a time or in such a way that they were not substantiated by specimens. It was only this spring (1908) that we were enabled to secure sufficient material to ascertain definitely the species responsible for the damage.

*Injury in North Carolina.*—During the last eight years there have been reports of this pest from time to time in county papers, and several times it has been asked about at Farmers' Institutes. But it was not until the spring of 1907 that it was promptly and specifically reported by letter in such a way as to admit of positive record. Between June 4th and July 12th, 1907, it was reported five times, once each from the counties of Bladen, Duplin, Johnston, Robeson and Wayne. That it was very destructive in 1907 is shown well by the following letter:

GOLDSBORO, N. C., June 27, 1907.

On the 1st day of June the cotton crop of Wayne and surrounding counties was fully normal; to-day 65 per cent would, perhaps, more than represent the present condition. Root lice (*Aphis*) have been so universally destructive that it is rare to find a field untouched, and most fields are permanently damaged from one-fourth to one-half. Corn, also, has been very much injured in some sections by this same pest.

Yours,

J. W. HALL.

Up to the present it seems to have attracted attention mainly in the more eastern of our cotton counties. Inquiry among 40 cotton farmers fails to locate it as a serious pest in the counties of Mecklenburg, Scotland, Wake and Warren. (Several in these counties merely mention "Lice" or "Cotton-louse," but do not specify the Root-louse). That it is present in these counties seems certain, for on inspection we located it in a field near Raleigh (Wake County), and the owner of the field said he was familiar with it. In an inquiry among 56 growers in the counties of Halifax and Edgecombe (two of our largest cotton-producing counties), 29 growers mention this Root-louse as a serious pest, a greater number than mention any of the other insect enemies of cotton, thus giving it first rank in importance among the cotton insects in these counties.

The species occurs on a number of plants, and this spring (1908) a louse on corn roots (doubtless this same species) has been reported from the western part of Gaston County.

Summing up all these fragments of evidence, we may say that this insect is doubtless present in a large portion of the State, and probably does some injury to cotton in most of the counties where the crop is grown, but up to the present it has attracted attention as a *serious* cotton pest principally in the eastern section of the State.

*Habits, Life-history, etc.*—As a result of our inquiries this year for information about this pest, and for specimens of it, a number of persons have written concerning it, and from these we quote:

BATTLEBORO, N. C., June 12, 1908.

DEAR SIR:—\* \* \* I feel that I can give you some information on this pest, as it is a common thing with us. The Root-louse is more prevalent in cold springs. \* \* \* They attack and suck the plant when small and cause it to dwarf and not grow until warm nights, when all this (affected) cotton will revive and grow, making late bolls subject to frost. \* \* \* The plant when first attacked will be (apparently) all right, but it will not grow, and becomes hard and knotty-looking, lacking all vitality, stem will be small and dark, and root seems to be decaying as the lice suck it, until it dies, or warm weather and cultivation seem to cause them to disappear. They are more prevalent in stiff and bottom lands. I notice cotton in my fields to-day affected, and while I have not personally examined the roots \* \* \* it is generally understood that Blue-bugs (Root-lice) are the cause of the non-growth and stunted form. Yours very truly,

HUGH B. BRYAN.

BATTLEBORO, N. C., June 13, 1908.

DEAR SIR:—I send you by to-day's mail three plants that are infested by the "Blue-bug" (Root-louse). One plant was about dead when taken up, another badly damaged, and the third is not so badly damaged. \* \* \* As you say you know nothing about this pest I will give you a few facts that any farmer in my section could tell you, but probably will not, because he would expect everybody to know about them. This insect is much worse in cool, damp weather, and on land that is of a close nature, as the heat will not penetrate this as it will sandy land. Hot, dry weather will drive the pest away. \* \* \* You are very apt to find ants working in a little hole by the side of all plants that are infested—in fact the ants are so apt to be there at work

that many say the ants ruin their cotton. We have not been very badly damaged by this insect this season, but last year (1907) they did great damage. The only thing I know to combat it is to prepare the land well and to work the cotton as soon as possible after a rain, so that the heat can get down to the roots.

Yours truly,

GEORGE C. PHILIPS.

These two letters indicate not only that the Root-lice on cotton is well known to growers, but that it is a truly important factor, and that it is entitled to rank among the most serious insect pests of the crop, at least in North Carolina.

It is interesting to note that ants are commonly found in company with this Root-lice, for this same louse in the Central States (where it seriously affects the roots of corn) is attended by a species of ant, and this ant not only does not eat the lice, but it protects them from enemies so far as it is able, and carries the lice or their eggs into its ant hills in the fall of the year, cares for them through the winter, and in spring transfers them again to the field and locates them on the roots of young corn plants. The lice secrete from their bodies a sweetish substance known as "honey-dew," and it is to obtain this that the ants stay near them. The ants themselves do not ordinarily hurt the plant, nor do they give birth to lice, nor do they destroy lice. They are an entirely distinct species of insect which attend the lice for the sake of the honey-dew.

This being the case with this same louse in the Central States on corn, there is every reason to suppose that here in North Carolina the ants attend the lice on the cotton roots for the same purpose. Growers who suppose that the ants eat the lice and are therefore beneficial, are almost certainly mistaken, and those who suppose that the ants attack the cotton are almost certainly mistaken, while those who suppose that the ants are the parents of the lice, are absolutely mistaken without any doubt or question whatever, since the louse has no stage of its life when it is really like an ant, and no ant has any stage of its life when it is like a louse.

We are hoping to begin some studies of this Cotton Root-lice this season, and at the time these lines are written preliminary inquiries are being made, but up to this time we have only definitely ascertained the identity of the pest and learned a few general facts concerning it. But with the little knowledge we have so far gathered, we feel considerable confidence in the remedial measures here recommended, and we doubt whether later studies will materially change them.

*Natural Enemies.*—Just what other insects kill and prey upon the Cotton Root-lice we do not know, but we know that its cousin, the Leaf-lice, is attacked by a number of enemies which subdue it when settled warm weather comes. This Root-lice also is said to disappear, or at least becomes harmless, when hot weather comes, and this is possibly due to the fact that its natural enemies are able to

subdue it when favored by warm weather; if so, frequent cultivation close up to the plants will break open the soil so as to admit these natural enemies under favorable conditions of warmth, and will at the same time disturb the ants.

*Summary.*—The Cotton Root-lice is identical with the Corn Root-lice of the Central States. It attacks the roots of cotton and causes the plant to be of slow, late, stunted growth, or oftentimes it is killed. It is known to infest corn in this State, and is also recorded as attacking the roots of a number of other plants. The ants which accompany it feed on the "honey-dew" which the lice secrete. This louse seems most serious to cotton in our eastern counties, where the prevailing soils are sandy, but it is most abundant on the stiffer portions of the field. They are worse in cool seasons and usually disappear when settled hot weather comes.

#### REMEDIES.

As cotton and corn seem to be the two chief food plants of this Root-lice we may expect some measure of relief if we avoid planting cotton in land that was in corn the previous year. One grower in Saupson County mentions that where he grows cotton after corn he is so much troubled by "Wood-lice" (by which we suppose he means this same Root-lice) that he has adopted the practice of growing cotton for two years in succession on the same land to avoid the necessity of having cotton always follow corn.

As pointed out in the letter of Mr. Phillips, much can be done by having the land well prepared and by cultivating frequently, and if the land is well fertilized the injury will be even less severe and will be more quickly outgrown by the plants. Cultivating as soon as possible after a rain is mentioned by Mr. Phillips, and has also been demonstrated as effectual against the Corn Root-lice in Illinois.

Possibly by planting later in the spring the plants would come on when the weather is more settled and hot, and thus escape. Planting increased quantity of seed, or chopping to a thicker stand will allow for a full stand even after the Root-lice has done its worst.

If the ant which attends these Root-lice takes them into its colonies for the winter and brings them out and places them on new plants in the spring, then the more of these ant colonies we can break up and destroy the less of the Root-lice we will have. For this purpose we must depend on a very deep plowing of the soil, either in preparing the land for the crop, or immediately after the injured crop is gathered. Lands in corn and which it is intended to plant in cotton the next year could be very deeply plowed in the fall to destroy the ant colonies and thus kill the lice. During the winter this could grow some useful cover crop or legume, after which, with good preparation for cotton, the Root-lice would be less likely to be destructive. The whole point of this deep plowing treatment, so far as this louse is concerned, would be to break up the colonies of ants.

It is possible that an application of tobacco dust at rate of from 100 to 200 pounds per acre, sown in the row with the seed, would be an effectual preventive, as tobacco in many forms is an excellent remedy for plant-lice. But this has not yet been proven. In the Central States it has been demonstrated that the seed corn can be so treated as to greatly reduce injury from this insect, but it is extremely doubtful whether these methods could be used profitably on cotton, owing to the vastly greater quantity of seed used.

For further discussion of several of the methods here mentioned the reader is referred to what is said under the headings Rotation (p. 4), Plowing (p. 5), Deep Fall Plowing (p. 5), Preparation of Soil (p. 5), Time of Planting (p. 6), Planting Excess of Seed (p. 6), Fertilization (p. 7), and Cultivation (p. 7).

**THE COWPEA-POD WEEVIL.** (*Chalcodermus ancus*.)

Order *Coloptera*. Family *Curculionida*.

*Description.*—A very dark brown, bronze or black weevil, less than one-fourth inch in length, with strong snout or beak bent down under the head. It appears in fields of young cotton in late May and early June, attacking and eating holes in the leaf, stems, and in tender parts of the main stem in the young growing part of the plant. Especially abundant and destructive in land which was in cowpeas the previous year.

*Injury in North Carolina.*—During seven years this insect had not been complained of to this office until 1907, in which season it was reported from Duplin, Wake, Johnston and Harnett Counties. That it has long been present in the State, however, is well shown by the fact that we have in the office collection specimens from Wake County in 1901, from Johnston in 1902, and from Carteret in 1903. In 1907 it was regarded as seriously destructive, as shown by the following:

CLAYTON, N. C., June 4, 1907.

The bug you call Cowpea-pod Weevil is still playing havoc with my cotton on the 3-acre lot where he first appeared. In nine days I have gathered over 5,000 of them off the three acres, and they seem to keep right on coming. \* \* \* They are in several of my neighbors' cotton also; one told me this morning that he had gathered over 2,000 from one of his fields. But in every instance where they have appeared it is where peas were planted last year. Lots of lice are working at the root and sucking the life out of it, so you see cotton is having a very bad time down here.

Most truly,

ICANA POOL.

R. F. D., FOUR OAKS, N. C., June, 1907.

I enclose a few bugs. \* \* \* They devour the cotton crop and are very destructive, get on the stalk and "bill" it, and kill it almost like a hot iron had been pierced through the stalk. One man says they are destroying his crop.

Very respectfully,

R. I. LASSITER.

On May 29, 1907, Mr. M. C. Hodge, R. F. D. No. 2, Raleigh, Wake County, brought to the State Department of Agriculture young

cotton plants hurt by this insect, together with specimens of the insect itself. Mr. Hodge reported that it was very destructive on land that was in cowpeas the year before, but was not present on other cotton not ten feet distant from where peas were grown. He said one could tell almost to the row just where the peas had been by the presence of the weevils.



FIG. 7.—Cowpea-pod Weevil. Side view. Much enlarged.  
(After Chittenden, Bur. Ent., U. S. Dept. Agr.)

*Life-history and Habits.*—The principal food plant of this insect and the one in which it naturally breeds, in the Southern States, is evidently cowpeas, and as already indicated its injury to cotton is principally confined to lands that were in cowpeas the year previous. Its attacks on cotton are likely due to absence of cowpeas in the fields where the weevils emerge in spring. The eggs are laid in the pod of the cowpea and the larva or grub comes to maturity without leaving the pod. In 1901 it was reported by Scott and Fiske (then State Entomologist and Assistant, respectively) as common among the insects jarred from peach trees in Georgia. In 1903 it was reported on cotton to the United States Department of Agriculture at Washington, but was thought to be of accidental occurrence in cotton fields and was not regarded as a serious cotton pest. In 1904 a brief account of it was published by F. H. Chittenden, of the United States Department of Agriculture, giving many instances of reported injury in the extreme southern States.\*

In 1904 it was quite destructive to young cotton in Georgia and was investigated to some extent by Mr. Newell, then State Entomologist. According to his account, they were found to feed on the cotton mostly in early morning or in the afternoon, or on cloudy days. The weevils punctured the leaf stems or the tender part of the main stem of the young cotton. In a 15-acre field fully 25 per cent. had been killed. During the middle of the day the weevils hid for the most part in the loose dirt about the plants at a depth of from one-half inch to two inches. Mr. Newell tested the preference of the beetles by placing them on young cotton plants and placing young cowpea plants close by and found that they preferred the cowpeas. In speaking of the injuries to cotton, Mr. Newell says: "In all cases the owners of infested fields reported that the first appearance of these insects was in those portions of the field that had been in cowpeas the year previous."

\*Bulletin 44, Division of Entomology, U. S. Dept. Agr., Feb., 1904., pp. 39-43.

*Natural Enemies.*—No careful study of the natural enemies of this insect has yet been made, though it is known to be attacked by one or more species of parasites. It is altogether likely that some are eaten by those species of insect-eating birds which frequent cotton and cowpea fields, such as the Bob White, Sparrows, Cat-birds, Mocking-birds and Blue-birds, but the good that they do in controlling this insect is not great, and it will not do for the farmer to rely on them.

*Summary.*—The Cowpea-pod Weevil seems to have only recently become a serious cotton pest in this State and apparently its regular food plant is the cowpea. It attacks young cotton in May and June and pierces the leaf stem and main growing stem with its beak or bill. It is apparently chiefly confined to lands which were in cowpeas the previous year. Up to the present it does not appear to be much under control of natural enemies.

#### REMEDIES.

With this insect, as with so many other cotton pests, we must depend chiefly on methods of management and care of the crop to avoid injury. It is doubtful whether it would be profitable to make any application of poison to the plants, even if such treatment were known to be effective. But as the insect is chiefly destructive to *young* cotton and on lands previously in peas, it is practicable to outline methods of treatment which will benefit the crop and which, at the same time, will be inexpensive.

The most obvious method of control is to avoid planting cotton on land which was in peas the previous season. The letters and experiences quoted in this account of the pest all show it to be *mainly confined to land previously in peas*, hence the *avoidance of such lands for cotton will furnish an almost absolute protection*. We well know that cowpeas are a favorite crop to go ahead of cotton, and for the present there will be no occasion to change this system of rotation so long as this weevil does not become a pest, but once the grower finds it serious on his cotton he may know that by avoiding land which was in peas the previous year he may secure practical immunity from this pest.

Since the insect attacks principally *young* cotton, the grower may find it in the field before the cotton is chopped. He can then chop to a thicker stand so as to allow for some being killed by the insect and yet have enough for his crop, or, if his cotton is late, he may postpone chopping until after the insects have disappeared (which they seem to do early in June), and then he can chop out those plants that have been badly injured and secure his stand from the healthy stalks remaining. Late planting will tend to avoid the insect.

In addition to these measures a point will be gained by having the land so well prepared, so fertile, and so well cultivated that the plant makes a quick, vigorous growth, which enables it to quickly recover from injury.

For further consideration of these measures, the reader should see what is said under the following headings in this BULLETIN: Rotation (p. 4), Preparation of Soil (p. 5), Time of Planting (p. 6), Planting Excess of Seed (p. 6), Fertilization (p. 7), and Cultivation (p. 7).

**THE NEW COTTON BEETLE.** (*Luperodes brunneus*.)

Order *Coleoptera*. Family *Chrysomelida*.

*Description*.—A dark brown or black beetle, less than one-fourth inch in length, appearing in great numbers in late June and in July, devouring the blossoms, squares and young bolls. The beetles run about quite actively, and fly readily.

*Historical*.—This is another of the cotton insects that is only recently forcing its way to the front as a pest. As early as 1892 it was reported to the United States Department of Agriculture as destroying cotton in Polk County, Georgia, but seems to have been only local and did not again attract notice for years. In 1905 it became quite destructive in six different counties in Georgia, and was discussed in Bulletin 20 of the Georgia State Board of Entomology, by Prof. R. I. Smith (at that time Entomologist of Georgia, now Entomologist of the Experiment Station of North Carolina). Mr. Smith proposed the name of "The New Cotton Beetle" for this pest, and we have, therefore, called it by that name. In North Carolina it was reported as injuring cotton in the three consecutive years of 1903, 1904 and 1905.

*Injury in North Carolina*.—In 1903 specimens were sent from the place of Mr. T. J. Watkins, Poplar Hill, Anson County, with the report that they were doing considerable damage to blooms and squares. In response to our inquiry we received the following:

POPLAR HILL, N. C., August 11, 1903.

I am in hopes that the beetles sent will not prove to be a serious pest. I enclose some of the blooms to show that they work inside the bloom as well as outside. He cuts the squares from around the bloom, and cuts the pollen from around the stem on the inside. You are mistaken if you think it attacks the dead blooms and leaves—it is the fresh blooms and the tenderest leaves that he works on. I can now see plainly how he is getting in his work. All stalks attacked are ruined except bolls that are nearly grown. It is something that has never preyed on the cotton plant in this section before.

Yours truly,

T. J. WATKINS.

In a letter written the next year (dated July 1st, 1904) Mr. Watkins wrote: "The same insect is on the cotton this year."

R. F. D. No. 3, APEX, N. C., August 1, 1904.

I send you some bugs found on cotton. They have damaged it one-half, I think. They started in one corner of the field and are spreading. They attack the bolls and blooms and squares. They can fly.

Respectfully, W. F. UPCHURCH.

The three complaints made in 1905 were from Wake and Granville Counties, but contributed nothing further to our knowledge of the injuries caused by the insect.

*Life-history and Habits.*—This beetle belongs to the family Chrysomelidae, the same large family to which many other pests belong, such as the Potato-beetle, Melon-beetle, Flea-beetle and the Elm Leaf-beetle. Most of them are of active habits, crawl briskly, fly readily, and feed on the flowers or leaves of plants. Some species are found on a considerable number of plants, while others confine themselves strictly to one or only a few kinds of plants.

Professor Smith, reporting on the Georgia outbreak of 1905, says that a favorite place of feeding of this New Cotton Beetle was in the opening blooms, from which they would eat the entire center. The insects were present in great numbers for a few weeks and then suddenly dropped out of sight.

The further life-history of this insect, the place of depositing the eggs, the food habits of the young or larva, the method of passing the winter, etc., all these points, so far as we know, are still a matter of conjecture and in need of further study. With such a complete knowledge of the insect it might be easier to devise some method of combating it, though with our present meagre knowledge we are almost helpless.

#### REMEDIES.

With an insect as active as this, which attacks the constantly growing and unfolding parts of a plant, it is very difficult to make any effective treatment. This is all the more impracticable on cotton where no expensive measures could be used with any profit. If cotton were relatively of as high value and grown in as limited areas as lettuce in a hot bed or as strawberries in a home garden, the enemy might be easily controlled.

From our present limited knowledge and experience we believe that in most cases this pest will not be seriously destructive. A considerable part of the flower of a plant (especially the petals) may be eaten away without actually diminishing the crop of bolls. We believe, therefore, that the grower can afford to take a little risk with this insect and wait a few days (keeping it under frequent observation) to ascertain, if possible, whether they are present in numbers and activity sufficient to really mean serious loss to the crop; but having concluded that some action is necessary, we have two methods to suggest, both troublesome, and neither justifiable except where serious injury is threatened. If the insect is widely distributed

over a large area, so that detailed treatment of all the individual plants is impracticable, he should use the dusting method of applying dry poison. This is fully discussed under remedies for the Cotton Boll-worm on page 38. So far as practicable care should be taken to direct the poison to the opening squares and blooms.

If the injury is confined to a restricted area, a more thorough treatment can be made by using a regular spray pump and applying Paris Green in water at the rate of one ounce to every eight gallons. The nozzle must be directed so as to thoroughly dampen all the young squares, opening blossoms, etc. where the insects feed. We could not expect this spraying treatment to pay merely by benefit to the plants treated, but the greatest good would come by preventing further spread into new parts of the field.

Should these methods of treatment seem impracticable, perhaps a strip or belt of plants around the infested area could be treated so that in their further spread the insects would encounter the poisoned plants and be checked.

We have no special reason to believe that any method of culture, rotation, etc., can be used that will avoid or diminish the ravages of this pest.

It is especially to be hoped that this will not become a serious and regular pest, for if it were every year to be widespread in destructive numbers its ravages would be very great and our remedies might not prove altogether satisfactory for such universal outbreaks.

#### THE COTTON RED SPIDER. (*Tetranychus gloveri*.)

(Also known as "Rust-mite," "Rust," and by other names.)

*Description.*—A tiny mite or "spider," barely noticeable to the naked eye, which occurs in great numbers on the under side of the leaves, causing them to turn reddish or "rust." Later they turn yellowish brown and fall from the plant. The little mite is yellowish-green or reddish in color.

*Notice.*—This little creature causes *one* of the several different troubles which most farmers know without distinction under the name of "rust." There are other forms of rust, sometimes caused or aided by a fungus or by bacterial diseases, or sometimes by the presence or absence of certain chemical elements in the soil, but this Red Spider or Rust Mite is one of the most frequent afflictions that pass under the name of "rust." It does some injury almost every year in midsummer, but usually becomes widely destructive in times of long continued dry weather.

*Injury in North Carolina.*—Since 1900 the years of 1902 and 1905 have witnessed the most destructive outbreaks of this creature. It has been reported from many counties scattered over our cotton-growing region, though the principal area of injury seems to be in a belt about two counties wide, extending across the State from

Halifax and Warren on the north, southward through Wayne and Johnston, and passing beyond our borders in the counties of Robeson and Scotland on the south. Nevertheless it has been twice reported from as far west as Cabarrus County, and what is presumably the same was sent on corn from Brunswick County. That it is not confined to cotton alone is made plain by the following, which shows it to be destructive to corn and peas as well, and these, with cotton, are the three main staple crops in the cotton counties:

FREMONT, N. C., July 25, 1902.

I send to-day two stalks of cotton, one of corn, and one hill of peas. You will observe that there is an insect on it which is spreading rapidly. The cotton, destitute of leaves, shows the way in which it is left. I notice they are spreading faster on the corn than on the cotton.

Yours, etc.,

J. A. DAVIS.

An examination of the samples sent by Mr. Davis showed all three of these kinds of plants to be swarming with this Red Spider in all stages of development, the leaves in each case showing the reddish or yellowish color due to their injurious attacks. Many other letters could be quoted showing it to be destructive, but most of our cotton farmers are already aware of its nature.

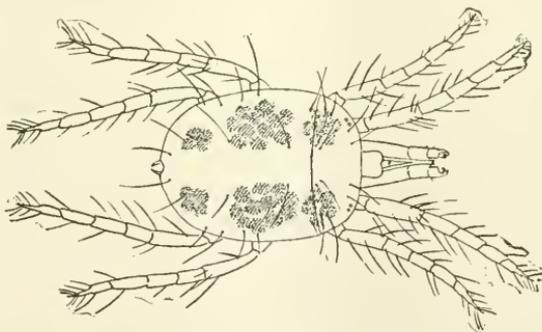


FIG. 8.—Cotton Red Spider, or Rust-mite. Adult mite, very much enlarged.  
(After Titus, Bur. Ent., U. S. Dept. Agr.)

*Life-history and Habits.*—How the Red Spider passes the winter is not known, but it seems likely that it may pass this season on hardy weeds. At any rate, during the summer, they are found in all stages of development on the cotton leaves. The young mites are of the same general appearance as the adults, but are smaller and generally paler in color. The eggs are round and are of a pearly color at first, but turn darker as the time for hatching approaches. The eggs hatch in a few days in hot weather.

The Red Spider usually first appears in restricted areas, in one corner, or along one edge of the field, or in spots here and there through the field. They spread gradually until by the latter part of summer they may be all over the field, causing leaves and bolls to

drop off and leaving only bare stalks with a few stunted, imperfect bolls. The natural method of spread is by the mites crawling from one plant to another where they touch in the row, or when they are blown by wind so that each plant brushes against the others near by. But it seems certain that they may also be spread by birds, or by other insects which may rest among the infested plants for a few minutes and then fly or crawl to some other plant, accidentally carrying a few of the mites. In fact, Mr. E. S. G. Titus, formerly Special Field Agent for the Bureau of Entomology at Washington, states\* that they have been taken from several insects, such as grasshoppers and small bugs, which frequent the plants. It is also likely that they would be spread to some extent in cultivating or hoeing the crop before it is "laid by."

The fact that it has a wide range of food plants is also important. As already indicated, it has shown itself destructive in this State on cotton, corn and peas. What is presumably this same species has been sent to us on tomato leaves, and several cotton growers have mentioned to us that it frequently starts in their fields from the pokeberry weeds, and infested leaves from this plant have been sent to us. Mr. Titus also records it on the cocklebur, which is a common weed in this State in cotton fields. There is little doubt that it also attacks many other species of weeds.

*Natural Enemies.*—Mr. Titus records the fact that several species of predaceous insects prey on the Red Spider, mentioning particularly one of the Lady-beetles. The mites are so very small that they would seldom, if ever, be eaten by birds, and up to the present we know of no species of true parasite that infests it. Upon the whole it seems to be not much under the control of natural enemies.

#### REMEDIES.

As a method of avoiding the first appearance of the Red Spider, all weeds, especially pokeberry and cocklebur, should be kept subdued by frequent and thorough cultivation. As many of the mites will still be on the younger parts of the cotton plant when the crop is picked, it would help considerably if all old stalks and remnants in badly infested fields were pulled and burned immediately after the cotton harvest, or else turned under deeply with a two-horse turning plow. These measures will tend to keep their numbers always decreased so as to escape the necessity of further and more expensive treatments.

When the Red Spider has made its appearance and begins to show its bad effect on the plants we believe that the best plan (if it is discovered early while it is yet confined to small areas) is to pull up all the plants that show the trouble *and also all others immediately adjoining even if they are not visibly affected*, and put them all in a

\*Circular No. 65, Bureau Entomology, "The Cotton Red Spider," Oct., 1905.

pile in the center of the area, add some dry leaves or straw, and burn. This may seem like a heroic treatment and it certainly does not save the infested plants, but in adopting this treatment the object will be to prevent the further spread of the Red Spider and thus save the rest of the crop.

Supposing, however, that the Red Spider has made its appearance and is doing injury, but that the grower does not wish to adopt the method of destroying the infested plants. Then he has recourse to either dusting the plants with dry powdered sulphur with a bellows (arranged or worked so that the application shall reach the under side of the leaves), or he may give a spraying treatment with some solution that will kill the mites by coming into contact with them.

In dusting the plants with a bellows or powder gun, ordinarily powdered sulphur may be used alone, or mixed with an equal amount of flour or sifted road dust. The application must be carefully made so as to reach the under side of the leaves, where the creatures are most plentiful.

If the grower decides to adopt a liquid treatment the material which will likely give best results is a solution of lime and sulphur, which can be prepared as follows, to make 100 gallons of the solution: Five pounds of fresh stone lime (unslaked) is put in a tub, keg, barrel, or *iron* kettle (not copper). Add a little water to start slaking and add more to keep it going. As it slakes add five pounds of sulphur, and the heat and boiling of the slaking will cause much of the lime and sulphur to unite. Keep the mixture stirring as it slakes and boils. When it has finished slaking, add water to make 100 gallons, and it is ready to apply. If desired, this mixture may be made up in smaller quantity than 100 gallons, but it should always be prepared in these proportions. One pound of lime and one pound of sulphur may be used to make up 20 gallons of the solution.

Ordinary laundry soap dissolved in hot water and diluted to make  $1\frac{1}{2}$  pounds soap to 4 gallons of water has been used by us with good effect against plant lice without injury to the plants, but whether this would be effective against Red Spider we do not know. It is worthy of trial.

It is doubtful whether the spraying and dusting treatments will always prove satisfactory. The cultural methods of prevention and the destruction of stalks to prevent spread of the trouble while it is yet confined to small areas, is more promising. This pest, like several others discussed in this BULLETIN, is irregular and sporadic in its outbreaks and in many seasons treatment will not be necessary, but it is best always for the grower to follow such methods of practice as give the least encouragement to attack, and to know what measures can be used in an emergency.

THE COTTON WORM. (*Aletia argillacea*.)

Order *Lepidoptera*. Family *Noctuidæ*.

*Description*.—A slender greenish caterpillar or worm from an inch to an inch and a half in length, with small black dots, sometimes showing stripes down the back, which feeds mainly on the top growth of the cotton, sometimes becoming destructive in late summer and fall. The caterpillar crawls with a looping or “measuring” motion.

*Injury in North Carolina*.—In this State the Cotton Worm has not often been destructive. It is a much more important pest in the extreme Southern States of Alabama, Louisiana and Texas. However, it seems to have attracted attention in Wayne and Halifax Counties as early as 1863. In recent years, however, there has been no serious outbreak until the fall of 1905, when it suddenly appeared in great numbers in Pitt and Lenoir Counties, where it was sometimes erroneously called “Army Worm.” That it was abundant and destructive at that time is shown by the following:

GREENVILLE, N. C., September 13, 1905.

I write to let you know that the Army Worm (Cotton Worm) is destroying all of the late cotton in this county. They have just begun on my farm near town.

Yours truly,

C. T. MUMFORD.

This outbreak was investigated by Mr. R. S. Woglum, at that time Acting Entomologist, and the results of his observations were published.\* From his notes, as well as from his published account, it is evident that the damage was very severe on the top crop of the late cotton. By the middle of October the caterpillars had practically all matured and the damage ceased.

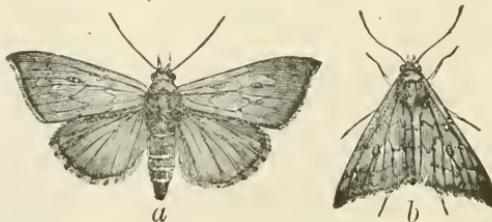


FIG. 9.—Cotton Worm Moth. *a*, with wings spread; *b*, with wings closed. Natural size.

(After Riley.)

*Life-history and Habits*.—The adult parent insect of the Cotton Worm is a flying moth as shown in Fig. 9. These moths can fly freely for long distances. Although the worms are known to feed to maturity only on cotton (which is grown only in the Southern States), the adult moths have been found at lights in towns and cities in Canada, having evidently flown there from hundreds of miles to the south, aided perhaps by favorable winds. As the insect is only

\*Entomological Circular No. 16, N. C. Dept. Agr., “The Cotton Worm.”

occasionally noticeable in North Carolina, it seems likely that the parent moths of the worms which do damage with us are brought here by long flights from the States further south. There are several generations of the insect and the moths of an early generation might come into North Carolina in July or August and their progeny would be destructive to the cotton a few weeks later. The moths lay their eggs principally on the under side of the leaves and in the tender growing part of the plant. The egg is circular, flattened, and somewhat ribbed as shown in Fig. 10.

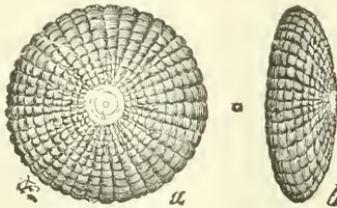


FIG. 10.—Two views of Egg of Cotton Worm Moth. *a*, View from above; *b*, view from side. Much enlarged.

(From Fourth Report, U. S. Entomological Commission)

The eggs hatch in about a week and the young caterpillar begins to “rag” the leaves. They do not usually attract attention until they get large enough to devour considerable quantities of the foliage. At this time the caterpillars present somewhat the appearance shown in Fig. 11, which shows two views of the worm somewhat enlarged, the length of the line between the two figures representing the actual length. The caterpillar crawls by a looping motion, and Mr. Wog-

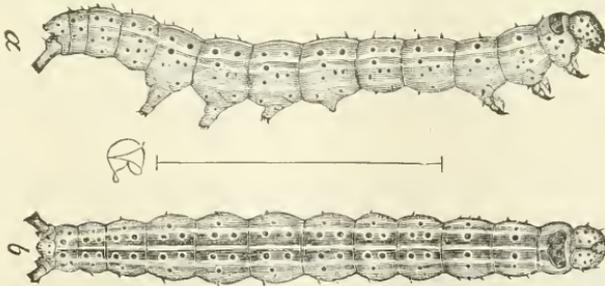


FIG. 11.—Cotton Worm, or Caterpillar. *a*, Side view; *b*, view from above. Somewhat enlarged. Actual length indicated by line.

(From Fourth Report, U. S. Entomological Commission.)

lum states that he has seen them, when disturbed, suddenly throw themselves into the air as much as a foot above the leaf on which they were. These caterpillars feed ravenously and when the tender growth of one plant is consumed, may attack the older leaves or crawl on to another plant, thus quickly spreading over an entire field, eating away the tender top growth.

When the caterpillar becomes full grown (which requires about two weeks) it turns to the condition known as the "pupa" or "chrysalis," usually attached to the under surface of a slightly folded leaf, by a very slightly spun cocoon. The pupa stage occupies from one to four weeks, depending on climatic conditions, and then the adult moth (as shown in Fig. 9) bursts out of the brown pupa shell, and after drying and stretching its wings is ready to begin its flying life. The adult moth flies chiefly at night, but when present in the field in large numbers may be flushed from the plants in daytime.

Since the Cotton Worm appears in destructive numbers with us only late in the season and confines itself principally to the late tender growth, it probably does not do nearly so much harm as is generally thought, for most of the late foliage and bolls are killed by frost before they mature, so that even when there is no outbreak of these worms the "top crop" is often of no value. That they do destroy the late growth in great quantities is not to be denied and no grower wishes to see the vegetation of his crops ruined by an insect enemy. But in this case there is at least some consolation in the fact that the injury usually is not in reality so bad as it appears. Even in the more southern States, where the late top crop is more often harvested and where it is of more account, the Cotton Worm is not now regarded so seriously as in former years, when it was the cause of much alarm.

*Natural Enemies.*—As the caterpillars of this insect are of good size, and feed openly and exposed on the cotton foliage, they are freely subject to the attacks of natural enemies which easily find them. When a worm falls to the ground it may be overcome by ants, and there can be no doubt that many are also eaten by insectivorous birds. There are also numerous parasites which infest the bodies of the caterpillars and cause their death. In years when only a few of the moths come to us from the south these natural enemies no doubt act strongly to keep them under control, but in other years (like 1905) where local conditions are favorable and where a considerable number of the insects become established, they get beyond the control of their natural enemies and are then recognized as seriously destructive. It is interesting for the farmer to know that every year there is a silent host of natural enemies at work in his behalf, not only subduing this pest, but many others on all kinds of crops. While he can do but little to aid or multiply these friendly little creatures, he may at least be thankful that nature provides such a means of protection.

*Summary.*—The Cotton Worm is the larva or caterpillar of a moth, and is sometimes destructive to the late top growth of cotton. It seems probable that the flying moths invade this State from the south in years when they are destructive. There are several broods each year, but only the later broods attract attention. It is attacked by a number of natural enemies.

## REMEDIES.

The culture methods of rotation, cultivation, etc., which are so useful against a number of our cotton pests, are relatively useless and impracticable against this. Furthermore, the Cotton Worm is so seldom a pest with us that it would not always pay to adopt any regular methods of prevention unless such methods were of themselves the best for the cotton crop.

On the whole, the methods of combating the Cotton Worm consist in the application of direct remedies, in the form of poisons put on the foliage to kill the caterpillars. They are so ravenous that they are easily killed by this means, the main question being to devise means for applying the remedies over large fields at low enough cost to be profitable. The course usually adopted is to dust dry Paris Green on the plants by the methods described in discussing remedies for the Boll-worm on page 38 of this BULLETIN. From 1 to 3 pounds of Paris Green will be sufficient for treating an acre of cotton. It should be dusted on as soon as the destructive work of the Cotton Worm becomes evident, without waiting until the tender top foliage is practically all eaten away.

The Paris Green may be dusted on pure, or mixed with an equal quantity of dry powdered air-slaked lime, or land plaster. If only a limited area is to be treated the material can be dusted on by hand, or it may be scattered broadcast when there is a good breeze blowing so that it shall be widely scattered. While the application must be thorough enough to get a small quantity of the poison on the growing part of every plant, yet at the same time we must choose such methods as are rapid and economical. It is best to do the dusting work in early morning or late afternoon and evening, so that the dews will cause it to adhere to the foliage.

For further discussion of the dusting method of applying poison to cotton the reader should see what is said on this subject in discussing the methods of applying poison for the Boll-worm on page .

**THE COTTON BOLL-WORM.** (*Heliothis obsoleta*.)

Order *Lepidoptera*. Family *Noctuidæ*.

*Description.*—A greenish, grayish, or pinkish colored caterpillar or worm, when full grown from an inch to an inch and a half in length, which injures cotton by eating into the squares and bolls. Found on cotton from the time the squares are formed, but attracts attention principally in September and early October, at which time injury to the bolls is sometimes serious. The same insect attacks the ears of corn, when it is known as the Corn Ear-worm; it also attacks the green or ripening fruit of tomatoes, when it is called the Tomato Fruit-worm, and it is sometimes also called the Tobacco Bud-worm

from its destructive habit of attacking the growing part of the tobacco plant. It is also known to attack the pods or fruits of various other plants, such as peas, beans, okra and squash.

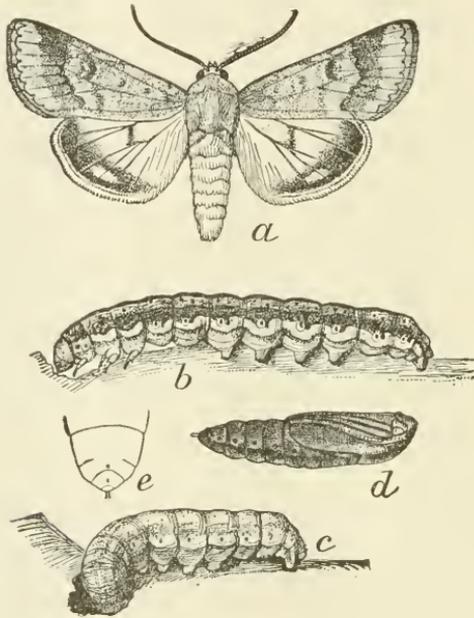


FIG. 12.—Cotton Boll-worm. *a*, Adult moth; *b* and *c*, views of the larva or Boll-worm; *d*, pupa. All slightly enlarged.

(After Howard, Bur. Ent., U. S. Dept. Agr.)

*Injury in North Carolina.*—The Boll-worm has not usually been considered as a serious cotton enemy in North Carolina, but it does some damage every year, and in its latent or pent-up possibilities for evil, we consider it one of our most prominent pests. Taking the State as a whole probably our four most important crops are corn, cotton, cowpeas and tobacco. There are few pests that attack all of these, yet this Boll-worm (so called when it attacks cotton) has been at various times reported to this office as doing noticeable damage to all four of these leading crops, and it is known to attack a large number of other crops and plants to a slighter degree. In all cases its habits and methods of attack make it a difficult pest to combat satisfactorily. Should conditions be favorable to its increase for a series of years, there can be little doubt that it would forge to the front as an exceedingly important pest, not only of cotton, but of other important crops as well. On one or another of the crops named this insect has been complained of every year from 1900 to 1907, inclusive, and no doubt 1908 will witness further destruction by it. It is such a common and universal pest in the ears of corn that it seldom attracts more than passing notice, except in gardens or truck patches

where corn is grown for table use, long familiarity with its ravages having made the planter indifferent to the really large aggregate of damage which it inflicts, and no doubt it is much more destructive



FIG. 13.—Boll-worm eating into boll from outside, as commonly found in cotton fields in late summer and fall. Natural size.  
(After Quaintance, Bur. Ent., U. S. Dept. Agr.)

to cotton than most of our growers realize. The following extracts from letters concerning this insect indicate, however, that it was seriously destructive in 1907:

MT. OLIVE, N. C., September 8, 1907.

I was in my cotton crop to-day and found that some kind of insect was creating great destruction. I send you sample.

Respectfully yours,

CALVIN BROCK.

CLINTON, N. C., September 9, 1907.

I send to-day cotton bolls ruined by worms—some of the worms are in the bolls. My cotton is very much hurt by them, in some places as much as 10 or 15 per cent, or probably more.

Yours truly,

S. H. HOBBS.

WARSAW, N. C., September 19, 1907.

I send some cotton bolls and a worm that is destroying my cotton. One can find thousands of them in my field, as many as forty on one stalk.

Yours, etc.,

R. P. RAIFORD.

DARDENS, N. C., September 21, 1907.

I send you some worms and cotton bolls. The cotton within a radius of five miles is badly damaged by this worm—in some instances the damage is not less than 25 per cent. We have had some of these worms for three or four seasons, but not as many as this year.

Yours respectfully,

C. C. FAGAN.

*Life-history and Habits.*—The adult (parent) insect is a brownish-yellow moth which measures about an inch and a half from tip to tip of the expanded wings. The moth flies at dusk and after dark, and feeds upon the nectar of flowers. The female moths lay the eggs (on the cotton plant) largely on the young leaves and squares. These moths do no harm other than to lay the eggs. The eggs hatch in from two days to a week to small dark-colored caterpillars, or larvæ. At first the young caterpillars feed on the leaves close to where the eggs were laid, but later they wander farther away and attack the first boll they can find, or bore into the bud. The worm may remain in the boll first attacked until it is completely eaten out, or it may eat directly through the boll and at once go in search of another. In this way one Boll-worm may destroy a considerable number of bolls.

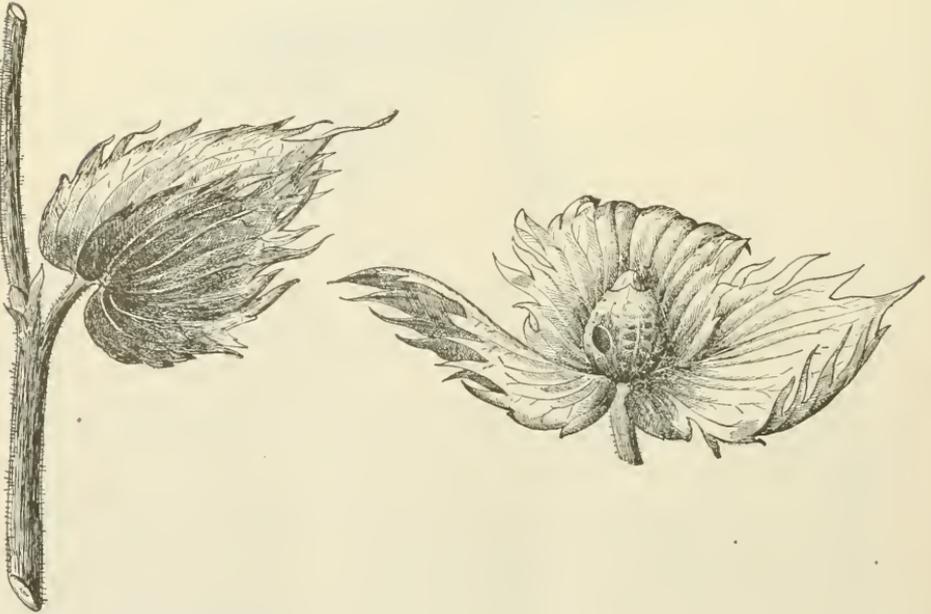


FIG. 14.—Healthy square at left. "Flared" square attacked by Boll-worm at right. Notice hole eaten in bud by worm. Natural size.

(After Quaintance, Bur. Ent., U. S. Dept. Agr.)

When the larva (caterpillar) is fully grown it is from an inch to an inch and a half in length. They vary greatly in color, some being dusky brown, others pink, reddish or yellowish. The grown larva leaves the boll and enters the ground, where it changes to the pupa.

It passes this stage in an oval cell in the earth. It is of a brown color and entirely helpless, as this is merely a transformation stage, when the larva is being formed into the adult moth. This stage of the insect lasts from one to four weeks (or over winter), at the end of which time the adult insect emerges. The adult insects mate and deposit eggs for another brood, and then die.

There are several distinct generations of the insect each year, the exact number having never yet been definitely determined for North Carolina, but it seems likely that in eastern North Carolina there are at least five distinct broods and in the piedmont section four or five broods. The winter is passed in the pupa stage in the ground.

It is interesting to know that the larvæ are cannibals and not infrequently eat one another. This is (to us) a very beneficial habit and worthy of all possible encouragement, but as it takes place only when they are numerous enough to come into competition for possession of food, there will always be enough left to do serious damage.

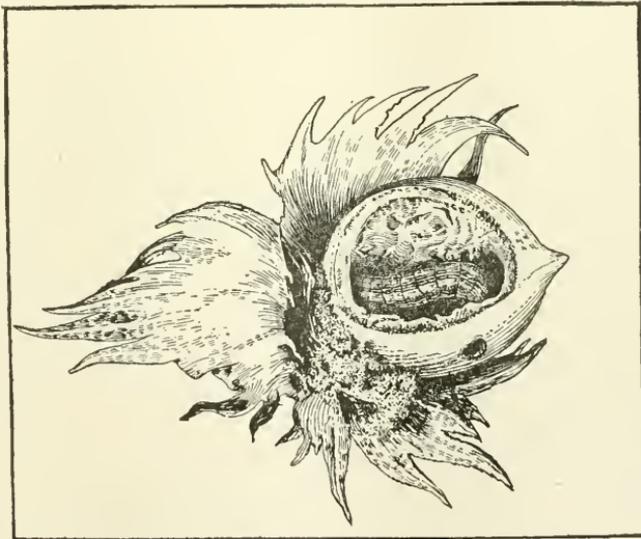


FIG. 15.—Boll cut open to show Boll-worm at work inside. Natural size.  
(After Quaintance, Bur. Ent., U. S. Dept. Agr.)

Corn seems to be the preferred food of the Boll-worm, for the adult moths lay their eggs on fresh corn silk in preference to anything else. But when the kernels have become hardened they turn to cotton and other crops.

Professor Quaintance states\* that noticeable injury to cotton begins with the August generation of caterpillars. When a young square is attacked it “flares” and drops from the plant. This injury

\*Farmers' Bulletin 191, U. S. Dept. Agr., “The Cotton Boll-worm.”

is well shown in Fig. 14. As injury on cotton begins to be serious in August, any treatment for the purpose of poisoning the worms should be made early in August so as to kill the young larvæ while they are feeding on the leaves, before they get in the bolls, where it would be impracticable to reach them effectively.

*Natural Enemies.*—As the Boll-worm spends much of its time *inside* the part of the plant which it attacks, it is not so often attacked by enemies as we could wish. There is a parasite which attacks the eggs, and which Professor Quaintance says sometimes destroys 50 to 75 per cent of them. The fact that the Boll-worms sometimes eat each other has already been mentioned. Birds also no doubt devour a considerable number.

*Summary.*—The Boll-worm attacks many other crops beside cotton and becomes noticeable as a cotton pest only in the latter part of the season. They cause young squares to flare and drop, and also bore into and ruin the growing bolls. It has long been present in the State and is usually not very destructive to cotton, but in 1907 did considerable injury.

#### REMEDIES.

*Cultural Methods.*—It has been pointed out that Boll-worm injury to cotton is not serious until late in the season, hence if the cotton is very early it may practically have its crop made before the Boll-worm injury reaches its height. Whatever can be done to hasten the crop will tend to decrease the injury by Boll-worms. Good preparation, early planting, use of early maturing varieties, frequent cultivation, all these things tend to force the crop along rapidly so that a good crop will be assured before the Boll-worm becomes destructive.

As we have learned that the insect passes the winter in the pupa stage in the soil, a thorough breaking of the land in winter will destroy many of the pupæ by exposing them to birds and weather. It has been proved that most of the Boll-worm pupæ which are thus disturbed in winter are killed.

*Dusting With Poison.*—As the Boll-worm begins to be destructive to cotton early in August, and as the young larvæ feed to considerable extent on young squares and leaves before they actually enter the bolls, it is possible to poison the cotton about the first of August so as to kill them. For this purpose the use of dry poison applied as dust seems the best, and Paris Green is recommended. It may be applied pure or mixed with an equal quantity of flour or dry air-slaked lime, but should be applied at the rate of from 2 to 3 pounds of the green per acre. If mixed with equal quantity of lime, use from 4 to 6 pounds of the mixture to the acre. It is easier to make a uniform and economical application when the poison is mixed with some other substance than to apply the Paris Green alone.

It is important to adopt some method by which the poison can be quickly and economically applied, else the application would not pay. A homemade apparatus for dusting cotton plants is shown in Fig. 16. This apparatus is described by Prof. R. I. Smith\* as follows:

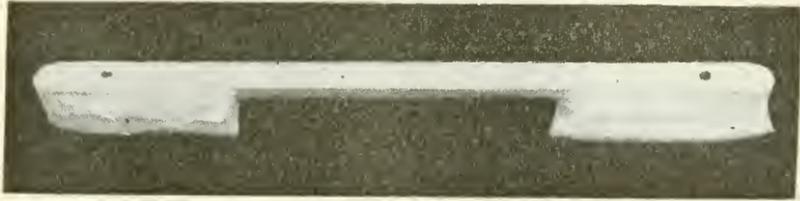


FIG. 16.—Apparatus for dusting cotton plants with Paris Green by hand.  
(After R. I. Smith.)

"The dusting apparatus is made from a one-inch board, four and a half feet long and three inches wide, by boring an inch and a half auger-hole five inches from each end, and attaching under each hole a sack five inches wide by about fifteen inches long. These sacks can be made from unstarched sheeting running about four pounds to the yard. If it is found that the poison is being applied too fast or too slow the proportion of lime (or flour) and Paris Green must be changed, so that the required amount of actual poison will be applied per acre."

Figure 17 shows this apparatus in actual use, and it will be observed that as the laborer walks along, swinging and shaking the duster, a cloud of the lime and green is shaken from the sacks and is wafted about in the air so as to settle on all parts of the cotton plants. By the use of such an apparatus (which costs practically nothing to make) a good laborer can treat cotton very rapidly. If favored by a very light breeze it would not be necessary to walk between every two rows, but every second middle (or every third or fourth middle) can be traveled, shaking the duster continually. While such a treatment cannot destroy all the Boll-worms on the cotton, yet if given at the right time (about August 1st to 10th) it will kill so many of the young worms as to greatly reduce their injuries.

\* Bulletin No. 16, Georgia State Board of Entomology, April, 1905 "*Cotton Boll-worm in Georgia.*"



FIG. 17.—Hand Duster in use in cotton field.  
(After R. I. Smith. Photo by Newell.)

This apparatus is entirely practicable for the farmer who grows up to about 50 acres of cotton. An application of the poisoned dust about the first of August may serve other purposes, for it may check the first ravages of the Cotton Worm, or the New Cotton Beetle or other leaf-feeding insects which might be gaining a start.

For use in very large plantations a still more rapid method of dusting is desirable. Fig. 18 shows a very similar method adapted to more wholesale use. A longer pole is used than with the hand duster and a larger bag of poison is tied at each end; the laborer rides a mule (or horse) down a middle and shakes the dust out as he goes. We can readily see that many acres can be treated in a short time by such a method. Reporting upon investigations conducted in 1903 in Texas, Professor Quaintance shows\* that in a 5-acre plat there was a



FIG. 18.—Poisoning cotton in large fields by pole-and-bag method.  
(After Quaintance, Bur. Ent., U. S. Dept. Agr.)

net profit of \$5.79 per acre from three applications with the dusting method, after allowing for cost of materials, labor, etc. But as the Boll-worm is more destructive in Texas than in North Carolina our farmers could not expect so high a return except in years like 1907, when the Boll-worm was more destructive than usual. But there can be little doubt that in many seasons when our farmers have "laid by" the crop and are scarcely looking at it (merely waiting for the harvest), there would be profit in one or more dusting treatments in certain parts of the field, at least during August and early September. Professor Quaintance suggests that dusting applications should be made at night, or early in morning or late in evening, to secure the very best results, as the plants will then be damp with dew and the poison will stick better.

\*Farmers' Bulletin No. 191, U. S. Dept. Agr., "The Cotton Boll-worm," p. 20.

*Liquid Sprays.*—Paris Green may be applied as a spray in water at the rate of one pound to 50 or 75 gallons of water with good effect in checking the Boll-worm, but this process is slower and more tedious and does not commend itself to the consideration of the cotton farmer in the middle of our average August day. Professor Quaintance found, however, a net gain of \$6.99 per acre as result of three sprayings. Five to six acres per day could be treated with a barrel outfit by using a team and wagon and two men. But the cost of the outfit and the few occasions on which it would be used on the general cotton plantation, lead us to recommend the planter not to depend on the spraying process. We believe the dusting process to be generally more practical and satisfactory.

*A Word About Dusting Cotton.*—We have gone into some detail here to describe and illustrate the methods of dusting cotton. We give this discussion in connection with the Boll-worm because at present it is the cotton pest most likely to require this treatment, but it must be remembered that the same method is effective against practically all insects which devour the foliage, squares, etc., the exact result depending largely on the care and thoroughness with which the work is done. We well know that with a large field of cotton a rapid method of treatment is the only practical one, even if it is not absolutely thorough. Every grower should be familiar with the methods and materials used in this dusting process, so that he can put it into operation without delay at any time that an emergency arises. That it can be used with decided profit in bad outbreaks of Boll-worm and Cotton Worm is absolutely proven, and there is reason to believe that it will be of some benefit against the New Cotton Beetle and against the Cowpea-pod Weevil. It will not be effectual against the Leaf-louse, and its effect on the Rust-mite will be only very slight if indeed there is any effect whatever.

The reader should see what is said under the headings: Plowing (p. 5), Time of Planting (p. 6), Fertilization (p. 7).

**THE COTTON BOLL-WEEVIL.** (*Anthonomus grandis*.)

Order *Coleoptera*. Family *Curculionida*.

*Notice.*—The Cotton Boll-weevil is not yet (June, 1908) known to be in this State, despite many rumors of its appearance. This account of the insect is given to instruct our farmers in advance.

*Description.*—A brown or blackish weevil, less than one-fourth inch in length, with snout about half as long as body, found on growing buds and young leaves of cotton in early season, and later attacking squares and young bolls, causing squares to "flare" and drop and bolls to be deformed. At present known in United States only in Texas and Louisiana and edge of adjoining cotton-growing States. The adult beetle is much like the Cowpea-pod Weevil in size and appearance.

*General Account.*—The Cotton Boll-weevil is not known to be in North Carolina at the present time, but it is well that our growers should be thoroughly informed regarding it in advance of its coming. It is impossible to say with certainty whether it will ever reach North Carolina, and it is also impossible to tell whether it would thrive in our climate. But it seems probable, judging from the rate with which it spreads and the hardness of other species which are closely related to it, that it will eventually reach this State, and that it will prove to be a serious, permanent pest of our cotton.

All talk of “exterminating” or “getting rid of” the Boll-weevil is unsound, in the light of all the evidence at hand. No insect pest has ever been “exterminated” or “gotten rid of,” so far as the writer is aware. Some will escape even the most painstaking application of remedies and their offspring make it again necessary to repeat the work after a few years at most. In regard to the Cotton Boll-weevil no direct means of applying remedies seems feasible at the present time, hence there is no probability that it will ever be wiped out of existence by any treatment which man may devise. Its habits and life-history are such that it is not much exposed to the attacks of birds or other natural enemies.

But we want it distinctly understood that we do not believe that the Boll-weevil will “ruin the cotton industry” or do many of the other alarming things that the newspaper reports declare. There are many farmers in Texas in the very heart of the Boll-weevil district, who are making from one-half to three-fourths of a bale of cotton to the acre, and this is far more than this State produces on an average. No agricultural industry in any enlightened country has ever succumbed to any insect pest. Like the Potato Beetle, the Chinch Bug, the San José Scale and the Hessian Fly, the Cotton Boll-weevil will probably always continue as a serious pest, and perhaps, worse than any of these, but when the people get better acquainted with it, it will probably find its level.

*Description of the Insect.*—The accompanying illustrations (Figs. 19 and 22) give an idea of the general appearance of the adult weevil. It is about as large as a house fly, but the hard wing-covers fit down closely over the back in the same manner as those of the common potato beetle. Note the snout or beak which projects from the head and which is about half as long as the body of the insect. At the end of this snout are the small but strong jaws, for it is truly a biting, and not a sucking, insect.

A much enlarged picture of the weevil is shown in Fig. 19. Here it may be seen the body is covered with a fine (yellowish-brown) fuzz. Note also the antennæ (feelers) which are attached to the snout. Hundreds of our native beetles have the antennæ attached to the snout in this same way. Now notice *carefully* the upper part (the part nearest the body) of the *front* leg. It is much thickened, as is the

case with nearly all beetles, but notice further that there is a projection on this thickened portion and that this projection is notched near the tip, so that it is divided into two points, "teeth," as they are called, one of these teeth being decidedly larger than the other. Also notice that the wing covers are smooth, except for the very fine parallel lines running lengthwise, and the downy fuzz. We know of none of our native snout-beetles of this size whose wing covers are as smooth as these and which have the two teeth on the upper part of the front leg. The Strawberry-weevil, which is very close kin to it, has only one tooth on the front leg, and the weevils which infest acorns, chestnuts and the like have only one. It is true that the plum curculio and its near relatives have two such teeth, but they have the wing covers much roughened. We have gone into these points in

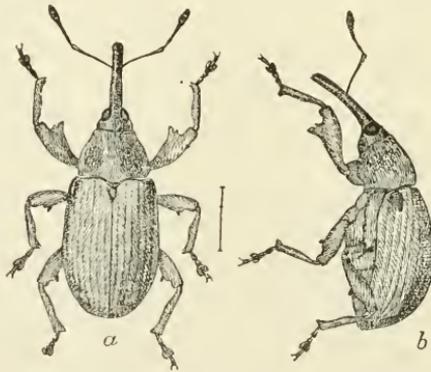


FIG. 19.—Enlarged picture of adult Boll-weevil, showing hairy covering, snout, antennæ, and the two small teeth or projections on the front leg. The line between the two figures indicates the actual length of the insect.

(After Hunter, Bur. Ent., U. S. Dept. Agr.)

some detail, for when the weevil once does appear in this State there will be need for every cotton grower to be able to distinguish it with certainty from other beetles which are like it in general appearance. The insect itself is of a chestnut brown color, sometimes almost black, but the covering of fuzz makes it look brown or almost grayish, the exact shade depending upon the extent to which the fuzz has become rubbed off. The insects are not especially active, in fact they are rather slow and clumsy walkers, and not rapid runners like some other beetles.

If you examine closely, then, you may distinguish the Boll-weevil with reasonable certainty by: First, its size, about that of a house fly, with the wing covers fitting closely over the back; second, its color, chestnut brown with more or less grayish or yellowish fuzz; third, the snout, about half as long as the body; fourth, the smooth nature of the wing covers, and fifth, the two teeth on the upper part (femur) of the front leg. If you have a specimen which does not agree with *all* of these points it is probably something else.

The description of the larva and pupa will be found in the account of the life-history.

Should any reader of this BULLETIN find what he takes to be the true Boll-weevil in this State, he should at once send specimens to the writer, so that it may be determined with certainty. By all means it should not be announced that the weevil has been found until it is ascertained to be an absolute fact. Harm and undue excitement may be caused by such careless reports. When it is determined beyond doubt that the insect is infesting the fields of this State the public will be promptly informed of the fact. In the meantime let us keep our eyes open and receive all sensational newspaper accounts of its appearance (unless they come from an authorized source) with the large grain of allowance which they deserve.

*Life-history.*—The adult weevils pass the winter in sheltered situations in the edges of woods, in and around farm buildings, under rubbish, among grass and weeds in the fields, etc. In the spring they begin to emerge and feed to a limited extent on the tender growing terminal leaves—"in the bud"—as one would say, of any volunteer cotton which may be growing. Later they go to the planted fields. When the buds or "squares" begin to form the insects feed on them and the females deposit their eggs in them also, placing the egg in a hole which is made in the square or boll with the snout. In Fig. 20, at the right-hand side, is shown a partly grown boll which shows the marks where the insects have been feeding and laying their eggs.

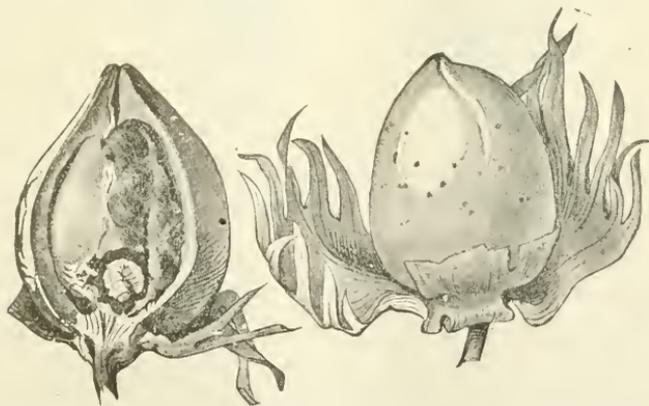


FIG. 20.—At right, a boll showing feeding and egg-laying marks of Boll-weevil. At left, partly grown boll opened to show grown larva of Boll-weevil inside. Natural size.

(After Howard, Bur. Ent., U. S. Dept. Agr.)

These marks should not be confused with the little specks of color which are to be seen on almost any boll. The egg is covered over with a substance somewhat like glue, which protects it from the attacks of enemies and also from such application of remedies as might be made. The eggs hatch to tiny white grubs which live, eat

and grow entirely within the boll in which they are hatched. When full grown these larvæ are of the size shown to the left in Fig. 20, never more than one-half inch in length, and white in color.

In Fig. 21 may be seen, natural size, several steps in the development of the larvæ and its transformation to the adult weevil condition. The young, newly-hatched larva is shown at *a*, and a later stage of its growth is shown at *b*. When it gets full grown it changes to the pupa shown in the square of *c*. From this it changes again to the adult beetle (Figs. 19 and 22) which provides for another generation and then dies.

By preference, the eggs are laid in the buds or squares, and it is only in late summer and fall that they are laid in the bolls to any considerable extent.

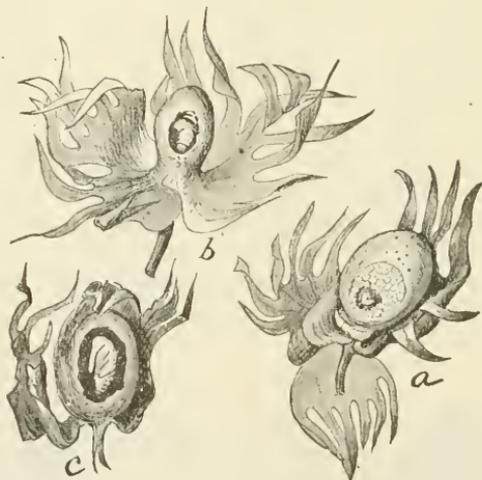


FIG. 21.—Showing development of Boll-weevil. *a*, Young larva in young square; *b*, larva nearly grown in square; *c*, pupa, still inside square. All natural size.  
(After Howard, Bur. Ent., U. S. Dept. Agr.)

When the squares are punctured and eggs laid in them they almost invariably become weakened and drop off. Squares are often shed even when not infested, so the shedding alone is not an indication of the presence of the weevil.

When the bolls are infested they do not ordinarily drop. Instead, they may continue to grow until about mature, but they do not open properly, so that it is not practicable to get the cotton by ordinary means. They are apt to be stunted, dwarfed and misshapen, so that they are valueless, but they do not drop.

From this account it will be seen that the entire life of the insect is such that it is not much exposed either to the attacks of birds or other enemies or the application of remedies. Indeed, the general life-history is very similar to that of the Strawberry-weevil,

which is very destructive in the south-eastern part of this State, and which is a close relative of the Cotton Boll-weevil (both belonging to the genus *Anthonomus*).

*Habits and Migration.*—When the weevils come out from hibernating quarters in the spring, the parts of the cotton fields nearest the hibernating places are attacked first, the weevil spreading later throughout the fields, or to the fields which are more remote from the hibernating quarters. At first they feed in the bud of the plant, but after squares are formed they devote their attention almost entirely to them.



FIG. 22.—A row of adult Boll-weevils, giving an excellent idea of their size and general appearance. Slightly enlarged.

(After E. D. Sanderson.)

Late in summer, when the uninfested bolls are about mature and practically all of the young squares have been punctured, there seems to be a general migration of the weevil to new fields. Prof. H. A. Morgan, formerly Entomologist of Louisiana, informed us that within three days at the time of this migration the weevils spread over a strip of country from 15 to 30 miles wide in western Louisiana; but this was practically all the spread that occurred during the season. When thus migrating the weevils avoid the uplands where the cotton is already mature and the plants dying, and they settle most readily in the sheltered situations in the lowlands and along river valleys where the cotton is still green.

There is not much migration or spread of the weevil to new localities in the summer season.

*How the Weevil Spreads.*—As has been pointed out, the most common means of spreading is by ordinary flight at the migrating season in late summer. At this time the insects *may* accidentally settle on vehicles, in cars, or other articles for transportation and thus be carried to new localities, but it is encouraging to learn that Professor Morgan (working in Louisiana) was not able to locate a single instance in which the weevil was being actually carried in this way. At the migrating season he also had a number of assistants in the field, who were instructed to sweep with insect nets all sorts of vegetation along the roadsides with a view to seeing upon what other plants the beetles might settle, but in no case was the insect found

anywhere except in cotton fields, and almost invariably in fields or parts of the fields where the cotton was green.

If, however, the cotton from an infested field be ginned the gin-house is likely to become infested with some of the weevils, which will pass the winter there. The cotton seed from such an infested gin-house may then be purchased by other farmers in the vicinity and the weevil is then liable to be carried to their fields in the cotton seed. It is for this reason that all our farmers should be especially particular not to use any seed or other cotton products which may come from Texas, Louisiana, or other weevil-infested territory.

*When Will the Boll-weevil Reach North Carolina?*—In speculating upon this question it must be remembered that the weevil may reach us by either of three methods: First, by its own natural means of spread; second, by being accidentally imported by trains or shipment of goods by other means from the weevil-infested territory; third, it might reach us by a combination of these methods, as, for instance, it might be brought into South Carolina by accident and from there it might reach us by natural spread, or *vice versa*.

It is now spreading at an average rate of from 40 to 75 miles per year, but as it gains in area it will likely spread faster. Its progress up to this time makes it seem probable that it will not reach North Carolina for eight or ten years yet (1915 or later), though there is always the possibility that it may appear suddenly or spread more rapidly by accidental transportation on trains or other vehicles, and estimates on this point are speculative.

*Mistaken Reports of Boll-weevil.*—Ever since about 1903, when the United States Department of Agriculture brought the Boll-weevil so forcibly to the attention of all the Southern States, there have been repeated reports of its presence in North Carolina, but every specimen which has been sent in has proven to be something else. Persons from Texas, and supposed to know the Boll-weevil, have captured beetles in this State which resemble it superficially, and have promptly and positively announced that the genuine Boll-weevil is here, but when the specimens come to us they always prove to be something else. Be it understood that these persons do not intentionally spread a false alarm, but their knowledge simply is not definite, positive and accurate enough to permit them to speak with certainty. They are not trained entomologists, and as there are a number of beetles native to North Carolina which closely resemble the Boll-weevil, a person who is not trained in the accurate study of insects is likely to get them confused. To the credit of the Texans who have made these erroneous announcements it should be said that the specimens which they have sent do bear a considerable resemblance to the true Boll-weevil. The specimens from North Carolina farmers who think that they have Boll-weevil prove to be everything from the common Boll-worm to June-beetles and Lace-wing Flies. This shows that,

while many of our own people are utterly ignorant regarding the nature and appearance of the weevil, the persons from Texas who have reported its presence, have at least been nearer the truth and have doubtless had only the best of intentions.

Cotton growers throughout this State may, therefore, set themselves at rest regarding this pest for the present, but they should still keep their eyes open for the weevil, and meantime receive with a liberal grain of allowance all unauthorized reports of its appearance.

#### REMEDIES.

Under this head we can only discuss the remedies that have been used in the weevil-infested districts, and consider them in the light of our own conditions. The recommendations here given are taken from Farmers' Bulletin No. 189 of the United States Department of Agriculture, by Mr. W. D. Hunter, who is in charge of the Boll-weevil investigations. These same lines of work will have to be followed when the weevil appears in this State. It will be observed that the principal object is to hasten the crop to early maturity, this being then supplemented by destroying food and winter quarters as soon as the crop can be gathered.

*Plant Early.*—If possible, plant seed of varieties known to mature early. It is much better to run the risk of being obliged to replant than to have the crop delayed. In this State this recommendation will not be of as much value as in Texas, for we already grow the early varieties and plant reasonably early.

*Wide Rows.*—Plant the rows as far apart as experience with the land indicates is feasible, and thin out the plants in the rows thoroughly. The idea here involved is to give the plants room for rapid growth, so as to secure a crop before the weevils become numerous enough to destroy most of the squares. It is also of value in allowing the sun to shine well between the plants and rows, so as to dry up the infested squares that fall to the ground, thus destroying the larvæ that may be contained in them.

*Fertilize Well.*—Here again the idea is to hasten the crop forward so as to mature a crop ahead of the weevil's most destructive season.

*Destroy* by plowing up, windrowing and burning all the cotton stalks in the field as soon as the weevils become so numerous that practically all the bolls or squares are being punctured. This may do away with the "top crop," but if the weevil is abundant it will not be worth picking anyway. This is the recommendation which is most likely to be neglected, for the farmer, once he gets the crop of this year, is not apt to look ahead to the next. Yet it is entirely a practicable recommendation, and the writer has seen it in actual practice in Texas.

In reference to the destruction of remnants and hibernating places, Mr. Hunter says: "Clean farming, by which is meant the killing of all weeds by thorough cultivation, and the removal of all portions of the crop from the land by burning or plowing under as soon as possible after the time of harvesting, is nearly as important in the case of a sorghum or corn field that is to be put in cotton the following season (provided there are cotton fields adjoining), as it will be later in the cotton field itself."

#### OTHER COTTON INSECTS OF LESSER IMPORTANCE.

In the foregoing pages we have discussed those insects which are really destructive cotton pests in this State. There are, however, a large number of other insects which are to be found frequenting the cotton plant, some more or less destructive, and others there for pollen, nectar, or in search of other insects. We will here consider briefly several of those that are most likely to attract the attention of the observing farmer.

*Grasshoppers* (Order *Orthoptera*).—There are a number of different species of grasshoppers which attack cotton, sometimes proving quite destructive. Some of these appear full winged when the cotton first gets well started in spring, while others appear first in the young wingless state and acquire wings later. When serious, the grasshoppers may be combated more or less successfully by the use of poisoned baits as described for Cut-worms on page 13.

*Flea-beetles* (Order *Coleoptera*).—There are many species of Flea-beetles and they attack a great variety of plants. Cotton does not usually suffer much injury from them, but in May, 1904, specimens of the Pale-striped Flea-beetle (*Systema blanda*) were sent in from Robeson County with the report that they were injuring cotton. Whenever occurring in serious numbers they can likely be combated by the poison dust method as discussed for Boll-worm on page 38.

*Lady-beetles* (Order *Coleoptera*).—The yellow beetles, less than one-half inch in length, with black spots, commonly found on cotton that is infested with the Leaf-louse, are known as "Lady-beetles." They have been discussed in connection with the Cotton Leaf-louse on page 15. Their object on the cotton is to destroy the lice and they are, therefore, distinctly beneficial to the cotton grower.

*Snails*.—Although snails are not really insects, they may be mentioned here. Certainly they are not usually a pest on cotton, yet in June, 1907, specimens were sent in from Halifax County with the report that they were present in great numbers on young cotton and destroying the foliage. The species sent was possessed of a small spiral shell, like some of the pond snails. Possibly the field was low and had been overflowed from a pond, with result that stranded snails were obliged to seek what food they could.

*Stinging Cotton-worm* (Order *Lepidoptera*).—Nearly all caterpillars are harmless to man, but we have about half a dozen species which are provided with extremely fine sharp spines which produce a nettling or poisoning effect when they pierce the skin. The one of this character which is most often found on cotton is the caterpillar of the Io moth, which is a very handsome species. The caterpillar is green, about two inches long when grown, with a bright crimson stripe down each side. The body is set with many tufts of sharp spines, which, if brushed against when working the cotton, may give a very painful, but not dangerous, sting. When grown the larva spins a brownish silken cocoon within which it transforms to a handsome moth, the males being yellowish and expanding two inches from tip to tip of the wings, and the females yellowish-brown and expanding as much as three inches in large specimens. In both sexes the hind wings are marked with conspicuous eye-spots. If one is stung by the caterpillars, relief may be had by bathing the part with ammonia water or a solution of baking soda.

*The Regal Moth* (Order *Lepidoptera*).—One of our finest and largest moths comes from a large, greenish caterpillar, with long black-tipped horns on the forward part of the body, which is sometimes found on cotton. The caterpillar, when grown, is about four inches long and nearly an inch in diameter. When disturbed they sometimes swing the front end of the body violently around as if to strike the tormentor with the horns. They are sometimes greatly feared by negroes, but in reality are harmless and can be handled without any injurious results. Even the spines are rather dull pointed, and there is no venom. The same caterpillar is sometimes found on persimmon, when they are known as "Persimmon-bulls." In the north it feeds on hickory, walnut, and butternut leaves, and is known as the "Hickory Horned Devil." These ferocious names do an injustice to a rather handsome caterpillar which transforms into one of our most beautiful moths. They pass the winter in the pupa stage under ground.

*The Fall Web-worm* (Order *Lepidoptera*).—This is the insect which makes ugly web nests in fruit trees, appearing about July 1st. The nests are also very common along roadsides in persimmon trees at any time from midsummer to winter. Sometimes a stray colony of caterpillars makes its web nest in a cotton plant and strips it of its leaves, but this is unusual.

*The Stalk Borer* (*Papiapema nitella*). (Order *Lepidoptera*).—This insect attacks a great variety of plants and in some sections becomes a serious pest from the habit of the caterpillar of boring into stems of growing plants. It has been twice complained of to this office as a cotton pest, once each from the counties of Bertie and Johnston. The life-stages of the insect are well shown in Fig. 23.

An infested plant soon begins to droop and wilt as a result of its attacks. This is an insect which might become very serious, but at this time is of minor importance to the cotton grower. When an infested plant is noticed it should be destroyed, or the borer should be cut out and killed.

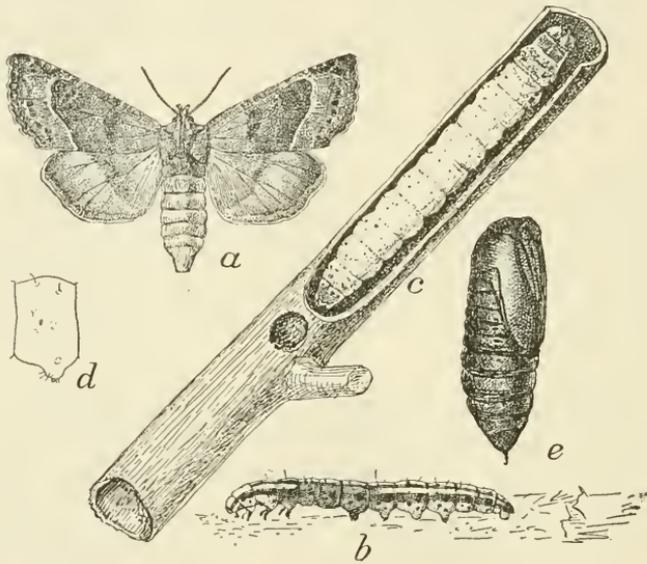


FIG. 23.—The Stalk Borer. *a*, Female moth; *b*, half-grown caterpillar; *c*, full-grown caterpillar inside hollowed-out cotton stalk; *e*, pupa. All shown a little larger than natural size. (After Chittenden, Bur. Ent., U. S. Dept. Agr.)

*The Cotton Stalk Borer (Ataxia crypta)*. (Order *Coleoptera*).—This insect affects cotton in much the same manner as the Stalk Borer just discussed, but the adult (parent) insect is a beetle instead of a moth. The larva is a white grub which bores within the stem of the cotton plant, but seems to confine itself mainly to plants which are already injured, and does not, therefore, seem likely to become a serious pest. We have had specimens of injured cotton sent to us from Gaston County in late July (1906), while the adult beetle is represented in our collection by specimens taken in Wake and Sampson Counties in April.

*“Click-beetle” or “Jack-snapper”* (Order *Coleoptera*).—Of this interesting group of beetles a species known scientifically as *Monocrepidius respertinus* has been quite frequently sent in to us under suspicion of being the Boll-weevil.

It is found within the squares and under the shuck or hull of the growing boll. So far as known, however, it is not really a pest of cotton and feeds but little, if at all, on the cotton plant. The eggs of Jack-snappers are usually laid in weedy or grassy fields and the larvæ are known by the name of Wire-worms, and feed on roots of grasses, etc. This particular species seems to be found frequently on cotton, for it has been sent in several different years and from various counties.



FIG. 24.—Jack-snapper. This species (*Monocrepidius vespertinus*) is found in squares and on young bolls, and sometimes mistaken for Boll-weevil. Enlarged. Line to right shows actual length. (After Chittenden, Bur. Ent., U. S. Dept. Agr.)

*Flower-beetles* (Order *Colcoptera*).—Two different species of the genus *Euphoria* have been sent in as attacking cotton bolls. These are *Euphoria melancholia* and *Euphoria inda*. They are closely related to the common green “June-bug,” and so far as we know they are found only in bolls that have started to decay, or have been bruised or eaten into by other insects. They have several times been taken for Boll-weevil by uninformed growers. They cannot be regarded as serious.

*Lace-wing Flies* (Order *Neuroptera*).—These are very delicate greenish little creatures, with four dainty greenish wings so finely netted with “veins” as to suggest lace work. With wings expanded, they measure from three-fourths to one inch from tip to tip. They are frequently startled and may be seen flying to other plants. They do no harm, on the contrary their young (larvæ) are predaceous and feed to a considerable extent on the Cotton Leaf-louse, and are, therefore, beneficial.

*Caterpillars* (Order *Lepidoptera*).—There are various species of caterpillars other than those discussed in these pages which may be found on cotton, especially if they are driven to find new food by the death of their favorite food plant. All true caterpillars normally develop into moths of some kind.

It must be remembered that many insects may be found on cotton plants which are not really enemies to the crop. Some may be merely resting, or may be seeking shelter from weather or hiding from enemies. In the preceding pages we have tried to discuss those which have attracted attention as actual pests and have mentioned also such others as are most frequently suspected of injury.

The writer will welcome correspondence with cotton growers who make use of the suggestions given in this BULLETIN, and who carefully watch results. He also desires to be promptly informed in case of any outbreak of any cotton pest not mentioned in these pages.

FRANKLIN SHERMAN, JR.,

*Entomologist, Dept. Agriculture, Raleigh, N. C.*



**REPORT FROM LEAF TOBACCO WAREHOUSES FOR MONTH OF  
MAY, 1908.**

Pounds sold for producers, first hand.....	515,530
Pounds sold for dealers.....	31,279
Pounds resold for warehouse.....	23,175
Total .....	<u>569,984</u>

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**NOTICE.**

The Department finds it necessary to revise the Bulletin list. All parties desiring the Bulletin sent to them in the future are requested to send notice to this effect on postal card, addressing Commissioner of Agriculture, Raleigh, N. C.

THE BULLETIN

OF THE

NORTH CAROLINA

DEPARTMENT OF AGRICULTURE,

RALEIGH.

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Volume 29.

JULY, 1908.

Number 7.

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I. ANALYSES OF FERTILIZERS—FALL SEASON, 1907; SPRING  
SEASON, 1908.

II. ANALYSES OF COTTON-SEED MEAL.

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# I. ANALYSES OF FERTILIZERS, FALL SEASON, 1907; SPRING SEASON, 1908.

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BY B. W. KILGORE, STATE CHEMIST,

AND

W. G. HAYWOOD, J. M. PICKEL, L. L. BRINKLEY AND S. O. PERKINS,

ASSISTANT CHEMISTS.

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The analyses presented in this BULLETIN are of samples collected by the fertilizer inspectors of the Department, under the direction of the Commissioner of Agriculture, during fall months of 1907, and the spring months of 1908. They should receive the careful study of every farmer in the State who uses fertilizers, as by comparing the analyses in the BULLETIN with the claims made for the fertilizers actually used, the farmer can know by, or before, the time fertilizers are put in the ground whether or not they contain the fertilizing constituents in the amounts they were claimed to be present.

## TERMS USED IN ANALYSES.

*Water-soluble Phosphoric Acid.*—Phosphate rock, as dug from the mines, mainly in South Carolina, Florida and Tennessee, is the chief source of phosphoric acid in fertilizers.

In its raw, or natural, state the phosphate has three parts of lime united to the phosphoric acid (called by chemists tri-calcium phosphate). This is very insoluble in water and is not in condition to be taken up readily by plants. In order to render it soluble in water and fit for plant food, the rock is finely ground and treated with sulphuric acid, which acts upon it in such a way as to take from the three-lime phosphate two parts of its lime, thus leaving only one part of lime united to the phosphoric acid. This one-lime phosphate is what is known as water-soluble phosphoric acid.

*Reverted Phosphoric Acid.*—On long standing some of this water-soluble phosphoric acid has a tendency to take lime from other substances in contact with it, and to become somewhat less soluble. This latter is known as reverted or gone-back phosphoric acid. This is thought to contain two parts of lime in combination with the phosphoric acid, and is thus an intermediate product between water-soluble and the original rock.

Water-soluble phosphoric acid is considered somewhat more valuable than reverted, because it becomes better distributed in the soil as a consequence of its solubility in water.

*Available Phosphoric Acid* is made up of the water-soluble and reverted; it is the sum of these two.

*Water-soluble Ammonia.*—The main materials furnishing ammonia in fertilizers are nitrate of soda, sulphate of ammonia, cotton-seed meal, dried blood, tankage, and fish scrap. The first two of these (nitrate of soda and sulphate of ammonia) are easily soluble in water and become well distributed in the soil where plant roots can get at them. They are, especially the nitrate of soda, ready to be taken up by plants, and are therefore quick-acting forms of ammonia. It is mainly the ammonia from nitrate of soda and sulphate of ammonia that will be designated under the heading of water-soluble ammonia.

*Organic Ammonia.*—The ammonia in cotton-seed meal, dried blood, tankage, fish scrap, and so on, is included under this heading. These materials are insoluble in water, and before they can feed plants they must decay and have their ammonia changed, by the aid of the bacteria of the soil, to nitrates, similar to nitrate of soda.

They are valuable then as plant food in proportion to their content of ammonia, and the rapidity with which they decay in the soil, or rather the rate of decay will determine the quickness of their action as fertilizers. With short season, quick-growing crops, quickness of action is an important consideration, but with crops occupying the land during the greater portion, or all, of the growing season, it is better to have a fertilizer that will become available more slowly, so as to feed the plant till maturity. Cotton-seed meal and dried blood decompose fairly rapidly, but will last the greater portion, if not all, of the growing season in this State. While cotton seed and tankage will last longer than meal and blood, none of these act so quickly, or give out so soon, as nitrate of soda and sulphate of ammonia.

*Total Ammonia* is made up of the water-soluble and organic; it is the sum of these two.

The farmer should suit, as far as possible, the kind of ammonia to his different crops, and a study of the forms of ammonia as given in the tables of analyses will help him to do this.

#### FORM OF POTASH IN TOBACCO FERTILIZERS.

Tobacco growers are becoming yearly more disposed to know the form of potash, whether from kainit, muriate or sulphate, which enters into their tobacco fertilizers. Considerable work of this kind has been done for individuals, and we now determine the form of potash in all tobacco brands, for the benefit of tobacco growers.

The term potash from muriate, as reported in the analyses, does not mean, necessarily, that the potash was supplied by muriate of potash. Sulphate or some other potash salt may have been used, but in all fertilizers where the term potash from muriate is used, there

is enough chlorine present to combine with all the potash, though it may have come from salt in tankage, kainit, or karnalite. As the objection to the use of muriate of potash in tobacco fertilizers arises from the chlorine present, it does not matter whether this substance is present in common salt or potash-furnishing materials.

The use of sulphate of potash where there is chlorine present in the other ingredients of the fertilizer will not prevent the injurious effect of the chlorine. The term potash from muriate in our analyses, therefore, means that there is sufficient chlorine present in the fertilizer from all sources to combine with the potash to the extent indicated by the analyses.

## VALUATIONS.

To have a basis for comparing the values of different fertilizer materials and fertilizers, it is necessary to assign prices to the three valuable constituents of fertilizers—ammonia, phosphoric acid, and potash. These figures, expressing relative value per ton, are not intended to represent crop-producing power, or agricultural value, but are estimates of the commercial value of ammonia, phosphoric acid and potash in the materials supplying them. These values are only approximate, as the cost of fertilizing materials is liable to change as other commercial products are, but they are believed to fairly represent the cost of making and putting fertilizers on the market. They are based on a careful examination of trade conditions, wholesale and retail, and upon quotations of manufacturers.

*Relative value per ton*, or the figures showing this, represents the prices on board the cars at the factory, in retail lots of five tons or less, for cash.

To make a complete fertilizer the factories have to mix together in proper proportions materials containing ammonia, phosphoric acid and potash. This costs something. For this reason it is thought well to have two sets of valuations—one for the raw or unmixed materials, such as acid phosphate, kainit, cotton-seed meal, etc., and one for mixed fertilizers.

## VALUATIONS FOR 1907.

*In Unmixed or Raw Materials.*

For phosphoric acid in acid phosphate.....	4	cents per pound.
For phosphoric acid in bone meal, basic slag and Peruvian guano.....	3½	cents per pound.
For ammonia.....	15½	cents per pound.
For potash.....	5	cents per pound.

*In Mixed Fertilizers.*

For phosphoric acid.....	4½	cents per pound.
For ammonia.....	16½	cents per pound.
For potash.....	5½	cents per pound.

The valuations decided on this season, for reasons already given, are:

## VALUATIONS FOR 1908.

*In Unmixed or Raw Materials.*

For phosphoric acid in acid phosphate.....	4	cents per pound.
For phosphoric acid in bone meal, basic slag and Peruvian guano.....	3½	cents per pound.
For nitrogen.....	18	cents per pound.

*In Mixed Fertilizers.*

For available phosphoric acid.....	4½	cents per pound.
For nitrogen.....	19½	cents per pound.
For potash.....	5½	cents per pound.

## HOW RELATIVE VALUE IS CALCULATED.

In the calculation of relative value it is only necessary to remember that so many per cent means the same number of pounds per hundred, and that there are twenty hundred pounds in one ton (2,000 pounds).

With an 8—2—1.65 goods, which means that the fertilizer contains available phosphoric acid 8 per cent, potash 2 per cent, and nitrogen 1.65 per cent, the calculation is made as follows:

Percentage, or Lbs. in 100 Lbs.	Value Per 100 Lbs.	Value Per Ton, 2,000 Lbs.
8 pounds available phosphoric acid at 4½ cents.....	0.36 × 20 =	\$7.20
2 pounds potash at 5½ cents.....	0.11 × 20 =	2.20
1.65 pounds nitrogen at 19½ cents.....	0.321 × 20 =	6.42
Total value .....	0.791 × 20 =	\$15.82

Freight and merchant's commission must be added to these prices. Freight rates from the seaboard and manufacturing centers to interior points are given in the following table:

FREIGHT RATES FROM THE SEABOARD TO INTERIOR POINTS.—From the Published Rates of the Associated Railways of Virginia and the Carolinas. In car-loads, of not less than ten tons each, per ton of 2,000 pounds. Less than car-loads, add 20 per cent.

Destination.	From Wilmington, N. C.	From Norfolk and Portsmouth, Va.	From Charleston, S. C.	From Richmond, Va.
Advance-----	\$3.20	\$3.20	\$3.40	\$3.20
Apex-----	2.70		3.80	3.00
Ashboro-----	3.20	3.20	3.60	3.20
Asheville-----	4.00	4.00	4.00	4.00
Chapel Hill-----	2.95	3.20	3.90	3.20
Charlotte-----	2.65	3.20	2.85	3.20
Clayton-----	2.48	2.86	3.63	2.80
Cherryville-----	3.85	3.60	3.40	3.63
Clinton-----	1.60	3.00	3.20	3.00
Creedmoor-----	3.00	3.00	3.80	3.00
Cuningham-----	3.00	2.40	4.00	2.40
Dallas-----	3.00	3.60	3.40	3.60
Davidson College-----	3.00	3.20	2.20	3.20
Dudley-----	1.70	3.00	3.20	3.00
Dunn-----	2.00	2.80	3.20	2.80
Durham-----	2.80	2.83	3.20	2.83
Elkin-----	3.60	3.20	3.60	3.20
Elm City-----	2.10	2.60	3.20	2.60
Fair Bluff-----	1.60	3.80	2.40	3.80
Fayetteville-----	1.80	3.00	3.00	3.00
Forestville-----	2.85	3.00	3.80	3.06
Gastonia-----	3.12	3.25	3.12	3.25
Gibson-----	2.10	3.50	2.10	3.50
Goldsboro-----	1.80	2.80	3.20	2.80
Greensboro-----	2.96	3.00	3.40	3.00
Hamlet-----	2.00	3.00	3.60	3.00
Henderson-----	3.00	2.83	3.55	2.83
Hickory-----	3.20	3.60	2.20	3.60
High Point-----	3.00	3.08	3.40	3.08
Hillsboro-----	2.88	2.88	2.68	2.88
Kernersville-----	3.00	3.00	3.40	3.00
Kinston-----	2.10	2.80	3.50	2.80
Laurel Hill-----	1.90	2.40	3.80	3.40
Laurinburg-----	1.90	3.40	3.80	3.40
Liberty-----	2.72	3.60	3.80	3.60
Louisburg-----	2.95	3.00	3.80	3.00
Lumberton-----	1.60	3.60	3.70	3.60
Macon-----	3.05	3.00	3.85	3.00
Madison-----	3.00	3.00	3.40	3.00
Matthews-----	2.60	3.20	3.20	3.20
Maxton-----	1.80	3.40	2.70	3.40
Milton-----	3.44	2.40	4.00	2.40
Mocksville-----	3.36	3.20	3.40	3.20
Morven-----	2.55	3.60	2.50	3.60
Mount Airy-----	2.20	3.40	3.80	3.40
Nashville-----	2.30	2.90	3.40	2.90
New Bern-----	1.25	1.75	3.95	1.75
Norwood-----	3.68	3.20	3.20	2.23
Oxford-----	3.04	2.83	3.55	2.83
Pineville-----	2.77	3.25	3.00	3.20
Pittsboro-----	2.60	3.30	4.10	3.30
Polkton-----	2.40	3.00	2.20	3.00
Raleigh-----	2.56	2.83	3.40	2.83
Reidsville-----	3.00	2.96	3.40	2.36
Rockingham-----	2.10	3.00	3.80	3.00
Rocky Mount-----	2.20	2.50	3.40	2.50
Ruffin-----	3.28	2.80	3.40	2.20
Rural Hall-----	3.28	3.20	3.60	3.20
Rutherfordton-----	3.05	3.65	3.05	3.65
Salisbury-----	3.25	3.20	3.20	3.20
Sanford-----	2.10	3.00	3.40	3.00
Selma-----	2.10	2.80	3.20	2.80
Shelby-----	2.90	3.60	3.90	3.60
Siler City-----	2.60	3.60	3.80	3.60
Smithfield-----	2.20	2.80	3.20	2.80
Statesville-----	3.50	3.20	3.60	3.20
Stem-----	2.95	2.83	3.80	2.83
Tarboro-----	2.30	2.40	3.00	2.40
Waco-----	2.90	3.60	3.40	3.60
Wadesboro-----	2.30	3.00	2.50	3.00
Walnut Cove-----	3.00	3.00	3.40	3.00
Warrenton-----	3.05	3.25	4.10	3.25
Warsaw-----	1.50	3.00	3.20	3.00
Washington-----	2.65	1.75	2.25	1.50
Weldon-----	2.55	1.90	3.85	1.90
Wilson-----	2.00	2.60	3.20	2.60
Winston-Salem-----	3.00	3.00	3.40	3.00

## ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1907.

Laboratory Number.	Name and Address of Manufacturer.	Where Sampled.	Name of Brand.	Percentage Composition or Parts per 100.							Total Potash.	Relative Value per Ton at Factory.
				Water-soluble Phosphate Acid.	Reverted Phosphate Acid.	Available Phosphate Acid.	Water-soluble Ammonia.	Organic Ammonia.	Total Ammonia.			
<b>MIXED FERTILIZERS.</b>												
6276	Brands claiming Baugh & Sons Co., Norfolk, Va.	Gibsonville	Baugh's Double Eagle Phosphate.	R	4.38	3.59	8.00	.82	1.34	2.00	1.00	\$14.90
6207	Piedmont-Mt. Airy Guano Co., Baltimore, Md.	Elkins	Piedmont Guano for Wheat	R	5.90	2.07	7.97	.66	1.34	2.00	2.17	16.16
6186	Va.-Car. Chemical Co., Richmond, Va.	Durham	A. & A.'s Star Brand Guano	R	5.08	2.76	7.84	.92	1.20	2.12	1.00	15.15
6187	do	Durham	Travers & Co.'s Beef, Blood and Bone.	R	5.45	2.58	8.04	.82	1.82	2.34	1.77	16.90
6191	Brand claiming Va.-Car. Chemical Co., Richmond, Va.	Wilson	Durham Fertilizer Co.'s Raw Bone-Superphosphate.	S	5.00	2.57	8.00	.26	1.24	2.50	1.50	17.10
6238	Brands claiming Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Statesville	Eli Ammoniated Fertilizer	D	2.78	2.77	8.00	1.18	1.58	2.00	2.00	16.21
6303	Columbia Guano Co., Norfolk, Va.	Ayden	Columbia Soluble Guano.	S	6.98	1.52	8.50	.92	.98	1.90	1.97	16.08
6281	Farmers Guano Co., Raleigh, N. C.	Siler City	State Standard Guano.	R	4.83	2.50	7.37	1.10	1.50	2.60	1.96	17.36
6284	Listers' Agricultural Chemical Works, Newark, N. J.	Liberty	Listers' Success Fertilizer.	R	5.00	3.02	8.02	1.02	1.18	2.20	2.36	17.07
6301	Navassa Guano Co., Wilmington, N. C.	Norwood	Navassa Guano Fertilizer	D	5.63	2.59	8.22	1.00	1.28	2.28	1.94	17.06
6286	do	Taylorsville	Navassa Grain	N	5.90	2.55	8.45	1.52	.90	2.42	2.36	18.18
6305	do	Newton	do	N	5.45	2.35	7.80	.76	1.74	2.50	2.18	17.66
6300	Ober, G., & Sons Co., Baltimore, Md.	Albemarle	Ober's Soluble Ammoniated Superphosphate.	R	8.50	1.00	9.50	.88	1.28	2.16	2.23	18.13
6223	Patapsco Guano Co., Baltimore, Md.	Mooreville	Sea Gull	S	4.80	3.38	8.18	.92	1.32	2.24	2.08	17.04
6206	Swift's Fertilizer Works, Atlanta, Ga.	Wilkesboro	Swift's Red Steer Standard Grade Guano.	R	7.15	2.05	9.20	.88	.90	1.78	2.14	16.50
6194	Union Guano Co., Winston, N. C.	Burlington	Old Honesty Guano	R	6.20	2.00	8.20	.64	1.36	2.00	2.16	16.35
6200	Va.-Car. Chemical Co., Richmond, Va.	Walnut Cove	A. & A.'s Anchor Brand Fertilizer.	R	4.68	3.38	8.01	1.24	1.00	2.24	2.28	17.10
6133	do	Burlington	Durham Fertilizer Co.'s Genuine Bone and Peruvian Guano.	R	6.70	1.95	8.65	.62	1.88	2.00	1.88	16.45
6201	do	Winston	Old Dominion Guano Co.'s Soluble Guano.	R	6.48	1.73	8.21	.96	1.14	2.10	2.18	16.71

6202	---do	Powers, Gibbs & Co.'s Eagle Island Ammoniated Guano	D	6.45	2.70	9.15	.62	1.30	1.92	2.13	16.48
6203	---do	Southern Chemical Co.'s Electric Standard Guano	R	4.28	3.94	8.22	1.08	.92	2.00	1.94	16.13
6291	---do	Travers & Co.'s National Fertilizer	R	5.40	2.82	8.22	1.38	.74	2.12	2.61	17.26
6251	---do	Travers & Co.'s National Fertilizer	D	6.88	1.78	8.66	.78	1.58	2.36	1.73	17.48
6205	<b>Brands claiming</b>	Patapsco Special Tobacco Mixture	R	5.43	2.74	8.00	.66	1.78	2.50	3.00	18.75
6184		Royster, F. S., Guano Co., Baltimore, Md.	R	7.05	1.64	8.69	1.34	1.22	2.56	2.73	19.27
6188	<b>Brands claiming</b>	Imperial X E O Cotton Guano	R	6.93	2.04	8.97	1.24	1.82	3.06	3.04	21.51
6283		Piedmont-Ht. Airy Guano Co., Baltimore, Md.	R	5.63	2.07	7.70	2.28	.62	2.96	4.06	20.96
6195		Va.-Car. Chemical Co., Richmond, Va.	R	6.05	2.42	8.47	1.84	1.22	3.06	3.16	21.19
6302	<b>Brands claiming</b>	Navassa Guano Co., Wilmington, N. C.	D	6.05	1.89	8.00	2.88	.28	4.00	4.00	24.80
6190		Va.-Car. Chemical Co., Richmond, Va.	S	6.45	1.88	8.33	3.16	1.00	3.16	4.20	22.19
6306	<b>Brand claiming</b>	Pocomoke Guano Co., Norfolk, Va.	R	6.10	2.32	8.42	.72	1.50	2.00	3.86	25.47
6189		Va.-Car. Chemical Co., Richmond, Va.	R	6.18	2.36	8.50	1.06	1.46	2.75	1.91	16.45
6304	<b>Brand claiming</b>	Ford's Wheat and Corn Guano	R	6.20	1.97	9.00			2.00	2.00	13.60
6224		Patapsco Guano	D	5.85	4.13	9.25	1.74	1.54	1.74	15.04	18.77
6307	<b>Brands claiming</b>	Imperial Yarkin Wheat Grower	D	7.23	1.88	8.00	1.56	1.02	2.58	2.19	19.90
6267		Sunrise Soluble Bone and Potash	R	3.45	4.84	9.11	8.00	9.40	2.00	2.00	9.40
6229		A. & A.'s McCavock's Special Potash Mixture	R	5.53	3.13	8.29	3.13	3.13	1.68	10.04	9.67
6259	---do	A. & A.'s McCavock's Special Potash Mixture	D	6.88	2.36	8.66	3.27	3.27	1.78	9.41	11.39
6222	<b>Brands claiming</b>	American Special Potash Mixture	R	3.75	4.28	8.00			2.07	4.00	11.60
6244		Navassa Guano Co., Wilmington, N. C.	R	6.40	2.29	8.69			4.52	4.52	12.19
6208		Royster, F. S., Guano Co., Norfolk, Va.	R	6.20	1.81	8.01			3.60	11.78	11.38
6231		Va.-Car. Chemical Co., Richmond, Va.	S	4.53	3.64	8.17			3.80	11.38	10.48

N—D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—damp; Y—lumpy; W—wet.

## ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1907.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.							Total Potash.	Relative Value per Ton at Factory.
				Mechanical Condition.	Water-soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-soluble Ammonia.	Organic Ammonia.	Total Ammonia.		
6235	Va.-Car. Chemical Co., Richmond, Va.	Old Dominion Miller's Special Wheat Mixture.	Kernersville	R	4.40	3.15	7.55	---	---	---	4.14	\$ 11.34
6233	-----do-----	Southern Chem. Co.'s Click's Special Wheat Compound.	Wilkesboro	R	5.30	2.78	8.08	---	---	---	4.96	12.72
6241	Brand claiming	Durham Fertilizer Co.'s Great Wheat and Corn Grower.	Burlington	R	8.03	2.07	10.10	---	---	---	1.50	10.64
6226	Brands claiming	Armour's Phosphate and Potash Works.	Winston	D	7.65	1.90	9.55	---	---	---	2.00	11.20
6273	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Electric Bone and Potash Mixture.	Ashboro	R	8.20	3.26	11.46	---	---	---	1.93	12.43
6312	Columbia Guano Co., Norfolk, Va.	Columbia Bone and Potash Mixture.	Hickory	S	8.53	1.16	9.69	---	---	---	1.99	10.91
6278	Farmers' Guano Co., Raleigh, N. C.	Century Bone and Potash Mixture	Siler City	R	6.15	3.62	9.77	---	---	---	2.25	11.26
6209	Patapsco Guano Co., Baltimore, Md.	Patapsco Soluble Bone and Potash.	Siloam	R	5.55	4.60	10.15	---	---	---	1.85	11.16
6255	-----do-----	-----do-----	Mebane	D	5.55	4.78	10.33	---	---	---	1.98	11.47
6260	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Bone and Potash Mixture.	Burlington	S	7.03	3.16	10.19	---	---	---	1.50	10.82
6228	Swift Fertilizer Works, Atlanta, Ga.	Standard Grade Field and Farm Phosphate and Potash.	Winston	R	8.30	1.86	10.16	---	---	---	2.27	11.64
6252	-----do-----	Standard Grade Wheat Grower.	Hillsboro	R	8.68	2.58	11.26	---	---	---	1.84	12.15
6289	Union Guano Co., Winston, N. C.	Union Bone and Potash.	Statesville	R	7.80	2.70	10.50	---	---	---	1.90	11.54
6234	Va.-Car. Chemical Co., Richmond, Va.	A. & A.'s B. P. Potash Mixture	Walnut Cove	R	5.80	4.08	9.88	---	---	---	2.20	11.31
6250	-----do-----	Durham Fertilizer Co.'s Blue Ridge Wheat Grower.	Statesville	R	6.50	4.05	10.55	---	---	---	1.70	11.36
6236	-----do-----	Old Dominion Guano Co.'s High Grade Alkaline Bone.	Winston	R	5.03	4.59	9.62	---	---	---	2.23	11.11
6239	-----do-----	Powers, Gibbs & Co.'s Dissolved Bone and Potash.	Winston	R	5.70	3.60	9.30	---	---	---	1.87	10.42

## MIXED FERTILIZERS.

6237	-----do-----	Southern Chemical Co.'s Mammoth Wheat and Grass Grower.	Kernersville	R	5.78	3.97	9.75	11.00
6254	-----do-----	Southern Chemical Co.'s Winner Grain Mixture.	Mebane	R	7.75	3.05	10.80	13.57
6258	-----do-----	Travis & Co.'s Capital Bone and Potash.	Graham	D	7.95	2.56	10.51	11.85
6240	-----do-----	Winston Bone and Potash Compound.	Winston	R	4.93	4.38	9.31	10.35
6266	Brand claiming	Old Dominion Guano Co.'s Planters' Bone and Potash Mixture.	Ashboro	D	7.10	2.69	10.00	12.30
6225	Brands claiming	Armour's Superphosphate and Potash Fertilizer.	Charlotte	R	7.65	1.39	10.00	13.40
6308	-----do-----	Special Caraleigh Bone and Potash Mixture.	Sanford	R	9.05	2.44	11.49	12.72
6287	-----do-----	Navassa Wheat and Grass Guano.	Taylorsville	D	5.25	2.81	8.06	10.92
6260	-----do-----	Royster, F. S., Guano Co., Norfolk, Va. Mixture.	Burlington	S	7.40	2.44	9.84	13.08
6285	-----do-----	Swift's Fertilizer Works, Wilmington, N. C.	Taylorsville	D	9.00	1.38	10.38	12.98
6272	-----do-----	Union Guano Co., Winston, N. C.	Ashboro	D	5.80	3.70	9.50	12.23
6257	-----do-----	Va.-Car. Chemical Co., Richmond, Va. Mixture.	Graham	D	7.88	2.51	10.39	13.65
6264	-----do-----	Va. State Fertilizer Co.'s XX Potash Mixture.	Liberty	D	7.15	2.53	9.68	13.01
6242	Brand claiming	Lynchburg Guano Co.'s Alpine Mixture.	Burlington	R	8.53	1.96	10.00	14.50
6310	Brand claiming	Horne & Sons High Grade Bone and Potash.	Asheville	R	7.08	2.62	9.70	11.63
6270	Brands claiming	12-3 Bone and Potash	Liberty	R	7.88	2.37	10.25	13.38
6256	-----do-----	Southern Chemical Co.'s Reaper Grain Application.	Graham	D	9.65	2.74	12.39	15.08
6275	Brand claiming	Navassa Special Wheat Mixture	Wilmington	D	8.43	2.75	11.18	15.20
6309	Brand claiming	Goodman's Special Potash Mixture.	Kernersville	R	7.40	3.84	12.00	16.30
6243	Brand claiming	Union 12-6 Bone and Potash.	Burlington	R	9.65	2.80	12.00	17.45
6192	Brand claiming	Formula 44, Va.-Car. C. Co.'s	Wilson	R	5.45	2.93	8.00	18.95
							3.10	22.44
							3.36	3.47
							2.62	.74

N, D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—damp; Y—lumpy; W—wet.

## ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1907.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.							Relative Value per Ton at Factory.	
				Mechanical Condition.	Water-soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-soluble Ammonia.	Organic Ammonia.	Total Ammonia.		Total Potash.
<b>Brands claiming</b>												
6214	Richmond Guano Co., Richmond, Va.	Old Homestead Dissolved Bone	Rural Hall	R	4.38	7.11	10.00					\$ 8.00
6215	Union Guano Co., Winston, N. C.	Union 10 Per Cent Acid Phosphate.	Rural Hall	D	5.85	4.20	10.05					9.19
6274	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Staple Acid Phosphate	Ashboro	R	10.28	2.95	13.23					9.60
6285	Va.-Car. Chemical Co., Richmond, Va.	Old Dominion Guano Co.'s Royster's High Grade Acid Phosphate.	Millboro	D	8.68	3.44	12.12					10.58
6217	do	Powers, Gibbs & Co.'s Almont Acid Phosphate.	Winston	D	6.40	5.21	11.61					9.29
6218	do	Travers & Co.'s Capital Dissolved S. C. Bone.	Winston	D	8.43	3.38	11.81					9.45
6198	Brands claiming	Armour's 13 Per Cent Acid Phosphate.	Winston	D	11.33	1.50	12.83					10.40.
6212	Armour Fertilizer Works, Wilmington, N. C.	Atlantic High Grade Dissolved Bone.	Elkins	D	10.75	3.42	14.17					11.33
6295	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Sterling High Grade Acid Phosphate.	Troy	D	11.05	2.82	13.37					10.69
6279	Farmers' Guano Co., Raleigh, N. C.	Farmers' High Grade Acid Phosphate.	Siler City	D	11.05	2.59	13.64					10.91
6210	Royster, F. S., Guano Co., Norfolk, Va.	Roysters' High Grade Dissolved Bone.	Elkins	D	9.58	2.54	12.12					9.69
6245	Va.-Car. Chemical Co., Richmond, Va.	A. & A.'s I X L Acid Phosphate.	Durham	N	9.08	4.21	13.29					10.63
6298	do	Atlantic and Virginia Fert. Co.'s Crenshaw's Acid Phosphate.	Hickory	D	9.07	3.29	12.99					10.39
6249	do	Durham Fertilizer Co.'s Double Bone Phosphate, Extra Strong.	Hillsboro	D	10.80	2.63	13.43					10.74
6298	do	Old Dominion Guano Co.'s High Grade Bone Phosphate.	Goldsboro	D	9.50	2.70	12.20					9.76

Brand	Manufacturer	Location	Grade	N	D	11.73	11.45	2.25	2.62	14.00	14.08	14.07	11.20	11.26	11.25
<b>Brands claiming</b>															
6221	American Fertilizer Co., Norfolk, Va.	Charlotte	High Grade Acid Phosphate	N		11.73		2.25		14.00					
6199	Armour Fertilizer Works, Wilmington, N. C.	Winston	Armour's Star Phosphate Fertilizer.	D		11.45		2.62		14.07					
6297	Carateigh Phosphate and Fertilizer Works, Raleigh, N. C.	Newton	Climax Dissolved Bone	D		11.05		3.37		14.42					11.83
6296	Columbia Guano Co., Norfolk, Va.	Hickory	Columbia 14 Per Cent Acid Phosphate.	R		11.00		3.19		14.19					11.35
6294	Pocomoke Guano Co., Norfolk, Va.	Pittsboro	Peerless Acid Phosphate.	R		11.35		2.72		14.07					11.25
6261	Royster, F. S., Guano Co., Norfolk, Va.	Hillsboro	Royster's 14 Per Cent Acid Phosphate.	R		10.78		3.74		14.52					11.61
6247	Swift's Fertilizer Works, Atlanta, Ga.	---do---	Swift's Cultivator High Grade Acid Phosphate.	R		12.88		1.71		14.59					11.67
6269	Union Guano Co., Winston, N. C.	Siler City	Union High Grade Acid Phosphate.	N		10.28		3.75		14.03					11.22
6246	Va.-Car. Chemical Co., Richmond, Va.	Henderson	Davie & Whittle's Owl Brand Acid Phosphate.	R		11.00		4.25		15.25					12.20
6220	---do---	Statesville	Durham Excelsior Dissolved Bone Phosphate.	N		12.00		2.44		14.44					11.55
6219	---do---	---do---	Southern Chemical Co.'s Red Cross Acid Phosphate.	R		12.13		2.99		15.12					12.09
6262	---do---	Graham	Southern Chemical Co.'s Red Cross Acid Phosphate.	D		10.60		3.62		14.22					11.38
6263	---do---	---do---	V.-C. Co.'s 14 Per Cent Acid Phosphate.	D		10.85		3.30		14.15					11.32
<b>Brands claiming</b>															
6213	Armour Fertilizer Works, Wilmington, N. C.	Winston	Armour's 16 Per Cent Acid Phosphate.	D		14.38		1.96		16.34					12.80
6292	Imperial Co., Norfolk, Va.	Windsor	Imperial High Grade Acid Phosphate.	R		13.85		3.05		16.91					13.82
6248	Va.-Car. Chemical Co., Richmond, Va.	Durham	Genuine German Kainit.	S						12.00	12.46	12.46	12.00	2.00	2.00
6197	Lee, A. S., Sons Co., Richmond, Va.	Wilkesboro	Lee's Prepared Agricultural Lime.	R						3.28	3.28	3.28	3.28	3.28	3.28
6232	Baugh & Sons Co., Norfolk, Va.	Madison	Baugh's Raw Bone Meal	R						4.50	4.46	4.46	4.50	4.46	4.46

\* Total Phosphoric Acid found, 21.38, valued at 3½ cents per pound.

N—D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—damp; Y—lumpy; W—wet.

## ANALYSES OF COMMERCIAL FERTILIZERS, SPRING SEASON, 1908.

Laboratory Number.	Name and Address of Manufacturer.	Where Sampled.	Name of Brand.	Mechanical Condition.	Percentage Composition or Parts per 100.										Relative Value per Ton at Factory.
					Water-soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.	
6785	Brand claiming Powhatan Chemical Co., Richmond, Va.	Greensboro	Magic Corn Grower	S	8.50	1.88	8.00	.58	.52	.82	1.00	1.00	1.34	1.53	15.31
6645	Brand claiming Ober, G., & Sons Co., Baltimore, Md.	Hillsboro	Ober's Farmers' Mixture	R	7.45	2.32	8.00	.60	.56	.82	1.00	2.00	1.41	2.36	12.59
6789	Brands claiming Va.-Car. Chemical Co., Richmond, Va.	Aulander	Virginia-Carolina Peanut Grower.	S	4.63	3.08	8.00	.58	.92	.82	1.00	4.00	1.82	3.76	14.80
6857	Brand & Sons Co., Norfolk, Va.	Edenton	Baugh's Excelsior Guano	R	4.40	3.42	7.82	.42	.82	1.24	1.50	4.68	1.00	5.00	17.02
6502	Brand claiming Martin, D. B., & Co., Richmond, Va.	Ayden	Martin's Special Potato, Cotton and Peanut Guano.	S	5.25	2.82	8.07	.78	.42	1.20	1.46	4.21	1.46	4.21	16.57
6427	Brands claiming American Agricultural Chemical Co., New York, N. Y.	Williamston	Dawson's Crop Maker	R	5.08	1.99	7.07	.87	1.52	2.39	2.90	2.00	2.51	2.51	15.82
6578	do	Wilson	Lazaretto Crop Grower	D	6.30	1.83	8.13	.78	.84	1.62	1.97	1.86	1.97	1.86	15.68
6514	do	Roper	Purity Guano	S	5.90	2.04	7.94	.94	.88	1.82	2.21	2.01	2.01	2.01	16.46
6804	do	Aulander	Triumph Soluble Guano	S	5.88	2.01	7.89	1.00	.72	1.72	2.09	2.03	2.03	2.03	16.04
6943	do	Windsor	Triumph Soluble Guano	S	5.70	2.28	7.98	.80	.94	1.74	2.11	2.02	2.11	2.02	16.19
6452	do	do	do	S	5.08	2.42	7.92	1.07	.74	1.81	2.20	2.09	2.20	2.09	16.48
6431	American Fertilizer Co., Norfolk, Va.	Elizabeth City	Bone and Peruvian Guano	R	7.08	1.22	8.30	1.05	.94	1.99	2.42	1.98	2.42	1.98	17.29
6694	Arps, G. L., & Co., Norfolk, Va.	Edenton	Arps' Big Yield Guano	S	6.53	1.49	8.02	.92	1.06	1.98	2.40	2.17	2.40	2.17	17.32
6512	do	Edenton	Arps' Premium Guano	S	6.70	1.59	8.29	.82	1.06	1.88	2.28	2.44	2.28	2.44	17.47
6771	Ashepool Fertilizer Co., Charleston, S. C.	Monroe	Eutaw XX Guano	R	6.68	2.54	9.22	1.10	.86	1.96	2.38	2.33	2.38	2.33	18.50
6597	Atlantic Chemical Co., Norfolk, Va.	Pittsboro	Atlantic Soluble Guano	S	6.33	1.11	8.04	1.12	.70	1.82	2.21	1.90	2.21	1.90	16.42
6430	Baugh & Sons Co., Norfolk, Va.	Kinston	Baugh's Animal Bone and Potash Compound.	R	7.30	1.67	8.97	.43	1.58	2.01	2.44	2.02	2.44	2.02	18.13
6448	do	Edenton	do	S	5.90	1.97	7.87	1.05	.91	1.96	2.38	2.35	2.38	2.35	17.31
6383	do	Elizabeth City	Baugh's Fish Scrap	S	6.25	2.22	8.47	.51	1.52	2.03	2.46	2.12	2.46	2.12	17.87

## MIXED FERTILIZERS.

6809	Bragaz Fertilizer Co., Wash- ton, N. C.	Old Reliable Premium Guano	Washington	S	5.13	2.90	8.03	.46	1.24	1.70	2.08	2.84	16.98
6677	Benton, C. J., Guano Co., Balti- more, Md.	Benton's Butcher Bone	Scotland Neck	R	5.93	2.06	<b>7.99</b>	1.32	.54	1.86	2.26	2.29	16.94
6524	Berkley Chemical Co., Norfolk, Va.	Brandon's Superphosphate	Edenton	S	6.43	2.06	8.49	1.04	.92	1.96	2.38	<b>1.99</b>	17.47
6742	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Crown Brand Ammoniated Guano	Selma	R	6.05	2.35	8.60	.70	1.08	1.78	2.16	2.47	17.40
6580	do	Eli Ammoniated Fertilizer	La Grange	R	6.48	2.36	8.84	.90	.84	<b>1.74</b>	2.02	2.38	17.36
6357	Columbia Guano Co., Norfolk, Va.	Columbia Soluble Guano	New Bern	R	7.38	.65	8.03	1.23	.43	1.66	2.02	2.00	15.90
6770	Etiwan Fertilizer Co., Charleston, S. C.	Plow Brand Ammoniated Fertilizer	Wadesboro	S	6.45	1.79	8.24	.90	1.10	2.00	2.43	2.50	17.96
6638	Farmers Cotton Oil Co., Wilson, N. C.	Crop King Guano	Wilson	R	5.30	2.47	<b>7.77</b>	1.48	1.30	2.78	3.37	2.16	20.21
6635	do	Farmers' Special Guano	Wilson	R	5.50	1.25	<b>6.75</b>	.26	1.58	1.84	2.23	2.59	16.09
6631	Farmers Guano Co., Raleigh, N. C.	State Standard Guano	Clinton	R	6.07	1.58	<b>7.65</b>	.48	1.24	1.72	2.09	1.94	<b>16.73</b>
6457	Hampton Guano Co., Norfolk, Va.	Shirley Superphosphate	Elizabeth City	S	6.18	2.02	8.20	.89	.99	1.88	2.28	2.01	16.92
6380	Harrell, S. B., & Co., Norfolk, Va.	Harrell's Champion Cotton and Peanut Grower.	Edenton	S	5.65	2.50	8.15	.98	.78	1.76	2.14	2.06	16.46
6648	Hubbard's Fertilizer Co., Balti- more, Md.	Hubbard's Exchange Guano	Hillsboro	R	6.08	1.59	<b>7.67</b>	.80	1.04	1.84	2.23	3.06	17.44
6322	Imperial Co., Norfolk, Va.	Imperial Cotton Grower	Kinston	R	6.25	1.68	<b>7.93</b>	.57	1.47	2.04	2.48	2.26	17.57
6467	do	Imperial Champion Guano	Washington	S	6.68	2.01	8.69	.61	1.14	1.75	2.12	2.04	16.88
6546	do	do	Tunis	S	6.73	1.62	8.35	.78	1.14	1.92	2.12	<b>1.93</b>	17.12
6545	do	Imperial Peanut and Corn Guano	Tunis	R	6.60	1.56	8.16	.82	1.40	2.22	---	---	19.09
6469	do	Imperial Standard Premium Guano	Tunis	S	7.08	1.24	8.32	.78	1.12	1.90	2.30	2.12	17.23
6416	Meadows, E. H. & J. A., New Bern, N. C.	Meadows' Cotton Guano	Kinston	S	6.98	1.32	8.30	.35	1.30	1.65	2.00	2.20	16.32
6598	Miller Fertilizer Co., Baltimore, Md.	Ammoniated Dissolved Bone	Pittsboro	R	5.48	2.24	<b>7.72</b>	1.22	.56	1.78	2.16	2.08	16.17
6763	Navassa Guano Co., Wilmington, N. C.	Navassa Cotton Fertilizer	Mebane	S	5.40	3.06	8.46	.90	.82	1.72	2.09	<b>1.75</b>	16.24
6661	do	Navassa Cotton-seed Meal Guano	Rose Hill	R	5.65	2.06	<b>7.71</b>	.34	1.36	1.70	2.06	2.07	15.84
6509	New Bern Cotton Oil and Fertil- izer Mills, New Bern, N. C.	Greene County Standard Fertilizer.	Grifton	R	7.03	1.97	9.00	.30	1.78	2.08	2.53	2.39	18.90
6564	N. C. Cotton Oil Co., Wilmington, N. C.	Wilmington Cotton Grower	Warsaw	D	7.35	1.66	8.99	.14	1.64	1.78	2.16	2.70	18.00
6544	Ober, G., & Sons Co., Baltimore, Md.	Ober's Special Cotton Com- pound.	Tunis	R	8.38	.76	9.14	.90	1.06	1.96	2.38	2.34	18.44
6800	Ober, G., & Sons Co., Baltimore, Md.	Ober's Standard Tobacco Fertilizer.	Burlington	R	7.70	1.49	9.19	1.22	.82	2.04	2.48	2.21	18.06
6505	Patapsco Guano Co., Baltimore, Md.	Sea Gull Ammoniated Guano	Ayden	S	5.53	2.46	<b>7.99</b>	1.04	.82	1.86	2.26	2.01	16.65
6759	Piedmont-Mount Airy Guano Co., Baltimore, Md.	Piedmont Cultivator Brand	Burlington	S	6.80	1.49	8.29	.90	.72	<b>1.62</b>	1.98	2.39	16.40
6515	do	Piedmont Special	Williamston	S	6.43	.98	<b>7.41</b>	1.62	1.50	3.12	3.79	2.61	21.70

N—D, R, S, B, F, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—damp; Y—lumpy; W—wet.



6361	Va-Car. Chemical Co., Richmond, Va.	Farmers' Favorite Fertilizer.	R	6.58	1.36	7.94	.55	1.56	2.11	2.56	1.97	17.54
6748	do	Lynchburg Guano Co.'s Lynchburg Soluble.	R	5.80	2.00	7.89	.24	1.34	1.58	1.92	2.28	15.77
6463	do	Norfolk and Carolina Genuine Shafterhouse Bone Guano	R	5.68	2.32	8.00	.64	1.22	1.86	2.26	2.06	16.52
6446	do	Old Dominion Guano Co.'s Farmers' Friend Fertilizer	R	6.03	1.92	7.95	1.07	1.09	2.16	2.62	1.92	17.69
6392	do	Old Dominion Guano Co.'s Soluble Guano.	R	6.75	1.17	7.92	1.03	1.00	2.03	2.46	2.01	17.25
6622	do	Old Dominion Guano Co.'s Soluble Tobacco Guano.	S	5.45	1.87	7.32	.98	.80	1.78	2.16	1.95	15.67
6745	do	Plant Food	S	5.60	2.77	8.37	.38	1.22	1.60	1.94	2.36	16.36
6386	do	Powers, Gibbs & Co.'s Ammoniated Guano.	D	5.58	2.12	7.70	.28	1.53	1.81	2.20	2.38	16.60
6673	do	Powers, Gibbs & Co.'s Island Ammoniated Guano	R	3.45	2.42	7.87	.20	1.70	1.90	2.31	1.93	16.61
6435	do	Southern Chemical Co.'s Electric Standard Guano.	R	6.73	1.42	8.15	2.09	.94	3.03	3.68	2.01	21.36
6713	do	Travers & Co.'s Beef, Blood and Bone Fertilizer.	R	7.05	1.77	8.82	.74	.82	1.56	1.89	1.94	16.16
6708	do	Travers & Co.'s National Fertilizer	R	6.40	1.64	8.04	.76	1.08	1.84	2.23	2.01	16.62
6512	do	Travers' National Special Tobacco Fertilizer.	R	3.98	2.92	6.90	.96	1.12	2.08	2.53	1.82	16.32
6568	do	Virginia State Fertilizer Co.'s Battle Axe Tobacco Guano	R	5.55	1.75	7.30	.66	1.10	1.76	2.14	2.02	15.65
6780	do	Wilson Standard	R	4.68	3.30	7.98	.56	1.22	1.78	2.16	2.07	16.40
6755	do	Winborne's Eureka Guano	R	4.70	3.64	8.34	1.12	1.28	2.40	2.91	1.77	18.81
6790	do	Winborne's Excelsior Guano	R	4.78	2.92	7.70	.16	1.58	1.74	2.11	2.36	16.31
6696	do	Imperial Bright Tobacco Guano.	S	4.95	2.98	7.93	.96	.72	1.68	2.04	2.90	16.87
6443	Brands claiming	Imperial Co., Norfolk, Va.	S	4.90	2.80	7.70	1.41	.66	2.07	2.51	2.66	19.80
6425	do	Pocomoke Guano Co., Norfolk, Va.	S	6.58	2.77	9.35	.85	1.65	2.50	3.04	3.29	16.94
6588	do	Richmond Guano Co., Richmond, Va.	BW	7.10	1.44	8.54	1.02	.92	1.94	2.36	2.79	18.32
6675	do	Union Guano Co., Winston, N. C.	R	5.40	1.65	7.05	1.60	1.28	2.88	3.50	3.36	21.27
6610	do	Brand claiming	R	7.38	1.18	8.56	.58	1.22	1.80	2.19	2.48	17.45
6698	do	Upshur, R. L., Norfolk, Va.	S	6.25	1.40	7.65	.50	1.32	1.82	2.21	2.54	18.02
6303	do	Martin, D. E., Co., Richmond, Va.	S	5.38	2.52	7.90	.78	.46	1.24	1.51	2.68	14.89
6662	do	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	R	6.87	1.72	8.59	.94	1.18	2.12	2.57	1.90	17.43

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## ANALYSES OF COMMERCIAL FERTILIZERS, SPRING SEASON, 1908.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Mechanical Condition.	Percentage Composition or Parts per 100.										Relative Value per Ton at Factory.	
					Water-soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.		Chlorine.
6743	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Raleigh Special Tobacco Guano.	Selma	R	6.83	1.41	8.24	.54	1.18	1.78	2.16	2.23	2.23	2.23	2.25	16.81
6820	Farmers Guano Co., Raleigh, N. C.	Big Chop Guano.	Clinton	R	7.22	1.55	8.77	.70	1.14	1.84	2.23	2.06	2.06	2.06	---	17.33
6860	Nayassa Guano Co., Wilmington, N. C.	Nayassa Soluble Ammoniated Guano.	Wallace	R	6.02	2.32	8.34	.86	1.04	1.90	2.31	2.84	2.84	2.84	---	18.04
6639	American Fertilizing Co., Norfolk, Va.	Bob White Fertilizer for Tobacco.	Greenville	R	6.08	2.40	8.48	.82	1.14	1.96	2.06	2.50	2.50	2.55	---	17.98
6504	Pocomoke Guano Co., Norfolk, Va.	Chico Tobacco Guano.	Ayden	R	5.58	2.22	7.80	.60	1.52	2.12	2.57	2.63	2.63	5.30	---	18.18
6308	Bragsaw Fertilizer Co., Washington, N. C.	Tuckahoe Tobacco Guano.	Washington	R	6.53	1.42	7.95	.66	1.34	2.00	2.43	2.93	2.93	3.80	---	18.18
6672	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Caraleigh Special Tobacco Guano.	Maxton	R	7.85	1.29	9.14	1.12	.58	1.70	2.06	2.28	2.28	2.15	---	17.36
6711	do	Planters' Pride	Lumberton	R	6.63	1.29	7.92	.72	1.22	1.94	2.36	2.90	2.90	---	---	17.88
6331	Craven Chemical Co., New Bern, N. C.	Marvel Great Crop Grower.	New Bern	R	5.60	2.20	7.80	.84	1.20	2.04	2.48	2.97	2.97	---	---	18.24
6787	Farmers Cotton Oil Co., Wilson, N. C.	Planters' Friend Guano.	Aulander	R	6.58	1.29	7.87	.32	1.70	2.02	2.45	3.17	3.17	---	---	18.45
6577	Meadows, E. H. & J. A., New Bern, N. C.	Meadows' All Crop Guano.	La Grange	S	6.35	2.12	8.47	.68	1.26	1.94	2.36	2.75	2.75	---	---	18.21
6576	do	Meadows' Roanoke Guano.	La Grange	R	8.50	1.32	9.82	.68	1.34	2.02	2.45	2.55	2.55	---	---	19.52
6477	Pamlico Chemical Co., Washington, N. C.	Farmers' Best Guano.	Washington	R	5.68	2.20	7.88	.61	1.53	2.14	2.60	3.26	3.26	---	---	19.02
6791	Patapsco Guano Co., Baltimore, Md.	Unicorn Guano.	Neals	R	5.55	2.25	7.80	1.08	1.00	2.08	2.53	2.76	2.76	---	---	18.17
6776	Piedmont-Mt. Airy Guano Co., Baltimore, Md.	Piedmont Guano for All Crops.	Mount Olive	S	6.30	1.64	7.94	.98	1.14	2.12	2.57	3.48	3.48	---	---	19.22
6791	do	Piedmont Guano for Tobacco	Burlington	R	2.60	5.43	8.03	1.00	1.16	2.16	2.62	3.78	3.78	9.25	---	19.81
6574	Powhatan Chemical Co., Richmond, Va.	King Brand High Grade Fertilizer.	Wilson	R	6.68	1.57	8.25	1.00	1.20	2.20	2.67	3.24	3.24	---	---	19.56
6324	do	White Leaf High Grade Tobacco Fertilizer.	New Bern	R	3.70	4.37	8.07	1.72	.82	2.54	3.08	3.26	3.26	5.97	---	20.65

## MIXED FERTILIZERS.

6480	Roberson, J. H., & Co., Robersonville, N. C.	Roberson's Bright Leaf Grower.	Robersonville	R	4.55	3.24	7.79	.82	1.37	2.19	2.66	3.44	3.44	3.05	19.53
6317	Royster, F. S., Guano Co., Norfolk, Va.	Orinoco Tobacco Guano	New Bern	S	7.30	1.02	8.32	.82	1.34	2.16	2.62	3.03	3.03	7.15	19.24
6752	Union Guano Co., Winston, N. C.	Union Waterfowl Guano	Haw River	R	5.55	1.88	7.43	.82	1.82	2.14	2.60	4.49	---	---	19.97
6540	Va.-Car. Chemical Co., Richmond, Va.	Blue Star	Edenton	R	6.03	1.80	7.83	.76	1.36	2.12	2.57	3.38	---	---	19.03
6563	do	Carolina Golden Belt Guano for Tobacco.	Robersonville	R	5.43	2.51	7.94	.50	1.58	2.08	2.53	3.94	3.94	6.20	19.59
6570	do	Durham Fertilizer Co.'s N. C. Farmers Alliance Guano	Magnolia	R	6.18	2.31	8.49	.98	1.10	2.08	2.53	3.05	3.05	---	19.10
6539	do	Powers, Gibbs & Co.'s Carolina Golden Belt Ammoniated Guano for Tobacco.	Washington	R	6.65	1.35	8.00	.78	1.46	2.24	2.72	2.77	---	---	18.98
6444	do	do	Robersonville	R	6.13	1.68	7.81	.69	1.83	2.52	3.06	3.06	3.06	2.95	20.22
6569	do	do	Magnolia	S	4.68	1.89	6.57	1.10	.96	2.06	2.50	3.05	3.05	2.90	17.30
6688	do	Southern Chemical Co.'s Pilot Ammoniated Guano.	Pembroke	R	6.65	1.16	7.81	.86	1.20	2.06	2.50	2.63	2.63	3.35	17.95
6566	do	Special for Tobacco.	Warsaw	R	6.23	1.76	8.09	.54	1.62	2.16	2.62	2.89	---	---	18.88
6649	do	Superlative Guano	Washington	R	6.38	1.40	7.78	.54	1.52	2.06	2.50	2.75	2.75	3.70	18.06
6513	Brands claiming	Tinsley & Co.'s Killikinnick Tobacco Mixture.	Elizabeth City	R	5.98	2.31	8.29	2.18	.60	2.78	3.37	2.11	---	---	18.25
6792	Camp, W. H., Manufacturing Co., Petersburg, Va.	Red Head Camp's Prepared Chemicals.	Elizabeth City	R	5.45	1.01	6.46	.92	1.48	2.40	2.91	2.36	---	---	20.62
6421	Farmers Cotton Oil Co., Wilson, N. C.	Wilson's High Grade Guano.	Anander	R	6.58	1.46	8.04	.60	1.56	2.16	2.62	2.01	---	---	17.77
6478	N. C. Cotton Oil Co., Raleigh, N. C.	Raleigh Standard Guano	Winston	R	6.33	1.73	8.06	.83	1.48	2.31	2.80	2.91	---	---	19.46
6689	Pamlico Chemical Co., Washington, N. C.	Staton & Taylor's Special Corn Grower.	Washington	R	7.23	.82	8.05	.50	1.50	2.00	2.43	2.06	---	---	17.31
6773	Va.-Car. Chemical Co., Richmond, Va.	Royal Crown	Rowland	R	5.41	2.16	7.57	.72	1.80	2.52	3.06	3.50	---	---	18.80
6449	Brands claiming	Southern Cotton Oil Co.'s High Grade Guano.	Mt. Olive	R	6.50	1.54	8.04	.63	2.07	2.70	3.28	2.61	---	---	20.49
6659	Home Fertilizer Chemical Co., Baltimore, Md.	Phoenix Crop Grower	Greenville	R	5.55	1.92	7.47	.78	1.58	2.36	2.87	2.08	---	---	19.03
6584	Navassa Guano Co., Wilmington, N. C.	Navassa Cotton-seed Meal Guano.	Rose Hill	R	5.38	1.61	6.99	.92	1.54	2.46	2.99	2.25	---	---	20.63
6709	do	Navassa Cotton-seed Meal Special 3 Per Cent Guano.	Laurinburg	R	6.93	1.16	8.09	.76	1.54	2.30	2.79	1.80	---	---	18.21
6368	Va.-Car. Chemical Co., Richmond, Va.	Powers, Gibbs & Co.'s Cotton Belt Ammoniated Guano.	Rowland	R	6.30	1.35	7.65	.85	1.88	2.73	3.32	2.25	---	---	18.36
6368	do	Charlotte Oil & Fert. Co.'s Special 3 Per Cent Guano.	Lumberton	D	6.30	1.35	7.65	.85	1.88	2.73	3.32	2.25	---	---	18.23

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ANALYSES OF COMMERCIAL FERTILIZERS, SPRING SEASON, 1908.

Laboratory Number.	Name and Address of Manufacturer.	Where Sampled.	Name of Brand.	Mechanical Condition.	Percentage Composition or Parts per 100.										Relative Value per Ton at Factory.		
					Water-soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.		Chlorine.	
6360	Brands claiming Acme Manufacturing Co., Wilmington, N. C.	Lumberton	Acme Fertilizer	R	6.60	1.59	8.00	8.19	1.04	1.55	2.47	3.00	2.50				19.58
6347	do	Robersonville	Acme Fertilizer for Tobacco	R	7.03	1.87	8.00	8.30	1.00	1.47	2.47	3.00	2.78	2.78			20.70
6357	Brand claiming Va.-Car. Chemical Co., Richmond, Va.	Clinton	Split Silk	R	6.37	1.05	7.42	7.42	.78	1.70	2.47	3.00	2.70				19.58
6348	Brands claiming American Agricultural Chemical Co., New York, N. Y.	Edenton	Lazaretto Special for Tobacco and Potatoes.	R	6.48	1.87	8.00	8.35	.55	1.91	2.46	3.00	3.00	3.14	3.14		20.56
6395	American Fertilizing Co., Norfolk, Va.	Edenton	American Eagle Guano.	R	5.53	1.24	6.77	8.35	1.55	1.73	3.28	3.98	3.68				21.83
6363	Armour Fertilizer Works, Wilmington, N. C.	Lumberton	Armour Cotton Special Fertilizer.	R	6.65	1.37	8.02	8.02	2.08	1.02	3.10	3.76	3.65				23.32
6739	Atlantic Chemical Co., Norfolk, Va.	Waxhaw	Atlantic High Grade Cotton Guano.	S	7.65	.60	8.25	8.25	1.50	.94	2.44	2.96	2.85				20.07
6384	Baugh & Sons Co., Norfolk, Va.	Elizabeth City	Baugh's Grand Rapid High Grade Truck Guano.	R	6.70	1.45	8.15	8.15	1.30	1.14	2.44	2.96	3.25				20.42
6419	do	Kinston	Baugh's High Grade Tobacco Guano.	R	6.90	1.41	8.31	8.31	1.23	1.27	2.50	3.04	3.40	3.40			20.96
6500	do	Williamston	Baugh's High Grade Truck Guano.	R	5.48	3.26	8.74	8.74	.38	2.38	2.76	3.35	3.36			6.85	22.32
6470	Braraw, Wm., & Co., Washington, N. C.	Washington	Beaufort County Guano	S	5.35	2.79	8.14	8.14	.60	1.15	1.75	2.12	2.96				17.41
6455	Caralrich Phosphate and Fertilizer Works, Raleigh, N. C.	Greenville	Horne's Best	R	5.90	1.65	7.55	7.55	.36	2.29	2.65	3.22	3.17				19.21
6707	Clayton Oil Mills, Clayton, N. C.	Selma	Clayton Guano	R	5.98	1.76	7.74	7.74	.76	1.76	2.52	3.06	3.12				20.22
6326	Columbia Guano Co., Norfolk, Va.	New Bern	Hyco Tobacco Guano	S	7.50	1.76	8.26	8.26	1.64	.77	2.41	2.93	2.99	2.99			7.00
6349	do	Edenton	Olympia Cotton Guano	R	6.95	1.04	7.99	7.99	1.30	1.35	2.68	3.22	3.35				21.20
6307	Cowell, Swan & McCotter Co., Bayboro, N. C.	Washington	Cowell's Great Tobacco Guano.	R	4.70	3.10	7.80	7.80	1.22	1.56	2.78	3.37	3.01	.40	2.61		21.17

MIXED FERTILIZERS.

6632	Craven Chemical Co., New Bern, N. C.	Foy's High Grade Guano	MT. Olive	R	2.80	4.45	7.25	.60	1.58	2.18	2.65	2.89	18.20
6636	Farmers Cotton Oil Co., Wilson, N. C.	Graves' Cotton Grower Guano	Wilson	R	6.38	1.64	3.02	.72	1.52	2.24	2.72	3.51	19.81
6676	do	Golden Gem Guano	Anlander	R	6.05	1.68	7.73	.24	2.52	2.76	3.35	3.29	20.67
6634	Farmers Guano Co., Raleigh, N. C.	Golden Grade Guano	Wilson	R	6.60	1.07	7.69	.78	1.86	2.64	3.20	3.10	20.00
6503	Hampton Guano Co., Norfolk, Va.	Hampton Tobacco Guano	Ayden	S	5.93	2.11	8.04	.36	1.04	2.40	2.91	3.24	20.16
6684	Hubbard Fertilizer Co., Baltimore, Md.	Hubbard's Yellow Wrapper Guano	Scotland Neck	S	3.48	3.22	6.70	1.68	.98	2.66	3.23	3.57	20.33
6465	Imperial Co., Norfolk, Va.	Imperial Tobacco Guano	Washington	R	6.78	1.16	7.94	1.22	1.17	2.39	2.90	3.07	19.84
6466	do	Imperial X-L-O Cotton Guano	Washington	S	6.80	1.20	8.00	1.28	1.12	2.40	2.91	3.16	20.03
6411	Martin, D. B. Co., Richmond, Va.	Martin's Bull Head Fertilizer	New Bern	R	6.65	1.83	8.58	2.24	.48	2.72	3.30	2.84	21.45
6438	do	Martin's Bull Head Fertilizer for Cotton and Tobacco	Edenton	S	6.23	1.92	8.15	1.85	.72	2.57	3.12	2.57	20.18
6415	Meadows, E. H. & J. A., New Bern, N. C.	Meadows' Gold Leaf Tobacco Guano	Kinston	R	7.70	1.15	8.85	.78	1.81	2.59	3.14	2.83	21.17
6631	Miller Fertilizer Co., Baltimore, Md.	Standard Phosphate	Scotland Neck	S	5.88	2.04	7.92	1.46	1.28	2.74	3.33	2.84	20.93
6507	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	Pitt's Prolific Golden Tobacco Grower	Ayden	R	6.70	1.44	8.14	.86	1.96	2.82	3.42	3.49	22.16
6669	do	Cartier's Lifter	Maxton	R	6.92	1.80	8.72	.76	1.68	2.44	2.96	3.76	21.50
6565	do	Wilmington High Grade Oriana Tobacco Guano	Warsaw	R	7.23	1.43	8.66	.68	1.66	2.34	2.84	3.60	20.88
6619	Norfolk Fertilizer Co., Norfolk, Va.	do	Washington	S	6.77	1.58	8.35	.70	1.16	1.86	2.26	2.48	17.50
6476	Ober, G. & Sons Co., Baltimore, Md.	Ober's Special Compound for Tobacco	Greenville	R	7.65	.85	8.50	1.61	.86	2.47	3.00	3.40	21.02
6644	do	do	Durham	R	7.63	1.10	8.73	1.64	.86	2.50	3.04	3.21	21.13
6436	Pamlico Chemical Co., Washington, N. C.	Farmers' Best Friend	Washington	R	6.75	2.22	8.97	2.06	.49	2.55	3.10	3.09	21.41
6394	do	Tobacco Growers' Friend	Washington	R	6.60	2.14	8.74	1.22	1.35	2.57	3.12	3.14	21.34
6472	Patapsco Guano Co., Baltimore, Md.	Choctaw Guano	Greenville	R	6.30	2.12	8.42	1.78	1.02	2.80	3.40	2.75	21.52
6798	Piedmont-Mount Airy Guano Co., Baltimore, Md.	Levering's Reliable Tobacco Guano	Burlington	S	6.48	1.68	8.16	1.30	1.18	2.48	3.01	3.24	20.56
6526	do	Piedmont High Grade Ammoniated Bone and Potash	Edenton	R	6.60	1.55	8.15	1.02	1.56	2.58	3.13	3.37	21.10
6738	Pocomoke Guano Co., Norfolk, Va.	Harvey's High Grade Monarch	Monroe	S	5.98	1.97	7.95	1.56	1.04	2.60	3.16	3.06	20.66
6423	Powhatan Chemical Co., Richmond, Va.	High Grade Hustler	Kinston	R	6.55	1.67	8.22	1.32	1.32	2.64	3.20	2.78	20.75
6737	Rasin-Monumental Co., Baltimore, Md.	Rasin's Gold Standard	Waxhaw	S	6.53	1.44	7.97	1.42	1.22	2.64	3.20	3.00	20.76
6372	Richmond Guano Co., Richmond, Va.	Gilt Edge High Grade Fertilizer	Edenton	R	6.40	1.70	8.10	1.50	1.38	2.88	3.50	3.06	21.99

N—D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—damp; Y—lumpy; W—wet.

## ANALYSES OF COMMERCIAL FERTILIZERS, SPRING SEASON, 1908.

Laboratory Number.	Name and Address of Manufacturer.	Where Sampled.	Mechanical Condition.	Percentage Composition or Parts per 100.										Relative Value per Ton at Factory.	
				Water-soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.		Chlorine.
6318	Royster, F. S., Guano Co., Norfolk, Va.	New Bern	S	6.75	.93	7.68	1.51	.71	2.22	2.70	3.16	3.16	3.16	8.00	\$ 19.05
6766	Southern Exchange Co., Maxton, N. C.	Maxton	S	6.62	1.44	8.06	1.40	1.04	2.44	2.96	3.06	3.06	3.06	---	20.14
6667	Jack's Best Fertilizer	Maxton	S	7.60	1.11	8.71	1.66	.76	2.42	2.94	2.97	2.97	2.97	---	20.54
6708	R. M. C. Special Crop Grower	Parkton	S	7.32	1.12	8.44	1.72	.72	2.44	2.96	2.98	2.98	2.98	---	20.39
6529	Swift Fertilizer Works, Wilmington, N. C.	Chadbourn	R	6.08	1.54	7.62	.80	2.20	3.00	3.64	3.36	3.36	3.36	---	22.25
6459	do	Greenville	R	7.33	1.79	9.12	.59	2.38	2.97	3.60	4.05	4.05	4.05	---	24.24
6466	Union Guano Co., Winston, N. C.	Wadesboro	R	6.98	1.74	8.72	1.00	1.60	2.60	3.16	3.20	3.20	3.20	---	21.50
6753	do	Haw River	D	6.40	1.84	8.24	.72	1.42	2.14	2.60	2.70	2.70	2.70	4.95	18.73
6722	Upshur, R. L., Norfolk, Va.	Elizabeth City	R	6.30	1.44	7.74	1.36	1.28	2.64	3.20	3.42	3.42	3.42	---	21.02
6422	Va.-Car. Chemical Co., Richmond, Va.	Kinston	R	5.58	2.07	7.65	2.62	.38	3.00	3.64	3.11	3.11	3.11	---	22.00
6741	do	Selma	S	6.95	2.08	8.33	.82	1.64	2.46	2.99	3.03	3.03	3.03	---	20.42
6386	do	Washington	D	6.70	.98	7.68	1.01	1.84	2.85	3.46	2.65	2.65	2.65	2.95	20.94
6391	do	Washington	R	6.83	.98	7.76	1.07	1.37	2.44	2.96	3.27	3.27	3.27	3.40	20.14
6330	do	New Bern	R	5.45	2.07	7.52	.94	1.40	2.34	2.84	4.32	4.32	4.32	---	20.64
6378	do	Washington	R	5.20	2.32	7.52	1.02	1.60	2.62	3.18	3.06	3.06	3.06	2.65	20.85
6379	do	Edenton	R	6.68	1.33	8.01	1.03	1.57	2.60	3.16	3.72	3.72	3.72	1.00	21.44

## MIXED FERTILIZERS.

6462	do	Washington	R	5.90	1.31	7.21	2.21	2.24	4.45	5.40	2.85	2.85	2.50	26.98
		Powers, Gibbs & Co.'s Old Kentucky High Grade Tobacco Manure.												
6328	do	New Bern	R	5.93	1.65	7.58	1.05	1.80	2.85	3.46	3.85	3.85		27.21
		Va.-Car. Chemical Co.'s Farmers' Friend High Grade Guano.												
6687	do	Rowland	R	6.43	1.42	7.85	.82	1.70	2.52	3.06	2.83	2.83		20.00
		Virginia State Fertilizer Co.'s Bull Dog Soluble Guano.												
6442	Winborne Guano Co., Tyner, N. C.	Edenton	R	4.08	2.96	7.04	2.16	.46	2.72	3.30	5.75	5.75		23.26
		Winborne's King Farming Guano.												
6538	do	Edenton	R	4.90	2.47	7.37	1.32	1.52	2.54	3.45	3.68	3.68	6.35	21.75
		Winborne's Tobacco Guano.							2.47	3.00	4.00	4.00		21.23
6353	Brands claiming	Greenville	S	6.01	1.99	8.00	1.30	1.38	2.68	3.25	4.11	4.11	4.40	22.36
		Meadows, E. H. & J. A., New Bern, N. C.												
6700	do	Edenton	R	6.85	1.64	8.49	1.24	1.08	2.32	2.82	3.64	3.64		20.69
		Piedmont-Mt. Airy Guano Co., Baltimore, Md.												
6365	do	Lumberton	R	6.50	1.90	8.40	1.53	.79	2.32	2.82	3.79	3.79		20.77
		Southern Exchange Co., Maxton, N. C.												
6369	do	Lumberton	R	6.13	1.72	7.85	1.07	1.47	2.54	3.08	3.68	3.68	5.00	21.01
		Va.-Car. Chemical Co., Richmond, Va.												
6567	do	Warsaw	R	6.13	1.57	7.70	2.00	.88	2.88	3.50	3.93	3.93	3.15	22.48
		Charlotte Oil and Fertilizer Co.'s Groom's Special Tobacco Fertilizer.												
6716	do	Goldsboro	R	5.88	1.65	7.53	1.22	1.42	2.64	3.20	3.57	3.57		21.00
		Va.-Car. Chemical Co.'s Lion High Grade Fertilizer.												
6506	Brand claiming	Grifton	S	5.03	2.92	7.95	1.76	.68	2.47	3.00	5.00	5.00	6.75	22.33
		Patapsco Plant Food for Tobacco, Cotton and Truck.							2.47	2.44	2.96	5.20		22.39
6555	do	Wilmington	D	7.20	.98	8.18	1.34	1.42	2.76	3.35	9.63	9.63		27.83
		Baugh & Sons Co., Norfolk, Va.							2.47	3.00	10.00	10.00		28.70
6387	Brand claiming	Wilmington	R	6.60	1.26	7.86	2.89	.51	3.40	4.13	3.08	3.08	4.90	23.37
		Va.-Car. Chemical Co., Richmond, Va.												
6420	Brands claiming	Kinston	R	6.73	1.34	8.07	.81	1.48	3.29	4.00	4.00	4.00		24.47
		Acme Mfg. Co., Wilmington, N. C.							3.29	4.00	3.90	3.90		24.38
6443	do	Kinston	R	5.20	1.77	6.97	2.47	.50	3.97	4.82	5.12	5.12		27.38
		Armour's Special Truck Fertilizer.												
6554	do	Chadbourn	R	6.65	1.78	8.43	1.60	1.64	3.24	3.93	4.83	4.83		24.98
		Baugh & Sons Co., Norfolk, Va.												
6736	do	Greensboro	R	6.40	1.15	7.55	2.44	1.34	3.78	4.59	3.99	3.99		25.92
		Columbia Guano Co., Norfolk, Va.												
6777	do	Mt. Olive	R	6.45	.62	7.97	1.84	1.44	3.28	3.98	3.92	3.92		24.28
		Craven Chemical Co., New Bern, N. C.												
6793	do	Charlotte	R	5.75	2.22	7.97	1.58	1.76	3.84	4.05	3.93	3.93		24.52
		Columbia Guano Co., Norfolk, Va.							1.76	3.84	4.05	4.05		24.52
6321	do	Kinston	S	6.95	1.15	8.10	.66	1.37	2.03	2.46	3.87	3.87		19.46
		Imperial Co., Norfolk, Va.							2.03	2.46	3.87	3.87		19.46

N—fine; D—good; R—fair; S—coarse; B—very coarse; P—damp; Y—lumpy; W—wet.

ANALYSES OF COMMERCIAL FERTILIZERS, SPRING SEASON, 1908.

Laboratory Number.	Name and Address of Manufacturer.	Where Sampled.	Mechanical Condition.	Percentage Composition or Parts per 100.											Relative Value per Ton at Factory.
				Water-soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.	Chlorine.	
6383	Martin, D. B., Co., Richmond, Va.	Martin's Red Star	S	6.53	1.52	8.05	2.78	.88	3.66	4.44	4.06	---	---	---	25.98
6450	Miller Fertilizer Co., Baltimore, Md.	Miller's Irish Potato	R	4.70	2.29	<b>6.99</b>	1.96	1.76	3.71	4.50	4.14	---	---	---	25.31
6392	Navassa Guano Co., Wilmington, N. C.	do	R	5.83	1.56	<b>7.39</b>	1.70	1.72	3.42	4.15	4.37	---	---	---	24.79
6583	Navassa Guano Co., Wilmington, N. C.	Navassa Special Truck Guano	R	5.68	1.86	<b>7.54</b>	2.28	1.64	3.92	4.76	<b>3.31</b>	---	---	---	25.71
6508	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	Oriole Tobacco Grower	R	7.05	1.39	8.44	1.84	2.04	3.88	4.71	4.58	1.47	3.11	1.10	27.76
6424	Powhatan Chemical Co., Richmond, Va.	High Grade North State Special.	R	6.83	1.66	8.49	2.31	1.17	3.48	4.22	4.08	---	---	---	25.46
6315	Royster, F. S., Guano Co., Norfolk, Va.	Truckers' Delight	R	6.88	.92	<b>7.80</b>	2.57	1.47	4.04	4.90	<b>3.94</b>	---	---	---	27.10
6530	Swift Fertilizer Works, Wilmington, N. C.	Swift's High Grade Monarch Vegetable Grower.	R	6.38	1.79	8.17	.56	2.68	3.24	3.93	<b>3.78</b>	---	---	---	<b>24.14</b>
6715	Va.-Car. Chemical Co., Richmond, Va.	Carr's 8-4-4 Crop Grower	S	7.10	1.32	8.42	1.90	1.14	3.04	3.69	<b>3.77</b>	---	---	---	<b>23.58</b>
6735	do	Carr's Crop Grower	S	6.75	1.17	<b>7.92</b>	2.20	1.18	3.38	4.10	4.53	---	---	---	25.29
6805	do	Powers, Gibbs & Co.'s Cotton Brand Ammoniated Bone.	R	5.35	2.41	<b>7.76</b>	.99	2.25	3.24	3.93	<b>3.77</b>	---	---	---	<b>23.77</b>
6434	Va.-Car. Chemical Co., Richmond, Va.	Powers, Gibbs & Co.'s Truck Farmers' Special Ammoniated Guano.	R	7.18	1.31	8.49	2.40	.78	3.30	4.00	<b>5.00</b>	---	---	---	25.75
6556	Baugh & Sons Co., Norfolk, Va.	Baugh's Special Guano	R	6.65	1.76	8.41	1.86	1.58	3.30	4.00	<b>6.00</b>	---	---	---	<b>26.67</b>
6693	Eliwan Fertilizer Co., Charleston, S. C.	Eliwan Superior Cotton Fertilizer.	R	8.15	1.27	9.42	2.02	1.60	3.62	4.39	6.33	---	---	---	27.88
6637	Farmers Cotton Oil Co., Wilson, N. C.	Deans' Special Guano	R	7.05	1.22	8.27	1.08	2.68	3.70	4.50	<b>7.00</b>	---	---	---	29.55
6633	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Best Guano	S	4.85	3.19	8.04	2.34	1.58	3.92	4.76	<b>6.53</b>	---	---	---	30.01
															29.71

MIXED FERTILIZERS.

6516	<b>Brand claiming</b> Camp, W. H., Petersburg, Va.	Yellow Head Camp's Prepared Chemicals.	Edenton	R	7.25	1.92	8.00	2.87	3.50	7.50	26.64
								.48	3.28	3.98	30.97
6541	<b>Brand claiming</b> Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s Special Plant and Truck Fertilizer.	Belcross	R	6.03	1.22	7.25	4.12	5.00	3.00	26.56
								1.84	3.90	4.73	25.77
6511	<b>Brands claiming</b> Meadows, E. H. & J. A., New Bern, N. C.	Meadows' Labos Guano	Grifton	R	4.58	3.07	8.00	4.12	5.00	5.00	28.77
								1.60	4.06	4.93	28.65
6528	<b>Brands claiming</b> Va.-Car. Chemical Co., Richmond, Va.	Norfolk and Car. Chemical Co.'s Norfolk Truck and Tomato Grower, Atlantic and Va. Fertilizer Co.'s Virginia Trucker.	Edenton	R	4.58	2.22	6.80	2.02	4.88	4.98	30.63
6527	-----do-----	Bone, Blood and Potash	Elizabeth City	R	5.68	1.87	7.55	2.16	4.38	5.32	29.50
6352	<b>Brands claiming</b> Armour Fertilizer Works, Baltimore, Md.	Cowell's Great Potato Grower	Elizabeth City	S	5.78	2.61	8.39	1.86	4.61	5.60	30.97
6323	<b>Brands claiming</b> Pamlico Chemical Co., Washington, N. C.	McKinnon's Special Truck Formula.	Beaufort	R	6.38	1.61	7.99	1.33	2.57	4.73	33.26
6007	<b>Brands claiming</b> Southern Exchange Co., Maxton, N. C.	Peruvian Mixture	Parkton	R	6.82	1.65	8.47	.96	4.02	4.88	29.46
6490	<b>Brands claiming</b> American Fertilizing Co., Norfolk, Va.	Coon Brand Guano	Edenton	R	4.08	2.97	7.05	.74	1.14	1.50	31.08
6475	<b>Brand claiming</b> Patapsco Guano Co., Baltimore, Md.	A. and A.'s Star Brand Guano.	Greenville	S	6.45	2.22	8.67	.63	.51	1.14	15.74
6641	<b>Brands claiming</b> Va.-Car. Chemical Co., Richmond, Va.	Va. State Fertilizer Co.'s Highland King.	Durham	R	6.10	2.62	8.72	.40	1.20	1.94	15.33
6795	-----do-----	Gold Dust Guano	Burlington	R	4.60	3.68	8.28	1.22	1.14	2.86	14.59
6388	<b>Brands claiming</b> American Agricultural Chemical Co., New York, N. Y.	Ober's Special Ammoniated Dissolved Bone.	Edenton	S	7.00	1.76	9.00	.99	1.81	2.20	15.64
6806	<b>Brand claiming</b> Bradley Fertilizer Co., Boston, Mass.	Sea Fowl Standard Guano.	Concord	R	7.98	1.07	9.05	.96	.92	1.88	15.26
6362	<b>Brand claiming</b> Berkley Chemical Co., Norfolk, Va.	Monitor Animal Bone Fertilizer.	Lumberton	D	5.35	3.70	9.05	.91	1.17	2.08	17.88
6579	<b>Brands claiming</b> Acme Manufacturing Co., Wilmington, N. C.	Farmer's Union Meal Mixture.	Edenton	R	6.10	2.60	8.70	1.20	.74	1.94	16.41
6482	<b>Brands claiming</b> Bragg Fertilizer Co., Washington, N. C.		La Grange	R	7.45	1.71	9.16	.90	1.34	2.28	17.63
			Washington	R	6.33	2.54	8.87	.46	1.81	2.27	18.93
											19.75
											19.16
											19.29
											19.00

N—D, R, S, B, F, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—clump; Y—lumpy;

ANALYSES OF COMMERCIAL FERTILIZERS, SPRING SEASON, 1908.

Laboratory Number.	Name and Address of Manufacturer.	Where Sampled.	Name of Brand.	Mechanical Condition.	Percentage Composition or Parts per 100.										Relative Value per Ton at Factory.			
					Water-soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Murate.	Potash from Sulphate.		Chlorine.		
6593	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Robersonville	Pacific Tobacco and Cotton Grower.	R	7.88	.63	8.51	.10	2.12	2.22	2.70	2.15						\$ 18.68
6560	Columbia Guano Co., Norfolk, Va.	Robersonville	Columbia C. S. M. Special Grower.	S	8.02	.79	8.82	.82	1.52	2.34	2.84	2.34						19.64
6668	MacMurphy Co., Charleston, S. C.	Maxton	Wilcox, Gibbs & Co.'s Manipulated Guano.	S	8.15	1.27	9.42	.76	1.62	2.38	2.89	2.43						20.43
6527	Pamlico Chemical Co., Washington, N. C.	Washington	Prosperity Cotton Grower.	R	7.38	1.72	9.10	1.04	1.28	2.32	2.82	2.55						20.04
6575	Powhatan Chemical Co., Richmond, Va.	Wilson	High Grade Economic Cotton Grower.	R	8.88	.66	9.54	.20	1.68	1.88	2.28	2.34						18.49
6562	Richmond Guano Co., Richmond, Va.	Robersonville	Carolina Cotton Grower.	D	8.38	1.48	9.86	.40	1.84	2.24	2.72	1.97						19.77
6558	Royster, F. S., Guano Co., Norfolk, Va.	Wilmington	Royster's Meal Mixture	R	8.00	1.50	9.50	1.00	1.36	2.36	2.87	3.63						21.74
6718	Southern Cotton Oil Co., Goldsboro, N. C.	Goldsboro	Best & Thompson's Special Cotton Grower.	R	6.68	2.35	9.03	.52	1.78	2.30	2.79	2.46						19.80
6495	Va.-Car. Chemical Co., Richmond, Va.	Edenton	Allison & Addison's Star Brand Special Tobacco Mixture.	N	6.50	2.26	8.76	.63	1.86	2.49	3.02	1.87			1.40			19.65
6678	do	Hobgood	do	R	7.35	1.31	8.66	.76	1.90	2.66	3.23	2.64						21.07
6674	do	Robersonville	Caroling Cotton Grower	D	6.42	2.78	9.20	.18	2.08	2.26	2.75	2.19						19.50
6447	do	Edenton	Pulitic Cotton Grower	D	6.08	1.69	7.77	1.04	2.22	3.26	3.96	2.68						22.65
6390	do	Washington	White Star	D	7.20	1.39	8.59	.60	1.75	2.39	2.90	2.19						19.45
Brand claiming							9.00		2.47	3.00	2.00							19.93
6656	Va.-Car. Chemical Co., Richmond, Va.	Clinton	Powers, Gibbs & Co.'s Standard Guano.	D	6.72	1.30	8.02	.80	1.80	2.60	3.16	2.04						19.60
Brand claiming							9.00		2.47	3.00	3.00							21.03
6439	Patapsco Guano Co., Baltimore, Md.	Bethel	Patapsco Tobacco Fertilizer	R	6.65	1.98	8.63	1.71	.86	2.57	3.12	3.25						21.36
Brand claiming							9.00		2.75	3.29	2.78							21.02
6486	Roberson, J. H., & Co., Robersonville, N. C.	Robersonville	Roberson's Cotton Grower	R	7.20	2.15	9.35	1.07	1.22	2.29	2.78	2.70						20.31

MIXED FERTILIZERS.





6418	Baugh & Sons Co., Norfolk, Va.	Baugh's Peruvian Guano Substitute for Potatoes and All Vegetables.	Kinston	R	4.78	1.76	6.54	2.73	1.45	4.18	5.08	7.42	30.35
6519	Hubbard Fertilizer Co., Baltimore, Md.	Hubbard's Early Trucker	Elizabeth City	S	5.58	1.39	6.97	2.80	1.20	4.00	4.86	9.04	31.82
6426	Imperial Co., Norfolk, Va.	Imperial Potato Guano	Kinston	R	6.20	.84	7.04	2.67	1.28	3.95	4.80	6.85	29.27
6531	Martin, D. B. Co., Richmond, Va.	Martin's Animal Bone Potato Guano.	Elizabeth City	R	4.40	2.20	6.60	3.14	1.08	4.22	5.12	7.47	30.61
6451	Miller Fertilizer Co., Baltimore, Md.	High Grade Potato	Elizabeth City	R	5.13	1.11	6.24	1.92	1.93	3.85	4.68	7.13	28.47
6629	Pataspco Guano Co., Baltimore, Md.	Pataspco Potato Guano.	Mount Olive	R	4.67	2.28	6.95	2.38	1.20	3.58	4.35	5.91	26.72
6353	Piedmont-Mt. Airy Guano Co., Baltimore, Md.	Piedmont Early Vegetable Manure.	Elizabeth City	R	4.15	3.88	8.03	2.74	1.58	4.32	5.24	7.68	32.52
6433	Va.-Car. Chemical Co., Richmond, Va.	V.-C. Co.'s Invincible High Grade Fertilizer for Truck.	Elizabeth City	S	4.28	1.94	6.22	3.05	1.33	4.38	5.32	6.63	27.97
6552	Mapes Formula and Peruvian Guano Co., New York, N. Y.	Mapes' Vegetable Manure	Washington	D	4.42	1.85	6.27	3.76	1.42	4.94	6.00	6.00	31.26
6481	Bragaw Fertilizer Co., Washington, N. C.	Riverview Trucker	Washington	S	5.28	1.82	6.80	3.22	2.12	5.77	7.00	5.00	33.40
6385	Baugh & Sons Co., Norfolk, Va.	Baugh's 7 Per Cent Potato Guano	Elizabeth City	R	4.73	1.99	6.72	3.11	2.47	5.58	6.78	5.25	33.58
6561	Piedmont-Mt. Airy Guano Co., Baltimore, Md.	Special Truck Fertilizer	Robersonville	S	4.53	1.06	5.59	3.32	1.92	5.24	6.36	4.82	30.77
6356	Pocomoke Guano Co., Norfolk, Va.	Seaboard Popular Trucker	Elizabeth City	R	4.30	2.13	6.43	4.20	1.65	5.85	7.10	5.20	34.32
6485	Roberson, J. H., & Co., Robersonville, N. C.	Roberson's Potato Grower	Robersonville	S	4.30	1.49	5.99	3.50	2.03	5.53	6.71	6.26	33.84
6483	Richmond Guano Co., Richmond, Va.	High Grade 10 Per Cent Cabbage Guano.	Washington	R	4.75	1.61	6.36	4.12	3.90	8.02	9.74	2.34	39.69
6581	Brand claiming Laurinburg Oil Co., Laurinburg, N. C.	Floradora Complete Guano	Laurinburg	R	5.28	1.27	6.55	.16	1.92	2.08	2.53	3.97	39.58
6468	Brand claiming Imperial Co., Norfolk, Va.	Imperial Guano	Washington	R	4.70	.60	5.30	5.52	1.68	8.25	10.00	2.50	17.07
6460	Pamlico Chemical Co., Washington, N. C.	Cowell's Great Cabbage Grower.	Washington	S	3.10	1.65	4.75	4.43	2.91	7.84	9.52	3.07	18.37
6536	Brand claiming Imperial Co., Norfolk, Va.	Cubanola Tobacco Guano	Edenton	R	3.00	1.14	4.14	1.20	2.06	3.00	5.00	5.90	39.43
6721	Brand claiming Va.-Car. Chemical Co., Richmond, Va.	Va. State Fertilizer Co.'s Gilt Edece Dissolved Bone and Potash.	Burlington	R	4.95	4.98	9.93			3.96	5.90	4.00	36.11
													38.23
													18.73
													22.93
													11.60
													13.57

N—D, E, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—damp; Y—lumpy; W—wet.

## ANALYSES OF COMMERCIAL FERTILIZERS, SPRING SEASON, 1905.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Mechanical Condition.	Percentage Composition or Parts per 100.										Relative Value per Ton at Factory.				
					Water-soluble Phosphate Acid.	Reversed Phosphate Acid.	Phosphoric Acid.	Available Phosphate Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Muriate.		Potash from Sulphate.	Chlorine.		
6758	Brand claiming Piedmont-Mt. Airy Guano Co., Baltimore, Md.	Piedmont Star Bone and Potash.	Burlington	R	6.30	1.20	7.50	8.00										5.00	12.70
6488	Brands claiming American Fertilizing Co., Nor- folk, Va.	Dissolved Bone and Potash for Corn and Wheat.	Elizabeth City	R	5.13	5.06	10.19	10.00										2.00	11.20
6695	Armour Fertilizer Works, Balti- more, Md.	M. H. White & Co.'s Special Corn Mixture.	Hertford	D	7.50	2.14	9.64											2.20	11.59
6626	Columbia Guano Co., Norfolk, Va.	Columbia Bone and Potash Mixture.	Clinton	R	6.90	2.45	9.35											1.90	10.76
6726	Imperial Co., Norfolk, Va.	Bone and Potash	Edenton	R	7.93	2.18	10.11											1.95	11.24
6761	Navassa Guano Co., Wilmington, N. C.	Navassa Dissolved Bone and Potash.	Burlington	R	6.83	3.27	10.10											1.70	10.96
6719	Piedmont-Mt. Airy Guano Co., Baltimore, Md.	Piedmont Farmer's High Grade Bone and Potash.	Burlington	R	8.18	1.42	9.60											2.04	10.38
6753	Powhatan Chemical Co., Rich- mond, Va.	Bone and Potash Mixture	Greensboro	R	8.18	3.12	11.30											1.86	12.21
6775	Royster, F. S., Guano Co., Rich- mond, Va.	Royster's Bone and Potash	Mount Olive	S	7.03	2.62	9.65											1.91	10.78
6642	Union Guano Co., Winston, N. C.	Union Bone and Potash	Mebane	R	6.35	3.87	9.72											1.71	10.63
6759	Va.-Car. Chemical Co., Richmond, Va.	A. & A.'s McGavock's Special Potash Mixture.	Burlington	R	5.48	4.40	9.88											1.80	10.87
6627	do	Durham Fertilizer Co.'s Bone and Potash Mixture.	Clinton	R	7.65	2.10	9.75											2.04	11.01
6746	do	Old Dominion Guano Co.'s High Grade Alkaline Bone and Potash.	Burlington	R	5.13	4.51	9.64											2.42	11.83
6810	do	Powers, Gibbs & Co.'s Dis- solved Bone and Potash.	Princeton	R	9.55	1.63	11.28											2.77	13.19
6802	do	Va.-Car. Chemical Co.'s Dis- solved Bone and Potash.	Tunis	R	4.30	5.22	9.52											1.96	10.72

## MIXED FERTILIZERS.

6749	<b>Brand claiming</b> Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s Great Wheat and Corn Grower.	Burlington	R	7.45	2.69	10.50 10.14	1.50 1.46	11.10 10.73
6762	<b>Brands claiming</b> Navassa Guano Co., Wilmington, N. C.	Navassa Wheat and Grass Grower.	Burlington	R	7.43	2.77	10.00 10.20	4.00 3.56	13.40 12.10
6701	Pocomoke Guano Co., Norfolk, Va.	Pocomoke Bone and Potash Mixture.	Edenton	R	5.90	3.92	9.82	3.80	13.02
6782	Powhatan Chemical Co., Rich- mond, Va.	Magic Bone and Potash Mix- ture.	Greensboro	R	8.73	2.33	11.06	3.59	13.90
6820	Royster, F. S., Guano Co., Nor- folk, Va.	Royster's Bone and Potash	Hertford	S	9.24	.74	9.98	3.01	12.21
6643	Union Guano Co., Winston, N. C.	Quaker Grain Mixture	Mebane	R	7.55	2.54	10.09	4.02	13.50
6811	Va.-Car. Chemical Co., Richmond, Va.	Va.-Car. Chemical Co.'s Special Bone Mixture.	Pine Level	R	7.40	2.65	10.05	3.60	13.00
6727	<b>Brands claiming</b> Armour Fertilizer Works, Balti- more, Md.	Armour Phosphoric Acid and Potash.	Elizabeth City	R	7.83	1.94	9.77	5.00	14.50
6747	Va.-Car. Chemical Co., Richmond, Va.	Lynchburg Guano Co. Alpine Mixture.	Burlington	R	7.60	2.42	10.02	4.42	13.88
6730	-----do-----	Va. State Fertilizer Co.'s Mountain Top Bone and Potash Mixture.	Burlington	R	5.63	4.44	10.07	5.91	15.56
6406	<b>Brand claiming</b> Pocomoke Guano Co., Norfolk, Va.	Alkali Bone	Elizabeth City	R	8.43	2.43	11.00 10.06	2.00 1.90	12.10 11.86
6730	<b>Brand claiming</b> Pataasco Guano Co., Baltimore, Md.	Pataasco High Grade Bone and Potash.	Neals	S	8.48	2.40	10.88	5.00 4.70	15.40 14.96
6647	<b>Brand claiming</b> Navassa Guano Co., Wilmington, N. C.	Navassa Gray Land Mix- ture.	Mebane	D	9.38	3.12	12.50	4.00 2.47	15.20 13.96

RAW OR UNMIXED FERTILIZER MATERIALS.

6646	<b>Brands claiming</b> Navassa Guano Co., Wilmington, N. C.	Navassa Acid Phosphate	Mebane	R	9.45	3.20	12.65	9.60 10.12
6812	Richmond Guano Co., Richmond, Va.	Old Homestead Dissolved Bone.	Princeton	R	6.73	5.21	11.94	9.55
6751	Union Guano Co., Winston, N. C.	Union 12 Per Cent Acid Phosphate.	Burlington	R	6.40	5.25	11.65	9.32
6756	Va.-Car. Chemical Co., Richmond, Va.	Charlotte Oil and Fertilizer Co.'s Charlotte Dissolved Bone.	Burlington	R	5.65	5.85	11.50	9.20

N, D, K, S, E, P, Y and W refer to the mechanical condition of fertilizers as follows: N—fine; D—good; R—fair; S—course; B—very coarse; P—damp; Y—lumpy; W—wet.



6517	Hubbard Fertilizer Co., Baltimore, Md.	Hubbard's H. G. Acid Phosphate.	Edenton	R	11-95	2.55	14.50	11-60
6582	Hubbard's Soluble Bone Phosphate.	Scotland Neck		R	12-48	3.06	15.54	12-43
6585	Imperial Co., Norfolk, Va.	Imperial High Grade Acid Phosphate.	Edenton	R	11-33	2.51	13.84	11-07
6792	Martin, D. B., Co., Richmond, Va.	Martin's Acid Phosphate.	Edenton	R	11-78	2.39	14.17	11-33
6559	Navassa Guano Co., Wilmington, N. C.	Navassa 14 Per Cent Acid Phosphate.	Warsaw	R	10-53	2.86	13.49	10-79
6510	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	Acid Phosphate.	Ayden	R	10-18	3.54	13.72	10-97
6586	Patapsco Guano Co., Baltimore, Md.	Patapsco Pure Dissolved S. C. Phosphate.	Sanford	R	9-83	4.36	14.19	11-35
6784	Powhatan Chemical Co., Richmond, Va.	High Grade Acid Phosphate.	Greensboro	R	11-05	3.17	14.22	11-37
6679	Rasin-Monumental Co., Baltimore, Md.	Rasin Acid Phosphate.	Scotland Neck	R	9-95	3.20	13.15	10-52
6487	Royster, F. S., Guano Co., Norfolk, Va.	Royster's 14 Per Cent Acid Phosphate.	Roper	R	10-70	2.85	13.55	10-84
6603	Southern Exchange Co., Maxton, N. C.	S. E. C. Acid Phosphate.	Parkton	R	12-02	2.68	14.50	11-60
6650	Swift's Fertilizer Works, Atlanta, Ga.	High Grade Swift's Cultivator.	Washington	R	10-18	4.44	14.62	11-68
6757	Union Guano Co., Winston, N. C.	Union High Grade Acid Phosphate.	Burlington	R	9-15	5.07	14.22	11-37
6639	Upshur, R. L., Norfolk, Va.	Upshur's High Grade Acid Phosphate.	Hertford	D	11-58	2.44	14.02	11-21
6796	Va.-Car. Chemical Co., Richmond, Va.	Southern Chemical Co.'s Red Cross Acid Phosphate.	Graham	R	10-68	2.86	13.54	10-83
6492	Winborne Guano Co., Tyner, N. C.	High Grade Acid Phosphate.	Tyner	R	9-90	3.79	14.80	11-81
6621	Brands claiming Acne Manufacturing Co., Wilmington, N. C.	Acid Phosphate.	Rockingham	R	16-21	1.17	17.38	12-80
6402	American Fertilizer Co., Norfolk, Va.	American High Grade Acid Phosphate.	Greenville	D	11-65	2.64	14.29	13-90
6617	Columbia Guano Co., Norfolk, Va.	Columbia Acid Phosphate, 16 Per Cent.	Edenton	R	13-65	3.19	16.84	11-43
6640	Hampton Guano Co., Norfolk, Va.	Supreme Acid Phosphate.	Edenton	R	11-83	3.56	15.69	13-47
6654	Imperial Co., Norfolk, Va.	Imperial High Grade Tennessee Acid Phosphate.	Greenville	R	13-95	2.25	16.20	12-55
6760	Navassa Guano Co., Wilmington, N. C.	Navassa Acid Phosphate.	Burlington	R	12-10	3.59	15.69	12-80
6587	Patapsco Guano Co., Baltimore, Md.	Florida Soluble Phosphate.	Sanford	R	12-05	15.96	16.01	11-74
6767	Richmond Guano Co., Richmond, Va.	R. E. X. Dissolved Bone Phosphate.	Monroe	D	10-63	4.05	14.68	11-96
6664	Southern Exchange Co., Maxton, N. C.	S. E. C. Acid Phosphate.	Maxton	R	10-57	4.38	14.95	

N—D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—damp; Y—lumpy; W—wet.

## ANALYSES OF COMMERCIAL FERTILIZERS, SPRING SEASON, 1908.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Mechanical Condition.	Percentage Composition or Parts per 100.										Relative Value per Ton at Factory.			
					Water-soluble Phosphate Acid.	Reverted Phosphate Acid.	Phosphoric Acid.	Available Phosphate Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Muriate.		Potash from Sulphate.	Chlorine.	
6663	Swift Fertilizer Works, Atlanta, Ga.	High Grade Swift's Special H. G. Acid Phosphate.	Maxton	D	13.12	2.33	16.05											12.84
6600	Va.-Car. Chemical Co., Richmond, Va.	Click's 16 Per Cent Acid Phosphate.	Pittsboro	R	12.32	3.40	15.72											12.57
6765	do	Durham Fertilizer Co.'s Best Acid Phosphate.	Monroe	R	12.63	3.25	15.89											12.71
6605	Brand claiming Lee, A. S., & Sons Co., Richmond, Va.	Lee's Prepared Agricultural Lime.	Red Springs	R											2.00	2.68		2.00
6573	Brand claiming Acme Manufacturing Co., Wilmington, N. C.	Genuine German Kaimit	Warsaw	S											12.00	12.06		12.00
6401	American Agricultural Chemical Co., N. Y.	do	Edenton	S											12.46			12.46
6728	American Fertilizing Works, Baltimore, Md.	do	Hertford	R											11.78			11.78
6613	Arps, Geo. L., & Co., Norfolk, Va.	do	Edenton	S											12.06			12.06
6344	Bangh & Sons Co., Norfolk, Va.	do	Edenton	S											11.92			11.92
6525	Berkley Chemical Co., Norfolk, Va.	do	Edenton	S											13.08			13.08
6717	Best & Thompson, Goldsboro, N. C.	do	Goldsboro	S											11.78			11.78
6341	Columbia Guano Co., Norfolk, Va.	do	Edenton	R											12.22			12.22
6685	Farmers Cotton Oil Co., Wilson, N. C.	do	Aulander	S											12.93			12.93
6571	Hall & Pearsall, Wilmington, N. C.	do	Magnolia	S											11.56			11.56
6704	Hampton Guano Co., Norfolk, Va.	do	Edenton	S											11.68			11.68
6683	Hubbard Fertilizer Co., Baltimore, Md.	do	Scotland Neck	B											12.92			12.92
6534	Imperial Co., Norfolk, Va.	do	Edenton	R											12.72			12.72
6409	Martin, D. B., Co., Richmond, Va.	do	New Bern	S											12.78			12.78
6408	Meadows, E. H. & J. A., New Bern, N. C.	do	Kinston	B											12.72			12.72

6585	McNair, John F., Laurinburg, N. C.	do	Laurinburg	S	12.34	12.34
6591	Navassa Guano Co., Wilmington, N. C.	do	Warsaw	S	12.50	12.50
6596	Ober, G., & Sons, Baltimore, Md.	do	Tunis	S	13.24	13.24
6552	Pearsall & Co., Wilmington, N. C.	do	Wilmington	S	13.04	13.04
6724	Piedmont-Mount Airy Guano Co., Baltimore, Md.	do	Edenton	S	11.04	11.04
6337	Pocomoke Guano Co., Norfolk, Va.	do	Hertford	S	11.82	11.82
6680	Powhatan Chemical Co., Richmond, Va.	do	Scotland Neck	S	12.00	12.00
6736	Rasin-Monumental Co., Baltimore, Md.	do	Waxhaw	S	11.84	11.84
6334	Richmond Guano Co., Richmond, Va.	do	Edenton	R	13.36	13.36
6319	Royster, F. S., Guano Co., Norfolk, Va.	do	Edenton	S	12.10	12.10
6604	Southern Exchange Co., Maxton, N. C.	do	Parkton	S	12.68	12.68
6625	Stackhouse, Wade, Dillon, S. C.	do	Rockingham	S	12.40	12.40
6651	Swift Fertilizer Works, Atlanta, Ga.	do	Washington	S	12.00	12.00
6658	Union Guano Co., Winston, N. C.	do	Clinton	S	12.56	12.56
6721	Unshar, R. L., Norfolk, Va.	do	Hancock	S	12.92	12.92
6333	Va-Cat. Chemical Co., Richmond, Va.	do	Edenton	R	11.90	11.90
6493	Winborne Guano Co., Tyner, N. C.	do	Tyner	S	12.00	12.00
6616	Brands claiming	do	Edenton	R	48.00	48.00
6521	Baugh & Sons Co., Norfolk, Va.	Muriate of Potash	Edenton	B	50.64	50.64
6781	Columbia Guano Co., Norfolk, Va.	do	Edenton	B	50.12	50.12
	Va-Car. Chemical Co., Richmond, Va.	do	Greensboro	S	47.12	47.12
6710	do	Sulphate of Potash	Lumberton	N	46.80	46.80
	do	do	Maxton	B	50.00	50.00
6670	Brands claiming	do	Wilmington	R	50.80	50.80
6553	Calder Bros., Wilmington, N. C.	Muriate of Potash	Wilmington	B	46.96	46.96
6691	Pearsall & Co., Wilmington, N. C.	do	Norfolk	B	48.84	48.84
6343	Pocomoke Guano Co., Norfolk, Va.	do	Washington	R	49.32	49.32
	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	do	do	do	14.83	18.00
6779	Brands claiming	do	Smithfield	B	15.64	18.99
	Armour Fertilizer Works, Wilmington, N. C.	Nitrate of Soda	Wadesboro	B	15.24	18.50
6769	MacMurphy Co., Charleston, S. C.	do	Wadesboro	B	15.56	18.89
6768	Parsons & Hardison, Wadesboro, N. C.	do	Edenton	B	15.23	18.50
6615	Brands claiming	do	do	do	15.88	19.28
	Baugh & Sons Co., Norfolk, Va.	do	do	do	54.86	54.86

N—fine; D—good; R—fair; S—coarse; B—very coarse; P—damp; Y—lumpy; W—wet.

## ANALYSES OF COMMERCIAL FERTILIZERS, SPRING SEASON, 1908.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Mechanical Condition.	Percentage Composition or Parts per 100.										Relative Value per Ton at Factory.						
					Water-soluble Phosphate Acid.	Reported Phosphate Acid.	Available Phosphate Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.		Chlorine.					
<b>RAW OR UNMIXED FERTILIZER MATERIALS.</b>																					
<b>Brands claiming</b>																					
6342	Caraleich Phosphate and Fertilizer Works, Raleigh, N. C.	Nitrate of Soda	Washington	B											15.65	19.00					56.34
6520	Columbia Guano Co., Norfolk, Va.	do	Edenton	B P											15.65	19.00					56.34
6620	Imperial Co., Norfolk, Va.	do	Edenton	B											15.52	18.84					55.87
6336	Richmond Guano Co., Richmond, Va.	do	Edenton	B											15.14	18.38					54.50
6655	Southern Exchange Co., Maxton, N. C.	do	Maxton	B											15.89	19.28					57.20
6494	Va.-Car. Chemical Co., Richmond, Va.	do	Edenton	B											15.64	18.99					56.30
6801	Baugh & Sons Co., Norfolk, Va.	Baugh's Raw Bone	Greensboro												3.71	4.50					29.21
6799	Over, G. & Sons Co., Baltimore, Md.	Pure Raw Bone Meal	Burlington												3.80	4.61					29.45
6886	Coe-Mortimer Co., Charleston, S. C.	Genuine Peruvian Guano	Maxton	B											4.04	4.90					30.05
6346	Coe-Mortimer Co., Charleston, S. C.	do	Bethel	B											5.56	6.75	2.25				30.45
6884	Coe-Mortimer Co., Charleston, S. C.	do	Lumberton	B											5.09	6.18	1.75				28.39
															3.54	4.30	2.80				27.41
															3.38	4.10	2.78				27.20
															2.80	3.40	2.80				25.90
															2.88	3.50	2.51				24.97

<sup>1</sup>Total Phosphoric Acid found, 20.90, valued at 3½ cents per pound.  
<sup>2</sup>Total Phosphoric Acid found, 20.43, valued at 3½ cents per pound.  
<sup>3</sup>Total Phosphoric Acid found, 9.00, valued at 3½ cents per pound.  
<sup>4</sup>Total Phosphoric Acid found, 15.66, valued at 3½ cents per pound.  
<sup>5</sup>Total Phosphoric Acid found, 15.68, valued at 3½ cents per pound.

N—D, R, S, B, P, Y and W refer to the mechanical condition of fertilizers, as follows: N—fine; D—good; R—fair; S—coarse; B—very coarse; P—lumpy; W—wet.

## II. ANALYSES OF COTTON-SEED MEAL.

Laboratory Number.	Name and Address of Manufacturer.	Where Sampled.	Per Cent Nitrogen Guaranteed.	Equivalent to Ammonia.	Per Cent Nitrogen Found.	Equivalent to Ammonia.
2309	Battleboro Oil Co., Battleboro, N. C.	Battleboro			6.69	8.12
2314	do	do			6.59	8.00
2321	do	do			6.57	7.98
2312	do	do			6.51	7.90
2326	do	do			6.43	7.80
2313	do	do			6.39	7.76
2380	do	do			6.29	7.64
2315	do	do			<b>5.77</b>	<b>7.00</b>
2338	Bragaw, Wm., & Co., Washington, N. C.	Washington	6.18	7.50	6.92	8.40
2362	Chatham Cotton Oil Co., Pittsboro, N. C.	Pittsboro	6.18	7.50	6.32	7.67
2363	do	Sanford	6.18	7.50	6.74	8.18
2366	Consumers Cotton Oil Co., Tarboro, N. C.	Windsor	6.18	7.50	6.64	8.06
2367	Cotton Oil Ginning Co., Scotland Neck, N. C.	Palmyra	6.18	7.50	7.14	8.67
2343	Eastern Cotton Oil Co., Hertford, N. C.	Edenton	6.18	7.50	<b>6.11</b>	<b>7.42</b>
2340	do	do	6.18	7.50	6.34	7.70
2364	Elba Manufacturing Co., Charlotte, N. C.	Laurinburg	6.18	7.50	6.36	7.72
2358	do	Charlotte	6.18	7.50	6.90	8.38
2303	Fremont Oil Mill Co., Fremont, N. C.	Edenton			6.59	8.00
2372	Georgia Cotton Oil Co., Atlanta, Ga.	Wadesboro	6.18	7.50	6.44	7.82
2366	Haven's Oil Mill, Washington, N. C.	Edenton	6.18	7.50	6.62	8.04
2297	Kings Mountain Cotton Oil Co., Kings Mt., N. C.	Kings Mountain			7.31	8.88
2368	Laurinburg Oil Co., Laurinburg, N. C.	Rockingham	6.18	7.50	6.76	8.21
2365	do	Hamlet	6.18	7.50	6.56	7.96
2386	do	Laurinburg			6.26	7.60
2289	do	do			<b>6.14</b>	<b>7.46</b>
2302	do	do			6.59	8.00
2290	Lenoir Oil and Ice Co., Kinston, N. C.	Kinston			6.74	8.18
2317	do	do			6.62	8.04
2304	do	do			6.56	7.96
2324	do	do			6.42	7.80
2323	do	do			6.39	7.76
2291	Morgan Oil and Fertilizer Co., Red Springs, N. C.	Red Springs			6.03	<b>7.32</b>
2337	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	Edenton	6.18	7.50	6.65	8.03
2320	North Carolina Cotton Oil Co., Henderson, N. C.	Durham	6.18	7.50	<b>5.62</b>	<b>6.82</b>
2335	North Carolina Cotton Oil Co., Wilmington, N. C.	Chadbourn	6.18	7.50	<b>6.00</b>	<b>7.23</b>
2288	Pine Level Oil Mills Co., Pine Level, N. C.	Pine Level			6.23	7.56
2319	do	do			6.90	8.38
2341	Pitt County Oil Co., Winterville, N. C.	Greenville	6.18	7.50	6.29	7.64
2311	Rowland Oil and Fertilizer Co., Rowland, N. C.	Rowland			6.15	7.50
2357	Southern Cotton Oil Co., Charlotte, N. C.	Charlotte	6.18	7.50	6.46	7.84
2356	do	Red Springs	6.18	7.50	6.04	<b>7.33</b>
2295	Southern Cotton Oil Co., Concord, N. C.	Greensboro	6.18	7.50	6.74	8.18
2369	Southern Cotton Oil Co., Goldsboro, N. C.	Lewiston	6.18	7.50	6.82	8.28
2339	Southern Cotton Oil Co., Rocky Mount, N. C.	Williamston	6.18	7.50	<b>6.01</b>	<b>7.30</b>
2344	Southern Cotton Oil Co., Tarboro, N. C.	Tarboro	6.18	7.50	<b>5.77</b>	<b>7.00</b>
2359	Southern Cotton Oil Co., Wilson, N. C.	Aulander	6.18	7.50	6.69	8.12
2361	Southern Cotton Oil Co., Wilmington, N. C.	Ahoskie	6.18	7.50	<b>6.14</b>	<b>7.45</b>
2331	Speed Milling Co., Speed, N. C.	Speed			6.62	8.04
2294	Statesville Oil and Fertilizer Co., Statesville, N. C.	Greensboro	6.18	7.50	6.84	8.30
2342	Tar River Oil Co., Tarboro, N. C.	Washington	6.18	7.50	6.90	8.35
2371	Virginia-Carolina Chemical Co., Richmond, Va.	Burlington	6.18	7.50	6.60	8.01
2325	Verner Oil Co., Lattimore, N. C.	Lattimore			6.98	8.38
2292	do	do			6.57	7.98
2318	Wells, J. Lindsay, & Co., Memphis, Tenn.	Hendersonville			7.08	8.60

### III. FERTILIZER BRANDS REGISTERED FOR 1908.

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>The Atlantic Chemical Corporation, Norfolk, Va.—</i>			
Nitrate of Soda.....	..	15.66	..
Sulphate of Potash.....	..	..	50.00
Muriate of Potash.....	..	..	48.00
Genuine German Kainit.....	..	..	12.00
Atlantic High Grade 16 Per Cent Acid Phosphate .....	16.00	..	..
Atlantic 14 Per Cent Acid Phosphate.....	14.00	..	..
Atlantic Dissolved Bone.....	13.00	..	..
Atlantic Acid Phosphate.....	12.00	..	..
Atlantic 10 and 4 Bone and Potash Mixture....	10.00	..	4.00
Atlantic Bone and Potash for Grain.....	10.00	..	3.00
Atlantic Bone and Potash Mixture.....	10.00	..	2.00
Atlantic 8 and 4 Bone and Potash Mixture.....	8.00	..	4.00
Atlantic 7 Per Cent Truck Guano.....	7.00	5.77	7.00
Atlantic Potato Guano.....	7.00	4.12	5.00
Atlantic Special Truck Guano.....	8.00	3.30	4.00
Atlantic High Grade Tobacco Guano.....	8.00	2.47	3.00
Atlantic Tobacco Grower.....	8.00	2.06	3.00
Atlantic Tobacco Compound.....	8.00	2.06	2.00
Atlantic Special Guano.....	9.00	1.65	1.00
Atlantic Cotton Grower.....	9.00	2.06	1.00
Atlantic Special Wheat Fertilizer.....	8.00	1.65	2.00
Atlantic Meal Compound.....	9.00	2.26	2.00
Atlantic High Grade Cotton Guano.....	8.00	2.47	3.00
Atlantic Soluble Guano.....	8.00	1.65	2.00
Apex Peanut Grower.....	8.00	.82	4.00
Perfection Peanut Grower.....	7.00	..	5.00
Oriental High Grade Guano.....	8.00	3.30	4.00
Paloma Tobacco Guano.....	8.00	3.30	4.00
<i>Geo. L. Arps &amp; Co., Norfolk, Va.—</i>			
Arps' Potato Guano.....	6.00	5.76	5.00
Arps' Standard Truck Guano.....	7.00	4.12	5.00
Arps' Scuppernong Guano for Trucks.....	6.00	4.12	7.00
Geo. L. Arps & Co.'s Big Yield Guano.....	8.00	1.65	2.00
14 Per Cent Acid Phosphate.....	14.00	..	..
Kainit .....	..	..	12.00
Arps' Premium Guano for Cotton, Tobacco and All Spring Crops.....	8.00	1.65	2.00
<i>Acme Manufacturing Co., Wilmington, N. C.—</i>			
Acme Acid Phosphate.....	12.00	..	..
Acme Bone and Potash.....	10.00	..	2.00
Acme Bone and Potash.....	10.00	..	3.00
Acme Bone and Potash.....	10.00	..	4.00
Acme Bone and Potash.....	8.00	..	4.00
Acme Bone and Potash.....	11.00	..	2.00
Acme High Grade Acid Phosphate.....	14.00	..	..
Acme Acid Phosphate.....	16.00	..	..
Acme Standard Guano.....	8.00	2.06	2.00
Acme High Grade.....	6.00	4.95	8.00
Acme Strawberry Top Dresser.....	8.00	1.65	4.00
Acme Truck Grower.....	6.00	3.30	8.00
Acme Cotton Grower.....	9.00	2.27	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Acme Special Grain.....	8.00	1.65	2.00
Acme Fertilizer for Tobacco.....	8.00	2.47	2.50
Acme Fertilizer .....	8.00	2.47	2.50
Acme Acid Phosphate.....	13.00	..	..
Gibson's Melon Grower.....	10.00	3.30	5.00
Corn Guano .....	6.00	2.47	3.00
Clark's Corn Guano.....	1.00	6.60	10.00
P. D. Special.....	8.00	2.47	3.00
Quickstep .....	8.00	3.30	4.00
Gem Fertilizer .....	8.00	1.65	2.00
Cotton Seed Meal Guano.....	8.00	1.65	2.00
Lattimer's Complete Fertilizer.....	8.00	2.06	2.00
Tiptop Crop Grower.....	8.00	2.06	3.00
Tiptop Tobacco Grower.....	8.00	2.06	3.00
Sulphate of Ammonia.....	..	20.62	..
Pure German Kainit.....	..	..	12.00
Nitrate of Soda.....	..	15.00	..
Sulphate of Potash.....	..	..	48.00
Muriate of Potash.....	..	..	48.00
Acme Bone and Potash.....	10.00	..	5.00
Muriate of Potash.....	..	..	55.00

*Ashepoo Fertilizer Co., Charleston, S. C.—*

High Grade Eutaw Acid Phosphate.....	14.00	..	..
High Grade Ashepoo Acid Phosphate.....	14.00	..	..
High Grade Dissolved Phosphate.....	16.00	..	..
High Grade Superpotash Acid Phosphate.....	10.00	..	4.00
High Grade Ashepoo Superpotash Acid Phosphate .....	10.00	..	4.00
High Grade Ashepoo Vegetable Guano.....	5.00	4.12	5.00
High Grade Ashepoo Truck Guano.....	7.00	4.12	5.00
High Grade Ashepoo Farmers' Special.....	8.00	2.06	3.00
High Grade Ashepoo Special Cotton Seed Meal Guano .....	8.00	2.46	2.00
High Grade Ashepoo Ammoniated Superphosphate .....	8.00	2.46	2.00
High Grade Ashepoo Bird and Fish Guano....	8.00	2.46	3.00
High Grade Ashepoo Meal Mixture.....	8.00	2.46	3.00
High Grade Ashepoo X Tobacco Fertilizer....	8.00	2.46	3.00
High Grade Ashepoo Golden Tobacco Producer.	8.00	2.46	3.00
High Grade Ashepoo Guano.....	8.00	3.29	4.00
High Grade Ashepoo Perfection Guano.....	8.00	3.29	6.00
High Grade Ashepoo Fruit Grower.....	8.00	3.91	2.75
High Grade Ashepoo Watermelon Guano.....	10.00	3.29	5.00
High Grade Eutaw X Golden Fertilizer.....	8.00	2.46	4.00
High Grade Eutaw Special Cotton Seed Meal Guano .....	8.00	2.46	4.00
High Grade Carolina XXX Guano.....	8.00	2.46	3.00
High Grade Taylor's Circle Guano.....	9.00	1.65	4.00
Standard Eutaw XX Acid Phosphate.....	12.00	..	..
Standard Eutaw XXX Acid Phosphate.....	13.00	..	..
Standard Eutaw Potash Acid Phosphate.....	11.00	..	1.00
Standard Eutaw Acid Phosphate and Potash...	12.00	..	1.00
Standard Eutaw Circle Guano.....	8.00	2.06	2.00
Standard Eutaw XX Guano.....	8.50	1.65	2.00
Standard Eutaw XXX Guano.....	9.00	1.65	2.00
Standard Eutaw Fertilizer.....	9.00	1.85	1.00
Standard Ashepoo Fertilizer.....	9.00	1.85	1.00
Standard Ashepoo Harrow Brand Raw Bone Superphosphate .....	9.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avall. Phos. Acid.	Nitrogen.	Potash.
Standard Ashepoo Wheat and Oats Special.....	9.50	1.65	1.00
Standard Ashepoo XXX Guano.....	8.65	1.65	2.00
Standard Ashepoo XX Guano.....	8.50	1.65	2.00
Standard Ashepoo Circle Guano.....	8.00	2.06	2.00
Standard Ashepoo Guano.....	8.50	2.06	1.00
Standard Ashepoo Special Fertilizer.....	8.00	1.65	2.00
Standard Ashepoo Acid Phosphate and Potash..	12.00	..	1.00
Standard Ashepoo Potash and Acid Phosphate..	11.00	..	1.00
Standard Ashepoo Potash Compound.....	10.00	..	3.00
Standard Ashepoo XXX Acid Phosphate.....	13.00	..	..
Standard Ashepoo Dissolved Bone.....	12.00	..	..
Standard Ashepoo XX Acid Phosphate.....	12.00	..	..
Standard Coomassie Acid Phosphate.....	12.00	..	..
Standard Coomassie Circle Fertilizer.....	8.00	1.65	2.00
Standard Carolina Guano.....	8.00	1.65	2.00
Standard Carolina Acid Phosphate.....	13.00	..	..
Standard Circle Bone.....	13.00	..	..
Standard Palmetto Potash Acid Phosphate....	11.00	..	1.00
Standard Brownwood Acid Phosphate.....	8.00	..	4.00
Standard P. D. Fertilizer.....	8.00	1.65	2.00
German Kainit .....	..	..	12.00
Standard Enoree Acid Phosphate and Potash...	10.00	..	2.00
High Grade Ashepoo XXXX Acid Phosphate...	14.00	..	..
Taylor's XX Ammoniated Dissolved Fertilizer..	10.00	.82	1.00
High Grade Ashepoo Nitrogenous Top Dressing.	3.00	7.00	2.00

*The Armour Fertilizer Works, Atlanta, Chicago and  
Wilmington—*

Top Dresser .....	5.00	8.25	2.00
10 Per Cent Trucker.....	5.00	8.25	3.00
Manure Substitute .....	6.00	3.30	4.00
7 Per Cent Trucker.....	6.00	5.78	5.00
General .....	8.00	1.65	2.00
Fruit and Root Crop Special.....	8.00	1.65	5.00
High Grade Potato.....	8.00	1.65	10.00
King Cotton No. 2.....	8.00	2.06	2.00
Champion .....	8.00	2.06	2.50
Gold Medal for Tobacco.....	8.00	2.06	3.00
Berry King .....	8.00	2.06	4.00
Cotton Special .....	8.00	2.47	3.00
Tobacco Special .....	8.00	2.47	3.00
Truck and Berry Special.....	8.00	2.47	10.00
All Soluble .....	8.00	2.88	4.00
Special Trucker .....	8.00	3.30	4.00
Bone, Blood and Potash.....	8.00	4.12	7.00
Bone and Dissolved Bone with Potash.....	9.00	1.65	3.00
African Cotton Grower.....	9.00	2.47	3.00
10 Per Cent Trucker.....	2.00	8.25	..
Dried Blood .....	..	13.20	..
Phosphoric Acid with Potash.....	10.00	..	5.00
Superphosphate and Potash.....	10.00	..	4.00
W. H. White & Co.'s Special Corn Mixture....	10.00	..	2.00
Phosphate and Potash No. 2.....	8.00	..	5.00
Phosphate and Potash No. 1.....	10.00	..	2.00
17 Per Cent Acid Phosphate.....	17.00	..	..
16 Per Cent Acid Phosphate.....	16.00	..	..
13 Per Cent Acid Phosphate.....	13.00	..	..
12 Per Cent Acid Phosphate.....	12.00	..	..
Star Phosphate .....	14.00	..	..
Nitrate of Soda.....	..	14.85	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Kainit .....	..	..	12.00
King Cotton .....	8.00	2.06	2.00
Ammoniated Dissolved Bone with Potash.....	10.00	1.65	2.00
Muriate of Potash.....	..	..	48.00
Sulphate of Potash.....	..	..	50.00
Van Lindley's Special.....	8.00	4.12	2.00
Standard Cotton Grower.....	8.50	1.65	2.00
Armour's Slaughter House Fertilizer.....	8.00	1.65	2.00

*Anderson Phosphate and Oil Co., Anderson, S. C.—*

Anderson's Special Formula.....	10.00	2.47	3.00
Anderson's Blood Guano.....	8.00	1.65	2.00
Anderson's Special Fertilizer.....	8.00	2.47	3.00
Anderson's Blood and Bone Guano.....	10.00	1.65	2.00

*American Fertilizer Co., Norfolk, Va.—*

10 Per Cent Ammoniated Guano.....	7.00	8.24	2.50
Standard 7 Per Cent Ammonia Guano.....	7.00	5.76	5.00
American Irish Potato Grower.....	7.00	4.12	5.00
American 7-7-7 for Irish Potatoes.....	7.00	5.76	7.00
American Fish Scrap Guano.....	7.00	3.29	4.00
American Eagle Guano.....	8.00	2.47	3.00
American No. 1 Fertilizer.....	8.00	2.06	3.00
American No. 2 Fertilizer.....	8.00	1.65	2.00
American Cotton Compound.....	8.00	1.65	2.00
American Standard Cotton Grower.....	10.00	1.65	2.00
American Special Potash Mixture for Wheat... ..	8.00	..	4.00
American High Grade Acid Phosphate.....	16.00	..	..
Special Formula Guano for Yellow Leaf Tobacco.	9.00	2.88	5.00
Special Potato Guano.....	7.00	4.12	7.00
Special Potato Manure.....	6.00	4.12	7.00
Bone and Peruvian Guano.....	8.00	1.65	2.00
Bone and Peruvian Guano.....	8.75	1.65	2.00
A. L. Hanna's Special.....	8.00	1.65	2.00
Peruvian Mixture .....	8.50	1.65	1.50
Blood and Bone Compound.....	8.50	2.06	1.00
Bob White Fertilizer for Tobacco.....	8.00	2.06	2.50
J. G. Miller & Co. Yellow Leaf Fertilizer.....	8.00	2.47	3.00
Pitt County Special Fertilizer.....	9.00	2.88	5.00
N. C. and S. C. Cotton Grower.....	8.00	3.29	4.00
Peruvian Mixture Guano Especially Prepared for Sweet Potatoes.....	8.00	3.29	5.00
Kale, Spinach and Cabbage Guano.....	7.00	4.12	4.00
Stable Manure Substitute.....	7.00	2.47	4.00
Strawberry and Asparagus Guano.....	9.00	2.88	9.00
Ground Fish Scraps.....	..	8.24	..
Nitrate of Soda.....	..	15.65	..
Bone Meal .....	Total 20.00	3.71	..
Muriate of Potash.....	..	..	50.00
Sulphate of Potash.....	..	..	49.00
Genuine German Kainit.....	..	..	12.00
Eagle Brand Acid Phosphate.....	13.00	..	..
High Grade Acid Phosphate.....	14.00	..	..
Dissolved Bone and Potash for Corn and Wheat.	10.00	..	2.00
Double Dissolved Bone and Potash.....	10.00	..	4.00
Cooper's Genuine Eagle Island.....	8.00	1.65	2.00

*American Agricultural Chemical Co., New York—*

Holmes & Dawson Productive Cotton and Pea- nut Guano.....	9.00	22.70	2.00
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Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Holmes & Dawson Triumph Soluble.....	8.00	1.65	2.00
Holmes & Dawson Gold Dust Guano.....	9.00	1.65	2.00
Savage Sons & Co. Purity Guano.....	8.00	1.65	2.00
Lazaretto Truckers' Favorite.....	6.00	5.76	5.00
Lazaretto Early Trucker.....	7.00	4.12	5.00
Lazaretto Challenge Fertilizer.....	8.00	2.47	3.00
Lazaretto Special for Tobacco and Potatoes....	8.00	2.47	3.00
Lazaretto Climax Plant Food.....	8.00	2.06	3.00
Lazaretto Universal Compound.....	8.00	2.06	2.00
Lazaretto Crop Grower.....	8.00	1.65	2.00
Lazaretto High Grade Dissolved Bone and Potash .....	12.00	..	5.00
Lazaretto Alkaline Bone Phosphate.....	12.00	..	3.00
Lazaretto Dissolved Bone and Potash.....	10.00	..	2.00
Lazaretto Acid Phosphate.....	14.00	..	..
Reese Pacific Guano.....	8.00	1.65	2.00
Reese Pacific Guano for Tobacco.....	8.50	2.47	2.50
Canton Chemical Truckers' Special 7 Per Cent..	6.00	5.76	5.00
Canton Chemical Excelsior Trucker.....	7.00	4.12	5.00
Canton Chemical Baker's Tobacco Fertilizer....	8.00	2.47	3.00
Canton Chemical Baker's Fish Guano.....	8.00	1.65	2.00
Canton Chemical Baker's Dissolved S. C. Bone..	14.00	..	..
Canton Chemical Baker's Standard High Grade Guano .....	8.00	2.06	3.00
Canton Chemical Gem Phosphate.....	12.00	..	..
Canton Chemical Soluble Bone and Potash.....	10.00	..	2.00
Canton Chemical Soluble Alkaline Bone.....	12.00	..	3.00
Canton Chemical Game Guano.....	8.00	1.65	2.00
Canton Chemical Virginia Standard High Grade Manure .....	8.00	2.06	2.00
Canton Chemical C. C. Special Compound.....	8.00	2.06	6.00
Canton Chemical Superior High Grade Fertilizer,	8.00	2.47	3.00
Detrick's Gold Basis.....	6.00	5.76	5.00
Detrick's Special Trucker.....	7.00	4.12	5.00
Detrick's Gold Eagle.....	6.00	2.47	3.00
Detrick's Quickstep Bone and Potash.....	8.00	2.47	4.00
Detrick's Special Tobacco Fertilizer.....	8.00	2.47	3.00
Detrick's Vegetator Ammoniated Superphosphate,	8.00	2.06	3.00
Detrick's Kangaroo Complete Kompound.....	8.00	1.65	3.00
Detrick's Royal Crop Grower.....	8.00	1.65	2.00
Detrick's Fish Mixture.....	8.00	1.65	2.00
Detrick's Victory Alkaline Bone.....	12.00	..	5.00
Detrick's P. & B. Special.....	12.00	..	3.00
Detrick's Soluble Bone Phosphate and Potash..	10.00	..	2.00
Detrick's XXtra Acid Phosphate.....	14.00	..	..
Zell's 10 Per Cent Trucker.....	5.00	8.23	3.00
Zell's 7 Per Cent Potato and Vegetable Manure,	6.00	5.76	5.00
Zell's Truck Grower.....	7.00	4.12	5.00
Zell's Special Compound for Potatoes and Vegetables .....	8.00	2.47	4.00
Zell's Tobacco Fertilizer.....	8.00	2.47	4.00
Zell's Bright Tobacco Grower.....	8.00	2.47	3.00
Zell's Royal High Grade Fertilizer.....	9.00	2.06	2.00
Zell's Special Compound for Tobacco.....	8.00	1.65	2.00
Zell's Calvert Guano.....	8.00	1.65	2.00
Zell's Ammonia Bone Superphosphate.....	8.00	1.65	2.00
Zell's High Grade Potash Fertilizer.....	10.00	..	4.00
Zell's Reliance High Grade Manure.....	8.00	2.47	3.00
Zell's Fish Guano.....	8.00	1.65	2.00
Zell's Dissolved Bone Phosphate.....	14.00	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Zell's Electric Phosphate.....	10.00	..	2.00
Bull Head Potato and Vegetable Manure.....	6.00	4.12	7.00
Enterprise Alkaline Phosphate.....	8.00	..	5.00
Royal Alkaline Bone.....	10.00	..	4.00
Palmetto Alkaline Phosphate.....	8.00	..	4.00
Slingluff's Bright Mixture.....	8.00	2.06	2.50
Pure Ground Bone.....	Total 45.00	3.29	..
Muriate of Potash.....	..	..	50.00
A. A. C. Co.'s 16 Per Cent Superphosphate.....	10.00	..	..
Detrick's Superior Animal Bone Fertilizer.....	9.00	1.86	4.00
Lazaretto Retriever Animal Bone Fertilizer....	9.00	1.86	4.00
Zell's Victoria Animal Bone Compound.....	9.00	1.86	4.00
Canton Chemical Bone Fertilizer.....	9.00	1.86	4.00
Canton Chemical Virginia Standard Manure....	8.00	2.06	2.00
Purity Guano—2-8-2—for S. S. & Co.....	8.00	1.65	2.00

*A. D. Adair & McCarty Bros., Atlanta, Ga.—*

Adair's Wheat and Grass Grower.....	10.00	..	4.00
Adair's Dissolved Bone.....	12.00	..	..
Adair's High Grade Dissolved Bone.....	14.00	..	..
Adair's High Grade Dissolved Bone.....	16.00	..	..
Adair's Formula .....	10.00	..	..
Adair's Special Potash Mixture.....	8.00	..	4.00
Adair's Ammoniated Dissolved Bone.....	8.00	1.65	2.00
Adair's High Grade Blood and Bone.....	10.00	2.47	3.00
Adair's Soluble Pacific Guano.....	10.00	1.65	2.00
McCarty's Cotton Special.....	10.00	.82	3.00
McCarty's Wheat Special.....	10.00	.82	3.00
McCarty's Corn Special.....	10.00	.82	3.00
McCarty's Soluble Bone.....	10.00	.82	1.00
McCarty's High Grade Corn Grower.....	10.00	1.65	2.00
McCarty's High Grade Cotton Grower.....	10.00	1.65	2.00
Planters' Soluble Fertilizer.....	8.00	1.65	2.00
Blood, Bone and Tankage.....	9.00	.82	2.00
High Grade Potash Compound.....	10.00	..	4.00
Golden Grain Compound.....	8.00	.82	3.00
A. & M. 13-4.....	13.00	..	4.00
David Harum High Grade Guano.....	10.00	3.30	4.00

*Asheville Packing Co., Asheville, N. C.—*

Asheville Packing Co.'s Bone and Potash.....	10.00	..	2.00
Asheville Packing Co.'s 8-4 Fertilizer.....	8.00	..	4.00
Asheville Packing Co.'s 8-1-3 Fertilizer.....	8.00	.82	3.00
Asheville Packing Co.'s 8-2-2 Fertilizer.....	8.00	1.70	2.00
Asheville Packing Co.'s Potato Grower.....	10.00	..	6.00
Asheville Packing Co.'s 8-5-5 Special Garden Fertilizer .....	8.00	4.25	5.00
Asheville Packing Co.'s High Grade Potato, 8-2-10 .....	8.00	1.70	10.00
Asheville Packing Co.'s Special Fruit Grower...	8.00	1.70	5.00
Asheville Packing Co.'s 17 Per Cent Acid Phosphate .....	17.00	..	..
Asheville Packing Co.'s 14 Per Cent Acid Phosphate .....	14.00	..	..
Asheville Packing Co.'s 13 Per Cent Acid Phosphate .....	13.00	..	..
Asheville Packing Co.'s 12 Per Cent Acid Phosphate .....	12.00	..	..
Asheville Packing Co.'s Blood and Bone.....	8.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Baugh &amp; Sons Co., Phila., Pa., and Norfolk, Va.—</i>			
Baugh's 16 Per Cent Acid Phosphate.....	16.00	..	..
Baugh's 5-6-5 Guano.....	6.00	4.12	5.00
Baugh's New Process 10 Per Cent Guano.....	5.00	8.23	2.50
Baugh's Fish Mixture.....	8.00	1.65	2.00
Baugh's Fertilizer for Wheat and Grass.....	8.00	1.65	2.00
Baugh's Fish, Bone and Potash.....	8.00	3.30	4.00
Baugh's Animal Bone and Potash Compound for All Crops .....	8.00	1.65	2.00
Baugh's Complete Animal Bone Fertilizer.....	8.00	1.65	2.00
Baugh's Peruvian Guano Substitute for Potatoes and All Vegetables.....	6.00	4.12	7.00
Baugh's Grand Rapids High Grade Truck Guano.	8.00	2.47	3.00
Baugh's Special Tobacco Guano.....	8.00	2.47	5.00
Baugh's Fruit and Berry Guano.....	8.00	2.47	10.00
Baugh's 7 Per Cent Potato Guano.....	6.00	5.76	5.00
Baugh's Soluble Alkaline Superphosphate.....	10.00	..	2.00
Baugh's Special Manure for Melons.....	10.00	3.30	4.00
Baugh's Sweet Potato Guano.....	8.00	2.47	3.00
Baugh's Potato and Truck Special.....	7.00	2.88	7.00
Baugh's Special Potato Manure.....	5.00	1.65	10.00
Baugh's Fine Ground Fish.....	..	8.23	..
Baugh's Raw Bone Meal, Warranted Pure, Total	21.50	3.70	..
Baugh's High Grade Acid Phosphate.....	14.00	..	..
Baugh's High Grade Tobacco Guano.....	8.00	2.47	3.00
Baugh's High Grade Potash Mixture.....	10.00	..	4.00
Baugh's High Grade Cotton and Truck Guano..	10.00	1.65	2.00
Baugh's Pure Animal Bone and Muriate of Pot- ash Mixture .....	15.00	2.47	5.00
Baugh's Pure Dissolved Animal Bone.....	13.00	2.06	..
Glover's Special Potato Guano.....	7.00	3.30	8.00
Fine Ground Blood.....	..	13.00	..
Genuine German Kainit.....	..	..	12.00
Sulphate of Ammonia.....	..	21.00	..
Muriate of Potash.....	..	..	48.00
High Grade Sulphate of Potash.....	..	..	48.00
Baugh's Excelsior Guano.....	8.00	.82	4.00
Randolph's Bone and Potash Mixture for All Crops .....	10.00	..	3.00
Nitrate of Soda.....	..	15.00	..
Lobos Peruvian Guano.....(Total)	14.00	1.65	1.70
<i>The John L. Bailey Co., Elm City, N. C.—</i>			
Fairmont .....	8.00	2.47	3.00
Stag Brand .....	8.00	1.65	2.00
<i>J. A. Benton, Ruffin, N. C.—</i>			
North Carolina Bright Fertilizer.....	9.00	1.65	2.00
<i>C. J. Burton Guano Co., Baltimore, Md.—</i>			
Acid Phosphate .....	14.00	..	..
Burton's Butcher Bone.....	8.00	1.65	2.00
Burton's High Grade.....	8.00	2.06	3.00
Tobacco Queen .....	8.00	2.47	3.00
High Grade Tobacco.....	8.00	3.29	4.00
Burton's Best .....	8.00	2.47	3.00
<i>Best &amp; Thompson, Goldsboro, N. C.—</i>			
Pure German Kainit.....	..	..	12.00

Name and Address of Manufacturer and Name of Brand.	Avall. Phos. Acid.	Nitrogen.	Potash.
<i>Blacksburg Guano Co., Inc., Blacksburg, Va.—</i>			
Red Letter for Tobacco.....	8.00	1.65	2.00
Jim Crow for Tobacco.....	8.00	2.47	2.00
Alliance for Tobacco.....	8.00	1.65	2.00
Red Letter .....	8.00	1.65	2.00
Alliance Guano .....	8.00	1.65	2.00
B. G. Co., Inc., Acid Phosphate.....	14.00	..	..
B. G. Co., Inc., Bone and Potash.....	10.00	..	2.00
Old Bellefonte .....	8.00	3.30	2.00
Red Warrior for Tobacco.....	9.00	2.47	3.00
Blackstone Special for Tobacco.....	9.00	2.47	3.00
Bellefonte for Tobacco.....	8.00	2.47	2.00
Hard Cash for Tobacco.....	8.00	2.06	2.00
<i>Bradley Fertilizer Co., Charleston, S. C.—</i>			
Standard Bradley's Palmetto Acid Phosphate..	12.00	..	..
Standard Bradley's XXX Acid Phosphate.....	13.00	..	..
Standard Bradley's Wheat Grower.....	10.00	..	2.00
Standard Bradley's Bone and Potash.....	10.00	..	2.00
Standard Bradley's Cereal Guano.....	8.00	1.65	2.00
Standard Bradley's X Guano.....	8.00	1.65	2.00
High Grade Bradley's Guano.....	8.00	2.46	3.00
High Grade Bradley's Circle Guano.....	8.00	3.29	4.00
High Grade Bradley's Acid Phosphate.....	14.00	..	..
Standard Bradley's Acid Phosphate.....	12.00	..	..
Standard Bradley's Ammoniated Dissolved Bone,	9.00	1.85	1.00
Standard Bradley's Patent Superphosphate....	9.00	1.85	1.00
Standard B. D. Sea Fowl Guano.....	9.00	1.85	1.00
Standard Eagle Ammoniated Bone Superphos- phate .....	9.00	1.85	1.00
German Kainit .....	..	..	12.00
<i>The Berkley Chemical Co., Norfolk, Va.—</i>			
Royal Truck Grower.....	6.00	5.76	5.00
Mascot Truck Guano.....	7.00	4.12	5.00
Victory Special Crop Grower.....	7.00	3.30	4.00
Advance Crop Grower.....	8.00	2.47	3.00
Berkley Tobacco Guano.....	8.00	2.47	3.00
Monitor Animal Bone Fertilizer.....	9.00	1.85	4.00
Select Crop Grower.....	8.50	2.06	2.50
Brandon Superphosphate .....	8.00	1.65	2.00
Berkley Plant Food.....	10.00	..	4.00
Berkley Bone and Potash Mixture.....	11.00	..	2.00
Berkley Acid Phosphate.....	14.00	..	..
Superior Bone and Potash.....	8.00	..	4.00
Laurel Potash Mixture.....	10.00	..	2.00
Resolute Acid Phosphate.....	16.00	..	..
Genuine German Kainit.....	..	..	12.00
Muriate of Potash.....	..	..	50.00
Nitrate of Soda.....	..	15.65	..
Long Leaf Tobacco Grower.....	8.00	1.65	2.00
<i>Bragaw Fertilizer Co., Washington, N. C.—</i>			
Chocowinity Special Tobacco Guano.....	5.00	3.29	6.00
Tuckahoe Tobacco Guano.....	8.00	2.06	3.00
Beaufort County Guano.....	8.00	2.47	3.00
Old Reliable Premium Guano.....	8.00	1.65	2.00
Hanover Tobacco Guano.....	8.00	2.47	3.00
Palmetto Acid Phosphate.....	14.00	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Long Acre Bone Phosphate.....	14.00	..	..
Pamlico Trucker .....	7.00	4.12	8.00
Riverview Potato Grower.....	6.00	5.76	5.00
Genuine German Kainit.....	..	..	12.00
Farmers' Union Meal Mixture.....	9.00	2.26	2.00
<i>Columbia Guano Co., Norfolk, Va.—</i>			
Columbia High Grade 16 Per Cent Acid Phosphate .....	16.00	..	..
Columbia 14 Per Cent Acid Phosphate.....	14.00	..	..
Columbia Dissolved Bone.....	13.00	..	..
Columbia Acid Phosphate.....	12.00	..	..
Columbia 8 and 4 Bone and Potash Mixture....	8.00	..	4.00
Columbia 10 and 4 Bone and Potash Mixture...	10.00	..	4.00
Columbia Bone and Potash for Grain.....	10.00	..	3.00
Columbia Bone and Potash Mixture.....	10.00	..	2.00
Columbia 7 Per Cent Special Truck Guano.....	7.00	5.77	7.00
Columbia Special Truck Guano.....	8.00	2.30	4.00
Columbia Potato Guano.....	7.00	4.12	5.00
Columbia C. S. M. Special.....	9.00	2.27	2.00
Columbia Special 4-8-3.....	8.00	3.30	3.00
Columbia Special Wheat Fertilizer.....	8.00	1.65	2.00
Columbia Special Tobacco Guano.....	8.00	2.06	2.00
Olympia Cotton Guano.....	8.00	2.47	3.00
Columbia Soluble Guano.....	8.00	1.65	2.00
Crown Brand Peanut Guano.....	7.00	..	5.00
Our Best Meal Guano.....	8.00	2.47	3.00
Special Peanut Grower.....	8.00	.82	4.00
Crews' Special .....	5.85	4.49	10.00
Hayes' Special .....	8.00	3.30	3.00
McRae's Special .....	9.00	4.12	7.00
McRae's High Grade Guano.....	8.00	3.30	7.00
Hycobacco Guano.....	8.00	2.47	3.00
Rex Brand Ammoniated Guano.....	9.00	2.06	1.00
Carolina Soluble Guano.....	9.00	1.65	1.00
Pelican Ammoniated Guano.....	8.00	3.30	4.00
Sulphate of Potash.....	..	..	50.00
Genuine German Kainit.....	..	..	12.00
Muriate of Potash.....	..	..	48.00
Nitrate of Soda.....	..	15.56	..
Trojan Tobacco Guano.....	8.00	3.30	4.00
Columbia 10-5 Bone and Potash Mixture.....	10.00	..	5.00
Columbia Top Dresser.....	..	7.42	3.00
<i>Cumberland Bone and Phosphate Co., Portland, Me., and Charleston, S. C.—</i>			
Standard Cumberland Bone and Superphosphate of Lime .....	9.00	1.85	1.00
<i>The Coe-Mortimer Co., Charleston, S. C.—</i>			
Genuine Peruvian Guano Ex. S. S. Planet Venus,	15.00	3.53	2.80
Genuine Peruvian Guano Ex. S. S. Celia Chinch Island .....	9.00	5.53	2.25
Genuine Peruvian Guano Ex. S. ¾ S. Celia Lobos Island .....	17.00	2.80	2.80
Nitrate of Soda.....	..	14.76	..
Kainit .....	..	..	12.00
Thomas' Phosphate Big Slag.....	17.00	..	..
Sulphate of Potash.....	..	..	48.00
Muriate of Potash.....	..	..	49.00
Thomas Phosphate (Big Slag).....	..	15.50	..
Lobos Peruvian Guano..... (Total)	14.00	1.65	1.70

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Calder Bros., Wilmington, N. C.—</i>			
Genuine German Kainit.....	..	..	12.00
Muriate of Potash.....	..	..	50.00
<i>Craven Chemical Co., New Bern, N. C.—</i>			
C. E. Foy High Grade Guano (Trade Mark)...	8.00	2.47	3.00
Jewel Acid Phosphate.....	14.00	..	..
Neuse Truck Grower.....	6.00	4.94	6.00
Pantego Potato Guano.....	7.00	4.12	7.00
Hanover Standard Guano.....	8.00	3.29	4.00
Elite Cotton Guano.....	8.00	1.65	2.00
Marvel Great Truck Grower.....	8.00	2.06	3.00
Duplin Tobacco Guano.....	8.00	2.47	3.00
Gaston High Grade Fertilizer.....	8.00	2.47	3.00
Trent Bone and Potash.....	10.00	..	2.00
Genuine German Kainit.....	..	..	12.00
Craven Chemical Co.'s Truck Guano, 5-10-2½..	5.00	8.24	2.50
<i>William H. Camp, Petersburg, Va.—</i>			
Lion and Monkey Bone and Potash.....	10.00	..	4.00
Camp's Red Head Chemicals.....	8.00	2.25	2.00
Camp's Green Head Chemicals, Irish Potato....	7.00	6.15	10.00
Camp's Yellow Head Chemicals.....	8.00	2.87	7.50
Lion and Monkey for Tobacco.....	8.00	2.46	3.00
<i>Clayton Oil Mill, Clayton, N. C.—</i>			
Clayton Guano .....	8.00	3.00	3.00
Cotton Queen .....	8.00	2.00	2.00
Summer Queen .....	8.00	2.00	2.00
<i>Cowell, Swan &amp; McCotter Co., Bayboro, N. C.—</i>			
Cowell, Swan & McCotter Co.'s Cabbage Guano,	5.00	8.25	2.50
Cowell, Swan & McCotter Co.'s Tobacco Guano,	8.00	2.47	3.00
Bone and Fish Guano.....	8.00	1.65	2.00
Crop Guano .....	8.00	1.65	2.00
Rust Proof Cotton Guano.....	8.00	1.65	3.00
Standard Cotton Grower.....	8.00	3.30	3.00
Quick Grower Guano.....	8.00	2.06	3.00
Great Cabbage and Potato Guano.....	7.00	5.77	7.00
Aurora Trucker .....	7.00	4.12	7.00
Oriental Trucker .....	7.00	4.12	8.00
High Grade Truck Guano.....	7.00	4.12	5.00
Potato Favorite Guano.....	7.00	3.30	7.00
Champion Guano .....	8.00	2.47	3.00
Bone Phosphate .....	14.00	..	..
14 Per Cent Acid Phosphate.....	14.00	..	..
German Kainit .....	..	..	12.00
Cowell's Great Tobacco Grower.....	8.00	2.47	3.00
<i>Combahee Fertilizer Co., Charleston, S. C.—</i>			
Combahee 16 Per Cent Dissolved Bone.....	16.00	..	..
Combahee 14 Per cent Dissolved Bone.....	14.00	..	..
High Grade Cotton.....	8.00	2.47	3.00
High Grade Cantaloupe.....	10.00	2.47	10.00
B. B. & P. ....	8.50	2.06	1.00
Nitrate of Soda.....	..	14.83	..
Combahee Kainit .....	..	..	12.00
Malloy's Special for Cotton.....	8.65	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Special Mixture .....	8.00	1.65	2.00
10-4-5 Trucker .....	10.00	3.30	5.00
10-3-10 Trucker .....	10.00	2.47	10.00
Acid and Potash.....	8.00	..	4.00
<i>Chickamauga Fertilizer Works, Atlanta, Ga.—</i>			
Chickamauga Complete Fertilizer.....	8.00	1.65	2.00
Chickamauga High Grade Fertilizer.....	10.00	1.65	2.00
Chickamauga High Grade Plant Food.....	10.00	1.65	2.00
Chickamauga Wheat Special.....	10.00	.82	3.00
Chickamauga Corn Special.....	10.00	.82	3.00
Chickamauga Standard Corn Grower.....	8.00	1.65	2.00
Chickamauga Dissolved Bone.....	12.00	..	..
Chickamauga High Grade Dissolved Bone.....	14.00	..	..
Chickamauga High Grade Dissolved Bone No. 16,	16.00	..	..
Chickamauga Bone and Potash.....	10.00	..	2.00
Chickamauga Alkaline Bone.....	10.00	..	4.00
Georgia Home Guano.....	8.00	1.65	2.00
Special Corn Compound.....	10.00	1.65	4.00
Blood, Bone and Tankage.....	9.00	.82	2.00
Ben Hur High Grade Guano.....	10.00	2.47	3.00
Old Glory Mixture.....	10.00	.82	1.00
Chickamauga Wheat and Corn Grower.....	10.00	..	4.00
<i>Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.—</i>			
Horne & Son's High Grade Bone and Potash....	11.00	..	5.00
Special Bone and Potash Mixture.....	10.00	..	4.00
Buncombe Wheat Grower.....	8.00	..	4.00
Buncombe Corn Grower.....	8.00	..	4.00
Morris & Scarborough's Special Bone and Potash..	10.00	..	3.00
Electric Bone and Potash Mixture.....	10.00	..	2.00
16 Per Cent Acid Phosphate.....	16.00	..	..
Climax Dissolved Bone.....	14.00	..	..
Sterling Acid Phosphate.....	13.00	..	..
Staple Acid Phosphate.....	12.00	..	..
Genuine German Kainit.....	..	..	12.00
Sulphate of Potash.....	..	..	50.00
Muriate of Potash.....	..	..	50.00
Nitrate of Soda.....	..	15.65	..
Bone Meal .....	20.00	3.91	..
Bone Meal .....	26.00	2.14	..
Crown Ammoniated Guano.....	8.00	1.64	2.00
Ely Ammoniated Fertilizer.....	8.00	1.64	2.00
Eclipse Ammoniated Guano.....	8.00	2.06	2.00
Planters' Pride .....	8.00	2.06	3.00
Caraleigh Special Tobacco Guano.....	8.00	2.06	3.00
Pacific Tobacco and Cotton Grower.....	9.00	2.26	2.00
Horne's Best .....	8.00	2.47	3.00
Caraleigh Top Dresser.....	3.00	8.24	4.00
<i>Crow Fertilizer Co., Monroec, N. C.—</i>			
Kainit .....	..	..	12.00
14 Per Cent Acid Phosphate.....	14.00	..	..
<i>W. B. Cooper, Wilmington, N. C.—</i>			
Muriate of Potash.....	..	..	46.00
Kainit .....	..	..	12.00
Sulphate of Potash.....	..	..	48.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Contentnea Guano Co., Wilson, N. C.—</i>			
Special Formula for Tobacco.....	8.00	3.28	4.00
Special Formula for Cotton.....	8.00	3.28	4.00
Contentnea Corn Special.....	5.00	1.64	5.00
Davis' Best Fertilizer.....	8.00	3.28	6.00
Special Formula for Tobacco.....	8.00	2.05	3.00
Special Formula Fertilizer, 9-2½-5.....	9.00	2.05	5.00
Special Formula for Tobacco.....	8.00	3.28	7.00
High Grade 14 Per Cent Acid.....	14.00	..	..
Pick Leaf .....	8.00	2.47	3.00
Top Notch .....	8.00	2.47	3.00
Blood and Bone Cotton Compound.....	8.00	1.65	2.00
Contentnea Top Dresser.....	3.00	8.23	5.00
Muriate of Potash.....	..	..	50.00
Sulphate of Potash.....	..	..	50.00
Bone and Potash Mixture.....	10.00	..	4.00
S-4-1 2-7 for Tobacco.....	8.00	3.70	7.00
S-4-1 2-7 for Cotton.....	8.00	3.70	7.00
Contentnea Cotton Grower.....	8.00	2.47	2.50
German Kainit .....	..	..	12.00
<i>C. P. Dey, Beaufort, N. C.—</i>			
Ground Fish Scrap.....	..	8.25	..
<i>Etiwan Fertilizer Co., Charleston, S. C.—</i>			
Plow Brand Ammoniated Fertilizer.....	8.00	1.65	2.00
Plow Brand Special Tobacco Fertilizer.....	8.00	3.30	4.00
Plow Brand Acid Phosphate wth Potash.....	11.00	..	1.00
Etiwan Potash Bone.....	10.00	..	4.00
Etiwan Special Potash Mixture.....	8.00	..	4.00
Etiwan Soluble Bone with Potash.....	10.00	..	3.00
Etiwan Acid Phosphate with Potash.....	11.00	..	1.00
Etiwan Dissolved Bone.....	13.00	..	..
Etiwan High Grade Acid Phosphate.....	14.00	..	..
Etiwan Superior Cotton Fertilizer.....	8.00	3.30	6.00
Etiwan Special Cotton Fertilizer.....	8.00	3.30	4.00
Etiwan Cotton Compound.....	8.00	2.47	3.00
Etiwan Ammoniated Fertilizer.....	8.00	1.65	2.00
Etiwan High Grade Cotton Fertilizer.....	8.00	2.47	2.00
Diamond Soluble Bone.....	13.00	..	..
X Diamond Soluble Bone with Potash.....	10.00	..	2.00
XX Acid Phosphate with Potash.....	10.00	..	2.00
Genuine German Kainit.....	..	..	12.00
Etiwan Blood and Bone Guano.....	9.00	2.06	1.00
Plow Brand Raw Bone Superphosphate.....	9.00	2.06	1.00
<i>Farmers Guano Co., Raleigh, N. C.—</i>			
Farmers' Formula .....	7.00	2.47	3.25
Special Bone and Potash Mixture.....	10.00	..	4.00
Century Bone and Potash Mixture.....	10.00	..	2.00
16 Per Cent Acid Phosphate.....	16.00	..	..
14 Per Cent Acid Phosphate.....	14.00	..	..
Farmers' Acid Phosphate.....	13.00	..	..
Genuine German Kainit .....	..	..	12.00
Muriate of Potash.....	..	..	50.00
Sulphate of Potash.....	..	..	50.00
Bone Meal .....	..	..	..
Bone Meal .....	20.00	3.91	..
Nitrate of Soda.....	..	15.65	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Bone Meal . . . . . Total	26.00	2.14	..
State Standard Guano. . . . .	8.00	1.64	2.00
Big Crop Guano. . . . .	8.00	2.06	3.00
Toco Tobacco Guano. . . . .	8.00	2.06	3.00
Golden Grade Guano. . . . .	8.00	2.47	3.00
Farmers' Top Dresser. . . . .	3.00	8.24	4.00
<i>Fremont Oil Mills, Fremont, N. C.—</i>			
Up-to-date . . . . .	8.00	1.65	2.00
Nahunta Special . . . . .	8.00	2.47	3.00
Fremont Prolific Fertilizer. . . . .	9.00	2.26	2.00
Yelverton Bros.' Plant Food. . . . .	8.00	2.47	3.00
Fremont Standard Fertilizer. . . . .	8.00	2.47	3.00
Home Run Guano. . . . .	8.00	1.65	2.00
Fremont Oil Mill Co.'s Special for Tobacco. . . . .	8.00	2.47	5.00
<i>Farmers Cotton Oil Co., Wilson, N. C.—</i>			
German Kainit . . . . .	..	..	12.00
Sulphate of Ammonia. . . . .	..	20.57	..
Muriate of Potash. . . . .	..	..	50.00
Sulphate of Potash. . . . .	..	..	50.00
Nitrate of Soda. . . . .	..	15.63	..
Contentnea Acid Phosphate. . . . .	13.00	..	..
Bonum Acid Phosphate. . . . .	14.00	..	..
16 Per Cent Acid Phosphate. . . . .	16.00	..	..
Xtra Good Bone and Potash. . . . .	10.00	..	2.00
Crop King Guano. . . . .	8.00	1.65	2.00
Farmers' Special Guano. . . . .	8.00	1.65	2.00
Planters' Friend Guano. . . . .	8.00	2.06	3.00
Carolina Choice Tobacco Guano. . . . .	8.00	2.06	3.00
Wilson High Grade Guano. . . . .	8.00	2.27	2.00
J. D. Farrior's Special Guano. . . . .	8.00	2.47	3.00
Graves' Cotton Grower Guano. . . . .	8.00	2.47	3.00
Golden Gem Guano. . . . .	8.00	2.47	3.00
Regal Tobacco Guano. . . . .	8.00	2.88	5.00
Dean's Special Guano. . . . .	8.00	3.70	7.00
Perfect Top Dresser. . . . .	2.00	8.23	5.00
Wilson Top Dresser. . . . .	2.00	9.05	4.00
Washington's Corn Mixture Guano. . . . .	10.00	.82	5.00
<i>W. S. Farmer &amp; Co., Baltimore, Md.—</i>			
Kainit . . . . .	..	..	12.00
W. S. F. & Co.'s Dis. South Carolina. . . . .	14.00	..	..
W. S. F. & Co.'s Fish Mixture. . . . .	8.00	1.65	2.00
W. S. F. & Co.'s Hawk Eye. . . . .	8.00	2.47	3.00
W. S. F. & Co.'s Tampico. . . . .	7.00	4.12	5.00
Anne Arundel Trucker. . . . .	8.00	3.70	7.00
<i>Germofert Manufacturing Co., Charleston, S. C.—</i>			
Germofert Patented Vegetable Fertilizer, Total	25.00	3.29	6.00
Germofert Patented Extra Special Cotton Grower . . . . .	4.00	3.29	4.00
Germofert Patented Special Cotton Grower. . . . .	6.00	2.47	3.00
Germofert Patented Standard Cotton Grower. . . . .	8.00	1.65	2.00
<i>W. R. Grace &amp; Co., New York—</i>			
Nitrate of Soda. . . . .	..	15.00	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Griffith &amp; Boyd Co., Baltimore, Md.—</i>			
High Grade Acid Phosphate.....	14.00	..	..
Spring Crop Grower.....	6.50	1.65	4.50
Ammoniated Bone and Potash.....	8.00	1.65	2.00
<i>Home Fertilizer and Chemical Co., Baltimore, Md.—</i>			
Sulphate of Potash.....	..	..	48.00
Muriate of Potash.....	..	..	50.00
Nitrate of Soda.....	..	15.67	..
Sulphate of Ammonia.....	..	20.62	..
German Kainit.....	..	..	12.00
High Grade Acid Phosphate.....	14.00	..	..
Boykins' Alkaline Bone.....	10.00	..	2.00
Boykins' Cereal Fertilizer.....	8.00	1.65	2.00
Boykins' Dissolved Animal Bone.....	12.00	1.65	2.00
Boykins' Vegetable Fertilizer.....	6.00	4.12	6.00
Boykins' Home Potash Grower.....	6.00	3.30	4.00
Special Alkaline Mixture.....	10.00	..	5.00
Phœnix Crop Grower.....	8.00	2.48	2.00
Matchless Guano.....	8.00	1.65	4.00
Home Fertilizer.....	..	5.77	7.00
Cerealite Top Dressing.....	..	7.68	3.00
<i>Hadley, Harriss &amp; Co., Wilson, N. C.—</i>			
Hadley Bros. ....	8.00	2.25	2.50
German Kainit.....	..	..	12.00
Daisy Fish Mixture.....	8.00	1.64	2.00
John Hadley Special High Grade Plant Food...	8.00	1.64	2.00
Top Dressing.....	..	7.38	6.00
Golden Weed Tobacco Grower.....	8.00	2.46	3.00
<i>S. B. Harrell &amp; Co., Norfolk, Va.—</i>			
Harrell's Acid Phosphate.....	14.00	..	..
Harrell's Champion Cotton and Peanut Grower.	8.00	1.65	2.00
Harrell's Truck Guano.....	6.00	5.76	5.00
<i>Hardison &amp; Co., Wadesboro, N. C.—</i>			
Genuine German Kainit.....	..	..	12.00
<i>Hampton Guano Co., Norfolk, Va.—</i>			
Virginia Truck Grower.....	6.00	5.76	5.00
Reliance Truck Guano.....	7.00	4.12	5.00
Little's Favorite Crop Grower.....	7.00	3.30	4.00
P. P. P. (Princess Prolific Producer).....	8.00	2.47	3.00
Hampton Tobacco Guano.....	8.00	2.47	3.00
Arlington Animal Bone Fertilizer.....	9.00	1.85	4.00
Alpha Crop Grower.....	8.50	2.06	2.50
Shirley's Superphosphate.....	8.00	1.65	2.00
Hampton Crop Grower.....	10.00	..	4.00
Hampton Bone and Potash Mixture.....	11.00	..	2.00
Dauntless Potash Mixture.....	10.00	..	2.00
Hampton Acid Phosphate.....	14.00	..	..
Supreme Acid Phosphate.....	16.00	..	..
Muriate of Potash.....	..	..	50.00
Nitrate of Soda.....	..	15.65	..
Genuine German Kainit.....	..	..	12.00
Excelsior Bone and Potash.....	8.00	..	4.00
Extra Tobacco Guano.....	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avall. Phos. Acid.	Nitrogen.	Potash.
<i>M. P. Hubbard &amp; Co., Baltimore, Md.—</i>			
Hubbard's Bermuda Guano.....	7.00	5.78	4.00
Hubbard's Special Cotton and Corn Fertilizer...	7.00	1.65	5.00
<i>Hubbard Fertilizer Co., Baltimore, Md.—</i>			
Parker & Hunter's B. B. B.....	8.00	.82	3.00
<i>Hall &amp; Pearsall (Inc.), Wilmington, N. C.—</i>			
German Kainit .....	..	..	12.00
<i>L. Harvey &amp; Son Co., Kinston, N. C.—</i>			
Nitrate of Soda.....	..	15.50	..
<i>The Imperial Co., Norfolk, Va.—</i>			
Imperial Bright Tobacco Guano.....	8.00	2.05	3.00
Imperial Cotton Grower.....	8.00	1.65	2.00
Imperial 5-6-7 Potato Guano.....	6.00	4.11	7.00
Imperial Snowflake Cotton Grower.....	8.00	3.29	4.00
Imperial Peanut and Corn Guano.....	8.00	1.64	2.00
Imperial Champion Guano.....	8.00	1.64	2.00
Imperial X. L. O. Cotton Guano.....	8.00	2.47	3.00
Imperial Cisco Soluble Guano.....	8.00	1.64	2.00
Imperial Tobacco Guano.....	8.00	2.47	3.00
Imperial Laughinghouse Special Tobacco Guano,	4.00	3.29	6.00
Imperial Standard Premium.....	8.00	1.64	2.00
Imperial Cubanola Tobacco Guano.....	4.00	2.47	5.00
Imperial Martin County Special Crop Grower..	9.00	2.26	2.00
Imperial High Grade Acid Phosphate.....	14.00	..	..
Imperial Genuine German Kainit.....	..	..	12.00
Imperial Special 7 Per Cent Guano for Potatoes,	5.00	5.76	5.00
Imperial 10 Per Cent Guano.....	5.00	8.23	2.50
Imperial Sweet Potato Guano.....	6.00	1.64	6.00
Imperial Williams' Special Potato Guano.....	6.00	4.11	5.00
Imperial Fish and Bone.....	6.00	3.29	4.00
Imperial Lucky Strike Potato Guano.....	7.00	4.11	8.00
Imperial 7-7-7 Potash Guano.....	7.00	5.76	7.00
Imperial Bone and Potash.....	10.00	..	2.00
Imperial High Grade Irish Potato Guano.....	7.00	4.11	8.00
Imperial Tennessee Acid Phosphate.....	16.00	..	..
Muriate of Potash.....	..	..	50.00
Nitrate of Soda.....	..	15.63	..
Imperial Roanoke Crop Grower.....	7.00	2.47	2.00
17 Per Cent Acid Phosphate.....	17.00	..	..
Imperial Asparagus Mixture.....	6.00	4.11	7.00
Imperial Yellow Bark Sweet Potato Guano....	8.00	2.47	3.00
Dawson's Cotton Grower.....	7.00	2.67	2.75
Imperial 6-6-6 Crop Grower.....	6.00	4.92	7.00
Imperial Top Dresser for Cotton.....	2.00	8.32	..
<i>John King, Mt. Olive, N. C.—</i>			
Nitrate of Soda.....	..	15.00	..
<i>R. L. Kirkwood, Bennettsville, N. C.—</i>			
Nitrate of Soda.....	..	14.00	..
<i>Laurinburg Oil Co., Laurinburg, N. C.—</i>			
Flora Dora .....	6.40	2.13	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Lister's Agricultural Chemical Works, Newark, N. J.—</i>			
Lister's Ammoniated Dissolved Bone Phosphate.	8.00	2.06	2.00
Lister's Success Fertilizer.....	8.00	1.65	2.00
Lister's Standard Pure Bone Superphosphate of Lime .....	9.00	1.65	2.00
American Agricultural Chemical Co.'s Buyers' Choice Acid Phosphate.....	14.00	..	..
Lister's Bone Meal.....Total	20.60	3.30	..
<i>A. S. Lee &amp; Sons Co. (Inc.), Richmond, Va.—</i>			
Lee's Plant Bed Fertilizer.....	8.00	2.00	2.00
Lee's Bone and Potash.....	9.00	..	4.00
Lee's Corn Fertilizer.....	10.00	..	2.00
<i>The J. J. Littlejohn Co., Jonesville, S. C.—</i>			
Littlejohn's Superior Cotton Fertilizer.....	10.00	1.65	3.00
<i>E. H. &amp; J. A. Meadows Co., New Bern, N. C.—</i>			
Hookerton Cotton Guano.....	8.00	1.64	2.00
Meadows' Cotton Guano.....	8.00	1.64	2.00
Meadows' All Crop Guano.....	8.00	2.05	2.50
Meadows' Roanoke Guano.....	8.00	2.05	3.00
Meadows' Gold Leaf Tobacco Guano.....	8.00	2.47	3.00
Meadows' Lobos Guano.....	8.00	4.11	5.00
Meadows' Great Potato Guano.....	7.00	4.11	8.00
Meadows' Great Cabbage Guano.....	7.00	5.76	7.00
Meadows' 10 Per Cent Guano.....	6.00	8.23	2.50
Meadows' Sea Bird Guano.....	9.00	3.29	2.50
Meadows' Dissolved Bone and Potash Compound,	10.00	..	2.00
Meadows' German Kainit.....	..	..	12.00
Meadows' Diamond Acid Phosphate.....	14.00	..	..
Dixon's High Grade Tobacco Guano.....	8.00	2.47	3.00
Parker's Special Tobacco Guano.....	8.00	2.47	4.00
Meadows' Dissolved Bone and Potash Compound,	10.00	..	5.00
Brooks' Special Tobacco Grower.....	8.00	2.47	5.00
<i>The Miller Fertilizer Co., Baltimore, Md.—</i>			
Special Tobacco Grower .....	8.00	1.65	4.00
Standard Phosphate .....	8.00	2.47	3.00
Ammoniated Dissolved Bone.....	8.00	1.65	2.00
High Grade Potato .....	6.00	4.12	7.00
Tobacco King .....	8.00	2.47	3.00
Profit .....	8.00	1.65	2.00
Standard Potato .....	8.00	2.47	3.00
Potato and Vegetable Guano.....	8.00	1.65	4.00
Trucker .....	8.00	4.12	5.00
Farmers' Profit .....	8.00	1.65	2.00
Harmony .....	8.00	2.06	3.00
Corn and Peanut Grower.....	10.50	..	2.25
No. 1 Potato and Vegetable Grower.....	8.00	3.71	7.00
Clinch .....	10.00	..	2.00
4 Per Cent Tobacco.....	8.00	3.29	4.00
Miller's 7 Per Cent.....	7.00	5.77	7.00
Miller's Irish Potato.....	8.00	3.29	4.00
Miller's 16 Per Cent Acid Phosphate.....	16.00	..	..
Kainit .....	..	..	12.00
Acid Phosphate .....	14.00	..	..
S. C. Rock.....	14.00	..	..
The Miller Fertilizer Co.'s 10 and 4 Per Cent...	10.00	..	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>The Mapes Formula and Peruvian Guano Co., 143 Liberty Street, New York—</i>			
Mapes' Economical Potato Manure.....	4.00	3.29	8.00
Mapes' Vegetable or Complete Manure for Light Soils .....	6.00	4.94	6.00
Mapes' Coru Manure.....	8.00	2.47	6.00
Mapes' Complete Manure, "A" Brand.....	10.00	2.47	2.50
<i>C. F. Moore, Cheraw, S. C.—</i>			
Muriate of Potash.....	..	..	49.00
<i>John F. McNair, Laurinburg, N. C.—</i>			
Genuine German Kainit.....	..	..	12.00
Nitrate of Soda.....	..	14.76	..
<i>D. B. Martin Co., Richmond, Va.—</i>			
Martin's 7 Per Cent Guano.....	6.00	5.74	5.00
Martin's Early Truck and Vegetable Grower....	6.00	3.28	8.00
Martin's Claremount Vegetable Grower.....	7.00	2.46	5.00
Martin's Red Star Brand.....	8.00	3.28	4.00
Martin's Bull Head Fertilizer.....	8.00	2.46	3.00
Martin's Tobacco Special.....	8.00	2.46	3.00
Martin's Carolina Cotton Fertilizer.....	8.00	1.65	2.00
Martin's Old Virginia Favorite.....	8.00	1.65	2.00
Martin's Corn and Cereal Special.....	8.00	1.65	2.00
Martin's Gilt Edge Potato Manure.....	7.00	2.46	10.00
Martin's Animal Bone Potato Guano.....	6.00	4.10	7.00
Martin's Animal Bone Potato Compound.....	16.00	1.65	2.50
Martin's Pure Dissolved Animal Bone.....	12.00	1.65	2.00
Martin's Pure Ground Bone..... Total	22.90	1.65	2.00
Martin's Raw Bone Meal..... Total	21.00	3.69	..
Martin's Animal Tankage, Ground..... Total	16.00	4.92	..
Martin's Acid Phosphate.....	16.00	..	..
Martin's Potash and Soluble Bone.....	12.00	..	5.00
Martin's High Grade Blood.....	..	13.94	..
Martin's Blood .....	..	12.30	..
Acid Phosphate .....	14.00	..	..
Potash and Soluble Bone.....	12.00	..	3.00
Potash and Soluble Bone.....	10.00	..	5.00
Potash and Soluble Bone.....	10.00	..	2.00
Nitrate of Soda.....	..	15.52	..
Sulphate of Ammonia.....	..	20.50	..
Blood .....	..	10.66	..
Blood .....	..	9.84	..
Blood .....	..	12.30	..
Genuine German Kainit.....	..	..	12.00
Sulphate of Potash .....	..	..	50.00
Muriate of Potash .....	..	..	50.00
Pure Ground Bone..... Total	22.90	2.46	..
Martin's Carolina Special.....	8.00	1.65	2.00
<i>Marietta Fertilizer Co., Atlanta, Ga.—</i>			
Lion Power Guano.....	10.00	1.65	2.00
Lion Potash Compound.....	8.00	..	4.00
Lion High Grade Dissolved Bone.....	14.00	..	..
Lion Crop Producer.....	10.00	..	4.00
Lion Favorite Guano.....	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Marsh-Lee &amp; Co., Marshville, N. C.—</i>			
Marsh's High Grade Acid.....	14.00	..	..
Marsh's Cotton Fertilizer, 8-2-2.....	8.00	1.65	2.00
Marsh's Guano for Corn.....	8.00	1.65	2.00
Marsh's Special 8-3-3.....	8.00	2.50	3.00
Raven Brand .....	8.00	2.65	2.00
<i>J. W. McLaughlin Co., Raeford, N. C.—</i>			
Nitrate of Soda.....	..	15.00	..
<i>The MacMurphy Co., Charleston, S. C.—</i>			
Special 8-3-3 Guano .....	8.00	2.47	3.00
Special 8-2-2 Cotton and Corn Guano.....	8.00	1.65	2.00
Cotton and Corn Guano, 9-2-2.....	9.00	1.65	2.00
Wilcox & Gibbs Co.'s Manipulated Guano.....	9.00	2.26	2.00
Cotton and Corn Guano, 9-3-3.....	9.00	2.47	3.00
High Grade Acid Phosphate, 14 Per Cent.....	14.00	..	..
Pure German Kainit .....	..	..	12.00
Nitrate of Soda .....	..	14.82	..
Muriate of Potash .....	..	..	48.00
Acid Phosphate, 13 Per Cent.....	13.00	..	..
<i>N. C. Cotton Oil Co., Wilmington, N. C.—</i>			
Wilmington High Grade .....	8.00	2.47	3.00
Wilmington Cotton Grower .....	8.00	1.65	2.00
Wilmington Standard .....	8.00	2.47	2.50
Wilmington Truck Grower .....	8.00	3.30	4.00
Wilmington Special .....	8.00	1.65	2.00
Carter's Lifter .....	8.00	2.47	3.00
Clark's Special .....	8.00	1.65	3.00
Wilmington Banner .....	8.00	1.65	3.00
<i>North Carolina Cotton Oil Co., Raleigh, N. C.—</i>			
Raleigh Standard Guano.....	8.00	2.26	2.00
<i>North Carolina Cotton Oil Co., Charlotte, N. C.—</i>			
Majestic .....	8.00	1.65	2.00
<i>N. C. Cotton Oil Co., Henderson, N. C.—</i>			
Unedit Cotton Grower.....	8.00	1.65	2.00
Unedit Tobacco Fertilizer.....	9.00	2.47	3.00
Vance Cotton Grower.....	8.00	1.65	2.00
Pride of Vance.....	9.00	2.47	3.00
Henderson Cotton Grower.....	8.00	1.65	2.00
Henderson Tobacco Fertilizer.....	9.00	2.47	3.00
Franklin Cotton Grower.....	8.00	1.65	2.00
Franklin Tobacco Fertilizer.....	9.00	2.47	3.00
<i>New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.—</i>			
Oriole Tobacco Grower.....	8.00	3.30	4.00
Greene County Standard Fertilizer.....	8.00	1.65	2.00
Jones County Premium Crop Grower.....	8.00	2.06	3.00
Onslow Farmers' Reliance Guano.....	8.00	2.06	3.00
High Grade Fertilizer .....	8.00	2.47	3.00
Foy's High Grade Fertilizer.....	8.00	2.47	3.00
Pitt's Prolific Golden Tobacco Grower.....	8.00	2.47	3.00
Craven Cotton Guano .....	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Lenoir Bright Leaf Tobacco Grower.....	8.00	2.47	3.00
Ives' Irish Potato Guano.....	7.00	4.13	7.00
Dunn's Standard Truck Grower.....	7.00	5.77	7.00
Panlico Electric Top Dresser.....	5.00	8.25	2.50
Special Corn and Peanut Grower.....	11.00	..	2.00
Carteret Bone and Potash.....	10.00	..	2.00
14 Per Cent Acid Phosphate.....	14.00	..	..
Genuine German Kainit.....	..	..	12.00
Sulphate of Potash.....	..	..	50.00
Muriate of Potash.....	..	..	48.00
Bogue Fish Scrap.....	..	7.42	..
Nitrate of Soda.....	..	15.67	..
Sulphate of Ammonia.....	..	20.62	..
Favorite Cotton Grower C. S. M.....	8.00	2.27	2.00

*Norfolk Fertilizer Co., Norfolk, Va.—*

Oriana Cotton Guano.....	8.00	1.64	2.00
Oriana C. S. M. Special.....	9.00	2.26	2.00
Oriana Tobacco Guano.....	8.00	2.47	3.00
Oriana 3-8-3 for Cotton.....	8.00	2.47	3.00
Oriana Crop Grower.....	8.00	1.64	3.00
Oriana Bone and Potash.....	10.00	..	2.00
Oriana 14 Per Cent Acid Phosphate.....	14.00	..	..
Oriana 16 Per Cent Acid Phosphate.....	16.00	..	..
Genuine German Kainit.....	..	..	12.00
Iola Acid Phosphate.....	13.00	..	..
Oriana First Step Tobacco Guano.....	8.00	3.29	4.00
Oriana 4-4-6 High Grade Tobacco Guano.....	4.00	3.29	6.00
Pine Top Special Crop Grower.....	5.00	1.64	6.00
Nitrate of Soda Mixture for Top Dressing Cotton.....	2.00	8.23	..

*Navassa Guano Co., Wilmington, N. C.—*

Ammoniated Soluble Navassa Guano.....	8.00	2.06	2.00
Clarendon Tobacco Guano.....	8.00	2.47	3.00
Oconeechee Tobacco Guano.....	8.00	1.65	2.00
Coree Tobacco Guano.....	8.00	3.29	4.00
Harvest King Guano.....	8.00	1.65	3.00
Mogul Guano.....	8.00	2.06	3.00
Kainit.....	..	..	12.00
Muriate of Potash.....	..	..	48.00
Sulphate of Potash.....	..	..	50.00
Nitrate of Soda.....	..	15.65	..
Sulphate of Ammonia.....	..	20.59	..
Orton Guano.....	8.00	2.47	4.00
Navassa Universal Fertilizer.....	8.50	2.06	1.00
Navassa Wheat Mixture.....	10.00	..	2.25
Navassa Wheat and Grass Grower.....	10.00	..	4.00
Navassa Special Wheat Mixture.....	12.00	..	4.00
Navassa Gray Land Mixture.....	12.00	..	4.00
Navassa Dissolved Bone with Potash.....	10.00	..	2.00
Navassa Acid Phosphate.....	12.00	..	..
Navassa Dissolved Bone.....	13.00	..	..
Navassa Acid Phosphate.....	14.00	..	..
Navassa Acid Phosphate.....	16.00	..	..
Navassa Special Trucker.....	8.00	3.29	4.00
Navassa Strawberry Top Dressing.....	8.00	2.06	4.00
Navassa Blood and Bone Meal Mixture.....	8.00	2.47	5.00
Navassa Creole Guano.....	6.00	4.12	7.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Navassa Root Crop Fertilizer.....	7.00	4.12	7.00
Navassa Carib Guano.....	8.00	2.47	10.00
Navassa Guano for Tobacco.....	8.00	2.06	2.00
Navassa Grain Fertilizer.....	8.00	1.65	2.00
Navassa Fruit Growers' Fertilizer.....	8.00	1.65	6.00
Navassa Cotton Seed Meal Special 3 Per Cent Guano .....	8.00	2.47	2.00
Navassa Cotton Seed Meal Guano.....	8.00	1.65	2.00
Navassa Cotton Fertilizer.....	8.00	1.65	2.00
Navassa Complete Fertilizer.....	9.00	1.65	1.00
Navassa High Grade Guano.....	8.00	2.47	3.00
Navassa Acid Phosphate with Potash.....	8.00	..	4.00
<i>The Nitrate Agencies Co., Savannah, Ga.—</i>			
Nitrate of Soda.....	..	15.00	..
<i>G. Ober &amp; Sons Co., Baltimore, Md.—</i>			
Ober's Complete Fertilizer.....	6.00	4.12	6.00
Special High Grade Fertilizer.....	9.00	2.47	3.00
Ober's Special Compound for Tobacco.....	8.00	2.47	3.00
Ober's Standard Tobacco Fertilizer.....	8.00	1.65	2.00
Ober's Special Ammoniated Dissolved Bone.....	9.00	1.65	2.00
Ober's Special Cotton Compound.....	8.00	1.65	2.00
Ober's Soluble Ammoniated Superphosphate of Lime .....	8.00	1.65	2.00
Ober's Farmers' Mixture.....	9.00	.82	2.00
Ober's Dissolved Bone, Phosphate and Potash...	10.00	..	2.00
Ober's Acid Phosphate with Potash.....	8.00	..	2.00
Ober's Standard Potash Compound.....	12.00	..	5.00
Ober's High Grade Acid Phosphate.....	16.00	..	..
Ober's Dissolved Bone Phosphate.....	14.00	..	..
Nitrate of Soda.....	..	15.50	..
Muriate of Potash.....	..	..	48.00
Kainit .....	..	..	12.00
Cooper's Pungo Guano.....	8.00	2.06	2.00
Pure Raw Bone Meal.....Total	21.00	..	3.71
<i>The Pocomoke Guano Co., Norfolk, Va.—</i>			
Garrett's Grape Grower.....	8.00	3.29	10.00
Coast Line Truck Guano.....	5.00	8.23	3.00
Freeman's 7 Per Cent Irish Potato Grower.....	6.00	5.76	5.00
Seaboard Popular Trucker.....	6.00	5.76	5.00
Standard Truck Guano.....	7.00	4.12	5.00
Faultless Ammoniated Superphosphate.....	7.00	3.30	4.00
Harvest High Grade Monarch.....	8.00	2.47	3.00
Monarch Tobacco Grower.....	8.00	2.47	3.00
Monticello Animal Bone Fertilizer.....	9.00	1.85	4.00
Cinco Tobacco Guano.....	8.50	2.06	2.50
Horseshoe Complete Compound.....	8.00	1.65	3.00
Hornthal's Tobacco Guano.....	8.00	1.65	3.00
L. P. H. Premium.....	8.00	1.65	2.00
Electric Crop Grower.....	8.50	1.65	2.00
P'amlico Superphosphate .....	8.00	1.65	2.00
Pocomoke Superphosphate .....	8.50	1.65	2.00
Pocomoke Bone and Potash Mixture.....	10.00	..	4.00
Pure Ground Bone.....Total	20.00	3.70	..
10-2 Potash Mixture .....	10.00	..	2.00
Alkali Bone .....	11.00	..	2.00
Peerless Acid Phosphate .....	14.00	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Superb Acid Phosphate .....	16.00	..	..
Genuine German Kainit .....	..	..	12.00
Muriate of Potash .....	..	..	50.00
Nitrate of Soda.....	..	15.65	..
Pocomoke Defiance Bone and Potash.....	8.00	..	4.00
Smith's Special Formula.....	4.00	3.30	6.00

*Pamlico Chemical Co., Washington, N. C.—*

Pamlico Favorite Guano.....	7.00	4.12	5.00
Pamlico Bone and Fish Guano.....	8.00	1.65	2.00
Pamlico Potato Guano.....	7.00	4.12	7.00
Pamlico Cotton Guano.....	8.00	1.65	2.00
Pamlico 7-7-7 Guano.....	7.00	5.77	7.00
Pamlico 16 Per Cent Acid Phosphate.....	16.00	..	..
Pamlico Bone and Potash.....	14.00	..	..
Cowell's Great Potato Grower.....	8.00	4.12	7.00
Cowell's Great Cabbage Grower.....	5.00	8.25	2.50
Tobacco Growers' Friend.....	8.00	2.47	3.00
Genuine German Kainit.....	..	..	12.00
Farmers' Best Guano.....	8.00	2.06	3.00
Farmers' Friend .....	8.00	2.47	3.00
Stanton & Taylor's Special Grower.....	8.00	2.26	2.00
Prosperity Cotton Grower.....	9.00	2.26	2.00
Pamlico High Grade Tobacco Grower.....	8.00	2.47	5.00
Pamlico 8-4-4 Guano.....	8.00	3.30	4.00
Pamlico 6-3-6 Guano.....	6.00	2.45	6.00
Pamlico Bone and Potash.....	10.00	..	2.00

*Planters Fertilizer and Phosphate Co., Charleston, S. C.—*

Planters' Bright Tobacco Fertilizer.....	8.00	3.90	4.00
Planters' High Grade Cabbage Fertilizer.....	7.00	6.59	5.00
Planters' Fertilizer .....	8.00	2.06	2.00
Planters' Soluble Guano.....	8.00	2.47	3.00
Planters' Standard Guano.....	8.75	1.65	2.00
Nitrate of Soda .....	..	14.83	..
Planters' High Grade Acid Phosphate.....	14.00	..	..
Planters' Standard Fertilizer.....	8.00	1.65	2.00
Planters' Soluble Bone.....	13.00	..	..
Sulphate of Potash .....	..	..	48.00
Planters' German Kainit .....	..	..	12.00

*Parsons & Hardison, Wadesboro, N. C.—*

Nitrate of Soda.....	..	14.85	..
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*Z. V. Pate, Laurel Hill, N. C.—*

Nitrate of Soda .....	..	14.76	..
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*Pearsall & Co., Wilmington, N. C.—*

Kainit .....	..	..	12.00
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*Pacific Guano Co., Charleston, S. C.—*

Standard Soluble Pacific Guano.....	8.50	1.65	2.00
Standard Pacific Acid Phosphate.....	12.00	..	..
High Grade Pacific Fertilizer.....	8.00	2.46	3.00

*Powhatan Chemical Co., Richmond, Va.—*

Powhatan Trucker .....	7.00	4.94	5.00
Powhatan Bone and Potash Mixture.....	8.00	..	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Powhatan Acid Phosphate.....	13.00	..	..
Magic Dissolved Bone Phosphate.....	16.00	..	..
Magic Peanut Grower.....	8.00	..	4.00
Magic Grain and Grass Grower.....	8.00	..	4.00
Magic Bone and Potash Mixture.....	10.00	..	4.00
Magic Mixture.....	9.00	1.65	1.00
Magic Cotton Grower.....	8.00	1.65	2.00
Magic Special Fertilizer.....	8.00	1.65	2.00
Magic Tobacco Grower.....	8.00	1.65	2.00
King Brand Fertilizer.....	8.00	2.06	3.00
White Leaf Tobacco Fertilizer.....	8.00	2.06	3.00
Economic Cotton Grower.....	9.00	2.26	2.00
North State Special.....	8.00	3.29	4.00
Guilford Special.....	9.00	2.47	6.00
Pure Raw Bone Meal.....Total	20.00	3.29	..
Bone and Potash Mixture.....	10.00	..	2.00
Bone Meal.....Total	25.00	2.47	..
Nitrate of Soda.....	..	15.63	..
Sulphate of Ammonia.....	..	19.75	..
Sulphate of Potash.....	..	..	48.00
Muriate of Potash.....	..	..	50.00
Pure German Kainit.....	..	..	12.00
Virginia Dissolved Bone.....	12.00	..	..
High Grade Acid Phosphate.....	14.00	..	..
Uneda Acid Phosphate.....	15.00	..	..
P. C. Co.'s Hustle.....	8.00	2.47	3.00
Magic Corn Grower.....	10.00	.82	1.00
Magic Wheat Grower.....	9.00	.82	2.00
Johnson's Best Fertilizer.....	9.00	2.06	5.00
Holt's Magic Fertilizer.....	9.00	2.06	5.00
Magic Peanut Special.....	8.00	.82	4.00
Bone Mixture.....	10.00	.82	1.00
Magic Crop Grower.....	10.00	.82	1.00

*Patapsco Guano Co., Baltimore, Md.—*

Patapsco Plant Food for Tobacco, Potatoes and Truck.....	8.00	2.47	5.00
Patapsco Soluble Bone and Potash.....	10.00	..	2.00
Patapsco High Grade Bone and Potash.....	11.00	..	5.00
Patapsco 10 and 4 Potash Mixture.....	10.00	..	4.00
Patapsco 7-7-7 Truck Guano.....	7.00	5.77	7.00
Patapsco Potato Guano.....	6.00	4.12	7.00
Patapsco Top Dresser.....	4.00	3.30	4.00
Patapsco Trucker for Early Vegetables.....	7.00	4.12	5.00
Patapsco Tobacco Fertilizer.....	9.00	2.47	3.00
Patapsco Guano for Tobacco.....	9.25	2.06	2.00
Patapsco Guano.....	9.25	2.06	2.00
Patapsco Special Tobacco Mixture.....	8.00	2.06	3.00
Patapsco Fine Ground Bone.....Total	20.61	3.30	..
Patapsco Dissolved S. C. Phosphate.....	14.00	..	..
Coon Brand Guano.....	9.00	.83	3.00
Choctaw Guano.....	8.00	2.47	3.00
Planters' Favorite.....	8.00	1.65	2.00
Seagull Ammoniated Guano.....	8.00	1.65	2.00
Money Maker Guano.....	7.00	3.70	6.00
Unicorn Guano.....	8.00	2.06	3.00
Baltimore Soluble Phosphate.....	11.00	..	2.00
Florida Soluble Phosphate.....	16.00	..	..
Geuine German Kainit.....	..	..	12.00

Name and Address of Manufacturer and Name of Brand.	Avall. Phos. Acid.	Nitrogen.	Potash.
Nitrate of Soda.....	..	15.64	..
Muriate of Potash.....	..	..	50.00
Ground Fish .....	..	8.23	..
Swanson's Gold Leaf Special.....	8.00	2.06	2.00
<i>Pocahontas Guano Co., Lynchburg, Va.—</i>			
Imperial Dissolved S. C. Phosphate.....	14.00	..	..
Carrington's Superior Grain Compound.....	10.00	..	2.00
Wabash Wheat Mixture.....	10.00	..	4.00
Cherokee Grain Special.....	8.00	..	4.00
Farmers' Favorite Guano, Apex Brand.....	8.00	2.47	3.00
Blackhawk Brand .....	8.00	2.06	2.00
Spot Cash Tobacco Compound.....	8.00	2.06	3.00
Yellow Tobacco Special.....	9.00	1.65	2.00
High Grade 4 Per Cent Tobacco Compound, Mo- hawk King Brand.....	9.00	1.85	4.00
Standard Tobacco Guano, Old Chief Brand....	9.00	1.65	2.00
Pocahontas Special Tobacco Fertilizer.....	9.00	2.47	3.00
A. A. Complete Champion Brand.....	8.00	.82	3.00
Special Truck Grower, Eagle Mount Brand....	8.00	2.06	6.00
Indian Truck Grower.....	8.00	3.30	4.00
Pure Raw Bone Meal.....Total	22.00	3.71	..
Carrington's S. C. Phosphate, Waukesha Brand,	16.00	..	..
Carrington's Banner Brand Guano.....	8.00	1.65	2.00
Indian Tobacco Grower.....	8.00	2.46	4.00
<i>Piedmont-Mt. Airy Guano Co., Baltimore, Md.—</i>			
Piedmont Cultivator Brand.....	8.00	1.65	2.00
Piedmont Bone and Peruvian Mixture.....	8.00	1.65	2.00
Piedmont Special Truck Fertilizer.....	6.00	5.77	5.00
Piedmont Early Vegetable Manure.....	6.00	4.12	7.00
Piedmont Vegetable Compound.....	6.00	3.30	8.00
Piedmont Essential Tobacco Compound.....	9.00	1.65	2.00
Piedmont Guano for Tobacco.....	8.00	2.06	3.00
Piedmont High Grade Ammoniated Bone and Potash .....	8.00	2.47	3.00
Piedmont High Grade S. C. Bone Phosphate..	14.00	..	..
Levering's Potashed Bone.....	10.00	..	4.00
Levering's Reliable Tobacco Guano.....	8.00	2.47	3.00
Piedmont Special Potato Guano.....	6.00	4.94	7.00
Piedmont Red Leaf Tobacco Guano.....	8.00	1.65	2.00
Piedmont Guano for Cotton.....	9.00	1.65	1.00
Piedmont Early Trucker.....	6.00	4.12	5.00
Piedmont Potato Producer .....	5.00	2.47	6.00
Piedmont Farmers' Standard.....	9.00	1.65	2.00
Piedmont Guano for Wheat.....	9.00	1.65	1.00
Piedmont Special for Cotton, Corn and Peanuts,	8.00	1.65	2.00
Piedmont Special Farmers' Tobacco Guano....	8.40	2.47	4.00
Piedmont Farmers' Bone and Potash.....	10.00	..	2.00
Piedmont High Grade Guano for Cotton.....	8.00	2.47	3.00
Haynes' Cultivator Guano.....	8.00	1.65	2.00
Piedmont Farmers' Favorite.....	8.00	.82	4.00
Piedmont Farmers' Cotton Grower.....	9.00	.82	3.00
German Kainit .....	..	..	12.00
Piedmont Star Bone and Potash.....	8.00	..	5.00
Piedmont Unexcelled Guano.....	8.00	3.29	4.00
Piedmont Bone Meal.....Total	21.00	3.30	..
Ricks Bros.' Special Potato and Truck Guano..	6.00	4.12	7.00
Kaiser & Mauney's Special 2-8-2 Guano.....	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Kaiser & Mauney's Special 3-8-3 Guano.....	8.00	2.47	3.00
Privott's 3-8-4 Guano.....	8.00	2.47	4.00
Piedmont Guano for All Crops.....	8.00	2.06	3.00
Piedmont Vegetable Manure.....	6.00	3.29	8.00
Nitrate of Soda.....	..	15.23	..
Privott's Standard Guano.....	8.00	2.06	3.00
Privott's Special Guano.....	8.00	1.65	6.00
Muriate of Potash.....	..	..	48.00
Sulphate of Potash.....	..	..	50.00
Sulphate of Ammonia.....	..	20.58	..
Acidulated Rock and Bone Tankage.....	9.00	2.47	3.00
Acidulated Rock and Bone Tankage.....	9.00	2.47	3.00

*The Quinnepiac Co., Charleston, S. C.—*

Standard Quinnepiac Pine Island Ammoniated Superphosphate .....	9.00	1.85	1.00
Standard Quinnepiac Acid Phosphate.....	13.00	..	..

*F. S. Royster Guano Co., Norfolk, Va.—*

Sulphate of Potash.....	..	..	50.00
Muriate of Potash.....	..	..	48.00
Genuine German Kainit.....	..	..	12.00
Farmers' Bone Fertilizer.....	8.00	1.65	2.00
Bonanza Tobacco Guano.....	8.00	2.47	3.00
Orinoco Tobacco Guano.....	8.00	2.06	3.00
Special Tobacco Compound.....	8.00	2.06	2.00
Cobb's High Grade for Tobacco.....	8.00	3.30	5.00
Humphrey's Special for Tobacco.....	6.00	2.55	3.20
Eagle's Special Tobacco Guano.....	8.00	2.47	5.00
Royal Potato Guano.....	7.00	4.12	5.00
Royal Special Potato Guano.....	7.00	4.12	7.00
Ballentine's Potato Guano.....	6.00	5.77	7.00
Truckers' Delight .....	8.00	3.30	4.00
Special Compound .....	9.00	1.65	1.00
Tomlinson's Special .....	9.00	2.47	5.00
Williams' Special Guano.....	8.00	2.06	5.00
Magic Top Dresser.....	..	7.42	3.00
Royster's Special Sweet Potato Guano.....	8.00	2.47	3.00
Royster's Potato Guano.....	5.00	4.94	7.00
Royster's Special 7 Per Cent Truck Guano....	7.00	5.77	7.00
Royster's Early Truck Guano.....	7.00	4.12	8.00
Royster's Special 10 Per Cent Truck Guano....	5.00	8.24	3.00
Royster's Special 4-8-3.....	8.00	3.30	3.00
Royster's 4-9-5 Special.....	9.00	3.30	5.00
Royster's Special 1-9-2 Guano.....	9.00	.82	2.00
Royster's 2-6-5 Special.....	6.00	1.65	5.00
Royster's Meal Mixture.....	9.00	2.26	2.00
Royster's Special Wheat Fertilizer.....	8.00	1.65	2.00
Royster's H. G. 16 Per Cent Acid Phosphate...	16.00	..	..
Royster's 14 Per Cent Acid Phosphate.....	14.00	..	..
Royster's Dissolved Bone.....	13.00	..	..
Royster's XX Acid Phosphate.....	12.00	..	..
Royster's Bone and Potash Mixture.....	11.00	..	5.00
Royster's Bone and Potash Mixture.....	10.00	..	2.00
Royster's Bone and Potash for Grain.....	10.00	..	3.00
Royster's 8 and 4 Bone and Potash Mixture....	8.00	..	4.00
Royster's Peanut Special.....	7.00	..	5.00
Royster's Complete Guano.....	8.00	1.65	2.00
Royster's 10 and 4 Bone and Potash Mixture...	10.00	..	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Royster's Best Guano.....	8.00	3.71	7.00
Royster's Harvey's Cabbage Guano.....	5.00	6.59	3.00
Royster's Marlborough High Grade Cotton Guano .....	8.00	2.47	3.00
Nitrate of Soda.....	..	15.66	..
Jumbo Peanut Grower.....	8.00	.82	4.00
Watkins' Special .....	9.00	2.06	5.00
Haynes' Special .....	9.00	2.06	3.00
Pure Raw Bone Meal.....	Total	3.70	..
Milo Tobacco Guano.....	8.00	3.30	4.00
Royster's Soluble Guano.....	10.00	1.65	2.00
McDowell's Cotton Grower.....	6.00	2.30	2.50
Royster's 4-6-4 Special.....	6.00	3.30	4.00
Webb's Korn King.....	8.00	1.65	2.00
Royster's 10-5 Bone and Potash Mixture.....	10.00	..	5.00
<i>J. H. Roberson &amp; Co., Robersonville, N. C.—</i>			
Roberson's Potato Guano.....	6.00	5.77	5.00
Roberson's Cotton Grower.....	9.00	2.26	2.00
Roberson's Special Potato Grower.....	7.00	5.77	7.00
Roberson's Bright Leaf Grower.....	8.00	2.06	3.00
Roberson's High Grade Acid Phosphate.....	14.00	..	..
Genuine German Kainit.....	..	..	12.00
<i>Richmond Guano Co., Richmond, Va.—</i>			
10 Per Cent Cabbage Guano.....	6.00	8.23	2.00
Special High Grade for Truck.....	7.00	4.94	5.00
Southern Trucker .....	8.00	4.11	5.00
Perfection Special .....	8.00	3.29	4.00
Gilt Edge Fertilizer.....	8.00	2.47	3.00
Carolina Cotton Grower.....	9.00	2.26	2.00
Carolina Bright Special Tobacco Fertilizer.....	8.00	2.26	2.50
Tip Top Fertilizer.....	8.00	2.06	3.00
Special Premium Brand for Tobacco.....	8.00	1.85	2.25
Special Premium Brand for Plants.....	8.00	1.85	2.25
Carolina Bright for Cotton.....	8.00	2.06	1.50
Benson's Special Fertilizer.....	8.00	1.65	6.00
Parker & Hunter's Special Fertilizer.....	8.00	1.65	2.00
Premium Tobacco Fertilizer.....	8.00	1.65	2.00
Premium Brand Fertilizer.....	8.00	1.65	2.00
Bone Mixture .....	9.00	1.65	1.00
Clark's Special Formula.....	7.00	4.94	6.00
Carter's Special for Tobacco.....	4.00	2.47	6.00
Saunders' Special Formula for Bright Tobacco,	9.00	2.88	5.00
Burton's Special Tobacco Fertilizer.....	9.00	2.06	3.00
Hunter & Dunn's Special Ammoniated Fertilizer,	9.00	2.47	2.25
Hunter & Dunn's Ammoniated Fertilizer.....	8.00	1.65	2.00
Edgecombe Cotton Grower.....	8.00	1.65	2.00
Premium Bone and Potash Mixture.....	13.00	..	3.00
Rex Bone and Potash Mixture.....	10.00	..	4.00
Tip Top Bone and Potash Mixture.....	8.00	..	4.00
Winter Grain and Grass Grower.....	8.00	..	4.00
Premium Peanut Grower.....	8.00	..	4.00
Bone and Potash Mixture.....	10.00	..	2.00
Rex Dissolved Bone Phosphate.....	16.00	..	..
Regal Acid Phosphate.....	15.00	..	..
High Grade Acid Phosphate.....	14.00	..	..
High Grade Wheat and Grass Fertilizer.....	14.00	..	..
Premium Dissolved Bone .....	13.00	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Dissolved S. C. Phosphate.....	12.00	..	..
Hunter & Dunn's Dissolved Bone.....	12.00	..	..
Pure German Kainit.....	..	..	12.00
Muriate of Potash.....	..	..	50.00
Sulphate of Potash.....	..	..	48.00
Sulphate of Ammonia.....	..	19.75	..
Nitrate of Soda.....	..	15.63	..
Pure Raw Bone meal.....Total	20.00	3.29	..
Bone Meal.....Total	25.00	2.47	..
Premium Corn Grower.....	10.00	.82	1.00
Premium Wheat Grower.....	9.00	.82	2.00
Cracker Jack Fertilizer.....	9.00	1.65	2.00
Premium Peannt Special.....	8.00	.82	4.00
Premium Cotton Grower.....	9.00	.82	3.00
Old Homestead Dissolved Bone.....	12.00	..	..
Haw River Special Fertilizer.....	8.00	2.88	5.00
<i>Read Phosphate Co., Charleston, S. C.—</i>			
Genuine German Kainit.....	..	..	12.00
Read's High Grade Acid Phosphate.....	14.00	..	..
Read's Bone and Potash.....	10.00	..	4.00
Read's Alkaline Bone.....	10.00	..	2.00
Read's Special Potash Mixture.....	8.00	..	4.00
Read's High Grade Tobacco Leaf.....	8.00	2.47	3.00
Read's Blood and Bone Fertilizer No. 1.....	8.00	1.65	2.00
Read's Soluble Fish Gnao.....	8.00	1.65	2.00
Read's High Grade Cotton Grower.....	8.00	2.47	3.00
<i>Raisin-Monumental Co., Baltimore, Md.—</i>			
Dixie Guano.....	9.00	1.65	2.00
Empire Guano.....	8.00	1.65	2.00
Raisin Premium Brand for Tobacco.....	8.00	2.46	3.00
Raisin Gold Standard.....	8.00	2.46	3.00
Raisin Special Bone and Potash.....	10.00	..	5.00
Raisin Bone and Potash.....	10.00	..	2.00
Raisin 13 Per Cent Acid Phosphate.....	13.00	..	..
Raisin 16 Per Cent Acid Phosphate.....	16.00	..	..
Raisin Acid Phosphate.....	14.00	..	..
<i>Reidsville Fertilizer Co., Reidsville, N. C.—</i>			
Banner Fertilizer.....	8.00	1.65	2.00
Champion Gnao.....	8.00	1.65	2.00
Broad Leaf Tobacco Guano.....	8.00	1.85	2.50
Royal Fertilizer.....	8.00	2.47	3.00
Lion Brand Fertilizer.....	9.00	2.47	6.00
Bone and Potash.....	10.00	..	4.00
<i>Swift Fertilizer Works, Atlanta, Ga., and Wilmington, N. C.—</i>			
High Grade Swift's Strawberry Grower.....	8.00	2.47	10.00
High Grade Swift's Special Trucker.....	6.00	5.76	5.00
High Grade Swift's Special 10 Per Cent Blood and Bone Trucker.....	5.00	8.23	3.00
High Grade Swift's Carolina 7 Per Cent Special Trucker.....	7.00	5.76	7.00
High Grade Swift's Favorite Truck Guano.....	6.00	4.94	6.00
High Grade Swift's Special Irish Potato Grower.....	7.00	4.12	8.00
High Grade Swift's Special Potato Grower.....	6.00	4.12	7.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Standard Grade Swift's Red Steer Guano Standard Grade .....	8.00	1.65	2.00
Swift's Plow Boy Guano.....	10.00	.82	1.00
Standard Grade Swift's Cotton Plant Standard Grade Guano .....	9.00	1.65	1.00
Standard Grade Swift's Golden Harvest Standard Grade Guano.....	8.00	1.65	2.00
Swift's Eagle Standard Grade Guano.....	10.00	1.65	2.00
High Grade Swift's Farmers' Favorite High Grade Guano .....	9.00	1.65	3.00
High Grade Swift's Pioneer High Grade Guano Tobacco Grower .....	8.00	1.65	4.00
High Grade Swift's Early Trucker.....	7.00	4.12	5.00
High Grade Swift's Blood, Bone and Potash High Grade Guano.....	9.50	3.29	7.00
High Grade Swift's Corn and Cotton Grower High Grade Guano.....	10.00	2.47	3.00
High Grade Swift's Cotton King High Grade Guano .....	9.00	2.47	2.00
High Grade Swift's Ruralist High Grade Guano, High Grade Swift's Special High Grade Guano..	8.00	2.47	3.00
High Grade Swift's Monarch Vegetable Grower High Grade Guano.....	9.50	4.12	3.00
High Grade Swift's Atlanta High Grade Guano, High Grade Swift's Special High Grade Phosphate and Potash.....	8.00	3.29	4.00
Standard Grade Swift's Plantation Standard Grade Phosphate and Potash.....	12.00	..	4.00
High Grade Swift's Farmers' Home High Grade Phosphate and Potash.....	12.00	..	6.00
Standard Grade Swift's Field and Farm Standard Grade Phosphate and Potash.....	8.00	..	4.00
Standard Grade Swift's Wheat Grower Standard Grade Phosphate and Potash.....	10.00	..	4.00
Standard Grade Swift's Harrow Standard Grade Acid Phosphate .....	10.00	..	2.00
High Grade Swift's No. 1 Ground Tankage....	13.00	..	..
Swift's Pure Bone Meal.....Total	6.00	8.24	..
High Grade Swift's Cultivator High Grade Acid Phosphate .....	25.00	2.47	..
High Grade Swift's Special High Grade Acid Phosphate .....	14.00	..	..
Standard Grade Swift's Chattahoochee Standard Grade Acid Phosphate.....	16.00	..	..
High Grade Swift's Ground Dried Blood.....	12.00	..	..
Swift's Pure Nitrate of Soda.....	..	13.18	..
Swift's Pure Raw Bone Meal.....Total	..	14.82	..
Swift's Muriate of Potash.....	23.00	3.71	..
Swift's German Kainit.....	..	..	50.00
Swift's Farmers' Favorite High Grade Guano...	..	..	12.00
Swift's Pioneer High Grade Guano.....	9.00	1.65	3.00
High Grade Swift's Eagle High Grade Guano...	8.00	1.65	4.00
Swift's Atlanta High Grade Phosphate and Potash .....	10.00	1.65	2.00
ash .....	12.00	..	4.00

*Southern Chemical Co., Inc., Roanoke, Va.—*

Our Favorite .....	8.00	1.64	2.00
Farmers' Joy .....	8.00	1.64	4.00
Our Leader .....	9.00	.82	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Harvest King .....	8.00	.82	3.00
Southern Queen .....	8.00	2.46	10.00
Valley Chief .....	8.50	1.64	2.00
<i>Spartanburg Fertilizer Co., Spartanburg, S. C.—</i>			
Corn Formula .....	10.50	1.65	5.00
Gosnell's Plant Food .....	10.50	2.46	2.00
West's Potash Acid.....	13.00	..	3.00
Bold Buster .....	9.00	1.65	2.00
Potato Guano .....	7.00	2.46	7.00
Tiger Brand Acidulated Phosphate.....	14.00	..	..
<i>The Southern Exchange Co., Maxton, N. C.—</i>			
Melon Grower .....	8.00	4.12	7.00
McKimmon's Special Truck Formula.....	8.00	4.12	7.00
Two Fours Guano.....	7.00	3.30	4.00
That Big Stick Guano.....	8.00	2.47	4.00
Bull of the Woods Fertilizer.....	8.00	2.47	4.00
Jack's Best Fertilizer.....	8.00	2.47	3.00
Correct Cotton Compound.....	8.00	2.47	3.00
Juicy Fruit Fertilizer.....	9.00	1.85	4.00
The Walnut Fertilizer.....	8.50	2.06	2.50
The Racer Guano.....	8.00	1.65	3.00
The Coon Guano.....	8.00	1.65	2.00
R. M. C. Special Crop Grower.....	8.00	2.47	3.00
S. E. C. Bone and Potash Mixture.....	10.00	..	4.00
S. E. C. Bone and Potash Mixture.....	10.00	..	2.00
S. E. C. Acid Phosphate.....	16.00	..	..
S. E. C. Acid Phosphate.....	14.00	..	..
Genuine German Kainit.....	..	..	12.00
Muriate of Potash.....	..	..	50.00
Nitrate of Soda.....	..	15.65	..
<i>The Southern Cotton Oil Co., Charlotte District, Concord, Charlotte, Davidson, Madison, Shelby, and Gibson.—</i>			
Conqueror .....	8.00	3.28	4.00
Gloria .....	8.00	1.65	2.00
Peacock .....	8.00	2.46	3.00
Red Bull .....	8.00	2.05	2.00
Noon .....	8.00	2.46	3.00
King Bee .....	8.65	1.65	2.00
Gold Seal .....	14.00	..	..
Silver King .....	13.00	..	..
Genuine German Kainit.....	..	..	12.00
Magnolia Bone and Potash.....	10.00	..	2.00
Conqueror Bone and Potash.....	10.00	..	4.00
Cotton Seed Meal.....	2.30	6.18	1.50
Choice .....	8.00	3.30	6.00
Genuine German Kainit.....	..	..	12.00
Magnolia B. and P.....	10.00	..	2.00
Conqueror B. and P.....	12.00	..	4.00
Southern Cotton Oil Co.'s 16 Per Cent Acid Phosphate .....	16.00	..	..
Razem .....	9.00	1.65	3.00
<i>Southern Cotton Oil Co. (Charlotte Division).</i>			
Dandy Top Dresser.....	4.00	9.07	2.50

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Southern Cotton Oil Co., Goldsboro, Fayetteville, Rocky Mount and Wilson.—</i>			
Rocky Mount Oil Mill Standard.....	8.00	1.65	2.00
Fayetteville Oil Mill Standard.....	8.00	1.65	2.00
Goldsboro Oil Mill Standard.....	8.00	1.65	2.00
Wilson Oil Mill Standard.....	8.00	1.65	2.00
The Southern Cotton Oil Company Standard....	8.00	1.65	2.00
Fayetteville Oil Mill Special Cotton Grower....	8.00	2.47	3.00
Wilson Oil Mill Special Cotton Grower.....	8.00	2.47	3.00
Rocky Mount Oil Mill Special Cotton Grower...	8.00	2.47	3.00
Goldsboro Oil Mill Special Cotton Grower.....	8.00	2.47	3.00
Goldsboro Oil Mill High Grade.....	8.00	2.26	2.50
Rocky Mount Oil Mill High Grade.....	8.00	2.26	2.50
Fayetteville Oil Mill High Grade.....	8.00	2.26	2.50
Wilson Oil Mill High Grade.....	8.00	2.26	2.50
The Southern Cotton Oil Co. High Grade.....	8.00	2.26	2.50
Edgerton's Old Reliable.....	8.00	2.47	3.00
Hale's Special for Tobacco.....	8.00	2.47	4.00
Pine Level High Grade.....	8.00	2.47	3.00
Cotton Grower for all Crops.....	8.00	1.65	2.00
Best & Thompson's Special.....	9.00	2.26	2.00
The Southern Cotton Oil Co.'s Special Tobacco Grower .....	8.00	2.47	3.00
Echo .....	8.00	2.06	3.00
Morning Glory .....	8.00	2.47	3.00

*Tuscarora Fertilizer Co., Atlanta, Ga., and Wilmington,  
N. C.—*

Acid Phosphate .....	14.00	..	..
Acid Phosphate .....	13.00	..	..
Tuscarora Alkaline .....	10.00	..	5.00
Bone Potash .....	10.00	..	2.00
Champion .....	8.00	2.06	2.50
Manure Substitute .....	6.00	3.30	4.00
Tuscarora Trucker .....	8.00	4.12	7.00
Berry King .....	8.00	2.06	4.00
Tobacco Special .....	8.00	2.47	3.00
Tuscarora Fruit and Potato.....	8.00	1.65	10.00
Cotton Special .....	8.00	2.47	3.00
King Cotton .....	8.00	2.06	2.00
Big Four .....	7.00	1.65	4.00
Tuscarora Standard .....	8.00	1.65	2.00
Sulphate of Potash.....	..	..	50.00
Muriate of Potash.....	..	..	48.00
Kainit .....	..	..	12.00
Nitrate of Soda .....	..	14.85	..
Acid Phosphate .....	16.00	..	..
Tuscarora Bone and Potash.....	8.00	..	4.00
Tuscarora Bone and Potash.....	10.00	..	4.00

*Tide Water Fertilizer Co., Portsmouth, Va.—*

Tide Water Acid Phosphate.....	14.00	..	..
Tide Water 12 Per Cent German Kainit.....	..	..	12.00
Acid Phosphate and Tankage.....	8.00	2.47	3.00
Tide Water High Grade Cotton.....	8.00	2.47	3.00
Tide Water Tobacco Special.....	8.00	2.47	3.00
Tide Water Very Best Cotton and Corn Guano..	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Union Guano Co., Winston-Salem, N. C.—</i>			
Union 8-5 Bone and Potash.....	8.00	..	5.00
Sulphate of Potash.....	..	..	48.00
Muriate of Potash.....	..	..	48.00
Genuine German Kainit.....	..	..	12.00
Union 12 Per Cent Acid Phosphate.....	12.00	..	..
Union Dissolved Bone.....	13.00	..	..
Union High Grade Acid Phosphate.....	14.00	..	..
Union 16 Per Cent Acid Phosphate.....	16.00	..	..
Union 12-3 Bone and Potash.....	12.00	..	3.00
Union 10-6 Bone and Potash.....	10.00	..	6.00
Union 10-5 Bone and Potash.....	10.00	..	5.00
Union 10-4 Bone and Potash.....	10.00	..	4.00
Union 8-5 Bone and Potash .....	8.00	..	5.00
Union 12-4 Bone and Potash.....	12.00	..	4.00
Union 12-5 Bone and Potash .....	12.00	..	5.00
Union Wheat Mixture.....	8.00	..	4.00
Union Bone and Potash .....	10.00	..	2.00
Quakers' Grain Mixture .....	10.00	..	4.00
Giant Phosphate and Potash .....	10.00	..	3.00
Liberty Bell Crop Grower .....	10.50	..	1.50
Roseboro's Special Potash Mixture .....	12.00	..	6.00
Union Potato Mixture .....	8.00	1.65	10.00
Union Dissolved Animal Bone .....	12.50	2.06	..
Union Vegetable Compound .....	7.00	4.12	8.00
Union Truck Guano .....	7.00	3.29	5.00
Union Premium Guano .....	8.00	3.29	4.00
Union Perfect Cotton Grower .....	9.00	2.26	2.00
Union Standard Tobacco Grower.....	8.00	2.06	2.00
Union Mule Brand Guano .....	10.00	1.65	2.00
Union Water Fowl Guano .....	8.00	2.06	3.00
Union Homestead Guano .....	8.00	2.37	3.00
Union Superlative Guano .....	8.00	.82	4.00
Union Special Formula for Cotton.....	10.00	2.47	3.00
Union Complete Cotton Mixture .....	9.00	1.65	3.00
Old Homestead Guano .....	8.00	1.65	2.00
Victoria High Grade Tobacco Guano .....	8.00	2.47	3.00
Sparger's Special Tobacco Grower .....	8.00	1.65	3.00
Old Homestead Tobacco Guano .....	8.00	1.65	2.00
Genuine Animal Bone Meal.....Total	22.50	3.70	..
Nitrate of Soda.....	..	15.65	..
Quality and Quantity Guano.....	9.00	1.65	1.00
<i>R. L. Upshur, Norfolk, Va.—</i>			
Cotton Seed Meal Mixture.....	9.00	2.26	2.00
Nitrate of Soda.....	..	15.65	..
Quality and Quantity Guano.....	9.00	1.65	1.00
Nitrate of Soda .....	..	15.22	..
Muriate of Potash .....	..	..	50.00
Genuine German Kainit .....	..	..	12.00
Upshur's High Grade Acid Phosphate .....	14.00	..	..
Upshur's Peanut Guano .....	8.00	1.65	2.00
Upshur's G., G. & C. (Grain, Grass and Cotton Guano) .....	8.00	1.65	2.00
Upshur's Wheat Compound .....	12.00	..	5.00
Upshur's F. F. V. (Favorite Fertilizer of Vir- ginia) .....	8.00	1.64	2.00
Upshur's Bone and Potash Guano .....	10.00	..	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Upshur's Norfolk Special 10 Per Cent Guano....	5.00	8.22	2.00
Upshur's 7 Per Cent Irish Potato Guano.....	6.00	5.76	5.00
Upshur's F. C. (Farmers' Challenge) Guano ...	6.00	5.76	6.00
Upshur's 7 Per Cent Special Potato Guano.....	5.00	5.76	5.00
Upshur's Special Truck Guano .....	7.00	4.11	8.00
Upshur's F. F. (Farmers' Favorite).....	7.00	4.11	6.00
Upshur's 5 Per Cent Guano .....	5.00	4.11	5.00
Upshur's Fish, Bone and Potash Guano .....	8.00	1.64	4.00
Upshur's 8-3-3 Cotton Guano .....	8.00	2.47	3.00
Upshur's High Grade Tobacco Guano .....	8.00	2.47	3.00
Premo Cotton Guano .....	8.00	1.65	2.00
Upshur's Special 2½ 8-3 Guano .....	8.00	2.05	3.00
Upshur's 16 Per Cent Acid Phosphate.....	16.00	..	..
Upshur's 4-6-4 Guano .....	6.00	3.69	4.00

*Venable Fertilizer Co., Richmond, Va.—*

Venable's 10 Per Cent Trucker .....	6.00	8.23	2.00
Venable's 6-6-6 Manure .....	6.00	4.94	6.00
Venable's 5 Per Cent Trucker .....	8.00	4.11	5.00
Venable's 4 Per Cent Trucker .....	8.00	3.29	4.00
Venable's Ideal Manure .....	8.00	1.65	5.00
Venable's Alliance Tobacco Manure No. 1....	8.00	2.06	3.00
Venable's Alliance Tobacco Manure No. 2....	8.00	1.65	2.00
Venable's B. B. P. Manure .....	9.00	1.65	1.00
Venable's Cotton Grower .....	8.00	2.06	3.00
Venable's Roanoke Special .....	8.00	2.06	3.00
Venable's Alliance Bone and Potash Mixture..	8.00	..	4.00
Venable's Peanut Grower .....	8.00	..	4.00
Venable's Best Acid Phosphate .....	16.00	..	..
Venable's Alliance Acid Phosphate .....	14.00	..	..
Venable's Dissolved Bone .....	13.00	..	..
Venable's Standard Acid Phosphate .....	12.00	..	..
Bone and Potash Mixture .....	10.00	..	2.00
High Grade Bone and Potash Mixture .....	10.00	..	4.00
Planters' Bone Fertilizer.....	8.00	1.65	2.00
Ballard's Choice Fertilizer .....	8.00	2.47	3.00
Roanoke Mixture .....	9.00	2.26	2.00
Roanoke Meal Mixture .....	9.00	2.26	2.00
Bone Meal .....	Total 25.00	2.47	..
Pure Raw Bone.....	Total 20.00	3.20	..
Muriate of Potash .....	..	..	50.00
Nitrate of Soda.....	..	15.63	..
Sulphate of Potash .....	..	..	48.00
Pure German Kainit .....	..	..	12.00
Venable's Corn, Wheat and Grass Fertilizer..	10.00	.82	1.00
Venable's Peanut Special .....	8.00	.82	4.00

*Virginia-Carolina Chemical Co., Richmond, Va.—*

V.-C. C. Co.'s Special High Grade Potash Mix- ture .....	12.00	..	6.00
V.-C. C. Co.'s 14 Per Cent Acid Phosphate.....	14.00	..	..
V.-C. C. Co.'s 16 Per Cent Acid Phosphate.....	16.00	..	..
V.-C. C. Co.'s Standard Bone and Potash.....	10.00	..	5.00
V.-C. C. Co.'s Special Crop Grower.....	12.00	..	3.00
V.-C. C. Co.'s Formula 4-4.....	7.00	2.55	3.20
V.-C. C. Co.'s Special Truck Guano.....	6.00	4.10	7.00
V.-C. C. Co.'s Special.....	8.00	3.28	4.00
V.-C. C. Co.'s Special Potash Mixture.....	10.00	..	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
V.-C. C. Co.'s Lion's High Grade Tobacco Fer- tilizer .....	8.00	2.46	4.00
V.-C. C. Co.'s Invincible High Grade Fertilizer..	6.00	4.10	7.00
V.-C. C. Co.'s High Grade Tobacco Fertilizer...	8.00	2.46	10.00
Great Texas Cotton Grower Soluble Guano....	9.00	2.46	4.00
Cock's Soluble High Grade Animal Bone.....	9.00	1.85	3.00
Truck Crop Fertilizer.....	7.00	4.10	7.00
Prolific Cotton Grower.....	9.00	2.26	2.00
Battle's Crop Grower.....	12.00	..	3.00
3 Per Cent Special C. S. M. Guano No. 3.....	8.00	2.46	2.00
Delta C. S. M.....	8.00	2.26	2.50
Winston Special for Cotton C. S. M.....	8.00	1.65	2.00
Diamond Dust C. S. M.....	8.00	1.65	2.00
Admiral .....	8.00	2.46	2.50
Blue Star C. S. M.....	8.00	2.05	3.00
Good Luck C. S. M.....	8.00	2.46	2.50
North State Guano C. S. M.....	9.00	1.65	1.00
Plant Food .....	8.00	1.65	2.00
Split Silk C. S. M.....	8.00	2.46	2.50
Superlative C. S. M. Guano.....	8.00	2.06	3.00
Farmers' Friend Favorite Fertilizer Special....	8.50	1.65	2.00
White Stem C. S. M.....	9.00	2.26	2.00
Special High Grade Tobacco Fertilizer C. S. M..	8.00	2.46	3.00
Wilson's Standard C. S. M.....	8.00	1.65	2.00
Adams' Special .....	8.00	2.46	3.00
Ajax C. S. M. Guano.....	8.00	1.65	2.00
Royal Crown .....	8.00	2.26	2.00
Farmers' Favorite Fertilizer C. S. M.....	8.00	1.65	2.00
Atlas Guano C. S. M.....	8.00	2.46	2.50
Blake's Best .....	8.00	2.46	3.00
Orange Grove .....	8.00	2.26	2.50
Carr's 8-4-4 Crop Grower.....	8.00	3.28	4.00
Ford's Wheat and Corn Guano.....	9.00	.82	2.00
Konqueror High Grade Truck Fertilizer.....	7.90	4.10	5.00
Goodman's Special Potash Mixture.....	12.00	..	5.00
Jones' Grain Special.....	8.00	..	4.00
Raw Bone Meal .....	Total	3.70	..
Dissolved Animal Bone.....	12.50	2.05	..
Sludge Acid Phosphate.....	14.00	..	..
Manure Salts .....	..	..	20.00
Sulphate of Potash.....	..	..	50.00
Sulphate of Ammonia.....	..	20.59	..
Fish Scrap .....	..	8.25	..
Nitrate of Soda.....	..	15.68	..
Genuine German Kainit.....	..	..	12.00
Muriate of Potash.....	..	..	48.00
V.-C. C. Co.'s Grain Special.....	10.00	..	6.00
V.-C. C. Co.'s Dissolved Bone and Potash.....	10.00	..	2.00
Diamond Cotton Seed Meal Guano.....	8.00	2.47	3.00
Bold Buster Guano.....	10.00	1.65	2.00
Bigelow's Crop Guano.....	9.00	.82	3.00
V.-C. C. Co.'s 12-4 Grain Grower.....	12.00	..	4.00
Jeffreys' High Grade Guano.....	9.00	2.47	3.00
V.-C. C. Co.'s High Grade Top Dresser.....	4.00	6.18	2.50
V.-C. C. Co.'s 13 Per Cent Acid Phosphate....	13.00	..	..
Haynes' Special Cotton Fertilizer.....	8.00	1.65	2.00
Parker & Hunter's Special.....	8.00	1.65	2.00
Allison & Addison's Star Brand Vegetable Guano .....	8.00	3.70	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Allison & Addison's Star Special Tobacco Manure .....	9.00	2.26	2.00
Allison & Addison's Anchor Brand Tobacco Fertilizer .....	8.50	2.26	2.00
Allison & Addison's Anchor Brand Fertilizer....	8.00	1.65	2.00
Allison & Addison's A. A. Guano.....	8.00	2.46	3.00
Allison & Addison's Old Hickory Guano.....	8.00	1.65	2.00
Allison & Addison's Star Brand Guano.....	9.00	1.65	1.00
Allison & Addison's B. P. Potash Mixture.....	10.00	..	2.00
Allison & Addison's McGavock's Special Potash Mixture .....	10.00	..	2.00
Allison & Addison's Fulton Acid Phosphate....	14.00	..	..
Allison & Addison's I. X. L. Acid Phosphate....	13.00	..	..
Allison & Addison's Standard Acid Phosphate..	12.00	..	..
Allison & Addison's Rocket Acid Phosphate....	12.00	..	..
Atlantic and Virginia Fertilizer Co.'s Eureka Acid Phosphate .....	16.00	..	..
Atlantic and Virginia Fertilizer Co.'s Crenshaw Acid Phosphate .....	13.00	..	..
Atlantic and Virginia Fertilizer Co.'s Valley of Virginia Acid Phosphate.....	14.00	..	..
Atlantic and Virginia Fertilizer Co.'s Our Acid Phosphate .....	12.00	..	..
Atlantic and Virginia Fertilizer Co.'s Eureka Bone and Potash Compound.....	10.00	..	2.00
Atlantic and Virginia Fertilizer Co.'s Eureka Ammoniated Bone Special for Tobacco.....	9.00	2.05	2.00
Atlantic and Virginia Fertilizer Co.'s Eureka Ammoniated Bone .....	8.00	1.65	3.00
Atlantic and Virginia Fertilizer Co.'s Carolina Truckers .....	7.00	5.74	7.00
Atlantic and Virginia Fertilizer Co.'s Virginia Truckers .....	8.00	4.10	5.00
Atlantic and Virginia Fertilizer Co.'s Orient Special for Tobacco.....	8.00	1.65	2.00
Atlantic and Virginia Fertilizer Co.'s Orient Complete Manure .....	9.00	1.65	2.00
Charlotte Oil and Fertilizer Co.'s King Cotton Grower .....	8.00	1.65	2.00
Charlotte Oil and Fertilizer Co.'s The Leader B. G.....	8.00	1.65	2.00
Charlotte Oil and Fertilizer Co.'s Groom's Special Tobacco Fertilizer.....	8.00	2.46	4.00
Charlotte Oil and Fertilizer Co.'s Charlotte Dissolved Bone .....	12.00	..	..
Charlotte Oil and Fertilizer Co.'s Charlotte Ammoniated Guano B. G.....	8.00	2.05	1.50
Charlotte Oil and Fertilizer Co.'s Charlotte Ammoniated Guano C. S. M.....	8.00	2.05	1.50
Charlotte Oil and Fertilizer Co.'s Charlotte Acid Phosphate .....	13.00	..	..
Charlotte Oil and Fertilizer Co.'s Catawba Guano B. G.....	8.00	2.46	3.00
Charlotte Oil and Fertilizer Co.'s Catawba Acid Phosphate .....	14.00	..	..
Charlotte Oil and Fertilizer Co.'s Queen of the Harvest C. S. M.....	9.00	1.65	2.00
Charlotte Oil and Fertilizer Co.'s Oliver's Perfect Wheat Grower.....	11.00	2.46	4.00

Name and Address of Manufacturer and Name of Brand.	Avall. Phos. Acid.	Nitrogen.	Potash.
Charlotte Oil and Fertilizer Co.'s 10-2 Bone and Potash .....	10.00	..	2.00
Charlotte Oil and Fertilizer Co.'s 15 Per Cent Acid Phosphate .....	15.00	..	..
Charlotte Oil and Fertilizer Co.'s McCrary's Diamond Bone and Potash.....	8.00	..	4.00
Charlotte Oil and Fertilizer Co.'s Special 3 Per Cent Guano C. S. M.....	8.00	2.46	2.00
Charlotte Oil and Fertilizer Co.'s High Grade Special Tobacco Fertilizer.....	9.00	2.05	2.00
Davie & Whittle's Owl Brand Guano for Tobacco .....	8.00	2.46	3.00
Davie & Whittle's Owl Brand Special Tobacco Guano .....	9.00	2.05	2.00
Davie & Whittle's Owl Brand Truck Guano....	8.00	4.92	5.00
Davie & Whittle's Owl Brand Guano.....	8.00	1.65	2.00
Davie & Whittle's Owl Brand Acid Phosphate with Potash .....	10.00	..	2.00
Davie & Whittle's Owl Brand High Grade Dissolved Bone .....	14.00	..	..
Davie & Whittle's Owl Brand Dissolved Bone...	12.00	..	..
Davie & Whittle's Owl Brand High Grade Acid Phosphate .....	16.00	..	..
Davie & Whittle's Owl Brand High Grade 3 Per Cent Soluble Guano.....	9.00	2.05	3.00
Davie & Whittle's Owl Brand Acid Phosphate..	13.00	..	..
Davie & Whittle's Vinco Guano.....	8.00	1.65	2.00
Durham Fertilizer Co.'s Blacksburg Soluble Guano .....	8.00	1.65	2.00
Durham Fertilizer Co.'s Blacksburg Soluble Bone .....	13.00	..	..
Durham Fertilizer Co.'s Diamond Wheat Mixture .....	10.00	..	3.00
Durham Fertilizer Co.'s Standard Wheat and Corn Grower .....	10.00	..	2.00
Durham Fertilizer Co.'s Excelsior Dissolved Bone Phosphate .....	14.00	..	..
Durham Fertilizer Co.'s Double Bone Phosphate, Durham Fertilizer Co.'s Blue Ridge Wheat Grower .....	13.00	..	..
Durham Fertilizer Co.'s Carr's Special Wheat Grower .....	10.00	..	2.00
Durham Fertilizer Co.'s Standard Guano.....	8.00	..	4.00
Durham Fertilizer Co.'s Best Potato Manure...	9.00	1.65	2.00
Durham Fertilizer Co.'s L. & N. Special.....	7.00	5.74	7.00
Durham Fertilizer Co.'s Special Plant and Truck Fertilizer .....	9.00	2.46	2.00
Durham Fertilizer Co.'s Golden Leaf Bright Tobacco Guano .....	8.00	4.10	3.00
Durham Fertilizer Co.'s Golden Leaf Bright Tobacco Guano .....	8.00	2.46	3.00
Durham Fertilizer Co.'s Gold Medal Brand Guano .....	8.00	2.46	3.00
Durham Fertilizer Co.'s Durham Bone and Potash Mixture .....	8.00	2.46	3.00
Durham Fertilizer Co.'s Genuine Bone and Peruvian Guano .....	10.00	..	2.00
Durham Fertilizer Co.'s Genuine Bone and Peruvian Tobacco Guano.....	8.00	1.65	2.00
Durham Fertilizer Co.'s Genuine Bone and Peruvian Tobacco Guano.....	8.00	1.65	2.00
Durham Fertilizer Co.'s Raw Bone Superphosphate .....	8.00	2.05	1.50

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Durham Fertilizer Co.'s Raw Bone Superphosphate for Tobacco.....	8.00	2.05	2.00
Durham Fertilizer Co.'s N. C. Farmers' Alliance Official Guano .....	8.00	2.05	3.00
Durham Fertilizer Co.'s N. C. Farmers' Alliance Official Acid Phosphate.....	13.00	..	..
Durham Fertilizer Co.'s Standard High Grade Acid Phosphate .....	14.00	..	..
Durham Fertilizer Co.'s Great Potato and Corn Grower .....	10.50	..	1.50
Durham Fertilizer Co.'s Progressive Farmer Guano .....	8.00	1.65	2.00
Durham Fertilizer Co.'s Durham Ammoniated Fertilizer .....	9.00	1.65	1.00
Durham Fertilizer Co.'s Durham Best Acid Phosphate .....	13.00	..	..
Durham Fertilizer Co.'s Durham Acid Phosphate .....	12.00	..	..
Lynchburg Guano Co.'s New Era.....	8.00	1.65	2.00
Lynchburg Guano Co.'s Ironside Acid Phosphate,	16.00	..	..
Lynchburg Guano Co.'s Spartan Acid Phosphate,	12.00	..	..
Lynchburg Guano Co.'s Arvonja Acid Phosphate,	13.00	..	..
Lynchburg Guano Co.'s S. W. Special Bone and Potash Mixture .....	10.00	..	4.00
Lynchburg Guano Co.'s Alpine Mixture.....	10.00	..	5.00
Lynchburg Guano Co.'s Dissolved Bone and Potash .....	10.00	..	2.00
Lynchburg Guano Co.'s Independent Standard..	8.50	1.65	2.00
Lynchburg Guano Co.'s Solid Gold Tobacco.....	8.00	2.26	4.00
Lynchburg Guano Co.'s Lynchburg High Grade Acid Phosphate .....	14.00	..	..
Lynchburg Guano Co.'s Lynchburg Soluble.....	8.00	1.65	2.00
Lynchburg Guano Co.'s Lynchburg Soluble for Tobacco .....	8.00	1.65	2.00
Norfolk and Carolina Chemical Co.'s Crescent Brand Ammoniated Fertilizer.....	8.00	1.65	2.00
Norfolk and Carolina Chemical Co.'s Cooper's Bright Tobacco .....	8.00	2.05	3.00
Norfolk and Carolina Chemical Co.'s Norfolk Trucker and Tomato Grower.....	8.00	4.10	5.00
Norfolk and Carolina Chemical Co.'s Genuine Slaughter House Bone.....	8.00	1.65	2.00
Norfolk and Carolina Chemical Co.'s Genuine Slaughter House Bone, Made Especially for Tobacco .....	8.00	2.05	2.00
Norfolk and Carolina Chemical Co.'s Amazon High Grade Manure.....	8.00	2.46	3.00
Norfolk and Carolina Chemical Co.'s Bright Leaf Tobacco Grower .....	8.00	2.46	3.00
Norfolk and Carolina Chemical Co.'s Norfolk Bone and Potash.....	10.00	..	2.00
Norfolk and Carolina Chemical Co.'s Norfolk Soluble Bone .....	12.00	..	..
Norfolk and Carolina Chemical Co.'s Norfolk Best Acid Phosphate.....	13.00	..	..
Norfolk and Carolina Chemical Co.'s Norfolk Reliable Acid Phosphate.....	14.00	..	..
Old Dominion Guano Co.'s Standard Raw Bone Soluble Guano .....	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Old Dominion Guano Co.'s Farmers' Friend High Grade Fertilizer .....	8.00	2.46	3.00
Old Dominion Guano Co.'s Farmers' Friend Fertilizer .....	8.00	1.65	2.00
Old Dominion Guano Co.'s Farmers' Friend Special Tobacco Fertilizer.....	8.00	2.46	3.00
Old Dominion Guano Co.'s Old Dominion Special Wheat Guano .....	8.00	1.65	2.00
Old Dominion Guano Co.'s Old Dominion Special Sweet Potato Guano.....	6.00	1.65	6.00
Old Dominion Guano Co.'s Old Dominion Soluble Tobacco Guano.....	8.00	1.65	2.00
Old Dominion Guano Co.'s Old Dominion Soluble Guano .....	8.00	1.65	2.00
Old Dominion Guano Co.'s Old Dominion Potato Manure .....	7.00	4.10	8.00
Old Dominion Guano Co.'s Old Dominion Raw Bone Soluble Guano.....	9.00	2.05	3.00
Old Dominion Guano Co.'s Old Dominion 6-7-5 Truck Guano .....	6.00	5.74	5.00
Old Dominion Guano Co.'s Old Dominion 7-7-7 Truck Guano .....	7.00	5.74	7.00
Old Dominion Guano Co.'s Old Dominion Alkaline Bone and Potash.....	10.00	..	2.00
Old Dominion Guano Co.'s Bullock's Cotton Grower .....	8.00	1.65	2.00
Old Dominion Guano Co.'s Osceola Tobacco Guano .....	8.00	2.05	3.00
Old Dominion Guano Co.'s Dissolved Bone and Potash .....	10.00	..	2.00
Old Dominion Guano Co.'s Millers' Special Wheat Mixture .....	8.00	..	4.00
Old Dominion Guano Co.'s Planters' Bone and Potash Mixture .....	10.00	..	3.00
Old Dominion Guano Co.'s Bone Phosphate.....	13.00	..	..
Old Dominion Guano Co.'s Royster's Acid Phosphate .....	12.00	..	..
Old Dominion Guano Co.'s High Grade Acid Phosphate .....	14.00	..	..
Powers, Gibb & Co.'s Almont Acid Phosphate..	12.00	..	..
Powers, Gibb & Co.'s Cotton Brand Best Acid Phosphate .....	13.00	..	..
Powers, Gibb & Co.'s Almont High Grade Acid Phosphate .....	14.00	..	..
Powers, Gibb & Co.'s Fulp's Acid Phosphate 13 Per Cent .....	13.00	..	..
Powers, Gibb & Co.'s Cotton Brand Acid Phosphate .....	12.00	..	..
Powers, Gibb & Co.'s Acid Phosphate and Potash .....	10.50	..	1.50
Powers, Gibb & Co.'s Almont Wheat Mixture...	10.00	..	3.00
Powers, Gibb & Co.'s Dissolved Bone and Potash,	10.00	..	2.00
Powers, Gibb & Co.'s Almont Soluble Ammoniated Guano .....	8.00	1.65	2.00
Powers, Gibb & Co.'s Carolina Golden Belt Ammoniated Guano for Tobacco.....	8.00	2.05	3.00
Powers, Gibb & Co.'s Truck Farmers' Special Ammoniated Guano .....	8.00	3.28	5.00
Powers, Gibb & Co.'s Old Kentucky High Grade Manure .....	8.00	2.46	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Powers, Gibb & Co.'s Cotton Seed Meal Standard Guano .....	9.00	2.46	2.00
Powers, Gibb & Co.'s Cotton Seed Meal Soluble Ammoniated Guano .....	8.00	1.65	2.00
Powers, Gibb & Co.'s Cotton Belt Ammoniated Guano .....	8.00	2.46	2.00
Powers, Gibb & Co.'s Eagle Island Ammoniated, Powers, Gibb & Co.'s Cotton Brand Ammoniated Dissolved Bone .....	8.00	1.65	2.00
Powers, Gibb & Co.'s Gibb's Ammoniated Guano, Powers, Gibb & Co.'s Powers' Ammoniated Guano .....	8.00	2.05	1.50
Southern Chemical Co.'s Electric Tobacco Guano, Southern Chemical Co.'s Electric Standard Guano .....	8.00	2.05	2.00
Southern Chemical Co.'s Electric Standard Guano .....	8.00	1.65	2.00
Southern Chemical Co.'s Pilot Ammoniated Guano Special for Tobacco.....	8.00	2.05	3.00
Southern Chemical Co.'s George Washington Plant Bed Fertilizer for Tobacco.....	8.00	2.46	2.50
Southern Chemical Co.'s Sun Brand Guano....	9.00	2.05	5.00
Southern Chemical Co.'s Yadkin Complete Fertilizer .....	8.00	1.65	2.00
Southern Chemical Co.'s Solid South.....	10.00	..	6.00
Southern Chemical Co.'s Chick's Special Wheat Compound .....	8.00	..	4.00
Southern Chemical Co.'s Mammoth Wheat and Grass Grower .....	10.00	..	2.00
Southern Chemical Co.'s Winston Bone and Potash Compound .....	10.00	..	2.00
Southern Chemical Co.'s Winner Grain Mixture, Southern Chemical Co.'s Mammoth Corn Grower, Southern Chemical Co.'s Farmers' Pride Bone and Potash .....	10.00	..	4.00
Southern Chemical Co.'s Reaper Grain Application .....	10.00	..	2.00
Southern Chemical Co.'s Quickstep Bone and Potash .....	12.00	..	3.00
Southern Chemical Co.'s Tar Heel Acid Phosphate .....	11.00	..	5.00
Southern Chemical Co.'s Red Cross 14 Per Cent Acid Phosphate .....	12.00	..	..
Southern Chemical Co.'s Comet 16 Per Cent Acid Phosphate .....	14.00	..	..
Southern Chemical Co.'s Chick's 16 Per Cent Acid Phosphate .....	16.00	..	..
Southern Chemical Co.'s Chick's 16 Per Cent Acid Phosphate .....	16.00	..	..
Southern Chemical Co.'s Chatham Acid Phosphate .....	13.00	..	..
Southern Chemical Co.'s Horseshoe Acid Phosphate .....	12.00	..	..
Southern Chemical Co.'s Victor Acid Phosphate, J. G. Tinsley & Co.'s Champion Acid Phosphate, J. G. Tinsley & Co.'s Dissolved S. C. Bone.....	13.00	..	..
J. G. Tinsley & Co.'s Powhatan Acid Phosphate, J. G. Tinsley & Co.'s Richmond Brand Guano..	14.00	..	..
J. G. Tinsley & Co.'s Lee Brand Guano.....	8.00	2.46	3.00
J. G. Tinsley & Co.'s Killickinick Tobacco Mixture .....	8.00	1.65	2.00
J. G. Tinsley & Co.'s Stonewall Brand Acid Phosphate .....	8.00	2.05	3.00
J. G. Tinsley & Co.'s Stonewall Brand Acid Phosphate .....	12.00	..	..

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
J. G. Tinsley & Co.'s Stonewall Brand Guano..	8.00	1.65	2.00
J. G. Tinsley & Co.'s Stonewall Tobacco Guano,	8.00	1.65	2.00
J. G. Tinsley & Co.'s Tinsley's Special Irish Potato Grower .....	6.00	5.74	6.00
J. G. Tinsley & Co.'s Tinsley's Bone and Potash Mixture .....	10.00	..	2.00
J. G. Tinsley & Co.'s Tinsley's Strawberry Grower .....	6.00	3.28	4.00
J. G. Tinsley & Co.'s Tinsley's 10 Per Cent Truck Guano .....	5.00	8.25	2.50
J. G. Tinsley & Co.'s Tinsley's Irish Potato Grower .....	6.00	4.92	6.00
J. G. Tinsley & Co.'s Tinsley's Tobacco Fertilizer.	8.00	3.28	2.50
J. G. Tinsley & Co.'s Tinsley's 7 Per Cent Am- moniated Guano for Beans, Peas, Cabbage, Strawberries, etc.....	6.00	5.74	6.00
S. W. Travers & Co.'s National Fertilizer.....	8.00	1.65	2.00
S. W. Travers & Co.'s National Special Tobacco Fertilizer .....	8.00	1.65	2.00
S. W. Travers & Co.'s Beef, Blood and Bone Fertilizer .....	8.00	1.65	2.00
S. W. Travers & Co.'s Standard Dissolved S. C. Bone .....	13.00	..	..
S. W. Travers & Co.'s Travers' Dissolved Bone Phosphate .....	14.00	..	..
S. W. Travers & Co.'s Capital Dissolved Bone...	12.00	..	..
S. W. Travers & Co.'s Capital Cotton Fertilizer.	8.00	2.05	2.00
S. W. Travers & Co.'s Capital Bone and Potash Compound .....	10.00	..	2.00
S. W. Travers & Co.'s Capital Truck Fertilizer..	8.00	3.28	3.00
S. W. Travers & Co.'s Capital Tobacco Fertilizer.	8.00	3.28	3.00
S. W. Travers & Co.'s Farmers' Special Wheat Compound .....	8.00	..	4.00
S. W. Travers & Co.'s Farmers' 7 Per Cent Truck Fertilizer .....	6.00	5.74	5.00
Virginia State Fertilizer Co.'s Virginia State Dissolved Bone and Potash.....	10.00	..	2.00
Virginia State Fertilizer Co.'s Virginia State Guano .....	8.00	1.65	2.00
Virginia State Fertilizer Co.'s Virginia State High Grade Tobacco Guano.....	8.00	2.46	3.00
Virginia State Fertilizer Co.'s Number One Sol- uble Guano .....	9.00	1.65	2.00
Virginia State Fertilizer Co.'s XX Potash Mix- ture .....	10.00	..	4.00
Virginia State Fertilizer Co.'s Mountain Top Bone and Potash .....	10.00	..	5.00
Virginia State Fertilizer Co.'s Peerless Tobacco Guano .....	8.00	2.46	3.00
Virginia State Fertilizer Co.'s Battle Axe To- bacco Guano .....	8.00	1.65	2.00
Virginia State Fertilizer Co.'s Dunnington's Spe- cial Formula for Tobacco.....	8.00	2.46	3.00
Virginia State Fertilizer Co.'s Austrian Tobacco Grower .....	8.00	2.05	2.00
Virginia State Fertilizer Co.'s Buffalo Guano..	8.00	2.05	3.00
Virginia State Fertilizer Co.'s Gamecock Special for Tobacco .....	8.50	1.65	2.00
Virginia State Fertilizer Co.'s G. E. Special To- bacco Grower .....	8.00	2.05	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Virginia State Fertilizer Co.'s Bull 'Dog Solu- ble Guano .....	8.00	2.46	3.00
Virginia State Fertilizer Co.'s Clipper Brand Acid Phosphate .....	13.00	..	..
Virginia State Fertilizer Co.'s Highland King...	9.00	1.65	1.00
Virginia State Fertilizer Co.'s Alps Brand Acid Phosphate .....	12.00	..	..
Virginia State Fertilizer Co.'s Bull Run Acid Phosphate .....	16.00	..	..
Virginia State Fertilizer Co.'s Lurich Acid Phos- phate .....	12.00	..	..
Virginia State Fertilizer Co.'s Gilt Edge Brand Acid Phosphate .....	14.00	..	..
Virginia State Fertilizer Co.'s Gilt Edge Brand Dissolved Bone and Potash.....	8.00	..	4.00
Sun Tobacco Fertilizer.....	5.00	5.11	9.20
<i>Thomas Wakefield, Friendship, N. C.—</i>			
Bone Meal .....	Total	21.73	4.12
<i>Williams &amp; Clark Fertilizer Co., Charleston, S. C.—</i>			
Standard American Ammoniated Bone Super- phosphate .....	9.00	1.85	1.00
<i>Winborne Guano Co., Tyner, N. C.—</i>			
King Tammany Guano.....	8.00	2.47	3.00
Farmers' Select Guano.....	8.00	2.06	3.00
Winborne's 7 Per Cent Guano.....	5.00	5.75	5.00
Winborne's Excelsior Guano .....	8.00	1.65	2.00
Winborne's Tobacco Guano.....	8.00	2.47	2.00
Winborne's Eureka Guano.....	8.00	1.65	2.00
Winborne's 3-8-4 Guano.....	8.00	2.47	4.00
Winborne's Triumph Guano.....	8.00	1.65	2.00
High Grade Acid Phosphate.....	14.00	..	..
Standard 16 Per Cent Acid Phosphate.....	16.00	..	..
Genuine German Kainit.....	..	..	12.00
<i>T. W. Wood &amp; Sons, Richmond, Va.—</i>			
Standard Grain and Grass Grower.....	8.00	1.65	2.00
Standard High Grade Trucker.....	8.00	4.94	6.00
Standard Potato Fertilizer.....	8.00	1.65	5.00
Standard Vegetable Fertilizer.....	8.00	2.47	3.00
Standard Tobacco Fertilizer.....	8.00	2.47	3.00
Standard High Grade Acid Phosphate.....	14.00	..	..
Standard Bone and Potash Mixture.....	10.00	..	2.00
Wood's Pure Animal Bone.....	Total	23.00	2.47
Wood's Lawn Enricher.....	6.00	2.47	3.00
Nitrate of Soda.....	..	15.63	..







**REPORT FROM LEAF TOBACCO WAREHOUSES FOR MONTH  
OF JUNE, 1908.**

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Pounds sold for producers, first hand.....	43,552
Pounds sold for dealers.....	4,069
Pounds resold for warehouse.....	9,390
Pounds resold for other warehouses.....	.....
Total .....	57,011

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**NOTICE.**

The Department finds it necessary to revise the Bulletin list. All parties desiring the Bulletin sent to them in the future are requested to send notice to this effect on postal card, addressing Commissioner of Agriculture, Raleigh, N. C.

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COMMERCIAL APPLE CULTURE IN MOUNTAIN REGIONS.

BY

W. N. HUTT, HORTICULTURIST.



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# COMMERCIAL APPLE CULTURE IN MOUNTAIN REGIONS.

BY W. N. HUTT, HORTICULTURIST.

The apple is the most widely distributed of tree fruits. It is found growing on every continent of the globe. In the United States it grows in every State of the Union, from the subtropic to the north temperate zone. It is found from sea level to mountain top, with every variety of soil and with every grade of humidity and aridity. In this wide range it has almost every environmental change to which a plant could well be subjected. Under all these varying conditions it gives evidence of its likes and its dislikes by the varying degrees of success to which it grows.

Plants, like animals, have their preferences and also their means of showing them. The environmental likes and dislikes of plants are easily seen. When they are at home and comfortable in their surroundings they give evidence of their satisfaction in increased growth and production and in the highest quality of fruit. When they are not comfortable they show a puny growth, scarcity of foliage, susceptibility to the attacks of insects and diseases, lack of fruit and lessened longevity.

It is interesting to note the instinctive desires of the apple tree and what conformity it shows to local conditions. In the low altitudes where the cotton plant is at home the apple tree is generally most uncomfortable. Except with the early or summer varieties, it is hard in such locations to keep apple trees in life. After resisting conditions unsuited to them they have little power left for fruit production. In the warm, sandy soils where sweet potatoes grow large and sweet, apple trees lose their leaves and have a struggle for life from season to season. On loamy or clay soils they feel more comfortable, show a correspondingly increased growth and productiveness, are freer from disease and are longer-lived. Observations on apple growing throughout the whole of this country show that the trees require for their best growth, productiveness and longevity the following conditions:

1. Zone .....Temperate.
2. Climate .....Summer cool, winter cold.
3. Soil .....Rich loams and clays.
4. Altitude .....High.
5. Rainfall .....Copious and constant.
6. Drainage .....Good.
7. Sunlight .....Abundant (air clear and cloudless).
8. Food .....Constant supply of humus and plant food.

In America the regions that produce the most and best apples are those that afford the largest number of these conditions.

## APPLE ZONES.

The temperate zone is the native home of the apple. All around the world it finds its best general temperature for growth in this zone. In the temperate zone it inclines to the north and finds there rather than in the south its best or *optimum* condition of growth. In the south temperate zone the apple departs itself much the same as in the north temperate zone, and inclines to the cooler south rather than towards the tropical boundary. As an evidence of the hardiness of the apple tree and its love for a cool climate it may be unknown to many that most magnificent apples are grown in Canada, away north of the great lakes, on the forty-sixth parallel, north latitude. In this region the lakes and rivers are icebound for several months of the year, the ground in winter is covered with three or four feet of snow and the thermometer is sometimes 30 degrees below zero. In that region the apple is nearing the northern limit of its growth. Considering these extremes of temperature, one would begin to wonder how North Carolina, with its mild climate, could raise apples at all. It does show, however, why apple growing is so commonly unsuccessful in the cotton belt. Being a cool-loving plant, the apple tree finds in the cotton belt its extreme southern limit of endurance. The pecan tree, on the other hand, being a southern neighbor of the cotton plant, will grow and thrive well in the area of cotton production. About one-third of the area of North Carolina is in the cotton belt, one-third rolling piedmont and one-third high and mountainous. It is in this mountainous region of the State, where altitude guarantees a cool climate, that the apple grows and thrives and produces even better than it does in the renowned apple regions of the North.

## MOUNTAIN REGIONS FOR APPLE CULTURE.

It is not generally known to apple growers that a mountain region in the South, which by virtue of its altitude affords the same cool temperature that a northern region gives, has yet other advantages that a northern location, with its higher latitude but lower altitude, cannot give. The "Sunny South," particularly in its mountain regions, has the clear air and abundant sunlight that put the rich colors on the outside of the fruit and the fine flavors within. Other things being equal, the greater the amount of sunlight the higher colored the fruit. In regions where cloudy skies are prevalent fruits and also flowers are of dull colors. Clear, sunny weather will give bright flowers and also highly tinted fruits. The maximum hours of sunlight are obtained at high elevations. It is for this reason that mountain-grown fruit is superior in color and flavor to that of the same varieties grown in the lowlands. The best fruit grown in eastern United States is that produced on the slopes of the Blue Ridge and Alleghany Mountains.

The most lofty portions of these mountain ranges are found in western North Carolina. Here a rich soil, combined with high elevation, affords almost ideal conditions for commercial apple culture. Very few fruit growers in the South appreciate the splendid opportunities afforded for commercial apple growing in the high, cool but sunny slopes of the southern Appalachian region. It is only in the last decade or so that fruit growers generally have become aware of the advantages of elevated regions for the commercial growing of hardy fruits. At present, all along the eastern slopes and foothills of the Alleghany Mountains, in Pennsylvania, in Maryland, in Virginia, in West Virginia and in North Carolina, lands which were formerly considered almost worthless for agricultural purposes are now rapidly passing the mark of \$100 per acre for commercial orcharding.

#### DRAINAGE IN MOUNTAIN REGIONS.

Another great advantage of mountain lands for growing fruit trees is that they naturally afford the most perfect drainage. The slope of such lands is almost a perfect guarantee that they are naturally well drained or can be made so at very small expense. Orchard trees of all plants require the most perfect drainage. Since they are perennial, they cannot, like annual crops, occupy the ground only in the favored season of summer, when growth conditions are almost perfect. They must be subject to every prevailing condition of heat and cold and of flood and drought throughout the entire year. Trees placed on wet or undrained land have to resist a condition that is adverse to their growth, and their productiveness and longevity are reduced accordingly. In connection with Experiment Station work I once had charge of an orchard that was on very flat land. This orchard received almost ideal tillage, fertilization and spraying. In spite of the most constant care and attention the trees were unproductive; they shed their foliage prematurely, and not a year passed but some of them died and went to the brush pile. When this orchard should have been at the age of its greatest production and usefulness there was but a remnant of dying trees marking an ill-advised attempt to grow trees in a location entirely unsuited to them. One single circumstance will be sufficient to explain the cause of the utter failure of this orchard: Crayfish would build up their burrows in the soil beneath the trees. A pebble dropped into a burrow could often be heard to splash into water a few inches below the surface of the ground. These trees, as fruit trees always do, naturally refused to grow and produce on a waterlogged soil. In mountain regions, on account of favorable drainage, conditions of this kind are almost impossible.

## THE ADVANTAGES OF ALTITUDE IN COMMERCIAL APPLE ORCHARDING.

An apple tree, in its soil and fertilizer requirements, differs little from a forest tree. The conditions of soil that will produce heavy timber will produce productive fruit trees. Forest trees grow naturally on mountain slopes because they find there a rich soil, abundant drainage and clear sunlight. The same conditions will produce large, productive, long-lived fruit trees. Where the natural forest is taken off the mountain slopes by the lumbermen a forest of fruit trees can profitably succeed it. Indeed, no cultivated crop so well holds sloping lands from washing as do the strong roots of fruit trees. The common agricultural trouble known in the South as "washing of land" is only another name for uncontrolled drainage. Trees, since they are perennial in growth and have their roots in the soil at all seasons, are more useful than any other crop in protecting mountain lands from destructive erosion. Sloping soils which will wash must necessarily be well drained. This is the foremost reason why trees like sloping land and why mountain orchards give better results than those in similarly cool locations, but on flat lands with the water table too close to the surface.

The cool but sunny slopes of southern mountains have ideal conditions of soil and drainage that are unexcelled for the culture of hardy fruits. The cool climate of a southern mountain region obtained by high altitude is, for many reasons, better for apple growing than the equally cool but less sunny locations in the North obtained by higher latitudes.

## NATURAL IRRIGATION IN MOUNTAIN REGIONS.

It is not only necessary that trees be protected from excessive moisture by drainage, but to insure their best growth and productiveness they must have a copious and constant supply of water during their season of growth, and particularly when they are developing a crop of fruit. If the roots of a tree are immersed in water for any length of time its leaves will turn yellow and drop, and it will cast off its fruit. If this condition becomes chronic, as on ill-drained lands, the roots will sooner or later become diseased and rot off. On the other hand, excessive droughts may leave in the soil so limited an amount of moisture that the tree will show yellow foliage and cast off its fruit as it does on too wet land. As sloping land is a natural corrective for too much water being supplied to trees, it is also a means of furnishing moisture in times of excessive drought. In elevated regions it is often found that moisture precipitated on mountain tops is carried down gradually, so that lower slopes receive from it a copious and constant supply. This is especially true where the soil is more or less mixed and underlaid with rock or shale. The rocks protect the moisture from the sun, and the roughness of a rocky or shaley bed affords a natural reservoir, which gives up its moisture in a slow but constant supply to lower

lands. Moisture obtained in this way is known in the irrigated regions of the West as "seepage water" and is used to grow immense fields of wheat in the foothills clustering about the bases of high mountains. This condition is found to a greater or less degree in all mountain regions. In coves and protected places it amounts to a natural system of subirrigation. The slope that in times of flood takes excessive and injurious moisture from the roots of the trees in times of drought brings the life-giving moisture to them. In mountain regions one frequently sees large, healthy trees clinging to rocky crags, where they would scarcely appear to have sufficient soil to cover their roots. Though they have little soil, they have from their location so perfect a system of root aeration, irrigation and drainage that they grow and flourish to perfection. Such natural conditions of drainage and irrigation occur only in mountain regions. It is for this reason, more than any other, that fruit trees in mountain regions are large, vigorous and long-lived.

The late T. K. Bruner, of this Department, in his valuable work on "North Carolina and Its Resources," gives the following note on mountain apple trees:

The size to which apple trees attain in the mountains of North Carolina is a source of wonder to those who have become accustomed to the trees in the North. In one orchard in Haywood County was measured a tree that had a girth of eleven feet and nine inches, and in the same orchard, which had never been cultivated, there were a hundred other trees that were full three feet in diameter of trunk and all in the most luxurious health. All that is needed here is a population of fruit growers who understand the culture and handling of winter apples. Apples of the northern varieties grown in Watanga County are hardly recognizable because of their greater size and beauty.

#### AIR NECESSARY TO TREE ROOTS.

Roots of trees require air as well as moisture. If the roots of a tree are fully surrounded by water, air is excluded and the tree dies of suffocation. On ill-drained lands trees have a way of pushing their large roots partially above the surface of the soil, so that they can get the air necessary for their growth. The cypress, which grows in tidewater, sends up its knees above high-water mark, so that it can get its air in time of flood. The roots of trees, even under the most favorable circumstances, do not go nearly so deep into the ground as is commonly supposed. Their home is between the water table and the surface. As to how commodious a home the tree roots have will depend on how much living room there is between the water table and the surface. The orchard in which the crayfish made their burrows had too cramped a layer of aerated soil to support vigorous tree life. Trees which make the maximum growth are those which have a deep water table, with a retentive but well-aerated soil above it. The roots of trees will not grow below the line of permanent ground-water. Of almost all trees three-fourths of the root system is found in the first foot of soil. One is often

surprised to find that large trees uprooted by a storm have a much shallower root system than one would have expected. On the other hand, tree roots are sometimes found deep in wells, but on examination it will be found, too, that they adhere only to the air-exposed surfaces. In cities, where filling-in is done to raise the grades of streets, the deeper covering of the tree roots is almost always fatal to shade trees. The same thing is often seen where lumber mills blow out their piles of sawdust about the roots of growing trees. It is not that the sawdust in itself is injurious, but that it suffocates the tree roots by burying them beyond the reach of air.

#### ATMOSPHERIC DRAINAGE AND FROST PROTECTION.

In mountain regions, besides the draining of water from higher to lower levels, there is a similar drainage of air. This latter might seem to be of trifling importance in fruit growing, but it is in fact one of the most important considerations, for it tends greatly to avert frost. Freezes and frosts are undoubtedly the greatest hazard of the business of fruit growing. No disease or depredator destroys half so many hopes and dollars for the fruit grower as a few hours of frost. We are told that "the frost falleth alike on the just and on the unjust," but in seasons when the daily papers are heralding reports that an untimely frost has taken the entire fruit crop of the State some lucky fellow high up in his mountain coves, with not too many good works to his credit, has his entire crop saved as if by miracle. Frosts appear to strike in a very erratic manner; they are, however, like other phenomena of nature, subject to very definite laws. It is well known that as air becomes heated it ascends, and as it cools it becomes heavier and falls. On sloping ground air as it cools passes down from higher to lower levels. Other things being equal, low lands are more frosty than higher lands, because the cold and frosty air drains from the higher and settles into the lower levels. A corn field in the fall gives one of the best illustrations of the places most subject to frost and those also which are exempt. On the bottom lands the blades and stalks will almost invariably show where frost has bitten first. Up on the hillsides and higher elevations the corn will often be found growing fresh and green, while in the bottoms below not a green stalk can be seen. Where knolls occur in bottoms they will often be seen to lift their green-clad sides out of the blighting frost-laden atmosphere of the surrounding valley. Air drainage is just as natural as water drainage, and for orchard locations is just as important a consideration.

The frostiest locations, and those therefore to be most avoided, are valleys shut in on all sides. To the uninitiated these places would appear to be most admirably protected, but they are veritable frost pockets. On cold nights they receive the cold air from higher regions, and frosts and freezes in them are inevitable. Once while traveling

in the Rocky Mountains I saw one of these small valleys shut in by hills, in which all the vegetation was nipped by frost. The surrounding hills on one side were somewhat lower than on the other sides. When the valley became full of cold air it flowed over the lowest side, just as water would have done. All around on the other sides of the valley the high frost mark could be seen, and it formed a line on a level with the top of the lowest hill where the frosty air had flowed over. Above this line the tenderest vegetation showed not the slightest injury. A valley with a large outlet will usually be reasonably safe from frost. The land about rivers which have a considerable fall will be drained of water and also of cold air. Lands contiguous to such streams can be counted on as being reasonably safe from frost. Experience with frost shows that mountain regions are much safer for fruit growing than the lower lands below them.

A carefully planned and conducted experiment which I made two years ago in a hillside peach orchard confirms the results of general experience on this point. This orchard was carefully surveyed with a leveling instrument and the ground mapped out in contours. Contour lines connected all trees at the same elevation. There was two feet difference in elevation between each two contour lines. Self-registering thermometers were placed on each contour line and readings were made on them three times a day throughout the entire winter and spring. The lower contour lines almost invariably registered lower temperatures than the higher ones. There was usually from one-half to one degree of difference between each line and the one above it. Instruments placed along one contour line, thus all being at the same elevation, showed practically no difference in temperature. During the winter zero temperatures were recorded in this orchard. At pruning time in the spring it was found that the wood of the trees on the lowest contour had been badly frozen and was "black-hearted." The effect of the "black-hearting" lessened with higher contours, and on the highest one not a single affected tree could be found. The only fruit produced in the orchard was on the two highest contours. Higher land above this, which was not planted in orchard, would undoubtedly have been a safer location for peaches. The same season an estimate was made on the effect of winter freezing of peach buds on trees grown on comparatively level land. A measuring pole was placed in the trees and by means of a step-ladder the buds were examined and counted at different heights from the ground. An examination of 1,300 buds gave the following percentage of buds killed by frost:

Two feet from the ground.....	50 per cent.
Four feet from the ground.....	30 per cent.
Eight feet from the ground.....	16 per cent.

These are only a few of hundreds of such examples that could be given to show the advantages of elevated locations for fruit growing.

## THERMAL FRUIT BELTS.

In mountain regions, where elevations are greatest, the maximum of exemption from frost is experienced. There are many places in our mountains known as thermal belts, which are said to be entirely free from frost. Whether or not this is claiming too much, it is certain that distinct lines can often be seen separating bright, fresh verdure above and blackened, frost-bitten foliage below. Similar lines of demarcation can be seen in spring between the early growth on the hillsides and the dormant buds of the valley below. In summer over the same area can be seen a distinct cloud line marking the height of the fog in the valley below, while above it on the hillside will be a cloudless air bathed in sunlight. In the fall, when frosts have claimed all the tender vegetation of the valley, there will be seen longitudinal bands skirting the hillsides, showing for a month or six weeks all the freshness of summer. Though the exact borders of these thermal zones cannot be located with precision, their general position is fairly constant. Orchards planted on thermal belts are remarkably regular in fruit bearing. There are many orchards in the mountains where old settlers claim they have never seen a failure in a crop from frost. The reason for these peculiar phenomena is undoubtedly the draining of cold air from the hillsides and its stratification in the valleys below. There are other circumstances connected with thermal belts that have not yet been fully worked out. By the aid of self-registering instruments for recording temperature and humidity we are at present working on these problems, and hope to have information to give later. However, there is at present sufficient practical evidence of the value of thermal belts in frost protection. Fruit growers should not fail, where possible, to take advantage of them in orchard planting.

## DIRECTION OF SLOPE.

There is considerable difference of opinion among fruit men as to what is the best direction for the slope of an orchard. The preferences of different men of experience are so variable as to include every point of the compass. Each slope has its advantages and its disadvantages. A northern slope is a little later in forcing growth in spring, and on that account the bloom is less apt to be nipped by late spring frosts. On the other hand, the fruit on northern slopes, when developing, gets less sunlight and does not have the high colors of that grown on southern slopes. As it is the sunlight that paints the bright colors, the southern slopes always produce the richest-tinted fruit. Southern slopes, too, are the ones from which the sun drinks the moisture most rapidly. They are apt, therefore, to be droughty, and unless the trees are well cultivated or mulched they will produce small fruit. On account of the continuous loss of moisture from southern

slopes it is found that the soils on them are almost invariably thinner and poorer than on northern slopes. Comparisons in the growths of natural forests on northern and southern slopes bear out the same idea. Western slopes give brighter colors of fruit than eastern ones, but they get the hottest rays of the sun, and trees on them are much more subject to sunscald. By care in cultivation and pruning many of the drawbacks due to slope can be overcome, but in any case the sloping lands are to be preferred to level ones for commercial orcharding.

The steepness of the slope on which it is practicable to plant orchards will depend on circumstances. One often finds apple trees in mountain regions that are producing large quantities of beautiful fruit in places that to a plainsman would scarcely seem to be accessible with a flying machine. There is little doubt about the trees doing well on very steep and even on rocky locations, but it is often next to impossible to harvest the fruit there economically. Mountain coves, even when high up in the mountain sides, offer the best possibilities for apple growing because they have natural irrigation and excellent drainage, and their soils are usually rich from the washing of the enclosing slopes. Often, while steep, high ridges may be entirely unsuited for apple trees, the coves which they contain may be almost ideal for the same crop. Nature never intended that the greater part of mountain lands should bear anything but forest. Man in mountain regions too often invades nature's realm, and thus we see washed and gullied fields on which cultivation is impracticable. Orchards can profitably go higher up the slope than any other agricultural crop, but our better judgment should not allow them to trespass on nature's domain.

#### SOILS FOR APPLE ORCHARDING.

Apple trees will grow on a great variety of soils, but they feel most at home and give their best results on deep, rich clays and loams. Why they prefer these soils it is impossible to say, but apple trees seem to be suited to clays just as cacti are to desert sands. The early or summer apples do well on light or sandy soils because they ripen their crop before the hot season, when moisture is scarcest. Late fall or winter varieties, which have to develop their fruit in the hot summer, when moisture is hardest to get, must have a soil that is retentive of moisture. Muck soils are rich and contain abundant moisture, but they produce large, rank-growing trees with tender terminals that produce poor fruit.

#### BEST RESULTS ON RICH SOILS.

Apple soils should be rich and they should not be called upon to produce anything but apples. It takes a great deal of fertility in the land to produce the wood of the trees on an acre of orchard. The

fertility that produces the fruit is over and above that required to grow the trees. There are few crops so exhaustive on land as a crop of nursery stock, and no tillers of the soil know so well how to fertilize the soil as do nurserymen. If trees continued to grow in the orchard with the vigor they are made to do in the nursery there would be a thousandfold greater returns from orchards than there are to-day. From my experience and observation in horticulture I think it safe to say that seventy-five per cent of all the trees that leave nurseries die of starvation before they come to usefulness. Soil poverty destroys more trees than all the pests and plagues put together. A soil cropped to death with corn or cotton or tramped hard by the feet of stock is a certain burying ground for the tender and well-favored tree from the fertile soil of a nursery. The reason timber trees grow so well in their native forests is that the fertile, spongy mould of the forest floor affords an ideal home for the little seedlings till they get big enough to fend for themselves. Soil for orchards should be as nearly as possible like nature's model forest soil. Indeed, the best soils for fruit trees are those just vacated by the forest primeval and occupied by the orchard before they can be pre-empted by any other agricultural tenant. Mountain coves are ideal for orchards.

#### STUMPY AND STONY LAND FOR ORCHARDS.

It is by no means necessary that a virgin soil should be cleared of stumps and stones before planting the orchard trees. Unless a stump is actually in the place where a tree should be set, it is not necessary to go to the trouble and expense of having it removed. It is much cheaper to let stumps rot out gradually, and while they are doing so they are supplying humus to the growing fruit trees. Stony land is not at all objectionable for commercial orcharding. On steep locations they help very greatly to hold the rich soil from being washed away. It is probably for this very reason that in many mountain orchards the stony soils produce the best trees. Loose stones may be placed to form shelf terraces below the trees, or they may be placed in lines to form general terraces between each two rows of trees. Unless the soil is very thin, stones may be considered as a benefit rather than otherwise, because of the value they have to the land in assisting drainage and in protecting soil moisture. It is noticeable that fruit trees near rock piles or stone fences suffer little from drought.

#### NEW VS. OLD LAND.

Where virgin soil from the forest cannot be obtained for orchard planting, only rich land should be used. As an orchard will occupy the ground for many years, very thorough preparation should be given the soil before planting the trees. Never set trees on poor or dry land, for if they do start they are so stunted that it is next to impossi-

ble to ever get them to make a satisfactory orchard. Land kept in good tilth and used for cultivated crops can be expected to give reasonably good results in starting and growing orchard trees. Lands used for grain crops should be shunned for orchard work, as they are almost certain to be of the driest and poorest character. Old pasture lands are very poor for tree culture. They may be fairly rich from the droppings of the stock, but the humus in them is ruined by trampling and their mechanical texture is at its very worst. A good previous crop is a heavy growth of some kind of leguminous plant. This crop should be plowed down to furnish humus for the trees. It is more or less difficult and expensive to improve land after trees are planted; so it is best to spare no pains on previous preparation. Preparatory to setting the trees the soil should be deeply plowed. Clean surface cultivation should be given to conserve moisture. A liberal dressing of manure is always beneficial. The manure should never be put in the holes in which the trees are planted, but it should be incorporated in the soil by general cultivation.

#### LAYING OUT A MOUNTAIN ORCHARD.

Laying off land for tree planting on a hilly or uneven surface is much more difficult than on level ground. It takes a good eye and a careful hand to lay out an orchard so that the trees will line up every way. On level ground nothing less should be done, for crooked or irregular rows of trees are not only an eyesore and a living monument to the incompetency of the planter, but they are an endless vexation to the one who has to cultivate them. On mountain land the slope usually makes cultivation impracticable except parallel with the hill-sides. This simplifies the problem itself, but one who has never tried hillside planting will be surprised at how difficult it is to get anything like a regular-looking orchard when the work is completed. If the slope is fairly regular—that is, with no “draws” or “coves”—one can measure up and down the hill and locate the ends of the rows on a base line at each end of the piece. If the land is not very steep, one can start at a bottom corner and measure up the hill, laying off the rows according to the distance desired between the trees. If the trees are to be 35 feet apart, which is the least distance standard trees should be set, he will simply measure up the hill, using one of the end boundaries as a base line and put in a stake at every 35 feet. Measuring down the hill, he should check up his distances to see that each was exact. Each stake so set would mark the end of a row. The same measurements should be made up and down the hill on the other border of the piece. Using these end stakes as fixed points, a row of stakes could be sighted in between to make a straight line. The plow could then be started and a perfectly straight furrow, practically parallel with the hillside, put in from this line of stakes. As the plow-

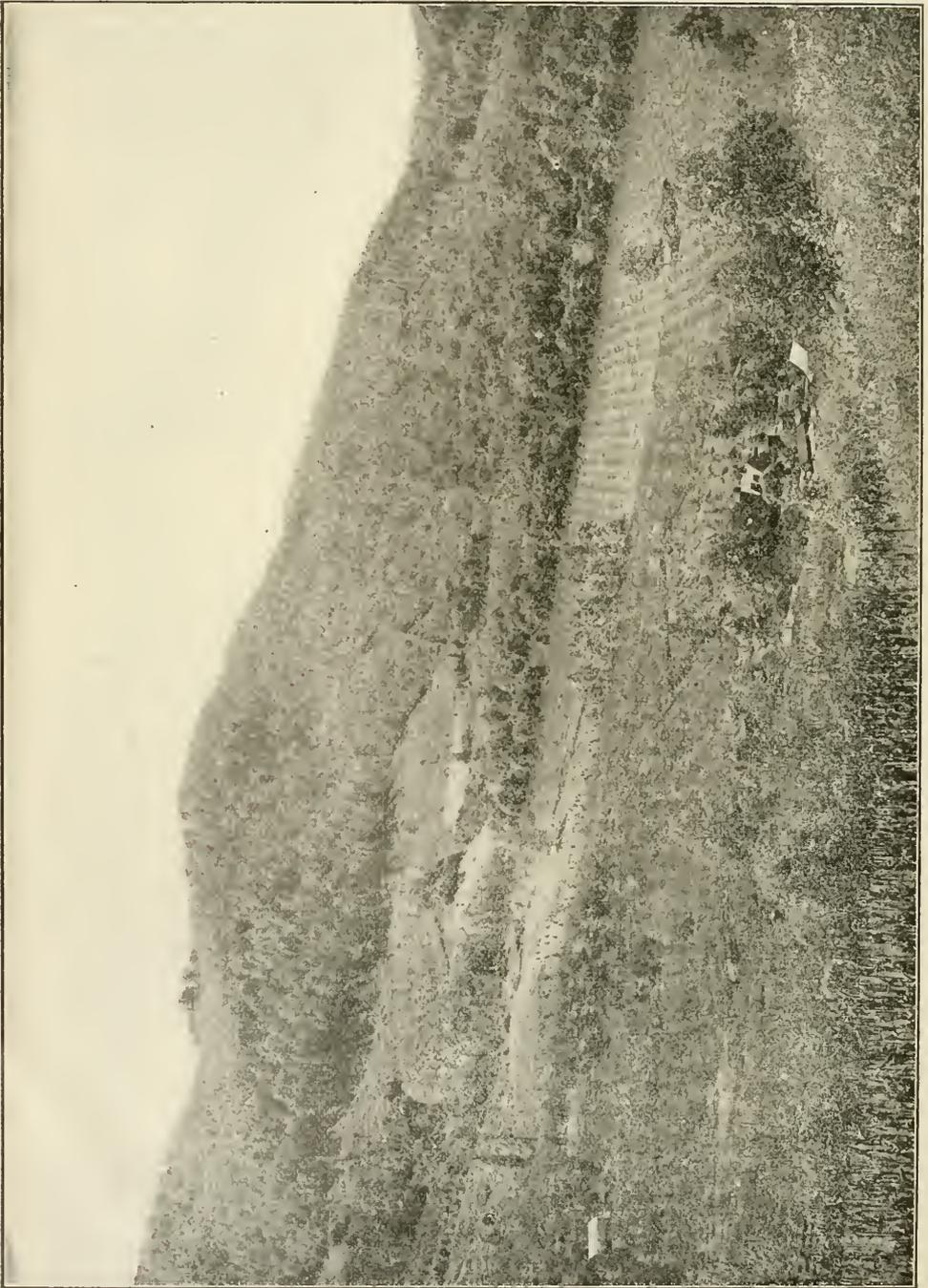


FIG. 1.—Mountain Orchards at Waynesville, N. C.

ing proceeded, a second row of sighting stakes could be set up to mark the next row to be plowed. In proceeding in this manner the whole piece would be laid off in exactly parallel furrows, running approximately parallel with the hillside. By making two rounds in each furrow the soil would be sufficiently plowed out, so that there would be very little more dirt to be thrown out with a shovel in planting the trees. In the highest and lowest parallel furrows stakes are set at every 35 feet. This marks the position of the trees in the first and last rows. From the second stake below a wire is reeled out and the end fastened tight to a stob driven in place of the second stake in the



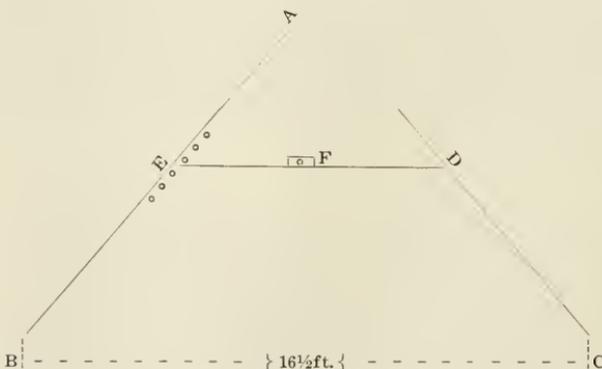
FIG. 2.—A Hillside Staked Out in Contours.

upper row. The wire is drawn tight between these two points and then slackened gradually till it conforms to the slope of the hill and rests on the ground in a straight line. Where the wire crosses the bottom of each parallel furrow will mark the spot where a tree is to be planted. The setting of the trees can now begin. While one man is distributing trees up or down the hillside along the wire other men with shovels can be throwing out any extra dirt to make a proper hole and planting the trees. The wire can then be moved over to the next two stakes, and planting of the next row proceed in the same manner. A bright wire affords a very handy means of marking out the rows,

for in the sun it shows like a silver ribbon and can be seen perfectly, even throughout a long stretch of land. If the land is steep the same method can be used, but instead of measuring off the 35 feet (the distance between two trees) on the slope it would be best to use a plumb line and level up, so that the 35 feet would be measured on the level instead of on the slope. On steep slopes, if some correction is not made for grade, it will be found that the rows are too close together. If the land is not too irregular, trees set out by this method will be found to "checker up" pretty well every way.

#### LAYING OFF IRREGULAR OR COVE LAND.

The foregoing method, though giving good results on even and regular slopes, will not be found practicable on irregular slopes or cove land. On these latter the best method is to terrace the land by running contour lines which will conform to all irregularities of slope and surface and bring all the trees in one row practically on the same level. The ground, whether rough or smooth, will be laid off in a series of steps. Where the slope is steep the contour lines will be made to diverge so as not to bring the trees too close together up and down the hillside. The most accurate method of laying off contours is by the use of a leveling instrument, such as is used by surveyors. From practical experience with hilly lands most mountaineers can by the eye lay off fairly good contours. There are, however, simple home-made levels that can be constructed in a few minutes which will lay off terraces that for all practical purposes are as good as those surveyed by an engineer. F. T. Meacham, superintendent of the Iredell Test Farm, gives the following description of the construction and use of a home-made terrace level:



To construct an A level, use well-seasoned timber, pine being preferable because it is light and does not tend to warp. Take three pieces 10 feet long, 3 inches wide and  $\frac{1}{2}$  inch thick. Now lay on a level floor so as to get the instrument of a rod span. The rod is commonly used in measuring land and is generally best, as it gets over land faster than a ten-foot level. Drive two nails in the floor just a rod, or  $16\frac{1}{2}$  feet apart, saw off the ends of the two

pieces to be used for legs so that the ends will rest flat on the floor. Now place one end of each leg against the nails and let the pieces cross above your head and just exactly over the center of the rod span. Put a bolt here through both pieces fasten them together at the point A then we have two legs of the level, AB and AC. Now take the third piece and use as a cross-bar, DE. Fasten the piece DE to AC at about D, bolt so as to permit it to work easily. Now place firmly on DE in the center a spirit level, such as you can get from almost any hardware store for ten cents. Bring DE, at E end, to a point on leg AB, where the spirit level indicates level; then mark or put a hole through both for-bolt to work in. This hole on AB leg we call zero, which means level. Now we wish to make a scale that will enable us to run a terrace having a fall anywhere from an inch to four inches. Let some one raise the foot of AB one inch and lower cross-bar DE until level; then put a hole through AB leg, and call this hole No. 1. Now raise foot of AB two inches and put another hole in AB leg and call it No. 2, and so on until we make our scale to four or five inches. The half-inch is then gotten by dividing the distance between holes and numbering halves. Now we have an instrument made that should not cost more than fifty cents at the outside, and will, if properly handled, suffice for most of this kind of work.

In terracing a field start about three feet from the top of the hill, and begin to lay off the first terrace. Usually about one to two inches fall to the rod will be sufficient. Try to put the second terrace so that it will be about three to four feet lower than the first, and so on down the hill until the whole field is terraced. Now, if a field has a swag about the center and water collects from both directions in this swag, to avoid this begin the terrace in the swag and go both ways, providing there is a good outlet at each end. Lay off the terrace, giving one to two inches fall, as desired, by fastening the cross-bar DE at E in the hole giving the fall desired. Start at the point we have selected to begin, and let the short leg, or the leg with the scale on it, be up-hill. The place for the terrace is found by raising the foot of the instrument up or down hill until the proper level is obtained, then let the boy carrying pegs stick one at the front end of the level; then go with the instrument to that point, and repeat same operation until all the terraces are laid off. When you come to a gulley make half sets with the instrument and set up-grade stakes to tell how high to build the banks to prevent breaking over by heavy rains. Now walk back over the line of stakes and when a place is found where there is too short a turn in the terrace, straighten a little or give a more gentle curve by moving the upper stakes a little down-hill; never move lower stakes up-hill.

After the terrace has been staked out a furrow can be run connecting the stakes. If desired, the terrace can be listed up by throwing several furrows together and the trees planted on the terrace. In planting orchards on contours it is impossible to have the trees line up as they would do on even land. The first row is set by simply spacing the trees along the contour at the regular distance desired. The second row is set by as nearly as possible alternating the trees with those in the first row set. As the work of setting proceeds the trees in each row will be alternated with those in the row preceding it. On account of the variability of slope it will be found impossible to exactly alternate the trees. Occasionally a tree will have to be shifted one way or the other, or one left out, in order to keep the spaces between the trees fairly uniform.

## HOW TO PLANT A TREE.

It is not every one who can properly plant a tree. From the time trees leave the nursery until they are permanently planted they should be exposed just as little as possible. They should never be left open to sun or wind or air when it can at all be avoided. Trees waiting for planting should be heeled in with moist earth about the roots and only taken out of the ground when actually needed for setting. The hole dug for a tree should be large enough so that the roots may be spread out naturally in all directions. Yet it is not necessary to dig wide holes if the trees are heavy-rooted, for the roots of a tree always need trimming back at transplanting time. Cut back all roots, leaving a clean-cut surface. Remove all broken or torn roots and those that have become dried or dead. The cut surfaces should always show fresh living wood. When these clean-cut surfaces come in contact with moist soil the cambium grows out over the end and forms a callus, from which new roots start very readily.

The filling-in of the holes is the most important step in the work of tree planting. To get the best results moist soil must be placed closely about the roots, so that there are no air holes or crevices. The best instrument for accomplishing this work is the human hand. When the tree is placed in position the roots are spread out and a shovelful or two of the finest and best earth thrown in upon them. This should be carefully worked into the crevices with the fingers, and when the hole is about a third full the dirt about the roots of the trees should be tramped down solid. Moving the tree up and down while the earth is being thrown in will assist materially in avoiding air holes and in bringing the soil into close contact with all the roots. There is little danger of packing the earth too much, but trees often die for lack of tramping. After the roots are all covered and packed in tightly the hole may be filled with the remainder of the earth. Trees should be set in the orchard no deeper than they stood in the nursery. Deep setting is almost as injurious as too shallow setting. The collar of the tree is the natural indicator of the proper depth of planting. The surface should be left loose; tramping it would pack the soil so that it would lose moisture and dry out the tree. In planting trees do not pour water into the holes, for a slightly moist soil is much better than a very wet one. In very cold regions trees are best set in spring. In fairly mild climates trees get a better start if planted in the fall. In North Carolina, even in the mountains, the fall planting of trees will almost invariably give best results. The proper distance for setting standard apple trees is not less than 35 feet.

Since the root surface has been reduced in transplanting the tree, it is necessary to cut back the top in similar proportion to maintain a balance between top and root. If this is not done, when the tree comes into leaf the foliage will give off moisture faster than the reduced roots can supply it, and so the tree is dried out and killed.

## FORMING THE YOUNG TREE.

There has always been considerable discussion among fruit growers as to what is the proper height to start young apple trees. High-headed trees have the advantage that they can be easily cultivated. On the other hand, with low-headed trees the fruit is much easier to pick, it is not so apt to be blown off by wind and the trunks are much less subject to sunscald. The advantages are much in favor of low-headed trees, especially in mountain regions. The best height at which to head the young tree is 2 feet. The most uniform orchards are made from setting trees one and not two years old from the bud or graft. The one-year-old trees are little whips, on which the grower can form just the kind of head he desires. They are, of course, cheaper than two-year-olds and the freight on them is less. Two-year-old trees are large and brushy and have a head formed on them under the unfavorable crowding of the nursery. Many of the heads formed on two-year-old trees in the nursery are badly formed and have to be cut off and a new head formed in the orchard. This reduces them to practically the whip condition of the one-year-old trees.

For the first season young trees should be allowed to grow pretty leafy. The more leaves they have the more wood they are able to form and the quicker they become established. After the trimming at planting time no pruning should be done the first season, except with especially vigorous trees to rub off a few of the sprouts at the collar and on the lower part of the trunk. In the spring of the second season a very thoughtful and careful pruning should be given. This is the most important pruning in the whole life of the tree and in a great measure determines the future usefulness of the tree. Trees should not be started with too many main limbs, as afterwards they thicken up and crowd each other and make it necessary to cut out very large limbs. This leaves very large wounds, which seldom heal over and usually cause the trunk of the tree to decay and become hollow. The cutting of large limbs is always a damage to a tree and should never be practiced except in the most extreme cases. Three or at most four main limbs are enough for any fruit tree, and if properly placed on the trunk it will never be necessary to cut out a large limb. All main limbs should not start out at the same height on the trunk, for all the weight of limbs and of fruit being directed at a single point, the tree is liable to become split down by the wind. Opposite crotches should be avoided. As far as possible have each main limb started so that it has the purchase of the whole trunk opposite it. Remove all suckers or water sprouts and limbs that cross and rub each other or that follow other limbs too closely in a parallel direction. The idea should be to obtain a symmetrically formed head, with the space well divided, so as to give each branch the maximum of light and air. There are different general forms of trees that are preferred by

different growers. Some like an open vase form of head, with hollow center and diverging branches. Such a tree is obtained by removing the leader bud in the little tree. Another form of tree desired by some growers is the "double-decked" or "two-story" tree, gotten by carefully maintaining the leader and allowing the tree to form a high top. With young trees it is nearly always necessary to head back the annual growth. From one-fourth to one-half the length should be cut from all long shoots. This causes the tree to thicken up and the branches to become thick and stocky. If heading-back pruning is not given young trees they will become tall and spindling and easily broken down when laden with fruit.

#### VARIETIES.

What varieties shall I plant? is a question oftener asked than any other horticultural inquiry. It is one of the most difficult questions to answer, for unless one knows the district and has seen its possibilities he can at best but make a good guess. The most exact and practical method of finding out what varieties do best in any section is for the intending planter to hitch up his best horse and visit the orchards in his vicinity. Varieties of fruit are much less selective as regards locality than is generally believed. It was formerly believed that the Albemarle Pippin could be grown nowhere with marked success but in a certain mountain region in Virginia. This very variety is now grown to such perfection on the Pacific coast that it threatens to drive the Virginia Albemarle out of the market. More of the elements of successful fruit culture are in the grower than in the variety. If one likes a certain variety he generally gives it the conditions that make it successful. The characteristics of a good commercial apple are as follows:

1. Tree heavy bearer.
2. Tree vigorous and healthy.
3. Fruit of fair size and bright color.
4. Fruit keeps and ships well.
5. Fruit of fair to good quality.

The thing of prime importance with commercial orchards is that varieties be used that are heavy bearers. The only kind of successful commercial orchard is the one that produces, *fruit*, FRUIT, FRUIT. No matter what other characteristic a variety may possess, if it is not a heavy producer it has no place in a commercial orchard. The commercial apple should be showy and of fair to large size. The money-making market apple is "the big red apple." With but a few notable exceptions markets want red apples. It is hard to educate the market; it has its prejudices and it is willing to pay for them. The commercial apple should be a good keeper and shipper. This assures a long season of sale and an attractive appearance on arriving in mar-

ket. It should have, too, the finest texture and best flavor consistent with keeping and shipping quality. Some varieties of apples of notably poor quality have in the past proved to be good money makers. Shipping and storing facilities are improving every year, and apples of fine texture and good flavor can now be placed in the best markets in perfect condition. The commercial apple of the future must have far better than Ben Davis quality.

The apple growers of Western North Carolina have not been living up to the ideal horticultural possibilities of their clear, salubrious climate and rich mountain slopes. They can grow the best of the best. There are much better commercial apples than the Limbertwig, Stein and Grannie Buff. From these same slopes I have seen as fine Baldwins as ever grew in Massachusetts and as big Blacktwigs as ever came out of Arkansas.

A commercial orchard, even a large one, should contain few varieties. Many fair-sized orchards have such a desultory collection of odd varieties coming on at all seasons of the year that the total output is of no consequence for market purposes. If I were planting a commercial apple orchard in Western North Carolina—and I know of no better horticultural proposition—I would plant largely of the few following varieties:

York Imperial,	Stayman,
Rome Beauty,	Albemarle,
Arkansas Blacktwig,	Bonum,
Winesap,	Buckingham.

#### AVOID BLOCK PLANTING.

Varieties of fruit should not be planted in orchards in large, solid blocks. Some of the most productive varieties are not readily fertilized with their own pollen. Such varieties would be unproductive unless situated so that their blossoms could be pollinated by other varieties blooming at the same time. Old orchards teach their lessons along this line. A commercial orchard under observation recently consisted of four varieties, in solid blocks, in the following order: Baldwin, Golden Russet, Roxbury Russet, and Spy. The Baldwin is a self-fertilizing variety, and whenever there was any fruit in the orchard it could always be found on the Baldwins. The Golden Russets were laden with fruit on alternate years. The Roxbury Russets were pretty generally productive. The Spy block was uniformly unproductive, except for a couple of rows next the Russets, which bore well whenever the orchard bloomed. Many good varieties of fruit are unproductive because they are so situated that their blossoms cannot be pollinated from neighboring varieties. Instead of planting varieties in solid blocks they should be planted in alternating rows. This may make a little more trouble at packing time, but there will almost invariably be more to pack.

## CULTIVATING ORCHARDS.

In horticultural papers discussions are often seen as to the advisability of cultivating or not cultivating bearing orchards. Regarding young trees there is not a shadow of a doubt of their being benefited by cultivation. Indeed, it is only a loss of time and money to plant trees without giving them cultivation at least during their early years. Little trees left to struggle against weeds, drought and a poverty-stricken soil very soon give up the struggle. If by chance they do survive they become so stunted that they are never of much value. Where the land is not too steep and rough, clean, shallow cultivation should be given over its whole surface. The plow should not be used in the orchard any oftener than necessary. An Acme harrow is a good orchard tool, and on land that is not stony a disc harrow is one of the best. Implement builders are now making for orchard work a reversible disc cultivator that does not ridge up the land and that has an extension for working under low-headed trees. As soon after rains as the land is in suitable condition it should be gone over lightly to make a surface mulch for conserving moisture. For cultivating close to the trees and reducing hand hoe work to a minimum a Planet, Jr., cultivator is one of the best tools. None but a careful man should ever be allowed to cultivate an orchard. A mule and a careless man can do more harm to trees in an hour than all the insects and diseases on record. Low collars and hames should be used on the horses, and they should be hitched to short whiffletrees. Chain traces should be wrapped with burlap to keep them from injuring the bark of the trees. There are special whiffletrees manufactured for orchard work which have the traces attached in such a way that there are no projecting ends to catch the bark.

Before midsummer trees make most of their new growth; the latter part of the season is used in developing the shoots and in ripening the terminal buds. If cultivation is continued after midsummer the terminals will continue to grow, and the immature growth thus made will be frozen back during winter. Cultivation should begin early in spring and cease early in summer.

Where land is too rough and rocky for general cultivation a circle should be dug by hand about each tree. A mattock or heavy hoe is a handy tool for doing this work. The first year a circle of two to three feet in diameter will be sufficient. As the roots spread the circle of cultivation should widen out. Lack of cultivation while the tree is small is always attended with loss.

## THE SOD-MULCH ORCHARD.

A great deal has of late been written in horticultural papers regarding the value of the sod method and the sod-mulch method of handling of orchards as compared with clean cultivation. On easily tillable

land cultivation is the surest if not the most economical way of retaining soil moisture. On rough, rocky or steep lands, such as are common in mountain regions, where tillage is difficult, modifications of the sod or the sod-mulch methods will be found advantageous. The Hitchings method of orcharding, of which a great deal has been heard of late, advocates the clearing roughly of the land from woods and the setting of the little apple trees among the stumps. No cultivation is given, but the grass and weeds are cut away with the scythe and timothy seed sown so that a sod will be formed. As the stumps rot sufficiently to be removed conveniently they are taken out and the ground is worked and seeded down to timothy. The orchard is then mowed with a mowing machine once or twice during the season and the grass allowed to lie and rot on the ground and form a partial mulch. Under certain conditions some growers have reported good results from this method. My own experience and observation compel me to advocate cultivation, and cultivation only, for the growing tree. After it has a fair root range it may be able to take care of itself and give good results in partial sod or under sod mulch. The color of the foliage and the amount of wood a young tree is able to form will indicate whether or not it is able to compete successfully with the vegetation beneath it. After trees are of bearing age there is no place in which they are better able to go without cultivation than in mountain regions. On land difficult of tillage and in terraced orchards the ground may be sown to grass and the grass cut and allowed to rot beneath the trees. If the trees are not occupying the whole soil with their roots it is best to pile the grass in the form of an individual mulch about each tree. Where the tree roots spread so as to cover the whole ground the grass may be allowed to decay where it falls. In most cases it would pay the orchardist to go a step farther than this and apply in addition any cheap material that could be readily obtained to thicken the mulch.

#### ORCHARD FERTILIZERS.

If we added together the sum total of injury to orchards from insects, diseases and frosts we would then have only a fraction of the losses due to poverty-stricken soils. "Saul and Jonathan may have slain their thousands, but David hath slain his tens of thousands." A great many more trees die of slow starvation on impoverished soil than perish from all other causes. If farmers gave their corn or cotton or truck crops no more fertilizer than they do their fruit trees they would not expect a crop. Somehow or other a tree is expected to take care of itself without cultivation or plant food, and even while the soil about it is growing another crop or is tramped hard by stock it is supposed to produce a crop of fruit. Under such circumstances, instead of producing fruit (the product of its surplus energy) it has

a struggle to maintain its existence. There is a good deal of plant food locked up in the wood of the root, trunk and branches (the working parts of the tree). It is only the surplus, after all necessities for growth are satisfied, that can go into fruit production. Growers often complain of their trees casting their fruit. This is because the tree finds itself unable to produce fruit and have a living balance left; so to maintain its existence it casts off its fruit. After a heavy crop many trees succumb because they have not sufficient reserve force left. Such trees could be saved by a fertilizer application supplying some of the ingredients exhausted by the crop.

A tree that is growing and building up its system of trunk and branches above and below ground requires a different fertilizer from a tree that already has these formed and is able to produce fruit. Growing tissues require considerable nitrogen and less of phosphoric acid and potash. Fruit production requires on the other hand a maximum of phosphoric acid and potash with a reduced amount of nitrogen. Stable manure is one of the very best fertilizers for young trees, but if used in large quantities on mature trees may stimulate too great a growth of wood at the expense of fruit production. Ashes are one of the best fertilizers obtainable for bearing trees. Where cover crops are used in the orchard they supply sufficient nitrogen to keep the trees in a good growing condition. If a dressing of acid phosphate and kainit at the rate of 250 pounds of each per acre be applied it would put the trees in good fruiting condition. One of our most successful growers uses for growing trees on light land the following fertilizer:

Phosphoric acid, 8 per cent	} 500 pounds per acre.
Nitrogen . . . . . 5 per cent	
Potash . . . . . 2 per cent	

And for fruiting trees on similar land:

Phosphoric acid, 8 per cent	} 500 pounds per acre.
Nitrogen . . . . . 3 per cent	
Potash . . . . . 10 per cent	

#### CROPS IN THE ORCHARD.

At the proper distance of setting there will be in a young orchard a considerable proportion of land not in use by the trees. This can be conveniently and profitably used by other crops until the trees get large enough to need the whole land. When of bearing age a tree should have all the land on which it stands. It is not possible to produce two crops on the same land at the same time. If in a mature orchard the land is used to produce other crops, very little can be expected from the trees. In young orchards cultivated crops may be

used to advantage to utilize vacant land, and at the same time the fertilizer and cultivation given will be useful to the growing trees. The best crops in the young orchard are those that mature early and thus do not compete with the trees during the summer season for their moisture and plant food. Early potatoes is one of the best crops; also snap beans and garden peas. Such crops leave the land in good tilth and do not draw heavily on the trees. Crops like corn, tomatoes and melons, that usually have to be cultivated later in the season, are not so suitable, because the later cultivation stimulates the trees to make growth too late in the season. With such crops they should not be allowed to come too close to the tree rows, and in no case is it advisable to plant in the tree row itself. For the first season a space of 4 feet on each side of the row should be given the little trees. In the following years this strip should be widened every year till the supplementary crops are crowded out and the trees are occupying the whole ground. In no case should grass crops or small grains be grown in the young orchard.

#### COVER CROPS FOR ORCHARDS.

As soon as cultivation ceases in an orchard the finely worked soil should be utilized as a seed bed for a cover crop. Leguminous plants are best for orchard cover crops, because they not only hold the soil and take up the plant food made available by cultivation, but, being nitrogen gatherers, they add to the soil this most expensive and elusive fertilizing constituent. Leguminous cover crops are the cheapest as well as the easiest means of adding nitrogen to the soil. During their growing period especially, orchard trees require a copious supply of nitrogen. With bearing orchards it is possible on rich land to use leguminous cover crops too frequently. If there is too much nitrogen supplied to the soil the trees will make wood and leaf growth at the expense of fruit. If the trees are found to be making too much new wood and the fruit does not color well it is advisable to leave out the cover crop for a year or two, till the balance is restored. Such a condition happens only under the most intensive tillage. What we usually see is orchards suffering grievously and starving for the want of cover crops. One of the best cover crops, especially for summer, is the cowpea. Unfortunately this plant does not grow well in mountain regions and it stops growing entirely at the first frost. Hairy vetch is a winter grower that makes a useful cover crop, but my experience has shown that crimson clover is the best cover-crop plant for mountain orchards. It should be sown early, when moisture is abundant. If the land is very poor it is difficult to get a stand of it, but with a reasonable chance it makes one of the best, if not the very best, cover crop. It will grow during the fall and most of the winter, and will add much to the fertility of the soil. It should be plowed

or worked in early in spring, for it does not gain anything for the land by being left to flower and seed, and by the delay much valuable moisture is lost. By the use of cover crops the land is kept full of humus, which is so necessary to the holding of moisture. Orchard slopes rich in humus will absorb and hold a great deal of rain before they show any signs of washing. When lands begin to wash it is a sure sign that they are deficient in humus and have not been tilled to cover crops.



FIG. 3.—Young Tree Protected from Rabbits by Veneer.

As has been said before, it is best to cultivate orchards during the early part of the season. Cultivation should begin as early in the season as the land can be properly worked. If necessary, the land should be plowed, and plowed shallow, but if it is possible to break up the land and to work in the accumulation of vegetable matter with a harrow or disc cultivator without plowing, it is best to do so. If the soil is taken in time and the accumulation of vegetable matter is not too heavy and green, it will usually be found that a disc cultivator will do the work thoroughly and more cheaply than the plow. From this earliest cultivation the orchard should receive numerous shallow

workings till midsummer. After each rain a light brushing with a harrow will do wonders in conserving moisture for the use of the trees. By midsummer it will be found that all the new shoots on the trees have made practically their season's growth. The remainder of the



FIG. 4.—Roots of Tree Eaten off by Mice.

summer and fall is used in maturing this growth and in ripening the terminals. If cultivation is continued after midsummer the trees are encouraged to make a long, sappy growth that will not mature, but will be killed by the first frost of winter.

## WARDING OFF MICE AND RABBITS.

A simple but by no means trifling drawback to orcharding in mountain regions is the destructive attacks of mice and rabbits. In a single winter's night one hungry rabbit will completely girdle and destroy trees that it has taken several years of labor and expense to produce. A few of these rodents, if not checked, will in a few weeks in winter entirely ruin valuable orchards. They seem to prefer apple bark to that of natural forest growth. The extensive timber lands of mountain regions afford harbor for rabbits, and an isolated orchard runs great risk. Small boys, with the usual desire for a dog and a gun and an appetite for rabbit pie, will do much to allay the trouble, but every careful orchardist should take special pains to protect his trees. The rabbit is a vegetarian, and blood and animal matter smeared on the tree trunks will do much to ward off his attacks. I have found, however, that the safest method is to wrap about the tree trunk a wooden veneer and fasten it securely with a wire. (See Fig. 3). This may take a little more trouble than other methods, but I have always found it a sure cure.

The injury of mice to trees would to the uninitiated appear to be trifling, but the harm they do to young trees is usually much more serious than that done by rabbits. Fig. 4 shows a young tree two years old set in a mountain orchard, the roots of which have been entirely eaten off by mice. In this orchard, which was not cultivated, several hundred trees were destroyed. There is but one practical cure for the mice trouble, and that is clean cultivation.

## SPRAYING.

Under present orchard conditions spraying is an absolute necessity in successful fruit production. It is practically impossible to raise good fruit now without spraying. One might as well try to raise fruit without planting the trees as to try to raise clean, marketable fruit nowadays without spraying. On account of the widespread culture of apples and the ever-increasing acreage of orchards it is only natural that the insects and diseases which prey upon the apple crop should be more numerous than they were a generation ago. To raise clean fruit one must spray, and spray persistently. That it pays to spray no one who has ever once tried it will for a moment question. Spraying is one of the necessities of the fruit business just as much as tillage, fertilization or marketing. It is not the purpose of this BULLETIN to discuss methods of making spraying mixtures or their application. Numerous bulletins on all phases of that subject have been published and can be had on application to this Department.

Commercial apple orcharding in the mountain regions is one of the most promising horticultural industries in this State. Many large orchards have been planted and thousands of trees are being set each year. Many mature orchards now in bearing are showing the advantages of rich mountain soils and a clear, cool climate, and are bearing large crops of rich-colored fruit. Young orchards, where given good care, are showing by a vigorous growth that the mountain sides are for them an ideal home. In spite of an ever-increasing acreage of orchard trees the prices paid for first-class apples are steadily advancing. There is at present an increasing demand for first-class fruit at fancy prices. The possibility of overproduction seems to be nowhere in sight. In the great cities of the states south of us North Carolina has a natural market for commercial winter apples. By geographical position and direct lines of transportation she has in Southern markets advantages over all Northern competitors in apple production. The unit of commercial production is the carload. Some cities in our oldest apple-producing counties are already handling apples on this scale. It is to be hoped that farmers in all our mountain regions will make use of their great natural advantages of soil and climate to develop large apple-shipping centers where wholesale buyers will come and purchase fruit in carload lots. To this end growers should plant only the best commercial varieties. The day of the seedling apple has passed. Spraying should be considered as an inseparable adjunct to fruit growing. Fruit should never be shipped in crates, but should be packed in tight barrels or boxes, and only clean, graded fruit should go to market.

In the oldest apple-producing sections land has greatly increased in value. Lands which were formerly considered of no use or of only trifling value for rough pastures are now held at high prices on account of their production of high-class, high-priced fruits. Many steep slopes formerly the prey of destructive erosion are now held in profitable use by the strong, tenacious roots of apple trees. Unlike annual crops, orchard trees add a yearly increment to the value of the land. A little apple tree of standard variety, when once established in an orchard, increases in value under good cultivation at the rate of one dollar a year for every year it grows towards its maturity. This gives some slight idea of the value and possibilities of mountain regions for commercial apple production.



## LEAF TOBACCO SALES DURING MONTH OF JULY, 1908.

Pounds sold for producers, first hand.....	527,383
Pounds sold for dealers.....	70,597
Pounds resold for warehouse...:	125,219
Pounds resold for other warehouses.....	.....
Total .....	723,199

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### NOTICE.

The Department finds it necessary to revise the Bulletin list. All parties desiring the Bulletin sent to them in the future are requested to send notice to this effect on postal card, addressing Commissioner of Agriculture, Raleigh, N. C.



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VARIETIES OF FRUIT  
FOR GROWING IN NORTH CAROLINA.

BY

W. N. HUTT AND S. B. SHAW.

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# VARIETIES OF FRUIT

## FOR GROWING IN NORTH CAROLINA.

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W. N. HUTT.

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The selection of suitable varieties is fundamental to success in fruit growing. If the tree is not of the proper breed, it makes no difference how rich the soil or how careful the tillage. Orchards are often seen that are on good soils and receive the most assiduous attention of their owners, but at harvest time they give no fruit, or fruit of only indifferent quality, in return for all the trouble and expense bestowed upon them. It is just as necessary for the successful fruit grower to have trees of the right breed as for the dairyman or the stock raiser to have animals of the right breed. Indeed, the stock raiser, finding he has made a mistake in the selection of his animals, can more easily and cheaply remedy his error than can the fruit grower who has planted an orchard with poor nursery stock.

A great deal of harm has been done to fruit growing by the irresponsible, itinerant tree peddler. Many farmers have, to their sorrow, paid high prices to tree peddlers for trees, the fruit of which was represented to them by enlarged and over-painted pictures, bolstered up by imaginary and flamboyant descriptions. Most of the fruit sold by such persons turns out to be entirely worthless or to be old varieties renamed, or inferior varieties substituted for standard sorts. A farmer once showed me a mature orchard, the trees of which had been bought from a traveling nursery agent. It consisted of eight acres and was supposed to be set with four leading commercial varieties. The orchard had been carefully tended for fifteen years. On coming into bearing, there were found to be as many varieties as there were trees, and not one of them was of any account. They had been simply ungrafted, seedling trees. Such an experience forever disgusts the ordinary farmer with fruit growing. If these trees had been purchased from a reliable nursery no such loss would have been experienced by the grower. Reputable nurserymen are in the business to stay in it, and they take pains to grow only useful varieties and exercise the greatest care to keep varieties true to name.

In the following pages will be found lists of varieties of each of the classes of fruits that can be grown in North Carolina. Although a great deal of thought, travel and research have been given to the making of these lists, they are by no means to be taken as absolute or perfect. No effort has been spared to make them as accurate as possible, yet the behavior of varieties depends so much upon conditions that the lists are to be considered as suggestive rather than dogmatic. There are many old and standard varieties that from wide dissemination by nurserymen have shown themselves to be cosmopolitan in

habit, and their behavior in any locality can be counted on with a fair degree of certainty. Some newer varieties, of high quality and exceptional promise, have not yet been widely enough grown to guarantee their good behavior in all locations. Other varieties have shown themselves to be rather fastidious of location, and give in some situations exceptional results and in others utter failures. To this class belong such fine varieties as Albemarle, Jonathan, Baldwin and Spy.

In the preparation of the following lists the idea has been especially to encourage commercial fruit culture. In doing this it has been the aim not to make an extended and exhaustive list of all varieties that are now in cultivation within our borders, but to recommend those which have shown themselves to have the especial excellence that warrants them displacing other varieties. For this reason growers may be surprised at the absence of certain varieties from these lists. The present lists are the product of many years of work in horticulture, together with the revision of all former lists published by this Department. A careful comparison of nursery catalogues has been made, and data on varieties collected from over a thousand letters from fruit growers in this State. I beg to acknowledge, also, the valuable suggestions on varieties from Prof. H. H. Hume, formerly of this Department, and of Prof. F. C. Reimer, of the North Carolina College of Agriculture and Mechanic Arts.

In the making of these lists of varieties for commercial culture it has been kept in mind that quality should be as high a consideration with commercial varieties as with those for home consumption. These lists may therefore be followed with safety for use in the home orchard and garden. The descriptions of varieties, arranged in alphabetical order, will give intending planters the nature and habits of each variety recommended. As the State of North Carolina extends from the surf of the Atlantic Ocean to a height of over 7,000 feet, the highest altitude east of the Rocky Mountains, it naturally divides itself into three horticultural zones. These are defined at the head of the fruit lists as Mountain, Piedmont and Coast. As fruits vary in earliness with altitude, what will be a summer fruit in the coastal region will usually be classed as an autumn fruit in the mountains. In classifying fruits allowance must always be made for altitude.

The general soil requirements for the succeeding classes of fruit may be briefly catalogued as follows:

Apples .....	Rich loams and clays.
Pears .....	Heavy clays.
Plums .....	Clays and loams.
Peaches .....	Loose sandy or shaley soils.
Cherries .....	Deep rich loams.
Grapes .....	Well-drained loams.
Quinces .....	Deep moist loams.
Figs .....	Rich moist, sandy loams.

- Raspberries ..... Rich moist loams.
- Currants ..... Rich moist loams.
- Blackberries and Dewberries.... Rich moist loams, and sands.
- Gooseberries ..... Rich moist loams.
- Strawberries ..... Very cosmopolitan, almost any soil.
- Crab Apples ..... Deep rich loams.
- Mulberries ..... Deep rich loams, and sands.
- Pecans ..... Sandy loams.
- Pomegranates ..... Sandy loams.
- Japanese Persimmons ..... Loams and sands.

APPLES.

SUMMER VARIETIES.

<i>Mountain.</i>	<i>Piedmont.</i>	<i>Coast.</i>
Chenango, Early Harvest, Maiden Blush, Oldenburg (Duchess), Red Astrachan, Red June, Summer Pearmain, Sweet Red June (Eckel), Yellow Transparent.	Chenango, Early Harvest, Early Colton, Horse, Maiden Blush, Oldenburg (Duchess), Red Astrachan, Red June, Summer Pearmain, Sweet Red June (Eckel), Williams, Yellow Transparent.	Early Harvest, Early Colton, Horse, Red Astrachan, Red June, Sweet Red June (Eckel), Williams, Yellow Transparent.

AUTUMN VARIETIES.

Belleflower, Bonum, Buckingham, Grimes Golden, Gravenstein, Jefferis, Mother, Virginia Beauty.	Bonum, Buckingham, Grimes Golden, Gravenstein, Jefferis, Mother, Virginia Beauty.	Bonum, Buckingham, Mother, Virginia Beauty.
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WINTER VARIETIES.

Albemarle (Yellow Newtown), American Golden Russet, Baldwin, Ben Davis, Fallwater, Gano, Hoover (Baltimore Red), Jonathan, Mammoth Blacktwig (Arkansas), Northern Spy, Rome Beauty, Roxbury Russet, Smith Cider, Smokehouse, Spitzenburg (Esopus), Stayman, Winesap, York Imperial (Johnson Fine Winter).	Ben Davis, Dula Beauty, Gano, Hoover (Baltimore Red), Limbertwig (Red), Limbertwig (Royal), Mammoth Blacktwig (Arkansas), Pope (Seedling), Rome Beauty, Smith Cider, Sparger, Stark, Stayman, Winesap, York Imperial (Johnson Fine Winter).	Ben Davis Gulley (Mangum), Horse, Mattamuskeet, Shockley, Stayman, Winesap, Yates, York Imperial (Johnson Fine Winter).
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## PEARS.

Of late years, on account of the ravages of pear blight, the present list of varieties of pears is necessarily very short. Owing to the deadly work of this fatal disease of the pear, most of the high-quality varieties are disappearing from cultivation. The names of old standard varieties are in most fruit regions passing into ancient horticultural history and are disappearing from orchard and nursery lists. With the exception of the resistant Seckel, it is extremely risky nowadays to set for commercial growing any varieties of pears except the resistant low-quality sorts of the Chinese class, such as Garber, Le Conte and Keiffer. Pears are most resistant of blight when grown slowly on clay land without being stimulated by cultivation.

## PEARS.

<i>Mountain.</i>	<i>Piedmont.</i>	<i>Coast.</i>
Anjou,	Anjou,	Garber (Chi.),
Bartlett,	Bartlett,	Keiffer (Chi.),
Early Harvest,	Early Harvest,	Le Conte (Chi.),
Flemish Beauty,	Flemish Beauty,	Magnolia (Chi.),
Garber (Chi.),	Garber (Chi.),	Seckel,
Howell,	Howell,	Smith (Chi.).
Keiffer (Chi.),	Keiffer (Chi.),	
Le Conte (Chi.),	Le Conte (Chi.),	
Seckel,	Magnolia (Chi.),	
Sheldon,	Seckel,	
Winter Nelis.	Sheldon,	
	Winter Nelis.	

## PLUMS.

Our list of cultivated plums is made up from several sources. We have our American plums, represented by the Miner, Weaver and Wild Goose, which are suited to our climate and grow and bear well in all parts of the State. This class of plums does not, however, compare in quality with the domestic class of plums introduced from Europe. The varieties, Bradshaw, Coe, General Hand and Imperial Gage belong to the European class. Unfortunately the European plums do not thrive well except in the cooler mountain regions. In the last decade or so very valuable additions have been made to our list of plums by importation from Japan. The Japanese plums thrive well in all parts of the State, but are especially valuable for the coast region, where the European plums are not successful. Abundance, Burbank and Kelsey are varieties of the Japanese class.

## PLUMS.

<i>Mountain.</i>	<i>Piedmont.</i>	<i>Coast.</i>
Abundance (Jap.),	Abundance (Jap.),	Abundance (Jap.),
Bradshaw (Eur.),	Chabot (Jap.),	Chabot (Jap.),
Chabot (Jap.),	Clifford (Amer.),	Clifford (Amer.),
Coe (Golden Drop, Eur.),	Climax (Jap.),	Climax (Jap.),
Damson (Eur.),	Damson (Eur.),	Damson (Eur.),
General Hand (Eur.),	Golden Beauty (Amer.),	Excelsior (Amer.),
Imperial Gage (Eur.),	Kerr (Jap.),	Golden Beauty (Amer.),
Lombard (Eur.),	Miner (Amer.),	Kerr (Jap.),

<i>Mountain.</i>	<i>Piedmont.</i>	<i>Coast.</i>
Lady Washington (Eur.), Miner (Amer.), Red June (Jap.), Weaver (Amer.), Wild Goose (Amer.).	Munson (Amer.), Ogon (Jap.), Red June (Jap.), Weaver (Amer.), Wickson (Jap.), Wild Goose (Amer.).	Miner (Amer.), Munson (Amer.), Ogon (Jap.), Red June (Jap.), Weaver (Amer.), Wickson (Jap.), Wild Goose (Amer.).

## PEACHES.

The list of peaches that can be grown in North Carolina is such a long one that one has to cut down rather than build it up. The following varieties have been selected as those having the most desirable characteristics. Peaches do best in light or sandy soils.

## PEACHES.

<i>Mountain.</i>	<i>Piedmont.</i>	<i>Coast.</i>
Bilyeu, Carman, Chairs Choice, Crawford Early, Crawford Late, Elberta, Greensboro, Mountain Rose, Mathews Beauty, Smock, Sneed.	Belle of Georgia, Bilyeu, Carman, Champion, Chinese Cling, Chairs Choice, Connett, Crosby, Elberta, Greensboro, Heath, Ingold, Mayflower, Mountain Rose, Reeves, Salway, Smock, Sneed, St. John.	Belle of Georgia, Carman, Champion, Chinese Cling, Connett, Crosby, Elberta, Greensboro, Hale, Heath, Ingold, Mayflower, Salway, Smock, Sneed, St. John.

## CHERRIES.

Cherries are divided horticulturally into two classes, the Dukes or Morellos and the English or Sweet cherries. These two types are quite different in form and in hardiness. The Duke or Morello cherries are characterized by a slow, firm growth of wire-like branches with very smooth, tough, leathery bark. The trees will grow over a much wider area than the Sweet cherries, and are much more resistant in the coastal region or cotton belt. The Sweet cherries are large, rapid-growing trees with thick, heavy twigs and branches. The Sweet cherries grow to perfection in the rich soils and cool climate of the mountains. They will do fairly well in the piedmont region, but are almost invariably unsuccessful in the coastal plain.

## CHERRIES.

<i>Mountain.</i>	<i>Piedmont.</i>	<i>Coast.</i>
Black Tartarian (sweet), Dyehouse (sour), Eagle (sweet), Early Richmond (sour), Gov. Wood (sweet),	Black Tartarian (sweet), Dyehouse (sour), Eagle (sweet), Early Richmond (sour), Gov. Wood (sweet),	Dyehouse (sour), Early Richmond (sour), May Duke (sour), Montmorency (sour), Morello (sour).

<i>Mountain.</i>	<i>Piedmont.</i>	<i>Coast.</i>
May Duke (sour), Montmorency (sour), Morello (sour), Napoleon (Royal Ann) (sweet), Reine Hortense (sweet), Wragg (sour), Windsor (sweet), Yellow Spanish (sweet).	May Duke (sour), Montmorency (sour), Morello (sour), Napoleon (Royal Ann), (sweet), Wragg (sour), Windsor (sweet), Yellow Spanish (sweet).	

## GRAPES.

The grapes grown in this State are of two native types, the Labruscas or bunch grapes and the Muscadines or "Bullaces." The bunch grapes have a very wide range of growth and will thrive in all parts of the State. The Muscadine grapes, which are represented by the varieties Scuppernong, James, Meisch and Flowers, are native in the coastal plain and grow there to great perfection. They can be grown to some extent in the lower piedmont, but will not thrive in the mountains.

## GRAPES.

<i>Mountain.</i>	<i>Piedmont.</i>	<i>Coast.</i>
Agawam, Brighton, Brilliant, Catawba, Concord, Delaware, Diamond, Lindley, Lutie, Moore, Niagara, Worden, Winchell.	Agawam, Brighton, Brilliant, Catawba, Concord, Delaware, Diamond, Ives, James, Lindley, Lutie, Meisch, Moore, Niagara, Scuppernong, Thomas, Worden, Winchell.	Brighton, Brilliant, Concord, Delaware, Diamond, Flowers, Ives, James, Lindley, Lutie, Meisch, Moore, Niagara, Scuppernong, Thomas, Worden, Winchell.

## QUINCES.

Meech Prolific, Orange.	Meech Prolific, Orange.
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## FIGS.

Brown Turkey, Celestial.	Brown Turkey, Brunswick, Celestial, Ischia (black), Ischia (white).
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## RASPBERRIES (RED).

Cuthbert, Golden Queen, King, Loudon, Marlboro, Miller.	Cuthbert, Golden Queen, King, Loudon, Marlboro, Miller.
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## RASPBERRIES (BLACK).

*Mountain.*

Eureka,  
Gregg,  
Kansas.

*Piedmont.*

Eureka,  
Gregg,  
Kansas.

*Coast.*

Cherry,  
Fay,  
Pomona,  
Red Dutch,  
White Dutch.

Early Harvest.

## BLACKBERRIES.

Early Harvest.

Early Harvest.

## DEWBERRIES.

Lucretia.

Lucretia.

## GOOSEBERRIES.

Downing,  
Houghton,  
Pearl,  
Red Jacket.

## STRAWBERRIES.

Bubach (imperfect),  
Climax (perfect),  
Excelsior (per.),  
Gandy (per.),  
Heflin (per.),  
Lady Thompson (per.),  
Nick Ohmer (per.).

Bubach (imp.),  
Climax (per.),  
Excelsior (per.),  
Gandy (per.),  
Heflin (per.),  
Lady Thompson (per.),  
Nick Ohmer (per.).

Bubach (imp.),  
Climax (per.),  
Excelsior (per.),  
Gandy (per.),  
Heflin (per.),  
Lady Thompson (per.),  
Nick Ohmer (per.).

## CRAB APPLES.

Red Siberian,  
White Honey,  
Yellow Siberian.

Red Siberian,  
White Honey,  
Yellow Siberian.

## MULBERRIES.

Black English,  
Black Russian,  
Hicks,  
New American,  
Stubbs,  
White English.

Black English,  
Black Russian,  
Hicks,  
New American,  
Stubbs,  
White English.

## PECANS.

Curtis,  
Frotscher,  
Schley,  
Stuart,  
Van Deman.

## POMEGRANATES.

Purple Seeded,  
Sweet.

Purple Seeded,  
Sweet.

## JAPANESE PERSIMMONS.

Okame,  
Tanenashi,  
Triumph,  
Zengi.

## DESCRIPTIONS OF VARIETIES.

S. B. SHAW.

### APPLES.

#### ALBEMARLE (YELLOW NEWTOWN):

Tree vigorous, productive under favorable conditions. Fruit medium, roundish, oblate; cavity regular, wide, obtuse, deep, russeted; basin wide, ribbed, medium deep. Calyx open. Surface greenish yellow, white and russet veinings; dots distinct, numerous, minute, russet. Flesh firm, crisp, juicy, yellow. Flavor rich, subacid. Very good. Late winter.

#### ASTRACHAN. (See Red Astrachan.)

#### ARKANSAS (MAMMOTH BLACKTWIG):

Tree vigorous, spreading, productive. Fruit large, roundish, oblate, conical. Cavity regular, obtuse, russeted. Basin shallow, nearly smooth. Calyx closed. Surface yellowish, almost entirely covered with red; dots distinct, many, whitish. Flesh yellow, with yellow veinings, firm, juicy. Flavor mild, subacid. Core partly open; seeds few, plump, short. Very good. Winter.

#### BEN DAVIS:

Tree erect, hardy, vigorous, productive. Fruit medium, roundish, oblong, conical. Cavity deep, regular, acute, russeted; basin medium, almost regular. Calyx partly open. Surface smooth yellow, almost entirely covered with bright and deep red splashes and stripes; dots distinct, minute, few, gray. Flesh white, firm, juicy. Flavor subacid. Good. Winter.

#### BALDWIN:

Tree vigorous, upright, spreading, productive. Fruit medium, large, roundish, conical. Cavity wide, regular, moderately deep; basin deep, narrow, generally plaited. Calyx large, partly closed. Surface rich yellow, nearly covered with red and striped with crimson; dots minute, russet or gray. Flesh yellowish white, crisp, juicy. Flavor good, subacid. Core closed. Seeds few, long, many imperfect. Very good. Winter.

#### BUCKINGHAM:

Tree upright, moderately spreading, productive. Fruit medium large, oblate, conical. Cavity broad, deep, slightly russeted; basin large, deep, slightly corrugated. Calyx closed. Surface greenish yellow, mostly covered with shaded stripes and splashes of red and crimson; dots numerous, light brown. Flesh yellowish, tender, juicy. Flavor mild, subacid. Core closed; seeds numerous, long, pointed. Very good. Fall.

**BONUM:**

Tree upright, spreading, hardy, productive. Fruit medium, regular, oblate. Cavity regular, wide, greenish russet; basin wide, shallow, slightly corrugated. Calyx closed. Surface yellow, mostly covered with red and crimson splashes; dots numerous, distinct, russet with dark center. Flesh white, often stained, firm, tender, juicy. Flavor aromatic, mild, subacid. Core small, closed. Seeds numerous. Very good. Autumn.

**BELLEFLOWER.** (See Yellow Belleflower.)

**CHENANGO:**

Tree vigorous, spreading. Fruit medium, oblong. Cavity regular, narrow, acute; basin narrow, shallow, smooth. Calyx partly closed. Surface yellowish white, almost covered with crimson stripes, sunny side thinly overlaid with whitish veinings; dots few, distinct, white, minute. Flesh white, tender, juicy. Flavor mild, pleasant, subacid. Core large, open; seeds flat, pointed. Very good. Late summer.

**COLTON (EARLY COLTON):**

Tree vigorous, upright, spreading. Fruit medium, roundish, slightly ribbed. Cavity narrow, regular, shallow; basin shallow, obtuse, wrinkled. Calyx partly open. Surface light greenish yellow, brownish red blush; dots large, numerous, greenish. Flesh whitish green, crisp, juicy. Flavor sprightly, subacid. Good. Summer.

**DULA BEAUTY:**

Tree vigorous, productive. Fruit large, oblate, conical. Cavity deep, obtuse, russeted; basin wide, shallow. Calyx open. Surface dark green, almost entirely covered with dark red, obscurely striped with red; dots few, obscure, whitish. Flesh yellowish white, tender, crisp, juicy. Flavor mild, subacid. Core medium, closed; seeds numerous, plump, pointed. Very good. Early winter.

**ESOPUS (SPITZENBURG):**

Tree thrifty, erect, with drooping, slender limbs. Fruit large, round, oblong, conical. Cavity wavy, deep, wide, light brown; basin shallow, slightly furrowed. Calyx small, closed. Surface smooth, almost entirely covered with red, one side shaded, tinged with yellow; dots distinct, numerous, small, gray. Flesh firm, crisp, juicy. Flavor rich, spicy, subacid. Core open; seeds large, light-colored, flat. Best. Winter.

**EARLY HARVEST:**

Tree fairly vigorous, erect, spreading, productive. Fruit medium, roundish, often oblate. Cavity wide, regular with russet patch; basin wide, shallow, smooth. Surface very smooth, clear yellow; dots few, minute, white and green. Flesh very white, tender, juicy, crisp. Flavor rich, subacid. Core small, closed; seeds few, large, pointed. Very good. Early summer.

**ECKEL (SWEET RED JUNE):**

Tree upright, productive. Fruit large, roundish, oblong. Surface red. Flesh white, crisp, juicy. Flavor sweet, aromatic. Good. Early.

**FALLAWATER:**

Tree vigorous, very productive. Fruit large, round, regular. Cavity regular, narrow, slightly russeted; basin narrow, nearly flat. Calyx large, open. Surface yellowish green, shaded with dull red; dots large, distinct, numerous, gray. Flesh greenish white, crisp, tender, juicy. Flavor mild, subacid. Core open; seeds short, plump. Fair. Early winter.

**GANO:**

Tree erect, vigorous, productive. Fruit medium to large, regular, roundish. Cavity deep, regular, acute, russeted; basin smooth, more abrupt. Calyx partly open. Surface smooth, dark, solid crimson; dots distinct, few, gray. Flesh white, firm, moderately juicy. Flavor pleasant, subacid, not rich. Core closed, medium; seeds large, long, pointed. Good. Late winter.

**GRAVENSTEIN:**

Tree vigorous, spreading, productive. Fruit large, roundish, oblate. Cavity acute, deep, angular, slightly russeted; basin angular, irregular, ribbed. Cavity closed. Surface bright yellow, striped and splashed with light and dark red and orange; dots obscure, few, gray, minute. Flesh yellow with yellow veinings, tender, juicy, crisp. Flavor aromatic, sprightly, subacid. Late summer.

**GRIMES GOLDEN:**

Tree erect, spreading, vigorous, productive. Fruit medium, regular, roundish, oblate. Cavity regular, medium, slightly russeted; basin abrupt, uneven. Calyx closed or partly open. Surface even, rich golden yellow; dots many, obscure, white. Flesh yellow, firm, crisp, juicy. Flavor rich, aromatic, spicy, subacid. Core small; seeds many, short, plump. Fine. Winter.

**GOLDEN RUSSET (NEW YORK):**

Tree vigorous, spreading, productive. Fruit medium, roundish, oblong. Cavity medium; basin deep, regular, smooth. Calyx partly open. Surface greenish yellow, almost entirely russeted. Flesh greenish yellow, fine-grained, tender, juicy. Flavor rich, aromatic, subacid. Very good. Winter.

**GULLEY. (See Mangum.)****HOOVER:**

Tree erect, spreading, retains foliage late. Fruit medium, roundish, oblate. Cavity large, russeted; basin slightly furrowed. Calyx open. Surface yellowish, splashed and striped with two shades of dark red; dots distinct, light, patches of russet. Flesh yellowish, firm, tender, juicy. Flavor rich, subacid. Core small. Very good. Winter.

**HORSE:**

Tree vigorous, productive. Fruit medium, roundish, oblate. Cavity deep, acute, russeted; basin abrupt, corrugated. Calyx closed. Surface yellow, shaded with red blush; dots few, sunken, large, gray. Flesh yellow, firm, coarse, tender. Flavor pleasant, subacid. Core large, partly open. Good. Late summer.

**JEFFERIS:**

Tree moderate grower, productive. Fruit medium, roundish, oblate, regular. Cavity large, regular, rather acute, slightly russeted; basin wide, smooth, abrupt, medium deep. Calyx closed. Surface clear waxen yellow, shaded and splashed with dark crimson; dots numerous, large, white. Flesh yellowish white, very juicy, tender. Flavor mild, aromatic, subacid. Core closed, small; seeds long, pointed, numerous. Very good. Late summer.

**JONATHAN:**

Tree upright, spreading, vigorous, slender limbs. Fruit medium, roundish, oblong, conical. Cavity deep, regular, acute; basin deep, smooth, abrupt. Calyx small, closed. Surface smooth, clear, light yellow, almost covered with red, deepening into solid brilliant dark red on sunny side; dots distinct, numerous, minute, white. Flesh white, sometimes stained wine color, very tender and juicy. Flavor mild, aromatic, spicy, subacid. Core closed; seeds plump, long, pointed. Best. Early winter.

**LIMBERTWIG (RED):**

Tree hardy, productive, spreading, limbs drooping. Fruit medium, roundish, oblate, conic. Cavity deep, acute, thin green russet; basin small, shallow, uneven. Calyx small, nearly closed. Surface greenish yellow, shaded and striped with crimson; dots large, numerous, light brown. Flesh white, firm, juicy. Flavor brisk, subacid. Core closed; seeds numerous, large, plump. Good. Late winter.

**LIMBERTWIG (ROYAL):**

Tree vigorous, spreading, drooping limbs. Fruit medium, large, oblate. Cavity deep, acute; basin shallow, small. Calyx closed. Surface greenish yellow, marked with red; dots numerous, brown. Flesh yellow, firm, juicy. Flavor poor, subacid. Good. Late winter.

**MAIDEN BLUSH:**

Tree vigorous, spreading, productive. Fruit roundish, oblate, medium. Cavity wide, deep, with trace of russet; basin wide, smooth. Calyx closed. Surface smooth, pale yellow, blushed with red next the sun. Flesh white, tender. Flavor pleasant, subacid. Core closed. Good. Early fall.

**MANGUM (GULLEY):**

Tree thrifty, productive. Fruit medium, oblate, conical. Cavity broad, russeted; basin shallow, corrugated. Calyx partly closed.

Surface yellowish, striped and shaded with red; dots numerous, whitish or bronze. Flesh yellow, very tender, juicy. Flavor mild, subacid. Very good. Early fall.

**MATTAMUSKEET:**

Tree vigorous, productive. Fruit medium, roundish, oblate, conic. Surface yellow, shaded and splashed with light and dark red. Flesh whitish yellow, crisp. Flavor brisk, subacid. Good only in Eastern North Carolina. Late winter.

**MOTHER:**

Tree upright, rather slender, vigorous, productive. Fruit medium, roundish, conic. Cavity deep, acute, often a little russeted; basin small, corrugated. Calyx closed. Surface golden yellow, almost wholly covered with rich, warm red, splashed and striped with deeper red; dots numerous, minute, light russet. Flesh yellow, tender, juicy. Flavor rich, aromatic, subacid. Core medium, closed; seeds numerous. Best. Early winter.

**NORTHERN SPY:**

Tree upright, spreading with age, productive. Fruit large, roundish, oblong, conical. Cavity wide, deep, sometimes russeted; basin narrow, abrupt, furrowed. Calyx small, closed. Surface smooth, greenish yellow, thinly covered with light and dark red stripes, overlaid with thin whitish bloom; dots obscure, few, yellow. Flesh white, fine-grained, tender, juicy. Flavor spicy, subacid. Core large, open; seeds numerous, short, plump. Very good. Winter.

**OLDENBURG (DUCHESS):**

Tree hardy, upright, spreading. Fruit medium, regular, roundish, oblate; cavity deep, regular, acute; basin abrupt, regular. Calyx medium, closed. Surface smooth, yellow, almost wholly covered with red stripes and splashes; dots white, numerous, minute. Flesh white, juicy. Flavor sprightly, subacid. Good. Late summer.

**RED ASTRACHAN:**

Tree upright, vigorous, spreading, productive. Fruit medium roundish, conical. Cavity shallow, regular, obtuse, russeted; basin shallow, smooth. Calyx small, closed. Surface smooth, greenish yellow, almost entirely covered with mottled and striped red crimson. Flesh white, crisp, moderately juicy. Flavor brisk, acid. Very good. Summer.

**RED JUNE:**

Tree erect, vigorous, productive, hardy. Fruit medium size, irregular, roundish, oblong, conic; cavity narrow, regular, acute, with slight trace of russet; basin narrow, smooth or slightly corrugated. Calyx closed. Surface smooth, rich her; dots minute, obscure. Flesh finely grained, white, tender, juicy. Flavor agreeable, subacid. Core rather large; seeds black-brown, numerous. Good. Early market.

**ROME (BEAUTY):**

Tree moderate grower, round-headed, productive. Fruit large, roundish, oblate, conical. Cavity wide, obtuse, lined with greenish russet; basin smooth, deep, abrupt. Calyx closed. Surface smooth, pale yellow covered with red, splashed and striped; dots distinct, abundant, russet. Flesh yellowish, tender, juicy. Flavor sprightly, subacid. Good. Early winter.

**ROXBURY (RUSSET):**

Tree moderately vigorous, spreading, productive. Fruit medium, roundish, oblate. Cavity deep, regular; basin smooth, shallow, regular. Calyx closed. Surface green, entirely covered with network of brownish russet; dots obscure, few, gray. Flesh greenish white, moderately juicy. Flavor rich, subacid. Core closed; seeds pointed and plump. Very good. Late winter.

**SHOCKLEY:**

Tree vigorous, upright, very productive. Fruit medium, small, roundish, conical, regular. Cavity regular, acute, deep, russeted; basin shallow, narrow, corrugated. Calyx small, partly open. Surface very smooth, pale yellow blushed with red and crimson; dots few, minute, obscure, gray. Flesh yellow, crisp, juicy. Flavor rich, mild, subacid. Core closed; seeds many, plump. Good. Winter.

**SMITH (SMITH'S CIDER):**

Tree vigorous, spreading, straggling, productive. Fruit medium, round, oblate, conical. Cavity deep, acute, russeted; basin broad, shallow. Calyx small, half open. Surface smooth, yellow, shaded and striped with red; dots few, distinct, large, gray. Flesh white, tender, juicy, crisp. Flavor aromatic, mild, subacid. Core open; seeds many, plump, pointed. Good. Late winter.

**SMOKEHOUSE:**

Tree moderately vigorous, spreading head. Fruit medium, round, oblate. Cavity wide, acute; basin wide, medium deep, corrugated. Calyx closed. Surface yellow, shaded and splashed with red and crimson; dots few, large, gray and brown. Flesh yellow, firm, juicy, crisp. Flavor aromatic, subacid. Very good. Winter.

**STARK:**

Tree vigorous, upright, spreading. Fruit roundish, conical. Cavity regular, obtuse, russeted; basin shallow, slightly wrinkled. Calyx closed. Surface yellowish green, overlaid with red streaks and splashes; dots numerous, distinct, brown and whitish. Flesh yellowish, crisp, moderately juicy. Flavor mild, subacid. Good. Late winter.

**STAYMAN (STAYMAN WINESAP):**

Tree vigorous, open, irregular, spreading, productive. Fruit medium, oblong, conical. Cavity wide, deep, russeted; basin narrow, abrupt, shallow, furrowed. Calyx large, partially open, erect. Sur-

face greenish yellow, mostly covered with indistinct red stripes and splashes. Flesh yellow, firm, tender, juicy. Flavor rich, mild, subacid. Core medium. Very good. Late winter.

**VIRGINIA BEAUTY:**

Tree vigorous, spreading. Fruit medium, roundish, conical. Surface greenish yellow, streaked and striped with red and purple. Cavity regular, deep, russeted; basin shallow, broad. Calyx open; dots numerous, obscure, bronze. Flesh greenish yellow, firm, juicy. Flavor sweet. Very good. Late winter.

**WILLIAMS:**

Tree vigorous, productive. Fruit medium, roundish, oblong, conical. Cavity wide, shallow, slightly russeted; basin wide, shallow, abrupt, corrugated. Calyx closed. Surface very smooth, yellow, almost entirely covered with splashes and stripes of dark red; dots few, very minute. Flesh yellowish white, tender, moderately juicy. Flavor mild, aromatic, subacid. Core closed; seeds few, pointed. Good. Summer.

**WINESAP:**

Tree moderately vigorous, open, straggling head, very productive. Fruit medium, roundish, oblong, conical. Cavity wide, regular, acute, russeted; basin narrow, shallow, corrugated. Calyx closed. Surface smooth, dark yellow, mostly covered with splashes and occasionally stripes of rich dark red; dots few, minute. Flesh yellow, firm, crisp, fine-grained. Flavor rich, sprightly, subacid. Core slightly open; seeds medium, few, short, plump. Very good. Late winter.

**YATES:**

Tree upright, productive. Fruit small, oblate, conic. Cavity large, slightly russeted; basin shallow. Calyx small, closed. Surface whitish yellow, shaded, striped and splashed with shades of red; dots numerous, small, light. Flesh white, sometimes stained next skin, tender, juicy. Flavor pleasant, subacid. Good. Late winter.

**YELLOW TRANSPARENT:**

Tree vigorous, upright, round-headed, productive. Fruit medium, roundish, oblate, conical. Cavity regular, acute, russeted; basin narrow, shallow, corrugated. Calyx closed. Surface smooth, light yellow; dots numerous, large, white. Flesh white, tender, juicy. Flavor pleasant, subacid. Core half open. Good. Summer.

**YORK IMPERIAL:**

Tree moderate grower, productive. Fruit medium, roundish, oblong, oblique. Cavity regular, narrow, acute, russeted; basin smooth, deep, abrupt, slightly leather-cracked. Calyx closed or open. Surface light yellow, almost wholly covered with marbled, washed and striped red; dots few, distinct, gray. Flesh yellow, with yellow veinings, firm, crisp, juicy. Flavor pleasant, subacid. Core small, open; seeds many, plump. Good. Winter.

## PEARS.

**ANJOU:**

Tree productive. Fruit large, regular, oblong, pyriform. Cavity shallow, uneven; basin shallow, small, even. Calyx very small, open. Surface greenish yellow, dull red cheek and clouding russet; dots numerous, brown and crimson. Flesh yellowish white, melting. Flavor rich, vinous, perfumed. Best. Late.

**BARTLETT:**

Tree upright, vigorous. Fruit large, oblong, obtuse, pyriform. Cavity shallow; basin shallow, obscurely plaited. Calyx open. Surface uneven, clear yellow, with blush on sunny side. Flesh white, fine grained, buttery. Flavor juicy, sweet, richly perfumed. Very good. Late summer.

**EARLY HARVEST:**

Tree upright, vigorous. Fruit medium, regular, obovate. Cavity slight; basin shallow. Surface smooth, golden yellow, with bright red cheek. Flesh yellowish white, firm, juicy. Flavor mild, subacid. Good. Early. Very resistant of blight.

**FLEMISH (BEAUTY):**

Tree vigorous, hardy, upright. Fruit large, obovate, obtuse, pyriform. Cavity very narrow, deep, regular; basin small, round. Calyx open. Surface slightly rough, pale yellow, mostly covered with marblings and areas of light russet, becoming reddish brown at maturity. Flesh yellowish white, slightly coarse, juicy, melting. Flavor sweet, rich, slightly musky. Very good. Early fall.

**GARBER:**

Tree hardy, upright, vigorous. Fruit large, roundish, oblate, pyriform. Surface brownish yellow, with red blush on sunny side. Flesh firm, granular, juicy. Flavor acid. Poor. Late summer. Very resistant of blight.

**HOWELL:**

Tree upright, vigorous. Fruit large, roundish, obovate, pyriform. Cavity narrow, shallow; basin broad, deep, uneven. Calyx open. Surface rich yellow, with traces of red in the sun; dots numerous, grayish. Flesh whitish, juicy, melting. Flavor brisk, vinous. Very good. Early fall.

**KEIFFER:**

Tree hardy, vigorous, upright. Fruit large, oval, nearly obtuse, pyriform. Cavity medium; basin shallow, medium. Surface yellow, with brighter shade toward sun, patchings of netted russet. Flesh whitish, somewhat coarse, juicy, half melting. Flavor sweet when fully ripe. Good. Late fall. Very resistant of blight.

**LE CONTE:**

Tree vigorous, upright. Fruit large, roundish, oblong, pyriform. Surface yellow, with red on sunny side. Flesh whitish, melting. Flavor fair. Midsummer. Very resistant of blight.

**MAGNOLIA:**

Tree dwarfish, prolific. Fruit large, roundish, regular. Cavity shallow, acute, uneven; basin, regular, deep, acute. Calyx wanting. Surface smooth, yellow, russeted, tinged with red and brown on sunny side; dots numerous, obscure, russet. Flesh white, crisp, tender, juicy. Flavor mild, subacid. Early fall.

**SECKEL:**

Tree hardy, vigorous, uniform, compact head. Fruit small, regular, obovate. Cavity slight; basin very shallow. Calyx small. Surface smooth, brownish green at first, becoming dull yellowish brown with russet red cheek. Flesh whitish, buttery, melting, very juicy. Flavor rich, spicy, aromatic. Best. Late summer.

**SHELDON:**

Tree vigorous, erect, hardy. Fruit large, roundish, obtuse, obovate. Cavity deep; basin broad, deep. Calyx open. Surface greenish yellow, with thin russet, slight blush where exposed. Flesh whitish, juicy, melting. Flavor sweet, vinous, aromatic. Very good. Fall.

**SMITH:**

Tree hardy, productive. Fruit large, roundish, ovate. Surface yellow, with red blush where exposed. Flesh whitish yellow, tender, vinous. Flavor astringent, subacid. Good. Resistant of blight.

**WINTER NELIS:**

Tree vigorous, productive. Fruit medium, obovate, sometimes pyriform. Cavity small, narrow; basin broad, deep. Surface greenish yellow, russeted. Flesh white, tender, juicy, buttery. Flavor rich, sweet. Very good. Late.

**PLUMS.****ABUNDANCE:**

Tree hardy, prolific. Fruit large, roundish, ovoid, unequal sides. Stem short and strong; suture distinct but shallow. Surface yellow, washed with purplish crimson; dots numerous. Flesh firm, meaty. Flavor pleasant, subacid. Good. Early.

**BRADSHAW:**

Tree upright, vigorous. Fruit large, obovate, sometimes with neck. Stem stout, curved; suture broad, shallow, half round. Cavity small. Surface reddish purple, with light blue bloom. Flesh yellowish, changing to brownish purple when fully ripe, coarse, juicy. Flavor pleasant, subacid. Good. Late summer.

**CHABOT:**

Tree upright, productive. Fruit large, oblong, conical. Stem short, stout. Cavity large, abrupt; suture not distinct. Surface yellow, almost covered with cherry-red blush, blue bloom. Flesh yellow, juicy. Flavor rich, sweet. Very good. Late summer.

**CLIFFORD:**

Tree vigorous, productive. Fruit large, long, ovate; suture light. Surface bright scarlet; dots yellow; lilac bloom. Flesh yellow, firm. Flavor sweet, aromatic, vinous. Very good. Early summer.

**CLIMAX:**

Tree vigorous, prolific. Fruit large, heart-shaped. Stem short, stout. Cavity deep, abrupt; suture distinct, shallow. Surface dark red, varied-sized yellow dots. Flesh yellow, firm. Flavor rich, sweet. Very good. Early summer.

**DAMSON:**

Tree hardy, prolific. Fruit small, oval. Surface purple, covered with thick blue bloom. Flesh melting and juicy. Flavor subacid. Good. Late summer.

**EXCELSIOR:**

Tree thrifty, productive. Fruit medium to large, conical, flattened at top. Stem short. Cavity wide, shallow; no suture. Surface solid wine color. Bloom heavy, light blue; dots very small, white. Flesh yellowish, with reddish shade next pit, firm. Very good. Early.

**GOLDEN BEAUTY:**

Tree hardy, productive. Fruit medium, roundish; suture distinct. Surface golden yellow, with white dots and white bloom. Flesh firm, meaty, bright yellow. Flavor mild, subacid. Good. Late summer.

**GOLDEN DROP (COE'S GOLDEN DROP):**

Tree moderately vigorous, productive. Fruit large, oval, short neck, unequal sides. Stem long, stout. Cavity shallow, abrupt; suture well marked, extending beyond apex. Surface golden yellow, with numerous yellow dots; bloom yellow. Flesh yellow, firm. Flavor rich, sweet. Very good. Late summer.

**HAND (GENERAL HAND):**

Tree vigorous, productive. Fruit large, rounish, oval. Stem medium, slender. Cavity broad, shallow; suture shallow. Surface golden yellow, with marbling of greenish yellow; dots small; bloom light colored. Flesh yellow, not firm, juicy. Very good. Summer.

**IMPERIAL GAGE:**

Tree thrifty, prolific. Fruit medium to large, oval. Stem one inch long, stout. Cavity obtuse, flattened on top. Surface pale green, with tinge of yellow; bloom white. Flesh greenish, juicy, melting. Flavor rich. Best. Summer.

**KERR:**

Tree vigorous, productive. Fruit medium, conical; suture deep. Surface orange yellow; bloom cream-colored. Flesh juicy. Flavor rich, sweet. Not susceptible to rot. Good.

**LOMBARD:**

Tree vigorous, productive, peculiar crimped leaves. Fruit medium, roundish, oval, slightly flattened at ends. Stem short, slender; suture shallow. Cavity broad, abrupt. Surface violet red, with blue bloom; dots whitish. Flesh yellow, juicy. Flavor pleasant, subacid. Good. Late summer.

**MINER:**

Tree hardy, productive when planted with other varieties. Fruit medium, roundish, oblong. Surface dull purplish red; dots numerous, small, yellow and gray. Flesh amber-colored, soft, juicy. Flavor rich, vinous. Good. Early fall.

**MUNSON:**

Tree thrifty, moderately prolific. Fruit medium, long, oval. Surface yellow, covered with red; dots numerous, yellow; bloom lilac. Flesh yellow, very soft. Flavor sweet. Good. Early summer.

**OGON:**

Tree vigorous, productive. Fruit medium, roundish, irregular. Stem short. Cavity regular; suture well defined. Surface lemon yellow; dots numerous; bloom white. Flesh yellow, firm, meaty. Good, not susceptible to rot. Summer.

**RED JUNE:**

Tree vigorous, productive. Fruit medium to large, roundish, conical. Stem medium. Cavity large, regular, deep; suture distinct to apex. Surface deep vermilion red, sometimes marbled with purple; dots numerous, small, light-colored. Flesh light, yellowish white, veined, firm, tender, juicy. Flavor mild, subacid. Good. Early.

**WASHINGTON (LADY WASHINGTON):**

Tree vigorous, productive. Fruit very large, roundish, oval. Stem  $\frac{3}{4}$  inch long. Cavity wide, shallow; suture obscure except near cavity. Surface bright yellow, sometimes marbled with green. Flesh yellow, firm. Flavor sweet. Very good. Summer.

**WEAVER:**

Tree productive, thrifty. Fruit large, oblong, flattened at ends. Stem medium. Cavity shallow, regular; suture well defined. Surface dark marbled red; bloom purplish. Flesh firm, meaty. Very good. Summer.

**WICKSON:**

Tree vigorous, upright, productive. Fruit large, heart-shaped. Stem short, stout; suture distinct. Cavity abrupt. Surface dark

red, with bluish bloom; dots numerous, yellow. Flesh yellow, firm. Flavor delicious. Good. Summer.

**WILDGOOSE:**

Tree vigorous, very productive. Fruit medium to large, roundish, oblong. Surface light red, attractive appearance. Flesh yellow, meaty, juicy. Flavor rich, sweet. Very good. Summer.

PEACHES.

**BELLE OF GEORGIA:**

Tree hardy, productive. Fruit large, roundish, oblate. Surface whitish, with red cheek. Flesh white, firm. Flavor excellent. Pit free. Very good. Summer.

**BILYEU:**

Tree hardy, productive. Fruit large, roundish. Surface greenish white, with red cheek. Flesh white, firm, crisp. Flavor sweet. Pit free. Good. Early fall.

**CARMAN:**

Tree strong, prolific. Fruit large, broadly oval, pointed. Surface white, dotted and blushed with red. Flesh creamy white, tinged with red. Flavor vinous, sprightly. Pit free. Good. Early.

**CHAIRS (CHAIRS CHOICE):**

Tree vigorous, productive. Fruit large, roundish, oval. Cavity deep, narrow; suture extending beyond apex. Surface yellow, with blush next the sun. Flesh yellow, red at pit. Flavor acid. Pit free. Very good. Late summer.

**CHAMPION:**

Tree vigorous, spreading, productive. Fruit large, roundish, regular. Cavity shallow; suture distinct, extending two-thirds around. Surface yellowish white, mottled with red on sunny side. Flesh whitish, red at pit, tender, juicy. Flavor rich, subacid. Very good. Summer.

**CHINESE CLING:**

Tree vigorous, productive. Fruit large, roundish, somewhat elongated. Suture shallow. Surface pale yellow, shaded with fine red. Flesh white, with red at pit, juicy, melting. Flavor rich, vinous. Pit not free. Good. Summer.

**CONNETT:**

Tree prolific, hardy. Fruit large, roundish, oval. Cavity deep, abrupt. Suture extends beyond apex. Surface creamy white, mottled with red next the sun. Flesh yellowish white, without red, tender, juicy. Flavor excellent. Pit not free. Very good. Summer.

**CRAWFORD'S EARLY (EARLY CRAWFORD):**

Tree vigorous, hardy, prolific. Fruit large, roundish, elongated. Suture compressed, extending two-thirds around. Cavity broad but

shallow. Surface bright yellow, with red cheek. Flesh yellow, juicy, colored at pit. Flavor sweet, rich. Pit free. Very good. Late summer.

**CRAWFORD'S LATE (LATE CRAWFORD):**

Tree hardy, prolific. Fruit very large, roundish, oval. Distinct suture. Surface yellow, with red blush next sun. Flesh yellow, with red at pit, juicy, melting. Flavor rich, excellent, vinous. Pit free. Very good. Fall.

**CROSBY:**

Tree hardy, productive. Fruit medium, roundish. Cavity narrow, deep; suture two-thirds around fruit. Surface yellow, with mottlings of red and red cheek, and some bloom. Flesh yellow, juicy, quite firm. Pit free. Very good. Late summer.

**ELBERTA:**

Tree strong, prolific. Fruit large, roundish, oval, slightly compressed. Suture more than half around. Surface yellow, with red cheek. Flesh yellow, with red at pit, tender, juicy. Flavor rich, sweet. Pit free. Very good. Summer.

**GREENSBORO:**

Tree vigorous, hardy. Fruit large, round. Surface yellow, with red and crimson cheek. Flesh white, very juicy. Flavor sweet. Pit free. Good. Early summer.

**HALE:**

Tree hardy, productive. Fruit medium, round. Cavity abrupt, deep. Suture extends to apex. Surface creamy white, with red cheek and light bloom. Flesh white, tender, juicy. Flavor rich, sweet. Pit not free. Good. Early summer.

**HEATH:**

Tree vigorous, prolific. Fruit large, oblong, narrowed at both ends. Cavity shallow; suture distinct, extending to apex. Surface yellowish white, with red cheek. Flesh white, firm, tender, melting. Flavor vinous, subacid. Very good. Pit not free. Late summer.

**INGOLD:**

Tree vigorous but not hardy, productive. Fruit medium, roundish, irregular. Cavity shallow; suture distinct. Surface deep yellow, with red cheek, almost entirely covered with minute dots and shadings of red. Flesh yellow, red at pit, firm, juicy. Flavor rich, melting, subacid. Pit free. Very good. Summer.

**MATHEWS (BEAUTY):**

Tree vigorous, productive. Fruit large, roundish. Cavity narrow. Suture obscure. Surface golden yellow, red-streaked, crimson cheek. Flesh yellow, firm, juicy. Flavor rich, subacid. Pit free. Good. Late summer.

**MAYFLOWER:**

Fruit medium, oblong. High color, excellent quality. Very early. New.

**MOUNTAIN ROSE:**

Tree thrifty, prolific. Fruit large, roundish. Cavity abrupt, deep. Suture slightly depressed, extending beyond apex. Surface creamy white, blushed and sprinkled with red spots. Flesh white, with red at pit, tender, melting. Flavor rich, subacid. Pit free. Good. Summer.

**REEVES:**

Tree hardy, productive. Fruit medium to large, roundish, ovate. Cavity deep, broad; suture not distinct. Surface yellow, dark red cheek; thin bloom. Flesh yellow, red at pit, tender, juicy. Flavor mild, vinous, subacid. Pit free. Good. Late summer.

**ST. JOHN:**

Fruit large, round. Surface yellow, with red cheek. Flesh juicy, firm. Flavor rich, sweet. Pit free. Very early.

**SALWAY:**

Tree vigorous, productive. Fruit large, roundish, somewhat oval, one side enlarged. Suture slight, extending beyond apex. Surface creamy yellow, crimson blush next sun. Flesh yellow, with red at pit, juicy, tender. Flavor vinous. Pit free. Good. September.

**SMOCK:**

Tree vigorous, productive. Fruit large, roundish, ovate. Cavity narrow, deep. Suture obscure, except near apex. Surface orange yellow, with blush on cheek; bloom heavy. Flesh yellow, red at pit, quite tender, juicy. Flavor rich, sprightly, subacid. Pit free. Good. Late summer.

**SNEED:**

Tree hardy, prolific. Fruit medium, roundish, ovate. Cavity narrow and deep. Suture obscure. Surface yellow, with slight blush on cheek; heavy bloom. Flesh yellowish white, tender. Flavor excellent. Pit nearly free. Good. Early.

## CHERRIES.

**BLACK TARTARIAN:**

Tree vigorous, erect. Fruit very large, heart-shaped. Stem  $1\frac{1}{2}$  inches long. Cavity shallow. Surface often uneven. Skin glossy, bright purplish black. Flesh colored, half tender. Flavor rich, sweet, delicious. Stone small. Very good. Early summer.

**BLACK EAGLE:**

Tree vigorous, moderately productive. Fruit medium, obtuse, heart-shaped. Stem medium, slender. Cavity shallow. Surface

dark, purple to black. Flesh deep purple, tender, juicy. Flavor rich, vinous, sweet. Best. Early summer.

**DYEHOUSE:**

Tree hardy, prolific. Fruit medium, oblate. Apex depressed. Cavity narrow, abrupt. Stem  $1\frac{3}{4}$  inches long. Skin light red. Flesh uncolored, firm. Flavor acid. Fair. Early.

**EARLY RICHMOND:**

Tree hardy, productive, erect, roundish, spreading head. Fruit medium, round. Stem one inch long. Cavity broad, sloping. Apex depressed. Suture well defined. Skin light red. Flesh soft, uncolored. Flavor rich, acid. Very good. Early.

**GOV. WOOD:**

Tree vigorous, round, regular head. Fruit large, heart-shaped. Stem one and one-half inches long. Cavity broad, shallow. Suture well defined. Skin yellow, shaded with red. Flesh tender, juicy. Flavor rich, sweet, delicious. Best. Middle of June.

**MAY DUKE:**

Tree thrifty, erect, productive. Fruit roundish, obtuse, heart-shaped. Stem one to one and one-quarter inches long. Cavity shallow. Surface bright red, becoming darker. Flesh lightly colored, tender, melting. Flavor rich, subacid. Very good. Quite early.

**MONTMORENCY:**

Tree erect, hardy, productive. Fruit large, roundish, oblate. Stem one and one-quarter inches long. Cavity deep. Skin reddish amber. Flesh tender, uncolored. Flavor mildly acid. Good. Early summer.

**MORELLO:**

Tree very hardy, productive. Fruit medium, roundish, flattened at ends. Stem three-quarters inch long. Cavity broad, deep. Apex slightly compressed. Surface bright red. Flesh light-colored, juicy. Flavor brisk, acid. Very good. Early.

**NAPOLEON:**

Tree vigorous, productive. Fruit very large, heart-shaped, a little oblong. Stem short. Cavity narrow. Skin pale yellow, dotted with red and marbled crimson on sunny side. Flesh firm, juicy. Flavor excellent. Good. Summer.

**REINE HORTENSE:**

Tree hardy, productive. Fruit very large, roundish, elongated. Suture a distinct line on even surface. Surface bright red, marbled and mottled. Flesh tender, juicy. Flavor mild, subacid. Best. Late.

**WINDSOR:**

Tree hardy, prolific. Fruit large, round, obtuse, heart-shaped. Stem one and one-half inches long. Cavity deep. Skin dark red. Flesh yellowish with red tint, firm, juicy. Flavor rich, sweet. Good. Late.

**WRAGG:**

Tree strong, hardy, productive. Fruit large, roundish, heart-shaped. Stem one and one-half inches long. Cavity small, shallow. Skin dark crimson. Flesh and juice light crimson, firm, juicy. Flavor slightly astringent. Good. Summer.

**YELLOW SPANISH:**

Tree strong, spreading, prolific. Fruit large, obtuse, heart-shaped. Stem one and one-half inches long. Cavity wide, shallow. Skin light yellow, blush and dots on side next sun. Flesh firm, light yellow. Flavor rich.

## GRAPES.

**AGAWAM:**

Vine vigorous, productive. Bunch large, compact, shouldered. Berry large, roundish, oval. Skin dark red. Flesh tender, juicy. Flavor vinous, with trace of native aroma. Good. After Concord.

**BRIGHTON:**

Vine strong, productive. Bunch medium to large, compact, shouldered. Berry medium. Skin dark red. Flesh tender. Flavor rich, sweet. Very good. Requires mixed planting. Earlier than Delaware.

**BRILLIANT:**

Vine hardy, prolific. Bunch large, conical, shouldered, compact. Berry medium, roundish. Skin brownish black. Flesh and skin very tender, juicy. Flavor sweet, vinous. Very good. Before Concord.

**CATAWBA:**

Vine hardy, productive. Bunch medium, shouldered, not very compact. Berries quite large, roundish, often oval. Skin pale red in shade, deeper red in sun, lilac-colored bloom. Flesh pulpy, juicy. Flavor rich, sweet, slightly musky. Good. Early fall.

**CONCORD:**

Vine very healthy, vigorous, productive. Bunch compact, large, shouldered. Berry large, globular. Skin almost black, thickly covered with bloom. Flesh buttery, juicy, tough near center. Flavor sweet. Very good. Late summer.

**DELAWARE:**

Vine vigorous, hardy, productive. Bunch small, very compact, usually shouldered. Berries small, round. Skin handsome light red.

Flesh tender. Flavor rich, sweet, aromatic. Best. Summer. Very resistant of rot.

**DIAMOND:**

Vine vigorous, productive. Bunch long, shouldered, compact. Berries round, medium. Skin greenish white, with white bloom. Flesh juicy, tender. Flavor sweet, vinous. Very good. Summer.

**FLOWERS:**

Of Muscadine class. Bunches have from fifteen to twenty-five berries; black skin; sweet, vinous flavor. A month later than the Scuppernong.

**IVES:**

Vine vigorous, productive. Bunch medium, compact, shouldered. Berries medium, roundish, oval. Skin black. Flesh juicy, pulpy. Flavor sweet, quite foxy. Good. Early.

**JAMES:**

Of Muscadine class. Vine hardy, prolific. Bunches small, irregular. Berries very large, round. Skin black, slight bloom, thick. Flesh firm, juicy. Flavor sweet, aromatic, vinous. Very good. September.

**LINDLEY:**

Vine vigorous, very productive. Bunch large, long, compact. Berries medium, round. Skin pale yellow, violet bloom. Flesh tender, juicy. Flavor sweet, slightly aromatic. Very good. Needs mixed planting. Summer.

**LUTIE:**

Vine strong, very productive. Bunch medium, long, roundish, compact. Berries large, round, pale to dark red, thin bloom. Flesh tender, juice uncolored. Flavor aromatic, foxy odor. Early.

**MEISCH:**

Of Muscadine class. Vine vigorous, productive. Bunch medium, not compact. Berries medium, roundish. Skin black, slight bloom. Flesh juicy. Flavor sweet. Good. Late.

**MOORE:**

Vine hardy, productive. Bunch smaller than Concord, roundish, conical, rarely shouldered, compact. Berries large, round. Skin black, bloom thin. Flesh firm, juicy. Flavor vinous, slightly foxy. Good. Summer.

**NIAGARA:**

Vine very hardy, strong grower. Bunches large, compact, shouldered. Berries large, round. Skin yellowish white. Flesh juicy. Flavor vinous, sprightly. Very good. Summer.

**SCUPPERNONG:**

Of Muscadine class. Vine hardy, productive. Bunches very small. Berries large, round. Skin greenish yellow, sometimes sprinkled with red and patches of russet, thick. Flesh firm, juicy. Flavor rich, sweet, aromatic, musky, slightly perfumed. Very good for local consumption. Late summer.

**THOMAS:**

Of Muscadine class. Vine vigorous, productive. Bunches very small. Berries medium, round. Skin reddish purple. Flesh pulpy, tender. Flavor sweet. Good. Late summer.

**WINCHELL:**

Vine vigorous, productive. Bunch medium, compact, long, shouldered. Berries small, round. Skin greenish yellow, with slight bloom. Flesh juicy, tender. Flavor rich, sweet. Very good. Early.

**WORDEN:**

Vine vigorous, prolific. Bunch large, long, compact, shouldered. Berries large, round. Skin black. Flesh greenish, pulpy, juicy. Flavor vinous, pleasant. Good. Summer.

## QUINCES.

**MEECH PROLIFIC (MEECH):**

Tree hardy, prolific. Fruit large, obscure pyriform. Surface bright yellow. Flesh, flavor and quality very good, particularly fragrant. Early.

**ORANGE:**

Tree vigorous, prolific. Fruit large, roundish. Surface orange color. Flesh, flavor and quality good, particularly fine for preserving. August.

## FIGS.

**BLACK ISCHIA:**

Bush hardy, productive. Fruit medium, turbinate, flat at top. Surface deep purple. Flesh deep red. Flavor luscious, sweet. Good.

**BROWN TURKEY.**

Bush hardy, prolific. Fruit large, pear-shaped, thick stem. Surface dark brown, with blue bloom. Flesh red. Flavor luscious. Good.

**BRUNSWICK:**

Fruit very large, broadly pear-shaped, short, slender stalk, ribs well marked. Eye large, open, with rosy scales. Skin tough, dark brown in color, with violet shade. Flesh amber-colored, thick, soft. Very good. Early.

**CELESTIAL (BLUE CELESTE):**

Bush hardy, productive. Fruit very small, ovate. Surface dark violet amber, with bloom at neck. Flesh amber-colored. Flavor sweet. Good.

**WHITE ISCHIA:**

Bush vigorous, prolific. Fruit small, round; neck small; stem short. Eye open. Surface smooth, bluish green, brown blush. Flesh rosy red. Good.

**RASPBERRIES (RED).****CUTHBERT:**

Bush hardy, very productive. Fruit large, roundish, conical. Surface scarlet crimson. Flesh firm, juicy. Flavor mild, subacid. Best.

**GOLDEN QUEEN:**

Bush vigorous, productive. Fruit medium, roundish, conical. Surface yellow. Flesh soft, juicy. Flavor sweet. Very good.

**KING:**

Bush strong, prolific. Fruit medium, roundish. Surface red. Flesh firm. Flavor mild, sweet. Good.

**MARLBORO:**

Bush small, hardy, productive. Fruit large, roundish, conical. Surface crimson. Flesh firm, juicy. Flavor subacid. Good.

**MILLER:**

Bush vigorous, productive. Fruit large, roundish. Surface bright crimson. Flesh firm, juicy. Flavor sprightly, subacid. Good.

**LOUDON:**

Bush vigorous, productive. Fruit medium, roundish, conical. Surface bright red. Flesh firm, juicy. Flavor rich, subacid. Very good.

**RASPBERRIES (BLACK).****EUREKA:**

Bush vigorous, hardy, productive. Fruit medium, roundish. Surface black. Flesh quite firm, juicy. Flavor mild, subacid. Good.

**GREGG:**

Bush hardy, prolific. Fruit large, roundish, oblate. Surface black, with gray bloom. Flesh firm, juicy. Flavor pleasant, subacid. Very good. Late.

**KANSAS:**

Bush hardy, sprawly. Fruit large, roundish. Surface shining black, with slight bloom. Flesh firm. Flavor subacid. Good.

## CURRANTS.

**CHERRY:**

Plant strong, stout, erect. Clusters short. Berries large, round. Color red. Flesh firm. Flavor quite acid. Very good.

**FAY:**

Plant hardy, upright. Clusters medium. Berries large, round. Color red. Flesh firm. Flavor acid. Good.

**POMONA:**

Plant vigorous, productive. Clusters medium. Berries medium, round. Color bright red. Flesh tender. Flavor subacid. Good.

**RED DUTCH.**

Plant thrifty, upright, productive. Clusters medium long. Berries large, round. Color red. Flesh firm. Flavor acid. Good.

**WHITE DUTCH:**

Plant hardy, erect, productive. Clusters medium long. Berries large, round. Color yellowish white. Flesh tender, mild, subacid. Very good.

## GOOSEBERRIES.

**DOWNING:**

Plant upright, vigorous, productive. Fruit medium, roundish, oval. Color green, with distinct rib veins and smooth skin. Flesh quite soft, juicy. Flavor subacid, mild. Very good.

**HOUGHTON:**

Plant vigorous, branches rather slender, drooping. Fruit small, roundish oval. Color light green, shaded red. Flesh tender, juicy. Flavor sweet. Very good.

**PEARL:**

Plant hardy, prolific. Fruit medium to large, roundish. Color light green, with shading of red. Flesh firm. Flavor subacid. Very good.

**RED JACKET:**

Plant vigorous, productive. Fruit medium, roundish, oval. Color light green, shaded with red. Flesh tender, juicy. Flavor rich, subacid, mild. Very good.

## BLACKBERRIES.

**EARLY HARVEST:**

Fruit medium, roundish, oblong. Surface greenish black. Flesh soft, juicy. Flavor rich. Good. Early.

## DEWBERRIES.

**LUCRETIA:**

Fruit very large, oblong, ovate. Flesh tender, juicy, almost melting. Good.

## STRAWBERRIES.

**BUBACH:**

Fruit large, conical, irregular. Surface dark red or crimson. Good. Pistillate. Early.

**EXCELSIOR:**

Fruit medium, roundish, slightly conical. Surface bright red. Flesh firm. Very good. Flowers perfect. Very early.

**GANDY:**

Fruit large, regular, conical. Surface glossy crimson. Flesh firm. Very good. Flowers perfect. Late.

**HEFLIN:**

Fruit large, uniform. Surface glossy crimson. Flesh firm. Very good. Flowers perfect. Early.

**LADY THOMPSON:**

Fruit large, conical, regular. Surface crimson and red. Flesh quite firm. Very good. Flowers perfect. Early.

**NICK OHMER.**

Fruit very large, roundish, conical, often three-sided. Surface glossy red. Flesh firm. Good. Flowers perfect.

## CRAB APPLES.

**RED SIBERIAN:**

Tree upright, vigorous, productive. Fruit medium, three-fourths inch in diameter, regular, roundish, flattened at ends. Stem long, slender; cavity smooth, shallow; basin slight, calyx small. Surface smooth, bright scarlet over clear yellow ground. Flesh yellowish white, firm, juicy. Flavor brisk, aromatic, acid. Very good. Late summer.

**YELLOW SIBERIAN.**

Tree vigorous, prolific. Fruit small, roundish, flattened at ends, angular, irregular. Stem long; cavity regular, obtuse; basin flat, wrinkled; calyx closed. Surface smooth, rich yellow. Flesh yellow, juicy. Flavor acid. Good. Late summer.

## MULBERRIES.

**BLACK ENGLISH:**

Tree large, vigorous, upright, productive. Fruit medium, oblong, slightly curved. Stem one-half inch long, slender. Apex rounded; base oblique, irregular. Druplets flat to circular in outline, compact, firm; sutures shallow, narrow. Surface reddish, becoming black. Flavor sweetish. Fair. Early summer.

**BLACK RUSSIAN:**

Tree vigorous, small, productive. Fruit medium, short, oval. Stem stout, small. Apex blunt, obtuse; base oblique, irregular. Druplets large, broad, rounded, irregular, compact; sutures deep, open. Surface black. Flavor sweet, slightly subacid. Good. Early summer.

**HICKS:**

Tree large, vigorous, productive. Fruit medium, oblong, sometimes curved. Stem medium, slender. Apex rounded; base oblique or rounded. Druplets medium, flattened, compact. Sutures narrow, shallow. Surface reddish, becoming black. Flavor sweet, insipid. Poor. Summer.

**STUBBS:**

Tree large, vigorous, prolific. Fruit large, oblong, curved, irregular. Apex rounded; base oblique, irregular. Druplets compact, flattened, medium. Sutures shallow, narrow. Flavor subacid, vinous, sharp. Good. Summer.

**WHITE ENGLISH:**

Tree vigorous, spreading. Fruit medium, oblong, curved. Stem long, slender, curved. Apex rounded; base oblique. Druplets medium, flattened, narrow, compact. Sutures narrow, deep. Flavor sweet. Good. Early summer.

## PECANS.

**CURTIS.**

Tree vigorous, productive. Nut medium, oblong, conical. Shell thin; partitions thin. Kernel plump, full. Excellent.

**FROTSCHER:**

Tree vigorous, productive. Nut large, oblong-ovoid. Shell quite thin; partitions thin. Kernel plump, full. Excellent. Early.

**SCHLEY:**

Tree thrifty, productive. Nut medium, oblong-ovoid, flattened. Shell very thin; partitions thin. Kernel plump, sweet, rich. Very good. Early.

**STUART:**

Tree thrifty, prolific. Nut large, ovoid. Shell thin; partitions thin. Kernel plump. Flavor good. Early.

**VAN DEMAN:**

Tree vigorous, productive. Nut large, oblong, pointed. Shell thin; partitions rather corky. Kernel rather plump. Good. Early.

## POMEGRANATES.

**PURPLE SEEDED:**

Fruit large, oval, yellow, with red and purple shading. Very good.

**SWEET:**

Fruit large, round, dark red with deeper shading. Good.

## JAPANESE PERSIMMONS.

**OKAME:**

Large, roundish, oblate, netted lines at apex. Surface orange yellow, changing to carmine, with bloom and waxy expression. Flesh light-colored, light-brown center around the seeds. Good.

**TANE-NASHI:**

Large, roundish, conical, pointed at apex. Surface light yellow, changing to bright red. Flesh yellow. Seedless. Fine.

**TRIUMPH:**

Medium, tomato-shaped. Surface yellow. Seeds few. Very good.

**ZENGI:**

Small, round or oblate. Surface light, with reddish shades. Flesh dark brown with darker spots. Flavor very sweet. Good. Late summer.

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**REPORT FROM LEAF TOBACCO WAREHOUSES FOR MONTH  
OF AUGUST, 1908.**

Pounds sold for producers, first hand.....	14,681,343
Pounds sold for dealers.....	493,041
Pounds resold for warehouse.....	1,138,558
Pounds resold for other warehouses.....	23,556
Total.....	16,336,498

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Z. P. METCALF.....	Assistant Entomologist.
J. A. CONOVER.....	Dairyman.

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R. W. SCOTT, JR., Superintendent Edgecombe Test Farm, Rocky Mount, N. C.  
 F. T. MEACHAM, Superintendent Iredell Test Farm, Statesville, N. C.  
 JOHN H. JEFFERIES, Superintendent Pender Test Farm, Willard, N. C.  
 R. W. COLLETT, Superintendent Transylvania and Buncombe Test Farms,  
 Swannanoa, N. C.



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## REPORT OF FARMERS' INSTITUTE WORK, 1908.

BY TAIT BUTLER, DIRECTOR.

During the last year—December 1, 1907, to December 1, 1908—there have been held 234 institutes under the direction of the State Department of Agriculture. Of these 151 have been regular Farmers' Institutes for men, 14 Orchard Demonstration Institutes, 68 Institutes for Women, and 1 five-day Short Course Dairy School. In addition, a round-up institute, or, as it is generally known, State Farmers' Convention, was held, embracing separate meetings for both men and women.

Institutes have been held in 95 of the 98 counties of the State—all except Dare, Carteret and New Hanover. The number of institutes held this year has been greater than ever before, as the following will show:

1898—	28 institutes in 27 counties.
1903—	17 institutes in 16 counties.
1904—	58 institutes in 58 counties.
1905—	79 institutes in 76 counties.
1906—	136 institutes in 91 counties.
1907—	169 institutes in 93 counties.
1908—	234 institutes in 95 counties.

Counting special institutes, there has been an increase of 66 over last year, which exceeded any previous year by 33.

The institutes for men, exclusive of round-up or dairy short course, held during this year numbered 165, exceeding those of any previous year by 46, while 68 institutes were held for women, exceeding any previous year by 19.

Even with this large increase it was not possible to supply the demands for institutes. While a few institutes were held in new localities, where none had previously been held and from which no requests for institutes had been made, still the total number of requests considerably exceeded the total number of institutes which it was possible for us to hold.

From the experience of the last few years it is plain that in the near future not less than an average of at least three institutes to the county will supply the demand.

## MEN'S INSTITUTES, 1908.

Date.	County.	Location.	Lecturers Supplied by the State.
Aug. 1	Alamance	Graham	Massey, Cates, Butler.
Aug. 17	Alexander	Taylorsville	Stevens, Browne.
Aug. 12	Alleghany	Sparta	Hutt, Michels, Finley.
Aug. 13	Alleghany	Laurel Springs	Hutt, Michels, Finley.
July 24	Anson	Bethel	Stevens, Hutt, French.
July 25	Anson	Polkton	Stevens, Hutt, French.
Aug. 14	Ashe	Jefferson	Hutt, Michels, Finley.
Aug. 15	Beaufort	Washington	Butler, Parker, Massey.
Jan. 30	Bertie	Aulander	Browne.
Jan. 31	Bertie	Windsor	Browne.
July 23	Bladen	Clarkton	Stevens, Hutt, French.
July 27	Bladen	White Oak	French.
July 23	Brunswick	Supply	Butler, Layton.
Aug. 13	Buncombe	Sand Hill	Sherman, Shaw.
Aug. 17	Buncombe	Farm School	French, Williams, Reimer.
Aug. 8	Burke	Morganton	French, Williams, Shaw.
Aug. 20	Burke	Connelly Springs	Stevens, Browne, Meacham.
Aug. 7	Cabarrus	St. John's Church	Jeffrey, Hudson.
Aug. 12	Cabarrus	Concord	Stevens, Browne, Meacham.
Aug. 19	Caldwell	Collettsville	Hutt, Michels.
Aug. 20	Caldwell	Granite Falls	Hutt, French.
Jan. 28	Camden	Shiloh	Butler, Parker.
July 24	Caswell	Leasburg	Sherman, Newman, Wilder.
July 25	Caswell	Yanceyville	Sherman, Newman, Wilder.
July 28	Caswell	Pelham	Butler, Massey, Cates.
Aug. 18	Catawba	Newton	Stevens, Browne.
Aug. 19	Catawba	Hickory	Stevens, Browne.
Aug. 21	Chatham	Pittsboro	Parker, Butler.
Aug. 21	Cherokee	Andrews	Sherman, Shaw.
Jan. 24	Chowan	Edenton	Parker, McLendon, Hutt.
Aug. 22	Clay	Hayesville	Sherman, Shaw.
July 20	Cleveland	Shelby	Butler, Massey, Conover.
July 21	Cleveland	Kings Mountain	Butler, Massey, Conover.
July 22	Columbus	Chadbourn	Stevens, Hutt, French.
July 25	Columbus	Whiteville	Butler, Layton.
Jan. 17	Craven	New Bern	Parker, McLendon.
July 28	Cumberland	Raeford	Stevens, Jeffrey, Hutt.
Aug. 7	Cumberland	East Over	Parker, Browne.
Jan. 27	Currituck	Moyock	Butler, Parker.
July 25	Davidson	Thomasville	Massey, Conover, Meacham.

## MEN'S INSTITUTES, 1908.

Date.	County.	Location.	Lecturers Supplied by the State.
Aug. 1	Davidson	Reid's Academy	Stevens, Hutt.
Aug. 8	Davidson	Linwood	Stevens, Butler, Cates.
Aug. 5	Davie	Farmington	Sherman, Newman, Wilder.
Aug. 6	Davie	Mocksville	Sherman, Newman, Wilder.
Aug. 17	Duplin	Beulaville	Parker, Butler.
Aug. 18	Duplin	Warsaw	Parker, Butler.
Aug. 21	Durham	County Home	Williams, Reimer, Michels.
July 29	Edgecombe	State Test Farm	Parker, Browne.
July 31	Forsyth	Kernersville	Massey, Cates, Meacham.
Aug. 8	Forsyth	Winston-Salem	Massey, Jeffrey, Michels.
Aug. 10	Forsyth	Rural Hall	Massey, Hutt, Michels.
July 17	Franklin	Louisburg	Sherman, Parker, Newman.
July 22	Gaston	Lowell	Massey, Conover, Meacham.
Aug. 3	Gaston	Dallas	Jeffrey, Massey.
Aug. 10	Gates	Sunbury	Parker, Butler.
Aug. 11	Gates	Gatesville	Parker, Butler.
Aug. 20	Graham	Robbinsville	Sherman, Shaw.
July 22	Granville	Oxford	Sherman, Newman, Wilder.
July 23	Greene	Snow Hill	Parker, Shaw, Fisher.
July 27	Guilford	Jamestown	Butler, Massey, Conover.
July 30	Guilford	Brown Summit	Massey, Cates, Meacham.
Aug. 7	Guilford	McLeansburg	Stevens, French, Meacham.
July 28	Halifax	Scotland Neck	Parker, Browne, Shaw.
Jan. 10	Harnett	Dewberry	Parker, Hutt.
Aug. 4	Harnett	Dunn	Parker, Browne.
Aug. 5	Harnett	Lillington	Parker, Browne.
Aug. 15	Haywood	Waynesville	Sherman, Shaw.
Aug. 10	Henderson	Hendersonville	Sherman, Shaw, Wilder.
Aug. 12	Hertford	Winton	Parker, Massey, Butler.
Jan. 31	Hyde	Swan Quarter	Parker, Butler.
Aug. 15	Iredell	Mooreville	Stevens, Browne, Meacham.
Aug. 18	Iredell	State Test Farm	Williams, Reimer, French.
Aug. 19	Iredell	Eupeptic Springs	Williams, Reimer, French.
Aug. 11	Jackson	Sylva	Sherman, Shaw.
Aug. 1	Johnston	Smithfield	Parker, Browne, Layton.
Aug. 3	Johnston	Princeton	Stevens, French, Meacham.
Aug. 4	Johnston	Clayton	Stevens, French, Meacham.
Jan. 15	Jones	Maysville	Parker, McLendon.
Aug. 22	Lee	Jonesboro	Parker, Butler.
Aug. 13	Lenoir	La Grange	Parker, Massey.

## MEN'S INSTITUTES, 1908.

Date.	County.	Location.	Lecturers Supplied by the State.
Aug. 4	Lincoln.....	Lincolnton.....	Jeffrey, Massey.
Aug. 5	Lincoln.....	Lowesville.....	Jeffrey, Massey.
Aug. 17	Macon.....	Franklin.....	Sherman, Shaw
Aug. 14	Madison.....	Mars Hill.....	French, Williams, Reimer.
Aug. 15	Madison.....	Marshall.....	French, Williams, Reimer.
Jan. 18	Martin.....	Williamston.....	Parker, McLendon.
Aug. 21	McDowell.....	Marion.....	Stevens, Browne, Meacham.
July 23	Mecklenburg ..	Pineville.....	Massey, Conover, Meacham.
July 24	Mecklenburg ..	Newell.....	Massey, Conover, Meacham.
July 31	Mecklenburg ..	Dixie.....	Stevens, Hutt.
Aug. 6	Mecklenburg ..	Piedmont Industrial School.	Massey, Jeffrey.
Aug. 7	Mecklenburg ..	Carolina Academy.....	Massey, Sherman, Wilder.
Aug. 13	Mecklenburg ..	Davidson.....	Stevens, Browne, Meacham.
Aug. 10	Mitchell.....	Spruce Pine.....	French, Williams, Reimer.
Aug. 11	Mitchell.....	Bakersville.....	French, Williams, Reimer.
Aug. 5	Montgomery ..	Star.....	Butler, Cates, Shaw.
Aug. 6	Montgomery ..	Mt. Gilead.....	Butler, Cates, Shaw.
July 27	Moore.....	Carthage.....	Stevens, Hutt, Jeffrey.
Aug. 4	Moore.....	Elise.....	Butler, Shaw, Cates.
July 25	Nash.....	Nashville.....	Parker, Shaw, Fisher.
July 27	Northampton ..	Woodland.....	Parker, Browne, Shaw.
Jan. 14	Onslow.....	Richlands.....	Parker, McLendon, Butler.
Aug. 6	Orange.....	Hillsboro.....	Stevens, French, Meacham.
Jan. 16	Pamlico.....	Bayboro.....	Parker, McLendon.
Jan. 29	Pasquotank ..	Elizabeth City.....	Parker, Butler.
July 23	Person.....	Roxboro.....	Sherman, Wilder, Newman.
Aug. 19	Pender.....	Burgaw.....	Parker, Butler.
Jan. 25	Perquimans ..	Hertford.....	Parker, McLendon, Butler.
Aug. 14	Pitt.....	Greenville.....	Parker, Butler, Massey.
Aug. 12	Polk.....	Columbus.....	Sherman, Shaw.
Aug. 3	Randolph.....	Ashboro.....	Butler, Shaw, Cates.
July 29	Richmond.....	Ellerbe Springs.....	Stevens, Hutt, Jeffrey.
July 30	Richmond.....	Rockingham.....	French.
July 29	Robeson.....	Rowland.....	French.
Aug. 6	Robeson.....	Lumber Bridge.....	Parker, Browne.
July 27	Rockingham ..	New Bethel Academy ..	Sherman, Wilder.
July 28	Rockingham ..	Stoneville.....	Sherman, Wilder, Newman.
July 29	Rockingham ..	Reidsville.....	Massey, Butler, Cates.
Aug. 10	Rowan.....	Salisbury.....	Stevens, Browne, Meacham.
Aug. 11	Rowan.....	China Grove.....	Stevens, Browne, Meacham.

## MEN'S INSTITUTES, 1908.

Date.	County.	Location.	Lecturers Supplied by the State.
Aug. 14	Rowan.....	Mt. Ulla.....	Stevens, Browne, Meacham.
Aug. 22	Rutherford....	Rutherfordton.....	Stevens, Browne, Meacham.
Aug. 3	Sampson.....	Newton Grove.....	Parker, Layton.
Aug. 8	Sampson.....	Salemburg.....	Parker, Browne.
Aug. 1	Scotland.....	Gibson.....	Jeffrey, French.
Aug. 7	Stanly.....	Albemarle.....	Butler, Cates, Shaw.
July 29	Stokes.....	Sandy Ridge.....	Sherman, Newman, Wilder.
July 30	Stokes.....	Locust Hill Farm.....	Sherman, Newman, Wilder.
July 31	Surry.....	Mt. Airy.....	Sherman, Newman, Wilder.
Aug. 1	Surry.....	Dobson.....	Sherman, Newman, Wilder.
Aug. 19	Swain.....	Bryson City.....	Sherman, Shaw.
Aug. 11	Transylvania..	Brevard.....	Sherman, Wilder, Shaw.
Jan. 22	Tyrrell.....	Columbia.....	Parker, McLendon, Hutt.
July 30	Union.....	Waxhaw.....	Stevens, Hutt, Jeffrey.
July 31	Union.....	Unionville.....	French, Jeffrey.
July 21	Vance.....	Bear Pond School.....	Sherman, Parker, Newman.
July 15	Wake.....	Green Level.....	Butler, Parker, Sherman.
Aug. 5	Wake.....	Cary.....	Stevens, French, Meacham.
Nov. 14	Wake.....	Holly Springs.....	Parker, Smith, Michels.
Nov. 21	Wake.....	Garner.....	Parker, Smith, Newman.
July 18	Warren.....	Warrenton.....	Sherman, Parker, Newman.
July 20	Warren.....	Wise.....	Sherman, Parker, Newman.
Jan. 20	Washington....	Plymouth.....	Parker, McLendon.
Jan. 21	Washington....	Creswell.....	Parker, McLendon.
Aug. 17	Watauga.....	Boone.....	Hutt, Michels, Finley.
July 30	Wayne.....	Pinkney.....	Parker, Browne, Layton.
Aug. 3	Wilkes.....	Wilkesboro.....	Sherman, Newman, Wilder.
July 24	Wilson.....	Wilson.....	Parker, Shaw, Fisher.
Aug. 4	Yadkin.....	Yadkinville.....	Sherman, Newman, Wilder.
Aug. 13	Yancey.....	Burnsville.....	French, Williams, Reimer.

## INSTITUTES, LECTURERS AND SUBJECTS.

LECTURER.	SUBJECTS.
T. E. BROWNE..... Farmer.	Peanut Culture. Corn Culture. Commercial Fertilizers.
DR. TAIT BUTLER..... Veterinarian and Director of Farmers' In- stitutes, State Department of Agriculture.	How to Harvest the Corn Crop. Crop Rotation. How to Eradicate the Cattle Tick. Common Diseases of Live Stock. How to Purchase Commercial Fertilizers. The Feeding of Farm Live Stock.
MISS N. W. COBB..... Teacher.	Food and Cookery for the Sick. Food and Its Relation to the Body. Household and Personal Hygiene.
J. S. CATES..... Farm Management Division, United States Department of Agriculture.	Weeds and How to Eradicate Them. Economy in Farm Management.
J. A. CONOVER..... Dairy Expert in charge of Dairy Demonstration Work in North Carolina for the State and United States Departments of Agri- culture.	Farm Dairying. How the Dairy Demonstration Work of the State and United States Departments of Agriculture May Help North Carolina Dairymen.
W. W. FINLEY..... Farmer.	Corn Culture.
DR. ADAM FISHER..... Veterinarian.	Diseases of Farm Live Stock.
A. L. FRENCH..... Farmer.	The Silo. Corn Culture. Problems in Live Stock Husbandry.
MRS. SUE V. HOLLOWELL.....	The Influence of the Woman in the Home. The Purposes and Aims of the Women's In- stitutes.
W. N. HUTT..... Horticulturist, State Department of Agricul- ture.	Orchard Management. The Farm Fruit Garden. Soil Improvement. Commercial Apple Growing.
MRS. W. N. HUTT.....	Foods, Their Cooking and Use. The Prevention of Disease in the Home.
J. S. JEFFREY..... Poultryman, North Carolina Agricultural Ex- periment Station.	Farm Poultry. Farm Butter Making.
N. A. LAYTON..... Farmer.	The Farm Fruit Garden. Oat Culture.
W. F. MASSEY..... Horticulturist and Agricultural Writer.	Loss to Farmers and Gardeners from Poor Seed. Use and Misuse of Legumes. Planting, Pruning and Cultivating Fruit Trees. Seed Selection. The Use of Fertilizers.
DR. W. J. McLENDON..... Farmer.	Cotton Culture. Soil Improvement.
F. T. MEACHAM..... Superintendent Iredell Test Farm, State De- partment of Agriculture.	Wheat Culture. Oat Culture. Corn Culture. Terracing. The Use of Farm Machinery.
JOHN MICHELS..... Professor of Animal Husbandry and Dairying, North Carolina College of Agriculture.	Farm Dairying. The Importance of Live Stock in North Caro- lina Agriculture. Feeding Farm Live Stock.
C. L. NEWMAN..... Professor of Agriculture, North Carolina Col- lege of Agriculture.	Cotton Breeding. Soil Improvement. Winter Gardening. The Cowpea. Commercial Fertilizers.

## INSTITUTES, LECTURERS AND SUBJECTS.

LECTURER.	SUBJECTS.
T. B. PARKER In charge of Farm Demonstration Work, State Department of Agriculture.	Commercial Fertilizers. Soil Improvement by Legumes. Alfalfa. Corn Culture.
F. C. REIMER Horticulturist, North Carolina College of Ag- riculture.	Apple Growing. Soil Improvement. Fertilizers. The Farm Garden.
DR. G. A. ROBERTS Veterinarian, North Carolina College of Agri- culture.	Diseases of Farm Live Stock. Care and Feeding of Farm Work Stock. Lameness.
R. W. SCOTT Farmer.	Corn Culture. How a Farmer May Succeed in North Carolina without Growing Cotton or Tobacco. The Advantages of a Diversified Agriculture.
S. B. SHAW Assistant Horticulturist, State Department of Agriculture.	The Farm Vegetable Garden. Fruit Growing. Seed Selection.
FRANKLIN SHERMAN, JR. Entomologist, State Department of Agricul- ture.	Insect Pests and How to Combat Them. Suggestions for the Improvement of Farm Homes.
DR. F. L. STEVENS Professor of Botany and Plant Diseases, North Carolina College of Agriculture.	Plant Diseases and Spraying. The Value of an Agricultural Education (Illus- trated).
MRS. F. L. STEVENS	Home Nursing. Saving Steps in the Home The Improvement of the Farm Home (Illus- trated).
C. B. WILLIAMS Director Agricultural Experiment Station, North Carolina Agricultural and Mechan- ical College.	Commercial Fertilizers and Their Use. The Improvement of Corn and Cotton by Seed Selection.
T. B. WILDER	How to Build Wire Fences. The Care and Use of Farm Machinery. Sheep Raising.

## COUNTY AND LOCAL MEN'S ORGANIZATIONS.

There now exists a Farmers' Institute organization, or committee, in each of 96 counties of the State—in all except the counties of Carteret and Dare—and in several counties, such as Catawba, Forsyth, Iredell, Mecklenburg and Rowan, where more than one institute has been held annually for several years, there have also been organized local institute committees.

Up to this time no effort has been made to extend the scope and duties of the county organization beyond the selecting of a committee, constituted of one active farmer from each township, and requiring of it the advertising and arranging for the annual institute.

That each township and eventually each neighborhood should maintain a Farmers' Institute organization for the purpose of creating interest in and disseminating agricultural information is beyond question, but in many sections there has not yet been developed sufficient interest in this work to actuate the existing simple county

organizations to properly arrange for and advertise one county institute each year. In such cases it would be useless to attempt a more complex organization for the extension of the work, but in several counties or sections there now appears to be sufficient interest to justify an attempt to extend the organization to the formation of township or neighborhood clubs, or institutes, with more frequent meetings of both the local and county organizations. In several counties of the State local clubs or institutes, holding meetings monthly, bi-monthly or quarterly, and the county organizations, holding institutes quarterly or semi-annually, seem not too much to expect in the near future, and during the coming year an attempt will be made to effect such an extension of the work in several of the more progressive counties.

## CHAIRMEN OF COUNTY AND LOCAL FARMERS' INSTITUTE COMMITTEES.

County.	Chairman of Committee.	Post-office.
Alamance	Charles F. Cates	Mebane.
Alexander	J. N. Smith	Taylorville.
Alleghany	S. F. Thompson	Walls.
Anson	Dr. W. J. McLendon	Wadesboro.
Ashe	John Dent	Jefferson.
Beaufort	W. D. Grimes	Washington.
Bertie	C. W. Spruill	Quitsna.
Bladen	R. B. Cromartie	Elizabethtown.
Brunswick	Jack Johnson	Winnabow.
Buncombe	C. P. Weaver	Alexander.
Burke	J. E. Coulter	Connelly Springs.
Cabarrus	J. P. Allison	Concord.
Cabarrus	Wm. Fisher (Local, St. John's Church)	Mt. Pleasant.
Caldwell	George Goforth	Lenoir.
Camden	W. G. Ferebee	Gregory.
Caswell	T. P. Womack	Yanceyville.
Caswell	E. W. Lee (Local, Leasburg)	Leasburg.
Catawba	C. E. Smyre	Newton.
Catawba	John Robinson (Local, Hickory)	Hickory.
Chatham	W. B. Wilson	Patmos.
Cherokee	W. P. Walker	Andrews.
Chowan	M. Makeley	Edenton.
Clay	W. T. Bumgarner	Hayesville.
Cleveland	J. T. Gardner	Shelby.
Cleveland	Samuel Farris (Local, Kings Mountain)	Kings Mountain.
Columbus	M. Meares	Tabor.
Columbus	D. Boughner (Local, Chadbourn)	Chadbourn.

## CHAIRMEN OF COUNTY AND LOCAL FARMERS' INSTITUTE COMMITTEES.

County.	Chairman of Committee.	Post-office.
Craven.....	J. M. Spencer.....	New Bern.
Cumberland.....	W. H. Downing.....	Fayetteville.
Cumberland.....	T. B. Upchurch (Local, Raeford).....	Raeford.
Currituck.....	J. J. Morse.....	Moyock.
Davidson.....	P. J. Leonard.....	Lexington.
Davie.....	S. A. Woodruff.....	Mocksville.
Duplin.....	J. A. Shine.....	Faison.
Durham.....	P. H. Massey.....	Durham.
Edgecombe.....	G. T. Deberry.....	Tarboro.
Forsyth.....	A. B. Atwood.....	Winston-Salem.
Forsyth.....	L. A. Strupe (Local, Rural Hall).....	Tobaccoville.
Franklin.....	T. B. Wilder.....	Louisburg.
Gaston.....	C. F. Smith.....	Stanley.
Gates.....	Lycurgus Hofler.....	Gatesville.
Graham.....	G. B. Walker.....	Robbinsville.
Granville.....	Dr. J. A. Morris.....	Oxford.
Greene.....	J. T. Frizzell.....	Snow Hill.
Guilford.....	J. Franklin Davis.....	Guilford College.
Guilford.....	George W. Darson (Local, Brown Summit).....	Brown Summit, R. F. D. 2.
Halifax.....	J. R. Sherron.....	Enfield.
Harnett.....	C. McArtan.....	Lillington.
Haywood.....	Dr. G. D. Green.....	Waynesville.
Henderson.....	J. P. Fletcher.....	Fletcher.
Hertford.....	W. P. Shaw.....	Winton.
Hyde.....	Charles Brin.....	Swan Quarter.
Iredell.....	W. L. Matheson (Local, Mooresville).....	Mooresville.
Jackson.....	G. P. Miller.....	Sylva.
Johnston.....	W. M. Sanders.....	Smithfield.
Jones.....	K. R. Hay (Local, Mayesville).....	Mayesville
Lee.....	W. I. Brooks.....	Jonesboro.
Lenoir.....	G. F. Loftin.....	Kinston
Lincoln.....	H. S. Robinson.....	Lincolnton.
Macon.....	Arthur Siler.....	Franklin.
Madison.....	J. F. Bryan.....	Marshall.
Madison.....	J. R. Sams (Local, Mars Hill).....	Mars Hill.
Martin.....	W. A. Everett.....	Robersonville.
McDowell.....	Dr. R. J. Burgin.....	Marion.
Mecklenburg.....	C. C. Moore.....	Charlotte.
Mecklenburg.....	W. C. Barnett (Local, Pineville).....	Pineville.
Mecklenburg.....	N. S. Alexander (Local, Hickory Grove).....	Charlotte.

## CHAIRMEN OF COUNTY AND LOCAL FARMERS' INSTITUTE COMMITTEES.

County.	Chairman of Committee.	Post-office.
Mecklenburg	William Caldwell (Local, Huntersville)	Huntersville.
Mecklenburg	James Kirk (Local, Newell)	Newell.
Mitchell	S. M. C. Green	Toecane.
Montgomery	C. C. Wade	Troy.
Montgomery	J. L. Stuart (Local, Star)	Star.
Moore	William J. Harrington	Glendon.
Nash	S. F. Austin	Nashville.
New Hanover	George Trask	Wilmington.
Northampton	T. C. Peele	Rich Square.
Onslow	Dr. J. L. Nicholson (Local, Richlands)	Richlands.
Orange	S. W. Andrews	Hillsboro.
Pamlico	W. H. Sawyer	Bayboro.
Pasquotank	R. N. Morgan	Elizabeth City.
Pender	W. M. Hand	Burgaw.
Perquimans	David Cox	Hertford.
Person	J. A. Long	Roxboro.
Pitt	O. L. Joyner	Greenville.
Polk	T. T. Ballinger	Tryon.
Randolph	John F. Beeson	Randleman.
Richmond	W. I. Everett	Rockingham.
Robeson	E. F. McRae	Maxton.
Rockingham	J. V. Price	Madison.
Rowan	R. L. Thomason	Salisbury.
Rowan	J. K. Goodwin (Local, Mt. Ulla)	Mt. Ulla.
Rowan	B. S. Brown (Local, China Grove)	China Grove.
Rutherford	W. K. McDowell	Island Ford.
Sampson	S. H. Hobbs	Clinton.
Scotland	L. D. McKinnon	Laurinburg
Stanly	G. T. Dunlap	Norwood.
Stokes	I. G. Ross	Walnut Cove.
Surry	S. C. Franklin	Mt. Airy.
Surry	N. J. Herring (Local, Mt. Airy)	Mt. Airy.
Swain	R. L. Sandidge	Bryson City.
Transylvania	W. H. Grogan	Brevard.
Tyrrell	E. B. Hopkins	Columbia.
Union	T. J. W. Broom	Monroe.
Vance	J. B. Allen	Henderson.
Wake	W. B. Upchurch (Local, Green Level)	Apex.
Wake	H. W. Norris (Local, Holly Springs)	Holly Springs.
Wake	D. H. Buffaloe (Local, Garner)	Garner.

## CHAIRMEN OF COUNTY AND LOCAL FARMERS' INSTITUTE COMMITTEES.

County.	Chairman of Committee.	Post-office.
Warren.....	H. T. Macon.....	Warrenton.
Warren.....	P. R. Perkinson (Local, Wise).....	Wise.
Washington.....	T. W. Blount.....	Roper.
Watauga.....	T. C. Baird.....	Valle Cruces.
Wayne.....	H. D. Ham.....	Goldsboro.
Wilkes.....	J. G. Hackett.....	North Wilkesboro.
Wilson.....	Walter F. Woodard.....	Wilson.
Yadkin.....	John F. Long.....	Chestnut Ridge.
Yancey.....	W. B. Wray.....	Cane River.

## STATE FARMERS' CONVENTION.

State at Large.....	A. L. French, President, Rockingham County.	R. F. D., Byrdville, Va.
State at Large.....	Tait Butler, Secretary, Wake County.....	Raleigh, N. C.

## WOMEN'S INSTITUTES, 1908.

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The holding of institutes for the women in the farm homes was inaugurated in 1906 and 21 institutes were held in 19 counties. During 1907 this work was greatly extended, there being held 50 institutes in 38 counties. During 1908 the number was also largely increased, 68 institutes being held in 46 counties.

The success of these Women's Institutes has more than justified our assumption that an effort to improve rural conditions through the co-operation of the women on the farms would be as effective as the institutes for men had been. Allowing for the general lack of knowledge regarding the purposes or objects of these institutes, the interest in them and the appreciation shown for the information sought to be imparted have been very gratifying, and indicate very plainly that the women on the farms of the State are ready to take hold of the work and make it a tremendous power for the upbuilding of farm conditions and farm life. The best farms are impossible without the best farm homes, and a knowledge of modern domestic science is as important and useful to the woman who is to develop and maintain the ideal farm home of the future as is a knowledge of modern agricultural science to the man who is to build up a model farm.

For the benefit of those not entirely familiar with the scope and nature of the work contemplated by these Women's Institutes, the following list of subjects is given as a sample of the topics discussed:

- The Farm Fruit Garden.
- The Farm Vegetable Garden.
- Farm Poultry.
- Farm Butter Making.
- Beautifying the Home Surroundings.
- Home Conveniences.
- Literature for the Farm Home.
- Home-making.
- Home Nursing.
- The Nutritive Value of Foods.
- Cooking Meats, Vegetables, etc.
- Bread Making.
- Educating the Girls on the Farm.
- Home Sanitation.

The usual practice has been to hold the Women's Institute on the same day and at the same place as the institute for men, but in a separate hall. At least one and usually two separate sessions are

held, which enable the women to form an organization of their own and permit of greater freedom in the discussion of special household topics, many of which would neither be instructive nor interesting to a mixed or general audience.

Two women lecturers are usually sent out by the State to each meeting, and when a joint afternoon session is not held with the men, some of the lecturers from the men's institute usually assist at the women's meeting in the discussion of such subjects as dairying, poultry-raising and gardening.

The objects of these women's meetings, as with those for men, has been one of instruction rather than entertainment.

## WOMEN'S INSTITUTES, 1908.

Date.	County.	Location.	Lecturers Supplied by the State.
Aug. 1	Alamance.....	Graham.....	Mrs. Hutt, Mrs. Hollowell.
Aug 17	Alexander.....	Taylorsville.....	Mrs. Stevens, Miss Cobb.
July 24	Anson.....	Bethel.....	Mrs. Stevens, Miss Cobb, Mr. Jeffrey.
July 25	Anson.....	Polkton.....	Mrs. Stevens, Miss Cobb, Mr. Jeffrey.
Oct. 30	Anson.....	Wadesboro.....	Mrs. Stevens.
Jan. 30	Bertie.....	Aulauder.....	Mrs. Stevens, Mrs. Hutt.
Jan. 31	Bertie.....	Windsor.....	Mrs. Stevens, Mrs. Hutt.
July 23	Bladen.....	Clarkton.....	Mrs. Stevens, Miss Cobb, Mr. Jeffrey.
Aug. 20	Burke.....	Connelly Springs.....	Mrs. Stevens, Miss Cobb.
Aug. 7	Cabarrus.....	St. John's Church.....	Mrs. Hutt, Mrs. Hollowell.
Aug. 12	Cabarrus.....	Concord.....	Mrs. Stevens, Miss Cobb.
Jan. 28	Camden.....	Shiloh.....	Mrs. Stevens, Mrs. Hutt.
July 28	Caswell.....	Pelham.....	Mrs. Hutt, Mrs. Hollowell.
Aug. 18	Catawba.....	Newton.....	Mrs. Stevens, Miss Cobb.
Aug. 19	Catawba.....	Hickory.....	Mrs. Stevens, Miss Cobb.
Aug. 21	Chatham.....	Pittsboro.....	Mrs. Hutt, Mrs. Hollowell.
July 20	Cleveland.....	Shelby.....	Mrs. Hutt, Mrs. Hollowell.
July 21	Cleveland.....	Kings Mountain.....	Mrs. Hutt, Mrs. Hollowell.
Jan. 17	Craven.....	New Bern.....	Mrs. Stevens, Mrs. Hollowell.
July 28	Cumberland.....	Raeford.....	Mrs. Stevens, Miss Cobb.
Jan. 27	Currituck.....	Moyock.....	Mrs. Stevens, Mrs. Hutt.
July 25	Davidson.....	Thomasville.....	Mrs. Hutt, Mrs. Hollowell.
Aug. 8	Davidson.....	Linwood.....	Mrs. Stevens, Miss Cobb.
Aug 18	Duplin.....	Warsaw.....	Mrs. Hutt, Mrs. Hollowell.
July 31	Forsyth.....	Kernersville.....	Mrs. Hutt, Mrs. Hollowell.
July 17	Franklin.....	Louisburg.....	Mrs. Hutt, Mrs. Hollowell.
July 22	Gaston.....	Lowell.....	Mrs. Hutt, Mrs. Hollowell.
Aug. 3	Gaston.....	Dallas.....	Mrs. Hutt, Mrs. Hollowell.
July 27	Guilford.....	Jamestown.....	Mrs. Hutt, Mrs. Hollowell.

## WOMEN'S INSTITUTES, 1908.

Date.	County.	Location.	Lecturers Supplied by the State.
July 30	Guilford.....	Brown Summit.....	Mrs. Hutt, Mrs. Hollowell.
Aug. 7	Guilford.....	McLeansburg.....	Mrs. Stevens, Miss Cobb.
Aug. 15	Iredell.....	Mooreville.....	Mrs. Stevens, Miss Cobb.
Aug. 3	Johnston.....	Princeton.....	Mrs. Stevens, Miss Cobb.
Aug. 4	Johnston.....	Clayton.....	Mrs. Stevens, Miss Cobb.
Jan. 15	Jones.....	Maysville.....	Mrs. Stevens, Mrs. Hollowell.
Aug. 22	Lee.....	Jonesboro.....	Mrs. Hutt, Mrs. Hollowell.
Aug. 13	Lenoir.....	La Grange.....	Mrs. Hutt, Mrs. Hollowell.
Aug. 4	Lincoln.....	Lincolnton.....	Mrs. Hutt, Mrs. Hollowell.
Aug. 5	Lincoln.....	Lowesville.....	Mrs. Hutt, Mrs. Hollowell.
Jan. 18	Martin.....	Williamston.....	Mrs. Stevens, Mrs. Hollowell.
July 23	Mecklenburg ..	Pineville.....	Mrs. Hutt, Mrs. Hollowell.
July 24	Mecklenburg ..	Newell.....	Mrs. Hutt, Mrs. Hollowell.
Aug. 6	Mecklenburg ..	Piedmont Industrial School	Mrs. Hutt, Mrs. Hollowell.
Aug. 13	Mecklenburg ..	Davidson.....	Mrs. Stevens, Miss Cobb.
July 27	Moore.....	Carthage.....	Mrs. Stevens, Miss Cobb.
Jan. 14	Onslow.....	Richlands.....	Mrs. Stevens, Mrs. Hollowell.
Jan. 16	Pamlico.....	Bayboro.....	Mrs. Stevens, Mrs. Hollowell.
Jan 29	Pasquotank ..	Elizabeth City.....	Mrs. Stevens, Mrs. Hutt.
Aug. 19	Pender.....	Burgaw.....	Mrs. Hutt, Mrs. Hollowell.
Jan. 25	Perquimans ..	Hertford.....	Mrs. Stevens, Mrs. Hutt.
Aug. 14	Pitt.....	Greenville.....	Mrs. Hutt, Mrs. Hollowell.
July 29	Richmond.....	Ellerbe Springs.....	Mrs. Stevens, Miss Cobb.
July 29	Rockingham ..	Reidsville.....	Mrs. Hutt, Mrs. Hollowell.
Aug. 10	Rowan.....	Salisbury.....	Mrs. Stevens, Miss Cobb.
Aug. 11	Rowan.....	China Grove.....	Mrs. Stevens, Miss Cobb.
Aug. 14	Rowan.....	Mt. Ulla.....	Mrs. Stevens, Miss Cobb.
Aug. 1	Scotland.....	Gibson.....	Mrs. Stevens, Miss Cobb.
Jan. 22	Tyrrell.....	Columbia.....	Mrs. Stevens, Mrs. Hollowell, Mrs. Hutt.
July 30	Union.....	Waxhaw.....	Mrs. Stevens, Miss Cobb.
July 31	Union.....	Unionville.....	Mrs. Stevens, Miss Cobb.
July 21	Vance.....	Bear Pond School.....	Mrs. Stevens, Miss Cobb, Mr. Jeffrey.
July 31	Wake.....	Green Level.....	Mrs. Hutt, Mrs. Hollowell.
Aug. 5	Wake.....	Cary.....	Mrs. Stevens, Miss Cobb.
July 18	Warren.....	Warrenton.....	Mrs. Stevens, Miss Cobb, Mr. Jeffrey.
July 20	Warren.....	Wise.....	Mrs. Stevens, Miss Cobb, Mr. Jeffrey.
Jan. 20	Washington.....	Plymouth.....	Mrs. Stevens, Mrs. Hollowell.
Jan. 21	Washington.....	Creswell.....	Mrs. Stevens, Mrs. Hollowell, Mrs. Hutt.

## COUNTY AND LOCAL WOMEN'S ORGANIZATIONS.

The same general plan of organization has been followed with the Women's Institutes as with those for men. A county institute committee was selected in each county where an institute was held, and where there was more than one institute in a county a local committee was also organized. When these county committees become sufficiently interested and active then township or neighborhood clubs or institutes, with more frequent meetings, are organized.

In many places in the State the women are organizing local branches of the Woman's Branch of the Farmers' Institute. Some have become firm organizations, strong and self-supporting, and others are struggling still for even an existence. Extracts from two reports of the work will show best the trials and the triumphs of the women. The first is from a brave, busy little woman who will have a cheerful report yet to give, and the other speaks for itself:

"I can hardly tell you how we are getting on with our work. Our ladies do not seem to be interested in the work. I can't get them to come to the meetings; I have been to one or two and nobody else would go, so you see it is hard to ever do anything when you can't get them together, though I have not given up yet. I am still trying to awaken interest. I hope and pray for a better progress in the future. You could not but help seeing from the appearance of some of the ladies that it is education that is needed to make them more interested in this great work. They say 'we can't leave home one afternoon in a month, our chickens and various poultry keep us at home.' I try to explain to them how much good it would do them both carnally and spiritually as well as socially. I tell them a nice social evening or afternoon would help them wonderfully, but some of them do not think so. So you see what obstacles have been in my path."

## A SUCCESSFUL ORGANIZATION.

"We had an institute meeting in January which was a success, I think. We served a luncheon of sandwiches and coffee with fruit, given by the grocers. The plates this luncheon was served on were given by the merchants; each person took home a plate, cup, saucer, spoon, bottle of Wells & Richardson's butter color, a tablet and pencil, woolen scraps from Hargrave & Leak skirt factory, and several other little articles. The name of the merchant who contributed was on the article which each gave. We had a poultry show in connection with this.

"Our hardware men loaned us churns, stoves and the conveniences used in housekeeping, a system of hot and cold water was shown and explained. Pretty prints of "Gilt Edge" butter made by the ladies were sold. Different articles were sold or exchanged. Poultry was exhibited and quite a number sold. We had a good meeting."

Thus, you see, ladies, you can do nothing better than to organize one in your home county or neighborhood.

## CHAIRMEN OF COUNTY AND LOCAL WOMEN'S INSTITUTE COMMITTEES.

County.	Chairman of Committee.	Post-office.
Alamance.....	Miss Eula Dixon.....	Snow Camp.
Alexander.....	Mrs. J. T. Rowland.....	Taylorsville.
Anson.....	Mrs. J. G. Boylin.....	Wadesboro.
Anson.....	Mrs. C. Redfearn, Secretary.....	Wadesboro.
Anson.....	Mrs. S. K. Harris (Local, Polkton).....	Polkton.
Bertie.....	Mrs. H. M. Dunston.....	Windsor.
Bertie.....	Mrs. Judd Dunning.....	Aulander.
Bladen.....	Mrs. G. L. Clark.....	Clarkton.
Burke.....	Mrs. F. S. Asbury.....	Morganton, R. 2.
Cabarrus.....	Mrs. R. A. Brown.....	Concord.
Cabarrus.....	Mrs. Paul Means (Local, Concord).....	Concord.
Cabarrus.....	Mrs. R. A. Brown (Local, St. John's Church).....	Concord.
Camden.....	Mrs. Willis G. Ferebee.....	Gregory.
Caswell.....	.....	Pelham.
Catawba.....	Mrs. Noah Huit.....	Conover, R. 2.
Catawba.....	Mrs. J. W. Robinson (Local, Hickory).....	Newton, R. 4.
Chatham.....	Mrs. J. A. Pearley.....	Pittsboro.
Chowan.....	Mrs. D. G. Bond.....	Edenton.
Cleveland.....	Mrs. Frank Elams.....	Cleveland Mills.
Cleveland.....	Miss Sallie Ware (Local, Kings Mountain).....	Kings Mountain.
Columbus.....	Mrs. E. H. Miller.....	Chadbourn.
Cumberland.....	Mrs. J. H. Currie.....	Fayetteville.
Cumberland.....	Mrs. John Moore (Local, Raeford).....	Raeford
Currituck.....	Mrs. M. C. Poyner.....	Moyock.
Davie.....	Mrs. Sarah Hanes.....	Mocksville.
Davidson.....	Mrs. W. L. Kivett (Local, Thomasville).....	High Point.
Davidson.....	Mrs. B. E. Meacham (Local, Linwood).....	Linwood, R. 1.
Duplin.....	Mrs. Don Moore.....	Warsaw, R. 1
Durham.....	Mrs. P. H. Massey.....	Durham, R. 3.
Forsyth.....	Mrs. J. Gilmer Koerner (Local, Kernersville).....	Kernersville.
Franklin.....	Mrs. J. R. Jones.....	Katesville.
Gaston.....	Miss Mabel Bulwinkle.....	Dallas.
Gaston.....	Mrs. S. M. Robinson (Local, Lowell).....	Lowell.
Granville.....	Mrs. B. F. Hester.....	Oxford, R. 1.
Guilford.....	Mrs. T. N. Sellers (Local, Brown Summit).....	Brown Summit.
Guilford.....	Miss Elva Blair.....	High Point, R. 3.
Guilford.....	Mrs. A. C. Rankin (Local, McLeansburg).....	Greensboro, R. 4.
Harnett.....	Mrs. S. H. Washburn.....	Lillington.
Iredell.....	.....	.....

## CHAIRMEN OF COUNTY AND LOCAL WOMEN'S INSTITUTE COMMITTEES.

County.	Chairman of Committee.	Post-office.
Iredell	Mrs. T. J. Williams (Local, Mooresville)	Mooresville.
Johnston	Mrs. D. G. Wellons	Smithfield.
Johnston	Mrs. D. E. McKinney (Local, Princeton)	Princeton.
Johnston	Mrs. R. H. Gower (Local, Clayton)	Clayton.
Jones	Miss Florence Wooten	Maysville.
Lee	Mrs. J. H. Henley	Sanford, R. 1.
Lenoir	Miss B. L. Elmore	Kinston, R. 4.
Lenoir	Mrs. W. J. Dawson (Local, La Grange)	La Grange.
Lincoln	Mrs. T. H. Cansler	Lincolnton.
Lincoln	Mrs. W. N. Connell (Local, Lowesville)	Stanley, R. 2.
Martin	Mrs. A. G. Griffin	Williamston, R. 1.
Mecklenburg	Mrs. B. T. Price	Charlotte, R. F. D.
Mecklenburg	Mrs. Perry Pegram (Local, Shopton)	Charlotte, R. 12.
Mecklenburg	Mrs. John F. Caldwell (Local, Davidson)	Davidson.
Mecklenburg	Mrs. G. B. Bryant (Local, Pineville)	Matthews.
Mecklenburg	Mrs. S. S. Caldwell (Local, Newell)	Newell.
Mecklenburg	Miss M. C. Squires, Secretary (Local, Newell)	Charlotte, R. 8.
Mecklenburg	Miss Ida Clark (Local, P. Ind. School)	Charlotte, R. 9.
Mecklenburg	Mrs. Z. W. S. Tayloe (Local, Hickory Grove)	Charlotte, R. 9.
Mecklenburg	Mrs. G. F. Overcash (Local, Huntersville)	Huntersville.
Mecklenburg	Mrs. Dr. Abernethy (Local, Alexander Academy)	Charlotte, R. 2.
Moore	Mrs. H. F. Sewell	Carthage.
Onslow	Mrs. J. E. Rhodes	Richlands.
Orange	Mrs. H. D. Woods	Cedar Grove.
Pamlico	Mrs. G. T. Farnell	Bayboro.
Pasquotank	Mrs. J. N. Winslow	Elizabeth City.
Pender	Mrs. E. McN. Moore	Burgaw.
Perquimans	Mrs. B. Perry	Belvidere.
Pitt	Mrs. R. R. Cotten	Bruce.
Richmond	Mrs. E. D. Whitlock	Rockingham.
Richmond	Mrs. W. R. Coppedge, Secretary	Rockingham.
Richmond	Miss Lillie Baldwin (Local, Ellerbee Springs)	Ellerbee Springs.
Robeson	Mrs. W. K. Culbreth	Lumberton, R. 6.
Robeson	Mrs. R. N. Williams	Maxton.
Robeson	Mrs. K. M. Barnes (Local, Barnesville)	Barnesville.
Rockingham	Mrs. T. F. Humphreys (Local, Reidsville)	Wentworth, R. 1.
Rockingham	Mrs. J. D. Meador	Stoneville, R. 1.
Rowan	Miss Ellen Barringer	Salisbury, R. 4.

## CHAIRMEN OF COUNTY AND LOCAL WOMEN'S INSTITUTE COMMITTEES.

County.	Chairman of Committee.	Post-office.
Rowan.....	Mrs. E. L. Fisher (Local, China Grove) .....	China Grove.
Rowan.....	Miss Mattie Miller (Local, Mt. Ulla) .....	Mt. Ulla, R. 2.
Rutherford.....	Mrs. J. W. Griffin.....	Rutherfordton.
Scotland.....	Mrs. J. M. Wright.....	Laurinburg.
Scotland.....	Mrs. John McGregor (Local, Gibson) .....	Gibson.
Stokes.....	Miss D. B. Petree.....	King, R. 1.
Tyrrell.....	Mrs. C. W. Swain.....	Jerry.
Union.....	Miss Jessie Edwards (Local, Carmel) .....	Monroe, R. 4.
Union.....	Mrs. L. L. Green (Local, Marshville) .....	Marshville, R. 3.
Union.....	Mrs. H. M. McCain (Local, Waxhaw) .....	Waxhaw, R. 2.
Union.....	Mrs. W. B. Presson (Local, Unionville) .....	Unionville.
Vance.....	Mrs. J. A. Gill.....	Henderson, R. 4.
Wake.....	Mrs. A. S. Sears (Green Level).....	Morrisville, R.
Wake.....	Mrs. W. G. Clements (Local, Cary).....	Morrisville.
Warren.....	Mrs. J. F. Hunter.....	Arcola.
Warren.....	Miss Rosa Cole (Local, Wise).....	Wise.
Washington.....	Mrs. T. L. Satterthwaite.....	Plymouth.
Washington.....	Miss Sadie Eberon.....	Creswell.
Wayne.....	Mrs. M. T. Johnson.....	Fremont.
Wayne.....	Miss Lillie Cox.....	Dudley, R. 2.

## WOMEN'S BRANCH OF FARMERS' CONVENTION.

State-at-Large.....	Mrs. W. N. Hutt.....	Raleigh.
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## DEMONSTRATION RAILWAY CARS.

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For many years special trains or cars have been run in a large number of States for the purpose of carrying institute workers and materials for illustrating their work. But, with the exception of the Corn Growers' Special, run by the N. & S. Ry. and the Experiment Station of the A. & M. College, C. B. Williams, Director, during March, 1908, no use of this means of conducting institutes had been made in the work in this State prior to this season.

The special trains are usually run so as to devote at most a few hours at a place, from three to ten stops being made each day. In this way much spectacular effect is obtained, but facilities and opportunities for teaching are sacrificed. While one whole day is all too little if much real instruction is to be given, there is unquestionably much to be gained in effective work by the facilities which one or two cars offer for carrying materials, apparatus and implements for demonstrations.

During the past institute season it was determined to use two cars, one for domestic science demonstrations and the other for agricultural implements, seeds, spraying and dairy apparatus, etc., for demonstrations at the men's meetings.

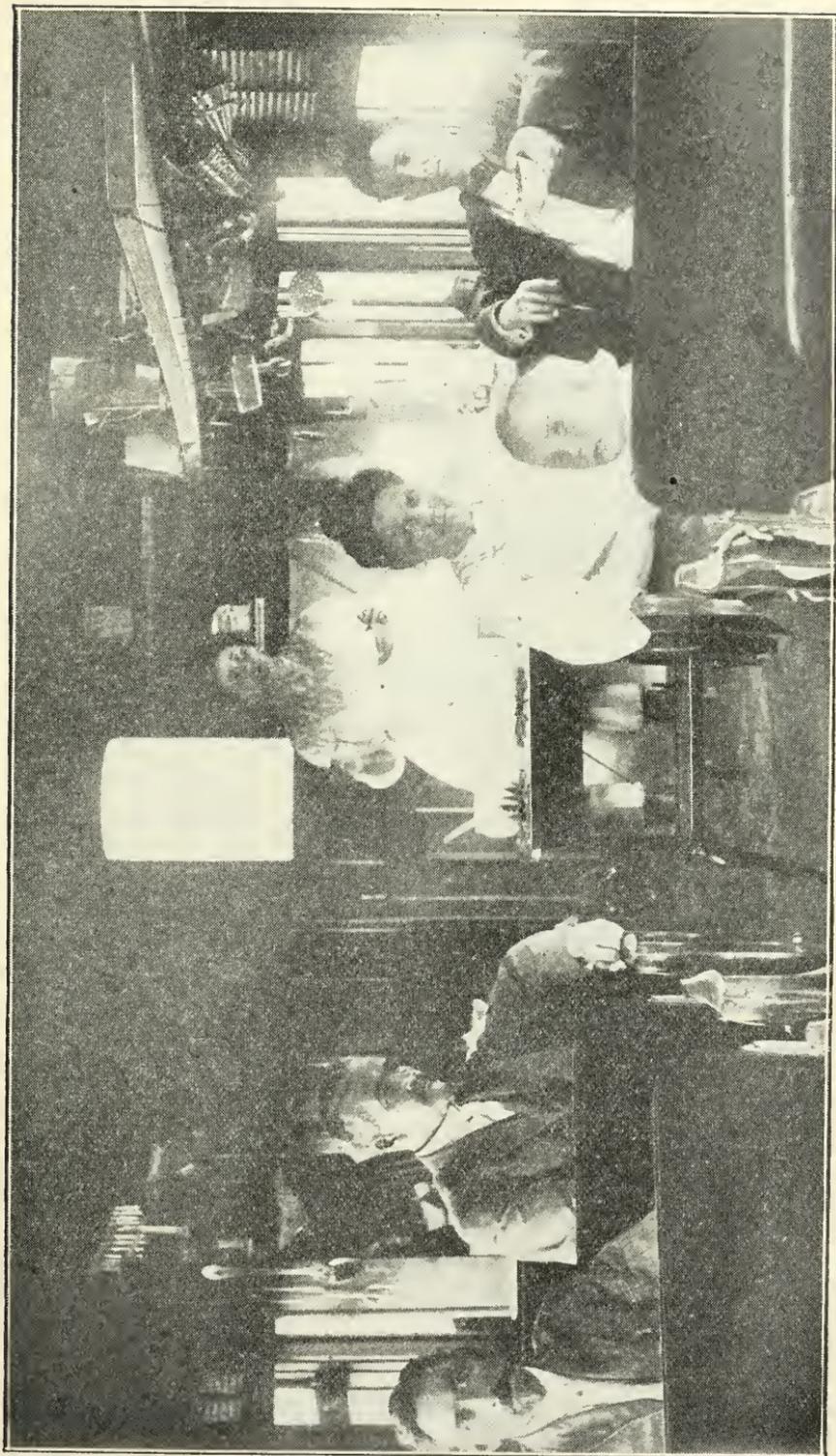
The institutes were held as usual, three sessions being held, forenoon, afternoon and night, in order that nothing might be lost in facilities for instructional work, but that materials might be present for demonstrations.

A passenger coach from one end of which two seats were removed was fitted up as a modern kitchen with labor saving utensils and devices. In this kitchen was an oil stove, oven, ice box, kitchen cabinet, fireless cooker, sink and necessary utensils. The remaining seats of the car were utilized for seating those attending the demonstrations, and when the attendance was not too large the Woman's Institute was held in this car.

It is believed that this is probably the first domestic science car ever run, but it clearly demonstrated its utility in rendering more effective the work of the women's institutes by offering facilities for actual demonstrations of many of the things taught.

Another car was filled with modern improved agricultural implements, etc., and whenever practicable the farmers furnished teams and these implements were taken to the fields and their working demonstrated.

These cars were furnished and hauled free of charge by the Southern Railway Company, through the courtesy and co-operative assistance of Mr. M. V. Richards of the Land and Industrial Department of the company.



INTERIOR DOMESTIC SCIENCE CAR.

These cars were used at thirty institutes, separate meetings for the men and women being held in the forenoon and for a part of the afternoon and joint meetings for the remainder of the afternoon and at night.

The results obtained were more than satisfactory, especially with the domestic science car, and it is felt that this use of the car for the purpose of adding better facilities for teaching is the proper use of the special institute car or train rather than the spectacular effect, which has apparently been the chief aim and must result from the short time usually spent at each stopping place with the special institute train.

The Farm Machinery car was in charge of Mr. F. T. Meacham, Superintendent of the Iredell Test Farm of the State Department of Agriculture, who conducted the field demonstrations.

The following kindly loaned implements and other apparatus and materials for the Institute cars, for which the grateful appreciation of the Institute Director and workers is hereby acknowledged:

Bateman Mfg. Co. (agricultural implements), Greenloch, N. J.

Cole Mfg. Co. (agricultural implements), Charlotte, N. C.

N. C. College of Agriculture and Mechanic Arts.

Duane H. Nash, Inc. (agricultural implements), Millington, N. J.

The Blanton Hardware Co. (agricultural implements), Shelby, N. C.

S. L. Allen & Co. (agricultural implements), Philadelphia, Pa.  
Standard Oil Co.

De Laval Separator Co., New York, N. Y.

Creamery Package Mfg. Co., Chicago, Ill.

Hart-Ward Hardware Co., Raleigh, N. C.

Boylan-Pearce Co., Raleigh, N. C.

Royal-Borden Furniture Co., Raleigh, N. C.

G. L. Vinson, Plumber, Raleigh, N. C.

J. P. Wyatt & Son (agricultural implements), Raleigh, N. C.

## ORCHARD DEMONSTRATION INSTITUTES.

During the past year 14 Orchard Demonstration Institutes were held in the counties of Alexander, Caldwell, Haywood, Henderson, Jackson, Stokes, Surry, Swain and Watauga, as follows:

### ORCHARD DEMONSTRATION INSTITUTES.

Date.	County.	Location.	Lecturers Supplied by the State.
Feb. 3	Alexander-Wilkes	Brushy Mountains.....	Sherman, Shaw.
Sept. 18	Alexander-Wilkes	Brushy Mountains.....	W. N. Hutt.
Feb. 5	Caldwell.....	Lenoir.....	Sherman, Hutt.
Sept. 21	Caldwell.....	Lenoir.....	W. N. Hutt.
Feb. 17	Haywood.....	Waynesville.....	Shaw, Clapp.
Sept. 29	Haywood.....	Waynesville.....	W. N. Hutt.
Feb. 15	Henderson.....	Dana.....	Shaw, Clapp.
Sept. 26	Henderson.....	Dana.....	W. N. Hutt.
Feb. 18	Jackson.....	Sylva.....	Shaw, Clapp.
Jan. 31	Stokes.....	King.....	Sherman, Shaw.
Feb. 1	Surry.....	Mt. Airy.....	Sherman, Shaw.
Sept. 15	Surry.....	Mt. Airy.....	W. N. Hutt.
Feb. 19	Swain.....	Bryson City.....	Shaw, Clapp.
Sept. 23	Watauga.....	Blowing Rock.....	W. N. Hutt.

These institutes were held to show the best methods of pruning and spraying fruit trees. The meetings were held right out in the orchards, where the demonstrators could actually do the work and have the trees to illustrate what they were talking about.

The orchards in which the demonstrations were given were selected beforehand, on account of convenient and central location. The trees used in the demonstration were generally near a road, where they could be under observation throughout the season, so that the results of the demonstration could be noted.

#### PRUNING, BY W. N. HUTT, HORTICULTURIST.

The demonstration of pruning proceeded about as follows:

1. The fruit growers present were taken through the orchard, and the best forms of trees for commercial orcharding were noted.
2. Those present picked out a tree which they desired to see pruned.
3. The demonstrator outlined the method of growth in trees and explained the reasons for pruning.
4. The origin of fruit buds and their development were explained.

5. Pruning tools of different kinds were shown and their uses explained by the demonstrator.

6. The tree was pruned and the principles of pruning and the why and wherefore of each step explained while the work was being done.

7. The pruned and unpruned trees were compared.

8. How to properly remove a limb and treat the resulting wound was demonstrated.

9. Different kinds of trees were pruned. For example, apple, pear, peach, plum, etc.

10. The pruning and training of a young tree were explained and demonstrated.

11. Methods of renovating old and neglected trees were shown.

12. Tools were distributed to those present and trees were pruned by them, under the direction of the demonstrator.

13. A general discussion of the subject of pruning followed these demonstrations, and questions were freely asked and answered.

#### SPRAYING, BY FRANKLIN SHERMAN, JR., ENTOMOLOGIST.

At the conclusion of the pruning work described above a demonstration was given of the spraying of fruit trees, to prevent damage by insects and diseases, and to improve the quality of the fruit. The general method followed was similar to that of the pruning demonstration, and the trees which had already been pruned were used in the spraying demonstration.

1. A brief account was given of the most serious orchard insects which are combated by spraying, and when present these were pointed out in their actual natural location on the trees.

2. A complete barrel-spraying outfit for commercial orchards and a complete bucket outfit for family orchards were exhibited, explained and put together, ready for work.

3. The manner of measuring out and dissolving the ingredients for making the *Bordeaux Mixture* and *Paris Green* was explained and the mixture was prepared before the audience.

4. The trees were thoroughly sprayed, the process being fully explained in every detail. Members of the audience were encouraged to take part in the work.

5. Different nozzles and extension rods were used to show their adaptability to different uses.

6. A general discussion of the subject of spraying followed, with the asking and answering of questions.

Twice during the growing season a representative of the Department went to these orchards again, each time giving another application of the same spraying mixture.

It would be very desirable to give more demonstrations of this kind in the future, not only in the western counties, but in the piedmont and eastern sections as well—particularly in counties where fruit is

grown for distant shipment or to supply local markets, and where the methods of spraying are not now well understood.

Demonstrations of similar character, and using the same mixture, should be made with other crops, especially Irish potatoes, grapes and melons. With all of these it is fully established that spraying is profitable in average seasons, and it only remains to adequately demonstrate to the growers the methods and the value of the operation. It is the purpose of the Department of Agriculture to extend this work as the facilities and interest warrant.

#### APPLE PACKING.

When the fruit was ready to gather, the orchards where the pruning and spraying demonstrations were held were again visited and apple grading and packing demonstrations were given. By these demonstrations it is hoped to assist our fruit growers to make use of our splendid natural facilities and to encourage them in the development of a great commercial fruit industry.

#### RESULTS OBTAINED.

The results obtained by these Demonstration Institutes are forcibly shown by the following letters from a few of those whose trees were pruned and sprayed in the demonstrations.

Copy of letter from J. W. Spainhour, stating condition, on July 13, of the trees pruned and sprayed during the spring:

KING, N. C., July 13, 1908.

DEAR SIR:—I wish to say that the fruit on those trees sprayed is larger and more free from worms and knots. The foliage seems to be in a more vigorous condition, as I can tell a difference in the trees as far as I can see them. The apples on the trees treated seem to be perfect at this writing. The tree, half of which was treated, shows a marked difference on the half which was sprayed.

Very respectfully yours,

(Signed) J. W. SPAINHOUR.

Copy of letter showing, on October 7, the results of the demonstrations:

KING, N. C., October 7, 1908.

DEAR SIR:—I wish to state that the foliage and fruit on the Winesap trees was fine; the fruit almost perfect and the foliage at this writing is fresh and green. And on the Maiden Blush tree the fruit was fine, but did not keep as well as it should have done. I sold three bushels to a canner, and they told me these were the only apples they found with no worms in them. Foliage on this tree is now fresh and green.

Two other trees of the same variety, right near the one sprayed, foliage all off, and did not get an apple from either one fit for use. The Magnum Bonum tree, half sprayed and half not, there was a marked difference in the fruit on the sprayed side. The fruit on side that was sprayed was much larger and finer. The foliage on the side that was sprayed at this writing is fresh and green; on the side not sprayed, nearly all off.

Respectfully yours,

(Signed) J. W. SPAINHOUR.

Copy of letter from J. A. Dula, showing condition of sprayed trees  
July 15:

LENOIR, N. C., July 15, 1908.

DEAR SIR:—I think that the demonstration you made spraying apples is a splendid success. The foliage remains sound and healthy, and the fruit also is looking superior to the unsprayed. After you left I did some spraying, about the middle of May, on some Limbertwig trees that (heretofore) specked and fell off badly. The fruit on the sprayed trees is doing splendidly; is twice as large as the unsprayed.

I have a couple of early apple trees near my house that have all specked for the last thirty years. I sprayed these one time. They are now ripening nicely, are about twice the usual size and not a speck on them. I heartily commend your work as being of incalculable value to the fruit growers of North Carolina.

Respectfully,

(Signed) J. A. DULA.

Copy of letter from J. A. Dula, showing condition of sprayed trees  
October 7:

LENOIR, N. C., October 7, 1908.

DEAR SIR:—In regard to the apple trees your department sprayed last spring and summer, the foliage is still green and healthy and the apples still hanging on the trees, sound and free from worms and bitter rot. The variety sprayed is my seedling, Dula's Beauty. One-half tree was sprayed, the other half shed its leaves and fruit more than three weeks since, and the fruit is on the ground, rotten, and that is the condition of a large part of my orchard. I hope that the demonstrations in spraying on my place will emphasize the importance of spraying to obtain sound fruit. It is no longer an experiment.

Respectfully,

(Signed) J. A. DULA.

The two letters which follow are from Mr. I. G. Ross, who attended the Demonstration Institute at King, Stokes County, January 31, and, profiting therefrom, sprayed his apple trees for the first time. His statements show that the demonstrations were of value to him.

R. F. D. No. 1, WALNUT COVE, N. C., July 3, 1908.

DEAR SIR:—I can now see the benefit I have derived from spraying, and write to let you know what I have accomplished by it. My May, Harvest and June apples have fewer worms than they ever had before, and I had no knotty or one-sided ones. I think I can safely say I added 50 per cent to their value by pruning and spraying, for they are larger and smoother than ever before. I feel very grateful for what I learned from the demonstrations at King. My winter apples, especially Winesaps, are falling less than ever before.

Very respectfully,

(Signed) I. G. Ross.

R. F. D. No. 1, WALNUT COVE, N. C., October 7, 1908.

DEAR SIR:—My apple trees are still full of dark green leaves, and very few, if any, have fallen. I have the finest lot of apples by far that I have ever had, and fewer with rotten specks than ever before. From fifteen bushels of Winesaps gathered from my sprayed trees I did not get over one-fourth of a bushel of specked apples, and practically none were wormy. The Virginia Beauties showed a little rot, but I can safely say it was 50 per cent less than ever before. The Ben Davis fell off worse than any of the others that were sprayed, but showed no signs of rot. The Royal Limbertwig showed very little rot and hung on the trees until gathered, and as yet show no sign of rotting, although heretofore they have been very bad to rot. My neighbors say that I am well repaid for the money spent for spray pump and the labor of spraying.

Yours respectfully,

(Signed) I. G. Ross.

## ASSISTANCE RECEIVED FROM THE U. S. DEPARTMENT OF AGRICULTURE.

Through the courtesy of Dr. S. A. Knapp, in charge of Farm Demonstration Work for the U. S. Department of Agriculture, the Institutes are indebted to Mr. S. W. Hudson for his assistance at 24 Institutes, and to Mr. E. S. Millsaps at 11 Institutes. Through the courtesy of Senator Lee S. Overman and Congressmen Small, Page, Thomas and Godwin, the work is indebted to other employes of the U. S. Department of Agriculture as follows:

- M. O. Eldridge (office of Public Roads), 13 Institutes.
- W. W. Ashe (Forestry Service), 4 Institutes.
- D. A. Brodie (Division of Farm Management) 10 Institutes.
- C. L. Goodrich (Division of Farm Management), 4 Institutes.

## LECTURES DELIVERED AT WOMEN'S INSTITUTES.

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On the following pages are three lectures delivered at the Women's Institutes during 1908.

### WHY WE SHOULD ATTEND THE INSTITUTE.

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By MRS. J. C. REDFEARN, Anson County.

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When we consider the question of attending the meetings of the Woman's Institute, one naturally asks, "Why should I go? Of what benefit would it be to me?" To those of us who have attended the institutes, both in the county and at Raleigh, the advantages are very apparent.

The first and greatest reason why we should attend the meeting is because of the work that the institute is doing and hopes to do. The underlying principle of the work is the betterment of home conditions and the education of the woman in the home to higher ideals.

The institute is a convention of women who are deeply interested in home-making and housekeeping. It presents an opportunity for wives and mothers to come together and discuss subjects of mutual interest and benefit.

The ladies who have charge of the work have spent years in the study of domestic science and home economics, and are thoroughly capable of handling the subjects. They insist on the co-operation of the members by the exchange of ideas, and in this way we have an opportunity of profiting by the experience of others as well as imparting to them some suggestions that have been helpful to us.

It has been said that our home life is gradually slipping away from us, and how true it is that many of us are so busy with our daily struggle for making money that we lose sight of the fact that we owe a duty to our homes that cannot be measured by a monetary value. Right here is where the institute does some of its most effective work in teaching the wives and daughters that the life that counts, the life worth living, is not measured by social success or lucky speculation, but is the busy, useful life whereby we do our part towards helping others to be useful and happy.

How important it is that we, as housekeepers, may meet together and learn from each other how the home life may be made fuller, more complete and more conducive to the happiness of its members; that we may learn to plan and systematize our work, use more conveniences for saving time and lightening labor, and, instead of our life being a daily grind of work, worry and dissatisfaction, find that many hours may be devoted to rest, recreation and improvement; that by attending these meetings we may catch the secret of considering our work ennobling instead of degrading, and in this age, when domestic help is hard to secure, that instead of admitting that we do our own work with reluctance, as if it were a sign of poverty, we may refer with pride to our well-regulated household.

Another great advantage of attending the institute is the knowledge to be gained of the subjects discussed. Perhaps you are interested in waterworks for your home on the farm (and we can have this luxury as well as our town friends), but we hesitate and put off taking any steps because we lack the necessary information, whereas by attending these institutes we may receive all the information we need as to cost and necessary equipments. There is a great deal being said just now on betterment work for schools. This subject also comes under the head of the institute work. At our State meeting in Raleigh this work was discussed by Miss Edith Royster. She told us of a community of ladies who wished to build up their school, and, lacking the

necessary funds for the work, they rented some land and did all the work, except plowing, of making and gathering several bales of cotton. This shows what perseverance will accomplish.

To those who are interested in dairying this is an ideal place for information. All the improved utensils for handling the milk and butter are shown and suggestions given for marketing.

We also learn of the value of ventilation in the home, of the prevention of diseases, of home nursing and properly cooked food for the sick.

One of the most enjoyable discussions at our State meeting was on "The Country Woman's Spending Money," by Mrs. Boylin and Mrs. Smith of Raleigh. In this discussion it was shown that nearly every article around the farm home is marketable if properly handled. These discussions are a great source of inspiration and encouragement to the woman who feels that she can do such a little towards providing small luxuries for the family.

Another interesting subject discussed was the importance of beautifying the home grounds. It was shown that with little expense so much improvement could be made by sodding the lawn in grass, the arrangement of a few well-chosen flowers, shrubs and trees, which would add material value to the property as well as afford great pleasure to both family and passerby.

To the mother who has but a few days to spend on a pleasure trip the State meeting of the Woman's Institute in Raleigh presents great attractions. The expenses are very small, and the trip can be made one of profit as well as great pleasure. In a social way it affords an opportunity of meeting the best and most earnest women of our State, women who are wide-awake and progressive, who are willing and anxious to do all that is possible towards up-building the homes of North Carolina and the education of her sons and daughters.

The city itself offers many attractions, being not only our capital, but also a city of colleges and other public institutions.

I hope to have shown by this review of the work that the Woman's Institute is an organization whose objects are helpful, whose aims are liberal and whose subjects for discussion are profitable, interesting and unlimited, and when it appeals to all persons of a community, bringing about a hearty co-operation, it may become a great source of education.

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## THE PREVENTION OF DISEASE IN THE HOME.

By Mrs. W. N. Hurr.

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The big strong man swings joyously along to his work, the happy mother hums a little tune as she performs her daily round of duties, and the children in the yard scream with laughter at the mere joy of play and sunshine and strong little bodies.

Do we appreciate this priceless treasure of health? Yes; the five wise virgins appreciate and guard it tenderly and the foolish ones learn its value only when it is too late. Let every Woman's Institute woman be a wise virgin, and, believing the old adage that "an ounce of prevention is worth a pound of cure," still fortify herself with knowledge for the day of sickness.

A medical journal recently made the statement that nearly all illness is the result of either carelessness or lack of knowledge, and so it is, as you will see, if you consider a moment. It may not be carelessness or lack of knowledge on your part, perhaps, or my part, or on the part of anyone you know, but that does not prevent you or your loved ones being the sufferers.

If we would value that "ounce of prevention" let us learn more and more to appreciate fresh air and sunshine, to never forget the virtues of water and to study the well-balanced diet—these three, the trinity of health.

Sometimes we forget that it is not just air we want—it is fresh air, air with plenty of oxygen in it, air to which the sunshine has given its golden touch. It would take too long here to explain just why oxygen makes for good red blood, and how that good red blood helps us to resist disease, but write this on your book of health: Have no shut room in your house; faded carpets are better than faded health; never allow a day to go by, winter or summer, in which at least one window of each room is not opened for a while. Do not believe that the air is not purest when it is raining. Does not God know what is best when he sends the gentle rain from heaven to wash out its particles of dust and its gases and impurities.

Then there is that old superstition of night air being bad. Sit down and think it over and then decide whether or not you want every bedroom window open at night. Again, do not forget that there are everywhere germs and microbes, so small that it takes a powerful microscope to see them. For the good of our health it is good for many of these germs to die, and few of them can live longer than thirty minutes in the sun and wind. Therefore put your feather beds and pillows to sun, and you are not apt to wonder "how Lucy got the scarlet fever so long after Willie was well. She must have gotten it somewhere else."

Water. Ah, the Creator knew what was best for his children when he gave it in abundance. Take a glass of it first thing in the morning, for it flushes out the intestines and, being somewhat of a shock to it, spurrs it to action, often making pills less necessary. Hot water is a good stimulant and cold is a tonic.

Our third member of the "trinity," a well-balanced diet, is too long a subject to discuss here other than to say there is nothing more important in the household.

Once there was a time when the wisest of the savants of the world did not dream that there were animals and plants so small that our eyes would not see them. Now we know that there are, for even an ordinary microscope will reveal some of these germs or microbes to us. Some of them are our friends, but they are of vital interest to us, because they are sometimes responsible for our crop failures, for the spoiling of our foods, and because they are the cause of many diseases. To learn the causes of diseases is to prevent them.

Tuberculosis is caused by a germ that may live in almost any part of the body. In the hip it may be called hip disease; the skin, lupus; the spine, spinal disease; then there is scrofula, white swelling, quick consumption, etc., but the germ, wherever or however it may have entered the body, usually finds its way to the lungs, where it is called consumption. So prevalent is this consumption that one out of every four persons between the ages of fifteen to forty—the age at which they are useful to the world—die of it; one out of every seven deaths in the United States is due to it; so dreaded is it that it is called the Great White Plague, and a congress of the world's greatest doctors was recent'y held to try to save us from it.

It is contagious, and we get it by repeated contact with the person who has it, with the place he has occupied or with the things used by him. It may be cured at first, when we make ourselves think it is only a cold or bronchial trouble, but it is well-nigh incurable when it has made deep ravages.

For the patient, give him plenty of fresh air and sunshine, letting him live out of doors by day and sleep in the breezes by night. Do not fear draughts, simply protect him from any directly on him. Give him all he can eat of milk, eggs, fresh fruit, nuts, good, tender, rare beef, and, instead of the usual three meals, let him take something nutritious but easily digested every two hours, if possible. Also give him regular rest and, if there is not a tendency to hemorrhages, regular exercise also. So many sick people are inclined to settle down and neglect it, when they are not able to perform their regular work.

I might supplement this with be cheerful when with him and do not spend one cent for advertised cures. Don't kiss him. Tuberculosis is frequently spread through the sputum, so the main point in prevention is to destroy the spit, for it has millions of these tiny living germs in it. Let the patient spit in rags and burn them, or if that is not possible soak them in five per cent carbolic acid, and after boiling hang them out exposed to the sun. If he spits

in the cuspidore keep some good antiseptic in it; a tablet of bichloride of mercury dissolved in a quart of water is a good one. He should cough or sneeze into a rag. Never let a well person sleep with him, if possible, nor in the same bed clothing after he has been in it; sun the pillows and mattresses and air the room well, for the germs will live long in curtains and sofas and walls. Hardly a day passes but we see some person disregarding these rules, but if man understood the reasons for them, I do not believe a being exists who would do aught to cause suffering to those he holds dear.

Diphtheria is very, very contagious and lives for months and is often carried far. The excretions from the nose and throat contain the germs, so don't let a child go near a person with sore throat, don't kiss anyone with sore throat, don't drink from the same cup or blow the same whistle, don't handle the clothing worn by the person, don't let a cat or dog in the sick room, and don't fail to disinfect the bed clothing; two per cent carbolic acid and boiling are good.

Typhoid is another of our dreaded diseases, especially in the rural districts. Usually we get it through the medium of water. After swallowing the typhoid germ it remains in the intestine from ten to twelve days before making itself definitely felt. There it multiplies enormously, and from the time the germ is drunk till weeks after convalescence thousands of them are in every discharge of the bowels. By this means they get on the soil, and being tiny plants, loving darkness and warmth and moisture, they remain there alive a long time. Rain comes and they are washed into the wells, where again they begin their work of destruction. The remedy, therefore, is not quarantine, but disinfection—that is, to kill the typhoid germ in the discharges, both liquid and solid. Chloride of lime is good and should be allowed to stand in the vessel at least half an hour before emptying. Then care should be taken to empty it far from the well, and a covering of lime is a good extra precaution. Soak the bed clothes in two per cent of carbolic acid and boil. Care that no such contamination can possibly get in the well should be a first consideration.

Sometimes we get typhoid through the milk. Pans and pails are washed in contaminated water and then the germs find a happy home in the milk. Boil the dishes and spoons after the patient is through with them. Epidemics have started in which oysters and vegetables were the medium, but this happens rarely. A very common source of contamination is through the agency of flies. Not only is this true of typhoid, but of many other of our diseases.

By care and diligence almost anyone can rid herself of flies, because they do not travel far. The thing, therefore, to do is to prevent the exposure of fresh horse stable manure in your vicinity. Have the outhouses well protected from flies and, where possible, sprinkle lime and sand over the top. The piles of manure in the stables are a favorite breeding place, and since it is ten days from the time the fly lays the egg till it is again a fly, keeping the manure in a tight box and removing it once a week will do much to check their spread. Where this cannot be done, sprinkling the stalls with a five per cent solution of carbolic acid occasionally will help to remedy matters. The fly lights on the germ-laden manure and, with its hairy legs, carries hundreds away to deposit them in baby's glass of milk or on the food we are eating.

Malaria, chills and fever, ague, which is the same thing, is an infectious disease. We cannot get it directly, but we do contract it through the agency of one particular kind of mosquito. Not all mosquitoes are capable of carrying malaria, but one light, frail, almost noiseless kind, with hind legs so long that it looks as though it were standing on its head when it bites, is the guilty creature. The malaria germ is in the blood, and the malaria mosquito bites the person and sucks in the blood and with it the germs. The germs fasten themselves on the intestine of the mosquito, remain there a while and at last find their way into its salivary glands. Again it bites a person and injects, with the saliva, the germs into the victim, where it is taken up by the blood. The germs get into the red corpuscles, where they remain for twenty-four hours, sometimes thirty-six, before coming out and, by the presence of their poisons, producing the chill of malaria. The question is, What can be

done to prevent mosquitoes? Mosquitoes lay their eggs in stagnant water, where they hatch into "wrigglers," swimming around and having a gay life, coming occasionally to the surface to breathe. The thing to do obviously is to allow no stagnant water, or else to prevent their coming to the surface to breathe. As a remedy for the first watch any little pools, all old cans, etc., and for the latter cover the surface of the water in the old rain barrel or pool with a little skim of kerosense.

JUST A FEW DON'TS.

Don't use patent medicine.

Don't darken the sick room, just shade the patient's eyes.

Don't think it extravagant to pay fifty cents for a thermometer.

Don't forget to be cheerful, even though it be at the cost of an effort.

"It is easy enough to be pleasant  
 When life flows along like a song,  
 But the man worth while is the one who will smile  
 When everything goes dead wrong.  
 For the test of the heart is trouble,  
 And it always comes with the years,  
 But the smile that is worth the praise of earth  
 Is the smile that comes through tears."

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A TALK ON FOODS.

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By MISS NELLIE W. COBB, Goldsboro, N. C.

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It is said that what we all need to know is what to eat, when to eat, and how much to eat. Sick people must have a special diet, prescribed as a rule by a physician, but the rest of us need only be concerned with what foods will keep us well, strong and healthy.

"Food is that which builds up the body and furnishes heat and energy for its activities." In other words, it must build up new tissue, muscle, bone and nerve, as for the child, and repair that which is worn out by constant use and exercise. It must also furnish heat to keep up the normal temperature of the body and to give it ability to do work.

Now, it has been found out by those who have given the matter careful study that there is only one foodstuff that will furnish these three things; that food is milk, which is suitable for the growing child and for the sick, but not as the only article of diet for the adult. The appearance of teeth in the child is nature's indication that solid food is needed. The analysis of milk shows that there are five different food substances contained therein. From this we know that our food should supply all these substances, which are (1) protein, or the body-building substances and repairers; (2) fats, and (3) carbohydrates, the heat and energy giving substances or fuel foods; (4) minerals, or bone-building substances, and (5) water, the "carrier" of the body.

History tells us that primitive man lived on nuts, berries, roots and the animals found nearest to his dwelling place. As civilization has advanced and facilities for travel by land and by sea have increased, our markets have become filled with products from nearly all parts of the earth. And so it has come about that we of to-day have such a wealth of food materials at our command that it is difficult to know what to select. Then, too, we have lost our early instincts and no longer possess a normal appetite. How important it is, then, that we study the "food question" and learn to select wisely, to prepare and serve the foods that go to make up a wholesome diet. Someone has said that the housewife holds in her hands the destinies of the members of her

family—another way of saying "If you will tell me what you eat, I will tell you what you are." It behooves us, therefore, to prepare for this great responsibility.

First, we will look for food materials that are body builders. Protein is the only food element that can do this important work. It can also yield heat and energy, but at too great a tax on the organs of digestion and also on the purse. Lean meat, fish, eggs, milk, cheese, peas, beans and nuts are examples of food rich in protein.

Fats are supplied by butter, cream, fat of meats, olive oil and cotton-seed products.

The vegetable kingdom largely furnishes the carbohydrates (starches, sugars and gums). Milk (containing sugar) is an exception. The cereals, rice, corn, potatoes, tapioca, fruits, beets, honey and syrups are some of the food materials which give us the carbohydrates. Such vegetables as cabbage, turnips, celery, lettuce, spinach, asparagus, green beans, egg-plant, squash, tomatoes, cucumbers, etc., supply the much-needed minerals and acids and a part of the water. Small quantities of mineral water are found in all food materials. Salt is the only mineral substance that man adds to his food.

A pure form of water comes from the fruits and melons, but this is not sufficient to supply the body. Rain water, deep and shallow wells, springs, rivers and lakes form the other sources of the body's great "carrier." Water forms about three-fourths of the weight of the body; it is not, however, considered a nutrient. It dissolves foods and helps carry them through the body.

We do not eat as food pure starch, fat, protein, etc.; neither do we as adults find it advisable to live on one article of diet. By so doing we would get too much of some food substances and not enough of others. It is not well, for most of us at least, to live on one class of food materials and be strict vegetarians. The arrangement of our digestive organs verifies the latter statement. All things being considered, a "mixed diet" is best for the normal adult.

There are few food materials that do not contain a little of each of the five food substances; so that without much thought or planning we get a certain amount of all in our daily food.

Green vegetables have not the nutriment found in the grains and most of the tubers, but they are valuable because of the phosphates and salts they contain and which our bodies demand. They dilute the more highly concentrated foods, as meats, eggs, etc., and give variety.

Fruits are refreshing, stimulating and sometimes nourishing. They help to keep the blood in good condition.

The fats and carbohydrates (starches, sugars and gums), besides being fuel foods, give needed bulk and help to keep the organs of digestion in good order. Vegetable foods take a longer time to be digested and require a more active outdoor life, and in that way are also greatly beneficial. The excess of fats, and starches and sugars, too, is stored as fatty tissue, to be used in "hard times" and drawn on when the food supply is low.

The foods supplying protein are essential to life itself. Upon these alone we could live, but by so doing our diet would be too highly concentrated and stimulating.

From the above we have seen something of what is called the "relative nutritive value" of foods in the raw state. The preparation, combination, cooking, serving and digestibility all help to determine the nutritive value of foods.

Food is largely affected by cooking. As an instance, we might have a nice piece of juicy, tender steak, which in its raw state is an unfailing source of strength-giving material. If this is badly cooked, overcooked, we'll say, and rendered tough and indigestible, its strength-giving property or nutritive value is greatly reduced. Again, the best of flour and other ingredients are at hand for making bread. If this is not properly made and baked, if it is sad and heavy, instead of giving the body its valuable force it may become what a famous teacher of cookery calls "the staff of death."

The housekeeper may so combine her articles of food that she will greatly lessen their value, if not entirely destroy it. For example, the mixing of fruits with pastry in pies, dumplings, etc. Then, if these are poorly cooked, the

result will be a still greater tax on the body to change such combinations to a liquid that can be taken up by the blood. Such foods retard digestion and use up a good part of the body's energy that might be turned into mental and physical pursuits, to say nothing of the wear and tear they give the body, and the consequent headache and dullness that often follow.

The preparation and serving also plays an important part. A meal that is prepared and served by a person who disregards the rules of cleanliness by not removing the "visible dirt" from food and utensils, the table and its settings will in large measure affect one's appetite. Dainty ways of serving food and tastefully garnished dishes are pleasing to our "aesthetic sense" and often stimulate a flagging appetite—"make the mouth water"—a very important consideration, from a physiological standpoint.

Under this head, too, should come the effort to rid the food of harmful bacteria, disease germs, worms and other parasites. Food and drink may be, and often are, the carriers of dangerous disease germs. The careful washing of fruits and raw vegetables is a precaution we should all observe. The heat of cooking frees most foods from these germs. If there is any doubt about the purity of the drinking water, it, too, should be boiled or distilled. The "flat taste" so objectionable in boiled water may be easily overcome by pouring the boiled water from one vessel to another several times, out in the fresh air where there is no dust flying.

The condition—physical and mental—of the person who is to eat the food is to be considered. Any great excitement, as fear, anger, joy, grief, so affects the digestive system that the food eaten is arrested in its digestion, and often serious illness results. "Laugh and grow fat" here finds adequate expression. When one is very tired it is not well to eat heavily. After partaking of a very hearty meal, one should avoid taking violent exercise or a bath immediately. By so doing the blood is taken from the stomach.

The manner of eating must not be overlooked. Food that is rapidly eaten, not well chewed, is usually washed down with some liquid, loses for us a good part of its nutriment, also takes a longer time to be digested. Mr. Gladstone, one of the greatest men of England, well-rounded mentally and physically, was a great advocate of thoroughly chewing the food.

Food is also to be reckoned with from the standpoint of digestibility. Food is digested or, to express it in general terms, is dissolved or changed into a liquid form by certain organs set apart for this work. Now, for what purpose does it undergo this change? In order that it can pass through the very thin membranes of the small blood and other tubes and be carried by the blood to all parts of the body. It is indeed true that "we live not upon what we eat, but upon what we digest." From this it can be readily seen that a food that is easily and quickly digested—provided it is rich in nutriment—has a much higher food value than one not possessing these qualities.

Surely the building up and care of the body should not be left to chance. We all admit that the farmer should know how much hay and other feeds to lay in store for the feeding of his cattle. He must see that they thrive, and at the same time there must be no waste of feed by supplying too much or that of a poor quality. It is far more important that the housewife should know what foods to provide for the members of her household; also the right proportions and combinations of food substances, and how to substitute one food material for another without decreasing the nutritive value of the diet. She, too, should learn to be economical in the right sense; she should know of what "true economy" consists. It does not mean doing without things that are necessary to health, but it does mean a wise selection and preparation of foods. It means *no* wasting. The great difficulty with most housekeepers is that they are apt to serve too many kinds of food at one meal. One person does not have the time or skill to properly prepare so many different dishes. Fewer foods, simply cooked and well served, would mean better economy and better health. This, too, would provide for the variety that is so much needed.

If at one meal we have rice, potatoes (Irish and sweet), maccaroni, peas, beans, two kinds of meat and one or two kinds of bread, what is left for tomorrow's dinner? The rice, potatoes and maccaroni all supply starches; the peas and beans, also, are two vegetables of a kind.

It is sometimes necessary to provide food for the family at the lowest possible cost. To do this it is necessary to know what foods can be substituted one for the other; then to compare the relative cost of each. We must get rid of the idea that "a cheap food is a poor food." Often the cheaper cuts of meat contain as much nutritive value as more expensive ones, and can be made palatable and attractive by a wise exercise of the art of cookery.

By referring to the lists of food materials given under each of the five food substances we may easily find what foods can be interchanged; also at what reduction of cost. Meat, given at the head of the protein list, is usually an expensive food. Eggs make a good substitute, but here one must be governed by the price of eggs. When they go down to fifteen cents per dozen we can well afford to use them in the place of meat. Their food value is very great. The digestibility of well-cooked eggs is high. They can be cooked in many different ways, besides being a necessary ingredient of many dishes.

Fish affords another example of meat substitutes. It has this advantage over eggs—it is cheap, for "Nature does the feeding, and we have only to pay for the catching." Fresh fish should be used freely in the season it is cheapest and best. Fish is easily digested and is recommended for people who take little exercise. For people who live inland salted and smoked fish form a valuable food. Corned mullets or corned mackerel soaked over night make a nice breakfast dish. They may be either fried or broiled. Then there are the packages of codfish, which can be now bought already "flaked." Codfish mixed with mashed Irish potatoes, shaped into cakes or balls and fried, gives another good breakfast dish. Sardines should not be overlooked. They come "ready to eat," and so save the housewife's time and energy. They can be quickly served when an unexpected guest arrives at meal time.

Cheese is another meat substitute. In America, unfortunately, it seems to be regarded more as a luxury than as a staple article of diet, yet one pound of cheese is equal in food value to two pounds of meat. It is rich in both protein and fat. Considering this, its price is very low, and it ought to do good service in the place of meat. Its food value is fully recognized abroad. In Switzerland, and to a great extent in Germany and Italy, cheese is a part of the daily food given to the outdoor laborers in the place of meat. A great advantage in using cheese, and one that should appeal strongly to the overworked housewife, is that it is generally given uncooked. There is some doubt as to the digestibility of cheese. It is claimed by noted German scientists that, when taken in the usual quantity—from one-fourth to one-half pound daily—and by people who lead an active outdoor life, it is about as easily digested as meat. For the average person, who takes but little outdoor exercise, cheese is hard to digest. This is true of most kinds as purchased in our market, but the home-made cottage cheese, often called clabber cheese, is an exception. This dish is easy to prepare and is very economical where there is a home supply of milk. It is a good way to use up the overplus of sour milk on the farm. Cottage cheese makes a nice tea or supper dish, and is so palatable and nutritious that I will give the recipe.

#### COTTAGE CHEESE RECIPE.

Place sour milk in vessel on back of stove and let it warm gradually. Take care that the milk does not become *hot*, as this will make the curd tough and hard to digest. When the curd is separated from the whey—a process hastened by the application of heat—pour into a bag and let drip until the whey is removed. Turn curd into a dish, season to suit taste with salt and pepper, mould into little balls or pats, or stir with a fork, then pile lightly on dish. A little cream may be added to the curd along with the seasoning.

The vegetable foods—peas, beans, lentils and nuts, particularly peanuts—that may in a measure supplant meat should often be found on the table. The peanut paste or butter made from finely ground nuts is pleasing to the taste and very nutritious. Peanut-butter sandwiches make a wholesome lunch for school children. We Americans are said to eat too much meat. Since it forms the most expensive part of the diet, it would be well, from an economical standpoint, too, to often replace it with some of the above-named substitutes.

It is the duty of the housewife to furnish a well-balanced diet to the members of her family. By taking something from each group of food materials she will be able to supply all of the five food substances—protein, fat, carbohydrates, minerals and water—which are necessary. The correct proportions of each, however, must be determined by the individual requirements and peculiarities. Appetite, age, sex, occupation, climate and season must all be considered when making a well-regulated diet for the normal person.

This parting injunction is given in one of the *United States Farmers' Bulletins* by Professor Atwater:

"It should always be remembered that 'the ideal diet is that combination of foods which, while imposing the least burden on the body, supplies it with exactly sufficient material to meet its wants,' and that any disregard of such a standard must inevitably prevent the best development of our powers."

## STATE FARMERS' CONVENTION.

(ROUND-UP INSTITUTE.)

HELD AT THE A. AND M. COLLEGE, WEST RALEIGH, AUGUST 25, 26, 27, 28, 1908.

The State Farmers' Convention was organized five years ago through the efforts of the Faculty of the Agricultural College and a few others interested in agricultural progress. At the annual meeting of the Convention, July, 1906, it was affiliated with or made a part of the Farmers' Institute work conducted by the State Department of Agriculture, and the State Director of Farmers' Institutes made the Secretary of the Convention.

This convention was intended to be and virtually is a four-day Farmers' Institute. Its aims and purposes are educational, and in preparing the following program instruction more than mere amusement was the object in view.

While the money available would not permit of the securing of high-priced speakers and teachers from abroad, a glance at the program cannot fail to convince any one that those who attended were well repaid in knowledge acquired, inspiration, encouragement received and pleasure obtained from mingling with those engaged in similar lines of work.

This should annually be the largest meeting of farmers held in the State for the study of strictly agricultural problems, and all farmers who can possibly do so should certainly attend and take their families. The program for the women was also an attractive one, and, with all members of the family thus provided for, this State Convention should be made the occasion for giving all the grown members of the family an annual trip combining pleasure and profit at a minimum cost.

In a report of this kind it is manifestly impossible to give a complete statement of the proceedings of the Convention. The many most excellent discussions, and also a large number of the splendid addresses or lectures, are of necessity omitted. As an index of the character of the work of the Convention, the program which was carried out and a few of the lectures given at the women's and dairymen's meetings are printed on the following pages.

**PROGRAM SIXTH ANNUAL MEETING NORTH CAROLINA STATE FARMERS' CONVENTION, NORTH CAROLINA COLLEGE OF AGRICULTURE AND MECHANIC ARTS, RALEIGH, N. C., AUGUST 25, 26, 27, 28, 1908.**

TUESDAY, AUGUST 25.

MORNING SESSION.

- 10:00.—Convention called to order by President H. C. Dockery, Rockingham.  
 Enrollment of those present.  
 President's Address, by H. C. Dockery.  
 The Future of Agricultural Education in North Carolina, by D. H. Hill,  
 President N. C. College of Agriculture and Mechanic Arts.

AFTERNOON SESSION.

- 2:00.—Observations and Conclusions Concerning Certain Farm Practices, by  
 T. J. W. Broome, Union County.  
 Discussion:  
 The Soil Water and Its Management in the Production of Crops, by  
 W. A. Petree, Stokes County.  
 Commercial Fertilizers: When, How and Why Use, by C. B. Williams,  
 Director N. C. Experiment Station.  
 The Results of Feeding Stuffs Inspection, by C. D. Harris, Feed  
 Chemist, State Department of Agriculture.

## NIGHT SESSION.

- 8:30.—The Building of a Nation, by Dr. S. A. Knapp, in charge of Farmers' Co-operative Demonstration Work, U. S. Department of Agriculture.

## WEDNESDAY, AUGUST 26.

## MORNING SESSION.

- 7:30 to 10:00.—Live Stock Judging:  
 Cattle—John Michels, Professor Animal Husbandry, N. C. College of Agriculture.  
 Hogs—R. S. Curtis, N. C. Experiment Station.  
 Horses—Dr. W. J. Hartman, Assistant Veterinarian, State Department of Agriculture.  
 Commercial Fruit Culture in North Carolina, by F. C. Reimer, Horticulturist, N. C. College of Agriculture.  
 Discussion:  
 Commercial Apple Growing in Western North Carolina, by W. N. Hutt, Horticulturist, State Department of Agriculture.  
 Discussion:  
 Marketing Horticultural Products, by S. B. Shaw, Assistant Horticulturist, State Department of Agriculture.

## AFTERNOON SESSION.

- 2:00.—The Parts of a Flower, and Their Use in Cross-breeding, by F. L. Stevens, Biologist, N. C. College of Agriculture.  
 Discussion:  
 Cotton Breeding, by C. L. Newman, Agriculturist, N. C. College of Agriculture.  
 The Value of the Pure Bred Sire, by Dr. W. J. Hartman, Assistant Veterinarian, State Department of Agriculture.

## NIGHT SESSION.

- 8:30.—Character Building in the Farm Home, by Mrs. Sue V. Hollowell, Goldsboro.  
 Agricultural Education, by Prof. W. J. Spillman, U. S. Department of Agriculture.

## THURSDAY, AUGUST 27.

## MORNING SESSION.

- 7:30 to 9:30.—Dairy Demonstrations—College Dairy.  
 9:30.—Results Obtained by Dairy Demonstration Work in North Carolina, by J. A. Conover, U. S. Department of Agriculture.  
 Discussion:  
 Practical Scientific Farming, by A. L. French, Rockingham County.  
 Discussion:  
 Destructive Insects—The Consideration They Should Receive by the Farmer, by Franklin Sherman, Jr., Entomologist, State Department of Agriculture.

## AFTERNOON SESSION.

- 2:00.—Pure Drinking Water on the Farm, by Dr. J. M. Pickel, Raleigh.  
 Insects Injurious to Garden Crops, by R. I. Smith, Entomologist, N. C. College of Agriculture.  
 The Examination of Horses for Soundness, by G. A. Roberts, Veterinarian, N. C. College of Agriculture.  
 The officers elected for the ensuing year are: President, A. L. French, Rockingham County; Vice-President, T. J. W. Broom, Union County; Secretary, Tait Butler, Director of Farmers' Institutes.

## WOMAN'S DEPARTMENT, STATE FARMERS' CONVENTION.

For several years the meetings of the Woman's Department of the State Convention have been of great value to those interested in the improvement of rural conditions, and the following program will show that the meeting this year was no exception to the high standard set by previous meetings.

**WOMAN'S DEPARTMENT  
NORTH CAROLINA STATE FARMERS' CONVENTION.**

AUGUST 26, 27, 1908.

*PROGRAM.*

WEDNESDAY, AUGUST 26—10:00 A. M.

The Aims and Purposes of this Meeting—Mrs. W. N. Hutt, Chirman of the Woman's Branch of the State Farmers' Convention.

Address of Welcome—Mrs. W. S. Primrose, President of the Raleigh Woman's Club.

The Value of Fresh Air—Mrs. E. E. Moffitt, Raleigh.

Amusements and Recreation for the Children—Mrs. W. R. Hollowell, Goldsboro.

Address by Dr. S. A. Knapp, United States Department of Agriculture.

WEDNESDAY—2:00 P. M.

The Country Woman's Spending Money—Mrs. James G. Boylin, Wadesboro.  
The Country Woman's Methods of Earning Money—Mrs. W. Wise Smith, Raleigh.

The Mother as a Source of Inspiration to the Child—Mrs. Frank K. Elam, Cleveland Mills.

THURSDAY, AUGUST 27—10:30 A. M.

Improvement of the Farm Home—Mrs. F. L. Stevens, Raleigh.

The Woman's Association for the Betterment of Public Schools—Miss Edith Royster, Raleigh.

Simple Plumbing in Rural Districts—G. L. Vinson, Raleigh.

Bee-keeping as an Occupation for Women—Mr. Womble, Raleigh.

The Woman's Branch of the Farmers' Institute—Dr. Tait Butler, Director of Farmers' Institutes for North Carolina.

On the following pages will be found a few of the papers read at the meeting of the Women's Branch of the State Farmers' Convention, August 26, 27, 1908.

**THE AIMS AND PURPOSES OF THE WOMEN'S BRANCH OF THE  
FARMERS' INSTITUTES.**

By MRS. W. N. HUTT, Chairman of the Woman's Branch of the State  
Farmers' Convention.

*Ladies:*—I have this morning the delightful task of welcoming you, in the name of the State Department of Agriculture, to our Capital City. We, as an organization, have much to strive for and much to obtain. The object of the work of the Department of Agriculture is the upbuilding of the State. The object of the Farmers' Institute division of the Department of Agriculture is the encouraging of men to form a copartnership with nature that we, nature's

children, may enjoy the fruits of the earth and the fullness thereof. The object of the Women's Institute is to so touch the home life of the people as to make for a higher standard of manhood and womanhood, that in the years to come this State of North Carolina shall bring forth sons and daughters that shall be leaders of men in the paths of intellectuality, usefulness and helpfulness, than which there is no nobler mission under the sun.

We want men to better comprehend woman with her hopes and inspirations and devotion. We want women to understand more fully the goodness and kindness of purpose that prompt men in their daily acts and to realize that it is woman's place to know her business of home-making with its thousand duties just as much as it is man's duty to make the money for that home; to know as much about the gluten in the flour that makes their daily bread as the husband knows about the nitrogen in the fertilizer; to know how to make scraped beef when the child is sick as well as he knows how to tend the cattle; to know the cause and prevention of typhoid and to have a knowledge of those little labor-saving devices for the kitchen, the most expensive of which in the home are less dear than the cheapest of those used for man's work in the field. The only means that the average busy, tired mother on the farm has of gaining this knowledge is through the Woman's Institute, and she does not get that unless she attends the meetings.

The work of the Women's Branch of the Farmers' Institute has met with warm approval and hearty enthusiasm through the State, as is evidenced by the fact that in 1906 there were twenty-one institutes held and this year seventy-four, with requests for more from every quarter. The women are just waking up to the great advantages to be derived from attending the institutes.

There are three classes of people whom we women of the State wish to reach: first, the legislators, who are the husbands, fathers, brothers and sons of ourselves. Our work being new it is not strange that they do not understand its purposes. When we bring to them a knowledge of what is being done in a definite, practical, first-hand manner by things learned, by lessons applied, there will be no trouble in getting legislators to lend their aid in extending this great work. In Ontario the members of the Legislature think so highly of it that where the women of a county band themselves into a local Woman's Institute the government gives them a grant of money to defray expenses.

Secondly, there are the men whom we need to have realize that they need our aid in all things, where the home and children are intimately affected. We have an example of how small, narrow and short-sighted the men of a community can be, right here in our own State. In one of our counties the men took little interest in having a good school for their own children, not having sufficient education themselves to realize its advantages, and a woman, free, talented and a money-maker, came in and worked until the school was provided. The men were so pleased that they wrote to Raleigh asking if it was legal to put her on the school board, and when the answer came, "The law says 'he' and 'him,' and not 'she' and 'her,'" they said they would defy the law and put her on the school board, for it was nothing but right. They did put her on and so efficient was she, so progressive, that the devil stepped in and said: "She makes better use of her brains than you men, she is more progressive, she is trying to build your children into noble men and women in spite of you, and hark, my children, she is making more money than any man of you, so cast her out, cast her out"; and these men, exulting in the manly, noble privilege of a free country, cast their votes against her, and did their utmost to stem the tide of progress. She was like a big toad in a very little puddle; she stirred up much mud and exposed the hidden, harmful germs of ignorance to the sunlight that kills.

Let us as women, when we see any evidences of smallness of spirit on the part of man, or woman either, realize that without progress our children are not going to take their places in the great and ever-increasing tramp, tramp, tramp of humanity. There is no such thing as standing still; if we are not going forward we are going back, for as Tennyson says, "The lives of men are widened by the progress of the suns." Above all things, let us make up our minds to accomplish our purposes, not by arrogance and combativeness and ill temper, but by sweetness, kindness and appeal to the reason of man.

Third. Let us realize that we come together more as teachers than as students. The army manual says that to be a good commander you must be a good soldier, so to be a good teacher you must be a good student. Let us come together as students and go forth as teachers; teachers in our own homes by example; teachers to our neighbors by word and helpfulness in time of need, and teachers to all the world by word and helpfulness and example in all that is of lasting benefit.

One thing I wish to emphasize and that is the lack of development of local talent. I hope it will be but a very few years before local talent will be so utilized that to the country women will belong the organization, and then, instead of the Department sending out speakers, the local organization will but appeal to the Department for specialists along whatever lines it at that time deems helpful. The best good can be accomplished only by the scientifically trained worker joining hands with the one whose information is gained by practical experience.

In the matter of labor-saving devices I have a few words to say. Where do you think your home farm would be to-day in comparison with the neighbor's if the only devices used were an old wooden plow and a mule? Many of the kitchens on the farms, as compared with the modern kitchen, is as that farm compared to a fine one in which machinery accomplishes what muscle could never do.

The kitchen is the workshop of the home, and the worker in it must have the proper tools if she is going to accomplish the greatest amount of work with the least expenditure of labor. If a man can have improved plows, harrows, etc., which cost many dollars, we can have a Blue Flame oil stove, the largest and finest of which costs \$12.50, or a good range, or a washing machine and wringer for \$8.50, oil-cloths for the tables at twelve and one-half cents a yard, and the various graters and squeezers, which seldom cost over ten cents.

There is one matter to which I wish to draw your attention and that is the necessity for interesting the young women in the work. They are the future home-makers, the wives of our sons and the mothers of our grandchildren. Encourage them to feel that they are a very important part of the organization, that they may consciously or unconsciously realize the dignity of home labor and the futility of going forth to be teachers or helpers in cities when their labor and brightness are more needed at home.

We can not make our girls enjoy kitchen work until we make kitchens brighter and work less arduous. We cannot accomplish that until we make use of labor-saving devices, and we cannot get those until we have either obtained incomes of our own or succeeded in making the men see things domestic in the right light. And how woefully ignorant most men are of things domestic. If more men recognized the ability and strength it took to properly manage home perhaps more wives would have heart to make more effort. Men like to poke fun at woman's ignorance of business. Is it one-tenth as great as the dense ignorance of most men of matters pertaining to the work of the home? When any man realizes that the time saved from washing black pots and scrubbing bare boards will be spent in bringing up his children properly, in making home brighter, and in keeping herself bonnie for him, he will be glad to succumb and let her use her judgment in her own province.

A girl's ideal at seventeen  
 Must have fine eyes,  
 Likewise a bold and striking mien,  
 And faultless ties.  
 But later on her fancies roam  
 To one who'll bring his wages home.

A man's ideal of seventeen  
 Must be a sprite,  
 A dainty, fluffy little queen  
 Of sheer delight.  
 But later on he sort of feels  
 He'd like a girl who can cook his meals.

The woman who goes to the meetings will gain a knowledge of diseases, their cause and prevention, helps in the upbringing and educating of her children, a practical knowledge of the laws of hygiene; in short, a knowledge of home making and home keeping.

Like the little woman who said: "I never did do outside work, but I came to realize that I just had to go outside to know what was going inside my baby," let us use our own brains in deciding for ourselves the right of any moral custom in the community, and throw all our weight on the side we believe to be right. When we get to heaven the great book of life will not show how many times we used our influence on the side that was popular in the home, but it will show whether or not we used our influence for good or bad. Let it be good.

A French writer says: "If we would upbuild our nation let us educate the mothers of our future sons." A superintendent of institute work puts it more beautifully than I can when he says: "Although we hear of political corruption, and betrayals of trusts and frauds in business, we can place every confidence in the stability of the nation when the best mothers and daughters meet together in large numbers, with a common object in view—the betterment of the home and the advancement of the nation—'For Home and Country.'"

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### BEE-KEEPING AS AN OCCUPATION FOR WOMEN.

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By WALTER L. WOMBLE, Raleigh, N. C.

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Of the various industries in the State of North Carolina bee-keeping could, with intelligent management and the expenditure of a little energy, be made to pay handsomely with less outlay of capital and time than anything else I know of; and of the various classes engaged in bee-keeping, the "woman on the farm," it strikes me, is the one best fitted to push this industry to the front.

In the first place, nature, as a rule, provides her with a good field, and this, combined with study and energy, will, under favorable circumstances, yield her quite a little income annually.

Do not understand me to say there are no ups and downs in the business, that all is clear sailing, that you will make money every year and plenty of it, regardless of the kind of bees you keep, the boxes you use or the section you live in, for such will not be the case.

Bee-keeping, as an occupation for woman, has its objectionable as well as commendable features, and for this reason I would not advise any woman to adopt it as an occupation until she is satisfied beyond a doubt that the section in which she lives is well fitted for bee-keeping. It is also necessary that she herself should have a taste for the business, otherwise I would not advise her to engage in it at all.

It is true there are women in our State who have made quite a success financially as professional bee-keepers; but such cases are very rare and the sections in which they live are exceptionally fine for the production of honey. This is not said to discourage bee-keeping as an occupation, but as a profession.

While there are some whose locations are especially adapted to bee-keeping and who make handsome incomes annually, there are others who, with the same expenditure of labor and capital, owing to the unsuitability of their locations, make little or nothing. Hence, the location has more to do with successful bee-keeping, according to my way of thinking, than anything else. For instance, there are sections of our State where from 200 to 300 colonies of bees may be successfully kept in one yard, owing to an abundance of good honey-producing plants, while there are others where not more than a dozen may be kept profitably.

The proper method is not to invest too heavily at first. Two or three or four colonies of Italian bees in improved or movable frame boxes are sufficient to start with. Then subscribe to some good bee journal and study the business—study it *hard*. Test your field thoroughly, and add no more colonies to your yard than the field will support and give you a fair surplus under ordinary circumstances. When you have reached this point you can sell your increase (if you keep good, pure-bred stock) and add quite a nice sum to your income annually. If you keep good stock and advertise it you will have no trouble in selling it at a fair price. And right here I will say, there are more ways than one to get money out of bees. There is just as much money to be made from the sale of queen bees as there is from the sale of honey, and in a dull season, when there is not much honey made, you can divide your stock, build them up and sell off the surplus and still have as many or more colonies than you started with for the fall or next spring honey crop. Artificial division and queen-rearing can both be very readily learned by anyone that has a taste for bee-keeping, and by these methods a nice little sum may be picked up annually by the farmer's wife or daughters.

If you wish to make a success with bees do not start with black bees in box hives. If you do you need not expect to succeed. Purchase one or more boxes of Italian bees in improved boxes, and start right. There is just as much in the stock of bees as there is in well-bred cattle or anything else. The Italian bee was imported from Italy many years ago, and, after undergoing most thorough tests by expert bee-keepers, has long since been pronounced and recognized as the best all-round, general-purpose bee in the world. You will make no mistake in buying the Italian, either the three-banded, five-banded, golden, or leather-colored varieties. All are good.

The Italian will fly further for honey than any other bee, and owing to its greater tongue-reach can gather honey from many deep-tubed flowers which the common black bee cannot work at all. The tongue of the average Italian will measure from 20/100 to 21/100 of an inch, while that of our common black bee will not exceed 16/100 of an inch. Hence, when crimson clover is grown the Italians will, as a rule, store a nice crop of surplus honey, while the blacks will procure hardly enough to keep themselves alive. I have proven this to my own satisfaction time and again.

There is another point in favor of the Italians that speaks highly for them. They will not, under ordinary circumstances, tolerate the presence of the moth or web-worm that destroys thousands of boxes of bees annually throughout the country where the blacks are kept.

An old box hive, as you perhaps know, sometimes throws out three or four swarms of bees in the spring. In a case of this kind there are usually not enough bees left to cover the combs. And here is where the moth gets in her work. It is the nature of the black bee to protect no more comb than they actually cover, and in a case of this kind three-fourths of the comb remains unprotected. Hence, the moth crawls in and deposits eggs in the cells of all unprotected combs, and in due time each egg produces a worm that spins webs from comb to comb, and in a short time completely destroys that which remains of the colony of bees and every particle of comb.

In the case of the Italians it is quite different. They rarely swarm themselves weak, and when this does occur I have proved that, though only a handful may be left, they will industriously traverse the combs and keep them clean and free from the eggs that the moth may slip in and deposit.

Perhaps it is not generally known that a colony of bees consists of four classes: Two classes of workers, queen and drones. The two classes of workers are *field* bees, those that gather pollen and honey, and *nurse* bees or comb-builders, those that attend to the duties inside the box. The duty of the field force is to bring the honey in and deposit it in the cells, while the nurse bees seal it up at the proper time, and also deposit food in the cells containing eggs or "grubs" (which are young bees just started), to be consumed by the "grub" after the cell is sealed up, which is promptly done on the ninth day from the time the egg is deposited by the queen. In twelve days more young, thoroughly developed bees will gnaw their way from the cells and crawl around on the comb two or three days before going forth on the wing to gather honey from the field.

A full colony contains usually from 30,000 to 60,000 bees, and, with the exception of a few hundred drones, *all* are females. It is strictly a "female institution," governed, and perfectly, too, by a queen. The drone, while he performs certain duties prescribed for him, has no "say so" as to the government of the colony at all. He is created for certain purposes and after these are performed he is cast forth from the box, crippled and maimed, to starve.

One of the most wonderful things about bees is this: By special feeding and treatment they can produce from any egg in the box either a worker, queen or drone. This is wonderful and something no expert has yet been able to explain.

Another wonderful thing, too, is this: It has been proven beyond contradiction that a good healthy queen can lay during the heavy breeding season, which is late spring, from 2,000 to 3,000 eggs a day. Now, to one not familiar with bee-keeping this may seem unreasonable, but there is nothing strange about it. I have taken a comb from a box on which was a laying queen and proven to my own satisfaction that such is true. Of course, her body does not contain all these eggs at one time. After exhausting her supply she resorts to a cell or cut containing a white, "pasty"-like food. She will partake of this food and you can see with your naked eye her body gradually grow larger. After a bit she moves away and it will not be long before you will see her begin depositing eggs as before. Of course it is absolutely necessary that she lay heavily, as she has a family of 30,000 or 60,000 to keep up, as the life of the field bee, or worker, is only about twenty-one days to a month. During the honey season they are dying by the hundred every day and hatching out at the same rate. Thus the "wheel" turns round.

To exhaust this subject would take an indefinite period. Like Tennyson's "Brook," it has no end.

Bee-keeping could be made a paying industry in this State, and if intelligently managed would be a source of considerable revenue; but as the men, who constitute the reigning factors in our State government, cannot see the matter in the light in which I have tried again and again to put it, I now appeal to the "woman on the farm," the farmers' wives and their daughters. It is up to you, ladies, to start the "ball a-rolling." I hope to live to see the day when the farmers' wives have made such progress along this line that their "masters" (?) will open their pocketbooks and cheerfully lend their assistance.

I guess you all have heard the story of the old woman and old man that were attacked by a bear. The man, without offering any protection whatever to his wife, climbed a tree and left her to fight the bear alone, which she did, and very soon laid him low with an axe. When the bear breathed his last breath, the old man came down from the tree and seizing the axe exclaimed: "Stand aside, Martha, and let me show you how to kill that 'bar.'"

So it will be, perhaps, with the farmer's wife and her bees. When she begins to make annually from \$50 to \$100 from a half-dozen to a dozen boxes of bees, giving them but a small portion of her time during the swarming season, his eyes will then be opened perhaps, and he, no doubt, will then come forward and offer to show her "*how to keep bees.*"

California produces, on an average, from 3,000,000 to 5,000,000 pounds of honey annually and ships to the eastern markets from 200 to 300 carloads each year, and enjoys not only a national but an international reputation as a honey-producing State. While North Carolina, on the other hand, which has twice the number of bees of California, according to government statistics, enjoys no reputation at all as a honey-producing State, though she has a finer field for bees than California. What's the trouble? Answer: Crude methods in North Carolina and scientific bee-keeping in California.

As I have traveled extensively through North Carolina, California, Texas, Florida and other honey-producing States, I can honestly say I have never yet found a section that surpasses Western and Eastern North Carolina as bee-producing sections.

What we need to place North Carolina in the front ranks is energy, intelligence and up-to-date methods. There is plenty of money in bees and honey, but you will not get it by keeping your bees in old box-hives, hollow logs, nail kegs, etc. Modern boxes, modern bees and modern methods are the requisites to successful bee-keeping.

## THE COUNTRY WOMAN'S SPENDING MONEY.

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By MRS. JAMES G. BOYLIN, Wadesboro.

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A prominent educator of North Carolina, now a president of one of the most thriving banks of our State, said to me when a girl of fifteen summers: "Be something; know something, and do something"; to these three admonitions I will add, "have something."

In the home sometimes the question of the rule of the fittest arises, who shall carry the purse, the husband or the wife? From my standpoint the solution is this: let each have his or her money.

If an opportunity is given a cheerful working woman to make her spending money she usually profits by it.

Women, as a class, must have something to do to be content. A woman is never happier than when she is independent.

Contentment is a beautiful trait of character to cultivate, and a woman is happier in proportion as she is content. Everyone has an individual talent for something and every ambitious woman has a special object in life she hopes to accomplish. By her efforts of hand and brain she leaves an impress upon the world, in the work she does, and pays a debt to her Creator.

Every woman should start a savings bank account for this reason: when she comes from the market, after having bought a few necessities, there is only a little left, and this thought comes to her mind: These few pennies amount to so little that I will never accumulate anything, but as the little sums jingle in the small iron bank, her ambition for more pennies and dimes is aroused and thereby a system of saving is established.

Little by little, as our savings increase, our opportunity for doing greater things is enhanced. The time for the wife to begin saving is in the early stages of married life; as the family increases the expenses of feeding, clothing and the sending to school of the children must be met. Then all the extra earnings of the mother are used for these things and to all appearances her work amounts to but little. The children should be encouraged to work by paying them. Boys and girls will help make the mother's spending money account grow by having a commission given them on the produce taken to market.

An individual bank book is a stimulus to every man, woman and child.

Children have favorite schemes which they hope to accomplish. Oftentimes with boys it is the pony and little red saddle, and with the girls the doll with golden curls. While the sons are out on the farms making wages, raising colts, which will mature into a span of well-matched horses, the daughter just developing into womanhood ought to have the privilege of making money. So, many times the farm life grows monotonous to the young lady. A yearning desire seizes her to go into the town to earn her livelihood.

Girls on the farm who make an effort can have as much spending money for their individual pleasures as the girl who goes to town to work at the stenographer's table or behind a ribbon counter.

In the case of the educated daughter there are the younger children to teach. What nobler calling can the young girl graduate follow than teaching the children of her neighborhood, be they kindred or tenants? The country children need the advantage of higher education to keep abreast of the times. At the present market value of produce there is no reason why every neighborhood cannot have a teacher supported by the earnings of the women of the community. An honest man or woman of sound body and trained mind can become fitted to enter any position in life.

The country woman is coming more and more into prominence. The State Department of Agriculture is issuing helpful bulletins for her benefit, at the cost of the asking, on subjects like these: Butter-making, bread-making, the wholesome foods, etc.

The cooking of nutritious foods for our tired husbands, sons and helpful daughters is an accomplishment equal in value to the knowledge of the fine arts. Nourishing diet fed to our boys and girls helps to mould character for greater things.

The making of beautiful preserves, jellies, palatable jam, and pungent pickles, and the canning of vegetables, help to add to the spending money account. Possibly our town and city friends would buy from us rather than the foreign canners.

The kitchen apron made of "white homespun" is a badge of honor to the poorest country woman, to the woman of the city, who rules in the highest educational meetings or leads in the most fashionable circles.

The person who dislikes the sign of toil is weak morally and intellectually. The humblest calling affords room for expansion.

Every woman should try to excel in something. Be authority on some subject, try to reach the topmost round of the ladder. Every woman has a favorite recipe, and when husband or children, possibly guest, compliment the dish, a tender chord is touched.

In this day of improved roads and netted telephone systems, we can add weekly to our bank accounts. It is just as necessary to know how to sell our produce as it is to make it. The most essential feature is special customers, the next the manner in which we deliver our products. Attractive, clean, neat and fresh packages necessarily bring a better price than carelessly handled packages.

We must cater to the tastes of our customers, not put too much salt in the butter, nor too much pepper in the sausage, and the many little peculiar tastes we learn by dealing with people for years.

When we think of the fruits of the orchard, the vegetables of the garden, with the pure milk and butter from the dairy, the fresh eggs, tender broilers, juicy roasters from the poultry yard, we cannot be cut off from anything we wish to have.

So many of the people of my county do not own their homes. As the country woman sees her bank account grow, her husband must necessarily be accumulating too; then the desire for a few acres of land is so strong that soon a real home of their own is bought, then the insatiable desire to own the adjoining acre is too strong to resist; a good investment for a woman is a good horse and comfortable buggy. To the woman who owns her acres and lives in her colonial residence, the bank account is just as necessary as to the woman of the few acres and the three-roomed house.

A herd of fawn-colored Jerseys grazing on the pasture makes the plantation more attractive, the sheep adding delicious lamb to the spring menu, the goats for the little ones to drive, all increase the spending money of the planter's wife. The prize-winning chickens, the quacking ducks, the noisy guineas, warning the hostess of the approaching guest; the downy geese, which are the faithful guardians of the night; the fattening turkeys gobbling for Thanksgiving, the vari-colored pea fowls, screaming in the highest trees, all lend an aristocratic air to the model home, and by the prizes won, the feathers produced and the pounds of delicious meats produced may all be made to add to our individual bank account.

My personal experience with spending money comes from the care of two good cows. I think I can safely say a woman who is near enough to town to sell her milk and butter can realize one hundred dollars clear profit a year from each cow.

What occupation is more health-giving than to go out with your boys early in the morning and speak a few cheerful words with them as they bring the milk that will be turned into dollars?

There is so much satisfaction in being called over the 'phone and asked for butter by your customer, whom you have held for years.

## THE MOTHER AS A SOURCE OF INSPIRATION TO THE CHILD.

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By MRS. FRANK ELAM, Cleveland County.

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Of course, all mothers wish that their children may reach high ideals in every way. This model or pattern varies according to the different people. In ancient times it was strength, size and symmetry of form more than mental ability; at least that was man's view of perfection. As an example, let us refer to the choice man would have made when David, the boy king, was chosen. Our ideals should be carefully studied, and we should ask ourselves this question: Is this the mould God would have us choose?

Let us aspire to something noble and great; then, if we are so unfortunate as to have our little ones stop before reaching the topmost round of the ladder of fame, their position will not be one of which we are ashamed.

How early do these aspirations take effect on our children? Can we tell? At first they are creatures of imitation. What mother has not watched the little tots at their play do just as they have seen father and mother do? When several children are at play where they think they are unseen and unheard, so often we see our own actions reproduced, hear our own words used, even the tones imitated. Sometimes these reproduced scenes that come before our vision bring sorrow and remorse. What hint is this to us? Our every action is an inspiration in some way. Is it as we would like to have it—a noble, uplifting one? So, much can be given by way of example. If we are cheerful and look at the bright and best side of life, so will the child. If we complain and call life's pleasant paths a hard way, and appear as if we were the most abused of all God's creatures, talk as if all were foes instead of friends, and never had what we term a streak of good luck, just so the child will be.

How can we teach the children to be unselfish, pleasant, cheerful companions, to be a help and give to others that happy, uplifting inspiration, if we are not so ourselves? At times we should stop and think. What impressions have my actions made to-day? After the day's summing-up, perhaps on the morrow we may make better and more lasting ones—something God would have us print deeply on the character of the little lives He has given to our care to mould into noble manhood and womanhood, and for whom we would sacrifice our lives.

Further on, the little ones take more notice of life, of their surroundings and all that may appear before their vision. They ask us so many questions concerning what they have seen; they begin to think and reason for themselves. So, often when we find a little one deeply interested in something he has seen, we can lead him to think so much further than if left alone.

At this period we can begin education proper. Let us think what education is and what it means to our children. What will it do for them? What has it done for nations in the past? It has lifted human beings from a level with the lowest of God's creation to the highest place of Heaven. If by a tact belonging to the mother alone we can create a desire for this education, an unceasing desire for learning more and more about what is seen and heard every day, much has been accomplished. Soon they will be obtaining knowledge for themselves.

Without the proper aid, teachers and text-books cannot accomplish much. Mothers must aid them. Ask the children about what they are doing every day. Tell them how you did when you studied these same lessons, and compare the difference. Often this alone will arouse deeper interest, and interest in the work is all that is necessary. When a child has become interested and filled with enthusiasm, what a joy it is to him to tell father and mother all the new things he has learned each day! By the interest we take in this their first great achievement we add to or diminish their desire for study. So, often our little ones' interest is just what the parents' may be, and we must ever be mindful of this fact.

Now that we have inspired this thirst for knowledge, we have a greater problem before us. There is a way in which we may satisfy this thirst that may cause a bright, beautiful life to prove an utter failure. I have seen two brothers, both equally brilliant and promising, with equal opportunities, one make a man of whom our whole nation may well be proud; the other become an outcast and a curse to his country. This one failed to receive the inspiration creating the high ideal of manhood and the desire to learn something to lead to the true greatness. That is only reached by being truly good and useful.

So, often the making or marring of lives is due to the taste for reading and study. The child who enjoys history, biography, nature study and later on science is not so likely to ever stray off into the haunts of vileness, always at hand, as the one who quenches his thirst for knowledge or whiles away the golden moments by reading sensational stories and dime novels, the vilest of all vile literature. Do we mothers see this as we should?

Of all the moulders of character, mothers are so much more responsible and should more than all others rely on Divine guidance that they may not err in directing the lives of their children.

In a list of literature that we may safely give our little ones are the following: First Stories from the Bible (nothing is so interesting to a child as well-told stories from this wonderful Book), Andersen's Fairy Tales, Æsop's Fables, The Swiss Family Robinson, Robinson Crusoe, Kingsly's Greek Heroes, some of Shakespeare's works, and mythology. There are other authors not to be overlooked. There are no books more wholesome or enjoyable than those of Louisa M. Alcott and Joel Chandler Harris. Of the periodicals, *St. Nicholas* and *The Youth's Companion* are excellent.

If we provide children with this most helpful of all pastimes, they are happy and content in their own homes. Often if their minds are unemployed they will find entertainment elsewhere. Country mothers and children are blest beyond all others; they have nature for a teacher—and where is the child one cannot interest with all the sights and sounds seen and heard on a bright, sunny day? The early song of the birds at dawn, the glorious sunrise, to watch the sparkling dew—teach them to watch every one of God's creations from morning till night. So much can be gained. The more one can see, the more there is to enjoy through life.

We must teach them to have thoughts for the future. What will they do, and whom will they be like? Will they want to do something great, to be a force and factor in their day, to make the world richer while they live and poorer when they die?

We must try to make them understand that these golden days of life's morning are the days of preparation for all life's battles. As the moments fly they must get ready for living a life that is pure and noble, or else live in vain. Let us teach them that they can train the mind as well as the sinews while they plow the fields, or feed the horses, or sweep and dust—that

There is a work for me and for you,  
 Something for each of us to do.  
 And it befits us to do noble things—  
 Not dream them all day long.  
 We are not here to play, to dream and drift;  
 We have hard work to do, and loads to lift.  
 Shun not the struggle; face it; 'tis God's gift.

Carlisle said: "Men do less than they ought unless they do all they can."

There is another thought we must not pass—that of individuality. We want our children to be *themselves*. We must have ideals, but still retain that individuality. We all have seen people who tried to be just like some one they had seen, and often they failed to do anything at all, though their ideal was a charming personality. Teach them that they must think and act for themselves—that thinking well is wise, planning well is wiser, doing well is best of all.

There is another noble trait of character we must at all times try to impress deeply while we are moulding—that of doing something for the happiness of others. Selfishness is a most unlovable trait, and there is always unhappiness.

If I can live  
 To make some pale face brighter, and to give  
     A second luster to some tear-dimmed eye,  
 Or even impart  
 One throb of comfort to an aching heart,  
     Or cheer some wayworn soul in passing by;  
 If I can lend  
 A strong hand to the fallen, or defend  
     The right against a single envious strain,  
 My life, though bare,  
 Perhaps, of much that seemeth dear and fair  
     To us of earth, will not have been in vain.  
 The purest joy  
 Most near to Heaven, far from earth's alloy,  
     Is bidding cloud give way to sun and shine.  
 And 'twill be well  
 If on that day of days the angels tell  
     Of me, "She did her best for one of Thine."

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#### WORK WHICH THE WOMEN'S INSTITUTES MAY DO.

By MISS EULA DIXON, Alamance County.

The day of castle and moat and draw-bridge is over. The moat is filled up and the castle torn down. Humanity is beginning to realize that "no man liveth to himself"; that "we are members one of another." Being "members one of another" implies service one for another—sometimes mutual, sometimes missionary. In either case we have learned just one way of working together—organization—and this is the order of the day, because it is the key to the quickest and best results.

An organization has only one excuse for existing, and that is the need of it. The fact that it is able to reach any individual or class which cannot be reached by any other agency proves the need. When the work of an organization is done, it dies as we die when our work is done.

The Farmers' Institute was introduced into our State only a few years ago. Its counterpart, the Woman's Institute, is practically new to us. Thousands of our women, probably, have never heard of it. To thousands of others, perhaps, it is scarcely more than a name—their knowledge of it so slight as to preclude any possibility of practical benefit therefrom without further acquaintance. To others, no doubt, it appears but another of numerous organizations which in some cases are proving a "weariness to the flesh." A few persons have been introduced to this institute work and are beginning to realize its value.

I am here to-day to present, as best I can, its claims for existence, as I see them.

The Woman's Institute is, as far as I know, the only organization on earth for the benefit of the women of the country particularly—a class that includes more individuals who need *more* help and get *less* than any other class in the world. In defining the Woman's Institute we might first specify what it is not—an organization intended to advance any particular interest—physical, mental, moral or material—yet embracing all. If I were asked to give its aim in a single phrase, I think I would say "a more abundant life." Because of the neglected class for which it exists, and the number and variety of interests it may foster and vitally affect, this definition cannot be far wrong.

Some people are very enthusiastic over country life, and picture it as almost ideal. Nature *is* beautiful—the changes which the seasons bring, with their ever-varying tints and shadows, the life that teems on every hand. The country is *all right*, but the joys of farm life that you read about do not always materialize. A drive in the pure air of a spring morning, as the birds begin to wake, is no doubt delightful, but do you suppose that one farmer's wife in a thousand ever experienced that delight? What can be grander than some of our gorgeous sunsets? Yet they pass unobserved by thousands of tired women in the midst of milking, baking hot biscuits and putting the children to bed. Up before day, busy from sun to sun, the last one to rest at night, sooner or later the constant grind has its effect. Eye and ear become dulled and the heart unresponsive to the beautiful things our Heavenly Father has provided, and hosts of women right here in North Carolina might as well be in midocean, as far as their enjoyment of country life is concerned.

A woman remarked to me once: "Seems like I haven't the time to *train* my children. It is all I can do to keep them something to eat and wear." And she was not the breadwinner, either—only cook, housekeeper, seamstress, etc. This is but the wail of many hearts. My precious mother kept house over fifty years, and, as far as I know, never had a vacation. There was always something for her to do. She, like many others, didn't know how to rest. Much hard work falls to the lot of women in the country, and, at best, it must always be so; but I do believe it could be lessened to an extent.

By the introduction of as many conveniences as the head of the house would install, and just as much machinery as he would bring in if he had his wife's work to do; by the addition of labor-saving utensils; by the disposal of useless accessories in the home; by the united plan and effort of both husband and wife to make the work on the farm fit the force indoors—these things would do more than anything else, I believe, toward lifting the burden from the back of the patient housewife—things to save strength and save time. How she needs to conserve her strength we can easily guess, but how she craves more time for herself no one but herself realizes. How she longs for it—time to take care of her health, time to cultivate the virtues of character, time to open up imprisoned mental activities, time to give her children proper training, time to enjoy the friendships of life and the beauties of nature, time to practice the deeds of Christian charity, time to rest and be happy and to grow old gracefully.

We need the Woman's Institute for scattering information concerning conveniences in the farm home and for the interchange of ideas and experiences which will facilitate the work. Intelligent effort along this line would undoubtedly result in great benefit to the women directly, and indirectly to all. I am glad that this idea has been embraced already and carried out to an extent by the institute workers this year. But we need *more, much more, very* much more of it.

Imagine, if you can, a young girl, all pink and white, and dainty and æsthetic, looking forward with delight to a life of routine work, such as falls to the lot of the average farmer's wife. Such a monstrosity has never lived, I'm sure. Our girl cannot possibly understand how mother can devote herself entirely to pots and pans and broom and mop and wash tub, and never want any pretty clothes nor to have any fun. The daughter thinks, honestly, she never could be like that. But a few years bring about great changes, and ere long she finds herself in her mother's place, doing the very same kind of work, with equal interest and devotion.

By making the farm home less of a grind, and introducing into the country, as far as practicable, the attractions of city life which charm and are really "worth while," opportunity for the study of music and art, etc., and substituting ways and means for making pin money, at least as much clear money as salesgirl or seamstress or any other position which the average country girl must accept can command, many girls might be saved to the country, much to its benefit and their own. I believe that this thing of making a little money to have and to spend as her very own takes many a girl away from home who would not otherwise go. Here is a wide-open door for the Woman's Institute.

The isolation of the country home, the lack of recreation and social enjoyment militates also against country life in the minds of the young, both boys and girls.

In how many farm homes do you suppose the recreation of the children is a matter of much concern? How many fathers did you ever hear encouraging their boys to go to a ball game? Did you ever hear a mother say "there is plenty of work to do if she wants exercise"? Did you ever hear a parent say that the children were not sent to school to play?

The question in the rural mind should be changed from "How can I get away?" to "How can I make conditions such that I shall want to stay or be contented if I have to stay?"

North Carolina has for some time had the unenviable distinction of standing low down in illiteracy. A decided effort has been made by the authorities to raise the standard, and with gratifying results, but the desired end is not yet attained. The trouble is that too few are working, compared with the amount of work to be done. There is not that support from the people as a whole that would appreciably hasten the work. And why? Right here is an open door for the Woman's Institute. One of the first things to emphasize is the necessity of regular attendance, and with this the mother has most to do. The brightest child can make but poor progress if kept out or allowed to remain out of school a day or two in every week. The best teacher and course of study fails under such conditions. State and county may furnish the best equipment at command, but it is with the mothers to see that the children take advantage of the opportunities offered. They can at least see to it that the children are at the place appointed, even if they cannot compel them to study diligently. We are bound to admit that chances are in favor of the boy or girl who is *there*. Mothers can see to it that for no trivial thing the children are kept at home. But before mothers will make it a point to keep their children in school regularly they must be made to realize the necessity of such attendance.

Our public-school system is undergoing a change—better teachers, better salaries, better houses, better everything. Graded schools are being established in every county, built up on the basis of local taxation. People are beginning to think of having a plan of work and working the plan, and even improving the plan as the years go by. Education is no longer confined to the mastery of the three R's, as in the past, important as these are. Gradually it is taking on a broader meaning. Slowly the idea is growing that the dead past is not more important than the living present. A prominent educator of Wake County defines education as "putting the mind in sympathy with conditions around." You may give this your own interpretation.

There is certainly a growing demand for what the scientist terms "coming into the knowledge of your surroundings," of getting acquainted with the things about us—the birds, animals, fishes, flowers, trees, insects, rocks—for instruction in agriculture, manual training and domestic science. Now, I believe that the country school needs all of these. We have too long been educating our children not for but away from their surroundings, practically driving them away to the towns and cities. In a recent issue of *The Progressive Farmer* is this quotation from Dr. G. Stanley Hall: "The germ and extract of as many trades as possible must be introduced into the common schools."

Put your ear to the ground and listen. These things are coming. Manual training may be left largely to the city schools, but agricultural training will naturally come to the country, while domestic science belongs to both city and country. We can hardly think of a subject more important to our girls than domestic science. Everybody eats. There is no way to get out of it except to die. In the distribution of the world's work it is women's to prepare the food, and it is but reasonable to say that they should know their business, rich and poor—the rich, that they may have their cooking done properly; the poor, that they may do it properly. We want a dignity given to the kitchen work that it does not have at present. We want to hasten the time when milady's biscuits will no longer add to domestic discord, and what we eat will be what we need. We want to get rid, as soon as we can, of the idea, now largely prevalent, that if a man cannot do anything else he can farm, and if a woman cannot do anything else she can cook—the two professions which, of all others, it seems to me,

require the broadest training to practice successfully. In all this the Woman's Institute may prove a valuable aid.

A host of women over the State is at work for the schools, improving the surroundings, doing what they can to better the equipment. They are doing a great work. I, for one, deeply appreciate their motive and the spirit of helpfulness which they are cultivating everywhere. But in some cases, perhaps in many, I fear, they are but doing the work that their brothers are appointed to do, but are neglecting. If this be true, it is a condition of things which should not continue indefinitely. It is not just to the women. It seems to me that there is a position that they might occupy from which they could accomplish as much and more, with less expense of time and energy. Sometimes people can do more by getting into position to do more.

I can see no advantage in always occupying the position of a suppliant and begging permission to do the drudgery. Some drudgery is a necessity, and it is all right for one to do it until somebody "higher up" decides that that is all one is fit for. If it is all right for women to collect money to build school-houses, it is just as right for them to have a voice in the plan of building and in directing the work of the school. Why not? And nothing keeps you, my sisters, from these more honored positions except the laws, man-made, of your State. There is quite a good deal of sentiment scattered throughout our State already in favor of women serving on school boards, advancing them to a position of commanding influence. Some time this sentiment will crystallize into law. It may be within the province of the Woman's Institute to gather this sentiment together. Anyway, it might help to do it. The task will not be easy; it will not be without reproach from some quarters; but precious privileges come dear.

I do not mention this subject without deep conviction. We tried the experiment up in Alamance a few years ago. We have a county superintendent who says that a woman can give a touch to the work that no man can give. In line with this thought, in the establishment of two local tax districts by legislative enactment, six years ago, he named a woman on each board. It raised a storm of disapproval among the men at home. The attention of the Attorney-General even was called to the matter, as to whether or not these women could legally serve. His decision was that they were eligible because appointed by the Legislature, but that no woman could be elected by popular vote to any position in North Carolina. That's our status before the law.

There is hardly a school district in North Carolina in which there is not some woman who would gladly give her time and talent to this work. The State Normal has a representative in almost every neighborhood, and other colleges send out annually their contributions of capable, earnest women. A large per cent of our public school teachers are women, and the per cent is not likely to be materially lessened, for the State is educating her daughters to be teachers, and not her sons. If training for a special purpose and experience along that line do not qualify, what does? Is it to be supposed that men, minus this training and experience, are still better qualified for teachers and school committeemen than women, plus this training and experience? I do not believe in divine favor to that extent, and, unless there is some method of absorption of which I am ignorant, I see odds against the men. There is absolutely no argument against women serving on school boards—only prejudice. When this is gone women will come into possession of their own.

"Two heads in council, two beside the hearth,  
Two in the tangled business of the world."

I am not more ambitious for women than I am anxious for our schools to be under the care of those best fitted to direct the work. Nobody wants women to supplant men in this work. It is not man nor woman, but capability that will best serve the interests of our public-school system. Whether the present legal impediment debarring women from positions on school boards is either wise or expedient, the manhood of the State will in the course of events be called upon to decide.

The greatest difficulty with us in all of our work, perhaps, is that our efforts, in the main, are too spasmodic. Nothing counts in this old world like a strong, steady stroke. I admit that ignorance is a close second. We often fail to do because we do not know what to strike with nor where to strike. This, I feel, is not far from the condition of the women of the rural districts generally as regards this institute work. It appears to us such an indefinite something of which we do not know how to take hold.

If this work appeals to this meeting as worth doing, I believe that we should not go to our homes until some definite plan is suggested and approved for the benefit of the scattered workers over our State, who would do something if they knew how to begin.

Section 4140 of the public school law reads as follows: "The county superintendent shall each year hold not less than one teachers' meeting in each township, which the teachers shall be required to attend. If necessary, one school day must be set apart for this purpose." I do not know whether this provision is generally carried out or not, but it certainly was intended to be, and *ought* to be.

Now, in connection with the above, this is my suggestion: That the Woman's Institute, wherever there is an organization or an interested woman, ask the county superintendent for a share in the time of the teachers' meeting in its or her respective township, and aid in arranging for the meeting. With a live program and a good social time together, the day might be made one of mutual helpfulness and an encouragement and recreation all around. In course of time the occasion might become one of broader significance. These meetings would not be hard to arrange, and, I feel sure, would be well worth the trouble.

Anyway, we must get the unit nearer home. We must somehow get the women of the country, for whom the organization exists primarily, in touch with the work, or it will fail in its purpose. This cannot be done in a day, but it can be done in time, and it must be done. All reforms come slowly, but they come at last.

## DAIRYING.

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Under the stimulating and helpful influences of the National and State Departments of Agriculture, the State Dairymen's Association, the Dairy Department of the A. & M. College and the individual efforts of dairymen and other agricultural workers, the dairy interest in the State has been much increased.

### MOVABLE DAIRY SCHOOL.

The first movable short course in dairying held in this State was conducted by representatives of the United States and State Departments of Agriculture at the farm of Jonathan Case, Dana, Henderson County, October 26 to 30.

The following program was carried out:

#### MONDAY, OCTOBER 26.

9:00 to 12:00 A. M.—Separating Cream; Butter Making; Milk Testing.  
 2:00 to 3:00 P. M.—Corn Harvesting, Silo Filling.  
 3:00 to 4:00 P. M.—Feeds.

#### TUESDAY, OCTOBER 27.

9:00 to 12:00 A. M.—Cleaning Cattle; Separating Cream; Butter Making; Milk Testing.  
 2:00 to 3:00 P. M.—Diseases of Dairy Cattle.  
 3:00 to 4:00 P. M.—Herd Records.  
 8:00 to 9:30 P. M.—Clean Milk and Silo Building (illustrated with lantern views).

#### WEDNESDAY, OCTOBER 28.

9:00 to 12:00 A. M.—Judging Cattle; Separating Cream; Milk Testing.  
 2:00 to 3:00 P. M.—Home Grown Feeds.  
 3:00 to 4:00 P. M.—Dairy Buildings.

#### THURSDAY, OCTOBER 29.

9:00 to 12:00 A. M.—Separating Cream; Butter Making; Milk Testing.  
 2:00 to 3:00 P. M.—Pastures.  
 3:00 to 4:00 P. M.—Feeding.

#### FRIDAY, OCTOBER 30.

9:00 to 12:00 A. M.—Separating Cream; Butter Making; Milk Testing; Butter Judging.  
 2:00 to 3:00 P. M.—Flies in Relation to Clean Milk and Health on the Farm.  
 3:00 to 4:00 P. M.—Herd Records (figuring out records of herds in the neighborhood).

There were about thirty regular attendants at this school, who took a deep interest in the work. This short course in dairying was conducted by:

Mr. J. A. Conover, the expert dairyman who has for the last two years been in charge of the dairy demonstration work conducted in

North Carolina by the United States Department of Agriculture and the State Department of Agriculture.

Mr. B. H. Rawl, Dairy Expert, United States Department of Agriculture, Washington, D. C.

Dr. Tait Butler, Veterinarian and Director of Farmers' Institutes, North Carolina Department of Agriculture.

Mr. L. M. McCormick, Chief of the Sanitary Department, Asheville, N. C.

It is the purpose of those having in charge the dairy demonstration work in this State to hold several of these dairy schools in different parts of the State where satisfactory facilities can be secured and the interest is sufficient to justify the effort.

There is a good demand in this State for first-class butter at remunerative prices, and yet more than half the butter made in the State is sold for less than half the price which the first-class product commands on our markets. At these short course dairy schools special attention is given to butter making, which affords all interested an opportunity to learn how to make better butter by *actually doing it* under the direction of an expert butter maker.

## STATE DAIRYMEN'S ASSOCIATION.

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The dairymen of the State met during the Farmers' Convention and carried out the subjoined program:

### PROGRAM DAIRYMEN'S ASSOCIATION.

THURSDAY, AUGUST 27.

7:30 P. M.—Business Meeting and Address by President R. H. Gower.

FRIDAY, AUGUST 28.

8:00 A. M.—Judging Dairy Cattle.

9:00 A. M.—Cottage Cheese Making; Butter Making; Skimmed Milk; Butter-milk Manufacturing.

10:00 A. M.—How to Make Farm Butter Making Profitable—R. L. Shuford, Catawba County.

11:00 A. M.—Marketing of Milk and Cream—Prof. William R. Saunders, Virginia.

12:00 M.—Silos and Silage, by B. H. Rawl, Dairy Division, U. S. Department of Agriculture.

2:00 P. M.—Keeping Herd Records—J. W. Robinson, Catawba County.

3:00 P. M.—Relation of Dairying to Soil Fertility—Prof. C. L. Newman, North Carolina A. and M. College.

4:00 P. M.—Management of Dairy Herd—Prof. John Michels, North Carolina A. and M. College.

The following papers, chiefly relating to dairying, were read at the Dairymen's Meeting or at the Farmers' Convention proper:

### CO-OPERATIVE DAIRY DEMONSTRATION WORK IN NORTH CAROLINA.

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By J. A. CONOVER, United States and State Departments of Agriculture.

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July 1, 1906, the United States Department of Agriculture, in co-operation with the State Department of Agriculture, began dairy demonstration work in this State. This work is not for the purpose of gathering statistics, as many suppose, but to promote the dairy industry in this State. Assistance has been given along two principal lines of work, viz.: the building of barns and silos and the improvement of herds by a systematic weighing and testing of the milk from each cow.

It has been shown that the only way of knowing how much profit a cow will make is to weigh the milk each day, test once or twice a month and keep account of the feed eaten. There are many cows in this State that do not pay for the feed they eat, and yet their owners complain because the dairy business is not profitable.

January 1, 1907, the work of keeping records was begun with thirteen farmers; more were added during the year, and for various reasons some were dropped; only nine herds finished the year's work, with a total of 103 cows. Of the nine herds completing a year's record only one was composed entirely of pure breds, the remaining herds being made up mostly of scrubs and grades with a few pure breds.

In Table No. 1 is shown the ten best cows of the 103 head, but as these cows were all pure bred and all owned by the same man it seems hardly fair to the other 73 cows, which were mostly grades, to compare them with this pure bred herd, therefore, this herd of 30 pure bred cows is set aside and the ten best cows from the remaining herds selected and their records shown in Table No. 2.

TABLE I.  
RECORD OF 10 BEST COWS (PURE BRED).

No. of Cow.	Pounds of Milk.	Pounds of Butter Fat.	Value of Butter Fat.	Value Skimmed Milk.	Total Value.	Cost of Feed.	Profit per Cow.
1	8,325.5	538.79	\$188.58	\$15.57	\$204.15	\$72.03	\$132.12
2	9,531.5	522.53	182.89	18.02	200.91	68.60	132.31
3	7,990.5	488.48	170.97	15.00	185.97	74.52	111.45
4	8,447.8	484.89	169.71	15.93	185.64	68.72	116.92
5	7,001.3	419.58	146.85	13.16	160.01	66.75	93.26
6	6,598.7	385.32	134.86	12.43	147.29	63.24	84.05
7	6,098.0	378.16	132.36	11.44	143.80	63.34	80.46
8	6,159.5	372.39	130.33	11.57	141.90	62.02	79.88
9	6,389.5	361.88	126.66	12.05	138.71	56.53	82.18
10	4,908.5	343.50	120.23	9.13	129.36	53.08	76.28
Total..	71,450.8	4,295.52	1,503.44	134.30	1,637.74	648.83	988.91
Average	7,145.1	429.55	150.34	13.43	163.77	64.88	98.89

TABLE II.  
SECOND 10 BEST COWS (OMITTING HERD OF 30 PURE BREDS).

No. of Cow.	Pounds of Milk.	Pounds of Butter Fat.	Value of Butter Fat.	Value Skimmed Milk.	Total Value.	Cost of Feed.	Profit per Cow.
1	5,469.0	307.96	\$107.79	\$10.32	\$118.11	\$53.79	\$64.32
2	6,151.0	307.43	107.60	11.69	119.29	56.51	62.78
3	5,749.5	305.99	107.10	10.89	117.99	64.35	53.64
4	5,505.0	294.43	103.05	10.42	113.47	51.44	62.03
5	4,864.4	287.33	100.56	9.15	109.71	50.29	59.42
6	4,916.2	282.22	98.70	9.27	107.97	58.79	49.18
7	4,918.7	277.73	97.20	9.28	106.48	54.34	52.14
8	4,354.5	275.34	96.37	8.16	104.53	45.30	59.23
9	5,011.7	274.40	96.04	9.47	105.51	52.41	53.10
10	5,135.1	267.46	93.61	9.74	103.35	36.87	66.48
Total..	52,075.1	2,880.29	1,008.02	98.39	1,106.41	524.09	582.32
Average	5,207.5	288.03	100.80	9.84	110.64	52.41	58.23

In Table III is shown the record of the 10 poorest cows in the 103 head. It is worthy of note that none of the cows in the herd of pure bred, 30 in number, appear in this table.

TABLE III.  
SHOWING THE 10 POOREST COWS.

No. of Cow.	Pounds of Milk.	Pounds of Butter Fat.	Value of Butter Fat.	Value Skimmed Milk.	Total Value.	Cost of Feed.	Profit per Cow.
1	2,247.0	108.86	\$38.10	\$4.28	\$42.38	\$28.42	\$13.96
2	1,848.4	116.46	40.76	3.46	44.22	28.94	15.28
3	3,043.0	118.17	41.36	5.85	47.21	40.86	6.35
4	2,357.8	127.36	44.58	4.46	49.04	30.97	18.07
5	3,081.0	127.82	44.74	5.91	50.65	41.42	9.23
6	3,403.0	129.14	45.20	6.55	51.75	38.34	13.39
7	2,403.0	134.77	46.47	4.54	51.01	38.12	12.89
8	2,680.9	135.21	47.33	5.09	52.42	49.89	2.53
9	2,870.0	135.31	47.36	5.47	52.83	39.39	13.44
10	2,775.0	136.74	47.86	5.28	53.14	34.06	19.08
Total..	26,709.1	1,269.84	443.76	50.89	494.65	370.43	124.22
Average	2,670.9	126.98	44.38	5.09	49.47	37.04	12.42

It will be seen by comparing the tables that the average net income from Lot I was \$98.88; Lot II, \$58.23, and from Lot III, \$12.42. Many of the cows in Lot III would have run their owners in debt for the feed eaten had it not been for the high price of butter fat, viz., 35 cents per pound.

The average cost of producing a pound of butter fat: Lot I was 15.1 cents; Lot II, 18.1 cents; Lot III, 29.1 cents. The 103 head produced butter fat at a cost of 20.2 cents per pound; eliminating the 30 head pure bred brings the cost of butter fat to 22.3 cents per pound.

The poorest herd, 15 cows, produced an average net profit of \$20.95. The best herd, 30 cows, all pure bred Jerseys, produced an average profit of \$70.01, while the next best 10 cows produced an average profit of \$47.66.

These tables show the importance of weighing and testing the milk of each cow in the herd, as nothing else can. But I hear some one in the audience say, "Are you not afraid that if we all do this that we will soon overstock the market with butter?" What! Afraid! when North Carolina ranks 25th as a dairy State, has only five cows per square mile, as against 32 in New York, and imports 1,000,000 pounds of butter annually.

#### MY EXPERIENCE WITH THE DAIRY DEMONSTRATION WORK OF THE UNITED STATES AND STATE DEPARTMENTS OF AGRICULTURE—KEEPING HERD RECORDS.

By J. W. ROBINSON, Catawba County.

Two years ago last May I started into the dairy business with a hand separator and ten cows. The cows were such as I could pick up about the country; most of them were bought when they were calves and kept until freshening.

In the fall a representative of the State and Federal Departments of Agriculture, Mr. J. A. Conover, visited my place, assisted me in building a barn and silo, and tried to persuade me to keep a record of my cows. In fact, made a test or two of the herd, but like many men I wanted to wait until more cows were fresh or giving milk, so as to make a bigger show at the start, thinking this was the way to begin.

After several visits from Mr. Conover and a lot of talk on his part, I began keeping records February 1, 1907, weighing the milk twice a day and keeping a record of the feed. After weighing the milk for two months and seeing the tests made, I found that one cow ran me in debt ninety cents, while the nine cows giving milk made an average profit of only fifty-four cents above the cost of feed. This set me to thinking, and I decided that someone that didn't believe in records should have all my cows except three. The one I thought best in the herd before keeping records I afterwards decided to give away, if I couldn't sell her.

The money that came from these six cows and their calves was put into six pure-bred Jersey cows, whose owner had been keeping records for a number of years. This trade left me in debt, but I had the satisfaction of knowing just what to expect from my new cows. Since making the change and keeping records for one year, I find that my best cow made a net profit of \$53.61, while the poorest made a net profit of \$27.21. The best cow produced butter fat at a cost of 16.4 cents per pound. The poorest one produced butter fat at a cost of 21.5 cents per pound. The nine cows finishing the year's record made an average of 257½ pounds of butter fat at an average cost for feed of \$46.74. Figuring the butter at twenty-five and thirty cents per pound and skim milk at twenty cents per hundred for feed, the average profit per cow is \$39.40. The actual total money received for products sold for nine months of 1906, before keeping record of my herd, was \$273.09, an average of \$30.35 per month, or \$364.08 for twelve months. For the year 1907, after keeping records, I received for products sold \$759.95, and for six months of 1908 I have received \$617.42. If the average continues the same until the end of 1908 the amount received during this year will be \$1,234.84, so you see I have about doubled the receipts each year since I began keeping records: 1906, \$364.08; 1907, \$759.95; 1908 (if the average continues), \$1,234.84, and I think it will be more. If I had not begun the work I would have been, most likely, milking the same old herd of 1906. Of course the record shows more profit than actual money received, because it does not allow for the butter, cream or milk used in the home, or whole milk fed calves, but there is not a great difference.

I have sold several male calves from my herd at a good price, being able to show the purchasers their mothers' exact records. That's where the record pays again. There will be no trouble selling bull calves from a cow with a good record, which I consider a great item in the business. They will not do for beef and ought to go to help some man improve his herd, as the bull is half the herd, but if you do not have a record you are sending out a calf which will perhaps be an injustice to yourself and the purchaser.

Another thing, you can keep track of your milkers; if they are not milking clean or mistreating your cow, she will show it in the weight of milk, and the milkers take more interest trying to make their cows give most or beat someone else's, but it is not always the milker's fault if the weight runs down. If the cow is not feeling well or, through carelessness, is turned out in the cold rain or snow, not sufficiently watered, given ice water, dry pasture and numerous other careless things, she will be short in milk and test low. If you do not keep a record you cannot detect these things so quickly. If the weight of the milk runs down much you begin to investigate. These may seem small at the time, but at the end of the year the record shows them up to look like mountains.

Of course the feeding must also be governed by the record. You can look at it and see what the cow is giving. You know a cow ought to be fed in return for what she has given you. Without the feed record how could we get the profit or even learn what to feed and how much? We would run from year to year and never know which cow cost us most.

It is natural when a man improves one thing for him to improve others, so the cows were taken out of the old shed and put in a new barn; a silo was built for better feed and more of it; the hogs were taken out of their muddy pen and put into a new house with a concrete floor; the horses were moved into another new barn, with many more conveniences. The dairy house was somewhat improved and a gasoline engine installed. I thought gasoline cheaper than muscle and attached the separator, churn, pump and wood saw to it. Water is now pumped to all the barns and the house. The old fence seemed to need a lift, and the farm roads needed the pick and shovel. It seemed, too, that the fields called for improved machinery; so many improvements have been made, with valuable suggestions from the Department of Agriculture.

There is still room for many more improvements, but these have already had their influence over my neighbors, and there are new separators in the neighborhood, barns and silos going up and record work begun.

Without the scales and Babcock tester I do not know of any way in the world that you can build up a herd that you will be proud of in the future. We are not in the business simply to milk, for it is twice every day, and as Mr. French has said, "All dairymen are bowlegged from holding the milk pail 365 days a year." It does not cost any more to attend a good herd than a poor one, and I am sure the profit pays you in many ways.

If a man will keep a record of his herd for one year he will be no worse off at the end of the year, but much benefited. But if then he decides that it is too much trouble to weed out the "boarders" he is too lazy for a dairyman and will soon go out of business. The quicker the better.

What merchant in the city of Raleigh would think of selling goods without a cost-mark and selling-price. He would not run long without some book work, and all we dairymen would be ready to criticize and say: "There is a man who didn't know how to run his business and failed."

Now, my brother, it is just as important for we dairymen to keep an account as for the merchant. How can any man ever run a dairy farm if he does not keep a record of his herd; he will always be making mistakes. He may think old Daisy no good, because she gives such a little milk, and she goes on the block when old Sport ought to have gone instead.

I claim I am on the right track, and if I ever succeed it will be a great pleasure in my old age to sit down and look over the records and think of the old cow with the crooked horn, the stocking-legged cow, or the white switch cow, and say to my children, "This is the cow that helped to educate you."

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## RELATION OF LIVE-STOCK FARMING TO SOIL FERTILITY.

By C. L. NEWMAN, Professor of Agriculture, North Carolina A. and M. College.

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The subject I am to discuss to-day—"The Relation of Live-stock Farming to Soil Fertility"—is, to my mind, one of greater material importance to the agricultural South than any subject that might be discussed by any man or any body of men. It is both fundamental and perpetual in its relationship to the welfare of this State and to the South. I can say, with reverence and with the conviction of truth, that, should one great commandment be promulgated throughout our Southland for the guidance and for the insurance of a prosperous independence to our farmers, it would be: Thou shalt not till thy soil unless thou also maintain thereon its complement of live stock.

The geological origin of practically all of North Carolina's soils, their anatomy, physiology and topography are such as to render them easily portable under the influence of our heavy rainfall, and that portion, the surface, which possesses the conditions and composition most suitable to plant growth is the

first to be removed. The continued use of such soils for the production of hoed crops, and farming systems that prohibit rather than necessitate a covering of vegetation, encourage a rapid decomposition, dissolving out and washing away of the first requisite of our soil's fertility, decomposing vegetation or humus. The paramount desideratum in each and every dependence of the farmer upon the soil is fertility or capacity for plant production—the production of the largest yield of the best quality at the least cost, and at the same time leaving the soil in a better condition of fertility for the production of future crops. Nature, in her production of her crops of vegetation free from the interference of man, whether these crops are the herbage of prairies or giant forests, ever preserves upon the surface of her soil a covering of decomposing vegetation, conserving moisture and physical conditions and supplying organic plant food—ideal conditions for plant growth.

For many years the farming systems and practices of the South have had a tendency to exhaust rather than restore fertility. The South is now in a transitory historical period. The virgin soil, originally prodigal in its yield, has been robbed of fertility representing the accumulations of thousands of years, and the high tariff and exhausting rule of King Cotton find us to-day viewing our hillsides corrugated with gullies and spending millions of dollars for fertilizers that we may temporarily stimulate our abused and wasted soils. In the States west of us are to be found thousands of North Carolinians who, having worn their once fertile fields into gullies, went west to rob other soils, and further west to rob still other soils.

I believe the old South is now going through a period of reconstruction—an adjustment to conditions and to the demands of the times. This reconstruction may now be slow, but its velocity will be accelerated as it progresses towards its culmination; and the three forces, stronger than any others, that will operate in this progress are live stock, manufacturing and commerce. I do not eliminate cotton. Cotton, like the poor, will be with us always.

In 1907 North Carolina produced 268,004 tons of cotton seed. The present relative commercial valuation of nitrogen, potash and phosphoric acid gives this quantity of seed a market value for fertilizing purposes of \$3,553,000. Had the farmers of North Carolina bought the amounts of nitrogen, potash and phosphoric acid contained in the cotton seed produced in North Carolina in 1907 they would have paid \$3,553,000. The market value of these 268,004 tons of seed was \$5,587,893 (according to the United States Census), or this amount would have been paid the farmers had all the seed been sold. Had the 268,004 tons been fed to stock, they would have been worth to the farmers \$6,000,000, and, having secured the \$6,000,000 of value as a feed, there would have remained for the soil 85 per cent of the fertilizing ingredients of the cotton seed in the resulting excrement, and this excrement would have contained in a most desirable and available form the nitrogen, phosphoric acid and potash. Thus the combined feeding and fertilizing value of the 1907 crop of cotton seed would have amounted to \$9,020,000 to the farmers of North Carolina. The cotton crop of the South in 1897 was 11,200,000 bales and 5,600,000 tons of seed, having a combined feeding and fertilizing value of \$144,424,000. At \$5 per ton the seed would have brought \$28,000,000. The farmers of Mississippi lost \$16,632,000 on this one crop, and the farmers of the entire South lost \$116,424,000. Why this loss? Because the farmers of Mississippi did not feed their cotton seed to live stock; because the farmers of the South do not keep live stock; because the farmers of the South do not know the value of the South's products or of the South's by-products; because the farmers of the South have for the past century pursued a policy of soil exhaustion rather than a system of soil improvement.

The Mississippi station fed cotton seed to cattle through the winter. The feed used contained nitrogen, phosphoric acid and potash worth \$206.20. The fertilizing value of the excrement from these cattle, considered only from a chemical standpoint, was \$175.27. The cattle all increased in weight and were in much better condition in the spring than at the beginning of the winter.

The Maine Experiment Station found that the manure from cattle fed one ton of hay was worth \$4.38; from one ton of wheat bran, \$9.60; and from one ton of cotton-seed meal it was worth \$23.66.

The Mississippi station found in an experiment conducted there that a ton of cotton seed fed to cattle gave manure worth \$9.09; a ton of cotton-seed meal gave manure worth \$19.13; a ton of hulls, \$2.54; and a ton of Johnson-grass hay, \$3.50. Cotton-seed meal was then selling for less than \$20, yet the manure resulting from the consumption of a ton was worth \$19.13.

An experiment station found that one acre of soy beans supplied green feed for 10 cows 14.75 days; one acre of corn supplied green feed for 10 cows 19.11 days; one acre of cowpeas supplied green feed for 10 cows 22.27 days; one acre of sorghum and cowpeas supplied green feed for 10 cows 34.24 days. The same station found that sorghum and cowpeas from one acre gave 42,948 pounds of green forage, equal to 8,845 pounds air-dry matter containing 669.39 pounds of protein. Reported yields from eight Southern States exceed these yields by more than 30 per cent.

The Arkansas station used on one acre a crop of cowpeas and cotton seed, applied directly to the soil as a fertilizer, and secured a profit of \$13.61 per acre from a cotton crop that followed. On another acre the cowpea vines and the same quantity of cotton seed were fed to steers and the resulting manure applied to the soil. The profit from the increased weight of the steers and from the cotton crop was \$24.57, a difference of \$10.96, which would have been lost had the cowpea crop and the cotton seed not been fed.

The same station has conducted numerous live-stock and soil-improvement experiments, and, without an exception, the growing of cattle and hogs in conjunction with the growing of field crops shows a profitable increase in the yield of the crops and a profit from feeding and grazing the crop. Cotton following corn and peas grazed by the steers gave a yield of 1,675.5 pounds of seed cotton, as compared with only 1,049 pounds of seed cotton from following corn cut for stover. Corn following corn grazed by steers gave a yield of 35.8 bushels per acre, and corn following corn removed as stover gave only 21.8 bushels per acre. Oats following corn and peas grazed by steers gave 2,200 dry matter per acre. When the corn was cut and removed, the yield of dry matter was only 1,012, a decrease of more than 100 per cent. Similar experiments were carried on by the same station with peanuts, chufas, soy beans and corn grazed by hogs, with a resulting increase in the yields of crops, amounting to from 22 to 108 per cent, and a satisfactory profit from the hogs.

The Arkansas station, in various experiments conducted by Bennett, shows that, without an exception, when cattle and hogs were grown in wise association with common Southern field crops, the result was profit in three counts: First, the crops were grown with profit; second, the cattle and hogs were fed with a profit; third, the fertility of the land was rapidly increased without cost. These experiments were executed without the use of commercial fertilizers, and the hogs, with only an average daily gain of 1.15 and 1.31 pounds, produced pork at a low cost of 1½ cents per pound. Grazing tests made by this station show that land which will produce 25 bushels of corn per acre will, in peanuts, produce 1,252 pounds of pork per acre and leave the soil in an improved condition of fertility. Hundreds of such incidents might be cited from various experiment station reports and from the agricultural press. Few men will deny that rotation and diversification are cardinal bases of successful agriculture, and that rational rotation and diversification cannot be practiced unless the production of live stock enters largely into every farming system. When the States of the West and the Northwest discovered that the continuous growing of wheat and corn was draining their lands of fertility, they resorted to the live-stock industries, and now they supply the world with not only grain, but animal products, and their soil is again rich and their people rich.

On January 1, 1906, North Carolina had 282,600 milch cows, valued at \$24.

On January 1, 1906, North Carolina had 445,954 other cattle, valued at \$12.

On January 1, 1906, Ohio had 719,100 milch cows, valued at \$34.

On January 1, 1906, Ohio had 1,105,380 other cattle, valued at \$22.

On January 1, 1906, North Carolina had 223,965 sheep, producing 871,250 pounds of wool.

On January 1, 1906, Ohio had 1,850,000 sheep, producing 11,562,500 pounds of wool.

On January 1, 1906, North Carolina sheep averaged 4.25 per cent of wool.

On January 1, 1906, Ohio sheep averaged 6.25 per cent of wool.

On January 1, 1906, North Carolina had 1,291,781 hogs, valued at \$6,846,455.

On January 1, 1906, Ohio had 2,436,797 hogs, valued at \$20,103,575.

Throughout a very large portion of the cotton-producing area are to be found thousands upon thousands of acres of land that should never have been cleared. The rolling character of this area, under our system of cotton culture, has brought over thousands of acres to a cursed condition of yawning gullies and abandonment. The piedmont section of our Southern States was wonderfully endowed by nature, but our system and practice in the pursuit of agriculture have vandalized the forests and prostituted a once fertile soil. We now see and feel our sins, and it is our privilege and duty to repair the wrong we have done. I confidently affirm that we can do this in no way other than by the growing of live stock. Less labor will be required. We have the soil, the climate and water. We have feed stuffs (or can produce them) in such abundance and variety that we are puzzled to know which to select. If other sections of our country, producing 500 per cent more animal products than these sections consume, can find markets, we surely can find them, since millions of our cotton dollars are sent in exchange for mummied, embalmed and renovated products of the hog and the steer.

We can have pasturage and soiling crops for nine months in the twelve. Our short and mild winters do not necessitate expensive barns and stables. I can see but one obstacle in the way of our becoming a great live-stock producing section. That obstacle is brains, or the lack of them. Education, intellect, training and a determination to arise from our lethargic inaction, see and seize the opportunity within our grasp.

When some forty years ago the scarred Confederate soldiers returned to the deserts of their once exuberant homes, they had contracted the fighting habit, and ever since they and their descendants have been fighting—fighting grass. I have spent several months of the time since July, 1904, holding Farmers' Institutes in the section of the South where the reign of King Cotton is all but absolute. In and around thousands of acres that I passed through or by were growing grasses, legumes and weeds that, on many a farm at least, could have been converted into animal products that would have netted more money than the profits from the cotton grown on these farms.

The character of our soils under the influence of our heavy rainfall permits more plant food to be washed or leached from our bare cotton fields than is removed in the average crops through five years. A covering of vegetation not only prevents to a very great extent this loss, but also prevents the formation of gullies and the removal of our soil to the Atlantic Ocean. The character of the plants best adapted to live-stock farming is such as to reduce this loss to a minimum. Many of the crops found to be best for hay, pasturage, soiling and ensilage are legumes, and all legumes are soil improvers. The soil that yields an abundant crop of legumes is thrice blessed—it yields a rich food for live stock, a profit for the owner of the land, and the land itself is enriched.

Into whatever country it goes, cotton-seed meal, at \$30 per ton or at \$35 per ton, is considered one of the cheapest and best of dairy foods or for fattening purposes. If cotton-seed meal is shipped a thousand miles and there known as the cheapest and best source of protein, if the animal products resulting from its use are shipped to us and sold at a profit, are we not sending our goose to lay the golden egg in a nest not our own?

There was a time when cotton gins were so located as to permit the seed to fall into some stream of water that they might be carried out of the way. The use of cotton seed or cotton-seed meal directly as a fertilizer is also a practice most wasteful and unwise, since its feeding value of thirty or thirty-five dollars per ton is lost. The same principle may be applied to the plowing under of cowpea vines or other green manurial crops. A ton of cowpea hay is worth on the market anywhere from \$12 to \$25, the price depending upon the locality and the ignorance or wisdom of the purchaser or seller, or both. Its feeding value is equal to that of wheat bran. The relative commercial fertilizing value of a ton of cowpea hay is between \$10 and \$15; if used as a fertilizer without having been fed, from \$12 to \$25 of its total value is lost.

The manure dropped by a well-fed cow in one year contains nitrogen, phosphoric acid and potash worth \$27. The average value of the North Carolina cow is between \$25 and \$27. This is food for thought—a spur to action.

But the growing of live stock in North Carolina or in any land does not mean the rearing of razor-back hogs, saw-back cattle and imported mules. Some years ago, while attending a State fair, I was standing by a pen in which were confined three very fine Berkshires. They were from the North. I admired the hogs greatly, for they were the largest I had then seen. A Georgia farmer came up with his wife, and, after standing for some time, exclaimed to his wife: "Golly! ain't he a buster? As long as a fence rail and as big as a hoghead. He must be old enough to vote." The hog was not two years old. That day four carloads of hog meat were unloaded in Atlanta, consigned to three firms and distributed throughout the State. There may have been more than four carloads. There was more in Georgia. Do Asheville, Greensboro, Charlotte, Raleigh and Wilmington import meat?

North Carolina is a great State and deserves to be greater. Does North Carolina teach her sons the things the men of North Carolina should know? Do the people of North Carolina realize that North Carolina is an agricultural State? Does North Carolina grow her own meat, butter, corn and flour? Does she spend hard-earned dollars for commercial fertilizers? How many gully-scarred acres have blushed in their nakedness until Dame Nature, moved to compassion, clothed them with broomsedge, briar and pine? Do the farms of North Carolina maintain their complement of live stock? They do not, and, until they do, the sins of our fathers will be visited upon us.

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#### MANAGEMENT OF DAIRY HERD.

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By JOHN MICHELS, Professor of Animal Husbandry and Dairying, A. and M. College.

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One of the most important matters in the successful management of a dairy herd is to be constantly improving the quality of the stock. This is best accomplished by the use of the best quality of pure-bred dairy sires. The importance of the dairy sire is recognized in the expression, "The bull is half the herd." Usually, however, the bull is more than half the herd, either for good or bad. In the case of common or grade cows, for example, the pure-bred sire may count for three-fourths or more of the herd by reason of his greater prepotency. To so great an extent does the sire determine the improvement or deterioration of the herd as to call for the utmost caution in his selection, which should be based primarily upon the performance of his immediate ancestors.

Whether the cows be grades or pure bred, it is of the highest importance in building up a dairy herd to secure a pure-bred sire of outstanding dairy merit. Unless the sire is descended from good milkers, it is folly to expect him to produce good milkers, no matter how fine or how ideal he may be as an individual. It is, furthermore, of importance to remember that the herd cannot be successfully built up unless the sires that are successively used belong to the same breed. If the grading-up is begun with a Jersey sire, the process must be continued uninterruptedly by the use of Jersey blood.

Another matter of prime importance in the successful management of a dairy herd is the keeping of a record of the milk and butter fat produced by the individual cows of the herd. The keeping of a daily record of the weight of the milk of each cow is a very simple and inexpensive task. All that is necessary is to have a small scale and a ruled sheet of paper upon which to record the weights of milk morning and night. The daily weighing of the milk from each cow is valuable also in serving as a check upon the work of the milkers. A rapid shrinking of the milk is usually detected on the milk sheet and may be entirely due to careless milking. Great daily fluctuations in the yield of milk

are also in most cases the result of indifferent and inefficient milkers. The milk from each cow should be tested about once a month during the whole period of lactation. A satisfactory way of doing this is to collect what is known as a composite sample, which consists in securing about one-half ounce of milk from each of six consecutive milkings and placing this in a half-pint composite sample jar containing a small amount of preservative. The test of this composite sample will represent the average amount of butter fat for the period during which the sample was taken, and will serve with sufficient accuracy as an average test during the entire month.

By keeping a record of this kind it will be found that the owner of practically every herd is keeping cows which do not pay for their feed, and the only sure way of locating these cows is in keeping records as outlined above.

Another important matter in the building-up of a dairy herd is to select calves from the best milkers and to cull out the poor cows which by the records have been found to be paying either no profit at all or only a small one. The selection of calves from the best cows is the only sure and safe way of making any permanent improvement in the dairy herd. The practice of continually buying cows is not only costly, but is also a means of introducing contagious diseases into the herd.

Now, a word with regard to the subject of feeding. I wish to say at the outset that no dairyman can farm successfully who does not raise his own roughage. The man who continually depends on cotton-seed meal and cotton-seed hulls can never expect to attain a high degree of success in the dairy, not alone because of the high price of the hulls, but because of the unsatisfactory combination of these two feeds.

The cheapest and most satisfactory roughage that can be produced upon the farm is corn silage. Its succulence and palatability make it an ideal feed for milk production. This feed should be available upon the farm the larger portion of the year. In the winter it takes the place of some of the pasturage; in the summer and fall it is needed to supplement the shortage of pasturage which usually occurs about this time.

Cows giving a large flow of milk should be fed an ample allowance of grain. It always pays to feed a cow to the limit of her capacity. As a rule, 50 per cent of the total nutrients required by a dairy cow is necessary to maintain her own body, so that it will neither gain nor lose in weight. The other 50 per cent is converted into milk. If the farmer, therefore, feeds the cow three-fourths or 75 per cent of the amount of feed that the cow requires for her best milk production, he may in that case expect approximately only one-half the amount of milk that he would get if he supplied the remaining one-fourth or 25 per cent of the feed. It is one of the costliest things in the management of a dairy herd to underfeed cows.

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## PROFITABLE BUTTER MAKING ON THE FARM.

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By R. L. SHUFORD, Catawba County.

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To make butter profitable on the farm as well as in the larger dairy we must first have good cows. Every manufacturer of goods on the market knows that in order to make the most profit he has to have the very best machine possible for that business, and it must be kept in the best running condition. Constitutional vigor in a dairy cow, the machine that we have on the farm for doing this dairy work, is something that we cannot pour into an animal with a bottle; it has to be bred in her and fed into her. What are some of the first steps in breeding animals to secure this constitutional vigor we desire and must have to make the most out of our business?

First, breeding from nothing but strictly healthy animals. We do not want anything but strictly healthy dairy cows to raise dairy stock from. After we have healthy cows we should know their capacity. Everything should be

measured by its capacity for work, or, in case of the cow, by her production. A man is paid, or ought to be paid, for his ability to work, either with his mind or muscle. The value of a race horse is measured by his record. The value of the dairy cow depends upon her capacity to produce butter and milk at a profit. So the first thing we ought to do is to use the scales and Babcock test and find out whether old Brindle is paying or not. If we were dairying for fun it might be all right not to know this, but if for business we must use business methods. It is not enough to know that a cow gives a pail full of milk when she is fresh; we want to know what she produces in a year. To make butter profitable on the farm it is very important to know these things, because the small dairyman will have to breed and raise his cows, and if he acts wisely there is no reason why he cannot breed as good or even better than the larger breeder, as he can give the herd his personal supervision, while the large breeder has to depend on hired help, which in most cases will not take the interest that the owner would. I have been asked often whether or not a mule colt could not be raised to maturity as cheaply as a cow. My answer to this is, it probably can be, but why not raise a cow that will bring as much as a mule? This I have tried, and believe I have succeeded in doing.

To get the most profit out of butter on the farm it is necessary to do it in a co-operative way. Get several of your neighbors interested. This is particularly necessary when the market is not convenient and the product has to be shipped, as it is rather expensive to ship a small amount often, which it is very necessary to do in order to get the best price. By combining the shipments the cost can be very much reduced, as each can do this in turn. It will be quite a while yet before creameries of any size can be run to any advantage. We will first have to get more people interested in keeping cows, but with the hand separator and proper handling of the cream there is no reason why we cannot make just as good butter or even better on the farm. If we try to learn and have conditions right we can be sure to turn out the best product. Our people should be educated to make a better quality of butter, as this will greatly increase the consumption. When there is a lot of inferior butter on the market people use but little of it. I was once told by one of my customers that the only objection he had to my butter was "that it took too much of it," that he used double the amount he did of cheap butter. However, this man is still buying the best butter he can get for family use and paying the difference in price.

Co-operation with your neighbors will also greatly help in breeding up better dairy cattle. By co-operating we can buy the best sires and change our breeding without so much expense. I think every dairyman, it matters not how small his business, should make an effort to breed registered stock, as it does not cost any more to raise them, and when he has a surplus there is so much more profit in what he sells.

One among the most noted Jersey breeders in America to-day is a man who only keeps eighteen to twenty cows. He has bred and developed some among the largest producers. On the Island of Jersey the breed has been developed by small dairymen through co-operation. If the average farmer could get rid of his prejudices and false notions about registered stock and be persuaded to give up saying this, "They say grades are worth just about as much for business as registered stock," he would put himself far along on the road toward the improvement of his cows and a big increase in their earnings. They seem to stick to their notion that the haphazard cow is really better and more profitable for them than a cow born of an improved sire and dam. The same low grade of judgment prevails upon the subject of feeding. Many people really think they cannot afford to feed their cows well. It is true that no man can afford to buy feed, or raise it either, for poor cows, but it is certainly true that no man can afford not to feed a good cow the right food and all she will eat and digest.

## MARKETING MILK AND CREAM.

By WILLIAM D. SAUNDERS, Dairy and Food Commissioner of Virginia.

Our cities, for the most part alive to the interests of the health of their citizens, have established boards to control to a certain extent the production of the milk coming within their municipalities for consumption, the danger being that diseases of various kinds are frequently transported in milk and produce their characteristic troubles when taken into the intestinal tract, the principal requirements for the present being more cleanly methods in the production of the milk and freedom of the cows from disease. Some dairymen seem to resent interference on the part of the city authorities with their arrangements, while others are willing and eager to meet the requirements and do what the boards of health regard as necessary to be done in the interests of the health of the different cities.

I will deal with this question first, so far as it concerns the dairyman who is trying to supply cities with such milk as will satisfy their health officers and protect the consumer, so far as science indicates that it can be done. I think I will take a text at this point, as there are two words I want to impress on you, and want you to hold to and practice what I am going to say in connection with them:

## CLEANLINESS AND COLD.

Cleanliness about the stable, in the first place, is most important. We want our stable where the drainage is good; we don't want mud around it so deep we can hardly get through it all winter. We want the stable itself arranged so that it can be kept clean. Cement floors, with gutters for carrying off all liquid material, are most important. The stable should be cleaned out as often as necessary to get out all material and keep the floor clean. It is just as easy to clean the floor once daily as once a week, and twice daily as once. Getting in the habit of doing it is all that is necessary. We are all victims of habit. If we ever get in the habit of doing anything, we find it is all right. Another practice of keeping the dry feed over the cows is one that should be changed when new barns are being built and for several reasons. When the forage is being fed a considerable dust is raised in the barn, which is not good for the cows and also tends to infect the milk to some extent with germs that, while they may not be harmful, had better be kept out. More light is wanted as well as more air. Light, especially sunlight, tends to destroy germs and moulds, which might cause trouble and which may be present in the barns. Plenty of light and ventilation also tend to bring about better conditions of health amongst dairy cows. Cows when milked should first be brushed off along their sides and udders, their sides and udders dampened so that as little contamination as possible will get into the milk from this source; hairs from the sides of the cow, dandruff from the udder and dirt and dung from the tail will add foreign material to the milk, carrying more or less germs of various kinds that should be and can be kept out. The pail in which the milk is drawn should be carefully washed and sterilized before any milk is drawn into it. This is again a source of contamination. Steam is essential for sterilizing all vessels used in handling milk. A small boiler costing about \$25 will answer every purpose and drive a small turbine separator, if desired. The dairyman who is undertaking to provide a milk free from most objectionable features should, in the first place, provide good healthy cows. These cows, if it is practicable to be done, should be tested for tuberculosis regularly, as there seems to be a growing demand that only milk from cows tested and not reacting be allowed to be sold in our cities and towns. Whatever we may think of tuberculosis and its transmissibility from cattle to human beings, one thing we are all agreed upon, and that is its contagious character as to cattle. One case in a dairy herd threatens the entire herd, and sooner or later every cow in a herd may contract tuberculosis from one tuberculous animal. Knowing this, are we not as much interested in con-

trolling this disease as any one else who may be trying to lessen the possible risk of contracting this disease through the milk. We should observe cleanliness about the barn, cleanliness about the cows and cleanliness in handling the milk after it is taken from the cows. As soon as the milk is drawn it should be removed from the stable and to the milk room. The milk room should be located some little distance from the barn—far enough to be free at all times from the odors about the barn, and as far as possible from the flies that are around a stable at all times. In order to get rid of the flies as far as possible, screens should be provided for all the openings to the milk room, and kept closed, except when it is necessary to open the room. As soon as the milk is taken to the milk room it should be strained through two thicknesses of cheese cloth to remove whatever may be in it which may have gotten in in spite of whatever precautions may have been taken; these strainers should be carefully cleaned and sterilized by boiling if used again, or, what would be better, discarded each time after being used. The better way, however, to cleanse milk is to pass it through a cream separator, the separator holding all the foreign matter which may have gotten into the milk, except what may have gone into solution in the milk. As any strainer, from the nature of the case, is composed of material with small holes, allowing the milk to pass through, it can be seen that sufficiently small material will pass through with the milk when the milk is strained. In the case of passing milk through the separator, practically all solid matter is held in the separator bowl. Immediately after the milk is cleansed, whether by passing through a separator or straining, it should be cooled to as low a temperature as possible, short of freezing, and even some freezing would make no difference. This can be accomplished by using a Champion milk cooler, or a cooler of this type, and plenty of ice, reduced as fine as practicable, and with water to float it; filling the entire cooler with the ice and water, this is stirred at short intervals while the milk is slowly run over the outside, reducing the temperature of the milk to near the temperature of the water and ice in the cooler. If one passing of the milk over the cooler does not reduce the temperature sufficiently then it can be repeated. One passing over will usually reduce the temperature to about 35 degrees Fahr., or below. This temperature should be maintained until the milk is delivered. To do this the milk should be placed in a tank with plenty of ice and water surrounding the can containing the milk and held at a temperature as near 33 degrees F. as possible until delivery is made. When ready to ship the can should be surrounded with some nonconducting material, so that the temperature of the milk will be held as near as possible to what it has been brought to, until delivered; this is done by using felt jackets, which are made specially for this purpose, strapped tight to the cans, holding the temperature, with very slow rise, during the period of delivery. While ice is an essential almost to the successful handling of milk and cream, a great many dairymen do not provide themselves with ice and cannot, for that reason, handle their milk as has been suggested. In such cases they should use as cold water as may be available, and reduce the temperature of their milk to as near the temperature of the water as possible; this can be done by using a Champion milk cooler and running the water through it while the milk is running over it. The Star milk cooler is a very good cooler to use when it is desired to use water only to cool with. The temperature of the milk, if passed over either cooler slowly, will be reduced to near the temperature of the water used.

The proper cleaning of all vessels used is very important; some fat solvent should be used in the water. Sal. soda makes a very satisfactory material for this purpose, and all vessels used should be washed in this solution; the first water should be cold and the next as hot as the operator can stand. As soon as the vessels are washed they should be rinsed in hot water and placed over a steam pipe, allowing the steam to run slowly into the can or vessels and remain heated in this way for several minutes; this provides sterility or destruction of whatever germs may be present in the corners or crevices of the vessels from which they cannot be dislodged by washing.

I will now endeavor to indicate how to prepare milk and cream for market in large quantities. It will not be necessary to repeat the method of handling

the milk only after it has come to the creamery, the method up to this time being practically the same as far as it is possible to do it. As soon as the milk comes to the milk plant—not more than an hour or so should elapse before getting it to the plant—it should be treated so that it will be changed but little, if any, from what it was when received. The proposition then is to maintain this condition until the milk is put into the hands of the consumer; to do this it is necessary to destroy the germ content of the milk as far as possible, as milk two or three hours old contains large numbers of bacteria; to destroy these bacteria and not affect materially the taste of the milk is what is desired to be done. This can be done by raising the temperature of the milk to from 140 to 160 degrees F. and maintaining this temperature a sufficient time to destroy the bacteria present; this period will be longer in the case of the lower temperature; twenty minutes at 160 degrees F. destroys practically all bacteria present in milk. This treatment is called pasteurization. After the milk has been pasteurized, the germs being practically destroyed, a condition of temperature should be provided which will prevent the growth of such bacteria as may get in afterwards. This we do by reducing the temperature of the milk to a point at which the bacteria cannot develop—or as near 33 degrees as possible. To maintain this temperature until delivery the milk is frozen to some extent, about ten to twenty per cent of the can being frozen; this, with the protection the felt jackets give will maintain the temperature from 12 to 15 hours at about 33 to 35 degrees F. It is understood that such precautions in the way of washing and sterilizing all vessels used in connection with handling the milk, both before and after pasteurizing, as has been indicated, are most important. After the milk or cream, as the case may be, has been pasteurized and partly frozen it can be held in cold storage at a temperature of 30 degrees F. for several days without its condition being affected but very slightly. Milk and cream prepared in this way can be handled between points which can be reached within 36 hours very successfully; in fact, our creamery at Blacksburg has shipped cream prepared for shipment, as has been indicated, to points requiring 36 hours to make delivery. Cream has been shipped, prepared for shipment, as has been indicated, from the creamery at V. P. I. to Palm Beach, Fla., a distance of 1,200 miles, requiring 36 hours for delivery; to New Orleans, La., 800 miles, and requiring about 24 hours, also to Little Rock, Ark., and various points in North Carolina—from the mountains in the west to the seacoast on the east. Milk, treated in the above manner, could be as successfully handled as cream.



THE BULLETIN

OF THE

NORTH CAROLINA

DEPARTMENT OF AGRICULTURE,

RALEIGH.

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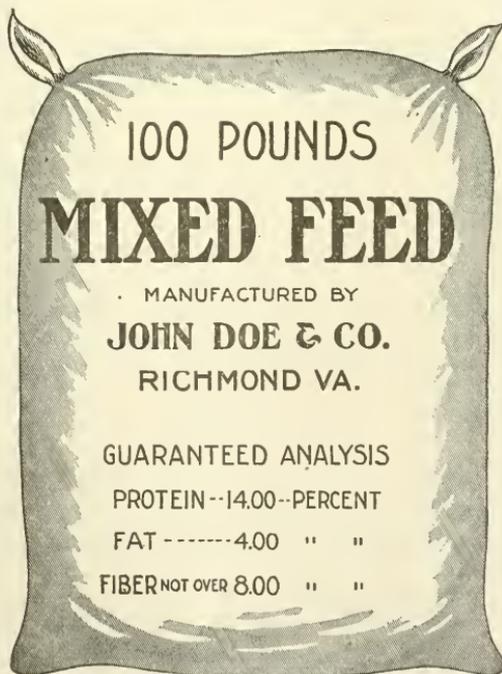
NOVEMBER, 1908.

Number 11.

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STOCK FEEDS.



LIBRARY  
NEW YORK  
BOTANICAL  
GARDEN.

A PROPERLY BRANDED BAG OF FEED.

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# SIXTH REPORT ON CONCENTRATED FEEDING STUFFS AND COTTON-SEED MEAL.

B. W. KILGORE, STATE CHEMIST.

BY C. D. HARRIS (FEED CHEMIST AND MICROSCOPIST IN CHARGE OF INSPECTION AND ANALYSIS OF FEEDS)

AND

L. L. BRINKLEY AND DR. J. M. PICKEL.

Since the publication of the last Bulletin on Concentrated Feeding Stuffs 497 samples of feeds and cotton-seed meals have been examined. The number of samples of each kind is as follows:

Wheat Bran and Mixed Brans.....	51
Middlings, or Shorts.....	50
Brans and Shorts.....	15
Shipstuff .....	47
Corn and Oat Feeds.....	12
Rice Feeds .....	7
Molasses Feeds .....	13
Beet Pulp .....	2
Hominy Feeds and Chops.....	14
Cotton-seed Feeds .....	3
Special Mixed Feeds.....	18
Miscellaneous Feeds .....	88
Miscellaneous Feeds examined microscopically.....	108
Cotton-seed Meals .....	55
Cracked Corn .....	14
Total.....	497

## DUTY OF THE DEPARTMENT OF AGRICULTURE.

It is the duty of the Department of Agriculture to see that all feeds are properly marked, to collect and examine them in order to note whether they are as represented, and to publish the results for the benefit of all interested parties.

The Department also analyzes free any sample of feeding stuff sent in.

The Department stands ready, through correspondence and through the personal services of its regular inspectors, to furnish whatever information it may possess concerning the character and nutritive value of all feed stuffs.

## STANDARDS ADOPTED.

As the present law requires that every bag must have a guaranteed analysis attached, and gives the Department the right to adopt standards for the different feeds, the following standards have been adopted. For Pure Wheat Bran, Pure Wheat Shorts, and Pure Wheat Bran and Shorts mixed:

	<i>Protein.</i>	<i>Fat.</i>	<i>Crude Fiber.</i>
Wheat Bran .....	14.5	4.00	9.5
Middlings .....	15.00	4.00	6.00
Bran and Shorts.....	14.5	4.00	8.00

Standards for the other feeds will be adopted as soon as this Department has had time to accumulate enough information and analyses to justify it in adopting standards that will be fair to both manufacturers and consumers.

## ENFORCEMENT OF THE FEED LAW.

North Carolina was the first Southern State to pass a feeding stuff law. This law went into effect July 1, 1903, and the first bulletin giving the results of the inspection and analyses of feeds found on the North Carolina markets was published in December, 1903. This bulletin revealed the fact that concentrated feeding stuffs were more largely adulterated than commercial fertilizers prior to the passage of the fertilizer law. The State was flooded with low-grade, misbranded and adulterated feeds. Such materials as rice chaff, ground corn cobs, peanut hulls and oat hulls, which have very little, if any, feeding value, were used extensively in the composition of feeds. There was nothing on the bag to indicate their presence. This Department realized the gravity of the situation and set to work under the feed law to force from the markets of this State all low-grade, misbranded and adulterated feeds. For the past five years frequent inspections have been made each year in all parts of the State, and every year the quality of feeds has increased. Consumers of feeds are now enjoying the benefits derived from a strict enforcement of the feed law and are being protected from unscrupulous manufacturers, mixers and manipulators.

This bulletin shows the results of five years' enforcement of the feed law, and, while there are still some misbranded and adulterated feeds offered at times during the year, their sale is very limited.

## PRICES OF FEEDS.

The prices of feeds have never been higher than they are to-day. Therefore, to buy the best feed at the least cost is the problem confronting buyers. This problem can be solved to a great extent by using a little judgment in the selection of different feeds.

There is but one way to judge the merits of different feeds, and that is by comparing the per cents of protein, fat, and fiber they contain with the price. Purchasers should compare the per cents of protein and fat of different feeds with the prices, and if the prices are about the same they should select the feed containing the highest per cent of protein and fat. By doing this the buyer will find many times that he will get from three to ten times as much protein and fat in one feed as in another for the same price.

#### DUTY OF FEED DEALERS.

Every feed dealer, to protect himself, should insist on feeds being shipped him in strict compliance with the law. If he will do this, and not buy from those manufacturers who do not comply with the law, he will be saved considerable trouble and inconvenience by having his feeds seized and confiscated by feed inspectors.

#### SERIOUS ADULTERATION.

The Capital Grain and Mill Company, of Nashville, Tenn., placed upon the markets of this State during the year two feeds—one branded "Mixed Bran Feed," the other "Mixed Middling Feed." The composition of these feeds was about the same. These two products were seriously adulterated with finely ground corn cobs, and were seized whenever found and their sale prohibited. They were guaranteed to contain thirteen (13) per cent protein, and only one sample ran as high as 10 per cent protein. Such mixtures cannot be offered for sale in this State.

#### MUELLER'S MOLASSES GRAINS.

Mueller's Molasses Grains are guaranteed to contain 19.88 per cent protein and 2.73 per cent fat. Four samples were analyzed. One sample contained 6.00 per cent protein, another 8.75 per cent protein, another 10.00 per cent protein, and a fourth sample 13.88 per cent protein. The composition of Mueller's Molasses Grains seems to differ with each shipment, and no attempt is evident to make the product uniform. Molasses is used in this feed to cover up the low grade and inferior materials used in its composition. Such mixtures, whenever offered for sale in this State, will be seized and confiscated and the manufacturer prosecuted.

#### FACTS OF INTEREST CONCERNING SOME FEEDS.

*Corn Cobs.*—Corn cobs are being very finely ground and called cob meal. This product is used as adulterant in many finely ground feeds, and its detection is difficult, except with a microscope. When the whole ear of corn and the cob are ground together, the product being corn and cob meal, this is a good, legitimate feed; but when cobs are found in other products they are put in them to cheapen the cost of

the feed to the manufacturer and are sold at a price much in excess of their value. In fact, their value as a feed, except in corn and cob meal, is very low indeed.

*Molasses Feeds.*—Some of these are good feeds, and the molasses used in them has a legitimate use, but in many of them the molasses is used to mask the adulterants, such as rice chaff, ground weed stalks and weed seeds. A molasses feed was found containing rice chaff, in which it was impossible to detect the rice chaff present without first thoroughly drying the sample and then putting it under a magnifying glass. Molasses is a carbohydrate and can be used in feeds to good advantage, but has been brought into disrepute by being used by unscrupulous manufacturers to mask adulterants.

*Cracked Corn.*—Much of the cracked corn that has been coming into the State lately has been made from damaged corn—so much so that now all cracked corn made from damaged corn must be branded and sold as Damaged Cracked Corn or Cracked Corn made from damaged corn.

*Corn and Oat Feeds.*—These feeds are perhaps the lowest-grade feeds on our market. They are certainly the most expensive. Most of them are composed of oat hulls and possibly enough cracked corn to make the intending purchaser think they are much better feeds than they really are. This Department has been accumulating evidence and analyses concerning these feeds for the past several years, and feels justified now in making a standard analysis for these products. Under this standard the per cent of oat hulls in these feeds will be greatly reduced, and consequently the quality of these feeds improved.

*Rice Products.\**—A good rice bran should contain 12.50 per cent protein, 10.00 per cent fat, not over 10.00 per cent fiber and not over 9.00 per cent ash, and should not have a rancid odor. According to Dr. Brown, formerly chemist of the Louisiana Experiment Station, who made extensive investigations on rice products, the formula used for calculating adulteration in rice bran with hulls is as follows: Per cent hulls =  $3.33 \times (\text{per cent fiber} - 10)$ , assuming that the hulls carry 40.00 per cent fiber and the bran runs 10.00 per cent fiber.

A sample of rice bran with 30.00 per cent fiber would be considered as having 66.60 per cent hulls. Example: Per cent hulls equals  $3.33 \times (30 - 10) = 20$   $3.33 \times 20 = 66.60$  per cent.

*Alfalfa Feeds.*—Alfalfa used as a feed is that part of the plant that grows above ground. When properly cured it makes a good hay. Alfalfa meal is the same as alfalfa hay, except that it is finely ground. Both have the same nutritive value and are worth about the same price for feeding purposes. Alfalfa has about the same feeding value as pea vines. Alfalfa meal is being used in many feed mixtures to bring up the per cent of protein and make the feed more palatable.

\*Georgia Department of Agriculture.

*Weed Seeds.*—Many feeds contain large quantities of different kinds of weed seeds, added as an adulterant. One feed widely advertised and sold in Maine was found to be made up of from 20 to 60 kinds of weed seeds. A germination test showed that this feed would produce at the rate of about 2,000,000 noxious plants for each 100-pound bag of the feed.

*Coloring Feeds.*—The prices of feeds have advanced so much that the coloring process has commenced. Low-grade and inferior feeds, by the use of coloring agents, are made to look fresh and green, and now when we see a nice, bright-colored feed we don't know whether it is the natural color of the product or a worthless imitation artificially colored.

*Free Acid.*—In the manufacture of gluten feeds, through carelessness enough free acid has been left in some of them to make their use as a feed dangerous.

**ANALYSES OF SAMPLES OF CONCENTRATED FEEDING STUFFS,  
SEASON 1908.**

On the following pages will be found the results of the chemical and microscopic examinations of the samples of concentrated stock feeds collected by the inspectors of the Department, and those sent in by farmers, dealers and manufacturers. These analyses, with the discussion of the results which follow them, are deserving of careful consideration on the part of all local dealers and also feeders.

## WHEAT BRAN.

Wheat bran is the by-product from the manufacture of flour. It carries a considerable amount of crude fiber, somewhat resembling straw in this par-

## RESULTS OF THE EXAMINATION

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
2657	Bran	Acme Mills and Elevator Co., Hopkinsville, Ky.	B. F. Mitchell & Co., Wilmington, N. C.	Mar. 17, '08
2653	do	do	John S. McEachern, Wilmington, N. C.	Mar. 17, '08
2690	do	Adams Grain and Provision Co., Fayetteville, N. C.	Adams Grain and Provision Co., Fayetteville, N. C.	April 20, '08
2867	Mixed Bran	Asheville Milling Co., Asheville, N. C.	T. B. Cray, Brevard, N. C.	July 22, '08
2885	do	do	R. L. McConnaughy, Morganton, N. C.	Aug. 11, '08
2723	Bran	do	Carolina Feed Store, Raleigh, N. C.	June 20, '08
2617	do	do	J. B. Schochett, Asheville, N. C.	Feb. 13, '08
2616	do	do	Asheville Grocery Co., Asheville, N. C.	Feb. 13, '08
2611	Mixed Bran	do	J. H. Pearson, Morganton, N. C.	Feb. 13, '08
2766	Wheat Bran	do	do	do
2686	Bran	Atlanta Milling Co., Atlanta, Ga.	A. E. Rankin & Co., Fayetteville, N. C.	April 20, '08
2841	Wheat Bran	do	J. H. Dellinger, Shelby, N. C.	July 15, '08
2772	Bran	Ballard & Ballard, Louisville, Ky.	Burrus & Gray, New Bern, N. C.	July 11, '08
1967	do	Carolina Roller Mills, Durham, N. C.	do	do
2892	do	Chilhowie Milling Co., Chilhowie, Va.	do	do
2822	do	H. C. Cole Milling Co., Chester, Ill.	do	do
2645	do	Concord Milling Co., Concord, N. C.	do	do
1989	do	Crown Milling Co., Ashboro, N. C.	C. L. Cranford, Ashboro, N. C.	Feb. 7, '08
1980	do	Dan Valley Mills, Danville, Va.	Tucker & Irwin, Greensboro, N. C.	Feb. 6, '08
2721	do	The Dunlop Milling Co., Clarksville, Tenn.	J. P. Wyatt & Son, Raleigh, N. C.	June 30, '08
1976	Wheat Bran	do	The Patterson Co., Greensboro, N. C.	Feb. 6, '08
2793	Bran	do	Elmere-Maxwell Co., Greensboro, N. C.	July 6, '08
2769	do	Dunlop Mills, Richmond, Va.	Edwards & Pegram, Kingston, N. C.	July 10, '08
1909	do	Eagle Flouring Mill, Sweetwater, Tenn.	do	do
2752	Mixed Bran	Forsyth Roller Mills, Winston-Salem, N. C.	Forsyth Mills, Winston, N. C.	July 1, '08
2628	Bran	do	Farmers Supply Co., Winston, N. C.	Feb. 24, '08
2880	do	Glen Alpine Milling Co., Glen Alpine, N. C.	Green & Kincaid, Morganton, N. C.	Aug. 11, '08
2875	do	do	do	do
2730	do	Harrisonburg Milling Co., Harrisonburg, Va.	Hunter & Dunn, Raleigh, N. C.	June 30, '08
2889	do	Horne-Johnstone Co., Mocksville, N. C.	J. L. Cowan, Statesville, N. C.	Aug. 14, '08
2806	Wheat Bran	do	Kluttz & Rendleman, Salisbury, N. C.	July 8, '08
1999	Bran	do	Adams Grain and Provision Co., Charlotte, N. C.	Feb. 11, '08

ticular. It differs from straw, however, in that the inner surface of the bran flakes is made up of the nutritious layer of the wheat grain, which is rich in protein and fat. To be of good quality it should contain 15½ per cent protein.

## OF WHEAT BRAN AND MIXED BRANS.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
2657	100	16.00	4.68	7.49	-----	16.63	4.92	7.12	-----	Wheat product.
2653	100	16.00	4.68	7.49	-----	16.00	4.53	7.40	-----	do.
2690	-----	-----	-----	-----	-----	14.88	3.22	7.95	-----	do.
2867	80	13.00	3.00	9.50	-----	12.63	3.71	5.22	-----	Wheat and corn bran.
2885	80	13.00	3.00	9.50	-----	13.63	4.20	5.77	-----	do.
2723	80	14.50	4.00	9.50	-----	14.62	3.98	7.67	-----	Wheat bran and corn bran.
2617	-----	-----	-----	-----	-----	14.00	4.05	8.07	-----	do.
2616	-----	-----	-----	-----	-----	15.25	4.10	8.15	-----	do.
2611	80	13.00	3.00	9.50	-----	16.13	5.52	8.15	-----	do.
2766	-----	-----	-----	-----	-----	14.63	3.27	6.87	-----	Wheat and corn product.
2686	100	14.50	4.00	9.50	-----	15.00	4.69	8.12	-----	Wheat product.
2841	80	14.50	4.00	9.50	-----	15.13	3.99	6.30	-----	do.
2772	100	15.25	4.60	9.08	-----	14.88	4.53	7.95	-----	do.
1967	-----	-----	-----	-----	-----	16.87	3.91	8.30	-----	do.
2892	-----	-----	-----	-----	-----	14.50	4.00	9.50	-----	do.
2822	-----	-----	-----	-----	-----	15.00	4.48	9.50	-----	do.
2645	-----	-----	-----	-----	-----	15.63	4.27	9.05	-----	do.
1989	80	15.50	4.00	8.60	-----	14.62	4.02	8.75	-----	do.
1980	100	14.50	4.00	9.50	-----	14.63	4.37	9.10	-----	do.
2721	100	14.50	4.06	9.49	-----	14.00	3.78	8.82	-----	do.
1976	100	14.60	3.82	9.49	-----	17.25	4.44	9.20	-----	do.
2793	100	14.60	4.06	9.49	-----	13.88	4.41	8.42	-----	do.
2769	100	14.50	4.00	9.50	-----	14.63	5.01	7.17	-----	do.
1909	-----	-----	-----	-----	-----	14.87	3.98	9.17	-----	do.
2752	-----	14.00	4.00	11.00	-----	13.75	4.99	8.95	-----	Wheat and corn bran.
2628	100	14.00	4.00	11.00	-----	14.50	3.97	9.50	-----	Wheat bran and corn bran.
2880	-----	-----	-----	-----	-----	15.62	3.62	7.75	-----	Wheat product.
2875	-----	-----	-----	-----	-----	14.13	3.67	9.05	-----	do.
2730	100	17.25	4.61	10.70	-----	14.00	3.24	7.85	-----	do.
2889	100	14.75	4.25	6.00	-----	14.00	-----	8.30	-----	do.
2806	100	14.75	4.38	6.14	-----	14.38	3.76	8.55	-----	do.
1999	100	14.75	4.38	6.14	-----	-----	4.35	8.30	-----	do.

## RESULTS OF THE EXAMINATION OF WHEAT

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
1995	Bran -----	Horne-Johnstone Co., Mocksville, N. C.	Kluttz & Rendleman, Salisbury, N. C.	Feb. 8, '08
2760	---do -----	J. M. Koier, Grottoes, Va.	H. Schafer, Mount Airy, N. C.	July 3, '08
2656	---do -----	Liberty Mills, Nashville, Tenn.	J. W. Brooks, Wilmington, N. C.	Mar. 17, '08
1960	---do -----	Liberty Milling Co., Liberty, N. C.	-----	-----
1948	---do -----	Lynchburg Milling Co., Lynchburg, Va.	-----	-----
2720	---do -----	J. D. Manor & Co., New Market, Va.	J. P. Wyatt & Son, Raleigh, N. C.	June 30, '08
2622	---do -----	Mountain City Mill Co., Chattanooga, Tenn.	J. L. Smathers & Co., Murphy, N. C.	Feb. 14, '08
2740	---do -----	F. L. Moses & Bro., Chat-ham, Va.	P. H. Williamson & Co., Reidsville, N. C.	June 29, '08
2714	---do -----	Read Bros., Morristown, Tenn.	-----	-----
2312	---do -----	South River Milling Co., Salisbury, N. C.	-----	-----
1974	---do -----	Statesville Flour Mills Co., Statesville, N. C.	-----	-----
1952	---do -----	---do -----	-----	-----
1982	---do -----	---do -----	J. H. & W. F. Law, Greensboro, N. C.	Feb. 6, '08
2606	---do -----	---do -----	D. J. Kimball, Statesville, N. C.	Feb. 14, '08
1979	---do -----	Tennessee Mill Co., Estill Springs, Tenn.	R. G. Hiatt, Greensboro, N. C.	Feb. 6, '08
2620	---do -----	---do -----	J. E. Fain, Murphy, N. C.	Feb. 14, '08
2751	---do -----	Wachovia Mills, Winston-Salem, N. C.	Wachovia Mills, Winston, N. C.	July 1, '08
2625	Wheat Bran -----	J. H. Walker & Co., Reidsville, N. C.	Harris & Hubbard, Reidsville, N. C.	Feb. 26, '08

## DISCUSSION OF RESULTS.

Fifty-one (51) samples of pure wheat bran and mixed brans were examined.

## WHEAT MIDLINGS AND SHORTS.

The terms "middlings" and "shorts" are frequently used interchangeably. Some of the middlings have been found to be made up of reground bran, occasionally mixed with other products. Middlings are rich in protein and

## RESULTS OF THE EXAMI

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
2364	Shorts -----	Akin-Erskine Milling Co., Evansville, Ind.	H. M. Blackwelder, Concord, N. C.	July 9, '08
2728	---do -----	---do -----	W. A. Myatt, Raleigh, N. C.	June 30, '08
2632	Wheat Middlings -----	Andrew Bowling, Staunton, Va.	Shelton Bros., Winston, N. C.	Feb. 24, '08
2627	Middlings -----	---do -----	Harris & Hubbard, Reidsville, N. C.	Feb. 26, '08
2738	---do -----	---do -----	Hutcherson Bros., Reidsville, N. C.	June 29, '08

## BRAN AND MIXED BRANS.—CONTINUED.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
1995	100	14.75	4.38	6.14	-----	14.75	3.61	9.80	-----	Wheat product.
2760	-----	-----	-----	-----	-----	14.25	4.30	7.72	-----	do.
2656	100	14.50	4.00	9.50	-----	14.75	4.18	9.10	-----	do.
1960	-----	-----	-----	-----	-----	13.62	4.26	8.45	-----	do.
1948	-----	-----	-----	-----	-----	17.12	4.02	10.52	-----	do.
2720	100	14.75	4.20	8.53	-----	15.75	4.17	7.95	-----	do.
2622	100	14.50	4.00	9.50	-----	16.25	4.49	7.65	-----	Product.
2740	-----	-----	-----	-----	-----	15.00	4.53	8.12	-----	Wheat product.
2714	-----	-----	-----	-----	-----	14.50	4.48	8.22	-----	do.
2812	-----	-----	-----	-----	-----	14.50	3.99	9.50	-----	do.
1974	-----	-----	-----	-----	-----	14.75	4.45	10.81	-----	do.
1952	-----	-----	-----	-----	-----	14.87	3.70	9.14	-----	do.
1982	100	17.50	3.50	7.25	-----	14.50	4.24	9.20	-----	do.
2606	80	17.50	3.50	7.25	-----	14.38	4.53	9.45	-----	do.
1979	100	14.00	5.00	9.50	-----	15.00	4.38	9.57	-----	do.
2620	80	14.00	5.00	9.50	-----	14.63	4.11	8.65	-----	do.
2751	-----	14.00	4.00	11.00	-----	13.12	4.69	8.85	-----	Wheat bran, small amount corn bran.
2625	100	16.87	4.48	6.82	-----	14.88	5.00	8.45	-----	Wheat product.

Thirteen (13) samples were below the guarantee in protein.

When wheat and corn bran are mixed the mixture must be branded mixed bran.

low in fiber, and for this reason are very excellent feed for hogs. The name "middlings" or "shorts" indicates that the feed is an all-wheat product, but sometimes it is mixed with other substances, and when it is mixed its feeding value, in most cases, is reduced.

## NATION OF SHORTS.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
2864	-----	16.36	4.50	3.90	-----	15.75	3.58	5.67	-----	Wheat product.
2728	100	16.36	4.50	3.90	-----	17.12	5.21	5.83	-----	do.
2632	100	15.00	4.00	6.00	-----	15.38	3.85	2.32	-----	do.
2627	100	15.00	4.00	6.00	-----	15.63	3.69	1.95	-----	do.
2738	-----	15.00	4.00	6.00	-----	15.00	3.46	2.37	-----	do.

## RESULTS OF THE EXAMINA

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
1963	Shorts	Andrew Bowling, Staunton, Va.		
1964	Middlings	do		
2884	Mixed Middlings	Asheville Milling Co., Asheville, N. C.	R. L. McConnaughy, Morganton, N. C.	Aug. 11, '08
2612	Middlings	do	Forney & Co., Morganton, N. C.	Feb. 13, '08
1949	Shorts	Augusta Roller Mills, Staunton, Va.		
1966	Middlings	Carolina Roller Mills, Durham, N. C.		
2821	do	H. C. Cole Milling Co., Chester, Ill.		
1986	Shorts	Crown Milling Co., Ashboro, N. C.	G. G. Hendricks, Ashboro, N. C.	Feb. 7, '08
1988	do	do	C. L. Cranford, Ashboro, N. C.	Feb. 7, '08
2726	Middlings	The Dunlop Milling Co., Clarksville, Tenn.	Crowder & Rand, Raleigh, N. C.	June 30, '08
2719	do	do	J. P. Wyatt & Son, Raleigh, N. C.	June 30, '08
2698	do	do	Leak & Marshall, Wadesboro, N. C.	April 15, '08
2691	do	do	The Armfield Co., Fayetteville, N. C.	April 20, '08
2668	do	do	Hales & Edwards, Rocky Mount, N. C.	Mar. 24, '08
2634	do	do	Bost & Newton, Hickory, N. C.	Feb. 12, '08
2609	do	do	McComb & Bros., Hickory, N. C.	Feb. 12, '08
2794	do	do	Elmere-Maxwell Co., Greensboro, N. C.	July 6, '08
2860	Shorts	Eagle Flouring Mill Co., Sweetwater, Tenn.	Burkmeyer Bros., Hendersonville, N. C.	July 22, '08
2859	do	do	S. A. Privett, Hendersonville, N. C.	July 22, '08
2732	Middlings	Eagle Roller Mills, New Ulm, Minn.	The Patterson Co., Greensboro, N. C.	June 26, '08
2689	do	do	Adams Grain and Provision Co., Fayetteville, N. C.	April 20, '08
1977	Red Dog Flour (Superb)	do	The Patterson Co., Greensboro, N. C.	Feb. 6, '08
1910	Shorts	Eagle Flouring Mills, Sweetwater, Tenn.		
2672	White Middlings	C. A. Gambrill Mfg. Co., Baltimore, Md.	Wells Grocery Co., Wilson, N. C.	Mar. 24, '08
2881	Shorts	Glen Alpine Milling Co., Glen Alpine, N. C.	Green & Kincaid, Morganton, N. C.	Aug. 11, '08
2883	do	do	J. A. Shupsing, Morganton, N. C.	Aug. 11, '08
2876	do	do		
2735	Middlings	H. S. Holliday Milling Co., Cairo, Ill.	Harris & Hubbard, Reidsville, N. C.	June 29, '08
2630	do	The Hunter Bros. Milling Co., St. Louis, Mo.	Standard Feed and Seed Co., Winston, N. C.	Feb. 24, '08
2604	Shorts	Koiner Flour Mills, Richmond, Va.	O. M. Boyd & Co., Gastonia, N. C.	Feb. 11, '08
1961	do	Liberty Milling Co., Liberty, N. C.		
2733	Middlings (Red Dog)	The Piedmont Mills, Lynchburg, Va.	The Patterson Co., Greensboro, N. C.	June 27, '08
2761	Daisy Middlings	Pillsbury Mills, Minneapolis, Minn.	H. Schafer, Mt. Airy, N. C.	July 3, '08
2748	do	do		June 30, '08
2713	Shorts	Read Bros., Morristown, Tenn.		
2614	do	do	Asheville Grocery Co., Asheville, N. C.	Feb. 13, '08

## TION OF SHORTS.—CONTINUED.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
1963						18.00	5.42	7.94		Wheat product.
1964						16.37	4.10	3.14		do.
2384	80	14.00	3.00	4.00		13.50	3.54	3.30		do.
2612	80	16.00	4.44	3.43		15.25	4.72	6.50		do.
1949						16.75	4.61	7.86		do.
1966						16.75	3.48	3.77		do.
2821						19.25	5.48	6.00		do.
1986	80	17.00	4.80	4.00		17.12	5.02	4.85		do.
1988	80	17.00	4.00	4.50		15.50	4.52	4.65		do.
2726	100	16.04	4.17	4.58		16.12	4.88	5.00		do.
2719	100	16.04	4.17	4.58		16.13	4.60	4.85		do.
2698	100	15.93	4.89			15.38	4.77	5.00		do.
2691	80	16.04	4.17	4.52		16.38	5.12	4.45		do.
2668	100	16.04	4.17	4.58		16.44	5.09	5.12		do.
2634	100	16.04	4.17	4.58		15.88	4.70	5.65		do.
2609	100	15.93	4.89			16.75	5.37	4.57		do.
2794		16.04	4.17	4.58		15.63	4.99	4.82		do.
2860		16.50	5.75	5.50		14.33	4.26	3.87		do.
2859		16.50	5.75	5.50		15.00	4.57	3.92		do.
2732		16.80	3.40	3.00		17.87	4.53	2.05		do.
2639	100	13.57	5.82			18.25	4.71	2.52		do.
1977	100	18.57	5.62			18.25	5.04	2.72		do.
1910						15.12	3.95	4.50		do.
2672	80	16.85	4.40	3.00		16.38	4.44	4.15		do.
2881						16.75	4.62	4.30		do.
2883						16.50	4.50	4.65		do.
2876						16.25	2.78	3.75		do.
2735	100	13.00	2.50	1.25		15.25	2.76	1.22		do.
2630		16.00	4.00			13.87	4.50	4.80		do.
2604	80	16.56	4.99	7.53		16.25	4.75	6.77		do.
1961						14.37	3.95	3.92		do.
2733	100	15.75	4.07	1.77		15.25	3.42	2.85		do.
2761		16.00	4.50	4.00		18.00	5.29	2.22		do.
2748		16.00	4.50	4.00		17.12	5.73	3.02		do.
2713						17.50	6.08	5.20		do.
2614	80	13.50	4.50	4.50		15.75	5.76	5.02		do.

## RESULTS OF THE EXAMINA

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
2731	Shorts-----	Southern Mills, Nashville, Tenn.	Hunter & Dunn, Raleigh, N. C.	June 30, '08
2683	....do-----	.....do-----	J. W. Carter, Maxton, N. C.	April 16, '08
2815	....do-----	South River Milling Co., Salisbury, N. C.	-----	-----
2680	....do-----	Star Mills, Nashville, Tenn.	R. E. Lee, Laurinburg, N. C.	April 16, '08
2607	Standard Middlings ----	J. I. Triplett, Woodstock, Va.	D. J. Kimball, Statesville, N. C.	Feb. 12, '08
2741	Shorts-----	Washburn-Crosby Co., Louisville, Ky.	Frank Bunton, Reidsville, N. C.	June 29, '08
2799	Standard Middlings ----	Washburn Mills, Minneapolis, Minn.	High Point Milling Co., High Point, N. C.	July 6, '08
2866	Shorts-----	Washburn-Crosby Co., Louisville, Ky.	W. B. Cooper, Wilmington, N. C.	July 24, '08
2779	Middlings-----	Ted B. Young, Norfolk, Va.	H. C. Privott, Edenton, N. C.	July 16, '08

## DISCUSSION OF RESULTS.

Fifty (50) samples of middlings were examined and all were found to be

## BRAN AND SHORTS.

When a feed is marked "Bran and Shorts" it is supposed to be made up of

## RESULTS OF THE EXAMINA

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
2865	Bran and Shorts-----	Acme Milling Co., Talbot, Tenn.	Bessemer Mercantile Co., Bessemer City, N. C.	July 14, '08
2877	....do-----	Glen Alpine Milling Co., Glen Alpine, N. C.	-----	-----
2882	....do-----	.....do-----	J. A. Shuping, Morganton, N. C.	Aug. 11, '08
2805	....do-----	Grimes Milling Co., Salisbury, N. C.	H. Z. White, Salisbury, N. C.	July 8, '08
1916	....do-----	.....do-----	-----	-----
2886	....do-----	The Home Milling Co., Lenoir, N. C.	Kincaid, Lenoir, N. C.	Aug. 12, '08
2857	....do-----	J. Lee Koiner, Richmond, Va.	Edward Campbell, Charlotte, N. C.	July 10, '08
2849	....do-----	Newton Roller Mills, Newton, N. C.	Chambers & Moody, Charlotte, N. C.	July 10, '08
2850	....do-----	.....do-----	W. L. C. Killiam & Son, Gastonia, N. C.	July 11, '08
2863	....do-----	T. J. Ransoms, Lincolnton, N. C.	Wampum Department Store, Lincolnton, N. C.	July 13, '08
2803	....do-----	Salisbury Milling Co., Salisbury, N. C.	H. Z. White, Salisbury, N. C.	July 8, '08
2813	....do-----	South River Milling Co., Salisbury, N. C.	-----	-----
1953	....do-----	Statesville Flour Mills, Statesville, N. C.	-----	-----
2887	....do-----	.....do-----	W. P. McLain, Statesville, N. C.	Aug. 13, '08
2852	....do-----	.....do-----	W. B. Palmer, Shelby, N. C.	July 15, '08

## DISCUSSION OF RESULTS.

Fifteen (15) samples of bran and shorts were examined, and all were found to be pure wheat products.

## TION OF SHORTS.—CONTINUED.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
2731	100	16.00	4.00	6.00	-----	17.12	5.27	4.45	-----	Wheat product.
2683	100	16.00	4.00	6.00	-----	15.63	4.42	5.15	-----	do.
2815	-----	-----	-----	-----	-----	15.37	4.53	6.00	-----	do.
2680	100	16.00	4.00	6.00	-----	16.50	5.38	5.45	-----	do.
2607	-----	16.00	4.75	-----	-----	16.00	5.11	5.82	-----	do.
2741	-----	12.80	4.85	-----	-----	15.62	4.75	6.50	-----	do.
2799	200	15.00	4.00	9.00	-----	15.38	5.11	7.05	-----	do.
2866	-----	18.00	4.50	-----	-----	15.50	4.46	6.52	-----	do.
2799	-----	-----	-----	-----	-----	14.38	3.24	2.17	-----	do.

pure wheat products. Fifteen (15) are below standard of 15 per cent protein.

pure bran and shorts run together. It cannot be marked "Bran and Shorts" if it contains anything except pure wheat products.

## TION OF BRAN AND SHORTS.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
2865	80	16.00	5.00	7.17	-----	15.25	4.27	5.95	-----	Wheat product.
2877	-----	-----	-----	-----	-----	15.50	4.35	6.00	-----	do.
2882	-----	-----	-----	-----	-----	12.63	3.57	5.90	-----	do.
2805	-----	15.12	4.00	7.00	-----	15.63	4.57	5.20	-----	do.
1916	-----	-----	-----	-----	-----	15.12	4.00	7.00	-----	do.
2886	80	15.12	5.69	6.59	-----	15.38	4.53	5.72	-----	do.
2857	-----	16.50	4.00	7.53	-----	14.75	4.33	6.65	-----	do.
2849	-----	15.60	4.01	5.96	-----	13.50	3.14	6.55	-----	Wheat bran and corn bran.
2850	100	15.60	4.01	5.96	-----	14.50	3.76	4.92	-----	Wheat product.
2863	-----	14.50	4.00	8.00	-----	14.75	5.45	6.35	-----	do.
2803	80	16.00	6.00	10.00	-----	14.13	4.88	5.85	-----	Wheat product and corn bran.
2813	-----	-----	-----	-----	-----	14.57	4.42	8.00	-----	Wheat product.
1953	-----	-----	-----	-----	-----	15.87	4.15	7.32	-----	do.
2887	80	16.50	3.80	5.99	-----	15.50	4.31	6.67	-----	do.
2852	-----	15.50	3.80	5.99	-----	15.00	4.10	6.07	-----	do.

Six (6) samples were below their guarantee.

Three (3) samples were below the standard of 14.50 per cent protein.

## SHIPSTUFF.

This is a name that applies to a mixture of no definite composition. It generally indicates a finely ground product, which may be an all-wheat prod-

## RESULTS OF THE EXAMI

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
2839	Shipstuff	Atlanta Milling Co., Atlanta, Ga.	J. H. Dellinger, Shelby, N. C.	July 15, '08
2000	do	do	Adams Grain and Provision Co., Charlotte, N. C.	Feb. 11, '08
2603	do	do	J. Flem Johnson, Charlotte, N. C.	Feb. 11, '08
2682	do	do	W. J. Pace, Maxton, N. C.	April 16, '08
2695	do	do	F. M. Hightower, Wadesboro, N. C.	April 15, '08
2755	do	Ballard & Ballard, Louisville, Ky.	Farmers Stock Co., Winston, N. C.	July 1, '08
2676	do	Bridgewater Milling Co., Bridgewater, N. C.	-----	-----
1968	do	Carolina Roller Mills, Durham, N. C.	-----	-----
1954	do	Concord Milling Co., Concord, N. C.	-----	-----
2647	do	do	-----	-----
1996	do	do	Cannon & Fetzer Co., Concord, N. C.	Feb. 10, '08
1981	do	Dan Valley Mills, Danville, Va.	Tucker & Irwin, Greensboro, N. C.	Feb. 6, '08
1983	do	do	J. H. & W. F. Law, Greensboro, N. C.	Feb. 6, '08
1994	do	Douhat-Riddle Co., Danville, Va.	I. Littmann, Salisbury, N. C.	Feb. 8, '08
2605	do	Dunlop Mills, Richmond, Va.	Morrison Produce and Provision Co., Statesville, N. C.	Feb. 6, '08
2633	do	do	Seltzer & Co., Hickory, N. C.	Feb. 18, '08
2673	do	do	Tomlinson & Co., Wilson, N. C.	Mar. 24, '08
2681	do	do	R. E. Lee, Laurinburg, N. C.	April 16, '08
2685	do	do	L. H. Caldwell, Lumberton, N. C.	April 18, '08
2753	do	Forsyth Roller Mills, Winston-Salem, N. C.	Forsyth Mills, Winston, N. C.	July 1, '08
2702	do	Harrisonburg Milling Co., Harrisonburg, Va.	E. N. Covington & Co., Rockingham, N. C.	April 14, '08
2800	Shipstuff and Bran	High Point Milling Co., High Point, N. C.	High Point Milling Co., High Point, N. C.	July 6, '08
2797	Shipstuff	do	V. W. Idol & Co., High Point, N. C.	July 6, '08
1947	do	Lynchburg Milling Co., Lynchburg, Va.	-----	-----
2651	do	Mayo Milling Co., Richmond, Va.	Southerland Co., Goldsboro, N. C.	Mar. 16, '08
2847	do	Mountain City Mill Co., Chattanooga, Tenn.	Lippard & Barrier, Concord, N. C.	July 9, '08
2848	do	do	W. F. Morrison, Concord, N. C.	July 9, '08
2608	do	do	Bost & Newton, Hickory, N. C.	Feb. 18, '08
2618	do	do	John H. Jenkins, Asheville, N. C.	Feb. 13, '08
2868	do	do	Feed and Lumber Co., Waynesville, N. C.	July 24, '08
1978	do	Piedmont Mills, Lynchburg, Va.	The Patterson Co., Greensboro, N. C.	Feb. 6, '08
2684	do	do	J. T. McNeill, Red Springs, N. C.	April 17, '08
2729	do	Riverside Milling and Power Co., Cartersville, Ga.	C. A. Norris Co., Raleigh, N. C.	June 30, '08

net or a mixture with wheat product as the basis and such other substances as finely ground corn bran, rice chaff, corn cobs, and oat hulls.

Shipstuff is so fine that the adulterants cannot be seen with the naked eye, and this fact is taken advantage of by unscrupulous manufacturers.

## NATION OF SHIPSTUFF.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
		Protein	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
2839	80	13.00	4.00	9.50	-----	13.38	3.67	4.92	-----	
2000	80	13.00	4.00	9.50	-----	13.50	5.69	5.77	-----	Wheat product and corn bran.
2603	80	13.00	4.00	9.50	-----	13.38	4.81	5.97	-----	do.
2682	80	13.00	4.00	9.50	-----	13.75	5.08	6.45	-----	Finely ground wheat bran and corn bran.
2695	100	13.00	4.00	9.50	-----	12.13	4.48	5.15	-----	Wheat and corn product.
2755	-----	16.50	4.80	6.87	-----	15.75	4.26	4.70	-----	Wheat product.
2676	-----	-----	-----	-----	-----	12.25	3.64	7.90	-----	Wheat bran and corn bran.
1968	-----	-----	-----	-----	-----	15.75	4.01	8.80	-----	Wheat product.
1954	-----	-----	-----	-----	-----	15.63	4.51	6.88	-----	do.
2647	-----	-----	-----	-----	-----	12.63	5.20	7.95	-----	Wheat bran and corn product.
1996	100	15.62	3.45	3.74	-----	14.50	3.95	5.57	-----	Mostly wheat product.
1981	100	15.00	4.00	6.00	-----	16.00	4.34	6.45	-----	Wheat product.
1983	100	15.00	4.00	6.00	-----	14.38	4.28	6.45	-----	do.
1994	80	10.00	3.75	12.00	-----	8.75	3.18	11.45	-----	Wheat product and corn cob finely ground.
2605	80	14.50	4.00	8.00	-----	15.50	4.92	8.00	-----	Wheat product containing small amount of corn product.
2633	100	14.50	4.00	8.00	-----	16.75	4.02	6.90	-----	Wheat product.
2673	100	14.50	4.00	8.00	-----	16.13	-----	5.45	-----	Wheat product containing some corn.
2681	100	14.50	4.00	8.00	-----	15.63	4.31	5.35	-----	Wheat and corn product.
2685	100	14.50	4.00	8.00	-----	16.13	4.99	5.97	-----	Wheat product containing some corn product.
2753	-----	15.00	4.00	6.00	-----	14.62	4.27	5.17	-----	Wheat and corn product.
2702	100	15.50	4.26	5.94	-----	15.50	5.61	4.95	-----	Wheat product.
2800	80	15.87	4.65	6.29	-----	15.13	5.28	7.25	-----	do.
2797	80	15.12	4.45	4.25	-----	17.50	4.88	5.20	-----	do.
1947	-----	-----	-----	-----	-----	15.00	4.45	8.55	-----	do.
2651	100	15.62	3.95	6.00	-----	16.00	4.83	6.32	-----	Wheat and corn product.
2847	100	13.00	5.50	7.00	-----	13.86	6.29	5.80	-----	do.
2848	-----	13.00	5.50	7.00	-----	12.63	5.63	4.60	-----	do.
2605	100	13.00	5.50	7.00	-----	13.75	5.95	6.57	-----	Wheat bran and corn bran.
2618	100	13.00	5.50	7.00	-----	14.50	5.77	5.52	-----	do.
2868	100	13.00	5.50	7.00	-----	14.25	5.71	5.82	-----	do.
1978	100	15.00	4.00	6.00	-----	13.62	4.14	6.75	-----	Wheat product.
2684	100	15.00	4.00	6.00	-----	15.63	4.48	5.77	-----	do.
2729	-----	-----	-----	-----	-----	9.45	4.27	7.82	-----	Wheat bran and corn bran.

## RESULTS OF THE EXAMINA

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
2687	Shipstuff -----	J. Allen Smith & Co., Knoxville, Tenn.	A. E. Rankin & Co., Fayetteville, N. C.	April 20, '08
1970	....do -----	Southside Mills, Winston-Salem, N. C.	-----	-----
1973	....do -----	Statesville Flour Mills, Statesville, N. C.	-----	-----
1975	Mixed Shipstuff -----	Statesville Flour Mills, Statesville, N. C.	-----	-----
2854	Shipstuff -----	do -----	W. J. Glass, Concord, N. C.	July 9, '08
2853	....do -----	do -----	W. B. Palmer, Shelby, N. C.	July 15, '08
2888	....do -----	Statesville Flour Mills, Statesville, N. C.	J. L. Cowan, Statesville, N. C.	July 14, '08
2872	....do -----	E. F. Spears & Sons, Paris, Ky.	J. L. Smathers & Co., Murphy, N. C.	July 25, '08
2870	....do -----	do -----	R. H. Hyatt & Co., Murphy, N. C.	July 25, '08
2621	....do -----	Tennessee Mill Co., Estill Springs, Tenn.	J. E. Fain, Murphy, N. C.	Feb. 14, '08
2750	....do -----	Wachovia Mills, Winston-Salem, N. C.	Wachovia Mills, Winston, N. C.	July 1, '08
2742	....do -----	J. H. Walker & Co., Reidsville, N. C.	Frank Burton, Reidsville, N. C.	June 29, '08
2709	....do -----	A. B. Williams, North Wilkesboro, N. C.	-----	-----
2835	....do -----	Wilson Grocery Co., Wilson, N. C.	Wilson Grocery Co., Wilson, N. C.	July 22, '08

## DISCUSSION OF RESULTS.

Forty-seven (47) samples of shipstuff were examined. Twenty-one (21) were pure wheat products and twenty-six (26) were mixtures of wheat and other products.

## OAT FEEDS AND CORN AND OAT FEEDS.

In the manufacture of oat products for human food the kernel of the oat is separated from the hull. Oat hulls are in themselves low in food value, being very much like straw in this regard. Their value may be materially greater if broken kernels or small oats are ground in with them. Manufacturers of oat products are putting ground oat hulls on the market in many forms, such

## RESULTS OF THE EXAMINATION OF

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
2662	Boss Chop Feed -----	The Great Western Cereal Co., Chicago, Ill.	M. G. Brown & Co., Edenton, N. C.	Mar. 20, '08
2660	....do -----	do -----	Burrus & Gray Co., New Bern, N. C.	Mar. 18, '08
2791	....do -----	do -----	M. P. Gallop Co., Elizabeth City, N. C.	July 17, '08
2790	....do -----	do -----	T. P. Nash, Elizabeth City, N. C.	July 16, '08
2780	....do -----	do -----	H. C. Privott, Edenton, N. C.	July 7, '08
2699	Protena Horse Feed -----	Purina Mills, St. Louis, Mo.	M. L. Millikin, Hamlet, N. C.	Apr. 14, '08
2768	Victor Feed -----	The Quaker Oats Co., Chicago, Ill.	Burrus & Gray, New Bern, N. C.	July 11, '08

## TION OF SHIPSTUFF.—CONTINUED.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
2687	100	15.00	5.00	7.00	-----	14.50	4.19	4.75	-----	Wheat and corn feed.
1970		-----	-----	-----	-----	15.43	4.68	5.77	-----	Wheat product.
1973		-----	-----	-----	-----	18.00	5.67	5.96	-----	do.
1975		-----	-----	-----	-----	14.81	5.56	5.70	-----	Wheat and corn product.
2854		16.00	4.00	6.75	-----	16.25	3.81	5.25	-----	Wheat product.
2853	80	16.00	4.00	6.75	-----	15.13	2.96	5.62	-----	
2888	100	16.00	4.00	6.75	-----	15.00	4.31	6.37	-----	Wheat product.
2872		-----	-----	-----	-----	13.13	4.42	6.60	-----	Wheat and corn product.
2870		-----	-----	-----	-----	14.25	4.74	6.90	-----	Mostly wheat product.
2621	80	16.00	4.00	5.00	-----	17.00	6.41	5.50	-----	Wheat product.
2750		14.00	4.00	4.00	-----	14.75	4.77	4.50	-----	do.
2742		16.75	4.50	4.71	-----	14.75	3.94	2.62	-----	do.
2709		-----	-----	-----	-----	16.75	5.19	5.62	-----	do.
2835	100	10.00	4.00	3.00	-----	8.38	3.41	5.05	-----	Corn product, some oats and wheat.

Close inspection of the above table will reveal the merits of the different shipstuffs.

Fourteen (14) samples were below their guarantee in protein.

as Oat Feed, Oat Chops, Corn and Oat Feed, Purina Feed, Boss Corn and Oat Feed, Vim Oat Feed, Victor Corn and Oat Feed, Model Corn and Oat Feed, Quaker Dairy Feed, and others. The bulk of all these materials is ground oat hulls, with admixture of ground corn and oat kernels. The feeding value of them is variable and they should never be bought except on a guaranteed composition, and then it should be remembered that the oat hulls are not as digestible as the kernel of oats or other grains.

## OAT FEEDS AND CORN AND OAT FEEDS.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
2662	100	8.00	3.50	11.00	-----	8.38	4.21	7.97	-----	Corn, oats and oat hulls.
2660	100	8.00	3.50	11.00	-----	7.88	3.87	10.05	-----	do.
2791	100	8.00	3.50	11.00	-----	8.25	4.23	8.50	-----	do.
2790	100	8.00	3.50	11.00	-----	7.75	4.48	8.70	-----	do.
2780	100	8.00	3.00	-----	-----	8.38	3.64	8.25	-----	do.
2699	100	13.50	4.50	9.00	-----	13.25	3.67	7.60	-----	Cracked corn, oats, alfalfa and barley.
2768		7.50	3.00	-----	-----	7.13	3.65	9.92	-----	Some cracked corn, oats and oat hulls.

## RESULTS OF THE EXAMINATION OF OAT

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
2688	Victor Feed .....	The Quaker Oats Co., Chicago, Ill.	Adams Grain and Provision Co., Fayetteville, N. C.	Apr. 20, '08
2781	.....do .....	.....do .....	M. G. Brown & Co., Edenton, N. C.	July 11, '08
1959	Purina Feed.....	Ralston Purina Co., St. Louis, Mo.	.....	.....
1958	Protena Feed.....	.....do .....	.....	.....
1955	Protena Dairy Feed .....	.....do .....	.....	.....

## DISCUSSION OF RESULTS.

Twelve (12) samples of corn and oat feeds were examined. Eight of these feeds contain less than 10 per cent protein, and are therefore low grade.

## RICE FEEDS.

In preparing rice for human consumption the mills first remove the two outer layers and then polish the grain before it is ready for the market. Rice bran, rice polish and rice meal, which are known as rice feeds, are the by-products from the manufacture of rice for human consumption. Rice bran is the thin skin which lies next to the rice grain; rice polish is the by-product from polishing the rice grain after the bran has been removed; rice meal is a

## RESULTS OF THE EXAMI

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
2674	Extra Rice Meal.....	Carolina Rice Mills, Goldsboro, N. C.	Tomlinson & Co., Wilson, N. C.	Mar. 24, '08
2652	Rice Meal.....	.....do .....	Southerland Co., Goldsboro, N. C.	Mar. 16, '08
2649	.....do .....	.....do .....	Best & Thompson, Goldsboro, N. C.	Mar. 16, '08
2811	.....do .....	.....do .....	Baker, Bizzell & Edgerton, Goldsboro, N. C.	July 9, '08
2808	Extra Rice Meal.....	.....do .....	Best & Thompson, Goldsboro, N. C.	July 9, '08
1950	Carolina Rice Meal .....	West Point Mill Co., Charleston, S. C.	.....	.....

## DISCUSSION OF RESULTS.

Seven (7) samples of rice feed were examined. These feeds vary very much

## FEEDS AND CORN AND OAT FEEDS.—CONTINUED.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
2688	100	7.50	3.00	12.00	8.50	3.70	11.27	Some cracked corn, oats and oat hulls.		
2781		7.50	3.00		6.13	3.28	9.82	do.		
1959					13.67	4.36	13.27	Wheat, cracked corn, alfalfa and barley.		
1958					12.75	9.15	11.41	Cracked corn, alfalfa and barley.		
1955					16.38	4.67	22.97	Mostly alfalfa and corn product.		

The true character of these feeds is shown by the results in the table above. This class of feeds bears a guaranteed analysis, which should guide the consumer in purchasing.

mixture of rice bran and rice polish. Pure rice bran is seldom found in this State, as in the majority of cases it is mixed with rice hulls or chaff, and its feeding value is accordingly reduced. The polish is free from hulls and other substances and is about as good feed as corn meal, and can be fed profitably when purchased at the same price.

Rice feeds have a high fat content, and for this reason their keeping quality is rather poor.

## NATION OF RICE FEEDS.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
2674	100	12.37	13.44	7.66	10.13	4.90	8.77	Rice product.		
2652	100	11.62	12.72	9.11	9.38	7.24	15.15	Rice meal, contains rice hulls—too large quantity.		
2649	100	12.37	13.44	7.66	11.50	5.84	7.12	Rice product.		
2811	100	12.00	9.00	8.00	10.88	9.09	11.72	do.		
2808	100	12.25	13.25	7.78	12.25	10.55	8.30	do.		
1950					11.12	10.75	9.59	Rice product.		

in composition, and should be purchased according to the analysis they bear.

## MOLASSES (SUGAR) FEEDS.

Some of these feeds are mixtures of molasses and feeds rich in protein, and should be productive of good results, provided the mechanical condition is satisfactory and the price is not excessive.

## RESULTS OF THE EXAMINATION

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
2858	Sucrene Horse, Mule and Ox Feed.	American Milling Co., Philadelphia, Pa.	-----	July 10, '08
2718	-----do-----	American Milling Co., Chicago, Ill.	J. P. Wyatt & Son, Raleigh, N. C.	June 30, '08
2717	Sucrene Dairy Feed	-----do-----	-----do-----	June 30, '08
2697	-----do-----	-----do-----	H. W. Little & Co., Wadesboro, N. C.	Apr. 14, '08
2696	-----do-----	-----do-----	Van Sikes, Monroe, N. C.	Apr. 16, '08
2663	-----do-----	-----do-----	H. C. Privott, Edenton, N. C.	Mar. 20, '08
2810	-----do-----	-----do-----	Best & Thompson, Goldsboro, N. C.	July 9, '08
2763	-----do-----	-----do-----	W. B. Smoot, Mt. Airy, N. C.	July 3, '08
2809	Sucrene Horse, Mule and Ox Feed.	-----do-----	Best & Thompson, Goldsboro, N. C.	July 9, '08
2670	Mueller's Molasses Grains.	E. P. Mueller, Norfolk, Va.	Wiggins Grocery Co., Wilson, N. C.	Mar. 24, '08
1998	-----do-----	-----do-----	Adams Grain & Provision Co., Charlotte, N. C.	Feb. 11, '08
2788	-----do-----	-----do-----	City Hay and Grain Co., Elizabeth City, N. C.	July 17, '08
2664	-----do-----	-----do-----	H. C. Privott, Edenton, N. C.	Mar. 20, '08

## DISCUSSION OF RESULTS.

Thirteen (13) samples of Molasses or Sugar Feeds were examined. The Sucrene Feeds are up to their guarantees and of good quality.

## DRIED BEET PULP.

This is by-product from the manufacture of beet sugar from the sugar beet.

## RESULTS OF THE EXAMINATION

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
2739	Dried Beet Pulp	Michigan Sugar Co., Bay City, Mich.	Hutcherson Bros., Reidsville, N. C.	June 29, '08
2873	Beet Pulp	-----do-----	Carolina Feed Store, Raleigh, N. C.	-----

## DISCUSSION

Two (2) samples of best beet pulp were examined. The

Molasses is a carbohydrate and can be fed in small quantities to cattle satisfactorily, but when mixed with rich protein substances can be used in large quantities with good results.

Molasses is being used by some manufacturers to cover up adulterants in their products.

OF MOLASSES OR SUGAR FEEDS.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
2558	-----	10.00	3.00	13.50	-----	12.00	5.22	8.40	-----	
2718	100	10.00	3.00	13.50	-----	11.38	4.63	7.92	-----	Cracked corn, oats, distillery product, molasses and weed seed.
2717	100	16.50	3.50	12.00	-----	17.75	6.71	10.55	-----	do.
2697	100	16.50	3.50	12.00	-----	17.63	7.39	13.70	-----	Weed seeds, whole oats, molasses, barley, corn product and cotton-seed meal.
2696	100	16.50	3.50	-----	-----	17.13	6.74	13.15	-----	do.
2663	-----	-----	-----	-----	-----	18.88	5.82	11.72	-----	Large quantity of weed seed, whole oats, molasses, barley, some cotton-seed meal and corn product.
2810	100	16.50	3.50	12.00	-----	17.50	6.16	11.60	-----	Weed seed, whole oats, molasses, barley, corn product and cotton-seed meal.
2763	-----	16.50	3.50	12.00	-----	17.25	5.35	10.80	-----	do.
2809	100	10.00	3.00	13.50	-----	12.75	3.72	11.15	-----	Cracked corn, oats, distillery product, molasses and weed seed.
2670	100	19.81	2.73	-----	-----	13.88	4.03	9.67	-----	Probably small amount cotton-seed meal, mostly hulls, barley hulls and clippings and molasses.
1998	-----	-----	-----	-----	-----	10.00	2.24	20.05	-----	do.
2788	100	22.54	-----	-----	-----	6.00	6.25	9.42	-----	do.
2664	100	19.81	2.73	-----	-----	8.75	2.39	9.95	-----	do.

The samples of Mueller's Molasses Grain were all below their guarantee, and are of very inferior quality, composed largely of oat hulls, barley hulls or clippings and screenings.

It is composed in part of the cell walls of the beet root, and for this reason contains considerable crude fiber.

TION OF DRIED BEET PULP.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
2739	-----	10.00	0.80	-----	-----	9.25	1.47	16.85	-----	Beet pulp.
2873	-----	-----	-----	-----	-----	8.88	1.15	17.22	-----	do.

OF RESULTS.

above analyses will reveal the nutritive value of this product.

## CHOPS, HOMINY MEALS AND FEEDS.

The hard part of the corn kernel, known as hominy or hominy grits, is used for human food. The residue, or soft part of the kernel, sometimes called

## RESULTS OF THE EXAMINATION

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
2789	Hominy Feed.....	Aydlett Bros. Co., Elizabeth City, N. C.	Aydlett Bros. Co., Elizabeth City, N. C.	July 17, '08
2650	Corn Chops.....	Boney & Harper, Wilmington, N. C.	J. W. Isler & Co., Goldsboro, N. C.	Mar. 16, '08
2827	.....do.....	.....do.....	Wells Grocery Co., Wilson, N. C.	July 22, '08
1911	.....do.....	A. O. Bray, Elkin, N. C.	.....do.....	.....do.....
2893	Ajax Chops.....	Chilhowie Milling Co., Chilhowie, Va.	.....do.....	.....do.....
2894	Chops.....	.....do.....	.....do.....	.....do.....
2646	Corn Chops.....	Concord Milling Co., Concord, N. C.	.....do.....	.....do.....
2624	.....do.....	Forsyth Roller Mills, Winston-Salem, N. C.	P. R. Lamb & Co., Winston, N. C.	Feb. 24, '08
2754	.....do.....	.....do.....	Forsyth Roller Mills, Winston, N. C.	July 1, '08
2762	Chops.....	Granite City Mills, Mt. Airy, N. C.	W. B. Smoot, Mt. Airy, N. C.	July 3, '08
2724	Hominy Feed, "Scioto".....	The Portsmouth Cereal Co., Portsmouth, Ohio.	Len H. Adams, Raleigh, N. C.	June 30, '08
1934	Chop Feed.....	W. A. Watson, Greensboro, N. C.	J. H. & W. F. Law, Greensboro, N. C.	Feb. 6, '08
2749	Corn Chops.....	Wachovia Mills, Winston-Salem, N. C.	Wachovia Mills, Winston, N. C.	June 30, '08
2623	.....do.....	.....do.....	Shelton Bros., Winston, N. C.	Feb. 24, '08

## DISCUSSION OF RESULTS.

Fourteen (14) samples of chops, hominy meals and feeds were examined. The name "Chops" generally applies to a feed composed entirely of corn prod-

## COTTON-SEED FEEDS.

If cotton-seed meal contains less than 38.6 per cent protein it is below the standard required by the law on this subject and has had hulls or some other adulterant ground with it. Hulls are found with meal rather extensively and the mixture is no longer sold as genuine cotton-seed meal, but as cotton-seed

## RESULTS OF THE EXAMINATION

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
2665	Creamo Brand Feed Meal	Tennessee Fiber Co., Memphis, Tenn.	Pamlico Grocery Co., Washington, N. C.	Mar. 21, '08
2666	.....do.....	.....do.....	E. K. Willis, Washington, N. C.	Mar. 21, '08
2615	.....do.....	.....do.....	Asheville Grocery Co., Asheville, N. C.	Feb. 13, '08

## DISCUSSION OF RESULTS.

Three (3) samples of cotton-seed feeds were examined. All of these samples

white meal, is sold as a cattle feed, and consists of the hull, germ and more or less of the protein and starch. It has a feeding value similar to dry corn meal.

OF HOMINY FEED, CHOPS AND MEALS.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
2789	100	10.00	4.00	4.00	-----	9.00	4.05	1.82	-----	Cracked corn.
2650	100	10.00	7.25	7.50	-----	8.75	6.31	10.17	-----	Corn product.
2827	100	10.00	7.25	7.50	-----	8.88	6.70	9.10	-----	do.
1911	-----	-----	-----	-----	-----	8.00	4.06	2.02	-----	do.
2893	-----	-----	-----	-----	-----	14.50	4.16	4.50	-----	do.
2894	-----	-----	-----	-----	-----	14.50	4.51	4.40	-----	do.
2646	-----	-----	-----	-----	-----	8.50	4.47	2.50	-----	do.
2624	100	9.87	3.91	1.97	-----	8.88	4.26	1.75	-----	do.
2754	-----	9.87	3.91	1.97	-----	8.25	4.00	1.60	-----	do.
2762	-----	9.50	4.00	4.00	-----	9.50	3.82	6.45	-----	do.
2724	100	10.00	6.00	-----	-----	9.15	2.88	5.25	-----	do.
1984	100	13.86	3.95	4.63	-----	14.62	3.70	6.05	-----	do.
2749	-----	9.00	4.00	1.00	-----	8.25	4.25	1.02	-----	do.
2623	100	9.00	4.00	1.00	-----	9.38	3.98	2.65	-----	do.

ucts, but this is not strictly adhered to, as some chops are mixed with other substances. Samples 2893 and 2894 are called chops, but are wheat products. The per cent of protein guaranteed in these products is too high, as very few of the samples come up to the guarantee.

meal feed for cattle, etc. These feeds are valuable in proportion to the amount of meal in the mixture, which is measured by the protein in the analysis.

Cotton-seed feeds must have a guaranteed analysis consisting of the per cents of protein, fat and crude fiber on every bag or tag attached thereto, and not the per cent of nitrogen or ammonia.

TION OF COTTON-SEED FEEDS.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
2665	100	22.00	5.00	28.00	-----	-----	4.95	22.65	-----	Cotton-seed meal, containing finely ground cotton-seed hulls.
2666	100	22.00	5.00	28.00	-----	18.87	3.76	22.35	-----	
2615	-----	22.00	5.00	28.00	-----	21.75	4.65	20.05	-----	do.

are below their guarantees in fat, and two samples are below their guarantees in protein.

## SPECIAL

Under this head are grouped those feeds which are

## RESULTS OF THE EXAMINATION

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
2671	Thoroughbred Feed	Lexington Roller Mills, Lexington, Ky.	Wilson Grocery Co., Wilson, N. C.	Mar. 24, '08
2667	do	do	E. K. Willis, Washington, N. C.	Mar. 21, '08
2700	do	do	J. H. Tice, Wadesboro, N. C.	Apr. 15, '08
2770	do	do	Edwards & Pegram, Kinston, N. C.	July 10, '08
2654	Corno Horse and Mule Feed.	The Corno Mills, East St. Louis, Ill.	Stone & Co., Wilmington, N. C.	Mar. 17, '08
2834	do	do	Wilson Grocery Co., Wilson, N. C.	July 21, '08
2825	do	do	W. B. Cooper, Wilmington, N. C.	July 24, '08
2796	do	do	The Patterson Co., Greensboro, N. C.	July 6, '08
2746	do	do	Standard Seed Feed Co., Winston, N. C.	June 30, '08
2786	Mixed Corn and Oat Feed.	W. S. White & Co., Elizabeth City, N. C.	W. S. White & Co., Elizabeth City, N. C.	July 18, '08
1940	Hollybrook Scratching Food.	T. W. Wood & Sons, Richmond, Va.		
1939	Hollybrook Chick Food.	do		
1938	Hollybrook Forcing Food.	do		
1937	Hollybrook Pigeon Mixture.	do		
1936	Hollybrook Developing Food.	do		
1935	Wood's Poultry Grain Food.	do		
1934	Wood's Practical Ration.	do		
2722	Wyatt's Special Cow Feed.	J. P. Wyatt & Sons, Raleigh, N. C.	J. P. Wyatt & Sons, Raleigh, N. C.	June 20, '08

## DISCUSSION

Eighteen (18) samples of special named feeds were

## MISCELLANEOUS FEEDS.

Under this head are grouped mill feeds, mixed feeds, mill sweepings, screen-

## RESULTS OF THE EXAMINATION

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
2703	Mill Feed	Aberdeen Power and Milling Co., Aberdeen, N. C.	E. J. Hale & Son, Rockingham, N. C.	Apr. 10, '08
2619	Acme Feed	Acme Milling Co., Talbot, Tenn.	John H. Jenkins, Asheville, N. C.	Feb. 13, '08
2837	do	do	J. L. Allen, Rutherfordton, N. C.	July 16, '08
2838	do	do	William Edward McCall, Marion, N. C.	Feb. 17, '08
2626	Mixed Feed	Adams Grain and Provision Co., Richmond, Va.	J. H. Burton, Reidsville, N. C.	Feb. 28, '08

## MIXED FEEDS.

sold under trade-mark, proprietary or special names.

## OF SPECIAL MIXED FEEDS.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
2671	100	16.41	3.62	7.53	-----	15.63	5.07	3.63	-----	Wheat and corn feed.
2667	100	13.40	3.62	7.58	-----	15.13	3.98	6.15	-----	do.
2700	100	15.05	3.34	6.56	-----	14.13	2.77	5.50	-----	do.
2770	100	15.05	3.34	6.56	-----	14.50	5.07	6.57	-----	do.
2654	100	10.00	3.50	12.00	-----	9.88	4.10	10.40	-----	Cracked corn, oats, alfalfa.
2834	-----	10.00	3.50	12.00	-----	8.75	3.81	13.10	-----	do.
2825	100	10.00	3.50	12.00	-----	9.63	3.68	11.07	-----	do.
2796	-----	13.00	3.50	12.00	-----	9.12	3.39	11.85	-----	do.
2746	100	14.00	3.50	12.00	-----	10.50	4.22	11.70	-----	do.
2786	100	11.44	4.92	8.82	-----	8.50	3.92	3.02	-----	Cracked corn and whole oats.
1940	-----	-----	-----	-----	-----	10.87	3.48	2.92	-----	Cracked corn, wheat, ground beans, rye, weed seed, sunflower seed, barley.
1939	-----	-----	-----	-----	-----	11.50	3.90	3.02	-----	
1938	-----	-----	-----	-----	-----	10.62	3.41	2.88	-----	
1937	-----	-----	-----	-----	-----	12.87	3.44	3.90	-----	Beans, wheat, rye, corn, weed seed and sunflower seed.
1936	-----	-----	-----	-----	-----	11.87	3.41	3.45	-----	Cracked corn, wheat, rye, beans, weed seed and sunflower seed.
1935	-----	-----	-----	-----	-----	12.37	3.21	4.25	-----	Wheat grain, cracked corn, cracked beans, peas, weed seed and rye.
1934	-----	-----	-----	-----	-----	14.75	4.48	5.66	-----	Wheat product, corn product, cracked beans and weed seed.
2722	100	21.00	3.50	14.00	-----	32.65	4.85	7.75	-----	Wheat product, cotton-seed meal, linseed meal and corn meal.

## OF RESULTS.

examined. Most of these feeds are of good quality.

ings, feed meals, etc. An idea of the quality of these feeds is given in the table below.

## OF MISCELLANEOUS FEEDS.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
2703	100	9.00	4.50	10.00	-----	7.75	2.56	8.20	-----	Mostly corn bran.
2619	-----	16.00	5.00	7.17	-----	14.00	6.08	6.75	-----	Wheat bran and corn bran.
2837	-----	16.00	5.00	7.17	-----	12.75	5.50	6.50	-----	Wheat and corn product.
2838	80	16.00	5.00	7.17	-----	15.12	4.35	6.60	-----	do.
2626	-----	-----	-----	-----	-----	13.50	3.35	3.40	-----	do.

## RESULTS OF THE EXAMINATION

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
1990	Mill Feed	Ashboro Roller Mills, Ashboro, N. C.	-----	Feb. 7, '08
2844	Feed	Asheville Milling Co., Asheville, N. C.	Gaston & Troutman, Marion, N. C.	July 17, '08
2843	do	do	Reid & Beam, Rutherfordton, N. C.	July 16, '08
1992	Mill Feed	Archdale Roller Mills, Archdale, N. C.	J. S. Kinley, High Point, N. C.	Feb. 7, '08
2840	Dairy and Stock Feed	Atlanta Milling Co., Atlanta, Ga.	The G. C. Brinkman Co., Charlotte, N. C.	July 10, '08
2747	Union Grains	The J. W. Biles Co., Cincinnati, Ohio.	Standard Feed and Seed Co., Winston, N. C.	June 30, '08
2710	Mixed Middling Feed	Capital Grain and Mill Co., Nashville, Tenn.	-----	-----
2711	do	do	-----	-----
2725	Mixed Bran Feed	do	Len H. Adams, Raleigh, N. C.	June 30, '08
2716	Mixed Middling Feed	do	In Car A. C. L., No. 30255, Aulander, N. C.	June 25, '08
2629	Mixed Bran Feed	do	Standard Feed and Seed Co., Winston, N. C.	Feb. 24, '08
2785	do	do	W. S. White & Co., Elizabeth City, N. C.	July 17, '08
2778	do	do	H. C. Privott, Edenton, N. C.	July 16, '08
2708	Mixed Middling Feed	do	-----	-----
2707	do	do	-----	-----
2706	do	do	-----	-----
2701	Mill Feed	Carrollina Roller Mills, Durham, N. C.	Sanford Supply Co., Sanford, N. C.	Apr. 13, '08
2677	do	do	W. L. London & Son, Pittsboro, N. C.	Apr. 13, '08
1965	do	do	-----	-----
1945	Feed	do	-----	-----
1946	do	do	-----	-----
2784	Mixed Feed	City Hay and Grain Co., Elizabeth City, N. C.	City Hay and Grain Co., Elizabeth City, N. C.	July 17, '08
2782	Corn and Cob Meal	do	do	July 17, '08
2679	Mill Feed	Crown Milling Co., Ashboro, N. C.	Keith & Co., Aberdeen, N. C.	Apr. 13, '08
1987	do	do	C. L. Cranford, Ashboro, N. C.	Feb. 7, '08
1985	do	do	G. G. Hendricks & Co., Ashboro, N. C.	Feb. 7, '08
1991	do	Dixie Milling Co., High Point, N. C.	J. S. Kinley, High Point, N. C.	Feb. 7, '08
2798	do	do	Hedrick & Co., High Point, N. C.	July 6, '08
2862	Mixed Feed	Douthat-Riddle Co., Danville, Va.	C. D. Shelton, Charlotte, N. C.	July 10, '08
2734	Mill Feed	do	Elmire-Maxwell Co., Greensboro, N. C.	June 27, '08
2692	Feed	do	The Armfield Co., Fayetteville, N. C.	Apr. 20, '08
2795	Mill Feed	do	Elmire-Maxwell Co., Greensboro, N. C.	July 2, '08
2792	Feed	do	E. R. Messick, Winston, N. C.	July 4, '08
2743	do	do	do	June 30, '08
2823	Mixed Feed	do	-----	-----
2631	Cotton-seed Feed	Elba Mfg. Co., Charlotte, N. C.	Standard Feed and Seed Co., Winston, N. C.	Feb. 24, '08

## OF MISCELLANEOUS FEEDS.—CONTINUED.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
1990	77	15.00	4.00	8.00	14.88	3.67	7.30		Wheat and corn product.	
2844	80	13.00	3.00	9.50	12.38	4.45	7.45		do.	
2843	80	13.00	3.00	9.50	13.25	4.15	5.95		Wheat and corn bran.	
1992	80	12.25	1.50	2.45	16.75	3.40	3.97		Wheat bran and corn product.	
2840	80	21.00	4.00	9.50	22.19	5.19	6.17			
2747		24.00	7.00	7.00	23.37	7.77	9.52		Distillery grain, malt sprouts, a corn and wheat product, some linseed meal, some cotton-seed meal.	
2710						1.76	12.95		Wheat feed, adulterated with ground corn cobs.	
2711					6.75	0.92	17.25		do.	
2725	100	13.42	3.80	11.24	9.75	2.39	5.65		Wheat bran, corn bran and corn cobs.	
2716	100	14.26	3.70	10.90					Wheat feed, adulterated with ground corn cobs.	
2629	100	13.42	3.80	11.24	10.75	2.96	11.20		Wheat product, adulterated with ground corn cobs.	
2785	100	13.42	3.80	11.24	8.38	2.58	18.22		Wheat bran, containing ground corn cobs.	
2778	100	13.42	3.80	11.24	9.38	2.71	16.05		Ground wheat bran, corn, corn bran and ground corn cobs.	
2708					7.37	2.59	14.65		Wheat feed, adulterated with ground corn cobs.	
2707					9.73	3.48	10.17		do.	
2706					8.31	3.31	16.32		do.	
2701	100	14.00	4.00	5.00	13.25	3.64	6.20		Wheat product and corn bran.	
2677	100	13.75	3.95	5.88	14.25	3.35	4.70		Wheat and corn product.	
1965					13.75	4.64	7.62		do.	
1945					16.37	4.17	8.18		do.	
1946					14.87	4.05	7.40		do.	
2784		10.00	4.00	5.00	8.75	3.73	2.67		Corn and oat feed.	
2782		8.00	3.00	6.00	7.13	4.51	5.07		Ground ear corn.	
2679	80	12.00	4.00	14.00	12.00	4.38	5.25		Wheat bran and corn bran.	
1987	80	12.00	4.00	14.00	12.88	3.96	6.67		Wheat and corn product.	
1985	80	12.00	4.00	14.00	10.88	3.82	6.05		do.	
1991	80	14.50	4.00	8.00					Wheat bran and corn product.	
2798	80	14.50	4.00	8.00	13.25	3.26	3.55		Wheat bran and corn bran.	
2862	80	10.00	3.75	12.00	9.50	3.27	8.50		Wheat product, containing ground corn cobs.	
2734		9.75	3.50	11.97	10.75	3.15	10.12		do.	
2692	100	10.00	3.50	11.97	10.38	3.08	8.02		Wheat and corn product, containing ground corn cobs.	
2795		9.75	3.50	11.97	11.13	3.05	10.10		Wheat product, containing ground corn cobs.	
2792		10.00	3.75	12.00	10.63	2.79	10.65		do.	
2743	100	10.00	3.75	12.00	10.37	3.07	11.95		Wheat product and corn cobs.	
2823					10.37	4.27	9.10		do.	
2631	100	8.00	2.50	40.00	10.63	2.37	31.12		Cotton-seed hulls, sprinkled with cotton-seed meal.	

## RESULTS OF THE EXAMINATION

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
2871	Jersey Daisy Feed.....	Englewood Milling Co., Englewood, Tenn.	J. L. Smathers, & Co., Murphy, N. C.	July 25, '08
2879	Feed.....	Glen Alpine Milling Co., Glen Alpine, N. C.	.....	.....
1915	Mixed Feed.....	Glenn Anna Milling Co., Thomasville, N. C.	.....	.....
2801	Corn Meal and Wheat Bran.....	Grimes Bros., Lexington, N. C.	.....	July 7, '08
1908	Feed.....	Koiner Flour Mills, Richmond, Va.	.....	.....
2759	Mill Feed.....	J. M. Koiner, Grottoes, Va.	H. Schafer, Mt. Airy, N. C.	July 3, '08
1962	.....do.....	Liberty Milling Co., Liberty, N. C.	.....	.....
2773	Mixed Feed.....	J. A. Meadows & Co., New Bern, N. C.	J. A. Meadows & Co., New Bern, N. C.	July 1, '08
2658	Cow Feed.....	.....do.....	.....do.....	Mar. 18, '08
2659	Mixed Feed.....	.....do.....	.....do.....	Mar. 18, '08
2818	Feed.....	.....do.....	.....do.....	.....
2802	Meal and Bran.....	Model Mills, Lexington, N. C.	G. W. Miller, Lexington, N. C.	July 7, '08
2869	Mixed Bran.....	J. L. Morgan, Clyde, N. C.	Feed and Lumber Co., Waynesville, N. C.	July 24, '08
2602	Mixed Feed.....	Newport Mill Co., Newport, Tenn.	J. Flem Johnson Co., Charlotte, N. C.	Feb. 11, '08
2613	.....do.....	.....do.....	Green Kincaid, Morganton, N. C.	Feb. 13, '08
1997	.....do.....	.....do.....	Adams Grain and Provision Co., Charlotte, N. C.	Feb. 11, '08
1993	.....do.....	.....do.....	I. Littmann, Salisbury, N. C.	Feb. 8, '08
2846	.....do.....	.....do.....	J. Flem Johnson, Gastonia, N. C.	July 13, '08
2845	.....do.....	.....do.....	Max Moses & Co., Concord, N. C.	July 9, '08
2804	.....do.....	.....do.....	H. G. White, Salisbury, N. C.	July 8, '08
2807	.....do.....	.....do.....	Klutz Grain and Provision Co., Salisbury, N. C.	July 8, '08
2745	Red Dog Flour.....	The Northwestern Milling Co., Minneapolis, Minn.	P. R. Lamb & Co., Winston, N. C.	June 30, '08
1957	Cereola Cow Feed.....	Ralston Purina Co., St. Louis, Mo.	.....	.....
1956	Star Feed.....	.....do.....	.....	.....
2601	Mill Feed.....	Riverside Milling and Power Co., Cartersville, Ga.	Adams Grain and Provision Co., Charlotte, N. C.	Feb. 11, '08
2737	Low Grade Wheat.....	Sheffield Mill and Elevator Co., Minneapolis Minn.	J. H. Walker & Co., Reidsville, N. C.	June 29, '08
2678	Mixed Feed.....	Silk Hope Roller Mills, Siler City, N. C.	W. L. London & Son, Pittsboro, N. C.	April 13, '08
2817	Crushed Corn and Cob.....	South River Milling Co., Salisbury, N. C.	.....	.....
2816	Crushed Corn and Cob and Wheat Bran.....	.....do.....	.....	.....
2814	Wheat Screenings and Bran.....	.....do.....	.....	.....
1969	Mixed Feed.....	Southside Mills, Winston-Salem, N. C.	.....	.....
2661	Royal Feed.....	C. L. Spencer, New Bern, N. C.	C. L. Spencer, New Bern, N. C.	Mar. 18, '08
2861	Mixed Feed.....	E. F. Spears & Son, Paris, Ky.	S. K. Breeding & Co., Hendersonville, N. C.	July 22, '08
2874	Feed.....	.....do.....	.....	.....
2820	.....do.....	.....do.....	.....	.....
2851	Mill Feed.....	Statesville Flour Mills, Statesville, N. C.	W. B. Palmer, Shelby, N. C.	July 15, '08
2610	.....do.....	.....do.....	Seltzer, Hickory, N. C.	Feb. 12, '08

## OF MISCELLANEOUS FEEDS.—CONTINUED.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
2871	75	15.00	4.00	8.00	-----	15.38	4.11	6.40	-----	
2879					-----	14.25	5.05	7.55	-----	
1915					-----	11.75	3.48	4.42	-----	Wheat and corn product.
2801	100	12.13	4.57	4.25	-----	13.00	4.03	3.30	-----	Wheat and corn feed.
1908					-----	14.12	3.97	5.90	-----	
2759		14.50	4.00	9.50	-----	15.25	4.70	4.35	-----	Wheat product.
1962					-----	12.12	2.27	3.60	-----	Wheat and corn product.
2773	100	11.00	4.00	4.50	-----	8.00	4.35	2.80	-----	Corn, oats and wheat bran.
2658					-----	20.88	5.40	6.77	-----	Wheat product, corn product and cotton-seed meal.
2659					-----	9.25	4.14	4.80	-----	Wheat, corn and oat feed.
2818					-----	9.13	3.82	6.00	-----	Wheat bran, oats and ground corn.
2802	100	12.00	3.50	4.00	-----	11.25	4.05	4.70	-----	Wheat bran and corn meal.
2869					-----	12.88	4.65	8.32	-----	Wheat and corn bran.
2602	80	13.00	4.00	8.00	-----	14.13	5.74	6.10	-----	do.
2613	80	13.50	4.00	8.00	-----	14.50	4.87	6.45	-----	do.
1997	80	13.00	4.00	8.00	-----	14.88	5.87	6.47	-----	do.
1993	80	13.00	4.00	8.00	-----	15.12	5.19	6.30	-----	do.
2846		13.00	4.00	8.00	-----	14.75	5.41	5.85	-----	do.
2845		13.50	4.00	8.00	-----	13.13	5.33	5.85	-----	do.
2804	80	13.50	4.00	8.00	-----	11.63	4.09	3.57	-----	do.
2807		13.00	4.00	8.00	-----	13.75	5.25	6.00	-----	do.
2745		18.25	5.25	2.50	-----	17.62	5.66	1.55	-----	Wheat product.
1957					-----	15.81	5.41	18.50	-----	Alfalfa, barley, corn product.
1956					-----	12.38	5.10	11.32	-----	Mostly cracked corn, alfalfa and barley.
2601	80	14.00	3.79	4.43	-----	11.25	4.36	4.75	-----	Wheat and corn product.
2737					-----	17.62	5.51	1.45	-----	Wheat product.
2678	100	14.50	4.00	8.00	-----	13.75	3.64	3.75	-----	Wheat and corn product, ground corn and cobs.
2817					-----	7.87	4.10	7.00	-----	Ground corn and cobs.
2816					-----	9.75	3.39	9.00	-----	Ground corn and cobs and wheat product.
2814					-----	13.37	3.04	10.00	-----	Wheat screenings and bran.
1969					-----	11.31	3.48	4.33	-----	Wheat and corn product.
2661	100	10.00	6.00	7.00	-----	10.63	6.33	9.45	-----	Whole oats, wheat and corn feed.
2861	100	16.00	4.00		-----	14.50	4.90	7.30	-----	Wheat bran and corn bran.
2874					-----	14.13	4.92	7.65	-----	Mostly a wheat product.
2820					-----	14.75	4.70	9.00	-----	Wheat product.
2851	80	14.00	4.00	6.00	-----	14.75	3.55	6.22	-----	
2610	100	15.50	3.80	5.99	-----	15.25	4.71	7.55	-----	

## RESULTS OF THE EXAMINATION

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
1972	Mill Feed.....	Statesville Flour Mills, Statesville, N. C.	-----	-----
1971	Mixed Corn and Wheat Bran.	-----do-----	-----	-----
1951	Bran and Shipstuff.....	-----do-----	-----	-----
2895	Feed.....	J. C. Thomas, Hiddenite, N. C.	-----	-----
2736	-----do-----	J. H. Walker & Co., Reidsville, N. C.	J. H. Walker & Co., Reidsville, N. C.	June 29, '08
2675	Cleanings from Wheat	Wachovia Mills, Winston-Salem, N. C.	-----	-----
2764	Rye Middlings.....	Washburn-Crosby Co., Minneapolis, Minn.	W. B. Haynere, Mt. Airy, N. C.	July 3, '08
2758	Mixed Feed.....	-----do-----	Piedmont Feed Co., North Wilkesboro, N. C.	July 2, '08
2757	-----do-----	-----do-----	The Forester Grocery Co., North Wilkesboro.	July 2, '08
2756	-----do-----	-----do-----	E. B. Williams & Co., Wilkesboro, N. C.	July 2, '08

## DISCUSSION OF RESULTS.

Eighty-eight (88) samples of miscellaneous feeds were examined. A critical

## CRACKED CORN.

Much cracked corn has been offered for sale in this State which was made

## RESULTS OF THE EXAMINA

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.	Retail Dealer.	Date of Collection.
2712	Cracked Corn.....	B. D. Booth & Co., Petersburg, Va.	-----	-----
2783	-----do-----	City Hay and Grain Co., Elizabeth City, N. C.	City Hay and Grain Co., Elizabeth City, N. C.	July 17, '08
2776	-----do-----	City Hay and Grain Co., Norfolk, Va.	E. R. Mixon Co., Washington, N. C.	July 14, '08
2648	-----do-----	Concord Milling Co., Concord, N. C.	-----	-----
2896	-----do-----	Dabney Brokerage Co., Newport News, Va.	-----	-----
2775	-----do-----	-----do-----	C. G. Morris & Co., Washington, N. C.	July 14, '08
2774	-----do-----	-----do-----	E. Peterson Co., Washington, N. C.	July 14, '08
2655	-----do-----	Gambrill & Davis, Roanoke, Va.	J. W. Brooks, Wilmington, N. C.	Mar. 17, '08
1914	-----do-----	Lynchburg Milling Co., Lynchburg, Va.	-----	-----
2777	-----do-----	Mayo Milling Co., Richmond, Va.	Pamlico Grocery Co., Washington, N. C.	July 14, '08
2771	-----do-----	S. D. Scott & Co., Norfolk, Va.	Burrus & Gray, New Bern, N. C.	July 11, '08
2767	-----do-----	-----do-----	Edwards & Pegram, Kingston, N. C.	July 10, '08
2819	-----do-----	Tennessee Mill Co., Estill Springs, Tenn.	-----	-----
2787	-----do-----	W. S. White, Elizabeth City, N. C.	W. S. White & Co., Elizabeth City, N. C.	July 17, '08

## DISCUSSION OF RESULTS.

Fourteen (14) samples of cracked corn were examined. Most of them are

OF MISCELLANEOUS FEEDS.—CONTINUED.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
1972	-----	-----	-----	-----	-----	15.74	4.35	7.45	-----	Wheat product.
1971	-----	-----	-----	-----	-----	12.40	4.47	11.25	-----	Wheat and corn product.
1951	-----	-----	-----	-----	-----	16.37	4.68	7.63	-----	Wheat product.
2895	-----	-----	-----	-----	-----	12.50	3.73	3.97	-----	
2736	-----	12.75	4.00	7.50	-----	10.75	3.77	6.70	-----	Wheat and corn product.
2675	-----	-----	-----	-----	-----	<b>14.63</b>	<b>3.13</b>	<b>11.50</b>	-----	Wheat cleanings.
2764	-----	-----	-----	-----	-----	15.50	4.10	5.70	-----	Rye product.
2758	-----	17.04	4.00	-----	-----	16.00	4.04	6.65	-----	Wheat product.
2757	-----	17.04	4.00	-----	-----	15.50	3.98	6.15	-----	do.
2756	-----	17.04	4.00	-----	-----	15.62	4.24	7.77	-----	do.

examination of the above table will reveal the true quality of these feeds.

from damaged corn. The results below will indicate the true quality of these products.

TION OF CRACKED CORN.

Laboratory Number.	Claimed Weight of Package—lbs.	Claimed—per cent.				Found—per cent.				Ingredients.
		Protein.	Fat.	Fiber.	Ash.	Protein.	Fat.	Fiber.	Ash.	
2712	-----	-----	-----	-----	-----	8.00	2.85	1.80	-----	Corn product.
2783	-----	10.00	3.50	3.00	-----	8.38	4.08	1.87	-----	do.
2776	100	10.00	4.00	4.00	-----	8.50	2.45	1.62	-----	Cracked corn.
2648	-----	-----	-----	-----	-----	8.25	4.43	2.39	-----	Corn product.
2896	-----	-----	-----	-----	-----	-----	4.15	1.77	-----	do.
2775	100	9.20	3.80	4.00	-----	7.88	3.41	1.92	-----	Cracked corn.
2774	100	9.20	3.80	4.00	-----	8.25	3.97	2.10	-----	do.
2655	80	10.00	4.50	1.50	-----	8.75	3.89	2.20	-----	do.
1914	-----	-----	-----	-----	-----	9.62	4.60	2.87	-----	Corn product.
2777	100	10.37	2.85	1.52	-----	8.63	3.88	1.77	-----	Cracked corn.
2771	100	10.00	4.00	4.00	-----	8.13	3.29	1.67	-----	Corn product.
2767	-----	10.00	4.00	4.00	-----	8.12	4.19	6.15	-----	do.
2819	-----	-----	-----	-----	-----	8.25	4.40	2.00	-----	Cracked corn.
2787	100	10.00	4.00	4.00	-----	7.63	4.12	1.70	-----	do.

guaranteed too high in protein and fat, as only one or two come up to their guarantee in either protein or fat.

## THE MICROSCOPIC EXAMINATION OF FEEDS.

It was not possible to make chemical analyses of all samples collected, but

## MICROSCOPIC

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.
213 M	Bran -----	Crown Milling Co., Ashboro, N. C.-----
214 M	----do -----	Southern Mills, Nashville, Tenn.-----
215 M	Shipstuff -----	J. Allen Smith & Co., Knoxville, Tenn. -----
216 M	Bran -----	J. A. Tate, Greensboro, N. C. -----
217 M	----do -----	Holt-Granite Mfg. Co., Haw River, N. C. -----
218 M	----do -----	Piedmont Mills, Lynchburg, Va. -----
219 M	Shipstuff -----	Carrolina Roller Mills, Durham, N. C.-----
220 M	Mill Feed -----	----do -----
221 M	Shipstuff -----	----do -----
222 M	Mill Feed -----	Aberdeen Power and Milling Co., Aberdeen, N. C.-----
223 M	Shipstuff -----	J. Allen Smith & Co., Knoxville, Tenn. -----
224 M	----do -----	Tennessee Mill Co., Estill Springs, Tenn. -----
225 M	----do -----	----do -----
226 M	----do -----	Dan Valley Mills, Danville, Va. -----
227 M	Middlings -----	The Dunlop Milling Co., Clarksville, Tenn. -----
228 M	Bran -----	Piedmont Mills, Lynchburg, Va. -----
229 M	Shipstuff -----	Dan Valley Mills, Danville, Va. -----
230 M	Bran -----	----do -----
231 M	Shipstuff -----	----do -----
232 M	Bran -----	Tennessee Mill Co., Estill Springs, Tenn. -----
233 M	----do -----	The Dunlop Milling Co., Clarksville, Tenn.-----
234 M	Shipstuff -----	Piedmont Mills, Lynchburg, Va. -----
235 M	Middlings -----	H. S. Holliday Milling Co., Cairo, Ill.-----
236 M	Bran -----	J. H. Walker & Co., Reidsville, N. C. -----
237 M	Middlings -----	H. S. Holliday Milling Co., Cairo, Ill.-----
238 M	Bran -----	F. L. Moses & Bro., Chatham, Va. -----
239 M	Shipstuff -----	J. Allen Smith & Co., Knoxville, Tenn. -----
240 M	----do -----	Dan Valley Mills, Danville, Va. -----
241 M	----do -----	J. Allen Smith & Co., Knoxville, Tenn. -----
242 M	Daisy Middlings-----	Pillsbury Mills, Minneapolis, Minn. -----
243 M	Shipstuff -----	Dan Valley Mills, Danville, Va. -----
244 M	----do -----	J. Allen Smith & Co., Knoxville, Tenn. -----
245 M	----do -----	Dunlop Mills, Richmond, Va.-----
246 M	Brown Shorts -----	Atlanta Milling Co., Atlanta, Ga. -----
247 M	Shorts -----	Tennessee Mill Co., Estill Springs, Tenn. -----
248 M	Daisy Middlings-----	Pillsbury Mills, Minneapolis, Minn. -----

microscopic examinations were made of all samples. The results of the microscopic examination of samples are brought together below :

## EXAMINATION. \*

Laboratory Number.	Retail Dealer.	Ingredients.
213 M	Sent in by mill -----	Wheat product, large per cent trash.
214 M	Carolina Feed Store, Raleigh, N. C. -----	Wheat product.
215 M	Phillips & Penny, Raleigh, N. C. -----	Wheat and corn product.
216 M	W. A. Myatt, Raleigh, N. C. -----	Wheat product.
217 M	----do -----	Wheat bran and cracked wheat.
218 M	C. A. Norris & Co., Raleigh, N. C. -----	Wheat product.
219 M	E. D. Nall, Sanford, N. C. -----	
220 M	----do -----	Wheat and corn product.
221 M	J. A. McIver, Jonesboro, N. C. -----	
222 M	H. D. Baldwin, Rockingham, N. C. -----	Mostly corn bran, with wheat product.
223 M	C. L. Kell, Hamlet, N. C. -----	Wheat and corn product.
224 M	-----	Wheat product.
225 M	Helms, Richardson & Co., Monroe, N. C. -----	do.
226 M	R. G. Hiatt, Greensboro, N. C. -----	do.
227 M	J. R. Chismen & Bros., Greensboro, N. C. -----	do.
228 M	Sockwell Bros., Greensboro, N. C. -----	do.
229 M	----do -----	do.
230 M	J. W. Jones & Bro., Greensboro, N. C. -----	do.
231 M	----do -----	do.
232 M	R. G. Hiatt, Greensboro, N. C. -----	do.
233 M	----do -----	do.
234 M	The Patterson Co., Greensboro, N. C. -----	do.
235 M	W. A. Stacy, Reidsville, N. C. -----	
236 M	J. H. Walker & Co., Reidsville, N. C. -----	do.
237 M	Hutcherson Bros., Reidsville, N. C. -----	
238 M	----do -----	do.
239 M	S. A. Pfaff, Salem, N. C. -----	Wheat and corn product.
240 M	Cromer Bros. Co., Winston, N. C. -----	Wheat product.
241 M	P. R. Lamb & Co., Winston, N. C. -----	Wheat and corn product.
242 M	Standard Feed and Seed Co., Winston, N. C. -----	
243 M	C. F. Bennett & Bro., Durham, N. C. -----	Wheat product.
244 M	Allen-Owens Co., Durham, N. C. -----	Wheat and corn product.
245 M	----do -----	do.
246 M	Markham-Stephens Co., Durham, N. C. -----	
247 M	E. B. Williams & Co., Wilkesboro, N. C. -----	Wheat product.
248 M	E. G. Bowman, Mount Airy, N. C. -----	

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.
249 M	Bran .....	Washburn-Crosby Co., Louisville, Ky. ....
250 M	do .....	J. H. Walker & Co., Reidsville, N. C. ....
251 M	do .....	J. Allen Smith & Co., Knoxville, Tenn. ....
252 M	Shorts .....	Southern Mills, Nashville, Tenn. ....
253 M	Shipstuff .....	Dunlop Mills, Richmond, Va. ....
254 M	Feed .....	Northwestern Consol. Milling Co., Minneapolis, Minn. ....
255 M	Middlings .....	Washburn Mills, Minneapolis, Minn. ....
256 M	Shipstuff .....	Dunlop Mills, Richmond, Va. ....
257 M	Bran and Shorts .....	Model Mills, Lexington, N. C. ....
258 M	Wheat Bran .....	Asheville Milling Co., Asheville, N. C. ....
259 M	Bran .....	Piedmont Mills, Lynchburg, Va. ....
260 M	Cracked Corn .....	E. T. Jennett, Washington, N. C. ....
261 M	Corn Chops .....	Boney & Harper, Wilmington, N. C. ....
262 M	Cracked Corn .....	Dabney Brokerage Co. ....
263 M	Bran .....	Washburn-Crosby Co., Louisville, Ky. ....
264 M	Shorts .....	Liberty Mills, Nashville, Tenn. ....
265 M	Shipstuff .....	Dunlop Mills, Richmond, Va. ....
266 M	Middlings .....	The Dunlop Milling Co., Clarksville, Tenn. ....
267 M	Bran .....	Watson Mills, Wichita, Kansas ....
268 M	Shipstuff .....	J. Allen Smith & Co., Knoxville, Tenn. ....
269 M	Bran .....	do .....
270 M	Shipstuff .....	Concord Milling Co., Concord, N. C. ....
271 M	do .....	The Mountain City Mill Co., Chattanooga, Tenn. ....
272 M	do .....	Concord Milling Co., Concord, N. C. ....
273 M	do .....	J. D. Manor, New Market, Va. ....
274 M	Bran .....	Concord Milling Co., Concord, N. C. ....
275 M	do .....	Star Mills, Nashville, Tenn. ....
276 M	Mill Feed .....	Statesville Milling Co., Statesville, N. C. ....
277 M	Shipstuff .....	Mountain City Mill Co., Chattanooga, Tenn. ....
278 M	do .....	Tennessee Mill Co., Estill Springs, Tenn. ....
279 M	Bran .....	do .....
280 M	Acme Feed .....	.....
281 M	Wheat Bran .....	Asheville Milling Co., Asheville, N. C. ....
282 M	Shipstuff .....	Mountain City Mill Co., Chattanooga, Tenn. ....
283 M	Bran .....	Read Bros., Morristown, Tenn. ....
284 M	Shorts .....	do .....
285 M	Shipstuff .....	Mountain City Mill Co., Chattanooga, Tenn. ....
286 M	Bran .....	Star Mills, Nashville, Tenn. ....

## INATION.—CONTINUED.

Laboratory Number.	Retail Dealer.	Ingredients.
249 M	W. B. Haymore, Mount Airy, N. C. -----	Wheat product.
250 M	C. L. Marshall, Mount Airy, N. C. -----	do.
251 M	Burrus & Gray, New Bern, N. C. -----	do.
252 M	W. H. Turner, Winston, N. C. -----	do.
253 M	do -----	do.
254 M	do -----	
255 M	The Patterson Co., Greensboro, N. C. -----	Wheat product.
256 M	Parker & Johnson, High Point, N. C. -----	do.
257 M	B. H. Finch, Lexington, N. C. -----	do.
258 M	W. W. Upchurch, Raleigh, N. C. -----	Wheat and corn product.
259 M	Best & Thompson, Goldsboro, N. C. -----	Wheat product.
260 M	Mayo Milling Co., Richmond, Va. -----	Corn product.
261 M	Brooks & Taylor, Wilmington, N. C. -----	do.
262 M	The Worth Co., Wilmington, N. C. -----	do.
263 M	B. F. Mitchell, Wilmington, N. C. -----	Wheat product.
264 M	C. Woodward Co., Wilson, N. C. -----	do.
265 M	R. B. Peters Grocery Co., Tarboro, N. C. -----	do.
266 M	Hales & Edwards, Rocky Mount, N. C. -----	do.
267 M	Matthews, Weeks & Co., Rocky Mount, N. C. -----	do.
268 M	do -----	Wheat and corn product.
269 M	Burrus & Gray Co., New Bern, N. C. -----	Wheat product.
270 M	H. L. Park & Co., Concord, N. C. -----	do.
271 M	H. M. Blackwelder, Concord, N. C. -----	Wheat and corn product.
272 M	do -----	Wheat product.
273 M	do -----	
274 M	do -----	Wheat product.
275 M	Cothran-McLaughlin Co., Charlotte, N. C. -----	do.
276 M	W. F. Redmond, Charlotte, N. C. -----	Wheat and corn product.
277 M	do -----	do.
278 M	G. G. Hyder, Hendersonville, N. C. -----	Wheat product.
279 M	do -----	do.
280 M	Burkmeyer Bros., Hendersonville, N. C. -----	Wheat and corn product.
281 M	do -----, Greensboro, N. C. -----	do.
282 M	S. K. Breeding & Co., Hendersonville, N. C. -----	Wheat and corn product, mostly corn bran.
283 M	Seigler & Co., Asheville, N. C. -----	Wheat product.
284 M	Allison & Jennette, Asheville, N. C. -----	
285 M	Asheville Grocery Co., Asheville, N. C. -----	Corn and wheat product, mostly corn bran.
286 M	do -----	Wheat product.

## MICROSCOPIC EXAM

Laboratory Number.	Brand Name from Label.	Manufacturer or Wholesaler.
287 M	Bran .....	Tennessee Mill Co., Estill Springs, Tenn. ....
288 M	Shipstuff .....	do .....
289 M	do .....	Mountain City Mill Co., Chattanooga, Tenn. ....
290 M	Bran .....	Asheville Milling Co., Asheville, N. C. ....
291 M	Mixed Bran .....	J. L. Morgan, Clyde, N. C. ....
292 M	Middlings .....	do .....
293 M	Shipstuff .....	J. Allen Smith & Co., Knoxville, Tenn. ....
294 M	Shorts .....	Star Mills, Nashville, Tenn. ....
295 M	Bran .....	Glen Alpine Milling Co., Glen Alpine, N. C. ....
296 M	Shipstuff .....	The Dunlop Milling Co., Richmond, Va. ....
297 M	Wheat Bran .....	J. D. Pitts, Glen Alpine, N. C. ....
298 M	Shorts .....	do .....
299 M	Feed .....	do .....

## MISCELLANEOUS MICRO

1 A	Corn Meal .....	
2 A	Bran .....	
3 A	Cracked Corn .....	
6 A	Corn Product .....	
7 A	Feed .....	
8 A	Cracked Corn .....	
9 A	Feed .....	Asheville Milling Co., Asheville, N. C. ....
10 A	do .....	
11 A	International Stock Food .....	
12 A	Victor Feed .....	Peters & Bradley Mill Co., Knoxville, Tenn. ....
13 A	Feed .....	
14 A	Bran .....	
15 A	Shorts .....	
16 A	Bran, Shorts and Screenings .....	
17 A	Bran .....	Hiddenite Roller Mills, Hiddenite, N. C. ....
18 A	Middlings .....	
19 A	do .....	
20 A	do .....	

## DISCUSSION OF RESULTS.

The inspection of the above table will reveal the components of these feeds.

## INATION.—CONTINUED.

Laboratory Number.	Retail Dealer.	Ingredients.
287 M	Asheville Grain and Feed Co., Asheville, N. C.	Wheat product.
288 M	do .....	do.
289 M	do .....	Wheat and corn product, mostly corn bran.
290 M	J. L. Smathers & Co., Murphy, N. C. ....	Wheat and corn bran.
291 M	C. H. Ray, Waynesville, N. C. ....	Wheat and corn bran.
292 M	do .....	do.
293 M	C. L. Lewis, Brevard, N. C. ....	Wheat and corn product.
294 M	Mitchell Bros., Brevard, N. C. ....	Wheat product.
295 M	J. A. Shuping, Morganton, N. C. ....	do.
296 M	J. K. Morrison Son, Statesville, N. C. ....	do.
297 M	Sent in by mill .....	do.
298 M	do .....	do.
299 M	do .....	Wheat product and screenings.

## SCOPIC EXAMINATIONS.

1 A	W. W. Graham, Oxford, N. C. ....	Corn product.
2 A	do .....	Wheat product.
3 A	R. B. Peters Grocery Co., Tarboro, N. C. ....	Corn, wheat, oats and trash.
6 A	A. E. Sides, Mt. Airy, N. C. ....	Corn product.
7 A	A. H. Vann, Franklinton, N. C. ....	Wheat product.
8 A	B. D. Booth, Petersburg, Va. ....	Corn product.
9 A	W. W. Upchurch, Raleigh, N. C. ....	Wheat and corn bran.
10 A	J. H. Morrow, Cherryville, N. C. ....	Wheat product and corn cobs.
11 A	P. B. Johnson, Benson, N. C. ....	Wheat product, oil meal, red pepper, gentian, salt, weed seed.
12 A	Sent in by manufacturer .....	Corn, oats, oat hulls, cotton-seed meal, wheat product.
13 A	Davis Bros., Hiddenite, N. C. ....	Wheat product.
14 A	J. D. Pitts, Glen Alpine, N. C. ....	do.
15 A	do .....	do.
16 A	do .....	Wheat product and screenings.
17 A	Sent in by manufacturer .....	Wheat product.
18 A	Adams Grain and Provision Co., Fayetteville, N. C.	do.
19 A	do .....	do.
20 A	do .....	do.

## ADULTERANTS.

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When mixed with good feeding materials, without proper labeling or guarantee to indicate their presence, corn bran, rice chaff, ground corn cobs, peanut hulls, peanut middlings, oat hulls, oat dust, mill sweepings, screenings, cotton-seed hulls, and other similar products are adulterants. The tables containing the chemical and microscopical examinations show that these adulterants were used to a considerable extent in the make-up of the feeds sold for stock in the State prior to the enforcement of the present feed law. To convey an idea of the real feeding value of these adulterants the following analyses were made:

	Per Cent Protein.	Per Cent Fat.	Per Cent Ash.	Per Cent Fiber.
Peanut Hulls -----	4.56	.81	2.17	67.31
Peanut Middlings -----	8.75	.88	16.75	40.75
Ground Corn Cobs -----	3.12	.32	2.19	30.37
Rice Chaff -----	2.50	.31	18.37	34.40
Oat Hulls -----	3.03	1.06	6.70	29.07
Oat Dust -----	8.09	5.01	6.09	1.82
Wheat Screenings -----	9.08	2.02	2.90	3.00
Corn Bran -----	9.00	5.08	1.30	12.70
Cotton-seed Hulls -----	4.75	1.59	3.20	40.54

## SUMMARY.

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*Wheat Bran and Mixed Brans.*—Fifty-one (51) samples of pure wheat bran and mixed brans were examined. Thirteen (13) samples were below the guarantee in protein.

*Middlings or Shorts.*—Fifty (50) samples of middlings or shorts were examined, and all were found to be pure wheat products. Fifteen (15) were below the standard of fifteen (15.00) per cent protein.

*Bran and Shorts.*—Fifteen (15) samples of bran and shorts were examined. All were found to be pure wheat products. Six (6) samples were below their guaranteed analysis. Three (3) were below the standard of 14.50 per cent protein.

*Shipstuff.*—Forty-seven (47) samples of shipstuff were examined. Twenty-one (21) were pure wheat products. Twenty-six (26) were mixtures.

*Corn and Oat Feeds.*—Twelve (12) samples of corn and oat feeds were examined. Eight of these samples contained less than 10.00 per cent protein, and are therefore low grade.

*Rice Feeds.*—Seven (7) samples of rice feeds were examined. These feeds vary very much in composition and should be purchased according to the analysis they bear.

*Molasses Feeds.*—Thirteen (13) samples of molasses or sugar feeds were examined. These feeds vary in quality, due to difference in composition.

*Beet Pulp.*—Two samples of beet pulp were examined. The analyses of this product will reveal its nutritive value.

*Hominy Feeds and Chops.*—Fourteen samples of hominy feeds and chops were examined. Samples 2893 and 2894 are not chops, but wheat products.

*Cotton-seed Feeds.*—Three (3) samples of cotton-seed feeds were examined. These samples are guaranteed to contain twenty-two (22) per cent protein.

*Special Mixed Feeds.*—Eighteen (18) samples of special named feeds were examined. Most of these feeds are of good quality.

*Miscellaneous Feeds.*—Eighty-eight samples of miscellaneous feeds were examined. The analyses of these products will reveal their nutritive value.

*Cracked Corn.*—Fourteen (14) samples of cracked corn were examined. Some of the samples of cracked corn were made from damaged corn.

*Miscellaneous Feeds Examined Microscopically.*—One hundred and five (105) samples of feeds were examined microscopically. An examination of the column marked "Ingredients" will show the material of which these feeds are composed.

Fifty-four (54) samples of cotton-seed meals were examined. Eighteen and a half (18½) per cent were found to contain less than 7½ per cent ammonia.

## INSPECTION AND ANALYSES OF COTTON-SEED MEAL.

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The cotton-seed meal law of this State requires that all cotton-seed meal sold in the State shall contain 7½ per cent ammonia or more. Fifty-four (54) samples of cotton-seed meals have been examined. The samples have been secured in different parts of the State, at different times, and represent the quality of this product that is offered for sale in this State. Ten (10) of the samples examined, or 18.5 per cent, were below the standard of 7½ per cent ammonia. The samples below 7½ per cent ammonia appear in black type.

*Discussion of Results.*—Good grades of cotton-seed meal contain 43 per cent or more of protein. This means that they have about 7 per cent of nitrogen, which is equal to 8.50 per cent ammonia.

## ANALYSES OF COTTON-SEED MEAL.

Laboratory Number.	Name and Address of Manufacturer.	Per cent Ammonia Guaranteed.	Per cent Ammonia Found.	Per cent Protein Found.
2309	Battleboro Oil Co., Battleboro, N. C. -----		8.12	41.81
2314	---do-----		8.00	41.19
2321	---do-----		7.98	41.06
2312	---do-----		7.90	40.68
2326	---do-----		7.80	39.72
2313	---do-----		7.76	59.93
2380	---do-----		7.64	39.31
2315	---do-----		<b>7.00</b>	36.06
2338	Bragaw, William, & Co., Washington, N. C. -----	7.50	8.40	43.25
2362	Chatham Cotton Oil Co., Pittsboro, N. C. -----	7.50	7.67	39.50
2363	---do-----	7.50	8.18	42.12
2366	Consumers Cotton Oil Co., Tarboro -----	7.50	8.06	41.50
2367	Cotton Oil Ginning Co., Scotland Neck, N. C. -----	7.50	8.67	44.62
2343	Eastern Cotton Oil Co., Hertford, N. C. -----	7.50	<b>7.42</b>	38.19
2340	---do-----	7.50	7.70	39.62
2364	Elba Manufacturing Co., Charlotte, N. C. -----	7.50	7.72	39.75
2358	---do-----	7.50	8.38	43.12
2303	Fremont Oil Mill Co., Fremont, N. C. -----		8.00	41.19
2372	Georgia Cotton Oil Co., Atlanta, Ga. -----	7.50	7.82	40.25
2336	Havens' Oil Mill, Washington, N. C. -----	7.50	8.04	41.37
2297	Kings Mountain Cotton Co., Kings Mountain, N. C. -----		8.88	45.68
2368	Laurinburg Oil Co., Laurinburg, N. C. -----	7.50	8.21	42.25
2365	---do-----		7.96	41.00
2386	---do-----		7.60	39.12
2289	---do-----		<b>7.46</b>	38.72
2302	---do-----		8.00	41.19
2290	Lenoir Oil and Ice Co., Kinston, N. C. -----		8.18	42.12
2317	---do-----		8.04	41.37
2304	---do-----		7.96	41.00
2324	---do-----		7.80	39.72
2323	---do-----		7.76	39.93
2291	Morgan Oil and Fertilizer Co., Red Springs, N. C. -----		<b>7.32</b>	37.68
2337	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C. -----	7.50	8.08	41.56
2320	North Carolina Cotton Oil Co., Henderson, N. C. -----	7.50	<b>6.82</b>	35.12
2335	---do-----	7.50	<b>7.28</b>	37.50
2288	Pine Level Oil Mills Co., Pine Level, N. C. -----		7.56	38.94
2319	---do-----		8.38	43.12
2341	Pitt County Oil Co., Winterville, N. C. -----	7.50	7.64	39.31

## ANALYSES OF COTTON-SEED MEAL.—CONTINUED.

Laboratory Number.	Name and Address of Manufacturer.	Per cent Ammonia Guaranteed.	Per cent Ammonia Found.	Per cent Protein Found.
2311	Rowland Oil and Fertilizer Co., Rowland, N. C. -----		7.50	38.44
2357	Southern Cotton Oil Co., Charlotte, N. C. -----	7.50	7.84	40.37
2356	-----do -----	7.50	<b>7.33</b>	37.75
2295	Southern Cotton Oil Co., Concord, N. C. -----	7.50	8.18	42.12
2369	Southern Cotton Oil Co., Goldsboro, N. C. -----	7.50	8.28	42.62
2339	Southern Cotton Oil Co., Rocky Mount, N. C. -----	7.50	<b>7.30</b>	37.56
2344	Southern Cotton Oil Co., Tarboro, N. C. -----	7.50	<b>7.00</b>	36.06
2359	Southern Cotton Oil Co., Wilson, N. C. -----	7.50	8.12	41.81
2361	Southern Cotton Oil Co., Wilmington, N. C. -----	7.50	<b>7.45</b>	38.37
2331	Speed Milling Co., Speed, N. C. -----		8.04	41.37
2294	Statesville Oil and Fertilizer Co., Statesville, N. C. -----	7.50	8.30	42.75
2342	Tar River Oil Co., Tarboro, N. C. -----	7.50	8.38	43.12
2371	Virginia-Carolina Chemical Co., Richmond, Va. -----	7.50	8.01	41.23
2325	Verner Oil Co., Lattimore, N. C. -----		8.38	43.62
2292	-----do -----		7.98	41.06
2318	Wells, J. Lindsay, & Co., Memphis, Tenn. -----		8.60	44.25

## INSPECTION AND ANALYSIS OF COTTON-SEED MEAL.

## AN ACT TO REGULATE THE SALE AND INSPECTION OF COTTON-SEED MEAL.

[Chapter 267, Laws 1905.]

*The General Assembly of North Carolina do enact:*

SECTION 1. That chapter three hundred and thirty-nine (339) of the Public Laws of one thousand nine hundred and three (1903), entitled "An act to regulate the sale, inspection and branding of cotton-seed meal," be amended so as to read as follows:

SEC. 2. That all cotton-seed meal sold for use as fertilizer or feed shall be subject to an inspection tax of twenty cents per ton, and be subject to inspection, as other fertilizers or fertilizing materials, unless sold to manufacturers for use in manufacturing fertilizers.

SEC. 3. That all cotton-seed meal offered for sale, unless sold to manufacturers for use in manufacturing fertilizers, shall have plainly branded on the bag containing it, or on a tag attached thereto, the following data:

1. Cotton-seed meal with brand.
2. Weight of package.
3. Ammonia or nitrogen.
4. Name and address of manufacturer.

SEC 4. That no person or persons, firm or corporation shall offer for sale any cotton-seed meal, except as provided in section three of this act, with a minimum per cent of ammonia of less than seven and one-half ( $7\frac{1}{2}$ ) per cent. Meal containing seven and one-half ( $7\frac{1}{2}$ ) per cent or more of ammonia is standard meal, and may be so branded. Meal containing eight (8) per cent or more of ammonia is high-grade meal, and may be so branded.

SEC. 5. That the State Board of Agriculture is empowered and directed to make such rules and regulations as are necessary to a proper carrying into effect the provisions of this act, and to provide for all such tags as manufacturers may demand, upon paying the tax therefor. Any person willfully violating any of the regulations made by the Board of Agriculture in connection with this act shall be guilty of a misdemeanor. Any person or persons, firm or corporation who shall sell or offer for sale any cotton-seed meal without having the proper tax tags attached thereto, or who shall use the required tags the second time to avoid the payment of the tonnage charge, and every person who shall remove any such meal, shall be liable to a penalty of ten dollars (\$10) for each separate bag, barrel or other package sold or offered for sale or removed, to be recovered by any person who may sue for the same.

SEC. 6. That any person or persons, firm or corporation who shall sell or offer for sale any cotton-seed meal contrary to the provisions above set forth shall be guilty of a misdemeanor, and all cotton-seed meal so sold or offered for sale shall be subject to seizure, condemnation and sale by the Commissioner of Agriculture. Such seizure and sale shall be made under the direction of the Commissioner of Agriculture by an officer or agent of the department; the sale to be made at the courthouse door in the county in which the seizure is made, after thirty (30) days' advertisement in some newspaper published in said county, or if no newspaper is published in said county, then by like advertisement in a newspaper published in the nearest county thereto having a newspaper. The advertisement shall state the grade of the meal, the quantity, why seized and offered for sale.

The Commissioner, however, shall have the discretion to release the meal so seized and condemned upon compliance with the law as set forth above and the payment of all costs and expenses incurred by the department in any proceedings connected therewith. The net proceeds from such sale shall be placed in the general fund of the department and accounted for upon its books.

SEC. 7. Whenever the Commissioner of Agriculture shall be satisfied that any cotton-seed meal is essentially below the guaranteed analysis it shall be his duty to assess said deficiency against the manufacturer of the meal and require that the value of said deficiency be made good to all persons who, in the opinion of the Commissioner, have purchased the said meal; and the Commissioner may seize any meal belonging to said company, to the value of the deficiency, if the deficiency shall not be paid within thirty (30) days after notice to the company. If the Commissioner shall be satisfied that the deficiency in analysis was due to intention or fraud of the manufacturer, then the Commissioner shall assess and collect from the manufacturer twice the amount of the deficiency and pay over the same to parties who purchased said meal. That if any manufacturer shall resist such collection or payment the Commissioner shall immediately publish the analysis and the facts in THE BULLETIN and in such newspapers in the State as he may deem necessary.

SEC. 8. It shall be unlawful for any manufacturer to adulterate cotton-seed meal in the process of manufacture or otherwise.

SEC. 9. This act shall be in force from and after July first, nineteen hundred and five (1905).

In the General Assembly read three times, and ratified this the 17th day of February, A. D. 1905.



## LEAF TOBACCO REPORT FOR MONTH OF OCTOBER, 1908.

Pounds sold for producers, first hand.....	41,291,239
Pounds sold for dealers.....	1,239,974
Pounds resold for warehouse.....	1,878,611
Pounds resold for other warehouses.....	71,296
Total .....	<u>44,481,120</u>



THE BULLETIN

OF THE

NORTH CAROLINA

DEPARTMENT OF AGRICULTURE,

RALEIGH.

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NINTH ANNUAL REPORT

ON

FOOD ADULTERATION

UNDER THE PURE FOOD LAW.

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Swannanoa, N. C.



# REPORT ON FOOD ADULTERATION FOR 1908.

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B. W. KILGORE, STATE CHEMIST.

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BY

W. M. ALLEN, . . . . . FOOD CHEMIST.

ASSISTED BY HAMPDEN HILL.

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A general statement, an extract from the State Food Law, the rulings of the Board of Agriculture on labeling, and the results of the examination of food products for the year 1908—constituting the ninth annual report under the Food Law—are presented on the following pages:

## GENERAL STATEMENT.

When of general interest, analyses will be made for parties within the State, if samples are taken in accordance with instructions furnished by the Department and the required data concerning the samples are given.

Results of analyses are sent to parties sending samples and parties from whom samples are obtained by the Department, as well as the manufacturer of the products.

It is the desire of the Department to put information into the hands of manufacturers, dealers and consumers of food, and to assist them in every way it can to know and manufacture, handle and use the best, most desirable and most wholesome food products. The Food Control is in the interest of the honest manufacturer, the honest dealer, and for the protection of the consumer.

## EXTRACT FROM FOOD LAW.

The following extract from the Pure Food Law is very important, and the same is herewith printed in order that the grocerymen may become more familiar with the requirements of the law.

State Food Law, section 6, defines and describes what constitutes food adulteration. Section 7 defines and describes what constitutes the misbranding of food products. Section 9 provides for a guaranty by which the retail dealer may be exempt from prosecution for violation of the law.

## EXTRACT FROM STATE FOOD LAW.

SEC. 6. That for the purpose of this act an article shall be deemed to be adulterated, in the case of food—

First. If any substance has been mixed or packed with it, so as to reduce or lower or injuriously affect its quality or strength.

Second. If any substance has been substituted wholly or in part for the article.

Third. If any valuable constituent of the article has been wholly or in part abstracted.

Fourth. If it be mixed, colored, powdered, coated, or stained in a manner whereby damage or inferiority is concealed.

Fifth. If it contains any added poisonous or other added deleterious ingredient which may render such article injurious to health. If it contains any of the following substances, which are hereby declared deleterious and dangerous to health when added to human food, to-wit: Colors which contain antimony, arsenic, barium, lead, cadmium, chromium, copper, mercury, uranium, or zinc; or the following colors: gamboge, corallin, picric acid, aniline, or any of the coal-tar dyes; dulcin, glucin, or any other artificially or synthetically prepared substitute for sugar except saccharine; paraffin, formaldehyde, beta-naphthol, abrastol, benzoic acid or benzoates, salicylic acid or salicylates, boric acid or borates, sulphurous acid or sulphites, hydrofluoric acid or any fluorine compounds, sulphuric acid or potassium sulphate or wood alcohol: *Provided*, that catsups and condimental sauces may, when the fact is plainly and legibly stated in the English language on the wrapper and label of the package in which it is retailed, contain not to exceed two-tenths of one per cent of benzoic acid or its equivalent in sodium benzoate. Fermented liquors may contain not to exceed two-tenths of one per cent of combined sulphuric acid and not to exceed eight-thousandths of one per cent of sulphurous acid.

Sixth. If it consists in whole or in part of a filthy, decomposed or putrid animal or vegetable substance, or any portion of an animal unfit for food, whether manufactured or not, or if it is the product of a diseased animal or one that had died otherwise than by slaughter. In addition to the ways already provided, sausage shall be deemed to be adulterated if it is composed in any part of liver, lungs, kidneys or other viscera of animals: *Provided*, that the use of animal intestines as sausage casings shall not be deemed to be an adulteration.

Seventh. If it differs in strength, quality or purity from the standard of purity of food products that have been or may be from time to time adopted by the Board of Agriculture.

SEC. 7. That the term "misbranded," as used herein, shall apply to all drugs or articles of food, or articles which enter into the composition of food, the package or label of which shall bear any statement, design or device regarding such article or the ingredients or substances contained therein which shall be false or misleading in any particular, and to any food or drug product which is falsely branded as to the State, Territory or country in which it is manufactured or produced.

That for the purpose of this act an article shall also be deemed to be misbranded, in the case of food—

First. If it be an imitation of or offered for sale under the distinctive name of another article.

Second. If it be labeled or branded so as to deceive or mislead the purchaser, or purport to be a foreign product when not so, or if the contents of the package as originally put up shall have been removed in whole or in part and other contents shall have been placed in such package, or if it fail to bear a statement on the label of the quantity or proportion of any morphine, opium, cocaine, heroin, alpha or beta eucaine, chloroform, cannabis indica, chloral hydrate, or acetanilide, or any derivative or preparation of any such substances contained therein.

Third. If in package form and the contents are stated in terms of weight or measure, they are not plainly and correctly stated on the outside of the package.

Fourth. If the package containing it or its label shall bear any statement, design or device regarding the ingredients or the substances contained therein, which statement, design or device shall be false or misleading in any particular: *Provided*, that an article of food which does not contain any added poisonous or deleterious ingredients shall not be deemed to be adulterated or misbranded in the following cases:

First. In the case of mixtures or compounds which may be now or from time to time hereafter known as articles of food under their own distinctive names,

and not an imitation of or offered for sale under the distinctive name of another article, if the name be accompanied on the same label or brand with a statement of the place where said article has been manufactured or produced.

Second. In the case of articles labeled, branded or tagged so as to plainly indicate that they are compounds, imitations or blends, and the word "compound," "imitation," or "blend," as the case may be, is plainly stated on the package in which it is offered for sale: *Provided*, the labeling is according to the rules prescribed by the Board of Agriculture: *Provided*, that the term "blend," as used herein, shall be construed to mean a mixture of like substances, not excluding harmless coloring or flavoring ingredients used for the purpose of coloring and flavoring only.

SEC. 9. That no dealer shall be prosecuted under the provisions of this act when he can establish a guaranty signed by the wholesaler, jobber, manufacturer or other party, residing in North Carolina, from whom he purchased such articles, to the effect that the same is not adulterated or misbranded within the meaning of this act designating it.

#### RULINGS OF THE STATE BOARD OF AGRICULTURE UNDER THE FOOD LAW IN REGARD TO LABELING FOOD PRODUCTS.

A label must be, as far as possible, attached to each package, and contain, in addition to other information, the name of the material, the name and address of the manufacturer, importer or jobber. When the words "artificial," "imitation," "compound," "adulterated," or other words of similar import, are required, they must be on the principal label and immediately precede or follow the word or words they modify, which must be the principal word or words of the label, and be in at least half the size and same style of type and on the same kind of background as the word or words with which they are closely associated. The principal words in the label must be printed in either dark-colored letters on a light-colored background or light-colored letters on a dark-colored background. Any statement that is required on the principal label of a barrel or cask of molasses, molasses compound, syrup or compound syrup, vinegar or compound vinegar, must appear on one end or head of the barrel or cask; and if the principal label or any part of it appears on both ends of barrel or cask, they shall be identical, one to the other.

The label on bottled soft drinks must bear the name and address of the bottler.

Where the presence of preservatives, coloring matter or other substance or substances is required to be printed on the label, the printing must be done clearly and conspicuously on the label, in type not smaller than *brevier heavy gothic caps*, and on the same kind of background as the rest of the label.

Retail dealers, while offering food or beverage for sale, must keep the label so that it may be seen by purchaser or inspector, and the label must be so kept that it will remain legible.

## RESOLUTIONS.

The following important resolutions were adopted by the Association of State and National Food Officials at their last annual meeting:

*Resolved*, That this Association is unalterably opposed to the bleaching of flour by the oxides of nitrogen or other chemicals.

*Resolved*, That this Association is convinced that all chemical preservatives are harmful in foods, and that all kinds of food products are and may be prepared and distributed without them, and pledges its best effort to use all moral and legal means at its disposal to exclude chemical preservatives from food products.

## BLEACHED FLOUR.

The Secretary of Agriculture of the United States has just issued a decision regarding the bleaching of flour, which is in part as follows:

Flour bleached with nitrogen peroxide, as affected by the Food and Drugs Act of June 30, 1906, has been made the subject of a careful investigation extending over several months.

A public hearing on this subject was held by the Secretary of Agriculture and the Board of Food and Drug Inspection, beginning November 18, 1908, and continuing five days. At this hearing those who favored the bleaching process and those who opposed it were given equal opportunities to be heard.

It is my opinion, based upon all the testimony given at the hearing, upon the reports of those who have investigated the subject, upon the literature, and upon the unanimous opinion of the Board of Food and Drug Inspection, that flour bleached by nitrogen peroxide is an adulterated product under the Food and Drugs Act of June 30, 1906; that the character of the adulteration is such that no statement upon the label will bring bleached flour within the law, and that such flour cannot legally be made or sold in the District of Columbia or in the Territories, or be transported or sold in interstate commerce.

In view of the extent of the bleaching process and of the immense quantity of bleached flour now on hand or in process of manufacture, no prosecutions will be recommended by this Department for manufacture and sale thereof in the District of Columbia or the Territories or for transportation or sale in interstate or foreign commerce for a period of six months from the date hereof.

The sale of flour bleached by nitrogen peroxide is regarded as a violation of the State Food Law, and after June 1, 1909, the sale of flour so bleached will be prohibited in North Carolina.

## SUMMARY OF RESULTS FOR COMPARISON.

For convenience of comparison of the work for the nine years, and to show at a glance the products which have been examined, and the extent of adulteration of each, a summary of the results by year and by subject is given below.

## SUMMARY OF WORK DONE BY YEAR.

1900.	No. of samples examined, 507; per cent adulteration found, 56.0.
1901.	No. of samples examined, 308; per cent adulteration found, 35.7.
1902.	No. of samples examined, 589; per cent adulteration found, 21.3.
1903.	No. of samples examined, 477; per cent adulteration found, 32.1.
1904.	No. of samples examined, 347; per cent adulteration found, 17.0.
1905.	No. of samples examined, 317; per cent adulteration found, 42.2.
1906.	No. of samples examined, 466; per cent adulteration found, 24.7.
1907.	No. of samples examined, 560; per cent adulteration found, 29.82.
1908.	No. of samples examined, 730; per cent adulteration found, 16.45.

Total number of samples examined since the law went into effect (1900), 4,301.

Average per cent of adulteration found, 30.58.

<i>Name of Sample.</i>	<i>Date.</i>	<i>Total No. Samples.</i>	<i>Per Cent Adulteration.</i>
Baking Powders .....	1901	85	18.80
Baking Powders .....	1902	12	
Baking Powders .....	1906	64	1.50
Baking Powders .....	1908	7	
Beers—1900, 1902, etc. See Malts.			
Beers and Imitation Beers.....	1907	50	6.00
Beers and Imitation Beers.....	1908	86	4.64
Breakfast Foods .....	1900	24	4.11
Breakfast Foods .....	1903	20	
Breakfast Foods .....	1904	39	
Breakfast Foods .....	1908	19	
Butter, Renovated Butter and Butterine.....	1900	11	
Butter, Renovated Butter and Butterine.....	1902	22	
Butter, Renovated Butter and Butterine.....	1904	15	
Butter, Renovated Butter and Butterine.....	1906	20	
Butter, Renovated Butter and Butterine.....	1908	10	20.00
Canned Fruit:			
Apples .....	1902	2	
Apples .....	1908	3	
Apricots .....	1902	6	17.00
Apricots .....	1904	1	
Apricots .....	1908	1	
Blackberries .....	1902	2	
Blackberries .....	1904	1	
Blackberries .....	1908	2	
Cherries .....	1902	3	33.33
Cherries .....	1908	1	

<i>Name of Sample.</i>	<i>Date.</i>	<i>Total No. Samples.</i>	<i>Per Cent Adulteration.</i>
Peaches .....	1902	14	21.50
Peaches .....	1904	1	
Peaches .....	1908	5	
Pears .....	1902	7	8.60
Pears .....	1904	2	
Pears .....	1908	2	
Pineapple .....	1902	3	
Pineapple .....	1904	3	
Pineapple .....	1908	2	
Plums .....	1904	2	
Canned Fish and Oysters.....	1904	53	1.88
Canned Meats .....	1904	33	39.39
Canned Vegetables:			
Asparagus .....	1904	3	
Beans, baked .....	1900	8	100.00
Beans, baked .....	1904	3	33.33
Beans, baked .....	1908	2	
Beans, Lima .....	1900	8	62.50
Beans, Lima .....	1904	3	
Beans, Lima .....	1908	2	
Beans, Snap .....	1900	9	77.77
Beans, Snap .....	1904	3	
Beans, Snap .....	1908	2	
Beets .....	1904	3	
Beets .....	1908	1	
Celery .....	1900	2	
Corn .....	1900	70	60.00
Corn .....	1902	56	34.00
Corn .....	1904	16	43.75
Corn .....	1905	29	
Corn .....	1908	2	
Corn and Tomatoes.....	1900	4	100.00
Okra .....	1900	2	50.00
Okra and Tomatoes.....	1900	8	100.00
Okra and Tomatoes.....	1904	3	33.33
Okra and Tomatoes.....	1908	1	
Peas, Garden .....	1900	37	81.00
Peas, Garden .....	1904	6	17.00
Peas, Garden .....	1908	1	
Pumpkin .....	1900	8	50.00
Succotash .....	1900	14	7.14
Tomatoes .....	1900	55	63.63
Tomatoes .....	1902	25	24.00
Tomatoes .....	1904	7	
Tomatoes .....	1908	10	
Canned Soups .....	1906	26	
Canned Soups .....	1907	4	

<i>Name of Sample.</i>	<i>Date.</i>	<i>Total No. Samples.</i>	<i>Per Cent Adulteration.</i>
Catsups and Sauces.....	1900	43	91.61
Catsups and Sauces.....	1902	22	100.00
Catsups and Sauces.....	1903	49	100.00
Catsups and Sauces.....	1907	11	27.27
Catsups and Sauces.....	1908	4	25.00
Ciders and Imitation Ciders.....	1900	3	100.00
Ciders and Imitation Ciders.....	1902	2	50.00
Ciders and Imitation Ciders.....	1903	1	100.00
Ciders and Imitation Ciders.....	1905	33	81.82
Ciders and Imitation Ciders.....	1908	40	27.50
Cheese .....	1902	33	6.00
Cheese .....	1904	11	
Chocolate .....	1904	10	20.00
Cocoa .....	1904	14	
Coffee .....	1900	55	36.30
Coffee .....	1903	38	
Coffee and Coffee Substitutes.....	1907	6	33.33
Coloring Matter .....	1907	7	
Coloring Matter .....	1908	12	
Condensed Milk .....	1907	16	
Condiments .....	1901	44	20.40
Confectionery .....	1908	42	
Corn Meal .....	1902	17	
Corn Meal .....	1903	23	
Corn Meal .....	1908	20	
Distilled Liquors .....	1903	3	
Distilled Liquors .....	1904	14	
Distilled Liquors .....	1906	28	
Distilled Liquors .....	1907	6	
Distilled Liquors .....	1908	30	6.66
Dried and Evaporated Fruit.....	1906	23	30.44
Fish and Oysters, fresh.....	1906	14	7.15
Fish and Oysters, fresh.....	1907	5	40.00
Fish and Oysters, fresh.....	1908	7	
Flour .....	1900	37	
Flour .....	1902	70	1.40
Flour .....	1903	77	
Flour .....	1904	59	
Flour .....	1908	68	
Fruit Butter, Plum.....	1901	5	100.00
Fruit Butter, Apple.....	1903	1	100.00
Fruit Butter .....	1907	6	100.00
Fruit Juice .....	1900	4	75.00
Fruit Juice .....	1903	2	100.00
Honey .....	1901	5	20.00
Honey .....	1903	6	33.30
Honey .....	1906	3	

<i>Name of Sample.</i>	<i>Date.</i>	<i>Total No. Samples.</i>	<i>Per Cent Adulteration.</i>
Jams .....	1901	9	100.00
Jams .....	1903	14	78.40
Jams .....	1907	14	28.56
Jams .....	1908	3	
Jellies .....	1901	10	100.00
Jellies .....	1903	14	76.60
Jellies .....	1907	50	48.00
Jellies .....	1908	12	
Lard .....	1900	11	9.00
Lard .....	1902	32	3.10
Lard, Compound .....	1902	24	
Malts, Beers, Ales, and Imitations.....	1900	30	80.00
Malts, Beers, Ales, and Imitations.....	1902	3	100.00
Malts, Beers, Ales, and Imitations.....	1903	14	86.00
Malts, Beers, Ales, and Imitations.....	1905	17	47.00
Malts, Beers, Ales, and Imitations.....	1906	91	31.68
Malts and Imitation Malts.....	1907	5	20.00
Maraschino Cherries .....	1907	8	100.00
Maraschino Cherries .....	1908	4	100.00
Meats, fresh .....	1904	12	83.33
Meats, fresh .....	1906	107	47.66
Meats, fresh .....	1907	134	7.46
Meats, fresh .....	1908	13	7.69
Mince Meat .....	1907	9	27.22
Miscellaneous .....	1908	21	18.20
Molasses and Syrup.....	1901	32	81.20
Molasses and Syrup.....	1903	11	37.50
Maple Sugar .....	1905	2	50.00
Maple Syrup .....	1905	15	86.66
Marmalade .....	1903	3	
Olive Oil and other Table Oils.....	1900	11	18.18
Olive Oil and other Table Oils.....	1905	14	
Olive Oil and other Table Oils.....	1908	6	
Phosphates .....	1902	6	100.00
Phosphates .....	1903	3	
Phosphates .....	1905	2	
Phosphates .....	1907	7	28.57
Phosphates .....	1908	3	66.66
Pickles .....	1907	6	66.66
Prepared Mustard and Salad Dressings.....	1902	11	90.90
Prepared Mustard and Salad Dressings.....	1904	37	75.75
Prepared Mustard and Salad Dressings.....	1906	24	12.50
Preservatives, chemical .....	1907	31	
Preservatives, chemical .....	1908	4	
Preserves .....	1901	11	100.00
Preserves .....	1903	20	75.00

<i>Name of Sample.</i>	<i>Date.</i>	<i>Total No. Samples.</i>	<i>Per Cent Adulteration.</i>
Preserves and Marmalades.....	1907	37	37.80
Preserves and Marmalades.....	1908	7	
Rice .....	1908	59	
Soda Waters, bottled.....	1900	33	72.72
Soda Waters, bottled.....	1902	36	72.00
Soda Waters, bottled.....	1903	20	25.00
Soda Waters, bottled.....	1906	7	43.00
Soda Waters, bottled.....	1907	54	61.05
Soda Waters, bottled.....	1908	144	54.86
Sugar, white .....	1901	19	
Sugar, brown .....	1903	16	
Sugar, white .....	1903	29	
Sweeteners, Artificial .....	1908	5	
Tea .....	1901	25	
Tea .....	1903	21	33.33
Tapioca .....	1903	3	
Tonics and Bitters.....	1900	1	100.00
Tonics and Bitters.....	1902	3	33.33
Tonics and Bitters.....	1903	3	33.33
Tonics and Bitters.....	1905	14	7.14
Tonics and Bitters.....	1906	13	
Tonics .....	1907	4	
Tonics .....	1908	3	
Vinegar .....	1900	22	59.00
Vinegar .....	1901	13	30.70
Vinegar .....	1903	62	29.00
Vinegar .....	1905	52	34.61
Vinegar .....	1906	21	47.62
Vinegar .....	1907	39	30.72
Vinegar .....	1908	64	15.50
Whiskeys. See Distilled Liquors.			
Wines .....	1903	5	100.00
Wines .....	1905	1	100.00
Wines .....	1906	5	
Wines .....	1907	2	

## WORK OF THE YEAR 1908.

During the year 730 samples of foods and beverages and products used in the manufacture and adulteration of the same have been analyzed. The samples were either sent to the Department by citizens of the State for analysis or were obtained by officers of the Department from various towns in the State.

## SUMMARY OF RESULTS OF THE EXAMINATION OF FOOD PRODUCTS FOR 1908.

Name of Sample.	Total Number of Samples.	No Adulteration Found.	Number of Samples Adulterated.	Per Cent of Samples Adulterated.	Number of Samples Mis-branded.	Number of Samples not Properly Labeled.	Kind of Adulteration.
Preservatives.....	4	4					
Oysters.....	7	7					
Tonics.....	3	3					
Fresh meats and sausage....	13	12	1	7.69			Sulphites.
Coloring matters.....	12	12					
Butters and imitation butters	10	8	2	20.00		1	Oleomargarine.
Oils.....	6	6					
Soda waters.....	144	65	79	54.86	68	68	Coal-tar dye.
Baking powder.....	7	7				2	
Phosphates.....	3	1	2	66.66			Benzoic acid.
Maraschino cherries.....	4		4	100.00		1	Benzoic acid, coal-tar dye.
Artificial sweeteners.....	5	5					
Catsups and sauces.....	4	3	1	25.00			Coal-tar dye.
Jellies.....	12	12					
Jams.....	3	3					
Preserves and marmalades...	7	7					
Canned vegetables.....	21	21					
Canned fruit.....	16	16				1	
Confectionery.....	42	42					
Vinegar.....	64	54	10	15.50	1		Below standard, compound.
Beer and imitation beer.....	86	82	4	4.64	6	14	Benzoates.
Ciders and imitation ciders...	40	29	11	27.50	6	4	Coal-tar dye, benzoates, salicylates.
Distilled liquors.....	30	28	2	6.66	8		Coal-tar dye, artificial flavor.
Rice.....	59	59				3	

SUMMARY OF RESULTS OF THE EXAMINATION OF FOOD PRODUCTS  
FOR 1908—CONTINUED.

Name of Sample.	Total Number of Samples.	No Adulteration Found.	Number of Samples Adulterated.	Per Cent of Samples Adulterated.	Number of Samples Misbranded.	Number of Samples not Properly Labeled	Kind of Adulteration.
Meal.....	20	20					
Flour.....	68	68					
Breakfast foods.....	19	19					
Miscellaneous.....	21	17	4	18.20			
Total.....	730	610	120	16.45	89	94	

## METHODS OF ANALYSIS.

The methods of analysis of the Association of Official Agricultural Chemists were followed in the examination of the products presented in this report.

## MEAT.

(MEAT, SAUSAGE, OYSTERS AND FISH.)

Meat is any clean, sound, dressed and properly prepared edible part of an animal in good health at the time of slaughter. The term "animal," as herein used, includes not only mammals, but fish, fowls, crustaceans, mollusks and all other animals used as food.

Meat is adulterated if treated with any chemical preservative or dyestuff whose use and purpose are to retard, prevent or mask decomposition. In addition to the above, sausage will be regarded as adul-

## RESULTS OF THE EXAMINATION

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.
5226	Sausage, meat and cereal.....	Swift & Co., Chicago, Ill.....
5227	..do.....	..do.....
5248	..do pork.....	W. S. Forbes & Co., Richmond, Va.....
5540	..do.....	Armour Packing Co., Chicago, Ill.....
6119	..do mixed.....	The Royal Meat Co., Henderson, N. C.....
6120	..do.....	Ross & Scroggins, Henderson, N. C.....
6121	..do.....	B. F. Payne, Henderson, N. C.....
6118	Beef.....	Schwarzschild & Sulzberger Co., Norfolk, Va.....
6130	Sausage, mixed.....	Watson Law, Greensboro, N. C.....
6131	..do.....	J. C. Olive, Greensboro, N. C.....
6132	..do Frankfort.....	Kingan & Co., Greensboro, N. C.....
6133	..do mixed.....	Schlosser & Son, Greensboro, N. C.....
6134	Tongue.....	Watson Law, Greensboro, N. C.....

## RESULTS OF THE EXAMINA

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.
5243	Oysters.....	S. S. Keeling & Co., Norfolk, Va.....
5244	..do.....	George N. Ives & Son, New Bern, N. C.....
5245	..do.....	A. L. Willis, New Bern, N. C.....
5246	..do.....	W. N. McAnge Co., Suffolk, Va.....
5249	..do.....	..do.....
6116	..do.....	..do.....
6117	..do.....	Isaac Foss, Portsmouth, Va.....

terated if it contains liver, lungs, kidneys or other viscera of animals, except intestines used as sausage casings.

Thirteen samples of meat were examined, and only one was found to be adulterated, and it contained sulphites.

OYSTERS.

Under the head of meats, according to the standards, come fish and oysters.

Under the subhead of oysters, only seven samples were examined, and no adulteration was found.

OF FRESH MEATS AND SAUSAGE.

Laboratory Number.	Retail Dealer or Party Who Sent Sample for Analysis.	Adulterants (Chemical Preservatives)	Remarks and Conclusions.
5226	Henry Honeycutt, Raleigh, N. C. ....	None found.	Contained starch.
5227	J. B. Green & Co., Raleigh, N. C. ....	do.	do.
5248	M. Rosenthal & Co., Raleigh, N. C. ....	do.	
5540	F. A. Lloyd & Son, Jonesboro, N. C. ....	do.	
6119	.....	do.	
6120	.....	do.	
6121	.....	do.	
6118	.....	do.	
6130	.....	do.	
6131	.....	do.	
6132	Schlosser & Son, Greensboro.....	do.	
6133	..do.....	Sulphites.	
6134	..do.....	None found.	

TION OF FRESH OYSTERS.

Laboratory Number.	Retail Dealer or Party Who Sent Sample for Analysis.	Adulterants (Chemical Preservatives).
5243	L. M. Waring, Raleigh, N. C. ....	None found.
5244	C. D. Arthur, Raleigh, N. C. ....	do.
5245	Britton Pearce, Raleigh, N. C. ....	do.
5246	G. S. Terrell, Raleigh, N. C. ....	do.
5247	M. Rosenthal & Co., Raleigh, N. C. ....	do.
6116	D. C. Locklin, Henderson, N. C. ....	do.
6117	B. H. Bullock, Henderson .....	do.

## BUTTER, RENOVATED BUTTER AND BUTTERINE.

"Butter is the clean, nonrancid product made by gathering in any manner the fat of fresh or ripened milk or cream into a mass, which also contains a small portion of other milk constituents, with or without salt, and contains not less than 82.50 per cent of milk fat. It may also contain added coloring matter, provided the coloring matter is not of coal-tar origin."

"Renovated butter, process butter, is the product made by melting butter and working, without the addition or use of chemicals or any substance except milk, cream or salt, and contains not more than 16 per cent of water and at least 82.50 per cent of milk fat."

Oleo, oleomargarine or butterine is a substitute for butter, made from other and cheaper fats than butter. It is manufactured so as to improve its granulation and texture, and a more or less butterlike

## RESULTS OF THE EXAMINATION OF

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.
5291	Butter .....	J. L. Thompson, Lilac, N. C. ....
5318	..do .....	.....
5551	..do .....	A. G. Higgins, Belwood, N. C. ....
5623	..do .....	.....
6061	Butter, Four Leaf Clover .....	Scott & Co., Norfolk, Va. ....
6062	Butter, Renovated .....	..do .....
6063	Butterine .....	..do .....
6115	Butter .....	.....
4463	Butter, Creamery .....	.....
4827	Butter, Country .....	J. A. Arnold, Raleigh, N. C. ....

flavor and odor are imparted to it by churning it with milk, skimmed milk, cream or buttermilk, or possibly by mixing a small amount of butter with it.

In nutritive value oleomargarine is not materially, if at all, inferior to genuine butter. The comparative digestibility of butter and oleomargarine has been found by various experiments to be about the same.

Under this head ten samples were examined, six of which proved to be standard butter, one renovated butter and three oleomargarine. The sample of renovated butter was labeled and sold as renovated butter. No. 4795, oleomargarine, was labeled and sold as such, but No. 6115 was served at a café for butter, and No. 5318 was sold as butter.

Retailers often speak of renovated butter as "tub butter" or "cooking butter," and it is often bought and used without the purchaser or consumer knowing that it is the renovated article.

## BUTTER AND SUBSTITUTES FOR BUTTER.

Laboratory Number.	Retail Dealer or Party Who Sent Sample for Analysis.	Volatile Fatty Acid 10 N. Ba OH c.c.	Reading Refractometer, 40°.	Refractive Index.	Adulterants.	Remarks and Conclusions.
5291	W. J. Lowe, Denton, N. C.-----	-----	43.75	1.4550	None found..	Butter.
5318	Bridgers & Co., Charlotte, N. C.	4.7	48.75	1.4584	Fats other than butter	Oleomargarine.
5551	A. G. Higgins, Belwood, N. C.-----	-----	44.25	1.4553	None found..	Butter
5023	Bridgers & Co., Charlotte, N. C.-----	-----	43.75	1.4550	....do.....	Butter, not properly labeled.
6061	W. B. Mann, Raleigh, N. C.-----	-----	42.97	1.4545	....do.....	Butter.
6062	....do.....	-----	43.25	1.4546	....do.....	Renovated butter.
6063	....do.....	-----	47.95	1.4579	....do.....	Oleomargarine.
6115	Giersch Cafe, Raleigh, N. C.-----	-----	50.00	1.4593	-----	Oleomargarine.
4463	W. P. White, Pine Bluff-----	-----	43.75	1.4550	None found..	Butter.
4827	W. J. Andrews, Raleigh, N. C.---	28.3	43.75	1.4550	....do.....	do.

## CANNED FRUIT.

The advantages to be gained by canning and the process of canning fruit are too well known to require explanation here.

## RESULTS OF THE EXAMI

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.
5408	Apples, Compass.....	D. E. Foot & Co., Baltimore, Md.....
5409	Peaches, Champion.....	H. J. McGrath & Co., Baltimore, Md.....
5410	Peaches, Fern.....	Ferndale Canning Co., Brooklyn, Cal.....
5411	Pears, Castle.....	Woodside Packing Co., Woodside, Del.....
5412	Peaches, Perry & Brooks.....	Schell Packing Co., Baltimore, Md.....
5413	Pineapple, White Cap.....	C. W. Antrim & Son, Richmond, Va.....
5414	Peaches, Turtle Dove.....	Jordan, Trotter & Co., Baltimore, Md.....
5423	Peaches, Belle.....	Marysville Packing Co., Marysville, Cal.....
5547	Apricots, Hesperides.....	Central California Canneries, Sebastopol, Cal.....
5549	Cherries, Helmet.....	California Fruit Cannery Association, Marysville, Cal.....
5892	Blackberries, Mountain.....	R. W. Boyles, Round Peak, N. C.....
5893	do.....	Foote & Johnson, Yadkinville, N. C.....
5894	Apples.....	R. E. Roberts & Co., Baltimore, Md.....
5895	do.....	Elkin Canning Co., Elkin, N. C.....
5898	Pears, Blue Ridge.....	Case & Jones, Dana, N. C.....
5899	Pineapple.....	

## CANNED VEGETABLES.

The advantages to be gained by canning and the process of canning vegetables, like those of fruit, are well known.

## RESULTS OF THE EXAMINATION

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.	Retail Dealer or Party Who Sent Sample for Analysis.
5876	Tomatoes.....	Hart & Bassett, Flat Rock, N. C.	Walker Smith, Hendersonville, N. C.
5877	Tomatoes, Standard.....	H. S. Simmons, Flat Rock, N. C.	do.....
5878	do.....	J. H. Jones, Saluda, N. C.	E. B. Guice & Co., Saluda, N. C.
5879	do.....	Jno. McMurray, Saluda, N. C.	do.....
5880	Tomatoes.....	A. S. Edney, Hendersonville, N. C.	A. L. Table, Hendersonville, N. C.
5881	Tomatoes, Choice.....	Logan Newman, Fish Top, N. C.	Burckmeyer Bros., Hendersonville, N. C.

Sixteen samples of canned fruit were examined for adulteration, but none was found. One sample of pineapple, No. 5899, was not properly labeled. The label did not show the name and address of the manufacturer.

## NATION OF CANNED FRUITS.

Laboratory Number.	Retail Dealer or Party Who Sent Sample for Analysis.	Adulterants.		Remarks and Conclusions.
		Preservatives.	Objectionable Coloring Matter.	
5408	Hayes & Pool, Durham, N. C. ....	None found .....	None found .....	
5409	do .....	do .....	do .....	
5410	do .....	do .....	do .....	
5411	do .....	do .....	do .....	
5412	J. D. Edwards & Son, Durham, N. C. ....	do .....	do .....	
5413	do .....	do .....	do .....	
5414	I. E. Burnett & Co., Durham, N. C. ....	do .....	do .....	
5423	C. Y. Holding & Co., Wake Forest, N. C. ....	do .....	do .....	
5547	N. Hammond, Laurinburg, N. C. ....	do .....	do .....	
5549	C. V. Williams, Hamlet, N. C. ....	None found .....	do .....	
5892	R. C. Poore, Mt. Airy, N. C. ....	do .....	do .....	
5893	W. F. Morrison, Concord, N. C. ....	do .....	do .....	
5894	Theo. Atwell, Salisbury, N. C. ....	do .....	do .....	
5895	W. F. Morrison, Concord, N. C. ....	do .....	do .....	
5898	Walker Smith, Hendersonville, N. C. ....	do .....	do .....	
5899	Dave Bost Co., Concord, N. C. ....	do .....	do .....	Not properly labeled.

Twenty-one samples of canned vegetables were examined, and no adulteration was found. One sample of tomatoes, No. 5885, contained a rather large amount of liquid matter, compared with the solid matter present.

## OF CANNED VEGETABLES.

Laboratory Number.	Adulterants.		Remarks and Conclusions.
	Preservatives.	Coloring Matter.	
5876	None found .....	None found .....	
5877	do .....	do .....	
5878	do .....	do .....	
5879	do .....	do .....	
5880	do .....	do .....	
5881	do .....	do .....	

## RESULTS OF THE EXAMINATION

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.	Retail Dealer or Party Who Sent Sample for Analysis.
5882	Tomatoes, Mountain.....	R. W. Boyles, Round Peak, N. C.	R. C. Poore, Mt. Airy, N. C.
5883	Tomatoes.....	D. M. Miller, Salisbury, N. C.	D. M. Miller, Salisbury, N. C.
5884	do.....	Foot & Johnson, Yadkinville, N. C.	do.....
5885	Tomatoes, Choice.....	T. J. Shinn, Georgeville, N. C.	D. J. Bost Co., Concord, N. C.
5886	Beans, Mountain.....	R. W. Boyles, Round Peak, N. C.	R. C. Poore, Mt. Airy, N. C.
5887	Lima Beans, Apple Blossom..	Blossom Canning Co., Rome, N. Y.	V. W. Idol & Co., High Point, N. C.
5888	String Beans.....	A. S. Edney, Hendersonville, N. C.	Walker Smith, Hendersonville, N. C.
5889	String Beans, Catawba Valley	Catawba Valley Canning Co., Morganton, N. C.	Bristol & Harbison, Morganton, N. C.
5890	Corn.....	Taylor & Boyles, Richmond, Va.	Vernon Grocery Co., Winston, N. C.
5891	Corn, Pride of the Valley....	Frederick Packing Co., Frederick City, Md.	do.....
5896	Tomatoes and Okra, Standard	Valmost Canning Co., Hendersonville, N. C.	Burckmeyer Bros., Hendersonville, N. C.
5897	Beets.....	J. W. Wofford, Hendersonville, N. C.	Walker Smith, Hendersonville, N. C.
4683	Peas, canned, Petite Pois....	Bennett, Sloan & Co., New York, N. Y.	W. H. Barnes, Goldsboro, N. C.
4765	Pork and Beans, Wagner's....	Martin-Wagner Co., Baltimore, Md.	Williams-Little Grocery Co., Wilson, N. C.
4766	Baked Beans, Bunker Hill....	Norman & Lange, Baltimore, Md.	Johnson Bros., Greenville, N. C.

## VINEGAR.

Acetic acid is, of course, the principal constituent of vinegar, but the latter also contains small amounts of ethyl acetate, aldehydes, alkaline acetates, tartrates and various other salts.

Vinegar, on long standing, exposed to the air, deteriorates and loses more or less of its acidity.

The food standards adopted by the Board of Agriculture recognize six kinds of vinegar, namely: (1) vinegar, cider vinegar; (2) wine vinegar; (3) malt vinegar; (4) sugar vinegar; (5) spirit vinegar; (6) glucose vinegar.

When vinegar is sold without naming the class to which it belongs, according to the standards, it means a product made from apple cider.

## RESULTS OF THE EXAM

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.	Retail Dealer or Party Who Sent Sample for Analysis.
5542	Vinegar, Blue Ribbon, Spirits..	American Extract and Vinegar Co., Nashville, Tenn.	A. P. Barrett, Rockingham, N. C.
5443	Vinegar, Star, Pickling.....	L. C. Younger, Richmond, Va.	J. R. Coley, Rockingham, N. C.
5444	Vinegar, Cider.....	R. M. Hughes & Co., Louisville, Ky.	H. M. Broom & Co., Monroe, N. C.

OF CANNED VEGETABLES—CONTINUED.

Laboratory Number.	Adulterants.		Remarks and Conclusions.
	Preservatives.	Coloring Matter.	
5882	None found .....	None found.....	Contained but little solid matter and much liquid.
5883	do .....	do .....	
5884	do .....	do .....	
5885	do .....	do .....	
5886	do .....	do .....	
5887	do .....	do .....	
5888	do .....	do .....	
5889	do .....	do .....	
5890	do .....	do .....	
5891	do .....	do .....	
5896	do .....	do .....	
5897	do .....	do .....	
4683	do .....	do .....	
4765	do .....	do .....	
4766	do .....	do .....	

Therefore, when a vinegar is sold under a brand or trade name, it should state the class to which it belongs; otherwise it will be presumed to be an apple-cider vinegar; then, in case it is not a cider vinegar, it will be classed as misbranded and its sale in the State regarded as a violation of the Food Law.

During the year sixty-four samples of vinegar have been examined, ten (or little more than 15.5 per cent) of which proved to be adulterated or misbranded.

To comply with the requirements of the law a vinegar must contain at least 4 per cent acetic acid. Eight of the samples examined and reported in the table below were below standard. Two samples that proved to be compounds were sold for cider vinegar.

INATION OF VINEGAR.

Laboratory Number.	Total Acidity (Acetic Acid)—Per Cent.	Solid Matter in Solution—Per Cent.	Ash—Per Cent.	Sodium Bicarbonate.	Remarks and Conclusions.
5542	3.00	0.27	0.02	No change.....	Distilled spirit vinegar, below standard.
5443	4.67	0.68	0.19	Slightly darker.....	Compound vinegar.
5444	4.28	2.19	0.29	Very dark.....	Apple cider vinegar.

## RESULTS OF THE EXAMINA

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.	Retail Dealer or Party Who Sent Sample for Analysis.
5445	Vinegar	Knadler & Lucas, Louisville, Ky.	S. B. Hartt, Monroe, N. C.
5558	do		G. Knotts & Son, Littleton, N. C.
5569	do	D. J. Gregory Vinegar Co., Richmond, Va.	C. A. Ingram, Mt. Gilead, N. C.
5579	Vinegar, White House	Semmes-Board Co., Washington, D. C.	Thomas White Co., Durham, N. C.
5584	Vinegar		R. J. Shields, Hobgood, N. C.
5615	do	Fleischman Vinegar Works, New York, N. Y.	The Hicks Co., Wilmington, N. C.
5626	Vinegar, Blue Grass Belle	Jones Bros. & Co., Louisville, Ky.	Uriah Watson, Murfreesboro, N. C.
6004	Vinegar, Apple Cider	Mrs. T. J. Smith, Crocket, Va.	W. L. Pickard, Greensboro, N. C.
6005	Vinegar	Price & Lucas Cider and Vinegar Co., Louisville, Ky.	F. S. Miles, Reidsville, N. C.
6006	Vinegar, Belle of the South	Knadler Pickling, Cider and Vinegar Co., Louisville, Ky.	J. C. Barker, Winston-Salem, N. C.
6007	Vinegar, Red Cross	Red Cross Vinegar Co., St. Louis, Mo.	Jos. A. Pace & Co., Saluda, N. C.
6008	Vinegar	Russell Mfg. Co., Louisville, Ky.	A. Ficker, Hendersonville, N. C.
6009	Vinegar, Royal, Tarragon	Horton-Kato Mfg. Co., Detroit, Mich.	Smathers Cash Grocery, Waynesville, N. C.
6010	Vinegar, Crab Apple Cider	Asheville Bottling Works, Asheville, N. C.	S. H. Miller, Asheville, N. C.
6012	Vinegar, Old Homestead, Spirit	Old Homestead Mfg. Co., Richmond, Va.	W. H. Taylor Co., Wilson, N. C.
6071	Vinegar, Apple Cider	Dewer & Wilder, Raleigh, N. C.	
6074	Vinegar, Monarch	D. J. Gregory Vinegar Co., Richmond, Va.	R. M. Riddick, Gatesville, N. C.
5332	Vinegar, Pure Cider	Louisville Cider and Vinegar Co., Louisville, Ky.	G. T. Powell, Raleigh, N. C.
5333	Vinegar, White House	Semmes-Board Co., Washington, D. C.	Rogers Grocery Co., Raleigh, N. C.
5385	Vinegar, Crab Apple	Asheville Bottling Works, Asheville, N. C.	Asheville Bottling Works, Asheville, N. C.
5394	Vinegar, Albemarle	C. W. Antrim & Sons, Richmond, Va.	C. E. Jourdan, Durham, N. C.
5395	Vinegar, White House	Semmes-Board Co., Washington, D. C.	do
5396	Vinegar, Heinz	H. J. Heinz Co., Pittsburg, Pa.	Perry, Wood & Co., Durham, N. C.
5397	Vinegar, Golden Rod	E. H. Shelby Vinegar Co., Richmond, Va.	Markham & Co., Durham, N. C.
5398	Vinegar	R. M. Hughes & Co., Louisville, Ky.	J. C. Hewitt, Durham, N. C.
5399	Vinegar, Albemarle	C. W. Antrim & Sons, Richmond, Va.	T. M. Stephens & Co., Durham, N. C.
5400	Vinegar	Burr Mfg. Co., Richmond, Va.	I. A. Burnett & Co., Durham, N. C.
5420	Vinegar, Blue Grass Belle	Jones Bros. & Co., Louisville, Ky.	R. W. Wilkinson, Wake Forest, N. C.
5421	Vinegar	Baltimore Mfg. Co., Baltimore, Md.	J. W. Hodge, Wake Forest, N. C.
5422	do	D. J. Gregory Vinegar Co., Richmond, Va.	Homer & Edwards, Wake Forest, N. C.
5427	Vinegar, Blue Grass Belle	Jones Bros. & Co., Louisville, Ky.	J. G. Ball, Raleigh, N. C.
5436	Vinegar, Acme, Spirits	Gathright-Childs Co., Richmond, Va.	Geo. E. Brooks, Pittsboro, N. C.
5437	Vinegar	Philadelphia Vinegar Co., Philadelphia, Pa.	J. T. McNeill, Red Springs, N. C.
5438	Vinegar, Blue Grass Belle	Jones Bros. & Co., Louisville, Ky.	Crump & Floyd, Lumberton, N. C.
5439	Vinegar	Austin, Nichols & Co., New York, N. Y.	E. H. Ray, Fayetteville, N. C.
5440	Vinegar, Albemarle	C. W. Antrim & Sons, Richmond, Va.	W. T. Buchanan, Sanford, N. C.

## TION OF VINEGAR—CONTINUED.

Laboratory Number.	Total Acidity (Acetic Acid)—Per Cent.	Solid Matter in Solution—Per Cent.	Ash—Per Cent.	Sodium Bicarbonate.	Remarks and Conclusions.
5445	3.84	0.28	0.04	No change.....	Distilled spirit vinegar, below standard.
5558	3.54	2.65	0.04	Dark.....	Vinegar.
5569	3.64	1.32	.....	do.....	Compound vinegar, below standard.
5579	4.18	2.12	0.23	Very dark.....	Apple cider vinegar.
5584	4.57	2.12	0.35	do.....	do.
5615	9.44	.....	.....	No change.....	Distilled spirit vinegar.
5626	4.57	2.21	0.21	Very dark.....	Apple cider vinegar.
6004	4.33	1.59	0.30	do.....	do.
6005	4.81	1.08	0.15	Dark.....	Compound vinegar.
6006	3.51	2.03	0.16	do.....	Compound vinegar, below standard.
6007	4.07	0.25	0.03	No change.....	Distilled spirit vinegar.
6008	4.69	1.60	0.21	Very dark.....	Apple cider vinegar.
6009	5.87	1.67	0.08	No change.....	Compound vinegar, Tarragon flavor.
6010	4.93	1.76	0.03	do.....	Compound vinegar, misbranded.
6012	3.48	0.15	0.02	do.....	Distilled spirit vinegar, below standard.
6071	4.86	3.13	0.47	Very dark.....	Apple cider vinegar.
6074	4.94	2.32	0.34	do.....	do.
5332	4.31	2.18	0.30	Very dark.....	Apple cider vinegar.
5333	4.39	1.82	0.28	do.....	do.
5385	4.86	2.44	0.01	No change.....	Compound vinegar.
5394	4.52	3.03	0.29	Very dark.....	Apple cider vinegar.
5395	4.22	1.81	0.30	do.....	do.
5396	4.70	2.67	0.22	do.....	do.
5397	4.47	2.83	0.38	do.....	do.
5398	4.17	1.53	0.21	do.....	do.
5399	4.58	3.13	0.30	do.....	do.
5400	4.13	0.28	0.01	.....	Distilled spirit vinegar.
5420	4.83	1.64	0.31	Very dark.....	Apple cider vinegar.
5421	4.93	0.65	0.12	Slightly darker.....	Vinegar.
5422	3.74	0.71	0.04	do.....	Compound vinegar, below standard.
5427	4.20	3.94	0.23	Very dark.....	Apple cider vinegar.
5436	5.30	0.20	0.02	No change.....	Distilled spirit vinegar.
5437	4.86	1.89	0.36	Very dark.....	Apple cider vinegar.
5438	4.88	3.62	0.32	do.....	do.
5439	5.45	2.02	0.24	do.....	do.
5440	4.67	3.00	0.29	do.....	do.

## RESULTS OF THE EXAMINA

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.	Retail Dealer or Party Who Sent Sample for Analysis.
5441	Vinegar, Hughes' Apple Cider	R. M. Hughes & Co., Louisville, Ky.	E. N. Covington, Rockingham, N. C.
5293	Vinegar, Monogram Blend	R. M. Hughes & Co., Louisville, Ky.	C. W. Jones & Bro., Raleigh, N. C.
5294	Vinegar	-----	Jones & Park, Raleigh, N. C.
5295	Vinegar, Monogram Blend	R. M. Hughes & Co., Louisville, Ky.	E. H. King, Raleigh, N. C.
5296	Vinegar	-----	G. W. Goodwin, Raleigh, N. C.
5297	Vinegar, Apple Cider	Lewis Elmer & Sons, Baltimore, Md.	J. J. Wilson, Raleigh, N. C.
5298	Vinegar, Blue Grass Belle	Jones Bros. & Co., Louisville, Ky.	C. W. White, Raleigh, N. C.
5299	do	do	Oakwood Avenue Grocery, Raleigh, N. C.
5300	Vinegar, Apple Cider	H. J. Heinz Co., Pittsburg, Pa.	Barnes Grocery Co., Raleigh, N. C.
5301	Vinegar, Purity, Apple Cider	Donaldson, Shutz & Co., Baltimore, Md.	Matthews & Taylor, Raleigh, N. C.
5302	Vinegar, Blue Grass Belle	Jones Bros. & Co., Louisville, Ky.	E. N. Pool, Raleigh, N. C.
5303	Vinegar, White House, Apple Cider	Semmes-Board Co., Washington, D. C.	J. A. Spencer, Raleigh, N. C.
5304	Vinegar, Apple Cider	-----	Thomas Burns, Raleigh, N. C.
5305	Vinegar, Blue Grass Belle	Jones Bros. & Co., Louisville, Ky.	M. Wortham, Raleigh, N. C.
5306	Vinegar, Elko, Cider	O. L. Gregory Vinegar Co., Paducah, Ky.	Dock Haywood, Raleigh, N. C.
5307	Vinegar, Cider	Raleigh Flour and Feed Co., Raleigh, N. C.	Central Mercantile Co., Raleigh, N. C.
5308	Vinegar, Elko, Cider	O. L. Gregory Vinegar Co., Paducah, Ky.	Jos. Baker, Raleigh, N. C.
5310	Vinegar, Cider	-----	L. A. Fort, Raleigh, N. C.
5317	do	R. M. Hughes & Co., Louisville, Ky.	C. C. Jones, Raleigh, N. C.
5330	Vinegar	J. G. Ball, Raleigh, N. C.	Theus Smith Grocery Co., Raleigh, N. C.
5331	Vinegar, Monogram Blend	R. M. Hughes & Co., Louisville, Ky.	Julius Heller, Raleigh, N. C.
5230	Vinegar, Cider	Hirsch Bros. & Co., Louisville, Ky.	G. S. Terrell, Raleigh, N. C.
5280	Vinegar, White House	Semmes-Board Co., Washington, D. C.	A. Blanton Grocery Co., Shelby, N. C.
5281	do	do	McLean Co., Greensboro, N. C.
6011	Vinegar	Louisville Vinegar and Cider Co., Louisville, Ky.	-----

## CATSUP AND SAUCES.

There is to be found on the market quite a variety of catsups and sauces, viz., Walnut, Celery, Mushroom, Chili, Tomato and others, but the tomato catsup is by far the most popular of all the bottled catsups and sauces.

In past years most of the tomato catsups were artificially colored with bright-colored coal-tar dyes and preserved with chemical preservatives. As sauces on tables are liable to stand open for some time before being used, there is possibly some excuse for the use of the pre-

## TION OF VINEGAR—CONTINUED.

Laboratory Number.	Total Acidity (Acetic Acid)—Per Cent.	Solid Matter in Solution—Per Cent.	Ash—Per Cent.	Sodium Bicarbonate.	Remarks and Conclusions.
5441	4.03	2.03	0.31	Very dark .....	Apple cider vinegar.
5293	4.76	0.46	0.09	Slightly darker .....	Compound vinegar.
5294	4.15	2.88	0.32	Very dark .....	Apple cider vinegar.
5295	4.11	1.85	0.10	Dark .....	Compound vinegar.
5296	4.59	3.16	0.39	Very dark .....	Apple cider vinegar.
5297	4.69	2.37	0.33	do .....	do.
5298	4.57	2.07	0.17	Dark .....	Vinegar.
5299	4.34	2.02	0.19	do .....	do.
5300	4.39	1.61	0.35	Very dark .....	Apple cider.
5301	3.57	2.14	0.24	do .....	Apple cider, below standard.
5302	4.07	2.35	0.31	Dark .....	Vinegar.
5303	5.84	2.44	0.31	Very dark .....	Apple cider vinegar.
5304	5.05	2.55	0.31	do .....	do.
5305	4.55	1.98	0.17	Dark .....	Vinegar.
5306	4.56	2.62	0.37	Very dark .....	Apple cider vinegar.
5307	5.06	3.06	0.77	do .....	do.
5308	4.90	2.69	0.38	do .....	do.
5310	3.68	4.10	0.42	Very dark .....	Apple cider vinegar, below standard.
5317	4.45	1.54	0.08	Dark .....	Compound vinegar.
5330	4.45	2.05	0.12	Slightly darker .....	Malt or cereal vinegar
5331	4.40	1.66	0.07	Dark .....	Compound vinegar.
5230	4.40	2.56	0.31	Very dark .....	Apple cider vinegar.
5280	4.67	2.13		do .....	do.
5281	4.70			do .....	do.
6011	4.28	2.04	0.33	Dark .....	Vinegar.

servative, but absolutely none for the coal-tar dye. Since food officials have condemned the use of preservatives and coal-tar dyes so severely, their use is being discontinued. However, as catsups and sauces are condiments and not foods to be eaten in large quantities, the State Food Law provides that they may, if the fact is stated on the label, contain not to exceed 0.2 per cent of benzoic acid. While this amount is provided for by the law, we are now firmly convinced that, if tomato catsup is properly made from the best materials, no preservative is necessary to keep the catsup in good condition.

During the past summer a test of its keeping qualities was made on a sample of catsup that contained no chemical preservative. The sample was opened in May and a part of the catsup removed. At various times during the months of June, July and August the sample was reopened, shaken up and more of it removed. On September 15th, after most of the contents of the bottle had been removed, the catsup that remained was perfectly sweet and good; in fact, it did not spoil at all.

## RESULTS OF THE EXAMINA

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.
5867	Catsup, Snider's.....	T. A. Snider Preserve Co., Cincinnati, Ohio....
5868	Catsup, Hyman's.....	Hyman Pickle Co., Louisville, Ky. ....
5869	Catsup, Admiral.....	Knadler & Lucas, Louisville, Ky.....
....	Catsup, Heinz.....	H. J. Heinz Co., Pittsburg, Pa.....

## TABLE AND COOKING OILS.

Olive oil is the oil obtained from the sound, matured fruit of the cultivated olive tree. It is highly prized as a table oil. Before the agitation of food adulteration became so general, olive oil was much adulterated with other oils, but of late much less adulteration is found in it.

## RESULTS OF THE EXAMINA

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.
5288	Olive Oil, Livola.....	Livola Olive Oil Co., Rochester, N. Y. ....
5992	Olive Oil, Monarch.....	Reid-Murdoch Co., Chicago, Ill. ....
5242	Cooking Oil, Wesson.....	Wesson Co., Savannah, Ga. ....
4462	Olive Oil, Lucca.....	.....
4545	Olive Oil, Hule D'Olive.....	Eugene DuRaix, Lucca, Italy.....
4622	....do.....	....do.....

It seems that, if a sample of catsup can be kept under those circumstances, it would be safe to say that a chemical preservative is not necessary in tomato catsup.

Four samples of catsup were examined. Three samples contained benzoates, one contained no preservative and one was adulterated with coal-tar dye.

#### TION OF CATSUPS AND SAUCES.

Laboratory Number.	Retail Dealer or Party Who Sent Sample for Analysis.	Preservatives.	Adulterants.
5867	Acme Grocery Co., Reidsville .....	Benzoic acid .....	None found.
5868	Acme Grocery Co., Reidsville .....	.....do .....	do.
5869	J. L. Seacrest, High Point .....	.....do .....	Coal-tar dye.
	.....	None found .....	None found.

Cooking oils are usually highly refined cotton-seed oils, and are not much adulterated. Some of the cooking oils are very desirable for such purposes.

Six samples of oil were examined. They were as represented, and no adulteration was found.

#### TION OF TABLE AND COOKING OILS.

Laboratory Number.	Retail Dealer or Party Who Sent Sample for Analysis.	Specific Gravity 15.5° C.	Reading Refractometer 15.5° C.	Refractive Index 15.5° C.	Adulterants.
5288	J. H. Posey, Asheville, N. C. ....	0.91618	67.07	1.4704	None found.
5992	Dove Bost Co., Concord, N. C. ....	0.91593	67.27	1.4706	do.
5242	Mrs. Sterling Price, Raleigh, N. C. ....				do.
4462	W. P. White, Pine Bluff, N. C. ....	0.91550	68.00	1.4710	do.
4545	Stronach Son's Co., Raleigh, N. C. ....	0.91645	68.00	1.4710	do.
4622	.....do .....	0.91638	68.00	1.4710	do.

## BAKING POWDERS.

There are three classes of baking powders in general use. They are tartrate powders, phosphate powders, and alum powders. The acid present in the first is tartaric acid, the acid present in the second is phosphoric acid, and the acid in the third or alum powder is sulphuric acid.

The value of a baking powder, so far as its leavening power is concerned, depends largely upon the amount of available carbon dioxide present. If properly made and used anything like fresh, any or all of them serve well the purpose for which they are intended, and it is

## RESULTS OF THE EXAMINA

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.
5824	Baking Powder, Cascade .....	American Pure Food Co., St. Louis, Mo.....
5825	Baking Powder, Victory .....	E. C. Hazzard & Co., New York City.....
5826	Baking Powder, Cream .....	Price Baking Powder Co., New York City .....
5827	Baking Powder, Quaker .....	E. M. Bergey Co., Chicago, Ill.....
5828	Baking Powder, Rough Rider .....	Southern Manufacturing Co., Richmond, Va....
5829	Baking Powder, Watermelon.....	Sea Gull Specialty Co., Baltimore, Md.....
5538	Baking Powder, Carolina .....	H. R. Horne & Sons, Fayetteville, N. C.....

only the residue left in the bread after baking that makes one class of powders more desirable than the others. Then the most choice class of powders is the powder whose residue left in the bread is the least injurious to health.

Seven samples of powders were examined and no adulteration was found. However, sample No. 5825 was very low in available carbon dioxide gas, which may have been partially due to age; but the results show that it was at least partially due to bad mixing. No. 5824 and No. 5825 were not properly labeled. The label did not show the acid ingredient present, as is required by the rules on labeling.

#### TION OF BAKING POWDERS.

Laboratory Number.	Retail Dealer or Party Who Sent Sample for Analysis.	Carbon Dioxide.			Ash Insoluble in H. Cl. Per Cent.	Class.	Filler.	Remarks and Conclusions.
		Available Per Cent.	Residual Per Cent.	Total Per Cent.				
5824	O. F. Pearce, Greensboro, N. C.	9.65	1.60	11.25	0.59	Alum -----	Starch.	Not properly labeled. do.
5825	Yates & McGuire, Asheville, N. C.	5.95	3.25	9.20	0.52	Alum ----- Tartrate Phosphate Tartrate-----	..do..	
5826	W. P. McLain, Statesville, N. C.	9.45	1.42	10.87	0.16	-----do-----	..do..	
5827	McKee & Son, Lincolnton, N. C.	12.27	2.35	14.62	0.53	Alum -----	..do..	
5828	J. W. Isler, Goldsboro, N. C.	12.20	4.65	16.85	0.65	-----do-----	..do..	
5829	Kinston Peanut Co., Kinston, N. C.	14.55	2.52	17.12	0.40	-----do-----	..do..	
5538	M. A. Bethune, Fayetteville, N. C.	11.55	3.60	15.15	0.29	Tartrate-----	..do..	

## RICE.

The examination of fifty-nine samples of rice, obtained by an inspector of the Department from various towns of the State, revealed the fact that they were all coated or polished with glucose and talc.

It is claimed by the manufacturers or millers that rice is coated for two reasons, as follows:

1. The coating makes the rice less susceptible to dust and other foreign matters during transportation and storage.

2. It is in a measure a preventive against the attack of weevils and worms, which are so destructive in warm climates.

The advantage gained by polishing rice, so far as rendering it less susceptible to dust, etc., would hardly, it seems, justify the polishing. The polishing of the rice to protect it from weevils, worms, etc., is more reasonable, and possibly makes it justifiable. However, as the

## RESULTS OF THE EX

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.
5348	Rice .....	D. L. Gore & Co., Wilmington, N. C. ....
5349	do .....	Melcher & Co., Charleston, S. C. ....
5350	do .....	D. L. Gore & Co., Wilmington, N. C. ....
5351	do .....	do .....
5352	do .....	Steadman & Sons, Charleston, S. C. ....
5353	do .....	Melcher & Co., Charleston, S. C. ....
5354	Rice, Cracked Grain .....	Marsh Grocery Co., Raleigh, N. C. ....
5355	Rice, Whole Grain .....	do .....
5356	Rice .....	
5357	do .....	Dewar & Wilder, Raleigh, N. C. ....
5358	Rice, Imperial .....	Carolina Rice Mills, Goldsboro, N. C. ....
5359	Rice .....	Githens, Rexasmer & Co., Philadelphia, Pa. ...
5360	do .....	Dewar & Wilder, Raleigh, N. C. ....
5361	do .....	Bloom & Son, New Orleans, La. ....
5362	do .....	Carolina Rice Mills, Goldsboro, N. C. ....
5363	Rice, Head Rice, first quality .....	do .....
5364	Rice, Head Rice, second quality .....	do .....
5365	Rice, Cracked .....	
5366	Rice, Fancy Head .....	Jos. G. Gill Co., Norfolk, Va. ....
5367	do .....	New Orleans Coffee Co., New Orleans, La. ....
5368	Rice .....	
5369	Rice, Carolina Head .....	Carolina Rice Mills, Goldsboro, N. C. ....

appearance of the rice is so much improved by the polishing, it would appear that the improvement of the appearance of it is the real reason of the polishing.

Under the fifth provision of Foods, section 7 of the National Food Law, and under regulation 14 of the United States Department of Agriculture, the use of talc as a preservative in food in interstate commerce is permitted, provided that each package be plainly labeled with the name of the preservative and the proper directions for its removal. As the polishing improves the appearance of the rice without improving its quality, under the State Food Law it could probably be prohibited; but, if it protects the rice from the attacks of weevils, worms, etc., it might not be advisable to do so.

If rice is coated with glucose and talc, the label of the package must bear the following statement: "Coated with glucose and talc. Remove by washing."

## AMINATION OF RICES.

Laboratory Number.	Retail Dealer or Party Who Sent Sample for Analysis.	Remarks and Conclusions.
5348	Standard Store Co., Aberdeen, N. C.-----	Coated with glucose and talc and the fact was not made known to purchaser.
5349	F. C. Allen, Wadesboro, N. C.-----	do.
5350	J. A. McRae, Wadesboro, N. C.-----	do.
5351	do-----	do.
5352	D. E. Gaitwood, Wadesboro, N. C.-----	do.
5353	J. T. McNeill & Co., Red Springs, N. C.-----	do.
5354	Julius Heller, Raleigh, N. C.-----	do.
5355	do-----	do.
5356	G. T. Powell, Raleigh, N. C.-----	do.
5357	Rudy & Buffaloe, Raleigh, N. C.-----	do.
5358	Rogers Grocery Co., Raleigh, N. C.-----	do.
5359	do-----	do.
5360	A. S. Womble, Raleigh, N. C.-----	do.
5361	D. T. Johnson & Son, Raleigh, N. C.-----	do.
5362	do-----	do.
5363	W. B. Mann, Raleigh, N. C.-----	do.
5364	do-----	do.
5365	do-----	do.
5366	J. B. Green & Co., Raleigh, N. C.-----	do.
5367	M. Rosenthal & Co., Raleigh, N. C.-----	do.
5368	Smith-Forest Co., Raleigh, N. C.-----	do.
5369	J. R. Ferrall & Co., Raleigh, N. C.-----	do.

## RESULTS OF THE EXAMINA

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.
5370	Rice .....	Dunn Bros., Raleigh, N. C. ....
5371	do .....	.....
5372	do .....	Dunn Bros., Raleigh, N. C. ....
5373	do .....	Marsh & Co., Raleigh, N. C. ....
5374	do .....	Peebles Bros., Raleigh, N. C. ....
5375	do .....	.....
5376	do .....	Dunn Bros., Raleigh, N. C. ....
5401	Rice, Premier .....	Francis H. Leggett & Co., New York .....
5402	Rice .....	Allen-Owen Co., Durham, N. C. ....
5509	Rice, Cracked .....	W. D. Porcher, Charleston, S. C. ....
5510	Rice, second quality .....	do .....
5511	Rice, first quality .....	do .....
5512	Rice .....	Melcher & Co., Charleston, S. C. ....
5513	do .....	New Orleans Coffee Co., New Orleans, La. ....
5514	do .....	Otto Tiedeman & Sons, Charleston, S. C. ....
5417	do .....	.....
5418	do .....	.....
5419	do .....	Langhoff Bros., New Orleans, La. ....
5620	Rice, first quality .....	Carolina Rice Mills, Goldsboro, N. C. ....
5621	Rice, second quality .....	do .....
5755	Rice .....	F. W. Wagner & Co., Charleston, S. C. ....
5756	do .....	.....
5757	do .....	Hendersonville Grocery Co., Hendersonville, N. C. ....
5758	do .....	F. W. Wagner & Co., Charleston, S. C. ....
5759	do .....	Carolina Rice Co., Charleston, S. C. ....
5760	do .....	F. W. Wagner & Co., Charleston, S. C. ....
5761	do .....	Githens, Rexasmer & Co., Philadelphia, Pa. ....
5762	do .....	F. W. Wagner & Co., Charleston, S. C. ....
5763	do .....	Otto Tiedeman & Sons, Charleston, S. C. ....
5764	do .....	Van Talmage 2nd, Charleston, S. C. ....
5765	do .....	Otto Tiedeman & Sons, Charleston, S. C. ....
5766	do .....	do .....
5767	do .....	Bayou City Rice Mills, Houston, Tex. ....
5769	do .....	Otto Tiedeman & Sons, Charleston, S. C. ....
5770	do .....	F. W. Wagner & Co., Charleston, S. C. ....
5771	Rice, Carolina Head .....	Carolina Rice Mills, Goldsboro, N. C. ....
5768	Rice .....	do .....

## TION OF RICES—CONTINUED.

Laboratory Number.	Retail Dealer or Party Who Sent Sample for Analysis.	Remarks and Conclusions.
5370	C. W. Jones & Bro., Raleigh, N. C.-----	Coated with glucose and talc and the fact was not made known to the purchaser.
5371	Jones & Park, Raleigh, N. C.-----	do.
5372	B. H. King, Raleigh, N. C.-----	do.
5373	C. S. Parker, West Raleigh, N. C.-----	do.
5374	L. J. Williams & Co., Raleigh, N. C.-----	do.
5375	----do-----	do.
5376	Hobby & Overby, West Raleigh, N. C.-----	do.
5401	C. E. Jourdan, Durham, N. C.-----	do.
5402	Perrywood & Co., Durham, N. C.-----	do.
5509	G. E. Brooks, Pittsboro, N. C.-----	do.
5510	----do-----	do.
5511	----do-----	do.
5512	E. W. Covington, Rockingham, N. C.-----	do.
5513	A. P. Barrette, Rockingham, N. C.-----	do.
5514	C. G. Porter, Rockingham, N. C.-----	do.
5417	R. W. Wilkinson, Wake Forest, N. C.-----	do.
5418	J. W. Hodge, Wake Forest, N. C.-----	do.
5419	Wake Forest Supply Co., Wake Forest, N. C.	do.
5620	J. F. Tayloe, Washington, N. C.-----	do.
5621	----do-----	do.
5755	Griffin & Parham, Gastonia, N. C.-----	do.
5756	D. M. Wells, Hendersonville, N. C.-----	do.
5757	----do-----	do.
5758	A. Ficker, Hendersonville, N. C.-----	do.
5759	----do-----	do.
5760	Mitchell & Cox, Brevard, N. C.-----	Coated with glucose and talc and the fact was made known to the purchaser.
5761	Walter Smith, Hendersonville, N. C.-----	Coated with glucose and talc and the fact was not made known to the purchaser.
5762	----do-----	do.
5763	M. Hyams, Asheville, N. C.-----	do.
5764	Bristol & Harbison, Morganton, N. C.-----	do.
5765	A. F. Summers & Co., Morganton, N. C.-----	do.
5766	----do-----	do.
5767	W. A. Ross, Morganton, N. C.-----	do.
5769	J. D. Lee, Wilson, N. C.-----	Not properly labeled; coated with glucose and talc and not so labeled.
5770	Ruffin High Co., Wilson, N. C.-----	do.
5771	Cash Grocery Store, Wilson, N. C.-----	do.
5768	Hadley, Harris & Co., Wilson, N. C.-----	Coated with glucose and talc and the fact was not made known to the purchaser.

## PRESERVES AND MARMALADES.

As the subject of preserves and marmalades has been discussed in previous reports, it is only necessary to state here that all products under this head containing ingredients other than fruit and cane sugar syrup, with or without spices, should be labeled "Imitation" or "Compound," or they will be regarded as adulterated.

## RESULTS OF THE EXAMINATION

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.	Retail Dealer or Party Who Sent Sample for Analysis.
5403	Marmalade, Hartley's .....	W. P. Hartley, London, Eng.	Patterson Bros., Durham, N. C.
5405	Marmalade, Premier, Orange.	Francis H. Leggett & Co., New York.	Perrywood & Co., Durham, N. C.
5406	Preserves, Taylor's Com- pound.	Taylor's Preserving Co., Bos- ton, Mass.	Markham-Stephens Co., Dur- ham, N. C.
5424	Preserves, Empire, Straw- berry.	Winters & Profit Canning Co., New York.	C. Y. Holden & Co., Wake For- est, N. C.
5541	Preserves, Glucose .....	E. G. Daily Co., Detroit, Mich.	J. R. Coley, Rockingham, N. C.
5542	Preserves, Peach .....	Emery Food Co., Chicago, Ill.	Hardison Co., Wadesboro, N. C.
5543	Preserves, Fruit .....	Thomas Preserving Co., New York.	L. A. Monroe & Son, Laurin- burg, N. C.

## JAMS.

Jams, like preserves and marmalades, having been discussed in previous reports, it is only necessary to say here that products under this head containing ingredients other than fruit specified and cane

## RESULTS OF THE EX

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.
5404	Jam, Genesee .....	Sprague, Warner & Co., Chicago, Ill. ....
5334	Jam, Red Raspberry .....	P. J. Ritter Conserve Co., Philadelphia, Pa. ....
5998	Jam, Pure Fruit .....	Reid, Murdock & Co., Chicago, Ill. ....

Only seven samples were examined under this head, and no adulteration was found. However, the samples were tested for chemical preservatives and dyes only. One sample of preserves, No. 5543, was artificially colored, but the dye was a harmless vegetable color, and its presence was stated on the label.

## OF PRESERVES AND MARMALADES.

Laboratory Number.	Adulterants.		Remarks and Conclusions.
	Preservatives.	Coloring Matter.	
5403	None found .....	None found .....	
5405	do .....	do .....	
5406	do .....	do .....	
5424	do .....	do .....	
5541	do .....	do .....	
5542	do .....	do .....	
5543	do .....	do .....	Artificially colored, vegetable dye.

sugar syrup, with or without spices, should be labeled "Imitation" or "Compound," or they will be regarded as adulterated.

Three samples of jams were examined, and no adulteration was found.

## AMINATION OF JAMS.

Laboratory Number.	Retail Dealer or Party Who Sent Sample for Analysis.	Adulterants.	
		Preservatives.	Coloring Matter.
5404	Patterson Bros., Durham, N. C. ....	None found.....	None found.
5334	G. S. Terrell, Raleigh, N. C. ....	do .....	do.
5998	Dove Bost Co., Concord, N. C. ....	do .....	do.

## JELLY.

Fruit jelly is a clear, gelatinous product, made entirely from the fruit specified and cane sugar, with or without spices. Fruit jelly containing ingredients other than those named above should be labeled "Imitation" or "Compound"; otherwise they will be regarded as adulterated.

## RESULTS OF THE EX

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.
5335	Jelly, Schimmel's.....	American Preserve Co., Philadelphia, Pa.....
5336	Jelly, Peerless.....	S. J. Van Lill Co., Baltimore, Md.....
5407	Jelly, Glucose, Apple.....	E. G. Daily Co., Detroit, Mich. ....
5425	Jelly, Michigan, Compound .....	do .....
5426	Jelly, Bull Head, Apple.....	Gibbs Preserving Co., Baltimore, Md.....
5545	Jelly .....	Mrs. W. L. Covington, Rockingham, N. C. ....
5544	Jelly, Pomona, Apple .....	P. J. Ritter & Co., Philadelphia, Pa.....
5546	Jelly, Old Orchard.....	Kidwell Bros. Co., Baltimore, Md.....
5548	Jelly, Glucose, Apple.....	E. G. Daily Co., Detroit, Mich.....
5995	Jelly, Pure Fruit.....	Reid, Murdock & Co., Chicago, Ill. ....
5996	Jelly, Apple.....	Merchant Bros., Dana, N. C.....
5997	Jelly, Highland, Glucose.....	Gibbs Preserving Co., Baltimore, Md.....

## CONFECTIONERY.

Confectionery is a term applied to a wide range of products, which may be described as preparations of saccharine substances with color and flavor added. Candy is a term that is applied to a large part of confectionery.

The saccharine materials which are employed in the manufacture of confectionery are sugars of various kinds—namely, maple, cane and beet sugar, together with glucose, dextrose and invert sugar. Starch is largely used as a filler in some forms of confectionery.

Various colors, such as saffron, annatto, cochineal and aniline dyes, are used in confectionery. The flavors employed in confectionery are either natural flavors, derived from nuts, fruits or flowers, or synthetic preparations resembling to a greater or less degree the natural flavor of fruit, nuts or flowers. Chocolate is one of the most common and one of the most highly prized flavoring reagents employed in confectionery.

Jelly, being made from the juice of fruit, is much easier to adulterate without being detected than preserves or jams.

These samples, twelve in number, were examined for chemical preservatives and coal-tar dyes, with negative results. For lack of time, these samples were not examined for other adulterants that may have been present.

## AMINATION OF JELLIES.

Laboratory Number.	Retail Dealer or Party Who Sent Sample for Analysis.	Adulterants.	
		Preservatives.	Coloring Matter.
5335	G. T. Powell, Raleigh, N. C. ....	None found.....	None found.
5336	Hobby & Overby, West Raleigh, N. C. ....	do.....	do.
5407	I. A. Burnett & Co., Durham, N. C. ....	do.....	do.
5425	Homer & Edwards, Wake Forest, N. C. ....	do.....	do.
5426	do.....	do.....	do.
5545	Palmer, Diggs & Co., Rockingham, N. C. ....	do.....	do.
5544	do.....	do.....	do.
5546	James Plunket, Wadesboro, N. C. ....	do.....	do.
5548	J. R. Coley & Son, Rockingham, N. C. ....	do.....	do.
5995	Dove Bost Co., Concord, N. C. ....	do.....	do.
5996	Walker Smith, Hendersonville, N. C. ....	do.....	do.
5997	M. P. Gallop Co., Elizabeth City, N. C. ....	do.....	do.

Each manufacturer has his own methods of mixing, flavoring and coloring his products, and these are mostly trade secrets.

To know just what constitutes adulteration of confectionery is rather difficult. The Food Law says that it must not contain terra alba, barytes, tale, chrome yellow, or other mineral substance. That sounds simple, but that is not all it says. It must not contain poisonous color or flavor, or other ingredients deleterious to health. The question, however, of what is deleterious to health is one that is difficult to answer. The manufacturer of coloring and flavoring materials and the manufacturer of confectionery are always quite ready to certify that the colors and flavors used are harmless to health.

Under the head of confectionery, forty-seven samples were examined, and, while many of them contained glucose, starch and coal-tar dyes, none contained any substance that could with certainty be regarded as an adulterant.

## RESULTS OF THE EXAMINA

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.	Retail Dealer or Party Who Sent Sample for Analysis.
5337	Candy, Crescent Creams	R. B. Horne & Co., Winston-Salem, N. C.	Theus Smith Grocery Co., Raleigh, N. C.
5338	Candy, Pure Coconut	New England Confectionery Co., Boston, Mass.	Rudy & Buffaloe, Raleigh, N. C.
5339	Candy, Twin City Sugar Sticks	R. B. Horne & Co., Winston-Salem, N. C.	do
5340	Candy, Mixed	Porter Candy Co., Raleigh, N. C.	D. T. Johnson & Son, Raleigh, N. C.
5341	Candy, Premium Chocolate Drops	Hawley & Hoofs, New York, N. Y.	do
5342	Candy, Red and White	Porter Candy Co., Raleigh, N. C.	do
5343	Candy, Oriental Eggs	do	Jones & Park, Raleigh, N. C.
5344	Candy, Eggs	do	do
5345	Candy, C. A. S. H.	The Hopkins Co., Manassas, Va.	B. H. King, Raleigh, N. C.
5346	Candy, Barber's Pole		do
5347	Candy		C. S. Parker, West Raleigh, N. C.
5521	Candy, Red Balls	Heath-Morrow Co., Monroe, N. C.	H. M. Broom & Co., Monroe, N. C.
5522	Candy, Blocks	Littlefield, Stern & Saunders, Knoxville, Tenn.	do
5523	Candy, Sticks	H. L. Sleschnor, Atlanta, Ga.	do
5524	do	do	do
5525	Candy	Chase & Co., Boston, Mass.	do
5526	Candy, Fancy	Croft & Allen, Philadelphia, Pa.	do
5527	Candy	Heath-Morrow Co., Monroe, N. C.	Helms, Richmond & Co., Monroe, N. C.
5528	Candy, Chocolate Drops	Fleming & Christian Co., Richmond, Va.	J. D. Parker, Monroe, N. C.
5529	Candy, Fancy	do	do
5536	Candy, Chocolate	Brades & Ghuns, Louisville, Ky.	H. M. Broom & Co., Monroe, N. C.
5530	Candy, Fancy	Fleming & Christian Co., Richmond, Va.	J. D. Parker, Monroe, N. C.
5531	Candy, Toyland Creams	The Plows Candy Co., St. Louis, Mo.	do
5532	Candy	Kemker-Woolwine Candy Co., Nashville, Tenn.	M. Waller, Monroe, N. C.
5533	do	do	do
5534	Candy, Chocolate Creams	Fleming & Christian Co., Richmond, Va.	do
5535	Candy, Chocolate	Stern & Co	H. M. Broom & Co., Monroe, N. C.
5536	Candy, Chocolate Drops	Brades & Ghuns, Louisville, Ky.	do
5831	Candy, Cup Strawberries		Ideal Candy Store, Greensboro, N. C.
5832	Candy, Necco Lollipops	New England Confectionery Co., Boston, Mass.	do
5833	Candy	Olympia Candy Works, Concord, N. C.	
5834	Candy, Coconut	do	
5835	Candy, White Taffy	do	
5836	Candy, Pink Taffy	do	
5837	Candy, Coconut	do	
5838	Candy, Peanut	do	
5839	Candy, Coconut	do	

## TION OF CONFECTIONERY.

Laboratory Number.	Ash—Per Cent.	Filler.	Coloring.	Glucose.	Adulterants.
5337	0.08	-----	-----	Glucose	None found.
5338	0.23	-----	-----	do	do.
5339	0.01	-----	-----	-----	do.
5340	0.15	-----	-----	Glucose	do.
5341	0.22	-----	-----	do	do.
5342	0.50	-----	-----	do	do.
5343	0.17	-----	-----	do	do.
5344	0.24	-----	-----	do	do.
5345	0.15	-----	-----	do	do.
5346	0.21	-----	-----	do	do.
5347	0.12	-----	-----	do	do.
5521	0.09	-----	Coal-tar dye	-----	do.
5522	0.33	-----	do	-----	do.
5523	0.12	Starch	do	-----	do.
5524	0.005	do	do	-----	do.
5525	-----	do	-----	-----	do.
5526	0.09	do	-----	-----	do.
5527	0.08	do	Coal-tar dye	-----	do.
5528	0.48	-----	-----	-----	do.
5529	0.24	Starch	Coal-tar dye	-----	do.
5536	0.69	-----	-----	-----	do.
5530	0.23	Starch	Coal-tar dye	-----	do.
5531	0.26	-----	-----	-----	do.
5532	0.22	Starch	Coal-tar dye	-----	do.
5533	0.10	-----	do	-----	do.
5534	0.25	-----	-----	-----	do.
5535	-----	-----	-----	-----	do.
5536	-----	-----	-----	-----	do.
5831	0.46	-----	Coal-tar dye	-----	do.
5832	0.27	-----	do	-----	do.
5833	0.28	-----	do	-----	do.
5834	0.30	-----	-----	-----	do.
5835	0.17	-----	-----	-----	do.
5836	0.12	-----	Coal-tar dye	-----	do.
5837	0.30	-----	-----	-----	do.
5838	0.51	-----	-----	-----	do.
5839	0.54	-----	Coal-tar dye	-----	do.

## RESULTS OF THE EXAMINATION

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.	Retail Dealer or Party Who Sent Sample for Analysis.
5840	Candy, Peanut .....	Olympia Candy Works, Concord, N. C.	
5841	Candy, Peach and Honey Kisses.	C. W. Antrim & Son, Richmond, Va.	Baker, Bizzell & Edgerton, Goldsboro, N. C.
5842	Candy, Monarch Mixture.	Gibbs Candy Co., Baltimore, Md.	do.....
5843	Candy, Newport Mixture.	do.....	do.....
5844	Candy, American Ices .....	do.....	do.....

## MARASCHINO AND CREME DE MENTHE CHERRIES.

Cherries on the market sold as Maraschino and Creme de Menthe, instead of being preserved in Maraschino brandy, etc., are generally preserved with sulphurous acid or benzoic acid. The natural color

## RESULTS OF THE EXAMINATION OF CHERRIES—

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.	Retail Dealer or Party Who Sent Sample for Analysis.
5537	Cherries, Maraschino, Belle.	-----	Garrett & McNeill, Red Springs, N. C.
5951	do.....	Dandicolle & Gaudin, Bordeaux, France.	A. P. Grizzard, Winston, N. C.
5952	Cherries, Maraschino, Cal. Royal Ann.	Long Syrup Refining Co., San Francisco, Cal.	Shell Grocery Co., Statesville, N. C.
5953	Cherries, Creme de Menthe.	The Mihalovitch-Fletcher Co., Cincinnati, O.	Whitener & Martin, Hickory, N. C.

## CORN MEAL.

BY C. D. HARRIS.

Considering the nutrition it carries and the market price, corn meal is by far the cheapest food offered to man over a large part of the civilized world.

## OF CONFECTIONERY—CONTINUED.

Laboratory Number.	Ash—Per Cent.	Filler.	Coloring.	Glucose.	Adulterants.
5840	1.32	-----	-----	-----	None found.
5841	0.88	-----	-----	-----	do.
5842	0.28	-----	-----	-----	do.
5843	0.13	-----	-----	-----	do.
5844	0.38	-----	-----	-----	do.

of the fruit, which is destroyed by the sulphurous acid, is replaced by coal-tar dyes, which are not affected by the acid.

Four samples of cherries (three Maraschino and one Creme de Menthe) were examined. All the samples were found to contain benzoates and two contained coal-tar dyes.

## MARASCHINO, CREME DE MENTHE, ETC.

Laboratory Number.	Adulterants.		Remarks and Conclusions.
	Preservatives.	Coloring Matter.	
5537	Benzoic acid	-----	Not properly labeled.
5951	do	Coal-tar dye	
5952	do	do	
5953	do	-----	
	-----	-----	

That it has not been more generally used can be explained only in part. In the first place, corn meal cannot be made into a light, porous loaf, as can flour from the wheat grain. Again, when reduced to meal on grinding, the oil of the grain soon becomes rancid and the meal loses its palatability.

Twenty samples of meal were analyzed. The per cent of ash and the microscopic examination showed all the samples to be pure corn meal.

Results of the examination of corn meal follow in the table:

## RESULTS OF THE EXAMI

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.
5631	Corn Meal, Bon Ton .....	Asheville Milling Co., Asheville, N. C. ....
5632	Corn Meal .....	T. M. Rymer, Asheville, N. C. ....
5633	do .....	Weaverville Milling Co., Weaverville, N. C. ...
5634	Corn Meal, Bon Ton .....	Asheville Milling Co., Asheville, N. C. ....
5635	Corn Meal .....	Hazel Green Mills, Asheville, N. C. ....
5636	do .....	Weaverville Milling Co., Weaverville, N. C. ...
5637	do .....	Hickory Milling Co., Hickory, N. C. ....
5638	do .....	Glen Alpine Milling Co., Glen Alpine, N. C. ...
5639	do .....	Lenoir Mills, Lenoir, N. C. ....
5640	do .....	Home Milling Co., Lenoir, N. C. ....
5641	do .....	do .....
5642	do .....	Lenoir Mills, Lenoir, N. C. ....
5643	do .....	H. F. Munt, Petersburg, Va. ....
5644	do .....	Mayo Milling Co., Richmond, Va. ....
5645	do .....	B. D. Booth, Petersburg, Va. ....
5646	do .....	Warner Moore & Co., Richmond, Va. ....
5647	Corn Meal, Sawyer's Dinner Party .....	Eiglehart, Evansville, Ind. ....
5719	Corn Meal .....	Mayo Milling Co., Richmond, Va. ....
5720	do .....	R. G. Thompson, Petersburg, Va. ....
5721	do .....	H. F. Munt, Petersburg, Va. ....

## EXAMINATION OF FLOUR.

BY C. D. HARRIS.

As is well known, flour is the interior portion of grain, usually wheat, finely ground and separated from the outer husks or bran by bolting. It is composed chiefly of two classes of substance—carbohydrates (mainly starch and sugar) and nitrogenous compounds. The former of these are heat and force producers in the body, while the latter go to the making of muscle and tissues. What are known as the finer grades and higher-priced flours are usually not the most nutritious. When the germ or wheat heart, which is rich in nitrogenous compounds, but not so white as the starchy matter, is removed, it is at the expense of the nutritive value of the flour, for it is naturally rich in the carbohydrates any way.

## NATION OF CORN MEAL.

Laboratory Number.	Retail Dealer or Party Who Sent Sample for Analysis.	Date of Purchase.	Ash— Per Cent.	Microscopic Examination.	Adulterants.
5631	Noland, Rowland Co., Asheville, N. C. ....	8-10-08	1.03	Corn product...	None found.
5632	Stradley & Luther, Asheville, N. C. ....	8-10-08	1.15	do.....	do.
5633	do.....	8-10-08	1.10	do.....	do.
5634	Allison & Jarratt, Asheville, N. C. ....	8-10-08	1.26	do.....	do.
5635	do.....	8-10-08	1.12	do.....	do.
5636	do.....	8-10-08	1.14	do.....	do.
5637	Bost & Newton, Hickory, N. C. ....	8-13-08	1.14	do.....	do.
5638	C. F. Kirksey, Morganton, N. C. ....	8-11-08	1.12	do.....	do.
5639	J. A. Bush, Jr., Lenoir, N. C. ....	8-12-08	1.19	do.....	do.
5640	do.....	8-12-08	1.27	do.....	do.
5641	Home Milling Co., Lenoir, N. C. ....	8-12-08	1.55	do.....	do.
5642	H. T. Newland, Lenoir, N. C. ....	8-12-08	1.44	do.....	do.
5643	Best & Thompson, Goldsboro, N. C. ....		1.50	do.....	do.
5644	Royall Grocery Co., Goldsboro, N. C. ....		1.25	do.....	do.
5645	Baker, Bizzell & Edgerton, Goldsboro, N. C. ....		1.29	do.....	do.
5646	Hadley, Harris & Co., Wilson, N. C. ....	7-22-08	1.18	do.....	do.
5647	C. Sawyer, Asheville, N. C. ....	8-20-08	1.13	do.....	do.
5719	Royall Grocery Co., Goldsboro, N. C. ....	7-9-08	1.33	do.....	do.
5720	Ruffin High Co., Wilson, N. C. ....	7-22-08	1.23	do.....	do.
5721	Wiggins Grocery Co., Wilson, N. C. ....	7-22-08	1.12	do.....	do.

However, finely ground mineral matter and corn meal have both been used to adulterate it. The mineral matter is easily detected by the increased weight of the ash, and the corn meal by the use of the microscope. The starch from corn and wheat appears almost as different under the microscope as the whole grains do to the eye alone.

Sixty-eight samples of wheat flour were examined by means of the microscope for adulteration with corn starch or flourine. None were found adulterated.

*Gluten in Flour.*—The per cent of gluten in flour is the best index to its bread-making qualities. The quality of the gluten is a factor of almost equal importance. Gluten, as such, does not exist in wheat or in flour. Gluten is produced by the union of two proteid bodies present in the wheat or flour when the latter is moistened with water or doughed. These two proteid bodies are known as gliadin and glutenin. They are very different in character. Glutenin is a

grayish, opaque, powdery substance, while gliadin is a yellowish or brownish, nearly transparent, glue-like body. It is the gliadin which gives to gluten the tenacity and elasticity which bind the flour particles together, and yet permit the dough to expand and become light

## RESULTS OF THE EXAM

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.
5693	Flour, Piedmont Belle.....	Hickory Milling Co., Hickory, N. C.....
5694	Flour, Our Expert.....	Bridgewater Milling Co., Bridgewater, N. C.....
5695	Flour, Tip Top.....	Dunlop Mills, Richmond, Va.....
5696	Flour, Faultless.....	Lynchburg Milling Co., Lynchburg, Va.....
5697	Flour, Sea Foam.....	Michigan Milling Co., Ann Harbor, Mich.....
5698	Flour, Best in the World.....	do.....
5699	Flour, Imperial.....	Dan Valley Mills, Danville, Va.....
5700	Flour, Monarch.....	Stonewall Roller Mills, Woodstock, Va.....
5701	Flour, Pure Gold.....	Northwestern Elevator and Mill Co., Mt. Vernon, Ohio.....
5702	Flour, Southern Belle.....	do.....
5703	Flour, White Rose.....	Voight Milling Co., Grand Rapids, Mich.....
5704	Flour, Champion.....	Valley City Milling Co., Grand Rapids, Mich.....
5723	Flour.....	Peninsular Milling Co., Flint, Mich.....
5724	Flour, Colonial.....	Dan Valley Mills, Danville, Va.....
5725	Flour.....	Voight Milling Co., Grand Rapids, Mich.....
5726	Flour.....	John T. Bailey Co., Philadelphia, Pa.....
4721	Flour.....	.....
4747	Flour, Magnolia.....	Page Milling Co., Luray, Va.....
4748	Flour, Cream of Wheat.....	do.....
5198	Flour.....	Vestal & Brun, Winston, N. C.....
5650	Flour, J. E. M.....	J. E. M. Milling Co., Frankfort, Ky.....
5651	Flour, Biltmore.....	Asheville Milling Co., Asheville, N. C.....
5652	Flour, Obelisk.....	Ballard & Ballard, Louisville, Ky.....
5653	Flour, Climax.....	Asheville Milling Co., Asheville, N. C.....
5654	Flour, Lily of the Valley.....	R. J. Gaston, Hominy, N. C.....
5655	Flour, Purina Graham.....	Ralston Purina Co., St. Louis, Mo.....
5656	Flour, Snow Bank.....	Stradley & Luther, Asheville, N. C.....
5657	Flour, Omega.....	H. C. Cole Milling Co., Chester, Ill.....
5658	Flour, Sawyer's Dinner Party.....	Eiglehart, Evansville, Ind.....
5659	Flour, Purina Graham.....	Ralston Purina Co., St. Louis, Mo.....
5660	Flour, Omega.....	H. C. Cole Milling Co., Chester, Ill.....
5661	Flour, Aulander.....	Noland, Rowland Co., Asheville, N. C.....

by enclosing bubbles of gas. The glutenin serves to fix the gliadin and to distribute it through the dough, and without it the gliadin would tend to gather in sticky masses in separate portions of the dough.

## INATION OF FLOUR.

Laboratory Number.	Retail Dealer or Party Who Sent Sample for Analysis.	Ash—Per Cent.	Microscopic Examination.	Adulterants.
5693	Bost & Newton, Hickory, N. C.-----	0.37	Wheat product...	None found.*
5694	...do-----	0.29	...do-----	do.
5695	...do-----	0.29	...do-----	do.
5696	Wiggins Grocery Co., Wilson, N. C.-----	0.37	...do-----	do.
5697	Best & Thompson, Goldsboro, N. C.-----	0.45	...do-----	do.
5698	...do-----	0.29	...do-----	do.
5699	...do-----	0.22	...do-----	do.
5700	...do-----	0.33	...do-----	do.
5701	Baker, Bizzell & Edgerton, Goldsboro, N. C.-----		...do-----	do.
5702	...do-----	0.54	...do-----	do.
5703	Royall Grocery Co., Goldsboro, N. C.-----	0.43	...do-----	do.
5704	T. R. Lamm, Wilson, N. C.-----	0.41	...do-----	do.
5723	Hadley, Harris & Co., Wilson, N. C.-----	0.39	...do-----	do.
5724	Wiggins Grocery Co., Wilson, N. C.-----	0.64	...do-----	do.
5725	Royall Grocery Co., Goldsboro, N. C.-----	0.39	...do-----	do.
5726	Cash Grocery Store, Wilson, N. C.-----	0.43	...do-----	do.
4721	J. H. Bryant, Raleigh, N. C.-----		...do-----	do.
4747	-----	0.17	...do-----	do.
4748	-----	0.21	...do-----	do.
5199	J. H. Hanson, Yadkinville, N. C.-----	0.41	...do-----	do.
5650	Yates & McGuire, Asheville, N. C.-----	0.17	...do-----	do.
5651	Stradley & Luther, Asheville, N. C.-----		...do-----	do.
5652	...do-----	0.45	...do-----	do.
5653	...do-----	0.27	...do-----	do.
5654	...do-----	0.27	...do-----	do.
5655	...do-----	1.58	...do-----	do.
5656	...do-----	0.35	...do-----	do.
5657	...do-----	0.39	...do-----	do.
5658	C. Sawyer, Asheville, N. C.-----	0.36	...do-----	do.
5659	Noland, Rowland Co., Asheville, N. C.-----		...do-----	do.
5660	...do-----	0.36	...do-----	do.
5661	...do-----	0.36	...do-----	do.

\*These samples of flour were not examined for bleaching agents.

## RESULTS OF THE EXAMINA

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.
5662	Flour, Pillsbury's Best	Pillsbury Mills, Minneapolis, Minn.
5663	Flour, Richelieu	Sprague Warner & Co., Chicago, Ill.
5664	Flour, La Rose	Austin Nichols & Co., New York, N. Y.
5665	Flour, Purity	Paris Milling Co., Paris, Ky.
5666	Flour, Obelisk	Ballard & Ballard, Louisville, Ky.
5667	Flour, Climax	Asheville Milling Co., Asheville, N. C.
5669	Flour, Calla Lily	Newport Mill Co., Newport, Tenn.
5670	Flour, Biltmore	Asheville Milling Co., Asheville, N. C.
5671	Flour, Town Talk	Lawrenceburg Roller Mills Co., Lawrenceburg, Ind.
5672	Flour, Pillsbury's Best	Pillsbury Mills, Minneapolis, Minn.
5673	Flour, Monitor	Statesville Flour Mill Co., Statesville, N. C.
5674	Flour, Crystal	do
5675	Flour, Daisy	Glen Alpine Mill Co., Glen Alpine, N. C.
5676	Flour, Daisy	do
5677	Flour, Golden Gate	do
5679	Flour, Banner	J. Allen Smith & Co., Knoxville, Tenn.
5680	Flour, Sleepy Eye	Sleepy Eye Milling Co., Sleepy Eye, Minn.
5681	Flour, Majestic	J. Allen Smith & Co., Knoxville, Tenn.
5682	Flour, Morristown Choice	Morristown Mills, Morristown, Tenn.
5683	Flour, Mayflower	Lenoir Mills, Lenoir, N. C.
5684	Flour, Happy Valley	do
5685	Flour, Piedmont Valley	Home Milling Co., Lenoir, N. C.
5686	Flour, Snow Flake	do
5687	do	do
5689	Flour, Mayflower	Lenoir Mills, Lenoir, N. C.
5690	Flour, Happy Valley	do
5691	Flour, Warlick's Best	Newton Roller Mills, Newton, N. C.
5692	Flour, Blue Ridge	Hickory Milling Co., Hickory, N. C.
5199	Flour	S. T. Hinshaw, Winston, N. C.
5200	do	Shore & Shore, Winston, N. C.
5201	do	J. H. Hanson, Winston, N. C.
5377	Flour, Peerless Patent	Carolina Roller Mill Co., Durham, N. C.
5378	Flour, Triumph	Statesville Flour Mill, Statesville, N. C.
5379	Flour, Crystal	do
5380	Flour, Pride of Richmond	J. L. Koener Flour Mill, Richmond, Va.
5381	Flour, Acme	Strasburg Steam Flouring Co., Strasburg, Va.

## TION OF FLOUR—CONTINUED.

Laboratory Number.	Retail Dealer or Party Who Sent Sample for Analysis.	Ash— Per Cent.	Microscopic Examination.	Adulterants.
5662	Noland, Rowland Co., Asheville, N. C. -----	0.24	Wheat product	None found.*
5663	do -----	0.40	do -----	do.
5664	do -----	0.36	do -----	do.
5665	do -----	0.44	do -----	do.
5666	do -----	0.33	do -----	do.
5667	Allison & Jarratt, Asheville, N. C. -----	0.29	do -----	do.
5669	do -----	0.41	do -----	do.
5670	do -----	0.42	do -----	do.
5671	do -----	0.46	do -----	do.
5672	do -----	0.53	do -----	do.
5673	W. A. Ross, Morganton, N. C. -----	0.27	do -----	do.
5674	Green & Kincaid, Morganton, N. C. -----	0.42	do -----	do.
5675	do -----	0.55	do -----	do.
5676	P. G. Harbison, Morganton, N. C. -----	0.45	do -----	do.
5677	C. F. Kirksey, Morganton, N. C. -----	0.28	do -----	do.
5679	Shell Grain and Feed Co., Hickory, N. C. -----	0.38	do -----	do.
5680	do -----	0.39	do -----	do.
5681	do -----	0.54	do -----	do.
5682	do -----	0.43	do -----	do.
5683	H. T. Newland, Lenoir, N. C. -----	0.37	do -----	do.
5684	do -----	0.35	do -----	do.
5685	Home Milling Co., Lenoir, N. C. -----	0.48	do -----	do.
5686	do -----	0.50	do -----	do.
5687	J. A. Bush, Jr., Lenoir, N. C. -----	0.44	do -----	do.
5689	do -----	0.37	do -----	do.
5690	do -----	0.56	do -----	do.
5691	Bost & Newton, Hickory, N. C. -----	0.24	do -----	do.
5692	do -----	0.35	do -----	do.
5199	J. H. Hanson, Yadkinville, N. C. -----	0.44	do -----	do.
5200	do -----	0.40	do -----	do.
5201	do -----	0.47	do -----	do.
5377	G. S. Terrell, Raleigh, N. C. -----		do -----	do.
5378	do -----		do -----	do.
5379	Julius Heller, Raleigh, N. C. -----		do -----	do.
5380	G. T. Powell, Raleigh, N. C. -----		do -----	do.
5381	Rudy & Buffaloe, Raleigh, N. C. -----		do -----	do.

\*These samples of flour were not examined for bleaching agents.

## BREAKFAST FOODS.

BY C. D. HARRIS.

*Preparation.*—Partially prepared or so-called breakfast foods are common articles of diet in American families. They consist of partially baked or softened cereals, prepared in different ways or sometimes eaten practically whole, as in the case of cracked wheat.

Many of them have been subjected to a high temperature, by which the starch grains are softened. The hulls and skins are removed from the cereals, so the product does not represent the whole grain, but only a portion thereof.

The main object in the manufacture appears to be the preparation of a food which can be made ready for the table in a short while. It is probable that too little time is consumed in the final cooking of these breakfast foods, and, instead of using only a few moments in the preparation, their wholesomeness, palatability and digestibility would be improved by subjecting them for a longer time to the temperature of boiling water.

*Classification.*—Breakfast foods may be divided into three classes:

- (1) Raw cereal products.
- (2) Prepared cereal products (cooked).
- (3) Medicated cereal products.

The medicated cereal products have added to them spices, sugars, gluten, salt, flour, flavoring extracts, etc.

The raw cereal can be changed to a prepared product by cooking, and into a medicated product by treatment with a ferment or malt. Malt does not act on raw starch directly; so the malting and cooking are carried on at the same time. The starch is changed into a soluble form by the heat, and into sugar by the malt. In making the original breakfast foods, the idea was to get the starch into a predigested form, but lately these ideas have been lost sight of, and these foods have been predigested to only a small degree.

The nutritive value of the different breakfast foods is based upon their content of digestible nutrients. It has been shown that the well-cooked cereals are more digestible than the raw or malted ones. The advantage that the prepared and malted foods have over the raw ones is that they come to the consumer ready for immediate consumption, and the preliminary preparation of boiling is not required.

The claim that the prepared foods are predigested only applies to the malted foods, and, as only a part of the starch in these is converted, they are only predigested to a small degree.

*Use of Breakfast Foods.*—Of late years breakfast foods have been growing more and more popular, nearly all the cereals being now represented. The oatmeals have been used for a long time and are almost a constant article of diet on the breakfast table. Wheat and corn are perhaps the next two that are more largely used, and rice is coming rapidly into general use.

*Adulterants.*—The chemical analyses and microscopic examination show that the breakfast foods are almost if not entirely free from adulteration. Common salt is used in some, which tends to increase the per cent of ash to such an extent that it might be supposed mineral matter had been added, but none has been found.

#### DISCUSSION OF RESULTS.

A conception of the relative merits of the different kinds of breakfast foods may be obtained by examining the figures in the table below, especially the columns marked "Protein" and "Fat." The higher these two constituents, the more nutritious is the food. It will be readily seen that the oat products contain from three to six per cent more protein and from six to seven per cent more fat than the other foods in the table, and are therefore of much more nutritive value. It is shown by the analyses that the wheat products rank second, followed by the corn and rice products. It is also shown that there is some variation in the analyses of the same brands, which may be due to the quality of the cereal used.

Nineteen samples of breakfast foods were examined, and all were found free from adulteration.

#### STARCH GRAINS.

In very finely ground substances, such as flour, the adulterants cannot be seen with the naked eye, and the fraud is only brought out when a high-power microscope is used. In examining flours with the microscope, and to get at their composition, the difference in the starch granules of the various grains is taken advantage of.

Cereal grains are composed largely of starch, the quantity ranging from sixty to more than eighty per cent of the entire weight of the dry hulled kernels. The starch is collected in almost a pure state in the inner portion of the grain, smaller portions being found in the coats, and only a trace or none at all in the germs. The starches of the cereals have many common properties. They are, as far as can be determined chemically, identical.

## RESULTS OF THE EXAMINATION OF

Laboratory Number	Material and Brand from Label.	Manufacturer or Wholesaler.	Retail Dealer or Party Who Sent Sample for Analysis.
5705	Biltmore Wheat Hearts.....	The Wheat Hearts Co., Asheville, N. C.	S. R. Lentz, Charlotte, N. C..
5706	Price's Wheat Flaked Celery Food.	Price Cereal Food Co., Chicago, Ill.	do.....
5707	Ralston Health Food.....	Ralston Purina Co., St. Louis, Mo.	do.....
5710	Cream of Wheat.....	Cream of Wheat Co., Minneapolis, Minn.	L. L. Sarratt, Charlotte, N. C.
5713	Ferndell Breakfast Food.....	Sprague, Warner & Co., Chicago, Ill.	Miller Van Ness, Charlotte, N. C.
5715	Wheatena.....	Wheatena Co., New York, N. Y.	Gates & McGuire, Asheville, N. C.
5717	Staf-of-life.....	Julian P. Thomas, M. D., New York, N. Y.	Noland, Rowland Grocery Co., Asheville, N. C.
6067	Pettijohn's Breakfast Food...	The American Cereal Co., Chicago, Ill.	J. R. Ferrall & Co., Raleigh, N. C.
5711	Egg-O-See.....	Egg-O-See Cereal Co., Chicago, Ill.	Miller Van Ness, Charlotte, N. C.

## RESULTS OF THE EXAMINATION OF

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.	Retail Dealer or Party Who Sent Sample for Analysis.
5708	Post Toasties.....	Postum Cereal Co., Battle Creek, Mich.	S. R. Lentz, Charlotte, N. C..
5712	Korn Kinks.....	The H-O. Co., Buffalo, N. Y.	Miller Van Ness, Charlotte, N. C.
5714	Maiz-all.....	Quaker Oats Co., Chicago, Ill.	do.....
6068	Corn Flakes.....	Egg-O-See Cereal Co., Chicago, Ill.	J. R. Ferrall & Co., Raleigh, N. C.

## RESULTS OF THE EXAMINATION OF

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.
6065	Puffed Rice.....	Quaker Oats Co., Chicago, Ill. ....
5718	Buckwheat.....	The H-O. Co., Buffalo, N. Y. ....
6066	Rolled White Oats.....	Quaker Oats Co., Chicago, Ill. ....

## BREAKFAST FOODS—WHEAT PRODUCTS.

Laboratory Number.	Date of Purchase.	Protein—Per Cent.	Fat—Per Cent.	Crude Fiber—Per Cent.	Ash—Per Cent.	Microscopic Examination.	Adulterants.
5705	7-6-08	11.37	2.01	1.85	1.33	Wheat product . . . . .	None found.
5706	7-6-08	11.28	1.48	3.25	1.59	do . . . . .	do.
5707	7-6-08	11.75	1.87	1.07	1.24	do . . . . .	do.
5710	7-6-08	11.50	1.34	0.17	0.57	do . . . . .	do.
5713	7-6-08	13.50	1.38	1.10	1.20	do . . . . .	do.
5715	7-28-08	10.75	2.48	1.82	1.19	do . . . . .	do.
5717	7-28-08	12.00	1.27	2.20	2.26	do . . . . .	do.
6067	9-30-08	10.25	2.53	2.62	1.90	do . . . . .	do.
5711	7-6-08	12.62	1.83	1.22	1.88	do . . . . .	do.

## BREAKFAST FOODS—CORN PRODUCTS.

Laboratory Number.	Date of Purchase.	Protein—Per Cent.	Fat—Per Cent.	Crude Fiber—Per Cent.	Ash—Per Cent.	Microscopic Examination.	Adulterants.
5708	7-6-08	7.50	0.68	0.75	1.33	Corn product . . . . .	None found.
5712	7-6-08	6.87	0.48	1.25	1.29	do . . . . .	do.
5714	7-6-08	8.25	0.37	0.24	1.24	do . . . . .	do.
6068	9-30-08	7.37	0.62	0.05	1.61	do . . . . .	do.

## BREAKFAST FOODS—RICE, BUCKWHEAT, ETC.

Laboratory Number.	Retail Dealer or Party Who Sent Sample for Analysis.	Date of Purchase.	Protein—Per Cent.	Fat—Per Cent.	Crude Fiber—Per Cent.	Ash—Per Cent.	Adulterants.
6065	J. R. Ferrall & Co., Raleigh, N. C.	Sept. 30, 1908	8.12	0.50	0.375	.56	None found.
5718	J. D. Lee, Wilson, N. C. . . . .	July 9, 1908	11.87	2.03	0.45	3.00	None found.
6066	J. R. Ferrall & Co., Raleigh, N. C.	Sept. 30, 1908	15.25	7.88	1.35	2.04	None found.

## RESULTS OF THE EXAMINATION

5727	Tapioca, Royal Pearl.....	Parrish Bros., Baltimore, Md.....
5728	Tapioca, Eagle.....	D. R. James & Bros., New York, N. Y.....
SAGO		
5729	Sago (Pearl).....	Newton Tea and Spice Co., Cincinnati, Ohio..

## PHOSPHATES.

Phosphates are usually nonalcoholic. Besides the adulterants usually found in soda waters, phosphates often contain chemical preservatives.

## RESULTS OF THE EXAM

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.
5327	Phosphate, Mezzo.....	Anderson & Co., Atlanta, Ga.....
5391	Phosphate, Peach.....	Gast, Croft & Co., Louisville, Ky.....
5390	Phosphate, Blackberry.....	do.....

## BOTTLED SODA WATERS.

The bottling of soda waters is getting to be quite an industry in the State. Almost every town has one or more plants for bottling soda waters and other summer drinks.

The syrups from which certain products are made are purchased by the bottler, and he only adds carbonated water to them. These are known as specialty drinks, and are usually sold under trade or proprietary names. However, the greater number of these drinks are made by the bottlers by mixing the flavoring, coloring, syrup, etc., and adding the carbonated water.

The bottling process is comparatively simple, and much of it in the State is in the hands of men with very little intelligence. These drinks are often bottled under dirty and unsanitary conditions, and, unless good attention is given them, they may be the source of much sickness and disease. The labels for these drinks are usually furnished by the manufacturer of the flavoring from which the drink is made. As the manufacturer of the flavoring and the labels does not ship the finished product into the State, he cannot be held for mis-

## OF BREAKFAST FOODS—CONTINUED.

5727	M. E. Bizzell, Goldsboro, N. C. . . . .	July 9, 1908	0.87	0.32	0.02	0.16	None found.
5728	-----do-----	July 9, 1908	1.50	0.38	0.30	0.39	do.

## PRODUCT.

5729	W. H. Taylor & Co., Wilson, N. C.	July 22, 1908	0.75	0.28	0.25	0.57	None found.
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Only three samples were examined, and two of the three were found to be adulterated, containing benzoates. They also ran rather high in alcohol.

## INATION OF PHOSPHATES.

Laboratory Number.	Retail Dealer or Party Who Sent Sample for Analysis.	Alcohol—Per Cent. by Vol.	Adulterants.	
			Preservatives.	Coloring Matter.
5327	Wm. Shelton, Speedwell, N. C. . . . .	0.54	None found . . . . .	None found.
5391	L. J. Williams, West Raleigh, N. C. . . . .	6.65	Benzoic acid . . . . .	do.
5390	-----do-----	6.50	-----do-----	do.

branding under the National Food Law. For that reason the bottler of a product will have to be held strictly responsible for his product under the law. The so-called flavoring extracts from which many soda waters are made are often misrepresented to the bottlers. It is claimed that they are fruit juices, extracts, etc., when they are entirely or partially artificial products. They have usually been labeled fruit products, often showing on the label an attractive-looking picture of the fruit from which the product was supposed to be made.

There is a tendency among the soda-water bottlers not to label these products at all. The rules of the Board of Agriculture on labeling require that every package must be labeled, and the label must bear the name and address of the bottler.

A large number (144) of samples of these goods were examined, and about 55 per cent of them were found to be adulterated.

The principal adulterants found in these products are coal-tar dyes and artificial flavors, without the presence of the latter being stated on the label.

## RESULTS OF THE EXAMINATION OF BOTTLED SODA

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.	Retail Dealer or Party Who Sent Sample for Analysis.
6045	Soda Water, Bludwine	Crescent Bottling Co., Hendersonville, N. C.	-----
6046	Soda Water, Pineapple	Hickory Bottling Works, Hickory, N. C.	-----
6047	Soda Water, Swiss Cream	do	-----
6048	Soda Water, Peach	do	-----
6049	Soda Water, Cream	Campbell Bottling and Supply Co., Hickory, N. C.	-----
6050	Soda Water, Peach	do	-----
6051	Soda Water, Strawberry	do	-----
6052	Soda Water, Cherry Phosphate.	do	-----
6053	Soda Water, Cream	High Point Bottling Co., High Point, N. C.	-----
6054	Soda Water, Strawberry	Coca-Cola Bottling Co., Salisbury, N. C.	-----
6055	Soda Water, Lemon	do	-----
6056	Soda Water, Cherry Phosphate.	do	-----
6080	Soda Water, Peach Mellow.	Acme Bottling Works, Kinston, N. C.	-----
6083	Soda Water, Chocolate Cream.	do	-----
6084	Soda Water, Cherry Phosphate.	do	-----
6086	Soda Water, Orange	Pepsi-Cola Bottling Works, Kinston, N. C.	-----
6087	Soda Water, Grape Champagne (imitation.)	do	-----
6088	Soda Water, Rootbeer, Crescent.	do	-----
6089	Soda Water, Iron Brew	Sumrell & McCoy Bottling Works, Kinston, N. C.	-----
6091	Soda Water, Real Chocolate.	Crown Bottling Works, New Bern, N. C.	-----
5238	Soda Water, Hop Ale	American Beverage Co., Atlanta, Ga.	Cel-i-Ko Bottling Works, Raleigh, N. C.
6024	Soda Water, Cherry Phosphate.	D. R. Huffines, Greensboro, N. C.	-----
6025	Soda Water, Orangeade	do	-----
6026	Soda Water, Peach Bounce.	do	-----
6027	Soda Water, Cream	do	-----
6028	Soda Water, Lemon	do	-----
6029	Soda Water, To-Ko	do	-----
6030	Soda Water, Strawberry	do	-----
6031	Soda Water, Digestol	do	-----
6032	Soda Water, Peach Mellow.	C. H. Scales, Reidsville, N. C.	-----
6032	Soda Water, Strawberry	F. & F. Bottling Works, North Wilkesboro, N. C.	-----
6034	Soda Water, Lemon Sour	do	-----
6035	Soda Water	do	-----
6036	Soda Water, Rasport	Forester Grocery Co., North Wilkesboro, N. C.	-----
6037	Soda Water, Cream	do	-----
6038	Soda Water, Eggnog	do	-----
6039	Soda Water, Strawberry	do	-----

## WATERS AND OTHER NONALCOHOLIC BEVERAGES.

Laboratory Number.	Adulterants.		Remarks and Conclusions.
	Preservatives.	Coloring Matter.	
6045	None found.....	None found.....	Misbranded, not properly labeled.
6046	do.....	do.....	Not properly labeled.
6047	do.....	do.....	
6048	do.....	do.....	Not properly labeled.
6049	do.....	do.....	do.
6050	do.....	do.....	Misbranded, not properly labeled.
6051	do.....	Coal-tar dye.....	do.
6052	do.....	do.....	do.
6053	do.....	None found.....	do.
6054	do.....	Coal-tar dye.....	Misbranded.
6055	do.....	None found.....	do.
6056	do.....	Coal-tar dye.....	Misbranded, not properly labeled.
6080	do.....	do.....	Not properly labeled.
6083	do.....	None found.....	Misbranded, not properly labeled.
6084	do.....	Coal-tar dye.....	
6086	do.....	do.....	Misbranded.
6087	do.....	None found.....	Misbranded, not properly labeled.
6088	do.....	do.....	do.
6089	do.....	do.....	
6091	do.....	do.....	Misbranded, not properly labeled.
5238	do.....	do.....	Not properly labeled, contains caffeine.
6024	do.....	Coal-tar dye.....	Misbranded.
6025	do.....	do.....	do.
6026	do.....	do.....	do.
6027	do.....	None found.....	
6028	do.....	Coal-tar dye.....	Misbranded, not properly labeled.
6029	do.....	do.....	Not properly labeled.
6030	do.....	do.....	Misbranded, not properly labeled.
6031	do.....	do.....	Not properly labeled.
6032	do.....	do.....	do.
6033	do.....	do.....	Misbranded, not properly labeled.
6034	do.....	do.....	Not properly labeled.
6035	do.....	do.....	Not labeled.
6036	do.....	do.....	Not properly labeled.
6037	do.....	do.....	do.
6038	do.....	do.....	Misbranded, not properly labeled.
6039	do.....	do.....	do.

## RESULTS OF THE EXAMINATION OF BOTTLED SODA WATERS

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.	Retail Dealer or Party Who Sent Sample for Analysis.
6040	Soda Water, Peach Mellow.	Forester Grocery Co., North Wilkesboro, N. C.	
6041	Soda Water, Peach	Crescent Bottling Co., Hendersonville, N. C.	
6042	Soda Water, Lemon Sour	do	
6044	Soda Water, Pickmeup	do	
5239	Soda Water, Hop Ale	American Beverage Co., Atlanta, Ga.	Cel-i-Ko Bottling Works, Raleigh, N. C.
5492	Soda Water, Ginger Ale	Pepsi-Cola Bottling Co., Wadesboro, N. C.	
5493	Soda Water, Strawberry	do	
5494	Soda Water, Lemon Sour	do	
5495	Soda Water, Peach Juice	do	
5496	Soda Water, Sarsaparilla	Anson Bottling Works, Wadesboro, N. C.	
5497	Soda Water	do	
5498	Soda Water	do	
5499	Soda Water, Ginger Ale, Rainbow.	do	
5500	Soda Water, Lemon Sour	Rockingham Bottling Works, Rockingham, N. C.	
5501	Soda Water, Coffee, Royal Crown.	C. Valaer Bottling Works, Charlotte, N. C.	T. F. Tadlock, Monroe, N. C.
5565	Soda Water, Eureka	Norton Cider and Vinegar Co., Statesville, N. C.	
5587	Soda Water, Pepsi-Cola	Pepsi-Cola Co., New Bern, N. C.	E. Dannenberg, Wilson, N. C.
5593	Soda Water, Rye-Ola	Monroe Bottling Works, Monroe, N. C.	
5608	Soda Water, Strawberry	Pepsi-Cola Bottling Works, Greensboro, N. C.	
6018	Soda Water, Cream, Jersey.	Greensboro Coca-Cola Bottling Co., Greensboro, N. C.	
6019	Soda Water	Greensboro Steam Bottling Co., Greensboro, N. C.	
6020	Soda Water, Strawberry, Game Cock.	do	
6021	Soda Water, Cherry Phosphate.	do	
6022	Soda Water, Peach Mellow.	do	
6023	Soda Water, Bracer	do	
6082	Soda Water, Hop Ale	American Beverage Co., Atlanta, Ga.	Acme Bottling Works, Kinston, N. C.
5471	Soda Water, Iron Brew	S. T. Boon Bottling Works, Fayetteville, N. C.	
5472	Soda Water, Lemon Sour, (imitation.)	do	
5473	Soda Water, Celery Cola	do	
5474	Soda Water, Peach	do	
5475	Soda Water, Lemon	do	
5476	Soda Water, Ginger Ale, (artificial.)	Coca-Cola Bottling Works, Fayetteville, N. C.	
5477	Soda Water, Strawberry, (artificial.)	do	
5478	Soda Water, Wild Cherry Phosphate.	do	
5479	Soda Water, Peach flavor (artificial.)	do	
5480	Soda Water, Cream flavor.	do	

## AND OTHER NONALCOHOLIC BEVERAGES—CONTINUED.

Laboratory Number.	Adulterants.		Remarks and Conclusions.
	Preservatives.	Coloring Matter.	
6040	None found	Coal-tar dye	Not properly labeled.
6041	do	do	Misbranded, not properly labeled.
6042	do	None found	do.
6044	do	do	Not properly labeled.
5239	do	do	Not properly labeled, contains caffeine.
5492	do	Coal-tar dye	Misbranded, not properly labeled.
5493	do	do	do.
5494	do	do	do.
5495	do	do	do.
5496	do	do	Misbranded.
5497	do	do	Not labeled.
5498	do	do	do.
5499	do	do	Misbranded, not properly labeled.
5500	do	None found	Misbranded.
5501	do	do	Not properly labeled.
5565	do	Coal-tar dye	
5587	do	None found	Contained caffeine.
5593	do	do	
5608	do	Coal-tar dye	Misbranded, not properly labeled.
6018	do	None found	do.
6019	do	do	Not properly labeled.
6020	do	Coal-tar dye	Misbranded.
6021	do	do	Misbranded, not properly labeled.
6022	do	do	do.
6023	do	None found	Not properly labeled.
6082	do	do	Not properly labeled, contains caffeine.
5471	do	do	
5472	do	Coal-tar dye	Not properly labeled.
5473	do	do	do.
5474	do	do	Misbranded, not properly labeled.
5475	do	None found	Misbranded.
5476	do	Coal-tar dye	Not properly labeled.
5477	do	do	Misbranded, not properly labeled.
5478	do	do	do.
5479	do	do	do.
5480	do	None found	do.

## RESULTS OF THE EXAMINATION OF BOTTLED SODA WATERS

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.	Retail Dealer or Party Who Sent Sample for Analysis.
5481	Soda Water, Pineapple flavor (artificial.)	Coca-Cola Bottling Works, Raleigh, N. C.	-----
5482	Soda Water, Orange	Pepsi-Cola Bottling Works, Fayetteville, N. C.	-----
5483	Soda Water, Cream	do	-----
5484	Soda Water, Chocolate	do	-----
5485	Soda Water, Lemon	do	-----
5486	Soda Water, Ginger Ale	do	-----
5488	Soda Water, Ginger Ale, Buffalo Lick.	do	-----
5489	Soda Water, Peach Mellow.	do	-----
5490	Soda Water, Lemon	F. M. Hightower, Wadesboro, N. C.	-----
5491	Soda Water, Ginger Ale	do	-----
5490	Soda Water, Lemon	Parker Bottling Works, Laurinburg, N. C.	-----
5451	Soda Water, Sarsaparilla	do	-----
5452	Soda Water, Lemon (artificial.)	Laurinburg Bottling Works, Laurinburg, N. C.	-----
5453	Soda Water, Strawberry	do	D. L. Jackson & Son, Laurinburg, N. C.
5454	Soda Water	do	do
5455	Soda Water, Sunbeam Ginger Ale.	Maxton Bottling Works, Maxton, N. C.	-----
5456	Soda Water, Strawberry	do	-----
5457	Soda Water, Lemon Sour	do	-----
5458	Soda Water	do	-----
5459	Soda Water, Cherry Cocktail.	Artesian Bottling Co., Lumberton, N. C.	-----
5460	Soda Water	do	-----
5461	Soda Water, Sarsaparilla	do	-----
5463	Soda Water, Chocolate	do	-----
5464	Soda Water, Peach Bounce (imitation.)	do	-----
5465	Soda Water, Capital Club Ginger Ale.	do	-----
5466	Soda Water, Sarsaparilla	S. T. Boon Bottling Works, Fayetteville, N. C.	-----
5467	Soda Water, Eggnog	do	-----
5468	Soda Water, Ginger Ale	do	-----
5469	Soda Water, Cherry Cocktail.	do	-----
5470	Soda Water, Strawberry (artificial.)	do	-----
5208	Soda Water, Ginger Ale, Mead.	Brannon Carbonating Co., Charlotte, N. C.	-----
5209	Soda Water, Hire's Rootbeer.	do	-----
5210	Soda Water, Peach Phosphate (artificial.)	do	-----
5211	Soda Water, Brannon's Cream (artificial.)	do	-----
5212	Soda Water, Brannon's Chocolate Cream (artificial.)	do	-----
5213	Soda Water, Brannon's Rootbeer (artificial.)	do	-----

## AND OTHER NONALCOHOLIC BEVERAGES—CONTINUED.

Laboratory Number.	Adulterants.		Remarks and Conclusions.
	Preservatives.	Coloring Matter.	
5481	None found	Coal-tar dye	Misbranded, not properly labeled.
5482	do	do	do.
5483	do	None found	do.
5484	do	do	do.
5485	do	do	Misbranded.
5486	do	Coal-tar dye	Not properly labeled.
5488	do	do	Misbranded.
5489	do	do	do.
5490	do	do	Misbranded, not properly labeled.
5491	do	do	do.
5490	do	do	do.
5451	do	None found	Not properly labeled.
5452	do	do	Misbranded, not properly labeled.
5453	do	Coal-tar dye	Misbranded.
5454	do	None found	Not labeled.
5455	do	Coal-tar dye	do.
5456	do	do	Misbranded, not properly labeled.
5457	do	do	do.
5458	do	None found	Not labeled.
5459	do	Coal-tar dye	Misbranded, not properly labeled.
5460	do	None found	Not labeled.
5461	do	do	Not properly labeled.
5463	do	do	Misbranded.
5464	do	Coal-tar dye	Not properly labeled.
5465	do	do	do.
5466	do	do	Misbranded.
5467	do	do	do.
5468	do	do	do.
5469	do	do	do.
5470	do	do	Not properly labeled.
5208	do	None found	
5209	do	do	
5210	do	do	Artificial product.
5211	do	Coal-tar dye	do.
5212	do	None found	do.
5213	do	do	do.

## RESULTS OF THE EXAMINATION OF BOTTLED SODA WATERS

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.	Retail Dealer or Party Who Sent Sample for Analysis.
5214	Soda Water, Brannon's Orangeade (artificial.)	Brannon Carbonating Co., Charlotte, N. C.	
5215	Soda Water, Brannon's Sarsaparilla (artificial.)	do	
5216	Soda Water, Brannon's Strawberry (artificial.)	do	
5217	Soda Water, Brannon's Cherry Phosphate (artificial.)	do	
5218	Soda Water, Brannon's Ginger Ale (artificial.)	do	
5219	Soda Water, Raspberry (artificial.)	do	
5220	Soda Water, Cafe-Cola (artificial.)	do	
5221	Soda Water, West India Lemon Sour (artificial.)	do	
5222	Soda Water, Lemon Phosphate (artificial.)	do	
5223	Soda Water, Pineapple Punch (artificial.)	do	
5446	Soda Water, Peach Mellow (artificial.)	Parker Bottling Works, Laurinburg, N. C.	
5447	Soda Water, Cream	do	
5448	Soda Water, Strawberry	do	
5449	Soda Water, Ginger Ale	do	
6092	Soda Water, Pepper's Phos-Ferrates.	The A. M. & B. Co., Waco, Tex.	Crown Bottling Works, New Bern, N. C.
6094	Soda Water, Cold-Cola	Carolina Beverage Co., New Bern, N. C.	do
6095	Soda Water, Lemon Sour	Crown Bottling Works, New Bern, N. C.	
6096	Soda Water, Strawberry	do	
6097	Soda Water, Pepsin-Ola	do	
6098	Soda Water, Lemon	J. F. Taylor Bottling Works, New Bern, N. C.	
6099	Soda Water, Ginger Ale	do	
6100	Soda Water, Sarsaparilla	do	
6101	Soda Water, Lemon Sour	do	
6102	Soda Water, Afri-Kola	do	
6103	Soda Water, Imitation Champagne	do	
6104	Soda Water, Eggnog	do	
6105	Soda Water, Rootbeer, Diamond.	Coca-Cola Bottling Works, New Bern, N. C.	
6106	Soda Water, Lemon Sour	do	
6107	Soda Water, Real Chocolate.	do	
6108	Soda Water, Ginger Ale, Superior Quality.	do	
6122	Soda Water, Kos-Kola	Henderson Bottling Works, Henderson, N. C.	
6123	Soda Water, Strawberry (artificial.)	do	
6124	Soda Water, Sarsaparilla (artificial.)	do	
6125	Soda Water, Ginger Ale, (artificial.)	do	
6126	Soda Water, Cream	do	

## AND OTHER NONALCOHOLIC BEVERAGES—CONTINUED.

Laboratory Number.	Adulterants.		Remarks and Conclusions.
	Preservatives.	Coloring Matter.	
5214	None found -----	Coal-tar dye -----	Artificial product.
5215	do -----	None found -----	do.
5216	do -----	Coal-tar dye -----	do.
5217	do -----	None found -----	do.
5218	do -----	do -----	do.
5219	do -----	Coal-tar dye -----	do.
5220	do -----	None found -----	
5221	do -----	do -----	Artificial product.
5222	do -----	do -----	do.
5223	do -----	do -----	do.
5446	do -----	Coal-tar dye -----	Artificial product, not properly labeled.
5447	do -----	do -----	do.
5448	do -----	do -----	Misbranded, not properly labeled.
5449	do -----	do -----	Artificial product, misbranded, not properly labeled.
6092	do -----	None found -----	Misbranded, not properly labeled.
6094	do -----	do -----	do.
6095	do -----	Coal-tar dye -----	
6096	do -----	do -----	
6097	do -----	None found -----	Misbranded, misrepresented.
6098	do -----	do -----	Misbranded, misrepresented; not properly labeled.
6099	do -----	do -----	Misbranded, not properly labeled.
6100	do -----	do -----	
6101	do -----	Coal-tar dye -----	Not properly labeled.
6102	do -----	do -----	
6103	do -----	do -----	Misrepresented, not properly labeled.
6104	do -----	do -----	Misbranded, not properly labeled.
6105	do -----	None found -----	Not properly labeled.
6106	do -----	do -----	Misbranded, not properly labeled.
6107	do -----	do -----	do.
6108	do -----	do -----	do.
6122	do -----	do -----	Not properly labeled.
6123	do -----	Coal-tar dye -----	do.
6124	do -----	None found -----	do.
6125	do -----	do -----	do.
6126	do -----	do -----	do.

## CIDERS AND ARTIFICIAL OR IMITATION CIDERS.

To comply with the requirements of the State Food Law a cider must be made entirely of unadulterated fruit juice and be sold under the name of the fruit from which it has been made. No color or flavor shall be added, unless the fact is made known by the proper label attached to each package. When artificially colored or flavored, these products must be sold as artificial, imitation or compound products, or their sale will be illegal, and therefore prevented. Their sale will also be prevented if they contain any chemical preservative, except 0.008 of one per cent of sulphurous acid, which is enough only to fumigate the cask.

Forty samples of this class of beverages have been examined, eleven (or 27.5 per cent) of which proved to be adulterated. The adulterated samples contained chemical preservatives, coal-tar dyes or arti-

## RESULTS OF THE EXAMINATION OF CIDERS

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.	Retail Dealer or Party Who Sent Sample for Analysis.
5314	Cider, Apple.....	W. P. Matthews & Son, Raleigh, N. C.	W. P. Matthews & Son, Raleigh, N. C.
5315	do.....	do.....	do.....
5386	Cider, Compound, Black-berry flavor.	Gast, Croft & Co., Louisville, Ky.	do.....
5516	Cider, Compound .....	Hicks Co., Wilmington, N. C.	Frank Jessup, Red Springs, N. C.
5552	Cider, Apple, Golden Rod	E. S. Shelby Vinegar Co., Richmond, Va.	Boykin Grocery Co., Wilson, N. C.
5553	do.....	do.....	W. M. Washington, Kinston, N. C.
5557	do.....	do.....	Jas. Bethea, Whitakers, N. C.
5560	Cider, Apple.....	W. P. Matthews & Son, Raleigh, N. C.	W. P. Matthews & Son, Raleigh, N. C.
5564	Cider, Imitation, Hotstuff	do.....	N. A. Collins (chief police), Asheville, N. C.
5570	Cider.....	Christian & Winfree, Richmond, Va.	J. R. Bergerson, Beaufort, N. C.
5571	do.....	do.....	do.....
5588	Cider, Apple.....	W. P. Matthews & Son, Raleigh, N. C.	W. P. Matthews & Son, Raleigh, N. C.
5589	do.....	do.....	do.....
5224	Cider, Imitation .....	J. E. Petty, Greensboro, N. C.	do.....
5225	Cider, Apple.....	do.....	T. K. Bruner, Raleigh, N. C.
5237	Cider, White Plum.....	Jones Bros. & Co., Louisville, Ky.	J. G. Ball, Raleigh, N. C.
5241	Cider, Apple.....	J. F. Matthews, Raleigh, N. C.	J. Dannenberg, Goldsboro, N. C.
5249	Cider.....	do.....	J. S. Bryan, Albemarle, N. C.
5279	Cider, Compound .....	Anderson & Co., Atlanta, Ga.	B. H. Hooper, Speedwell, N. C.
6016	Cider.....	Groves & Perry, Asheville, N. C.	Swannanoa Lunch Room, Asheville, N. C.
5312	Cider, Apple.....	R. W. King, Raleigh, N. C.	R. C. Batchelor, Raleigh, N. C.
5313	do.....	Haynor Mfg. Co., Norfolk, Va.	do.....

cial flavor, with the presence of the latter not stated on the label. A majority of these samples were wholly artificial or imitation products, while many of them were compound products containing a small quantity of fruit cider.

The adulteration and fraud practiced in this class of goods have been tremendous. More than 81 per cent of the samples examined in 1907 were found to be adulterated. It is gratifying to see that the per cent of adulteration this year has dropped down to 27.5 per cent.

On account of the sale of these products in territories where the sale of alcoholic beverages is illegal, like imitation beers, many of these samples were sent to the Department by officials or others for the determination of the amount of alcohol contained or supposed to be contained. The sale of them was often discontinued, either on account of the amount of alcohol found to be present or adulterants which rendered their sale in the State illegal.

## AND IMITATION OR ARTIFICIAL CIDERS.

Laboratory Number.	Alcohol— Per Cent by Volume.	Solid Matter in Solution— Per Cent.	Adulterants.		Remarks and Conclusions.
			Preservatives.	Coloring Matter.	
5314	5.50		None found	None found	Apple cider.
5315	6.00		do	do	do.
5386	6.70		do	do	Compound cider.
5516			do	do	do.
5552	7.95	9.31	do	do	Apple cider, sweetened with sugar.
5553	8.00	9.52	do	do	do.
5557	8.50	9.30	do	do	do.
5560	5.45	3.55	do	do	Apple cider.
5564	6.55		do	do	Imitation cider.
5570	6.65		do	do	Cider.
5571	6.55		do	do	do.
5588	4.95		do	do	Apple cider.
5589	0.75		do	do	Apple cider, sweet.
5224			do	do	Imitation cider.
5225			do	do	Apple cider.
5237	4.60		do	do	do.
5241	1.25		do	do	do.
5249	8.02		do	do	do.
5279	9.23		do	do	Compound cider.
6016	0.25		do	do	Cider.
5312	4.09		do	do	Compound cider, mis- branded.
5313	5.60		do	do	do.

## RESULTS OF THE EXAMINATION OF CIDERS AND

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.	Retail Dealer or Party Who Sent Sample for Analysis.
5316	Cider, Apple.....	Haynor Mfg. Co., Norfolk, Va.	W. P. Matthews & Son, Raleigh, N. C.
5433	Cider, Imitation.....	California Fruit and Extract Co., Louisville, Ky.	L. C. Neal, Raleigh, N. C.
5515	do.....	Haynes-Piper Co., Boston, Mass.	Williams Bros., Rockingham, N. C.
5517	Cider, Manhattan.....	E. A. Saunders, Richmond, Va.	E. J. Hale & Son, Raleigh, N. C.
5590	Cider, Apple.....	R. W. King, Raleigh, N. C.	W. P. Matthews & Son, Raleigh, N. C.
5591	do.....	G. E. Wismon, Raleigh, N. C.	do.....
6060	Cider, Compound.....		D. Holyfield, Rockford, N. C.
5382	do.....		King Bros., Raleigh, N. C.
5234	Cider, Imitation, Cherry.....	Louisburg Bottling Works, Louisburg, N. C.	F. L. Hermon, Louisville, Ky.
5235	Cider, Imitation.....		J. J. Lambert, Elon College, N. C.
6013	Cider, Grape.....	Hendersonville Grocery Co., Hendersonville, N. C.	T. B. Crary, Brevard, N. C.
6014	Cider, Champagne.....	Asheville Bottling Works, Asheville, N. C.	do.....
6015	Cider.....	Gast, Croft & Co., Louisville, Ky.	Swannanoa Lunch Room, Asheville, N. C.
6017	do.....	Warner-Jenkinson Co., St. Louis, Mo.	Coca-Cola Bottling Co., Gastonia, N. C.
6085	Cider, Artificial, Apple.....	Coca-Cola Bottling Works, New Bern, N. C.	Acme Bottling Works, Kinston, N. C.
5191	Cider, Apple.....		Lenoir Grocery Co., Lenoir, N. C.
5194	Cider, Imitation.....	Gast, Croft & Co., Louisville, Ky.	Crown Bottling Works, Ashboro, N. C.
5195	Cider, Imitation, Black-berry.	Warner-Jenkinson Co., St. Louis, Mo.	Norton Cider and Vinegar Co., Statesville, N. C.

## BEERS AND IMITATION BEERS.

Under the head of beers and imitation beers, eighty-six samples were examined, only four of which were found to be adulterated. Two of the four contained benzoates and the others contained coal-tar dye. The greater number by far of these samples belong to the imitation class. As standard beers cannot be sold in many territories in the State, there is quite a demand for a substitute with less alcohol than beer contains.

## RESULTS OF THE EXAMINATION

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.	Retail Dealer or Party Who Sent Sample for Analysis.
5823	Beer, Imitation, Cuban Ade.	Dannenberg Bros., Goldsboro, N. C.	S. T. Smith, Raleigh, N. C.
6059	Beer.....	Darley Park Brewery, Baltimore, Md.	J. D. Lee, Wilson, N. C.
5203	Beer, Imitation, Hop Brew.	Dannenberg Bottling Co., Goldsboro, N. C.	E. T. Alford, Youngsville, N. C.
5204	Beer, Imitation.....		Geo. A. Lupton, Beaufort, N. C.

## IMITATION OR ARTIFICIAL CIDERS—CONTINUED.

Laboratory Number.	Alcohol— Per Cent by Volume.	Solid Matter in Solution— Per Cent.	Adulterants.		Remarks and Conclusions.
			Preservatives.	Coloring Matter.	
5316	4.78		None found	None found	Compound cider, mis- branded. Adulterated.
5433	0.10		Benzoic acid	Coal-tar dye	
5515			do	None found	do.
5517			do	do	do.
5590	2.50		do	do	do.
5591	2.80		do	do	do.
6060	1.50		None found	do	Compound cider.
5382			do	do	do.
5234	0.40		Salicylic acid	Coal-tar dye	Imitation product, adulterated.
5235	5.92		None found	do	do.
6013	0.15		Benzoic acid	do	Compound cider, adulterated.
6014	6.95		None found	None found	Compound cider, mis- branded.
6015	1.20		do	Coal-tar dye	do.
6017	1.00		do	None found	Not properly labeled.
6085			do	do	Compound cider, mis- branded; not properly labeled.
5191	8.75		None found	None found	Apple cider.
5194	6.75	10.33	Benzoic acid	do	Not labeled, adulterated.
5195	1.55	14.05	None found	Coal-tar dye	do.

As many of the dealers in this class of goods desire to know that they are not violating the prohibition laws, and as many citizens and county and city officials desire to know that the laws are not being violated, many samples of these goods are sent to the Department for the determination of the amount of alcohol present. Very little adulteration was found, and the amount of alcohol contained was usually low.

## OF BEERS AND IMITATION BEERS.

Laboratory Number.	Alcohol— Per Cent by Volume.	Solid Matter in Solution— Per Cent.	Adulterants.		Remarks and Conclusions.
			Preservatives.	Coloring Matter.	
5823	2.15		None found	None found	
6059	1.30		do	do	
5203	1.75		do	do	
5204	8.04		do	do	

## RESULTS OF THE EXAMINATION OF

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.	Retail Dealer or Party Who Sent Sample for Analysis.
5205	Beer, Imitation, Cuban Ade.	Home Brewing Co., Richmond, Va.	Dannenberg Bros., Goldsboro, N. C.
5206	Beer, Imitation, Hop Brew.	Dannenberg Bottling Co., Goldsboro, N. C.	J. W. Hassell, New Bern, N. C.
5207	do	do	J. C. Guthrie, New Bern, N. C.
5231	Beer, Imitation, Rikk	Gottlieb-Bauenschmidt-Straus Co., Baltimore, Md.	Fred H. Burluson, Albemarle, N. C.
5232	Beer, Imitation, Hop Brew.	Dannenberg Bottling Co., Goldsboro, N. C.	-----
5240	Beer, Imitation, Yellow Ade.	Robert Portner Brewing Co., Alexandria, Va.	R. L. Davis, Raleigh, N. C.
5282	Beer, Imitation, Hopine	Consumers Brewing Co., Norfolk, Va.	National Drug Co., Wilson, N. C.
5284	Beer, Imitation, Cuban Ade.	Home Brewing Co., Richmond, Va.	J. E. Haywood, Zebulon, N. C.
6043	Beer, Imitation, Schooner Brew.	National Beverage Co., Chattanooga, Tenn.	Crescent Bottling Co., Hendersonville, N. C.
6064	Beer, Imitation, Liquid Bread.	Rosenegk Brewing Co., Richmond, Va.	W. F. Young, Princeton, N. C.
6070	Beer, Imitation, Small Brew.	Portner Malt Extract Co., Alexandria, Va.	Dannenberg Bros., Goldsboro, N. C.
6109	Beer, Imitation, Tidal Wave.	-----	W. E. Springer, Wilmington, N. C.
6090	Beer, Imitation, Hopse	Red Cliffs Co., Wheeling, West Va.	W. N. Hight, Kinston, N. C.
5597	Beer, Imitation	-----	G. E. Carman, Mapleton, N. C.
5599	Beer, Imitation, No. 23	New South Brewing and Ice Co., Middlesboro, Ky.	J. H. Lange, Asheville, N. C.
5600	Beer, Imitation, Daisy	do	do
5601	Beer, Imitation, Reinbrau	Consumers Brewing Co., Norfolk, Va.	Gus Roundtree, New Bern, N. C.
5602	Beer, Imitation	do	do
5603	do	do	do
5604	do	do	Isaac Simmons, New Bern, N. C.
5605	do	-----	do
5609	do	Portner Malt Extract Co., Alexandria, Va.	Ed. Denton, Raleigh, N. C.
5610	Beer, Imitation, Hop Beverage.	Home Brewing Co., Richmond, Va.	E. Dannenberg, Wilson, N. C.
5612	Beer, Imitation, Schooner Brew.	National Beverage Co., Atlanta, Ga.	J. R. Moore, Greenville, N. C.
5616	Beer, Imitation, Dukehart's Local Option.	Dukehart Mfg. Co., Baltimore, Md.	Edenton Bottling Co., Edenton, N. C.
5617	Beer, Imitation, Cuban Ade.	Dannenberg Bros., Goldsboro, N. C.	-----
5618	Beer, Imitation, Hop Brew.	do	-----
5619	Beer, Imitation, Hop Beverage.	do	-----
5624	Beer, Imitation, Schooner Brew.	National Beverage Co., Atlanta, Ga.	D. W. Davis & Son, Elizabeth City, N. C.
5627	Beer, Imitation, Reinbrau	Consumers Brewing Co., Norfolk, Va.	W. J. Wilson, Milwaukee, N. C.
5628	Beer, Imitation, Ner-Vo	Rosenegk Brewing Co., Richmond, Va.	W. E. Barker & Co., Mt. Airy, N. C.
5629	Beer, Imitation, Schlitz Fizz.	Jos. Schlitz Brewing Co., Milwaukee, Wis.	Sternberger Bros., Wilmington, N. C.
5630	Beer, Imitation, Tidal Wave.	Rosenegk Brewing Co., Richmond, Va.	I. F. Ormond, Goldsboro, N. C.
5435	Beer, Imitation, Amberine.	Robert Portner Brewing Co., Alexandria, Va.	Matthews & Hampton, Raleigh, N. C.
5502	Beer, Imitation, Beerine	C. Valaer Bottling Works, Charlotte, N. C.	W. T. Williams, Rockingham, N. C.
5554	Beer, Imitation, Kola Malt.	Virginia Brewing Co., Richmond, Va.	R. C. Batchelor, Raleigh, N. C.

## BEERS AND IMITATION BEERS—CONTINUED.

Laboratory Number.	Alcohol— Per Cent by Volume.	Solid Matter in Solution— Per Cent.	Adulterants.		Remarks and Conclusions.
			Preservatives.	Coloring Matter.	
5205	2.25		None found.	None found.	
5206	1.80		do.	do.	
5207	1.75		do.	do.	
5231	1.55		do.	do.	
5232	1.75		do.	do.	
5240	2.90		do.	do.	
5282	2.04		do.	do.	
5284	1.75		do.	do.	
6043	0.00		Benzoates	do.	Adulterated, misbranded.
6064	0.00	5.49	None found.	do.	
6070	1.80		do.	do.	
6109	1.60	3.96	do.	do.	Not properly labeled.
6090			do.	do.	do.
5597	0.00		do.	Coal-tar dye	Imitation product, not properly labeled.
5599	0.08		do.	None found.	
5600	0.95		do.	do.	
5601	1.65		do.	do.	
5602	1.10		do.	do.	Not labeled.
5603	1.10		do.	do.	do.
5604	3.25		do.	do.	do.
5605	3.20		do.	do.	do.
5609	1.60		do.	do.	
5610	1.40		do.	do.	
5612	0.35		Benzoates	do.	Adulterated.
5616	1.45		None found.	do.	
5617	1.20		do.	do.	
5618	1.70		do.	do.	
5619	1.70		do.	do.	
5624	0.35		Benzoates	do.	Adulterated, misbranded.
5627	1.20		None found.	do.	
5628	1.50		do.	do.	
5629	1.75		do.	do.	
5630	1.70		do.	do.	
5435	1.50		do.	do.	
5502			do.	do.	Name rather misleading, is more like soda water than beer.
5554	3.05		do.	do.	

## RESULTS OF THE EXAMINATION OF

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.	Retail Dealer or Party Who Sent Sample for Analysis.
5555	Beer, Imitation, Extra Dry.	East Tennessee Brewing Co., Knoxville, Tenn.	W. C. Rector, Hendersonville, N. C.
5556	Beer, Imitation, No. 23	New South Brewing and Ice Co., Middlesboro, Ky.	do
5559	Beer, Imitation, Beerine	Pepsi-Cola Bottling Works, Tarboro, N. C.	Pepsi-Cola Bottling Works, Tarboro, N. C.
5561	Beer, Imitation, Reinbrau	Consumers Brewing Co., Norfolk, Va.	Jos. Allison, Raleigh, N. C.
5562	Beer, Imitation, Vim	Haynor Mfg. Co., Norfolk, Va.	S. Rhodes, Elizabeth City, N. C.
5563	Beer, Imitation, Extra Dry.	East Tennessee Brewing Co., Knoxville, Tenn.	N. A. Collins (Police), Asheville, N. C.
5566	Beer, Imitation, Mead	Pabst Brewing Co., Milwaukee, Wis.	S. T. Smith, Raleigh, N. C.
5567	Beer, Imitation, Schlitz Fizz.	Jos. Schlitz Brewing Co., Milwaukee, Wis.	John Fuller, Mt. Airy, N. C.
5568	Beer, Imitation, Beerine	Pepsi-Cola Bottling Works, Tarboro, N. C.	do
5573	Beer, Imitation, Tidal Wave.	Rosenegk Brewing Co., Richmond, Va.	M. F. Caudle, Charlotte, N. C.
5575	Beer, Imitation, No. 23	New South Brewing Co., Middlesboro, Ky.	E. Dannenberg, Wilson, N. C.
5576	Beer, Imitation, Tidal Wave.	Rosenegk Brewing Co., Richmond, Va.	do
5577	Beer, Imitation, Cuban Ade.	Dannenberg Bros., Goldsboro, N. C.	J. E. Ramsey, Morganton, N. C.
5581	Beer, Imitation, Kola Malt.	Virginia Brewing Co., Roanoke, Va.	J. U. Smith, Raleigh, N. C.
5582	do	do	R. C. Batchelor, Raleigh, N. C.
5585	Beer, Imitation, No. 23	New South Brewing and Ice Co., Middlesboro, Ky.	Rocky Mount Pepsi-Cola Co., Rocky Mount.
5586	Beer	Home Brewing Co., Richmond, Va.	S. T. Smith, Raleigh, N. C.
5292	Beer, Imitation, Hopine	Consumers Brewing Co., Norfolk, Va.	National Drug Co., Wilson, N. C.
5321	Beer, Imitation, Cuban Ade.	Dannenberg Bros., Goldsboro, N. C.	L. H. Lee, Smithfield, N. C.
5322	Beer, Imitation, Crescent Ale.	Burr Mfg. Co., Richmond, Va.	Geo. T. Hudson, Edenton, N. C.
5323	Beer, Imitation, Tidal Wave.	Rosenegk Brewing Co., Richmond, Va.	F. R. Wilson, Raleigh, N. C.
5324	Beer, Imitation, Hop Brew.	Dannenberg Bottling Co., Goldsboro, N. C.	S. T. Smith, Raleigh, N. C.
5326	Beer, Imitation, Malto	do	W. F. Young, Princeton, N. C.
5328	Beer, Imitation, Tidal Wave.	Rosenegk Brewing Co., Richmond, Va.	F. R. Wilson, Raleigh, N. C.
5329	Beer, Imitation, Red Buck Ale.	do	J. B. Lowery, Elizabeth City, N. C.
5383	Beer, Imitation, No. 23	New South Brewing and Ice Co., Middlesboro, Ky.	L. M. McCormick (insp.), Asheville, N. C.
5384	Beer, Imitation, Extra Dry.	East Tennessee Brewing Co., Knoxville, Tenn.	do
5387	Beer, Imitation, G. B. S.	Darley Park Brewery, Baltimore, Md.	F. C. Turnage & Bro., Ayden, N. C.
5388	Beer, Imitation, Mead	Pabst Brewing Co., Milwaukee, Wis.	Armfield Co., Fayetteville, N. C.
5392	Beer, Imitation, Red Buck Ale.	do	J. T. Lamb & Co., Elizabeth City, N. C.
5416	do	do	Y. H. Byrum, Ayden, N. C.
5428	Beer, Imitation, Hop Brew.	Dannenberg Bottling Co., Goldsboro, N. C.	J. M. Arps, Plymouth, N. C.
5429	Beer, Imitation, Cuban Ade.	do	S. T. Smith, Raleigh, N. C.
5430	Beer, Imitation, Hop Brew.	do	do
5431	Beer, Imitation, Seaside	Consumers Brewing Co., Norfolk, Va.	Jas. Allison, Raleigh, N. C.

## BEERS AND IMITATION BEERS—CONTINUED.

Laboratory Number.	Alcohol— Per Cent by Volume.	Solid Matter in Solution— Per Cent.	Adulterants.		Remarks and Conclusions.
			Preservatives.	Coloring Matter.	
5555	1.30		None found	None found	
5556	0.60		do	do	
5559	0.65		do	do	Name rather misleading, is more like soda water than beer.
5561	1.90		do	do	
5562	4.10		do	do	
5563	1.40		do	do	
5566	1.50		do	do	
5567	2.20		do	do	
5568	0.35		do	do	Name rather misleading, is more like soda water than beer.
5573	1.95		do	do	
5575	0.60		do	do	
5576	1.90		do	do	
5577	0.85		do	do	
5581	0.55		do	do	
5582	0.60		do	do	
5585	0.15		do	do	
5586	3.60		do	do	
5292	2.48		do	do	Not labeled.
5321	1.59		do	do	
5322	2.16		do	do	
5323	1.90		do	do	
5324	1.05		do	do	
5326	4.15		do	do	Not properly labeled.
5328	1.90		do	do	
5329	1.97		do	do	Not properly labeled.
5383	0.25	11.92	do	do	
5384	2.45	2.35	do	do	
5387	4.95		do	do	
5388	1.65		do	do	
5392	1.90		do	do	Not properly labeled.
5416	1.97		do	do	do.
5428	1.67		do	do	
5429	1.50		do	do	
5430	1.67		do	do	
5431	2.15		do	do	

## RESULTS OF THE EXAMINATION OF

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.	Retail Dealer or Party Who Sent Sample for Analysis.
5432	Beer, Imitation, Kola Malt.	Virginia Brewing Co., Roanoke, Va.	R. C. Batchelor, Raleigh, N. C.
5434	Beer, Imitation, Vim	Haynor Mfg. Co., Norfolk, Va.	Matthews & Hampton, Raleigh, N. C.
6093	Beer, Imitation, Beerine	Maxstockline	Crown Bottling Works, New Bern, N. C.
6110	Beer, Imitation, Schlitz Fizz.	Jos. Schlitz Brewing Co., Milwaukee, Wis.	W. E. Springer, Wilmington, N. C.
6111	Beer, Imitation, Lagerine	do	do
6112	Beer, Imitation, Ambrine	Robert Portner Brewing Co., Alexandria, Va.	do
6114	Beer, Imitation, Hop Beverage.	Home Brewing Co., Richmond, Va.	E. Dannenberg, Wilson, N. C.
5309	do	do	Percy Holt, Wilson's Mills, N. C.
5578	Extract Dusseldorf's Malt.	Dusseldorf Extract Co., Germany.	J. E. Ramsey, Morganton, N. C.
5192	Beer, Vim	Haynor Mfg. Co., Norfolk, Va.	A. L. Eakir, Durham, N. C.
5193	Ale, Crescent	Burr Mfg. Co., Richmond, Va.	E. B. Jackson, Plymouth, N. C.

## DISTILLED LIQUORS.

Brandy and whiskey are the most important of this class of products, and whiskey, being of the greatest commercial importance, is the principal subject of this examination.

In beginning an investigation of whiskey the question naturally arises, What is whiskey and what are the normal constituents and the proportions in a pure whiskey? It is generally supposed that these things are well understood, but that is not the case. No subject has received less attention at the hands of chemists than distilled liquors. It seems rather strange that a product of so much commercial importance, and whose origin is lost in antiquity, should have had so little attention from chemists. Among the leading recent investigators of this subject are Shepard, Ladd, Crampton and Tolman. They have recently obtained a great deal of valuable information in regard to whiskey, and have disproven much that was formerly thought to be true of it.

Webster's Dictionary defines whiskey as "an intoxicating liquor distilled from fermented grain, potatoes," etc. The United States Pharmacopœia defines it as "an alcoholic liquor obtained by the distillation of a mash of fermented grain, usually a mixture of corn, wheat and rye, and at least four years old."

Distilled spirits corresponding closely to whiskey were known to the Egyptians in very early ages. When the English invaded Ireland they found the manufacture of whiskey a fairly well-understood art.

## BEERS AND IMITATION BEERS—CONTINUED.

Laboratory Number.	Alcohol— Per Cent. by Volume.	Solid Matter in Solution— Per Cent.	Adulterants.		Remarks and Conclusions.
			Preservatives.	Coloring Matter.	
5432	3.08		None found	None found	
5434	4.03		do	do	
6093			do	do	Not properly labeled; name rather misleading, is more like soda water than beer.
6110	1.70	4.72	do	do	
6111	0.40	5.43	do	do	
6112	1.40	4.54	do	do	
6114	0.65		do	do	
5309	1.60		do	do	
5578	3.75		do	do	
5192	3.40	3.75	do	do	
5193	3.25	5.99	do	do	

Malted barley alone was then used in the manufacture of whiskey, and the small or pot still was employed in its distillation.

Whiskey is now largely made from fermented grain, but potatoes, etc., are also used. In some cases the grain is malted, but the raw grain is more often used. When the unmalted grain is used, the first distillation produces a crude product, which is redistilled; but when the malted grain has been used, small stills are employed and the product is not redistilled.

There are other methods of manufacture which are recognized in this country, the products of which we find upon the market. This process of manufacturing has been known as blending or rectifying. The whiskeys found on the market may be classified as follows:

1. Whiskey manufactured wholly by the distiller, under the supervision of the Government. This whiskey is matured or aged in wood, and leaves the Government warehouse bearing two stamps—one, that of the warehouse, and the other a tax stamp. This is known as a straight whiskey and may be bottled while in the Government warehouse and sealed by a Government stamp, when it is said to be bottled in bond.

2. Blended whiskeys are made by taking two or more whiskeys of the first class and blending them in such proportions that certain properties may be developed. Since the Food Laws prevent a product composed of whiskey and dilute spirit colored with caramel being sold as blended whiskey, the manufacturers blend old and new whiskeys.

3. A large class of whiskey is made by adding whiskey of the first class to dilute silent spirit. Usually caramel is added to restore the color lost by the addition of the spirit. In this way the volume of whiskey of the first class used is increased to several times its original quantity. As the silent spirit has but little flavor, the flavor of this class of whiskey is largely that of the original whiskey of the first class used in the manufacture, though, of course, not so pronounced. As the original whiskey is mixed with silent spirit, this process of manufacture has formerly been known as blending, but as the Food Law provides that a blend is a mixture of like substances, and as silent spirit is not whiskey, a product made from whiskey and silent spirit cannot now be classed as a blended whiskey. The process is also called rectifying, as the manufacturer has a rectifier's license and uses rectified spirits. It can be classed as a compound whiskey, provided that it contains enough whiskey to make it a real compound and not a mere semblance of one. On the advice of the Attorney-General, the Secretary of Agriculture of the United States has ruled that to be lawfully labeled "Compound Whiskey" the amount of whiskey in a mixture of whiskey and silent spirit must equal or exceed one-third in volume of the product.

4. A fourth class of whiskey on the market is a product that is wholly artificial. It is made by adding coloring matter, beading oil and various essences for flavoring to dilute silent spirit. This class of whiskey was formerly classified by the manufacturer as a blended or rectified whiskey. As it is wholly an artificial product, it appears to have no right to be so called, and must be labeled "Imitation or Artificial Whiskey."

From the foregoing it is very evident that the term "whiskey," as it has generally been used, referred to quite a variety of products, necessarily varying in composition.

The United States Circuit Court at Baltimore, in a case where a product labeled "Whiskey" was seized, held that whiskey was one of the distillates from the fermented mash of sound grain, distilled so as to contain the volatile flavors, together with ethyl alcohol derived from the grain during fermentation, and stored in wood not less than four years.

The definition of "whiskey" is simple, but it is a very complex liquid. In addition to about 45 to 50 per cent by volume of ethyl alcohol and 50 to 55 per cent of water, it contains a number of other substances. Of these substances Allen (Analyst, June, 1901) says: "The secondary constituents of spirits are by no means to be regarded in the light of impurities, as they have wrongly been called and considered by some. They are the associated bodies which give the alcohol its special and valued characteristics, and to their production, modification or elimination by age we owe the change which spirits undergo during the process of maturing."

It is well known that new whiskey is harsh, unpalatable and not fit for use. The Government controls bonded warehouses where whiskey is stored during maturation. It is stored in charred barrels, and it was formerly believed that during this storage the fusel oil, or higher alcohols, were either absorbed, eliminated or so changed by oxidation or otherwise that the whiskey lost its harsh, unpalatable flavor. Professor Shepard, of the Food and Dairy Commission of South Dakota, says that the above theory is entirely wrong—that the percentage of these alcohols increases by aging instead of decreases. The results recently obtained by the leading investigators of the subject tend to show that Professor Shepard is correct in his statement regarding the effect of aging of whiskey on the fusel oil present.

The raw, harsh taste of new whiskey is attributed by some good authority to the presence of pyrrol, some alkaline and sulphur compounds and phenolic bodies. The pyrrol is supposed to resinify and the others are unstable and are oxidized during the process of aging or maturing.

It is evident that very marked changes take place in distilled liquors on the properly aging or maturing of them, but, with our present knowledge of the subject, it is safe to say that we do not know for certain what those changes are.

What has been said of whiskey is largely true of brandy, except that the latter is made from fermented fruit juice instead of cereal products.

*Samples Examined.*—Under this head, samples were examined as follows: Whiskey, 26; brandy, 3; gin, 1.

Of the twenty-six samples of whiskeys examined, five were straight whiskeys, properly aged; five were corn whiskeys, partially but not properly aged; five were new corn whiskeys, not aged at all; two were blends of old and new whiskeys; six were compound whiskeys, and three were imitation whiskeys.

Of the three samples which were labeled and sold as brandy, one proved to be an apple brandy, and two, No. 5269 (Peach and Honey) and No. 5270 (Blackberry Brandy) were not brandies in any sense, but were imitation cordials, adulterated with coal-tar dye.

One sample of gin was examined, and, while it was made from silent spirit, no adulteration was found.

In these samples the amount of alcohol, solid matter in solution, total acidity, esters and fusel oil present was determined. Qualitative tests for tannin, coloring matter, etc., were made. The results of the examination are printed in the table below.

## RESULTS OF THE EXAMINATION

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.	Retail Dealer or Party Who Sent Sample for Analysis.
5251	Whiskey, Rye, Sunny Brook	Sunny Brook Distilling Co., Jefferson Co., Ky.	Frank Hurley, Winston, N. C.
5252	Whiskey, Corn	Winston Distributing Co., Winston, N. C.	do
5253	Whiskey, Rye, Compound	do	do
5254	Whiskey, Corn	D. L. Arey, Salisbury, N. C.	M. Kobre, Winston, N. C.
5255	Whiskey, Corn, Blend	Winston Distributing Co., Winston, N. C.	do
5256	Brandy, Apple	Z. T. Fletcher, Wilkesboro, N. C.	do
5257	Whiskey, Rye, Blend	Straus, Gunst & Co., Richmond, Va.	do
5258	Whiskey, Corn, Silver Springs	J. W. Kelly & Co., Chattanooga, Tenn.	do
5259	Whiskey, Rye, Blend, Yellow Table	Chas. M. Pfeifer & Co., Cincinnati, Ohio.	do
5260	Whiskey, Corn, Compound	Racard & Goldsborough, Baltimore, Md.	Holleman & Herring, Winston, N. C.
5261	Whiskey, Rye, Blend	Straus, Gunst & Co., Richmond, Va.	do
5262	Whiskey, Corn, Catawba Valley	R. H. Bennett & Co., Marion, N. C.	do
5263	Gin, Red Lion, Courage	Mallard Distilling Co., New York, N. Y.	do
5264	Whiskey, Corn	Winston Distributing Co., Winston, N. C.	do
5265	Whiskey, Rye, Blend, Belle of Virginia	J. & E. Mahoney, Portsmouth, Va.	do
5266	Whiskey, Rye, Green River	Green River Distilling Co., Owensboro, Ky.	A. W. Jones, Winston, N. C.
5268	Whiskey, Rye, Blend	Straus, Gunst & Co., Richmond, Va.	Shermer & Phillips, Winston, N. C.
5269	Brandy, Peach and Honey	do	do
5270	Brandy, Blackberry	do	do
5271	Whiskey, Corn	Bailey Distilling Co., Danville, Va.	do
5272	do	Straus, Gunst & Co., Richmond, Va.	do
5273	Whiskey, Corn, Bailey's Hand-made Compound	Bailey Distilling Co., Danville, Va.	do
5276	Whiskey, Rye, Mellwood	Mellwood Distilling Co., Louisville, Ky.	do
5277	Whiskey, Rye, Old Taylor	E. H. Taylor, Jr., & Co., Frankfort, Ky.	T. K. Renigar, Winston, N. C.
5278	Whiskey, Rye, Old Overholt	A. Overholt & Co., Pittsburg, Pa.	do
5319	Whiskey, Corn, Old Eagle	Winston Distributing Co., Winston, N. C.	Frank Hurley, Winston, N. C.
5320	Whiskey, Corn	Straus, Gunst & Co., Richmond, Va.	do
5389	Whiskey, Corn, Bailey's Sweet Mash, Compound	Bailey Distilling Co., Danville, Va.	Holbrook & McCann, Winston, N. C.
6141	Whiskey, Rye, Blend, Jefferson Club	Straus, Gunst & Co., Richmond, Va.	do
6142	Whiskey, Rye, Blend, Old Henry	do	do

## OF DISTILLED LIQUORS.

Laboratory Number.	Alcohol— Per Cent by Volume.	Proof.	Grams in 100 c.c.			Fusel Oil— Per Cent by Volume.	Tannin.	Coloring.	Remarks and Conclusions.
			Solid Matter in Solution.	Total Acidity— Acetic.	Esters.				
5251	50.45	100.00	.141	.1031	.0736	.2328	Present	Natural	Straight whiskey, properly aged.
5252	44.40	88.10	.010	.0315	.0345	.0630		Colorless	New corn whiskey, not aged.
5253	35.40	70.20	.220	.0125	.0033	.0540		Caramel	Imitation whiskey.
5254	51.00	101.19	.010	.0514	.0591	.1748		Colorless	New corn whiskey, not aged.
5255	34.42	68.30	.010	.0315	.0537	.0730		do	do.
5256	48.06	95.30	.010	.0836	.0758	.1785		Natural	New apple brandy.
5257	42.89	85.10	.761	.0282	.0276	.0210		Natural and caramel.	Compound whiskey.
5258	46.43	92.10	.280	.0815	.0715	.2082		Caramel, small amount.	Corn whiskey, not properly aged.
5259	44.96	89.20	.360	.0488	.0065	.0541	Trace	do	Compound whiskey.
5260	35.11	69.70	.040	.0284	.0068	.0960	Trace	Caramel, small amount.	do.
5261	40.32	80.00				.0018		Caramel	Imitation whiskey.
5262	48.73	96.71	.720	.0816	.0715	.2065	Trace	Caramel, small amount.	Corn whiskey, not properly aged.
5263	39.11	77.60	2.0475	.0020	.0211	None		Colorless	Gin, prepared from neutral spirits.
5264	40.32	80.00	.010	.0315	.0341	.0640		do	New corn whiskey, not aged.
5265	44.10	87.50	.284	.0583	.0284	.0911	Trace	Caramel	Compound whiskey.
5266	50.60	100.40	.160	.1030	.0743	.2568	Present	Natural	Straight whiskey, properly aged.
5268	45.46	70.20	.276	.0151	.0190	Trace		Caramel	Imitation whiskey.
5269	18.35		16.526					Coal-tar dye	Misbranded, not a brandy.
5270	10.49	20.80	25.66	.0350	.0390	.0184		do	Misbranded, not a brandy but imitation cordial.
5271	46.18	91.60	.090	.0744	.0520	.1985	Trace	Caramel, small amount.	Corn whiskey, not properly aged.
5272	51.70	102.60	.290	.0843	.0735	.1625	Trace	do	do.
5273	46.45	92.20	.300	.0432	.0206	.0910	Trace	do	Compound whiskey.
5276	50.70	100.60	.170	.0849	.0728	.2458	Present	Natural	Straight whiskey, properly aged.
5277	50.60	100.39	.120	.0740	.0582	.1896		do	do.
5278	49.65	98.50	.160	.0941	.0858	.1976		do	do.
5319	44.25	87.80	1.516	.0340	.0435	.0970	Trace	Caramel, small amount.	Corn whiskey, partially aged.
5320	44.80	88.90	.654	.0826	.0398	.0620		do	New corn whiskey, not aged.
5389	44.45	92.00	.300	.0339	.0280	.1260		do	Compound whiskey, corn.
6141	49.90	99.50	.184	.0828		.1633	Present	Caramel and natural.	Whiskey, blend, new and old.
6142	49.95	99.60	.182	.0845		.1642		do	do.

## TONICS.

Three samples of tonics were examined. The amount of alcohol in

## RESULTS OF THE DETERMINATION OF ALCOHOL

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.	Retail Dealer or Party Who Sent Sample for Analysis.
5233	Blood Tonic, Cinery Americal.	Dr. D. M. McCanless, Asheville, N. C.	R. O. Patterson, Asheville, N. C.
5236	Walker's Tonic.....	The E. E. Sutherland Medicine Co., Paducah, Ky.	J. W. Evans, Kittrell, N. C.....
5290	Mullen, Horebound and Glycerine Tonic.	H. M. Smith, Durham, N. C.....	-----

## ARTIFICIAL SWEETENERS.

A few substances other than sugar are sweet to the taste. Only one of them, however (saccharine), is used to any extent as a substitute for sugar. Saccharine is from 350 to 500 times sweeter than sugar, and is right largely used as a substitute for that product, though its taste is the only relation that it bears to sugar, for it is not a food at

## RESULTS OF THE EXAMINATION

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.
5625	Crest Garantose .....	Heyden Chemical Works, Garfield, N. J. ....
5859	Sugarine .....	Manners & Laver, New York, N. Y. ....
5860	Power .....	Blumenthall Bros., Philadelphia, Pa.....
5861	Intensac .....	Liquid Carbonic Co., New York, N. Y. ....
4528	Henden Sugar .....	-----

## COLORING MATTERS.

Many soda-water bottlers and other food manufacturers use artificial coloring in their products. The colors are usually bought for

## RESULTS OF THE EXAMINATION OF COLOR

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.
5202	Coloring, Strawberry .....	Alford, Rosenfelt & Co., Cincinnati, Ohio ....
6072	Coloring .....	-----
6113	do .....	W. H. Hutchinson & Son.....

them was determined, and they were tested for chemical preservatives, but no effort was made to determine or even detect any medicinal constituent.

#### AND EXAMINATION FOR PRESERVATIVES IN TONICS.

Laboratory Number.	Alcohol— Per Cent by Volume.	Adulterants— Chemical Preservatives.	Remarks.
5233	11.57	None found.....	No effort was made to determine or even detect the medicinal properties. do. do.
5236	17.65	.....do.....	
5290	.....	.....do.....	

all. As sugar is a food and as saccharine is not, when it is used in food as a substitute for sugar its presence should be made known to the purchaser, or it will probably be misleading.

Saccharine is often sold under trade or proprietary names as a substitute for sugar. Five such products have been examined under this head, and all proved to be composed of saccharine, or at least largely so.

#### OF ARTIFICIAL SWEETENERS.

Laboratory Number.	Retail Dealer or Party Who Sent Sample for Analysis.	Remarks and Conclusions.
5625	Crescent Carbonating Co., Hendersonville, N. C.....	Saccharine.
5859	J. R. Cobb's Bottling Co., Brevard, N. C.....	do.
5860	L. T. Holmes & Co., Waynesville, N. C.....	do.
5861	Groves & Perry, Asheville, N. C. ....	do.
4528	Koca-Nola Bottling Works, Gastonia, N. C. ....	do.

vegetable substances, but are mostly coal-tar dyes.

Twelve samples of such coloring matters were examined. They all proved to be coal-tar dyes except one, which was caramel.

#### ING MATTERS USED IN FOOD AND BEVERAGES.

Laboratory Number.	Retail Dealer or Party Who Sent Sample for Analysis.	Remarks and Conclusions.
5202	C. Valaer Bottling Works, Charlotte, N. C.....	Coal-tar dye.
6072	S. T. Boon, Fayetteville, N. C.....	do.
6113	Coca-Cola Bottling Co., Salisbury, N. C.....	do.

## RESULTS OF THE EXAMINATION OF COLORING

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.
5506	Coloring .....	Scales-Wilson Co., Greenville, S. C. ....
5507	Coloring, Red .....	do .....
5508	Coloring, Vegetable Red .....	.....
5986	Coloring, Red .....	Blumenthall Bros., Philadelphia, Pa. ....
5987	Coloring, Green .....	Scales-Wilson Co., Greenville, S. C. ....
5988	Coloring, Peach .....	do .....
5989	Coloring, Red .....	do .....
6078	Coloring, Strawberry .....	S. T. Mitchell Co., Philadelphia, Pa. ....
6079	Coloring, Peach .....	Blumenthall Bros., Philadelphia Pa. ....

## PRESERVATIVES SOLD UNDER TRADE OR PROPRIETARY NAMES.

With the exception of catsups and sauces, the State Food Law prohibits the use of chemical preservatives in food products offered for sale in North Carolina.

Preservatives, the use of which in food offered for sale in this State

## RESULTS OF THE EXAMINATION OF PATENT OR PROPRIETARY BEVERAGE IS A VIOLA

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.	Retail Dealer or Party Who Sent Sample for Analysis.
5592	Frostine .....	.....	L. M. McCormick, Inspector, Asheville, N. C.
5990	Sure Keep Fruit Powders .....	Vaugh, Crutchfield Co., Winston, N. C.	G. W. Miller, Lexington, N. C. ....
5991	Scott's Fruit Powders .....	John M. Scott & Co., Charlotte, N. C.	Dove Bost Co., Concord, N. C. ....

## RESULTS OF THE EXAMINATION OF PATENT OR PROPRIETARY BEVERAGE IS NOT A VIOLA

Laboratory Number.	Material and Brand from Label.	Manufacturer or Wholesaler.	Retail Dealer or Party Who Sent Sample for Analysis.
5614	Freeze-Em .....	B. Heller & Co., Chicago, Ill. ....	L. M. McCormick, Inspector, Asheville, N. C.

MATTERS USED IN FOOD AND BEVERAGES—CONTINUED.

Laboratory Number.	Retail Dealer or Party Who Sent Sample for Analysis.	Remarks and Conclusions.
5506	Crown Carbonating Co., Hamlet, N. C.-----	Caramel.
5507	do-----	Coal-tar dye.
5508	Coca-Cola Bottling Works, Fayetteville, N. C.-----	do.
5986	Steam Bottling Works, Greensboro, N. C.-----	do.
5987	J. R. Cobb Bottling Co., Brevard, N. C.-----	do.
5988	do-----	do.
5989	do-----	do.
6078	Acme Bottling Works, Kinston, N. C.-----	do.
6079	do-----	do.

is a violation of the law, are offered to the public under trade or proprietary names. The names under which they are sold do not indicate their composition or that they contain a chemical preservative.

Under preservatives, four samples were examined. One, No. 5572, was composed of sodium sulphite and salt; two, Nos. 5990 and 5991, were composed of salicylic acid. The sale of food containing any of these three products is a violation of the law.

CHEMICAL PRESERVATIVES, THE USE OF WHICH IN FOOD OR TION OF THE FOOD LAW.

Laboratory Number.	Claims Made by Manufacturers Regarding Their Proprietary Preservatives.	Composed Principally of
5592	-----	Sodium sulphite and common salt.
5990	Powders absolutely pure and perfectly harm- less.	Salicylic acid.
5991	Perfectly harmless-----	do.

CHEMICAL PRESERVATIVES, THE USE OF WHICH IN FOOD OR TION OF THE FOOD LAW.

Laboratory Number.	Claims Made by Manufacturers Regarding Their Proprietary Preservatives.	Composed Principally of
5614	-----	Saltpeter and common salt.

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## LEAF TOBACCO REPORT FOR MONTH OF NOVEMBER, 1908.

Pounds sold for producers, first hand.....	17,831,000
Pounds sold for dealers.....	932,683
Pounds resold for warehouse.....	1,035,127
Pounds resold for other warehouses.....	45,283
Total.....	19,844,093









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