V I R G I N I A

EXTENSION AGRONOMISTS ANNUAL REPORT 1932

FCL-10

COOPERATIVE EXTENSION WORK
IN
AGRICULTURE AND HOME ECONOMICS
STATE OF VIRGINIA

VIRGINIA AGRICULTURAL AND MECHANICAL COLLEGE AND POLYTECHNIC INSTITUTE AND UNITED STATES DEPARTMENT OF AGRICULTURE, COOPERATING

EXTENSION SERVICE

Blacksburg, Virginia.
December 15, 1932

Director Jno. R. Hutcheson,
Blacksburg, Virginia.

Dear Mr. Hutcheson:

I submit herewith the annual report for the Extension Agronomy Department for the period from December 1, 1931 to November 30, 1932, inclusive.

Very truly yours,

W. H. Rowe
Extension Agronomist VPI

WHR/hw

ANNUAL REPORT

VIRGINIA

AGRONOMY EXTENSION WORK

(Project 16)

December 1, 1951 to November 30, 1952.

Personnel

W. H. Byrne..... Full time
W. H. Daughtrey.... Full time
C. W. Patteson..... One-sixth time
E. G. Anderson..... Thirty days
T. L. Copley..... Thirty days

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Organization Procedure

Strictly speaking the Extension Agronomy staff is composed of W. H. Daughtry and W. H. Byrne, full time; C. H. Patterson, one-sixth time; and T. A. Copley and R. C. Anderson, one-twelfth time. In addition to these, Professor T. B. Hutcheson, subject matter head of the department, which includes experimentation, resident teaching and extension, does a large amount of extension work; as does R. C. Harvey, field agent of the Virginia Crop Improvement Association. Close cooperation between the Teaching, Experimental, and Extension staffs is maintained by having connected offices, and holding conferences at intervals throughout the year. We also hold joint conferences with the Plant Pathology and Agricultural Chemistry Departments. Our work is correlated with the other extension departments through regular monthly specialists' conferences.

W. H. Daughtry has been responsible for the soil improvement project, with the exception of the soil management and farm management phases which have been handled entirely by Mr. Patterson, soils specialist. W. H. Byrne, with the assistance of R. C. Harvey, has been responsible for the good seed project. The tobacco project has been in charge of R. C. Anderson in the dark-fired belt; and T. A. Copley in the flue-cured belt.

While each man has been charged with the responsibility of a certain project, yet to save time and expense it has been necessary for W. H. Daughtry and W. H. Byrne to work on all of the projects outlined.

Means and Agencies

The program of the Extension Agronomy Department has been sponsored as usual largely through county agents and their farmers, county and community organizations, and the Virginia Crop Improvement Association. Other agencies used were fair associations, seedsmen, vocational agricultural instructors, the Farmers Institute, county weekly papers, the Extension Division News, farm papers and radio.

During the annual county agents' conference in December a meeting of twenty-five agents who desired to stress an agronomy project was held and definite plans of cooperation were outlined with each agent. On return to their counties each agent was to see that the cooperative project was made a part of their county and community farm organizations. These plans call for the selection of demonstrators by each community organization, and for field meetings to be held at, or tours to the demonstrations at the proper time.

Plans for conducting the good seed project were discussed with the board of directors of the Virginia Crop Improvement Association at its annual meeting and arrangements made whereby the Association would furnish certified seed to county agents desiring to conduct good seed demonstrations.

The cooperation of the fair associations was largely a matter of the secretary furnishing us with lists of the winners in their field crops departments from whom we solicited exhibits for the State Grain Show. These associations also had 4-H club, and vocational agricultural departments, and in some instances sponsored junior judging contests, with our cooperation.

The vocational agricultural instructors cooperated with us in soliciting exhibits for the State Grain Show and in increasing the attendance at same; also in conducting the junior grain judging contest at the State Fair.

Some of the instructors also cooperated with their county agents in conducting demonstrations and in holding field meetings at some.

During the Farmers Institute a program was sponsored by our department for those interested in agronomy. Exhibit A which will be found in the back of the report is a copy of the program.

At the beginning of the year weekly news items were furnished twenty county papers. In order that the items might have a wider distribution it was thought best that they be furnished to the editor of the Extension Division News who would send them to the county papers desiring them. We therefore, do not have a record as to the number of papers now using the items. Exhibit B gives the titles of the articles, and Exhibit C an illustration of the type of articles written; Exhibit D the subjects of articles prepared for the Extension Division News; and Exhibit E the types of articles, some of which were printed in farm papers; and Exhibit F the list of radio subjects discussed.

The 4-H Club Department, Agricultural Engineering Department, Agricultural Economics Department, and the Animal Husbandry Department cooperated in forwarding our projects.

Subject matter was presented during the week of the State Short Course to club members, and a special speaker was on the program of the State Grain Show for club members and agricultural students.

We cooperated with the Agricultural Engineering and the Agricultural Economics Departments in developing a farm management project on sixteen farms in six counties. The Animal Husbandry Department cooperated with us in our clover project in several counties, and in holding meetings at the pasture improvement experiment stations.

Situation

A fertile soil is the basis of successful agriculture in Virginia, as in any state, and Virginia's average crop yields indicate that her average soils are not fertile. This is illustrated by an average yield of less than 20 bushels of corn per acre, less than 13 bushels of wheat, and yields of other crops in proportion. It indicates further that the average farmer cannot make a profit, or is not making a profit, with such yields. That our soils can be economically improved is illustrated by accomplishments not only of farmers, but by the results of experimental data. Many farmers whose soil would produce only average yields a few years ago, are now producing from 50 to 75 bushels of corn per acre, and 30 to 40 bushels of wheat; and other crops in proportion. Their increase in yields has been due in most instances to following a good system of farming, such as following a definite rotation of crops, including the proper use of lime, legumes, fertilizer and good seed.

Only one acre in fifteen of the nearly five millions cultivated in the state is planted to legumes, while experimental data show that to properly keep up the nitrogen and organic matter supply of the soil, legumes should be planted at least one out of every three or four years. Investigations show further that an application of the equivalent of two tons of burnt lime per acre will give an average annual profit of $10.00 per acre when properly used. Even though this be true and wide publicity has been given to this fact, data obtained by our department indicate that only about one-thirtieth as much lime is being used by our farmers as could be economically done.

With the present prices of farm products, many farmers have decided that they cannot afford to use fertilizer. In many instances this has been, and will continue to be, false economy. Experimental data show that the proper use of the right kind of fertilizer increases corn 16 bushels, wheat 6½ bushels, and hay 1600 pounds per acre. The data obtained from fertilizer demonstrations conducted for the past three or four years compare very favorably with these results. Even though agricultural workers have stressed these results in season and out of season, there are many farmers in the state who do not know much about fertilizer and its value. Some still think of it as a plant stimulant instead of a plant nutrient. These farmers of course, pay little attention to analysis or formula and consequently do not get maximum results. Over forty percent of the farm land of this state is devoted to pastures, yet comparatively speaking, very little attention has been given in the past to the maintainance or improvement of pastures. Even in the best grazing sections much of the acreage will not support more than one steer to five or six acres, and this carrying capacity in many instances is being lowered each year. The results of experiments, and the experience of demonstrators and others have shown conclusively that pastures can be improved economically by topdressing with fertilizer and lime. This is illustrated by demonstrators who are now grazing three steers to five acres, where before treating only one steer to five acres could be grazed. Some demonstrators have also increased their grazing season more than thirty days. These results were obtained by simply topdressing pastures with 300 pounds of superphosphate per acre and correspond with experiment station findings a few years ago. These tests showed a total gain of 625 pounds of flesh more on a treated area than on a similar area which was untreated. Recent tests illustrate that under certain conditions both nitrogen and phosphate will pay on pastures which are to be grazed by dairy cows.

Tobacco occupies less than 4.5 percent of the total land in cultivation, yet it ranks second in total value of all crops grown, producing about 16 percent of the total value. Even with its small acreage it is the most important money crop in the state. Tobacco farmers use large amounts of fertilizer and probably know more about it than most other farmers. However, a large majority are not yet using more than one-half as much as they should for most economical returns. More attention should also be paid to varieties of tobacco. This is especially true since the demand of the trade has changed so radically and so rapidly. The kind and amount of fertilizer used probably plays a more important part with tobacco in the quality of the product produced than most any other crop. Experiment station findings and the experiences of the best dark tobacco growers show that the proper ratio of elements in the fertilizer is a 1-8-1. These same results show that a profit usually increases with the amount of fertilizer used up to 1000 pounds per acre. Recent experimental results, and those of farmers show that with tobacco it is useless to attempt to grow a good quality product on many of the soils which previously made a very good quality tobacco. They also illustrate that the ratio of plant food elements in the fertilizer should be changed to a 1-3-2 ratio, and that the leaves should be pulled instead of cutting the plants as was the old custom.

Even though it costs more to produce annual than other legumes, and they are not comparable in improving the soil, yet they make much better feed for livestock than non-legumes, and under certain conditions, farmers should be encouraged to grow them.

While soil probably exerts the greatest influence on the economy of crop production yet the kind of seed used often determines the quality, and in many instances the yield of the crop produced, regardless of the fertility of the soil. Even though livestock enterprises comprise about 57 percent of the

state's gross income, the state is dependent upon successful crop production because these animals must be fed, and the soil must be maintained, both of which depend upon the kind of crops grown. It is therefore, important that we have high-yielding, adapted strains of disease-free seed. The importance of seed in economical production is illustrated by the comparative yields over a period of five years of certified seed and the yield of the average seed used in the state. Certified corn has outyielded by more than 12.5 bushels, and certified wheat by more than 5.5 bushels the state average yield. Results of good seed corn are further illustrated by results of certified seed corn demonstrations conducted for the past two years. The twenty-five farmers who conducted these demonstrations got an increase yield of 2.5 to 11.5 bushels, with an average of 6 bushels per acre in favor of certified seed over their own seed.

Plan of Solution

To assist in improving the agricultural situation as set forth in the foregoing pages the Extension Agronomy Department initiated a program of work including the following activities:

1. Continuation of the clover and feed project started in 1931 in the following counties - Nelson, Franklin, Patrick, Buckingham, Prince William, Culpeper, Orange, Appomattox, Rappahannock, Albemarle, Fluvanna, and Louisa. Start the project in Fairfax, Campbell, Westmoreland, Pittsylvania, and Mecklenburg. Demonstrators and cooperators to be enrolled in each county, and field meetings to be held at each demonstration.

2. Assist county agents in enrolling at least one pasture improvement demonstration in each community in the following counties - Culpeper, Fluvanna, Franklin, Spottsylvania, Fairfax, Rappahannock, Amelia, Appomattox, Patrick, Nelson, Smyth and Washington.

Sponsor field meetings at pasture improvement experiment stations in Appomattox and Smyth counties.

3. Conduct soil tours in Augusta, Grayson and Pittsylvania counties, with farmers, bankers, merchants, vocational agricultural instructors, and county agents, for the purpose of identifying the characteristic soil types in each county, and making recommendations as to their management. (These counties were selected because soil surveys have been recently completed in them)

4. Make a soil survey of sixteen farms in six counties: four in Albemarle, four in Botetourt, two in Rockingham, two in Princess Anne, and three in Elizabeth City. This is really a farm management project in cooperation with the Agricultural Engineering and Agricultural Economics Departments. The purpose of the survey is to classify the soils and make recommendations, as to crops, fertilizers, lime, etc. (Numbers 3 and 4 are to be sponsored by C. E. Patterson, soils specialist)

5. Discuss fertilizer at meetings or schools arranged by the county agents in - Albemarle, Campbell, Rappahannock counties. Secure demonstrators in each community where possible, and hold field meetings at some.

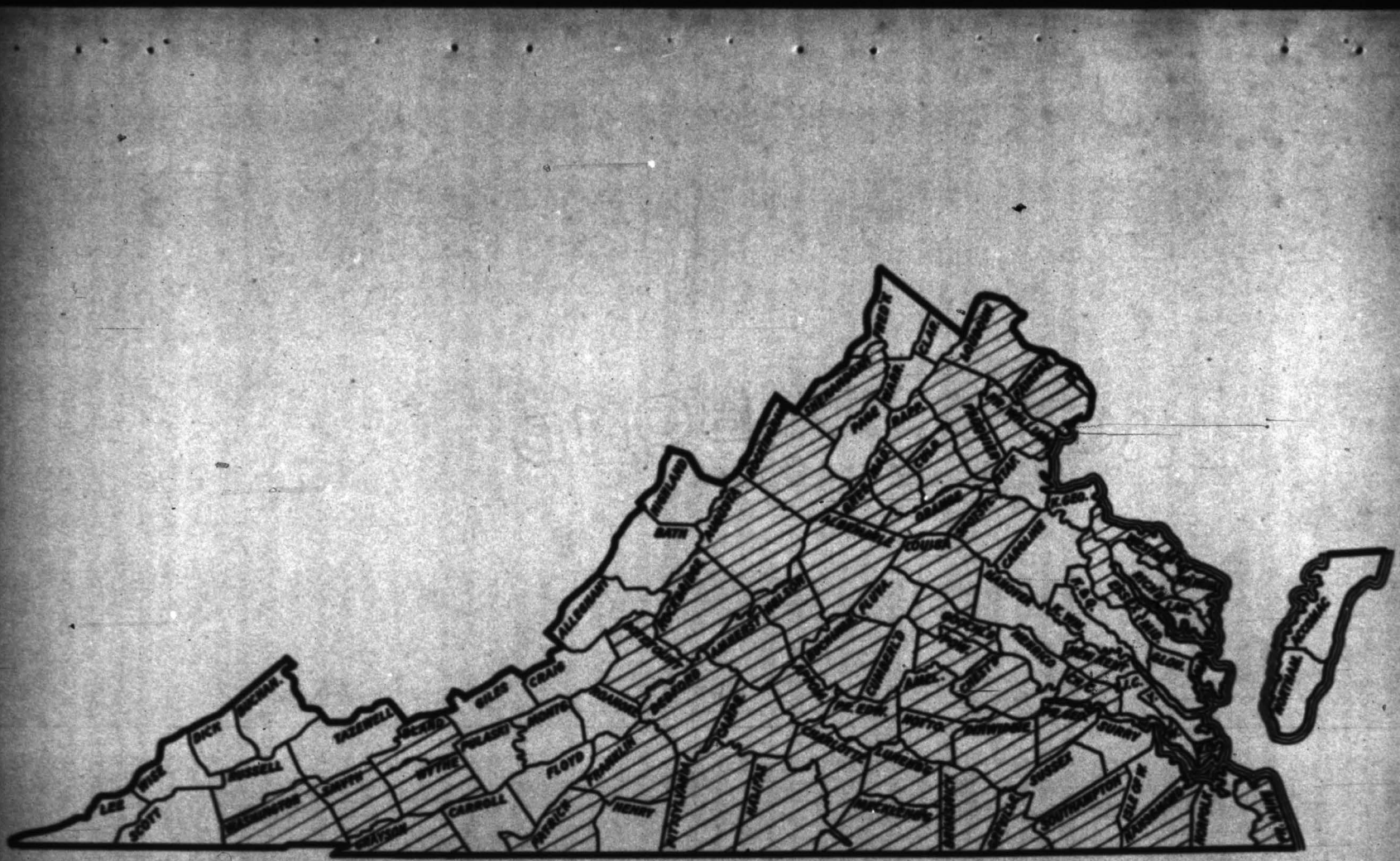
6. Assist the county agents in improving the type and quality of tobacco, and in organizing marketing associations in the following counties - Appomattox, Campbell, Charlotte, Prince Edward, Amherst, Bedford, Pittsylvania, Halifax, Brunswick, Mecklenburg, Dinwiddie, and Lunenburg. In the last six named counties which are in the flue-cured area, a few demonstrations will be attempted to show the value of proper fertilization and handling, such as topping high and harvesting by pulling leaves. A field meeting will be sponsored at the Chatham experiment station where tobacco is produced by this method.

7. Creation of a source of high-yielding, adapted, disease-free, pure, and adequate of seedcorn, county agents, vocational agricultural instructors and farmers to the value of none. Sponsor the State Corn and Grain Show and Convention of the Virginia Crop Improvement Association. Conduct grain judging contests for vocational agricultural students and 4-H club members during their annual State Rally and Short Course here at the college. Furnish certified seed corn for demonstration to county agents in the following counties - Culpeper, Amelia, Campbell, Orange, Greenville, Nelson, Smyth, Bedford, Pittsylvania, Patrick, Albemarle, Scott, Westmoreland, Brunswick, Grayson, Prince William, Lunenburg and Augusta.

8. At every meeting held in the spring the importance of seeding annual legumes and other feed crops to prevent a shortage of feed in the fall of 1938 will be stressed. A live-at-home policy will be stressed at all times.

9. Weekly news items will be furnished regularly to twenty county papers; news articles prepared for the Extension Division News monthly, and for other publications when possible. Radio talks will be prepared and given regularly over the V.P.I.-Roanoke system.

10. Any time not taken up with the projects outlined will be devoted to miscellaneous requests of county agents and others.



Counties in which representatives of the Agronomy Department worked in 1932.

Results of Year's Work

The foregoing map shows the counties in which agents and others were assisted in some phase of agronomy. The counties lined off were visited one or more times by a representative of our department.

During the annual county agents' meeting held here at the college in December 1931, agents who were conducting agronomy projects and those who were planning to start such projects in 1932 and desired our assistance were invited to meet with us. Twenty-five agents responded. At this meeting the agents' desires were made known and tentative plans made to carry out the work. Most of the agents wanted us to attend one or more meetings in their counties in the early spring in connection with the projects they were forwarding or planning to forward. We explained that it was our desire to assist every agent in the state who wished our cooperation, but that we felt it our duty to give a certain amount of preference to those agents who were conducting long time definite programs such as the clover project. We urged the agents with whom we were going to cooperate to have one or two demonstrations with shocks in each community, and that a field meeting or a tour to each successful demonstration be arranged, and that ample publicity be given the demonstration. We urged further that where possible the community organization select the demonstrations; guided of course, by the agent.

Projects were adopted as outlined, and tentative dates arranged for meetings in January, February, March and April with the understanding that the agronomy department could modify the dates so as to cut down expenses and loss of time in reaching the different counties. This was done immediately after the agents' conference and each agent notified of the dates we could get to his county. Definite dates for field meetings, tours and other meetings were made at a later date. A summary of meetings attended are listed below.

Summary of Meetings Attended during 1938

Community Meetings

Specialist	Number counties	Number community meetings	Total attendance
Byrne	19	48	1807
Daughtrey	19	72	3471
Copley	7	20	790
Anderson	8	17	558
Ruthveen	9	9	1035
Patteson	8	8	545
Total	48	166	7326

Field Meetings

Specialist	Number counties	Number field meetings	Total attendance
Byrne	7	15	347
Daughtrey	8	21	664
Copley	0	0	0
Anderson	0	0	0
Ruthveen	6	6	2049
Patteson	0	0	0
Total	21	42	3060

Tours

Specialist	Number counties	Number tours	Total attendance
Byrne	2	3	75
Daughtrey	0	0	0
Copley	0	0	0
Anderson	0	0	0
Ruthveen		1	150
Patteson		1	50
Total	2	5	275

Clover and Feed Project

Follow up work on this project was continued in Nelson, Franklin, Patrick, Rappahannock, Buckingham, Prince William, Culpeper, Orange, Halifax, and Appomattox; and the project started in Fairfax, Campbell, Mecklenburg, Pittsylvania, Lunenburg counties. Follow up work was agreed to in Louisa and Fluvanna, but was not accomplished in either county. Louisa discontinued the agent, and the agent in Fluvanna decided to drop the project. Nine community meetings were held in Louisa before the agent left the county.

The method of attacking the problem was not exactly the same in any two counties. The holding of community meetings in the early spring to obtain additional demonstrators and to interest the farmers of the communities in maintaining soil fertility, and producing sufficient legume forage for their livestock was done in practically every county mentioned, as well as in several other counties.

With the exception of Buckingham, where no spring meetings were held, eighty-two community meetings, with a total attendance of 1585, were held in connection with the clover project in the counties named above. In some counties a part of the program consisted of testing soil samples which the farmers had brought in to the county agent. The samples were tested for both lime and phosphorus and general recommendations made as to the amount of lime and phosphorus needed to successfully grow clover and other crops. More definite recommendations were made when a history of the soil and cropping system was available. Soil tests were made as follows: Prince William 88 in one community; Lunenburg 12 in four communities; Franklin 15 in one community; Shenandoah 55 in one community; Westmoreland 10 in three communities; and Orange 105 in nine communities. There was a total attendance at these meetings of 305. Over 90% of the soils tested were deficient in both lime and phosphorus. Exhibits G and H illustrate the kind of information furnished each farmer who brought samples of soil to the meetings to be tested.

Mr. T. S. Buie of the Superphosphate Institute cooperated with the soil testing in Prince William and Orange counties. His services were highly appreciated by County Agents Cox and Curtis, and the representative of the Agronomy Department. Mr. Buie expressed himself as being much pleased with the type of work done. A copy of his letter to me and my reply shortly after my return from Orange will be found as Exhibit I. County Agent Curtis reports that as a result of the meetings in his county that 48 farmers were influenced to adopt better practices, and 5700 pounds of Korean lespedeza were sown. Clover was not sown because the farmers were unable to purchase lime as the tests indicated they needed. Many farmers therefore, saved their clover seed money because many of those attending our meetings were planning to sow clover before having the tests made. Some of the farmers stated they had limed the land several years ago, but had not been able to get successful stands of clover for two or three years. They were advised to lime again or sow lespedeza or some other crop.

The agents in the counties where the clover project is being stressed report 61 community demonstrations which consisted of: clover 14; lespedeza 9; alfalfa 10; pasture 12; sweet clover 6; and soil testing 9. The same agents report the following number of farmers seeding legumes, using lime and better fertilizer, as a result of last year's demonstrations, field meetings, and last spring's meetings: clover 215; alfalfa 106; sweet clover 34; lespedeza 760; soybeans and cowpeas 581; improving pasture 76; lime 144, no. tons 1876; and better fertilizer 104. The demonstrations started last spring have not been in existence long enough to influence a change of practice in many instances.

Thirty field meetings with a total attendance of 669 were held at demonstrations in Prince William, Nelson, Pittsylvania, Buckingham, Mecklenburg, Albemarle, Franklin, Patrick and Halifax counties. The projects were conducted very satisfactorily in all of these counties, and the field meetings were a real success in each county, even though the attendance was small in some instances.

For the sake of brevity the work done in each county in addition to the spring meetings will not be discussed. Instead, a full discussion of our cooperation with the agent in one county will be given and only mention made of the work in some of the other counties. This will illustrate the type of work we are attempting with the clover project in all counties. The clover project has been forwarded in Nelson county for three years which allows the completion of a three-year rotation with clover. A definite short rotation including a legume, especially clover, to furnish high protein feed and improve the soil is the main object of the clover project. Instead of calling it a rotation project which would no doubt cause the farmers of the community to lose interest before the completion of the rotation, we elected to start with clover and stress each crop in the rotation step by step. This system has probably been followed more consistently by county agent John Whitehead in Nelson than in any other county in which we have worked. He has community committees in six different communities who select the demonstrators and arrange for all meetings, and cooperate in arranging for tours. He has had ten demonstrations in these six communities as follows: clover 5; alfalfa 1; sweet clover 2; lespedeza and pasture 1 each. Six field meetings with an attendance of 180 were held at these demonstrations including two tours.

Six-acre clover demonstration on the farm of B. W. Jones in Tye River community. The portion of the field on the left was limed at the rate of 1½ tons per acre in 1929. In 1930 the entire field was seeded to peas with 140 pounds of superphosphate per acre. The peas did not get six inches high. In the fall of 1930 wheat was seeded with 200 lbs. of 16% superphosphate per acre, and inthe spring of 1931 ten pounds of clover and 140 pounds of superphosphate per acre was seeded in the wheat. Mr. Jones reports a yield of two tons of clover per acre on the limed area and one-half ton per acre of weeds on the unlimed area. Read what Mr. Jones says about the demonstration - "Considered by myself and all other farmers in the community to be the best piece of red clover ever grown in this community." The interesting part of the demonstration from a soil improvement standpoint will be next year, as what was left of the second crop of clover after grazing it lightly will be turned under this winter or early spring for corn in 1932. Mr. Jones stated at the beginning of the demonstration that his corn yield on this land in 1929 was fifteen bushels per acre.

County Agent Whitehead states that as a result of this demonstration and the meetings held in connection with it that two farmers have used lime and sown clover, nine have sown lespedeza, two soybeans, and four cowpeas.

Norman Purvis standing in the clover demonstration which he made for the Shipman community.

The soil on which Mr. Purvis conducted his demonstration would produce about 25 bushels of corn per acre. It consisted of 5½ acres being limed with 1½ tons of ground lime per acre, and ½ acre without lime. As with other demonstrations all other treatments were alike. One hundred fifty pounds of 16% superphosphate and 10 pounds of clover seed were sown per acre in March 1931. The yield on the demonstration was 2½ tons, and on the check less than one-half ton per acre, which was largely weeds. This demonstration will also be planted to corn in 1932.

County Agent Whitehead has the following to say about this demonstration - "This was an excellent demonstration and should have influenced many farmers, but as yet it has not." It should be stated in this connectionthat this is a very backward community.

County Agent Whitehead discussing a sweet clover plant with a group attending a field meeting at H. H. McClellan's, Greenfield community, sweet clover demonstration. The check which is to the left of the group was not limed, while the balance of the field was limedwith two tons of lime per acre in the spring of 1930. Twenty pounds of unhulled sweet clover and 200 pounds of 16% superphosphate was seeded with one bushel of oats in February 1931. Against the agent's advice the crop was cut for hay twice in 1931. Even though this was done, three tons of hay per acre was harvested in 1932, as well as a seed crop. The yield on the check was largely weeds and very few of them. This land will be planted to a corn demonstration in 1933, and the yield compared with the yield before sweet clover was seeded. The county agent states that as a direct result of this demonstration three farmers used 40 tons of lime.

Community pasture improvement demonstration on the farm of Mr. Hylton in the Tye River section.

This is an old broom sedge field which was sprinkled with scrub pine bushes and which has been and still is used as a pasture. In the spring of 1930 the pine bushes were cut and two tons of ground limestone and 200 pounds of superphosphate per acre were applied on top of the broom sedge without further treatment. No results were noted in 1930, except that the cows stayed on the treated area most of the time. In the spring of 1931 200 pounds of superphosphate and 10 pounds of Korean lespedeza was seeded on top of the broom sedge, and the cows allowed to graze as usual. At one point inthe field a pen about 20 feet square was built to provide a comparison of growth with and without pasturing. This contrast can be seen in the above photograph. The fence which can be seen above the little girl's head was raised from just beyond pen feet. This is a very remarkable demonstration. Even in the portion of the field with the heaviest stand of broom sedge there was ofair stand of lespedeza, and as can be seen from the picture, the cattle have kept down the broom sedge as well as the lespedeza outside of the pen. As a result of this demonstration twelve farmers have used 180 tons of lime, and six will improve their pastures in 1933.

Group of farmers studying the demonstration just discussed.

Probably the most influential clover demonstration in Nelson county in 1932 was one conducted for the Nellys Ford community by Lewis Rhodes. This demonstration consisted of eleven acres which was limed at the rate of 2 tons per acre in 1931. In April of the same year 150 pounds of superphosphate and 15 pounds of clover was sown per acre. This demonstration was in a young orchard and no unlimed check was left except a strip in two rows of trees. Even with extreme dry weather the yield on the demonstration was over 1½ tons per acre. The yield on the check was not measured, however, there was very little clover where there was no lime. The Agent reports that as a result of this demonstration three farmers have used 160 tons of lime, and nine have sown or will sow clover next spring. Mr. Rhodes told me himself that he knew of one farmer in his community who did not believe in lime and had never attended one of our meetings during the past three years, who has used two cars of lime as a result of seeing this demonstration. Read what County Agent Whitehead says about this demonstration.

"This demonstration has put more people to thinking in this community in terms of better farming than anything that has happened in this community for 10 years. Although not many of them have been able to do much as yet, the people are talking as they never did before about this wonderful stand and crop of red clover. One farmer told the Agent, "That reminds me of old times, and I am proud to see this good work going on in our community." The demonstrator said to the agent, "I had attended several of the meetings the committee had been sponsoring (school house meetings) and I had heard you all say so much about clover, that I was anxious to see for myself (I do not think I would ever started had it not been for the meetings) what the clover would do. I got a perfect stand and a beautiful crop of hay, and a wonderful crop of second growth clover and seed, that I let stay on the land and disced in. The drought cut the highest height of my second crop considerably, but the seed was splendid. I am anxious to see what all of that seed is going to do, that I harrowed in."

The Agent never witnessed a more beautiful sight than this clover was when in full bloom."

County Agent Whitehead talking to a group of farmers at a field meeting held on his farm, July 2, 1932.

The news article written by the representative of the Agronomy Department who attended this meeting gives a description of it. The article will be found as Exhibit J in the back of this report. It might be added though that Mr. Whitehead's advisory board or county farmers organization was responsible for his calling the meeting, and those present represented each community in the county.

As a result of demonstrations conducted, and meetings held in connection with the clover project in Nelson county, County Agent Whitehead states that 18 farmers have used 365 tons of lime; 30 Sweet clover; 6 alfalfa; 6 sweet clover; 35 lespedeza; 26 soybeans and cowpeas; and 2 improved their pastures.

County Agent Alexander has 1 clover, 2 alfalfa, 2 pasture, and 1 soil conservation or terracing demonstrations in his four organized communities in Franklin county. He reports that as a result of these demonstrations and meetings held in connection with them that 59 farmers used 440 tons of lime; 90 seeded clover; 22 alfalfa; 6 sweet clover; 210 lespedeza; 205 soybeans and cowpeas; that 25 farmers improved their pastures, and 45 used fertilizer more intelligently.

Field meeting of fifty farmers at the Callaway community alfalfa demonstration, which is being conducted by Charlie Rennick.

The alfalfa was being cut at the time of the meeting. The demonstration consisted of 5 acres and the check 1 acre. In September 1931 the 5 acres was limed at the rate of two tons of ground lime per acre, and the entire field seeded with 25 pounds of Kansas grown alfalfa seed, and 200 pounds of 4-12-4 fertilizer per acre. The total yield in 1932 was 8½ tons per acre on the demonstration, and ½ of a ton on the check, a high percent of which was weeds.

The two pictures on this page show the condition of the soil at two different places in the same field. The group is studying the effect of the terracing as illustrated in the lower picture. The meeting was held several weeks after wheat had been seeded on the entire field. The demonstration is on the farm of Mr. Woody, who is conducting it for the Sentag community. The balance of the field will be terraced in 1935. As a result of this demonstration a number of farmers in the community plan to terrace portions of their farms. The terraces were laid out by County Agent Alexander and were made by Mr. Woody, with the assistance of the farmers of the community.

Clover demonstration made by J. H. Johnson for the Hendyille community in Halifax county. The portion of the field on Mr. Johnson's left received 2½ tons of ground lime per acre, while that on his right was not limed. The entire field received 300 pounds per acre of 16% superphosphate. The limed part of the field made 2½ tons of excellent clover hay per acre. The check did not have enough clover on it to cut.

Clover demonstration made by Frank Holley for the Mt. Laurel community in Halifax county. The portion of the field to the right of the hat was limed at the rate of 2 tons per acre, while the balance of the field was not limed. Notice the difference in the stand of clover.

We are not attempting to take credit for the large amount of lespedeza seeded during the past year, however, as a matter of interest the summary of reports from 75 counties is being given. The agents in these counties report that a total of 717,208 lbs. of lespedeza was sown, which consisted of Korean, 657,905 lbs.; Kobe, 5426 lbs.; Tenn. 76, 3085 lbs.; and Common 40,870 lbs. They report also that 360,545 lbs. was bought cooperatively at a saving of $11,798. The counties reporting the largest seedings were Campbell, Prince Edward, Pittsylvania and Amelia, 20,000 lbs. each; Bedford 21,000 lbs.; Rockingham 24,500 lbs.; Appomattox 25,000 lbs.; Charlotte 36,000 lbs.; Albemarle 41,500 lbs.; and Halifax 90,000 lbs.

These same agents report that 88,478 lbs. of seed was saved, which is composed of Korean 85,825 lbs.; Kobe 1050 lbs.; Tenn. 76 800 lbs.; and Common 800 lbs.

Pasture Improvement Project

Demonstrations in pasture improvement were obtained in counties as follows: Franklin 2, Nelson 1, Buckingham 1, Pittsylvania 1, Rappahannock 1, Culpeper 4, Amelia 1, Appomattox 1, and Patrick 1. As previously stated the work was discontinued in Fluvanna, Louisa and Washington counties. Some of the demonstrations referred to are outstanding and have been observed by many people. The demonstration in Nelson county has been discussed on page 16. Most of the others were as valuable to the communities in which they were conducted.

Two field meetings were held at the pasture experiment station in Appomattox county, one for Appomattox county farmers, and one for farmers from the surrounding counties. Reports show that both meetings were a success. Previous appointments prevented the Agronomy Department from being represented at either meeting. The field meeting scheduled for the Washington county station had to be called off as the cattle had to be removed from the different plots

because of a shortage of water.

News articles were written and radio talks given on pasture improvement in the early spring.

Soil Management Project

Mr. Patteson's report contained no mention of this project.

Farm Management Project

Mr. Patteson reports on this project as follows:

"Cooperated with the Agricultural Engineering Department in this project. My part consisted of making soil surveys of the seventeen farms located in seven counties, and then making recommendations for the proper land use and management. This is an interesting project and should be productive of results."

Other Soils Work Reported by Mr. Patteson

"Gave a soil discussion at the horticultural short course held in Blacksburg in January under the supervision of A. H. Teske."

"Assisted A. H. Teske with a one-day orchard tour in Albemarle county in which I discussed the soils of the seven or eight orchards at which we stopped during the day before the crowd of about fifty which attended. There are lots of orchardfailures due to the use of the wrong kind of soil."

"Held a two-day land valuation and usage tour which began in Richmond, swung down through Southside Virginia and ended in Lynchburg. It was attended by a number of land bank appraisers, bank officials, fertilizer men, farmers and others. I considered it highly successful and those who attended liked it."

"Assisted Donald F. Fenn of Hampton Institute with a one-day soil tour of Nansemond county for the benefit of negro county agents and teachers. They are much interested in soils."

"Identified and tested 118 soil samples during the year. Made recommendations on each."

"Made a special tripto Fauquier county to the Ziegler Farm to give soil and fertilizer advice."

"Visited several Augusta county farmers with County Agent Coiner to give soils information."

"Appraised some land in Franklin county for the Episcopal Mission School at Endicott."

"Attended the Farmers Institute in July and gave a soils discussion on the afternoon of the 27th."

"Visited County Agent Surber, Alleghany county; County Agent Hall in Halifax county; and County Agent Lippincott in Warwick county, for some special soils work with three large landowners, one in each of the counties."

"Attended Land Grant College meeting held in Washington, D. C. November 15-17, for the purpose of getting some land utilization and soil information."

Fertilizer Meetings and Schools

As called for in our program of work, fertilizer was discussed at six meetings, with an attendance of 54, in Rappahannock county; at four meetings, with an attendance of 63 in Albemarle county; at nine meetings, with an attendance of 188 in Orange county; and at one meeting with 15 present in Spottsylvania county.

J. A. Morris, Charlotte county, standing in his certified wheat field. The wheat on his right is following corn which received 200 pounds of 16% superphosphate, and made a yield of 10 bushels per acre. That on his left followed dark-fired tobacco which was fertilized with 1000 pounds of 3-8-3 fertilizer and made 25 bushels per acre. None of the wheat received a direct application of fertilizer.

Tobacco Project

In the dark-fired belt R. C. Anderson cooperated with county agents in Appomattox, Bedford, Amelia, Buckingham and Campbell counties in teaching better fertilization, cultural, handling and curing methods. He attended eighteen meetings for this purpose in these counties, with a total attendance of 550 farmers. In addition to these Mr. Anderson attended many meetings for the purpose of assisting with the organization of the tobacco growers' association. The following statement is taken from Mr. Anderson's report: "It is a well accepted fact that growers in these counties are using higher analysis fertilizer more abundantly on tobacco the last few years than before. They are also giving more attention to all phases of tobacco culture. Some of this improvement is no doubt the result of our meetings and other efforts during the past few years."

T. L. Copley's work in the flue-cured belt consisted largely of discussing better fertilization and cultural practices at meetings in Pittsylvania, Halifax, Brunswick, Charlotte and Mecklenburg counties. He attended twenty meetings with a total attendance of 790 farmers. He reports that in the eastern part of the belt the importance of increasing the potash in tobacco fertilizer was stressed. In Pittsylvania, Halifax and Charlotte counties growers were urged to top their tobacco high, and harvest it by priming instead of topping low and cutting, as has been the common practice. This will result, not only in higher yields, but a better cigarette type, which is in demand.

Demonstrations featuring fertilization, and the priming method of harvesting were attempted with several county agents. The agents were furnished outlines of the demonstrations and offered assistance in conducting them. The agent in Brunswick county was the only one to start demonstrations, and his was ruined by the drought.

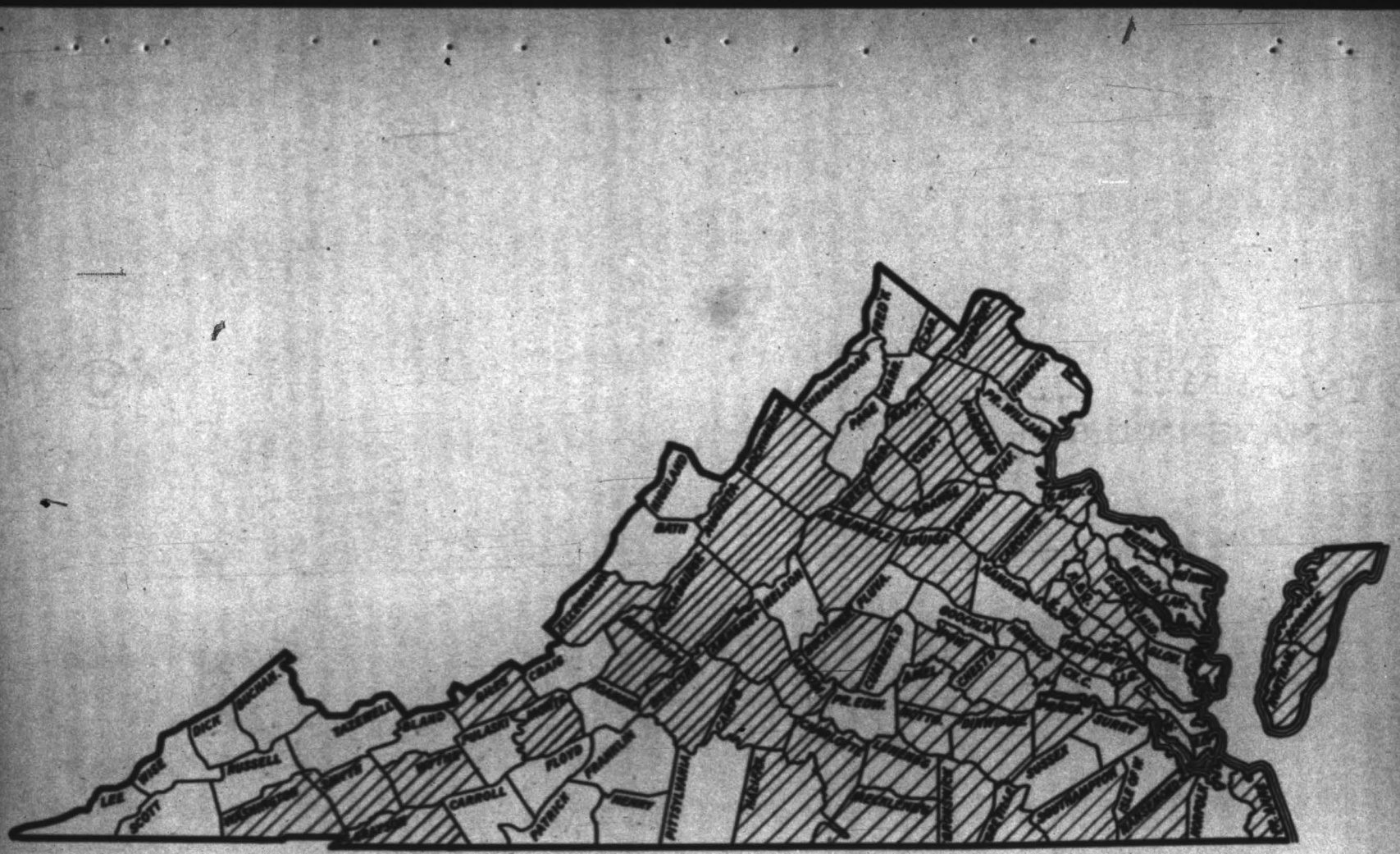
Mr. Copley reports that his tobacco work with farmers has not been in existance or followed closely enough to have a full check on results, but that a decided change in some of the important practices is evident. More attention is being given to fertilizer formulas and varieties of tobacco. The 3-8-3 fertilizer which has long been the standardis giving away to the recommended 3-8-5 analysis. The practice of harvesting by cutting is also gradually being replaced by topping high and priming the leaves. The county agent estimates that 25 percent of the 1928 crop in Pittsylvania county was primed. He states further that if Virginia bright tobacco growers are to successfully compete with growers in the Southern territory it is imperative that they adjust their practices and produce the types required by manufacturers. Many of our soils are well adapted to the production of high quality bright tobacco if the best practices are followed. High quality tobacco cannot be produced on the heavy types of soils, such as Cecil, regardless of the methods practiced. Therefore, farmers who do not have Granville, Durham, Appling or some such type soils should be urged to change to other types of farming. The tobacco specialist and county agents are stressing the selection of the proper soil type.

A member of our staff assisted growers of Appomattox county for two days in soliciting members for the tobacco growers association. He also attended two county meetings of the association and spoke on the merits of the association.

Mr. Copley assisted the county agent with a cooperative fertilizer pool in Pittsylvania county which purchased 400 tons of fertilizer at a saving of more than $5.00 per ton to the farmers. The fertilizers purchased were made by a formula recommended by the Agronomy Department. He also held a field meeting at the bright tobacco experiment station near Chatham. Eighty farmers and fertilizer men attended and studied the tobacco and other work being done.

Mr. Copley and another representative of the Agronomy Department attended the meeting of the Southeastern Tobacco Agronomists who outlined the fertilizer recommendations for these states. The meeting was held at Chatham and a field meeting at the experiment station held.

Field of bright tobacco being produced by R. P. Gordon in Mecklenburg county, on the proper soil type, with recommended fertilization and handling methods. Notice the size, shape and height of the plants.



Counties in which good seed work was done in 1952.

54 Co.

Good Seed Project

As previously stated the good seed project has been sponsored largely through the Virginia Crop Improvement Association, with the cooperation of county agents, vocational agricultural instructors, seedsmen, 4-H club members, vegetable garden department, and the seed testing laboratory of the State Department of Agriculture. The inspection work of the association, which includes both field and bin inspections before certification, was done by R. G. Harvey, field agent of the association. The foregoing map shows that inspections were made in fifty-four counties.

The following tables give the results of the inspections made, which includes the total number of acres of each crop field inspected and passed, and the total number of bushels of each crop bin inspected and certified, as well as the amount handled by seedsmen.

Bin Inspection of 1931 Fall Crops

Crop	Bus. Inspec.	Bus. Cert.	Bus. T. D.	Percent Certified.	Percent T. D.	Bus. handled by seedsmen.	Percent handled by seedsmen.
Corn	7705	7525	180	97.6	2.2	3510	44
Soybeans	1255	485	768	38.6	61.4	186	14
Korean lespedeza	200	180	20	90.0	10.0	0	0
Cotton	2000	2000	0	100.0	0	0	0
Sweet potatoes	17,225	16,280	945	94.4	5.6	0	0
Total	28,385	26,360	1945	92.0	8.0	3696	13

Field Inspection of Small Grain 1932

Crop	Total acres cert.	Acres passed.	Acres turned down.	Percent passed.	Percent turned down.
Abrumi					
rye	594	575	19	97	3
Wheat	329	314	15	95	5
Oats	108	107	1	99.1	.9
Barley	349	304	45	87	13
Total	1380	1300	80	94.	6.

Bin Inspection of Small Grain 1932

Crop	Bus. inspec.	Bus. cert.	Bus. T. D.	Percent cert.	Percent T. D.	Bus. handled by seedsmen.	Percent handled by seedsmen.
Abrumi							
rye	4367	4149	218	95	5	4367	100
Wheat	2800	2800	0	100	0	1400	50
Oats	1499	500	999	34	66	800	54
Barley	4007	3040	1047	74	26	3352	83
Total	12,653	10,289	2264	81	19	9919	78

Field Inspection of Fall Crops 1932

Crop	Total acres inspec.	Acres passed.	Acres turned down.	Percent passed.	Percent turned down.
Cane	385	355	30	92	8
Korean					
lespedeza	135	45	90	33.3	66.6
Lespedeza					
sericea	45	45	0	100.0	0
Soybeans	35	35	0	100.0	0
Cotton	75	75	0	100.0	0
Sweet					
potatoes	96	96	0	100.0	0
Total	769	649	120	88.0	12

Bed Inspection of Sweet Potatoes 1932

No. growers.	Bus. bedded.	No. plants produced.	Plants sold.	Plants set.
18	2349	2,177,725	1,524,725	653,000

Total Amount of Seed Inspected and Certified

Field inspections		Bin inspections	
Total acres inspected.	Total acres passed.	Total bus. inspected.	Total bus. certified.
2149	1949	40,926	36,639

From these tables it can be seen that 1949 acres of the 2149 field inspected passed, and that of the 40,926 bushels of seed produced and bin inspected, 36,639 bushels passed and was certified. Of the total amount of seed certified, 16,260 bushels were sweet potatoes, and 20,379 bushels grain and other crops. Seedsmen handled 12,515 bushels, or 65% of the seed certified, not including potatoes.

The price received by certified seed growers this year was the lowest in the history of the Association, however, the premium they received over ordinary seed was not much different from last year. Even at the very low increased average prices received by growers for certified seed of 50 cents for corn and cotton, 25 cents for barley and rye, and 15 cents per bushel for all other grain crops, they received a total increased income of $7,115.00.

Eighteen certified sweet potato growers treated and bedded 2349 bushels, set 855,000 plants, sold 1,336,725 plants for $1,742.00, and 5,895 bushels of seed for $7,190.25. The price received for the slips ranged from $1.00 to $2.00 per thousand with an average of $1.30. The price received per bushel for the seed ranged from $0.75 to $1.25, with an average of $0.90. During this time the state price for table stock ranged from $0.10 to $0.50 per bushel, with an average of $0.25. At these prices the 10,375 bushels sold as table stock brought $4,601.50 less than the 5,895 bushels of certified seed.

Valuing the 855,000 plants used by the growers at the conservative figure of $1.00 per thousand, certified sweet potato growers received a total of $9,790.25. by certification. This, of course, does not take into consideration the value of the work to agriculture in the seventeen states in which these

quality plants and seed were used.

The potato growers' increased income of $3,497.35 plus the increased income of $7,115.00 gives a total increased income of $10,612.35 for certified producers. (The increased income for potato producers is based on an increased price for certified over ordinary seed of $0.35 a bushel, and of an increase of $0.30 per thousand for plants.

If this small increase received by the producers of certified seed was the end sought in the production of certified seed the trouble and expense of certification work would hardly be justifiable. The greatest value of certified seed to the state is not the increased income to the relatively few producers, but the large amount of quality seed made available, to the average farmer. It is the effect on the yield and quality of the crops produced from this 22,679 bushels of good seed and its progeny. As an illustration that certified seed will increase yields it might be stated that according to a survey made a few years ago certified corn outyielded the state average yield by 12½ bushels, and wheat by 6 bushels per acre. Furthermore, farmers in eighteen counties were furnished certified seed corn in 1931, with which they made comparisons with their own seed. Measured results showed an increase in yield in favor of certified seed of from 2½ to 12½ bushels, with an average of 6 bushels per acre. Twenty-one demonstrations conducted in the ten counties from which we obtained records this year gave an increase of from minus nine to twenty bushels per acre, with an average increase of four bushels per acre in favor of the certified seed furnished. County agents in five counties reported their demonstrations were a failure. Most of these agents report that the drought was the cause of the failure.

The State Corn and Grain Show was sponsored during the Convention of the Virginia Crop Improvement Association at Marion, Virginia, January 26-27. Over 400 were present each day. A copy of the program rendered will be found as Exhibit K.

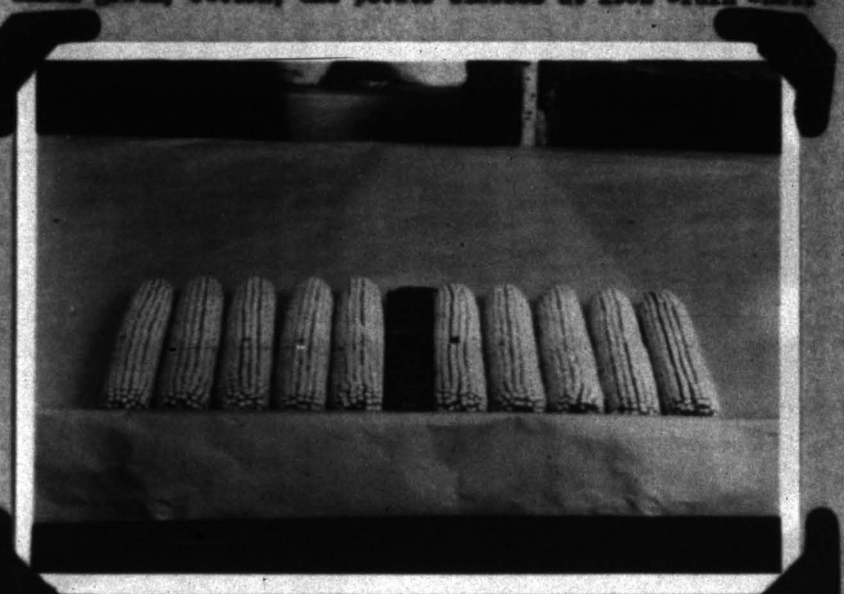
There was a total of 570 exhibits in the show, which included 336 corn, 80 small grain, 32 soybean, 14 cowpea, 16 cotton, 13 peanuts, 8 lespedeza, 34 Irish potatoes, 19 sweet potatoes, and 18 tobacco.

The Interstate corn and potato classes contained exhibited from seventeen states.

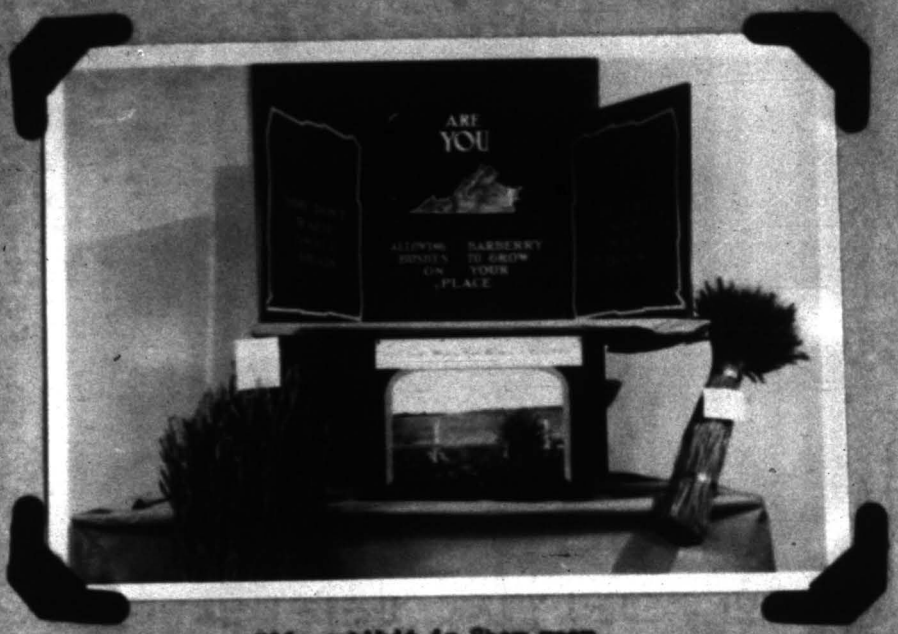
One hundred and twenty-five boys took part in the junior judging contest, and forty-one farmers in the adult contest.

Interstate and Certified Corn classes at 1932 Grain Show.

Small grain, cotton, and potato classes at 1938 Grain Show.



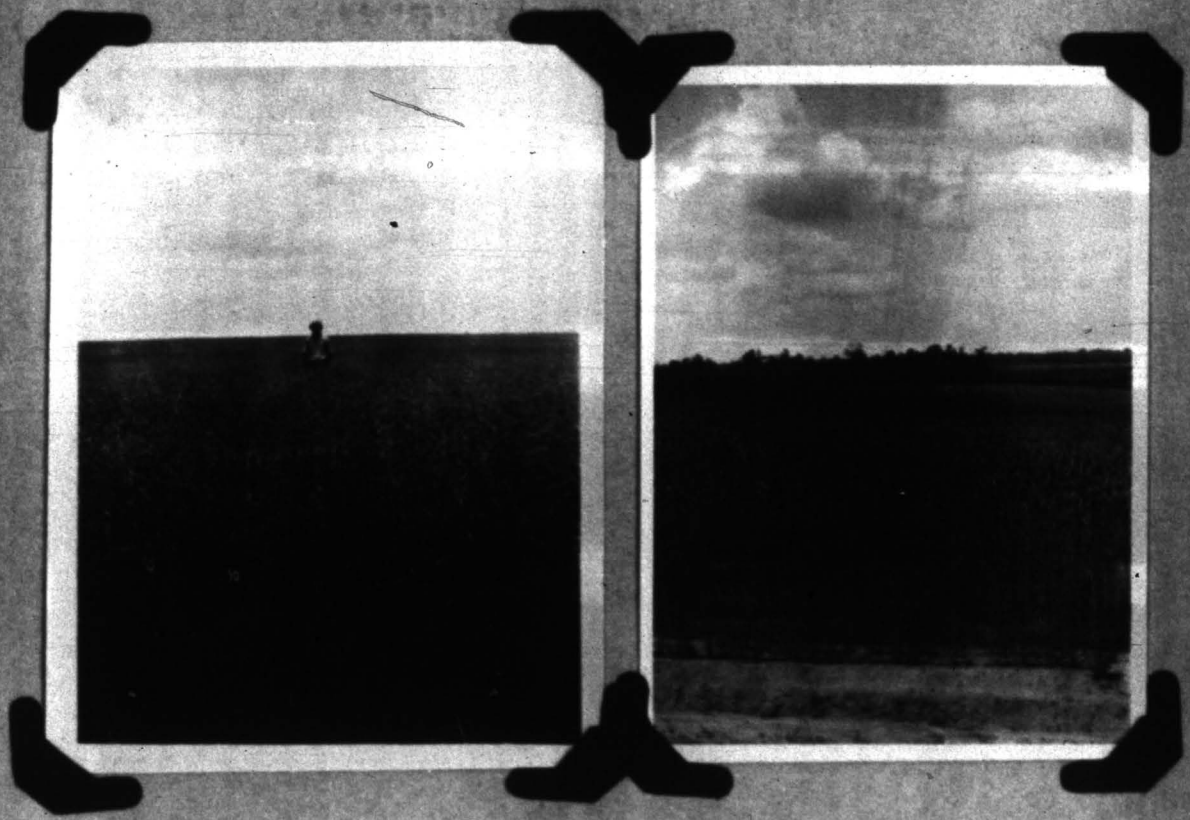
First prize exhibit in certified corn class - grown by Jno. S. Ward, Leesburg, Virginia.



Side exhibit in Show room.

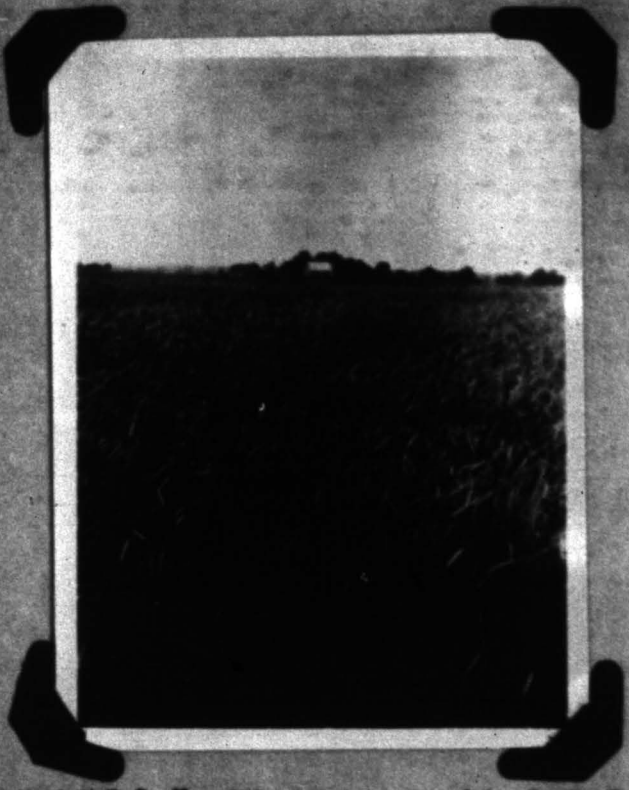
Results of utility corn class laid out for farmers to study.

Four thousand copies of the program and premium list of the State Grain Show which is to be held in Suffolk in January 1923 have been prepared and printed and willbe distributed within a short time. Much publicity has also been given to the show, which will be continued until the show. Arrangements have been made with the editor of the Suffolk paper to run a special corn show edition.



Certified Lee oats produced by R. E. Clock. Yield 60 bus. per A.

Certified Leeps Prolific wheat produced by John T. Heath. Yield 25 bus. per A.



Certified V.P.I. No. 151 wheat produced by G. E. Griffith in Culpeper county. Yield 30 bushels per acre.

County Agent C. A. Hall, and J. S. Hickson, studying Lespedeza sericea on the latter's farm in Halifax county. This 4-acre field of sericea has passed the field inspection for certification.

Twenty good seed news articles were prepared and published, and six radio talks made on some phase of good seed.

Two field meetings with 88 present, and 15 other meetings with 1261 present were held in interest of good seed. A judging contest was conducted here at the college for vocational agricultural students during their annual conference. Over 500 took part in the contest. A class of 14 Four-club members were given a four-days instruction ingood seed during the State 4-H Club Short Course. At the end of the week they were given a contest in judging and identifying seed.

Good seed demonstrations were visited in nine counties. One demonstrator was assisted with an ear-to-row test. He was assisted in selecting the ears and given instructions for carrying it out.

A group meeting of the county agents and vocational agricultural instructors from nine counties was held at Charlotte C. H. for the purpose of discussing the certification and marketing of lespedeza.

A new crop inspected for certification this year was Lespedeza Sericea. Neither the Association nor the Agronomy Department is ready to give this crop their unqualified indorsement. It appears that it will have a place in our agriculture, but as yet has not proven its place. Due to the high price of the seed, and to the probability of the seed being misrepresented by unscruplus persons, as well as to have a source of pure seed if it proves tobe as valuable a crop as many people think it is, the Association agreed to inspect and certify crops for growers who would trace their seed to the U. S. Department. We inspected for 34 farmers whose acreage ranged from 1/40 to 10 acres. A total of 45 acres were inspected which will probably yield 6000 pounds.

Certified seed corn demonstrations were conducted as has been previously stated. County Agent Sylvan of Bedford county reports that due to a field meeting which he held at one of these demonstrations in the fall of 1931 that twelve of the farmers in attendance bought good seed corn for their 1932 crop.

Quarterly news letters were sent to members of the Virginia Crop Improvement Association. An article on preparing show exhibits was also prepared for the State Fair Magazine.

We have had the cooperation of the State Department of Agriculture in all of our certification work. Mr. G. T. French of the State Seed Testing Laboratory has been of invaluable service to the Crop Improvement Association in testing all seed submitted for certification. He has also been called into conference many times on certification standards, and his advice has been taken in most instances.

Miscellaneous Work

County Agent O. B. Rose of Amherst county was assisted with two interesting tours, one August 12, and the other August 15. Fifteen farmers were present on each tour. Demonstrations visited were pasture improvement, several lespedezas, sweet clover, alfalfa, cattle and an improved cattle gate. Brief talks were made at each different kind of demonstration.

The group present the first day of the tours just referred to.

County Agent E. H. Williams was assisted with a weed killing demonstration in Mecklenburg county. The county agent's news article describing the demonstration will be found as Exhibit L.

Cooperated with J. J. Baker, Agricultural Agent, of the N & W Railroad in making recommendations for improving the lawn and training grounds of a wealthy landowner near Roanoke.

At the request of Director Hutcheson a representative of the department made a trip to Wythe county, where there is no agent, to give Mr. Umberger and his neighbors advice about their corn, which they reported was diseased.

Studies were made of two large farms for the purpose of recommending a farm management system on each farm. One farm is owned by St. Rose Institute, near Rock Castle; and the other by Richard Eppes, near Hopewell.

A definite rotation of crops, a system of fertilization, and varieties of seed to use were advised in each instance. Two visits were made to each farm, one to study the soil, equipment, livestock kept, layout of the farm, the cropping system, etc., in use; and the other to make recommendations. Each field on the Epps farm was tested for lime and phosphorus.

Exhibit N illustrates the kind of information furnished St. Elmo Institute. It shows the amount of feed needed for the livestock kept, a suggested rotation which will give the necessary feed, and at the same time maintain soil fertility; the total number of acres of each crop to be produced each year until 1937 at which time the farm will be in a well balanced rotation. Other farm management recommendations were also made.

The recommendations for the Epps farm were similar to those for the St. Elmo farm, except that it was necessary to use different crops and fertilizer analysis. The fields on this farm were rearranged in size and shape so machinery can be used tobetter advantage, and livestock handled with less trouble. The site for a new barn was also selected.

The interesting thing about the recommendations for both of these farms is that they have been put into operation in detail.

The agricultural products were judged at the following county fairs - Orange, Culpeper, Suffolk, and Chesterfield; and the corn and small grain at the State Fair. County or community grain shows were judged in Loudoun, Prince George, Prince William, Orange, and Smyth counties. (four community shows in Smyth). At each of these shows talks were made on good seed. Fertilizer was also discussed at three of the shows.

The outlook report for tobacco, cotton, small grain, peanuts, fertilizer and feeds was prepared and presented at a conference of Extension specialists. This same report was discussed at the annual agents' conference, and at three outlook conferences of agents, business men and farmers in different sections of the state.

A representative of our department discussed "How to make a plan of work" at one of the regular monthly specialists' meetings, previous to the date set for submitting plan of work for all departments. This same representative discussed, "How to make an annual report" before this same group at our regular November meeting.

During the Farmers Institute and Rural Institute of Affairs we arranged a program for those interested in agronomic problems. A copy of the program will be found as Exhibit A. Over one hundred attended the first day's program and about three hundred made the tour to the experiment station and college farm.

W. H. Daughtrey and W. H. Byrne visited the local experiment stations at Chatham, Holland, Appomattox and Glade Spring to study the work being done. These visits were made while in these sections on other business, and therefore were inexpensive.

A representative attended the state meeting of the negro agents' annual meeting in Petersburg and discussed, "Suggestions for meeting the present agricultural situation."

Our Agronomy Hand Book was revised. This required considerable study and time as many of the recommendations had tobe modified, and some new material added. A copy of the revised Hand Book will be found as Exhibit N.

County agricultural advisory boards in Amelia and Prince Edward counties were assisted in planning their work for the year.

Miscellaneous work reported by Mr. Patteson -

"Attended annual county agents' conference in December 1931."

"Prepared annual report for the period ending December 1, 1931."

"Judged the county corn show at Strasburg, Shenandoah county."

Statistical Summary

	Byrne	Daughtrey	Hutcheson	Copley	Anderson	Patteson	Total
Days in field ..	124	123	20	24	26	56	373
Days in office ..	171	155		2		31	359
Days leave	18	35					53
Agents visited ..	55	43	10	7	5	24	144
Ext. committee meetings	31	16					47
Attendance ...	548	257					805
Other meetings ..	64	92	18	20	17	9	220
Attendance ..	2458	3070	3702	790	558	595	11,173
Letters written	2180	218				428	2,826
Circular letters	16					5	21
Copies	4651					575	5,226
Bulletins sent out	148	186					334
Miles - auto .	8794	13,850	2643	1650	1800	2938	31,675
Miles - train .	6661	650	1990			2985	12,286
Counties without agents visited	4	1				2	7

Division of Time

Days devoted to field work on project

	Byrne	Daughtrey	Patteson	Hutcheson	Copley	Anderson	Total
Soil improvement..	46	65	56	8			175
Good seed.....	47	30		7			84
Tobacco.......	5				24	26	55
Miscellaneous..	26	28		5			59
Totals	124	123	56	20	24	26	373

Outlook for 1933

Viewed from an agronomic standpoint the agricultural outlook seems no better, though perhaps no worse, than it was a year ago. Therefore, we are of the opinion that farmers should still use safe and conservative farm management practices. This includes of course, the careful choice of soils for each crop, varieties of crops, fertilizers, as well as everything connected with farming. On most farms there are soils which cannot be made to produce a profit under present conditions. Some of these soils may be capable of returning a profit when price conditions again reach those of 1910-13. Such soils should be prevented from eroding and kept open by clearing the bushes each year so that they may be used without the expense of reclearing when the price level rises. It is our opinion that where possible these soils should be seeded to a few pounds of lespedeza and kafir grass to help prevent erosion and to build up the fertility. Soils badly eroded and extremely low in productivity should be planted to or allowed to grow up in forest trees. The better soils on every farm which are to be used for the production of food and feed and money crops should be farmed more carefully than ever and special attention given to increasing their productivity.

With the present low prices of farm crops we are of the opinion that hired labor should be used only when there is a fair assurance that it will pay a profit at the present price level. It is our belief also that new farm machinery should not be purchased except after it has been determined that it will probably pay under present prices.

We have been recommending and will continue to recommend that farmers give their first attention to the production of crops for home needs and thereafter produce as much cash crops as can be produced by the farmer and his family with a

minimum of hired labor, as we believe that by such a course he will likely be able to come out of the depression free from debt and in a position to go forward with a minimum of incumbrances.

With the above in mind the Extension Agronomy Department does not contemplate any marked changes in its program for 1933, but of course, some minor changes will be necessary. We hope to continue the clover (soil improvement) project in as many of the counties where it has been started as we can get the agents to cooperate, and start it in a few others. We appreciate the value of alfalfa, sweet clover and other legumes when seeded in their proper place. However, we are still of the opinion that clover is one of the best legumes to use in rotations in Virginia for soil improvement and high protein hay.

As in the past, we are stressing the clover project, and propose to encourage the growth of alfalfa on farms where conditions warrant it, and the use of sweet clover and lespedeza as soil improvement and grazing crops. As a matter of fact, we believe that the lespedeza seeded in the state this year will prove of untold value to Virginia soils, and that seeded in the future will be of equally as much benefit.

Many of our pastures, even in the best grazing section of the state, are badly in need of improvement. Under present beef and milk prices it is hard to get farmers to use fertilizer on pastures. We propose though to continue to stress the importance of good pastures in both economical beef and milk production. We will stress not only the fertilization of permanent pastures and the use of lespedeza where advisable, but will encourage dairymen to make available a sweet clover, or sweet clover and orchard grass pasture to be used for early grazing for their cattle.

We will continue to stress with county agents the importance of definite demonstrations, field meetings and tours, as we believe these are some of the best methods of extension teaching.

Time not required in furthering our regular projects will be devoted to miscellaneous or minor activities and requests.

As usual our projects will be sponsored largely through county agents, and their farm organizations; the Virginia Crop Improvement Association; and vocational agricultural instructors.

We plan to continue the good seed work through the Virginia Crop Improvement Association as usual, and hope to interest more of the state and county agricultural workers and seedsmen in our good seed program.

Exhibits O and P are the types of letters which have been sent county agents in interest of our 1935 agronomy program.

Exhibit A.

Program of Agronomy Section
of
The Farmers' Institute
July 27, 1922
Room 407 - Agricultural Hall

2:00 p. m. The Place of Lespedeza in Virginia Agriculture - W. H. Byrne

2:25 p. m. Discussion.

2:35 p. m. The Progress and Purpose of the Virginia Soils Survey - G. W. Patteson.

3:00 p. m. Discussion.

3:10 p. m. New Aspects of the Lime Question - H. A. Pettinger.

3:35 p. m. Discussion.

3:45 p. m. Pasture Fertilization in Virginia - T. B. Hutcheson.

4:10 p. m. Discussion.

4:20 p. m. Factors Influencing the Use of Fertilizers - W. H. Daughtrey.

4:45 p. m. Discussion.

July 28, 1922

2:30 p. m. Tour of experiment plots and the college farm.

Exhibit B.

Subjects of Weekly News Articles for County Papers

Date	Title
February 11	Need for soil improvement.
February 18	Seed sweet clover early.
February 25	Sweet clover as supplementary pasture.
March 3	Why seed clover?
March 10	Seeding clover in the spring.
March 17	What is lespedeza's place?
March 24	Legume hay for next winter.
March 31	Prepare a good seed bed.
April 7	What will your harvest be?
April 14	McKinney's experience with seed corn - Working in the Dark.
April 21	Why plant certified seed?
April 28	Silage varieties superior.
May 4	Fertilize and plant soybeans early.
May 11	Corn cultivation.
May 18	How to cut the alfalfa crop.
May 25	At what stage do you cut your clover?
June 1	When to cut sweet clover for hay.
June 8	Not too late to sow soybeans and cowpeas for hay.
June 15	Does it pay to side dress corn?
June 22	Clip the lespedeza and clover fields.
June 29	Prepare stubble land at once for August seeding (alfalfa, clover and grasses)
July 6	Continue to cultivate corn.
July 13	Seed alfalfa, clover and grass early.
July 20	Nelson county farmer finds it profitable to use lime.

Date	Title
August 3	Sources of clover seed.
August 10	Time to sow alfalfa, clover and grasses.
August 17	Cut soybeans and cowpeas at proper stage.
August 24	Shall I sow small grain?
August 31	Oats as a substitute for a part of the wheat crop.
September 7	Barley as a substitute for the winter corn crop.
September 14	Rye as a cover crop.
September 21	Fertilizing small grain.
September 28	Seed corn selection.
October 5	Husking and storing corn.
October 12	Save your soil.
October 19	Late seeded grain.
October 26	Lime the clover land.
November 2	Begin fall plowing.
November 9	Save the plant food in manure.
November 16	Utiline the roughage on the farm.

Exhibit C.

Article #26
October 12, 1938

SAVE YOUR SOIL

Can you make a good guess as to the amount of plant food lost each year in the United States from erosion? Here are the figures given by the U. S. Department of Agriculture. Erosion removes not less than 128,000,000,000 pounds of plant food from fields and pastures yearly. This is 21 times as much as is removed by crops and represents an annual loss of $200,000,000 to the farmers of our country. Virginia, due to its topography, bears more than an average share of this loss.

Look over your farm and see if you are losing your fertility in this manner. If so, get busy and do something about it.

Terracing is a good job for fall months and is the first step in soil conservation. This is not an expensive operation, and will save you many dollars. Terraces constructed in the fall have time to settle and become firm before spring cultivation begins, and will save many pounds of soil and plant food during the winter. See your county agent for information on this subject.

Do not leave any land bare this winter. Land left bare during the winter months loses more plant food through leaching than was removed by the crop just harvested. It is not too late to seed rye as a winter cover crop to save this loss. In addition it will furnish you some good grazing during the winter and early spring.

Exhibit C.

Article #25
July 14, 1932

SEED ALFALFA, CLOVER AND GRASS EARLY.

The season, as well as the date of seeding alfalfa, clover or grass, influences to a large extent the stand that may be expected. August is the month in which most grass is seeded. A good rule to follow is to sow the seed after the first good rain in this month. For the higher altitude of the state, July 20th is a better date. Do not sow on an extremely dry seed bed, as a light shower may cause the seed to germinate and be killed by continued dry weather. If consomble, early seeding is preferable to late seeding. Seed which cannot be sown at least 30 days before the usual date of the first killing frost should not be seeded until the following spring or summer. Young alfalfa or clover which does not have about a month's growth before frost will likely freeze out during the winter.

Do not forget that a firm, well compacted seed bed is of prime importance in getting stands. That such seed beds are accomplished by beginning the preparation early.

Exhibit C.

Article #16
May 26, 1932

CUT CLOVER IN FULL BLOOM

In saving crops for feed it is desirable to do it in a manner that will afford the largest amount of palatable and digestible nutrients. The leaves of the clover plant contain the most digestible nutrients and are the most palatable part of the plant when cut at the proper stage. It is therefore, important to cut clover when in full bloom, since at this stage the above can be accomplished. Cut at a later stage, the loss of leaves is greater, the stems are more woody, and the digestibility of the feed constituents lower, which means a lower yield of poorer quality hay.

The proper stage to cut sweet clover will be the title of next week's paragraph.

Exhibit C.

Article #8
April 7, 1932

WHAT WILL YOUR HARVEST BE?

Why talk about the harvest now, when the time of planting has hardly arrived? A disregard at this season of the year for the yield and quality of the crop which may be expected next fall has in many instances been responsible for very poor quality and yield at harvest.

Many farmers seem to have forgotten that very true old statement - "As a man soweth, so shall he also reap." This statement is as true today as it was two thousand years ago. Its result is even more important today than ever before, because when labor and machinery are relatively high in comparison with the prices of farm crops, it is essential to produce large acre yields of good quality crops.

That some seed is higher yielding than other seed the results of several farmers in 1931 is offered as evidence. With all conditions alike with the exception of the seed used fifteen farmers made an average increased yield of six bushels per acre with certified seed over ordinary seed. J. W. Wheeler, Bourbonville, used certified Reids Yellow Dent in comparison with his seed and got an increase yield of 10 bushels per acre in favor of the certified seed; while Walter Cale in Madison county made an increased yield of 7 bushels per acre with certified Boone County.

These farmers improved their harvest by using the best seed obtainable.

Exhibit C.

Article #10
April 14, 1932

SOWING IN THE DARK

When one waits until spring to select his seed corn, and then goes to the crib to make this selection, he is certainly working in the dark. This was favorably brought out last year in a seed contest held by one of our county agents. The agent went to twenty farmers and asked them to select five ears of corn from the crib which they considered good seed. The ears were then assembled at a central place and seventy-five farmers picked out what they judged to be good and poor seed ears. After this each ear was germinated and tested for disease, and the results compared with the farmers' [illegible]. The highest score was 85. This looks high, but actually means that out each hundred corn selected, fifteen were worthless for seed. What does this mean to your stand in the field? A poor stand and correspondingly low yield.

If you have waited to select your seed from the crib, run a germination test on it.

Exhibit C.

Article #6
March 17, 1932

WHAT IS LESPEDEZA'S PLACE?

At present lespedeza should not be considered as a substitute for clover. It is a plant which is adapted to acid and poor lands, and its place is to build up these lands rather than to take the place of clover in rotations on fertile soils which have been limed.

There are many acres of idle land that could be seeded to lespedeza at a very small cost, and be much improved when brought back into cultivation. It is a wonderful soil builder.

It also offers an excellent means of tiding over the slack grazing period during the summer. At this period it gives its best grazing and will respond even though grazed hard.

Lespedeza's place is to build thin, worn out soils and furnish summer grazing, but will make good crops of hay when conditions are favorable.

Exhibit C.

Article #8
February 25, 1932

SWEET CLOVER AS SUPPLEMENTARY PASTURE

In last week's article the statement was made that sweet clover was primarily a soil improvement and grazing crop. To support the statement that it is a good grazing crop, below is given the experience of a dairyman, at Oakton, Va.

In early March 1929 Mr. C. T. Rice seeded sweet clover at the rate of 20 pounds per acre on ten acres of wheat, and grazed off the wheat. In July of that same year 30 cows pastured this ten acres, producing $1,027.00 worth of milk. The cows were put back on this pasture for two weeks in August and two weeks in September, producing a little over $1,000.00 worth of milk during these four weeks. During the eight weeks these thirty cows were on the sweet clover less than $200.00 worth of grain was fed. During May 1930, thirty-one cows pastured on this ten acres produced $1,374.00 worth of milk, with only $80.00 worth of grain and during June 32 cows pastured on this ten acres, producing $1,256.00 worth of milk, with a grain cost of $150.00.

In obtaining his stand of sweet clover, Mr. Rice followed the essential practices necessary for success with it, such as inoculating the seed, liming the soil, and applying phosphate.

Exhibit D.

Subjects of Extension Division News Articles in 1932

1. December 20 - Sweet clover.
2. January 20 - Lespedeza.
3. February 20 - How much is Certified seed corn worth?
4. February 20 - Sweetclover pasture aids dairymen.
5. February 20 - Attention flue-cured tobacco growers.
6. March 20 - Soybeans.
7. March 20 - Looking ahead.
8. April 20 - Improve the grain crops by selection.
9. April 20 - Inspection of small grains.
10. May 20 - The summer seeding of clover.
11. May 20 - Why use lime.
12. June 20 - Abruzzi Rye
13. June 20 - Preparing the seed bed for small grain.
14. July 20 - Barley acreage increasing in state.
15. July 20 - Start the grain crop right by using good seed.
16. August 20 - Nelson county farmers study soil improvements on county agent's farm.
17. August 20 - Seeding small grain.
18. September 20 - Lime.
19. September 20 - State Grain Show.
20. October 20 - 1932 Corn and Grain Show.
21. November 20 - Care and use of farm manures.
22. November 20 - Program 1932 Grain Show.

Exhibit E.

Extension News
February 20, 1932

HOW MUCH IS CERTIFIED SEED CORN WORTH?

This question can be answered in a measure by citing the results of some demonstrations conducted in twenty counties. In the spring of 1931 two farmers in each of twenty counties were furnished enough certified Reids Yellow Dent or Boone County white corn to plant an acre. The seed furnished in each instance was planted in the field adjacent to the farmer's own seed, on land of the same fertility and given the same treatment throughout the season. Any difference in yield therefore, canbe attributed to the seed. One farmer in Southwest Virginia reported five bushels more per acre with his own seed than with the seed furnished. In this instance it is safe to say that this particular farmer already had good seed. This may not sound so good for certified seed, but what about the results of the farmers in the other nineteen counties? Their increase from the use of certified seed ranged from 2½ bushels to 11½ bushels per acre, with an average increase of five bushels per acre. Let's see what this means from a cost and profit standpoint. Suppose the certified seed cost $5.00 per bushel, that one bushel of seed was necessary to plant six acres, and that the price of the corn produced was 50 cents a bushel. Under these conditions how much will an investment of $5.00 in a bushel of good certified seed corn net a farmer? If the seed cost on six acres is $5.00, naturally the seed cost on one acre is fifty cents. At fifty cents per bushel the five-bushel increase is worth $2.50. This minus the fifty cents cost of the seed leaves a net profit of $2.00 per acre, due entirely to the seed.

Exhibit E.

Extension News
April 20, 1928

IMPROVE THE GRAIN CROPS BY SELECTION

Has your small grain become badly mixed or lost its varietal characteristics? If you have not been giving some attention to your seed the chances are that it has, and needs, some attention.

Last summer the writer had occasion to visit many fields of small grain. Some of these fields had made excellent growth, and were filling up nicely, but were practically worthless for seed purposes because of varietal mixture, and crop mixtures.

Does your smooth wheat have a lot of bearded heads showing in the field or vice versa? No doubt you have noticed this condition often with all small grain crops. Then too you have noticed fields badly mixed; wheat full of rye serves as a good example.

Not only does the crop get badly mixed when we pay no attention to selection, but it deteriorates in yielding ability. It does not pay to go to the bin year after year and just pick up sacks of grain to use for your seed.

This condition can be materially improved by spending a few hours in making head selections in our small grain. This can be done in the field before the grain is harvested, or made from the bundle after cutting.

Selecting from the standing field is the better of the two methods since it gives an opportunity to select from those plants which have produced well under competition. When selecting from the bundle one cannot determine this factor.

In making the selection, the thing of first importance is to select heads true in type for the variety. Heads which are well matured, heavy, and compact should be selected. Avoid long, loose, light heads. This condition usually denotes a low yielding strain.

Avoid all heads which show infections of disease, especially seed borne diseases. This feature alone would justify the time spent on making the selection. Those heads which appear to be damaged from weather, insects, etc. should also be avoided.

A bushel of heads selected in this way will give enough seed for approximately one-half acre. The seed so selected should be seeded in a plot to produce the necessary seed for the next year's crop. This practice does not require a great deal of time, is not complicated, and certainly gives paying results.

Next spring another selection can be made in seed plot to further improve the seed and get the type more definitely fixed.

If you do not feel like making this selection, at least set aside a certain area for seed and go through this and rogue out all mixtures and noxious weeds.

Exhibit E.

Extension News
May 20, 1933

THE SUMMER SEEDING OF CLOVER

If you are faced with the problem of your 1933 hay supply there is yet time to seed red clover for hay purposes. You will get a cutting of hay just about as early as you will from this year's spring seeded crop.

Land which is to be seeded to clover this summer should be disked often enough during the summer to keep it free of weeds and loose on top to conserve moisture. If the land is handled in this way it will be firm and well compacted by seeding time, giving an ideal clover seed bed. Proper seed bed preparation plays a big part in the production of any crop.

There are several advantages of summer seedings over spring seedings on small grain. On thin land the summer seeding of clover alone is much to be preferred. These lands are not sufficiently fertile to carry both the clover and grain crop with the result that the clover suffers.

Anthracnose is most harmful to clover during the summer months, thus the spring seedings do not have a chance to develop and get well established, resulting in more damage to these seedings than to the summer seedings which have had a chance to get better established.

Anthracnose kills a lot more clover each year than it is credited with, and this factor should be seriously considered.

The source of seed should always be considered, whether the seeding is made in the spring or in the summer. Seed from some sources have proven to be well adapted to Virginia conditions, while others are absolutely worthless. Get seed produced in one of the following states: Virginia, Tennessee, Ohio, Maryland or Michigan, even though you have to pay a small premium.

It is useless to try to grow clover on acid soils even though good seed are used. If there is any doubt as to whether or not the soil is too acid to produce clover, have it tested and be sure. If the land has not been limed for a number of years, it is a safe guess that it needs lime if clover is to be successful. In addition to the broadcast application, the use of 500 pounds of ground limestone per acre in contact with the seed gives paying results. Try this with your next seeding.

Clover should always be inoculated unless it has been produced successfully onthe land before. The cost of inoculation at the present is too low to take any chances in not having the clover inoculated.

Clover responds well to applications of superphosphate and potash. It is very seldom that it does not pay to use some fertilizer at seeding time. With the summer seeding this helps push the plants along and get them well established before winter.

Prepare a good seed bed and try a summer seeding of clover. Seed after the first good rain in August, using good seed, fertilizer and lime.

Exhibit F.

SUBJECTS OF RADIO ADDRESSES GIVEN DURING 1932

December 7	Utilization of straw and corn fodder.
December 14	The value of crop rotations.
December 21	Fertilizers in the rotation.
January 8	The soil resources of Virginia.
January 15	The State Corn and Grain Show.
February 5	Sweet clover as soil improver and grazing crop.
February 12	For what is your soil best suited and how should you treat it for best returns.
February 19	Fertilizer materials.
March 4	Value and place of lespedeza on Virginia farms.
March 11	How to determine fertilizer needs of soils.
March 18	Clover the keystone of profitable farming.
April 1	Preparing seed bed for spring seeded crops.
April 8	Good seed versus just seed.
April 15	How much can a farmer afford to pay for good seed corn.
May 6	Cultivating the corn crop.
May 13	Cultural practices for soybeans.
May 20	Harvesting and curing clover hays.
June 3	Effect of continuous cropping on soil fertility.
June 10	Improving small grains by selection.
June 17	Preparing for fall seeding of grass and clovers.
August 1	Some good varieties and strains of small grains.
August 2	Preparing land and seeding small grains.
August 3	Fertilizers for small grains.
August 4	Making silage.

September 2	Harvesting soybeans for hay and seed.
September 9	Some points of fertilizing and seeding small grains.
September 16	Importance of selecting seed corn from the field.
October 7	The late seeded grain crop.
October 14	Husking and storing the corn crop.
October 21	Some important winter jobs.
November 4	Liming.
November 11	Utilizing the farm fields.
November 18	The Virginia Crop Improvement Association.

Exhibit C.

COOPERATIVE EXTENSION WORK
IN
AGRICULTURE AND HOME ECONOMICS
STATE OF VIRGINIA

VIRGINIA AGRICULTURAL AND MECHANICAL COLLEGE AND POLYTECHNIC INSTITUTE AND UNITED STATES DEPARTMENT OF AGRICULTURE, COOPERATING

EXTENSION SERVICE

Orange, Va.
Mar. 4, 1932.

You were promised at the soil testing meeting held in your community this week that a report of the results would be mailed you. On the inclosed sheet you will find this report.

The results of the phosphorus and lime tests that were made at these meetings, as a general rule, were similar to the treatment that the field had received. The phosphorus test seemed to be very accurate or at least accurate enough for all practical purposes. The pounds of available phosphorus per acre shown on the inclosed sheet gives you an idea if you should apply an additional amount or not. For general crop production you should have at least 60 to 75 pounds of available phosphorus per acre or the amount of phosphorus you would get out of 350 to 400 pounds of 16 per cent superphosphate.

Phosphorus does not leach out of the soil like nitrogen nor is it all available at once like some forms of nitrogen, therefore in applying phosphate fertilizer to a crop you should think of fertilizing the crops in a rotation rather than the individual crop.

The lime test gives you an indication as to the amount of lime you should apply to be successful in growing clover. For alkaline and neutral soils, you can expect good crops of clover without applying any additional lime. For slightly acid soils, a small application of lime should be made for best results; medium acid soils should receive about one ton of ground limestone per acre. For best results on the strongly and very strongly acid soils, about two tons of ground limestone should be applied per acre. These recommendations are general and you should use your knowledge of the individual fields in question, in applying general recommendations. Some types of soil require less lime, that show the same acidity, to get good stands of clover than other types.

I hope the meeting in your community was of some value to you. Call on me if I can be of service.

Very truly yours,

T. T. Curtis.
T. T. Curtis.
County Agent.

Exhibit H.

Field	Pounds of available phosphorus per acre	Soil reaction or acidity

Equivalent applications of different forms of lime of average purity.

	: 1 T. of ground oyster shell
	: 1 T. of marl
One ton of ground limestone is equal to:	1 T. of precipitated lime
	: 1500 pounds hydrated lime
	: 1300 lbs. of burnt lime

The State is selling xxxx ground limestone at 60 cents per ton in bulk. This price stays in effect until May 1, 1932.

You should retain this sheet for future reference.

Exhibit I.

SUPERPHOSPHATE INSTITUTE

Washington, D. C.

4508 Elm St.,
Chevy Chase, Md.
March 4, 1932

Mr. W. H. Byrne,
Extension Agronomist,
Blacksburg, Va.

I am writing to express to you my appreciation of having been allowed to participate inthe series of meetings recently held in Orange county.

It appears to me that the making of acidity and phosphate tests for the individual farmer as was done in these meetings is a most effective way of serving his best interests. Undoubtedly he will be more receptive of suggestions when he can see the results of tests which show the soil differences of fields which he has cultivated for many years. The psychological value of these tests is also of much value.

Personally I was highly pleased with the interest shown by the farmers who participated in the meetings. Although the numbers in attendance at any one meeting was not great, I have never seen a more general interest shown by those participating in Extension meetings. As you will recall practically every man present took an active interest in what was said and done.

I also would like to commend the county agent, Mr. T. T. Curtis, for the excellent work which he is doing in this county. He showed a familiarity with soil types and their utilization not frequently found in one who has not had special training in this field. This he appears to be using most effectively as a basis of fertilizer recommendations.

Again thanking you for the opportunity to cooperate in these meetings, and with kindest personal regards, I am

Very truly yours,

T. S. Buie
Field Agronomist

CC to TTC

Exhibit I. Continued

Blacksburg, Virginia.
March 7, 1932

Mr. T. S. Buie, Field Agronomist,
4505 Elm St.,
Chevy Chase, Md.

Dear Mr. Buie:

Thanks very much for your letter of March 4 giving me your opinion of the value of the work which we did in Orange county last week. I believe too that it was worthwhile.

I agree with you also as to the excellent work which Curtis is doing in his county. Personally I consider him one of our best agents.

I want to take this opportunity to thank you for helping us out in Orange. It was not only a pleasure to have you with us, but your assistance was of much value to us.

When I got back to Blacksburg last night I found the ground covered with about nine or ten inches of snow. The wind began blowing long before night and all the roads in this section became impassable because of the drifts, some of them being fifteen or more feet high. We have not had any mail today because of the fact that the mail truck which brings our mail from Christiansburg has not been able to get over the road.

Again thanking you for your cooperation with the work in Orange county, I am

Sincerely yours,

W. H. Byrne
Extension Agronomist, VPI

WHB/hw

Exhibit J.

Nelson County Farmers Study Soil Improvement on County Agent's Farm

For a number of years County Agent J. B. Whitehead has been advising the farmers of Nelson county to sow clover, sweet clover, lespedeza and other legumes as the best known source of feed for livestock, and the most economical method of soil improvement. Many demonstrations with these legumes have been, and will are being conducted by the farmers of Nelson county. As a means of teaching more people the value of the practices being demonstrated, field meetings are usually held at the demonstrations. Five such meetings were held the first week in June.

Several years ago Mr. Whitehead bought a poor "worn out" farm near Lovingston, and while he has been preaching the value of legumes for feed and soil improvement he has been practicing what he has been preaching. It may be also stated that he has been "preaching what he has been practicing", and everyone knows that kind of argument is convincing. Not long ago a few of Mr. Whitehead's farmer friends who knew the condition of the farm before he purchased it, and have watched its improvement insisted that a field meeting be held. After much persuasion the meeting was called for Saturday, July 2. More than fifty representative farmers from all over the county came and what did they see where only eight years ago were gullies, ditches, briars and weeds on land that would not produce more than 10 or 15 bushels of corn per acre.

Here are some of the things observed: 20 acres of two-year old sweet clover, lespedeza and grass, which will be grazed, allowed to go to seed and then the land plowed next winter for corn in 1933. A small field of Korean lespedeza which is to be harvested for seed to obtain seed to sow on other fields of the farm. A good stand of sweet clover on fifteen acres of wheat stubble, which was seeded on the wheat in early March. Mr. Whitehead and his tenant stated that in 1928 this field made an average of 10 bushels of corn, mostly nubbins, per acre; that the wheat yield in 1929 was 12 bushels per acre, but that the

sweet clover made a good growth, and in 1950 was practically the only pasture his livestock had. Even though the stock grazed it very hard and there was not much growth to turn under that winter, 40 bushels of corn per acre was produced in 1951. A young orchard well pruned and sprayed, with almost a perfect stand of sweet clover and lespedeza growing between the trees. A wonderful crop of dark green corn, about waist high, growing on a sweet clover fallow and a good crop of tomatoes following alfalfa. Probably the thing which received the most comment was the growth of Korean lespedeza on a very thin, pine-pasture field. The seed were sown broadcast by hand on top of the briars and broom sedge last April without any preparation. Other interesting practices were observed, but space will not allow further mention of them, except to commend the good garden being grown by the tenant.

In answering the question of what he attributed the successful improvement of his soil, Mr. Whitehead said, "Lime and sweet clover, when I am able to buy lime, and Korean lespedeza when money is too scarce to buy lime." He stated further that much of the improvement was due to the whole-hearted cooperation of the men working on the place.

Exhibit K.

Program of the State Corn and Grain Show 1932

January 20, 1932

8:00 p. m. Meeting of Board of Directors.

January 21, 1932

Forenoon

10:00 Address of Welcome - Mayor R. T. Greer, Marion, Va.

10:15 Response - F. B. Cale, Sparta; President, Va. Crop Improvement Association.

10:30 Feed at Low Cost the Foundation of the Livestock Business - R. E. Hunt, Blacksburg; Head, Animal Husbandry Dept.

11:15 Economic Pasture Management - H. L. Bonham, Livestock farmer, Chilhowie, Va.

12:00 Discussion.

12:15 Lunch.

Afternoon

1:15 Discussion of Exhibits - T. B. Hutcheson, Head, Agronomy Department, Blacksburg, Va.

1:30 The Relation of Good Seed to the Production of Low Cost Feed - H. A. Pettinger, Agronomist, Blacksburg, Va.

2:15 The Value of a Crop Improvement Association to a State - O. S. Fisher, Agronomist, U. S. Dept. of Agriculture, Washington, D. C.

3:15 Adult Judging Contest (open to all adult farm men and women who have not previously won a first prize in this annual contest)

Evening

6:30 Banquet - James Godkin, Plant Pathologist, Chairman; Blacksburg, Va.

(Program of second day on next sheet)

January 22, 1952

Forenoon

9:30 Presentation of Adult Grain Judging Medals - Wm. P. Wood, Jr., For T. W. Wood & Sons, Richmond, Va.

9:45 The Relation of Fertilizer to the Production of Low Cost Feed - T. B. Hutcheson, Head, Agronomy Dept., Blacksburg.

10:30 The Place of Vocational High Schools in Virginia's Crop Improvement - W. S. Newman, Agricultural Supervisor, State Board of Education, Richmond, Va.

11:15 Review of exhibits by juniors.

11:20 Discussion (after juniors leave the hall.)

11:30 Business session of Association.

12:15 Lunch.

Afternoon

1:00 Junior grain judging contest.

1:15 Meeting of Board of Directors.

3:30 Presentation of junior grain judging medals - S. D. Preston, for The American Cyanamid Company.

Exhibit L.

WEED KILLING DEMONSTRATION SUCCESSFUL

Readers of the county papers saw recently a notice in this column that a weed killing demonstration by the use of chemicals would be held the 6th of October on the farm of S. T. Moore in LaCrosse district.

This was held and W. H. Daughtrey of the Agronomy Department, V.P.I. conducted the demonstration. He used a knapsack spray pump and sprayed on the Bermuda or wire grass a solution known as Atlacide. He explained that this material was not as dangerous to handle as some of the other materials and that it would not injure the land as some chemicals did. He advised those attending to repeat this spraying twice more or three times in all, and Mr. Moore was left enough of this chemical to use next spring.

The agent was at this farm one week after this material was used and the sprayed portions were brown and nearly dead. The roots probably were not killed but the second and third applications should kill them, according to Mr. Daughtrey.

The specialist was careful to state that it was impractical to spray large fields in this way on account of the cost, which was about $35.00 per acre, but he stated that small areas of bad weeds or obnoxious grasses could be killedin a garden or along a fence row or a terrace bank, etc. and that he considered this method useful in these cases.

Interested people should speak to Mr. Moore about this work and really if they can, should try to see the results of this treatment.

Exhibit M.

St. Rose Farm

Amount of Food Needed.

Livestock kept.	Hay tons.	Silage tons.	Grain Bus.			Pasture acres
			wheat	oats	corn	
Cows 25	40	75	350	350	350	150
Heifers 10	10	25	75	75	75	25
Brood sows 20	-	-			2500	40
Mules and horses 25	75	-		1200*	625	25
Hens 500	-	-	200	100	300	-
Pullets 500	-	-	65	35	100	-
	125	100	690	1760	4000	250

*Corn may be used in place of some oats.

1. Lime fields Nos. 5 and 6 before seeding to clover. Seed 8 pounds of clover and 5 pounds timothy in spring.

2. Fertilize pasture now with 200 pounds 5-8-5.

3. Fertilize small pasture now with 200 pounds 16% superphosphate.

4. Sow lespedeza in sweet clover.

5. Certified Reids Yellow Dent corn may be gotten from R. D. Stewart, Unionville; Lindsey Woolfolk, Orange; and Jno. S. Ward, Leesburg.

6. Use Virginia, Wilsonor Laredo soybeans for hay.

7. Eureka is a good silage variety.

8. Pasture mixture -
   - 10 lbs. orchard grass
   - 10 lbs. blue grass
   - 5 lbs. red top
   - 2 lbs. white dutch clover
   - 10 lbs. lespedeza.

9. Crops for hay rotations -
   - Rape
   - Corn and soybeans
   - Soybeans (Tokio and Ito San)
   - Rye
   - Crimson clover

St. Anne Farm — Exhibit M. Continued.

Fields, Crops and Rotations

Field No. 1 - 40 A.

1932 corn
1933 oats
1934 clover
1935 corn
1936 small grain

Field No. 2 - 35 A.

1932 clover
1933 corn
1934 oats
1935 clover
1936 corn

Field No. 3 - 20 A.

1932 oats
lespedeza
1933 wheat
1934 corn
1935 wheat
1936 clover and grass

Field No. 4 - 64 A.

1932 clover
1933 corn
1934 oats
1935 clover
1936 corn

Field No. 5 - 30 A.

1932 wheat
1933 clover
1934 corn
1935 wheat
1936 clover

Field No. 6 - 11 A.

1932 oats
1933 clover
1934 corn
1935 oats
1936 clover

Field No. 7 - 15 A.

1932 silage
1933 wheat
1934 clover
1935 corn
1936 small grain

Field No. 8 - 42 A.

1932 corn
1933 oats
1934 clover
1935 corn
1936 small grain

Field No. 9 - 24 A.

1932 corn
1933 oats
lespedeza
1934 corn
1935 oats
1936 clover

Field No. 10 - 56 A.

1932 soybeans and rye turned under.
1933 soybeans (hay)
1934 wheat
1935 clover
1936 corn

Field No. 11 - 16 A.

1932 soybeans and crimson clover turned under.
1933 corn
1934 wheat and lespedeza
1935 wheat
1936 clover

Exhibit M Continued

St. Rose Farm

Acreage of Crops Produced Each Year if Suggested Rotation is Followed

	1932 A.	1933 A.	1934 A.	1935 A.	1936 A.	1937 A.
Corn	106	115	105	97	115	121
Small grain	81	141	151	121	97	115
Soybeans		26				
Clover	99	61	97	136	121	97
Clover and grass						20

(PLEASE KEEP ME FOR REFERENCE)

Bulletin No. 97 May, 1932

A HAND BOOK OF AGRONOMY

(Field Crops, Lime, Fertilizer, Soils)

PREPARED BY
V. P. I. AGRONOMY DEPARTMENT

VIRGINIA AGRICULTURAL AND MECHANICAL COLLEGE AND POLYTECHNIC INSTITUTE
AND THE UNITED STATES DEPARTMENT OF AGRICULTURE, COOPERATING.
EXTENSION DIVISION, JNO. R. HUTCHESON, DIRECTOR
BLACKSBURG, VIRGINIA
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OF
AGRONOMY

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MAY, 1932

Assistance That Can Be Rendered by the Extension Division of The Virginia Polytechnic Institute

The Extension Division carries the Agricultural College and United States Department of Agriculture to the farmer and farm home. It endeavors to meet their problems in soils and crops, horticulture, dairying, live stock, poultry, agricultural engineering, home economics, agricultural economics, and community development. This is done by personal visits, meetings, and correspondence of County Farm and Home Demonstration Agents and Specialists, through boys' and girls' and women's club work, cow testing and purebred live stock and other associations and organizations, and the distribution of bulletins, circulars, newspaper articles, etc.

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INTRODUCTION

There is a mass of information available in bulletin form treating of the various field crops, lime, fertilizer, soil fertility, etc. Some of this information is not applicable to Virginia conditions and all of it is so scattered and distributed that the average man has difficulty in finding what he wants.

This bulletin is intended to be a help to those who are giving serious thought to the various agronomy problems and who have neither the time nor the references to find a few everyday facts easily and quickly. An effort has been made to give some of the important points on the various field crops, and other agronomic and related subjects as briefly as possible.

Many references are made to publications which contain more complete discussions of the various items. The Virginia bulletins and circulars may be obtained by writing the Extension Division, Blacksburg, Virginia, and the U. S. Department of Agriculture publications may be obtained from the Extension Division, Blacksburg, Virginia, or the Superintendent of Documents, Washington, D. C., as long as the supply lasts.

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A HAND BOOK OF AGRONOMY

ALFALFA

Varieties.—Canada Variegated, Grimm, Common Kansas-Grown, and Common Highland Utah. In the high mountain altitude it is often advisable to use Grimm.

Uses.—Hay, soil improvement, pasture.

Vitality of seed.—6 to 8 years.

Weight per bushel.—60 lbs.

Fertilizer requirement.—Heavy user of phosphoric acid and potash. At seeding 400 lbs. or more of about 4-12-4. Increase proportion potash on more sandy soils. Topdress old stands with superphosphate or superphosphate and potash about every other year.

Response to lime.—Heavy user; apply not less than 2 T. limestone.

Soil adaptation.—Deep rich, well drained soil that will produce at least 40 bushels corn per acre. Organic matter.

Inoculation.—Important. Do not sow without inoculating where alfalfa or sweet clover has not been grown successfully before.

Time of planting.—August 1st to 30th. Spring seeding (Mar. 20-Apr. 20) sometimes practiced with good results.

Rate of planting.—15 to 20 pounds per acre.

Method of planting.—Broadcast with drill, seeder, or by hand. Firm seed bed.

Cultivation.—Harrowing with spring tooth harrow sometimes advisable to get rid of grass and for tillage value.

Harvesting (Hay).—Harvest when the basal shoots or suckers are from 1 to 2 inches high.

Care.—Do not cut late in fall.

Rotation.—Have a clean cultivated crop on land for 1 or 2 years prior to seeding. Leave standing as long as it is profitable to cut.

References.—U. S. D. A. Farmers' Bulletins 1229, 1283, and 1467.
Va. Experiment Station Bulletin 247.

BARLEY

Varieties.—Union Winter, Tennessee Winter, Tennessee No. 6, and Arlington Awnless. Spring barley not recommended.

Uses.—Stock feed; also used to some extent for malt breakfast food preparations and flour. Good for early spring grazing.

Vitality of seed.—About three years.

Weight per bushel.—48 lbs.

Fertilizer requirement.—At seeding 200 to 400 lbs. 4-12-4 for soils of average fertility. On the better soils, particularly where manure has been used, the same amount of 16% superphosphate. Topdress as growth begins in spring where straw is likely to be too short.

Response to lime.—Moderately helped.

Soil adaptation.—Loams and clays are best. Does not do so well on sandy or poorly drained soils.

Time of planting.—Between winter oat and wheat seeding time; that is, about one week before the first killing frost.

Rate of planting.—1½ to 2 bushels.

Method of planting.—Broadcasting with grain drill or by hand.

Harvesting (Grain).—Harvest and thresh as would be done with wheat. Harvest in hard dough stage.

Care.—Attacked by rust and smut. "Weevil" will also injure it in the stack or bin.

Cost per acre.—Varies from $18.00 to $25.00 per acre.

Rotation.—May be grown in any rotation in which wheat or oats are grown.

Reference.—U. S. D. A. Farmers' Bulletin 1464.

BIRD-EYE BEANS

Uses.—For human food.

Weight per bushel.—60 lbs.

Fertilizer requirement.—300 lbs. superphosphate or 0-12-5. broadcast.

Response to lime.—Does well on acid soils.

Soil adaptation.—A well drained loamy soil with clay subsoil.

Inoculation.—Inoculation helps.

Time of planting.—Usually June 10th to 20th in mountains.

Rate of planting.—Leave 4 inches to 6 inches apart in row.

Method of planting.—Drilled in rows 24 inches to 36 inches apart.

Cultivation.—Plow shallow and frequently. Do not plow after blooms have started or when vines are wet with dew or rain.

Harvesting (Grain).—When the leaves have fallen off and the stems are dead and dry.

Rotation.—1st year, corn, rye and vetch;
2nd year, beans;
3d year, wheat;
4th and 5th years, clover and grass.

BROOM CORN

Varieties.—The Standard type. The Dwarf type not recommended for Virginia.

Uses.—Manufacture of brooms and brushes. Seed used for feeding poultry and stock.

Weight per bushel.—30 lbs. in South Dakota.

Fertilizer requirement.—150 to 400 lbs. 4-12-4 in row at planting (increase potash on sandy soils). Sidedress on average soils when corn is 40 days old with 100 to 200 lbs. quick acting nitrogen fertilizer.

Response to lime.—Moderately helped.

Soil adaptation.—About the same as for corn. A rich friable soil is best.

Time of planting.—1 to 2 weeks after the first corn is planted; that is, May 1st to June 15th; 80 to 90 days required for the brush to mature.

Rate of planting.—2 to 4 pounds per acre.

Method of planting.—Drilled in rows about 3½ ft. apart and left 3 to 5 inches apart in the row. Drill seed about 1 inch deep.

Cultivation.—Flat three or four times with a cultivator as for corn.

Harvesting.—When natural green color extends from tip of fiber to base and center of head. This will be from time flowers are falling to dough stage of seed.

Care.—Crosses with sorghum, Sudan and Johnson grass, producing worthless hybrids. Should be threshed immediately after harvest and placed

on racks in a shed out of sun and rain to cure. Requires 2 to 3 weeks to cure.

Cost per acre.—Cost about $50 to produce a ton of brush.

Rotation.—May be substituted for corn in any rotation.

Reference.—U. S. D. A. Farmers' Bulletin 958.

BUCKWHEAT

Varieties.—Japanese, Silverhull, Common Gray.

Uses.—Flour (the middlings used for stock); grain good for stock, especially poultry. Summer cover and green manure; bees.

Vitality of seed.—About 2 years.

Weight per bushel.—48 lbs.

Fertilizer requirement.—150 to 300 lbs. per acre of a fertilizer analyzing 2-12-4. Rather heavy user of potash and phosphoric acid, but can get these things from the soil better than other grain crops.

Response to lime.—Seems to do best on moderately acid soil.

Soil adaptation.—Is a poor-land crop. Does well on any well drained soil. Seed do not set well in warm weather. Likes a cool moist climate.

Time of planting.—Latter part of May to middle of July.

Rate of planting.—¾ to 1¼ bushels.

Method of planting.—Usually drilled broadcast; sometimes planted in rows.

Harvesting (Grain).—Harvest between time first seed are fully formed and the time they mature, using cradle, self-rake reaper, or binder. Set up in small shocks. Thresh with wheat thresher by adjusting.

Care.—Very little injury from disease. Hot, dry weather unfavorable to grain development.

Cost per acre.—$12 to $15.

Rotation.—1st year, corn;
2nd year, rye with clover in spring;
3rd year, clover;
4th year, buckwheat;
5th year, vetch and rye or crimson clover.

Reference.—U. S. D. A. Farmers' Bulletin 1062.

ALSIKE CLOVER

Uses.—Hay, pasture, and soil improvement.

Vitality of seed.—About 2 years.

Weight per bushel.—60 lbs.

Fertilizer requirement.—200 to 400 lbs. about 4-12-4 if seeded alone, or in grass mixtures. When seeded on well fertilized grain, no additional fertilizer required.

Response to lime.—Responds readily to lime. It should be used.

Soil adaptation.—Does as well or better on wet, poor, or acid soils than any other clover.

Inoculation.—Usually not necessary, but may help on land which has not been in clover before. Cross inoculates with red, crimson and white Dutch.

Time of planting.—In August, or on small grain from February to April.

Rate of planting.—5 to 8 pounds per acre when seeded alone.

Method of planting.—Seeded in grass mixtures or alone in August. On small grain in spring.

Harvesting (Seed).—Cut when about ¾ of the heads are ripe. Handle as other clover is handled.

Harvesting (Hay).—Cut when in full bloom.

Care.—Does not make a good second crop. If cut just as it is coming into bloom the second crop will be better.

Rotation.—1st year, corn;
2nd year, wheat;
3rd year, clover and grass;
4th year, clover and grass.

Reference.—U. S. D. A. Farmers' Bulletin 1151.

CRIMSON CLOVER

Varieties.—No sharply defined varieties are recongnized in the United States. There are a number of different varieties recognized in Europe.

Uses.—Green manure, and to some extent for hay and pasture. Winter annual.

Vitality of seed.—About 2 years.

Weight per bushel.—60 lbs.

Fertilizer requirement.—200 to 300 lbs. superphosphate usually pays.

Response to lime.—Not very sensitive to acid, but responds to lime.

Soil adaptation.—Best suited to Coastal plains soil. Not suited to wet soil. Vetch probably does best in the mountain section.

Inoculation.—Usually not necessary. Cross inoculates with red, white.

Time of planting.—Commonly sown in corn at last working or on small grain stubble, August and September, 60 days before frost.

Rate of planting.—15 lbs. hulled seed per acre.

Method of planting.—Broadcast at last working of corn or make special preparation. Fine compact seed bed.

Harvesting (Seed).—If mower or reaper is used, cut high before it is so ripe as to shatter. If a stripper is used, it should be very ripe.

Harvesting (Hay).—Cut when the most advanced heads are beginning to show faded flowers at base. If cut when too ripe it is dangerous to feed.

Care.—If the crop does not appear to be making sufficient growth supply nitrogen fertilizer. Graze some if the growth is too rank.

Rotation.—As a winter cover crop it may follow a variety of crops. It grows well after small grain. Frequently sown in the corn at the last cultivation.

Yield.—Seed, 3 to 6 bus.; hay, 1½ to 2 tons per acre.

Reference.—U. S. D. A. Farmers' Bulletins 1142, 1411, 1125 and 1365.

WHITE DUTCH CLOVER

Uses.—Pasture, furnishes early grazing.

Vitality of seed.—About 2 years.

Weight per bushel.—60 lbs.

Fertilizer requirement.—Superphosphate at rate of 500 lbs. per acre once in 4 or 5 years as a topdressing. Use some potash on sandy soil.

Response to lime.—Tolerant to acid soils but responds to lime.

Soil adaptation.—Best adapted to moist meadows but grows well under most any conditions.

Inoculation.—Cross inoculates with red and alsike.

Time of planting.—Spring or late summer.

Rate of planting.—5 to 8 lbs. per acre alone, but as generally used about 2 lbs. per acre should be included in any pasture mixture.

Method of planting.—Rarely seeded alone. Usually included in a pasture mixture.

Harvesting (Seed).—Harvested mostly in middle west.

Rotation.—Grown only in pasture and lawn mixtures. There are several varieties but only one recognized in the United States.

Reference.—Hutcheson and Wolfe, Field Crops; Journal, Ministry of Agriculture, vol. 30, p. 33.

HUBAM CLOVER

Description.—An annual white sweet clover. Its root system is smaller than biennial white but otherwise it is difficult to see any difference.

Uses.—Bees, hay, grazing and soil improvement.

Weight per bushel.—60 lbs.

Fertilizer requirement.—Responds to applications of superphosphate and manure or a phosphoric acid-potash fertilizer. 300 lbs. 0-12-5 or 16% superphosphate is good for average land.

Response to lime.—High lime requirement.

Soil adaptation.—Probably requires somewhat more fertile soil than biennial.

Inoculation.—Necessary. Cross inoculates with alfalfa.

Time of planting.—Sow in early spring.

Rate of planting.—20 to 25 lbs. per acre for hay.

Method of planting.—Broadcast as with any other clover.

Harvesting (Seed).—Produces seed readily. Harvest like other sweet clover seed.

Harvesting (Hay).—Two cuttings may sometimes be made. Cut first time before blooms appear.

Rotation.—Might be grown in place of any summer legume but is not recommended except for bee keepers.

Comment.—Produces a coarse hay which is lower in protein than the biennial sweet clover. Has not proven a success.

Reference.—U. S. D. A. Dept. Circular 169.

MAMMOTH RED CLOVER

Varieties.—Mammoth clover is a variety of red clover sometimes called Sapling, Big English, Bull. It is known botanically as *Trifolium pratense perenne*. It differs from medium red clover in maturing about two weeks later, and under similar conditions, is larger and coarser. It is more commonly hairy and in the autumn of the first season blooms little, or not at all. Only one crop can be harvested each season, since it does not recover quickly. On the other hand, it is generally longer lived than common red clover and is often used in pasture mixtures. It should be cut for hay when in early bloom rather than when past bloom, as with common red. Makes a good yield of seed readily. Commonly sown in a mixture of timothy because, due to its lateness, it ripens with it better than does the common red. It is more woody, viney, and taller than the common. Except for these differences, it is like the common in all requirements, etc.

Reference.—U. S. D. A. Farmers' Bulletin 1339, pp. 23 and 24.

RED CLOVER

Varieties.—Verified seed from Tennessee, Virginia, Maryland, Ohio and Michigan. Never use foreign grown seed.

Uses.—Primarily as a forage crop. Largely used in hay mixtures, but frequently sown by itself for hay. Soil improvement.

Vitality of seed.—5 to 6 years.

Weight per bushel.—60 lbs.

Fertilizer requirement.—200 to 400 lbs. about 4-12-4 if seeded alone, or in grass mixtures. When seeded on well fertilized grain, no additional fertilizer required.

Response to lime.—Lime is necessary; 1 to 2 tons ground limestone per acre once in a rotation. Half this amount burnt.

Soil adaptation.—It likes a productive loam or clay soil containing some organic matter. Soils should be well drained and fertile enough to produce 35 bu. corn.

Inoculation.—Usually not necessary. It cross inoculates with alsike, white and crimson.

Time of planting.—February to April on small grain or during August. Usually in grass mixtures. Sow foreign grown seed in August.

Rate of planting.—10 to 15 lbs. per acre.

Method of planting.—Broadcast alone or in grass mixtures.

Harvesting (Seed).—Cut with a mower or self-rake reaper when heads have turned brown, flower stalks deep yellow, and seed begun to show a distinct violet color. Many will be lost by shattering if cut later.

Harvesting (Hay).—Cut when just past the full bloom stage and handle to save as many leaves as possible.

Care.—Make first cutting early if good second cutting is wanted. Use good seed, superphosphate and lime. Sow only on land that will produce 35 bu. or more of corn.

Rotation.—1st year, corn;
2nd year, small grain;
3rd year, grass and clover.
4th year, grassand clover.

Yield.—1 to 4 bu. seed; 1 to 3 tons hay.

References.—U. S. D. A. Farmers' Bulletins 1339, 1365.
Va. Experiment Station Bulletin 252.

SWEET CLOVER
(Biennial)

Varieties.—Biennial white sweet clover is generally preferred. The stems of the biennial yellow are finer than those of the white and the plant does not grow as high. Yellow blooming 10 days earlier than white.

Uses.—Pasture, hay, soiling or soil improvement; also used as a honey plant.

Vitality of seed.—About 5 years.

Weight per bushel.—Hulled, 60 lbs.; unhulled, 32 lbs.

Fertilizer requirement.—Responds to applications of superphosphate and manure or a phosphoric acid-potash fertilizer. 300 lbs. 0-12-5 or 16% superphosphate for average land.

Response to lime.—High lime requirement; not less than 2 tons ground limestone or its equivalent per acre.

Soil adaptation.—Will grow well on poor soils, provided lime and inoculation are supplied, and the soil is well drained. Sands not well suited.

Inoculation.—Necessary. Cross inoculates with alfalfa.

Time of planting.—February, using unhulled seed. Use scarified seed for late March and April seeding.

Rate of planting.—Hulled, 15 lbs.; unhulled, 25 lbs.

Method of planting.—Sow on grain in February or March and harrow in, or sow on frozen ground. May be included in pasture mixtures.

Harvesting (Seed).—Cut with a self-rake reaper or binder when ¾ of the pods are ripe and the field has a brownish cast.

Harvesting (Hay).—Cut when in bud stage before any blooms appear.

Care.—If a second crop is desired, cut high and before any blooms appear.

Rotation.—1st year, corn;
2nd year, small grain;
3rd year, clover.

Reference.—U. S. D. A. Farmers' Bulletins 1005 and 1250.

CORN

Section of state	Varieties recommended	Color	Approximate days to mature
Mountains	Highland King	White	130–135
	Lancaster Sure Crop	Yellow	130–135
	Golden Queen	Yellow	130–135
	Cocke's Prolific	Ensilage White	140–145
	Eureka	Ensilage White	150–160
Valley	Reid's Yellow Dent	Yellow	135–140
	Leaming	Yellow	135–140
	Boone County	White	140–145
	Govt. 182	White	140–145
	Cocke's Prolific	Ensilage White	140–145
	Eureka	Ensilage White	150–160
Piedmont	Boone County	White	140–145
	Va. White Dent	White	140–145
	Reid's Yellow Dent	Yellow	135–140
	Leaming	Yellow	135–140
	Eureka	Ensilage White	150–160
	Cocke's Prolific	Ensilage White	140–145
Coastal Plains	Boone County	White	140–145
	Va. White Dent	White	140–145
	Reid's Yellow Dent	Yellow	135–140
	Leaming	Yellow	135–140
	Eureka	Ensilage White	150–160
	Cocke's Prolific	Ensilage White	140–145
	Biggs' Seven Ear	White (Prolific)	140–150

Uses.—Grain, ensilage, and hogging down.

Vitality of seed.—About 4 years, depending on care taken.

Weight per bushel.—Shelled corn, 56 lbs.; ear corn, 70 lbs.

Fertilizer requirement.—For soils that will produce 30 bushels per acre, 150 to 400 lbs. 4-12-4 in row at planting (increase potash on sandy soils). Sidedress on average soils when corn is 40 days old with 100 to 200 lbs. quick acting nitrogen fertilizer.

Response to lime.—Indirect.

Soil adaptation.—Will grow on most any type of soil but should not be planted where it will not produce 25 bu. per acre. Moist loams best.

Time of planting.—Usually May 1st to 31st.

Rate of planting.—Grain, 1 to 1½ gallons per acre; silage 1½ to 2 gallons.

Method of planting.—Drilled or checked in rows 3 to 4 ft. apart on level seed bed.

Cultivation.—Cultivate shallow and level often enough to keep down weeds, usually about three times.

Harvesting (Grain).—When kernels are well glazed and dented, shuck and bottom leaves dry, and upper leaves ¼ to ½ green.

Harvesting (Silage).—Early glaze stage, shucks yellow.

Care.—Seed should be selected in fall before there are any hard freezes and stored in a place of uniform temperature.

Cost per acre.—About $30.

Rotation.—1st year, corn;
2nd year, small grain;
3rd year, grass and clover;
4th year, grass and clover.
or
1st year, corn;
2nd year, small grain;
3rd year, clover.

References.—Va. Experiment Station Bulletins 202, 214, and Circulars 4 and 6.
U. S. D. A. Farmers' Bulletins 1176 and 1236.
Va. Extension Division Bulletin 101.

POP CORN

Varieties.—White Rice, White Pearl, and Eight Row. The first two named are considered best for popping.

Uses.—Confection and occasionally as flour.

Weight per bushel.—56 lbs.

Fertilizer requirement.—150 to 400 lbs. 4-12-4 in row at planting (increase potash on sandy soils). Sidedress on average soils when corn is 40 days old with 100 to 200 lbs. quick acting nitrogen fertilizer.

Response to lime.—Not needed except when grown on a field scale in a rotation containing a legume.

Soil adaptation.—Fertile and well drained. Sandy loam preferable.

Time of planting.—Early. When oak trees begin to show their new leaves. Never later than June 1st.

Rate of planting.—About 4 quarts per acre.

Method of planting.—In rows, or checked about the same distance as ordinary field corn but with four or five grains to the hill.

Cultivation.—Same as field corn. On account of small size of young plants, care has to be taken not to cover them up at first working.

Harvesting (Grain).—Shuck from standing stalks in the field after it is thoroughly ripe. Do not put in bulk in crib until it is well cured.

Care.—Do not plant where it will cross with other corn. Crossing injures popping qualities. It yields from ½ to ¾ as much grain per acre as ordinary field corn.

Rotation.—Same as field corn when grown commercially.

Reference.—U. S. D. A. Farmers' Bulletin 1236.

SWEET CORN

Varieties.—Golden Bantam, Adam's Early, Country Gentleman, Stowell's Evergreen.

Uses.—Human consumption, green, canned, and dried. Sometimes used in corn belt for hogging down.

Weight per bushel.—50 lbs.

Fertilizer requirement.—Easier than field corn on land. Uses about 50% as much nitrogen and 25% as much phosphorus as field corn.

Soil adaptation.—Any 35 bushel corn land.

Time of planting.—A little more sensitive than field corn to late spring frosts. For that reason it should be planted slightly later than field corn.

Rate of planting.—1 to 1½ gallons per acre.

Method of planting.—In rows 3 to 4 feet apart with 4 or 5 grains per hill.

Cultivation.—Same as field corn.

Harvesting (Grain).—Allow to mature thoroughly standing in the field.

Harvesting (Roasting Ears).—About 18 days after silks appear. Harvesting season lasts about a month.

Rotation.—When grown commercially it occupies the same place in rotation as field corn.

COTTON

Varieties.—Trice, Ingold, and Mexican. Named in order of preference.

Uses.—Of value for its lint. Seed used for stock feed, fertilizer, and oil

Weight per bushel.—30 lbs. in Virginia.

Fertilizer requirement.—400 to 800 lbs. in row about 4-8-6 for sandy soils, and 4-10-6 for heavier soils. Sidedress poorer soils at chopping time with 100 to 200 lbs. quick acting nitrogen fertilizer.

Response to lime.—Indifferent. Too much applied direct might injure.

Soil adaptation.—For Virginia "early" soils; that is, well drained sandy or loamy upland soils.

Time of planting.—Plant after the soil begins to warm, usually about May 1st, or a little later.

Rate of planting.—About 1 bu. per acre.

Method of planting.—Plant in rows 3 to 4 feet apart on low ridges and not over 1 inch deep. Drill thick.

Cultivation.—Cultivate shallow and frequently until the branches begin to overlap the middles of the rows.

Harvesting.—Most of the Virginia cotton is picked in October. Usually three pickings are made.

Care.—Young cotton plants are very tender until they reach a height of about 6 inches. Deep planting, or a crust on ground soon after planting, makes for a poor stand.

Cost per acre.—About $40.

Rotation.—1st year, peanuts;
2nd year, cotton and crimson clover;
3rd year, corn and crimson clover;
4th year, soybeans and rye;
or
1st year, cotton and crimson clover;
2nd year, corn;
3rd year, small grain;
4th year, grass and clover.

References.—Virginia Extension Bulletin 86.
Virginia Experiment Station Bulletin 229.
Any of the Experiment Station bulletins in Southern States.
Tennessee Experiment Station Bulletin 127.
Many U. S. Dept. of Agriculture bulletins on the subject.

COWPEAS

Varieties.—Whippoorwill, Groit, Brabham, and New Era, 75 to 90 days. Iron (not affected by root-knot and wilt), 90 to 100 days. Clays, 110 days. Black (several varieties), viney and hard to harvest with mower. Blackeye for food.

Uses.—Human food, hay, soil improvement, and pasture. Adapted to section of State east of mountains.

Vitality of seed.—Quickly damaged by weevil unless measures are taken to protect them.

Weight per bushel.—60 lbs.

Fertilizer requirements.—About 300 lbs. superphosphate. Add some potash for sandy soils.

Response to lime.—Not necessary but will help.

Soil adaptation.—Do best on sandy loam soils, but succeed on practically all types of well drained soils. Will grow on very poor soils.

Inoculation.—Usually not necessary in Virginia. Cross inoculates with peanuts, Japan clover, beggar weed and partridge pea.

Time of planting.—About 2 weeks after corn planting time.

Rate of planting.—½ to ¾ bu. in rows; 1¼ to 2 bu. broadcast. (Depends on size of seed).

Method of planting.—Drilled in rows about three feet apart, or broadcast.

Cultivation.—If drilled in rows, cultivate about as corn would be.

Harvesting (Hay).—When most of the pods are full grown and a few are ripe.

Harvesting (Seed).—Often picked by hand. If cut and threshed, the cutting should probably be done when ⅓ to ⅔ of pods are ripe.

Care.—Racks are a help in curing hay. It cures slowly.

Rotation.—Fit any place a summer legume is required. A valuable crop.

References.—U. S. D. A. Farmers' Bulletins 1148 and 1153.

CROTALARIA

Remarks.—A green manure and forage crop, grown in the Southern states and advertised extensively in Virginia. It has not proved of significant value at the Virginia experiment stations.

MEADOW FESCUE

(Randall Grass — English Bluegrass)

Characteristics.—A long-lived, tufted, deep-rooted perennial adapted to timothy section of the country. More persistent than timothy.

Uses.—Hay and pasture mixtures. Gives early spring and late fall grazing.

Vitality of seed.—3-year-old seed practically valueless.

Weight per bushel.—24 lbs.

Fertilizer requirements.—300 lbs. 4-12-4.

Soil adaptation.—Adapted to practically all tillable soils except sandy soil. Does as well as any grass on wet soils.

Time of planting.—Early fall or spring. Early fall seeding gives crop of seed following summer.

Rate of planting.—About 25 lbs. per acre when seeded alone.

Method of planting.—Broadcast as with any of the light seeded grasses. In mixtures.

Harvesting (Seed).—When field takes on a yellowish-brown cast and heads droop.

Harvesting (Hay).—As it comes into bloom. On average land 2 tons is not an exceptional yield.

Reference.—U. S. D. A. Farmers' Bulletin 1254.

SHEEP FESCUE

Characteristics.—A long-lived bunch grass forming a dense turf with numerous stiff, rather sharp, nearly erect, bluish gray leaves.

Uses.—Primarily a pasture grass. Will grow under any climatic conditions suited to bluegrass.

Vitality of seed.—Three years or less. Deteriorates rapidly.

Weight per bushel.—10 to 15 lbs.

Fertilizer requirement.—A complete fertilizer. An abundance of nitrogen is necessary for best results with any grass.

Response to lime.—Not necessary.

Soil adaptation.—It succeeds better than most grasses on poor, sandy, or gravelly land.

Time of planting.—August or early fall is best. May be sown in spring.

Rate of planting.—25 lbs. alone. 10 to 12 lbs. in mixtures.

Method of planting.—Sow in mixtures on land intended for grazing. An excellent grass for poor, sandy soil, especially in mixtures. Alone it is too bunchy.

Note.—The commercial seed of sheep fescue comes from Europe. The grass is tough, but is nutritious and eagerly eaten by sheep, and to a less degree by cattle.

Reference.—U. S. D. A. Farmers' Bulletin 1254.

RED FESCUE

Characteristics.—Very similar to sheep fescue, but the leaves are bright green instead of bluish and the plant does not grow in bunches, but creeps by underground stems.

Uses.—Used principally for lawns, though it has some value as a pasture grass. Suits sandy soils well and is used on lawns and golf courses on sandy soils. It will also withstand more shade than most grasses.

Weight per bushel.—10 to 15 lbs.

Rate of planting.—30 lbs. per acre alone.

Reference.—U. S. D. A. Farmers' Bulletin 1254.

RHODE ISLAND BENT GRASS

Closely related to the ordinary red top (Herd's grass) but differs from it by being smaller in size, narrow leaves, etc. Makes up much of the pastures of New England, but will grow most any place red top thrives. Does not make as good a yield of hay as red top and is used in this State princi-

pally in lawn mixtures and on the putting greens of golf courses. It is injured rather than benefited by lime. Will grow on almost any kind of soil.

Weight per bushel.—About 16 lbs.

Time of seeding.—Early spring or late summer.

Rate of seeding.—About 10 lbs. per acre if seeded alone.

Reference.—U. S. D. A. Farmers' Bulletin 1254.

CREEPING BENT GRASS

Creeping bent grass differs from Rhode Island bent chiefly in being more stoloniferous. Rhode Island bent does not always produce stolons and when it does they are not over 6 inches in length; while creeping bent produces stolons from 3 to 5 feet in length in one season. Considered the best of all grasses for golf putting greens. Injured by lime. Not used in Virginia in general farm practices. Suitable for lawns and golf greens in Virginia. May be obtained by planting chopped up roots. Requires considerable moisture.

BERMUDA GRASS

(Wire Grass)

Characteristics.—Long-lived, perennial, which spreads by runners, root stocks, and seed. Often considered a pest. Is best eradicated by shallow plowing in late fall, followed by crops which shade the land. Cannot be killed by summer cultivation or deep plowing at any time.

Uses.—Used mainly for grazing in this state, though also used for lawns and hay.

Weight per bushel.—35 to 36 lbs.

Response to lime.—It responds little if at all to lime.

Soil adaptation.—Will grow on all types of soil but thrives best on well drained, rich, moist bottom land.

Time of planting.—Seed should not be sown until late spring when soil is warm. Roots and cuttings used more commonly than seed.

Rate of planting.—5 lbs. seed, or 1 wagon load roots per acre.

Method of planting.—Seed broadcast by hand or seeder. Roots dropped in furrows and covered shallow.

Harvesting (Hay).—Cut when in bloom.

Harvesting (Seed).—Does not make seed in abundance in Virginia.

Care.—Spring seeding will give grazing or a light crop of hay by fall.

Reference.—U. S. D. A. Farmers' Bulletins 1254 and 1152.

KENTUCKY BLUEGRASS

Characteristics.—A long-lived perennial which forms a permanent sod.

Uses.—Permanent pastures and lawns.

Vitality of seed.—1 to 2 years.

Weight per bushel.—14 lbs.

Fertilizer requirement.—Topdress with 300 lbs. of superphosphate per acre in spring for three consecutive years, for permanent pastures. Add quick acting nitrogen for quick results. For new seedings apply 400 pounds 4-12-4 per acre.

Response to lime.—It was once thought that lime was indispensable but it is not considered so now, though it helps.

Soil adaptation.—Thrives best on the well-drained heavier types of soil, rich in organic matter and all of the fertilizing elements.

Time of planting.—Late summer seeding best, but it may be seeded in spring.

Rate of planting.—About 14 lbs. per acre in mixtures.

Method of planting.—Broadcast. It should be seeded in mixtures, as about 3 years are required for it to establish a sod.

Note.—It gives good early grazing, then in late summer it languishes, but comes up quickly again in fall to furnish good grazing. One of the best pasture grasses. Especially suited to the fertile soils of western Virginia.

References.—Virginia Experiment Station Bulletin 204.
Virginia Experiment Station Report 1917-18.
U. S. D. A. Farmers' Bulletin 1254.

CANADA BLUEGRASS

Description.—A hardy perennial. Produces an abundance of running root-stocks, and forms a dense sod. Differs from Kentucky Blue grass in its dark blue color, short leaves, flattened stem, and short, compact seed head.

Uses.—Pastures.

Vitality of seed.—1 to 2 years.

Weight per bushel.—Recognized weight is 14 lbs., though the actual weight is more.

Soil adaptation.—Most commonly found on clay soils. On stiff clay soils of low fertility it seems to thrive better than any other grass. Seldom found on sandy soils. Will grow anywhere Kentucky Bluegrass is found, and is adapted to thinner soils.

Time of planting.—On small grain in spring, or in late summer and early fall.

Rate of planting.—15 lbs. per acre, in pasture mixtures.

Harvesting (Seed).—Cut when at the "golden" stage or when the seed has a deep yellow color.

Reference.—U. S. D. A. Farmers' Bulletins 402, 1254.

BROME GRASS

Description.—A vigorous drought resistant perennial with many underground root-stocks. Often grows 5 feet high.

Uses.—Hay and pasture. Highest yield hay about the third year. Falls off rapidly after that.

Vitality of seed.—About five years.

Weight per bushel.—14 lbs.

Soil adaptation.—Best adapted to the Dakotas and west and north from there. Will grow on most any type of soil. Of doubtful value in Virginia, but will grow very well in the mountain sections.

Time of planting.—Early spring or with small grain in fall.

Rate of planting.—14 to 20 lbs. per acre.

Method of planting.—Broadcast. Use in mixture.

Harvesting (Seed).—Cut high with binder in "brown" stage.

Harvesting (Hay).—Cut just after full bloom in stage called the "purple."

References.—U. S. D. A. Bureau of Plant Industry Bulletin 111, part V.
U. S. D. A. Farmers' Bulletin 1433.

CARPET GRASS

Characteristics.—A perennial creeping grass forming a sod. Spreads by creeping stems which root at joints. Not troublesome as a weed. A Southern grass not suited to Virginia, except possibly the southeastern part.

Uses.—Permanent pasture.

Weight per bushel.—About 18 lbs.

Response to lime.—Indifferent.

Soil adaptation.—Especially adapted to sandy or sandy loam soils, particularly those where the moisture is near the surface. It will grow on very poor soils, but cannot stand much drought.

Time of planting.—From spring to mid-summer.

Rate of planting.—10 lbs. per acre when seeded alone; 5 lbs. in mixtures. Well to sow Lespedeza with it.

Method of planting.—Sow broadcast on a compact seed bed when there is moisture in the land.

Care.—Continuous close grazing, which also packs the ground, maintains the sod in best condition.

Reference.—U. S. D. A. Farmers' Bulletins 1130 and 1254.

RED TOP

(Herd's Grass)

Characteristics.—A perennial grass with a creeping habit of growth which makes coarse loose turf. Matures about the same time as timothy.

Uses.—Hay and pasture.

Vitality of seed.—About 6 years.

Weight per bushel.—14 lbs. (Varies with amount of hull left on seed).

Response to lime.—Seems to do better on "sour" soils.

Soil adaptation.—Is found all the way from Canada to the Gulf of Mexico. Will grow under any Virginia soil conditions. Suited to wet soils.

Time of planting.—August and September best time.

Rate of planting.—5-10 lbs. per acre alone; 3 lbs. in mixtures.

Method of planting.—Broadcast in the usual way for grasses.

Harvesting (Hay).—A little before or during full bloom.

Rotation.—1st year, bright tobacco;
2nd year, small grain;
3rd year, red top.

References.—U. S. D. A. Farmers' Bulletin 1254.
U. S. D. A. Circular 43.

JOHNSON GRASS

Characteristics.—A perennial which spreads by seed and strong underground stems. Considered a pest all over Virginia and should not be sown. Difficult to eradicate. A tall coarse grass of the sorghum family, often growing six feet in height.

Uses.—Hay and pasture.

Harvesting (Hay).—Cut before bloom stage. Sometimes several cuttings are made in one year.

Control.—Cannot be controlled satisfactorily in a cultivated crop. If it is very bad, the best way is to turn the land into a meadow or pasture and keep it closely cropped or cut.

Reference.—U. S. D. A. Farmers' Bulletins 279, 1476.

TALL MEADOW OAT GRASS

Characteristics.—A perennial growing in bunches. Often attains a height of 5 feet.

Uses.—Hay and pasture. Of most value in a mixture of red clover, alsike clover and orchard grass.

Vitality of seed.—Usually low.

Weight per bushel.—10 to 16 lbs.

Soil adaptation.—It will grow in any section in which orchard grass will grow. One of the best poor land grasses and is especially adapted to well drained sandy soils. Responds to soil improvement and fertilizer. Does not like shade. Very drought resistant.

Time of planting.—Late summer or fall seeding is best.

Rate of planting.—25-40 lbs. per acre if seeded alone.

Harvesting (Hay).—It should be cut about the time of blooming.

Reference.—U. S. D. A. Farmers' Bulletin 1254.

ORCHARD GRASS

Characteristics.—A long-lived, deep-rooted perennial bunch grass.

Uses.—Hay and pasture. Makes early spring and late fall grazing.

Vitality of seed.—2 to 3 years.

Weight per bushel.—14 lbs.

Soil adaptation.—Does best on the heavier soils such as clays and clay loams.

Time of planting.—Late summer, early fall, or early spring. Summer and fall seeding best.

Rate of planting.—When seeded alone 14 to 25 lbs. per acre; usually 14 lbs. per acre in mixtures.

Method of planting.—Probably serves best for hay and pasture when sown in a mixture of red clover, alsike, and tall oat grass.

Harvesting (Seed).—When seed are mature and stalks woody, cut with binder and set up in small shocks.

Harvesting (Hay).—Cut in bloom stage. It quickly becomes woody after blooming.

Reference.—U. S. D. A. Farmers' Bulletin 1254.

ITALIAN RYE GRASS

Not an annual, but under farm conditions little of it lives more than one year. Grows rapidly and in bunches to a height of 3 feet.

Used as an annual hay crop, as temporary pasture, and in lawns to give a quick covering to the ground. It produces a turf quickly, then dies out as the other grasses come on. For this reason it is often included in mixtures where quick covering or grazing is wanted, while waiting for the other grasses to establish themselves.

Will grow in about the same sections as orchard grass. Adapted to rich, moist, well drained soil. Does best seeded in early fall. Fall seeding will usually make hay by May.

Vitality of seed.—About 2 years.

Weight per bushel.—24 lbs.

Usual rate of seeding per acre.—Alone, 30 to 40 lbs.

References.—U. S. D. A. Farmers' Bulletin 1254.
U. S. D. A. Dept. Circular 44.

PERENNIAL RYE-GRASS

Other names for it are English rye-grass, darnel, Randall grass. Very similar to Italian rye-grass in use, adaptability, and all other ways.

It can be distinguished from Italian rye-grass by the flowers being awnless and the leaves folded in the bud, not enrolled.

It is preferred by some to Italian rye-grass because it is thought to be slightly more persistent, but Italian rye-grass is more drought resistant.

Vitality of seed.—About 2 years.
Weight per bushel.—20 lbs.
Usual rate of seeding per acre.—Alone, 30 lbs.; mixtures, 10 lbs.
References.—U. S. D. A. Farmers' Bulletin 1254.
U. S. D. A. Dept. Circular 42.

SUDAN GRASS

Characteristics.—An annual which in outward appearance when growing is much like Johnson grass, but it does not live over winter and has none of the troublesome qualities of Johnson grass. Has no underground root-stock as has Johnson grass.

Uses.—Catch hay crop, soiling, silage, and grazing.

Weight per bushel.—25 to 40 lbs.

Fertilizer requirement.—200 to 300 lbs. superphosphate and on sandy soils a little potash.

Soil adaptation.—Does well on any type of soils except those that are cold and wet. May be grown in any section of Virginia.

Time of planting.—Two weeks after corn planting time.

Rate of planting.—20 to 35 lbs. per acre. A grain drill set to sow 2 pecks of wheat will put down about 20 to 25 lbs.

Method of planting.—Broadcasting makes best hay though it is sometimes drilled in rows and cultivated. Does well sown with cowpeas or soybeans.

Harvesting (Seed).—Cut with binder when seed are ripe and set in shocks.

Harvesting (Hay).—Cut just after it is beginning to head.

Care.—It mixes with sorghum and should not be planted close to it. Drought resistant and produces well in dry seasons.

Rotation.—Its principal use is as a catch crop for hay. Probably does not take as much from the land as a corn crop.

References.—Virginia Experiment Station Bulletin 212.
U. S. D. A. Farmers' Bulletin 1126.

LESPEDEZA
(Japan Clover)

Varieties.—Annuals: Korean, Kobe, Tennessee 76 and Common; Perennial: Lespedeza Sericea.

Uses.—Soil improvement, pasture, seed production, and hay.

Vitality of seed.—Use double quantity of two-year-old seed. Three-year-old seed practically worthless.

Weight per bushel.—Common, Tennessee 76 and Kobe, 25 lbs.; Korean, no legal weight about 45 lbs.; Sericea, unhulled 31 lbs., hulled 64 lbs.

Fertilizer requirement.—200 to 300 lbs. superphosphate per acre; sandy soils an equal amount of 0-12-5.

Response to lime.—Not necessary, but responds readily.

Soil adaptation.—Will grow on any soil. Does best on fertile loams. When used for hay, put on fertile, moist land. Korean best adapted to mountainous section of state.

Inoculation.—Not necessary; cross inoculates with cowpeas, beggar weed and peanuts.

Time of planting.—Early spring, February 20 to April 10, depending on section of the state.

Rate of planting.—20 to 25 lbs. per acre alone; 10 lbs. per acre on sods or in grass mixtures.

Method of planting.—Broadcast by hand or seeder. Usually seeded with small grain.

Cultivation.—Harrow grain before seeding if land is hard on top.

Harvesting (Hay).—When plants have reached their maximum growth and before leaves begin to shed.

Harvesting (Seed).—Cut in fall when ripe and thresh with grain separator, or use seed pan attached to mower blade and cut when thoroughly ripe, that is, when all vegetation is dark brown.

Care.—Do not cover seed over ¼ inch deep.

Rotation.—Corn or tobacco, small grain, lespedeza.

Yield.—100 to 500 lbs. seed; 1 to 3 tons hay.

Remarks.—The annual varieties reseed each year and may be left down for a number of years.

References.—Virginia Extension Circular E-294.
U. S. D. A. Farmers' Bulletin 1143.

MANGEL-WURTZEL.

(Field Beets — Stock Beets)

Varieties.—Giant Half-Sugar, Giant Eckendorf, Yellow Globe, etc.

Uses.—Largely for cattle and sheep feed.

Fertilizer requirement.—Heavy application of manure with 400 to 600 lbs. per acre of a high potash fertilizer such as 4-8-6.

Response to lime.—Responds readily. Should receive an application of 2 tons ground limestone or its equivalent.

Soil adaptation.—Deep, well-drained, moist, rich loam or sandy loam soil. Does not do so well on heavy clays.

Time of planting.—April or May.

Rate of planting.—10 to 12 lbs. per acre.

Method of planting.—In rows 30 inches apart and thin to one plant every 10 to 12 inches. Put seed in ground about one inch.

Cultivation.—Seed germinate and start off slowly and, for this reason, land should be free of weeds.

Harvesting.—As soon as growing stops, which is indicated by the dropping of the outer leaves.

Note.—A fair yield is 20 tons per acre.

MILLET

(Foxtail)

Varieties.—There are a number of varieties. Probably the best for Virginia are Golden or German, Hungarian, and Turkestan.

Uses.—Used in Virginia as a catch hay crop.

Vitality of seed.—About 4 years.

Weight per bushel.—40 to 55 lbs.

Fertilizer requirement.—Fertilizer not usually profitable. When used, 200 lbs. superphosphate or 0-12-5.

Response to lime.—Not helped by lime.

Soil adaptation.—Rich, loose, loamy soil is best.

Time of planting.—2 or 3 weeks after corn planting time. Requires 60 to 70 days to mature.

Rate of planting.—About 40 lbs. per acre.

Method of planting.—Broadcast with a grain drill or by hand. Care should be taken not to cover the seed too deeply.

Harvesting (Grain).—Cut with binder and handle much like wheat.

Harvesting (Hay).—Cut just after blooming. Has about the same feeding value as timothy.

Note.—Injury has resulted when millet hay was used as a continuous ration for horses.

Reference.—U. S. D. A. Farmers' Bulletins 1125 and 1250.

OATS

Varieties.—Winter: Virginia Gray Winter, V. P. I. No. 1, Red Rustproof; spring: Fulgum, Burt, Swedish Select, V. P. I. No. 1.

Uses.—Chiefly as grain for horses and other livestock; also cut for hay and used for human food.

Vitality of seed.—About 3 years.

Weight per bushel.—32 lbs.

Fertilizer requirement.—At seeding 200 to 400 lbs. 4-12-4 for soils of average fertility. On the better soils, particularly where manure has been used, the same amount of 16 per cent superphosphate. Topdress as growth begins in spring where straw is likely to be too short.

Soil adaptation.—A well drained, moderately rich soil with clay subsoil is best. On account of the soft straw, they lodge readily.

Time of planting.—Winter, about three weeks before first killing frost. Spring, as soon as land can be prepared.

Rate of planting.—2 to 2½ bushels per acre.

Method of planting.—Broadcast with grain drill or by hand.

Harvesting (Grain).—With binder in the hard dough stage.

Harvesting (Hay).—Cut in early milk stage.

Rotation.—1st year, corn with cowpeas in the corn;
2nd year, oats;
3rd year, clover and grass;
4th year, clover and grass.

Note.—Fall sown oats are surer than spring oats and mature 2 or 3 weeks earlier.

Reference.—U. S. D. A. Farmers' Bulletins 424, 436, 892, 1119.

AUSTRIAN WINTER PEA

Description.—A winter annual, well adapted to Piedmont and Tidewater Virginia.

Uses.—Forage and soil improvement.

Vitality of seed.—About 3 years.

Weight per bushel.—60 lbs.

Fertilizer requirement.—A heavy user of phosphate: 200 to 400 lbs. superphosphate. Sandy soils—equal amount of 0-12-5.

Soil adaptation.—To practically all soils capable of producing 35 bus. or more of corn per acre. Gives best results in Piedmont and Tidewater Virginia.

Inoculation.—Cross inoculates with garden peas, Canada field pea, and vetch.

Time of planting.—Fall, September 15 to October 15; spring, March 1 to April 15.

Method of planting.—Broadcast with small grain, preferably Fulghum oats.

Rate of planting.—Hay, 40 lbs. peas and 40 lbs. oats; soil improvement, 60 lbs. alone.

Harvesting (for hay).—When in full bloom.

Harvesting (for seed).—When pods begin to turn brown.

FIELD PEA

(Canadian Field Pea)

Varieties.—Golden Vine is the best general purpose variety. Closely resembles the garden pea.

Uses.—Hay, early pasture, green manure, seed, and as human food.

Weight per bushel.—60 lbs.

Fertilizer requirement.—200 to 300 lbs. superphosphate.

Response to lime.—Responds to lime. Moderate requirement.

Soil adaptation.—Clay loam soils suit best.

Inoculation.—Usually not necessary. Cross inoculates with garden pea.

Time of planting.—February or March.

Rate of planting.—1½ to 2 bushels per acre alone.

Method of planting.—Does well mixed with oats. Broadcast with grain drill 2 to 4 inches deep.

Harvesting (Seed).—Cut when pods are mature and seeds are firm. Threshed like soybeans.

Harvesting (Hay).—Cut when most of the pods are well formed.

Note.—Not recommended for general use in Virginia. Better suited to the northern section of the United States.

Reference.—U. S. D. A. Farmers' Bulletin 690.

PEANUTS

Varieties.—Runner: Jumbo, Virginia Runner; bunch: Virginia Bunch, Spanish.

Uses.—Many forms as human food; also for livestock.

Weight per bushel.—22 to 30 lbs. depending on variety.

Fertilizer requirement.—300 to 500 lbs. 2-8-6 in row at time of planting.

Response to lime.—1000 lbs. burnt lime or 2000 lbs. ground limestone once in four years.

Soil adaptation.—Best quality are produced on light sandy soil. They may be produced anywhere east of the mountains, but the quality is poor on the heavier soils.

Inoculation.—Cross inoculates with cow peas.

Time of planting.—May 1st to June 15th in the peanut section of Virginia. Spanish may be planted as late as July 1st.

Rate of planting.—2 bushels unhulled, or ½ bushel hulled, per acre.

Method of planting.—Hull the peanuts (except Spanish) before planting in rows 2 to 3½ feet apart and 6 to 16 inches apart in the drill.

Cultivation.—Cross harrow the field before the peanuts are up, then cultivate shallow and frequently until pods begin to form.

Harvesting.—The time to dig is when the greatest number of mature pods are on the vines.

Cost per acre.—Approximately, including all costs, $35.00.

Rotation.—1st year, peanuts;
2nd year, cotton with crimson clover at last working;
3rd year, corn with crimson clover at last working;
4th year, soybeans with rye or crimson clover as cover.

References.—Virginia Experiment Station Bulletins 218 and 229.
U. S. D. A. Farmers' Bulletins 1127, 1437 and 1125.

PUMPKINS

Varieties.—Large type: King of the Mammoths, Virginia Mammoth; small type: Connecticut Field; flat type: Large Cheese; table use: Sugar pumpkin.

Uses.—Hog and cattle feed; table use.

Vitality of seed.—About 5 years.

Fertilizer requirement.—Forkfull manure in each hill; also good handfull 4-8-4 fertilizer.

Response to lime.—Benefited by good application of lime.

Soil adaptation.—Fertile, sandy loam or loam, well drained.

Time of planting.—May. Generally ground must be thoroughly warm and danger of frost past.

Rate of planting.—8 to 10 pounds per acre.

Method of planting.—In hills 8 x 12 feet apart, 5 to 10 seeds per hill; 2 to 3 plants are good stand; plant seed 1 to 1½ inches deep. May be dropped in row with corn.

Storage.—Keep in dry place free from hard frost or freezing.

Reference.—Indiana Experiment Station Circular 35.

RAPE

Varieties.—Dwarf Essex. Another variety of less importance is Dwarf Victoria.

Uses.—As pasture for hogs and sheep. Sometimes causes bloating in sheep.

Vitality of seed.—About 6 years.

Fertilizer requirement.—Heavy feeder and responds to manure and a complete fertilizer.

Response to lime.—Requirement high. For best results 2 tons of ground limestone per acre should be used.

Soil adaptation.—Rich, moist, loamy soil for best results. In general any soil that will produce a good crop of corn is all right.

Time of planting.—February and March or August and September, depending on section of state.

Rate of planting.—3 to 5 lbs. per acre broadcast with grain drill or by hand.

Care.—Usually ready for grazing about 8 weeks from time of seeding An acre of good rape will furnish grazing for 30 hogs for about 6 weeks.

References.—U. S. D. A. Farmers' Bulletin 164.
Arkansas Extension Circular 207.

RYE

Varieties.—Abruzzi, east of mountains; Piedmont Winter, west of mountains. Pasture and green manure, Abruzzi in all parts of State.

Uses.—Grain, winter and spring pasture, soiling, and cover crop. Does well as a winter cover crop, mixed with hairy vetch.

Vitality of seed.—About 2 years.

Weight per bushel.—56 lbs.

Fertilizer requirement.—At seeding 200 to 400 lbs. 4-12-4 for soils of average fertility. On the better soils, particularly where manure has been used, the same amount of 16 per cent superphosphate. Topdress as growth begins in spring where straw is likely to be too short.

Response to lime.—Lime not necessary but it helps some.

Soil adaptation.—Any well drained soil. Does better on poor soils than wheat.

Time of planting.—Same time as for wheat, but does better than wheat seeded late. For grazing, Abruzzi may be sown 2 weeks earlier.

Rate of planting.—4 to 6 pecks per acre.

Method of planting.—Broadcast with grain drill.

Harvesting (Grain).—Cut with binder in dough stage; usually a little ahead of wheat.

Rotation.—1st year, corn, rye;
2nd year, soybeans;
3rd year, wheat;
4th year, clover and grass;
5th year, clover and grass.
or
1st year, bright tobacco;
2nd year, rye.

May take the place of any small grain in a rotation.

Reference.—U. S. D. A. Farmers' Bulletins 756 and 894.

SYRUP SORGHUM

Varieties.—Orange, Sumac, and Amber.

Uses.—Syrup; also fodder, hay, soiling, and silage.

Weight per bushel.—45 to 60 lbs.

Fertilizer requirement.—150 to 400 lbs. 4-12-4 in row at planting (increase potash on sandy soils). Sidedress on average soils when corn is 40 days old with 100 to 200 lbs. quick acting nitrogen fertilizer.

Soil adaptation.—Any well drained soil that will produce a good crop of corn or wheat. Is hard on land.

Time of planting.—More sensitive to cold than corn and for this reason it is best to plant 2 to 4 weeks after earliest corn.

Rate of planting.—8 to 10 lbs. per acre.

Method of planting.—In rows 3 to 3½ feet apart and 4 to 6 inches apart in the drill. Do not plant as deep as corn.

Cultivation.—Same as for corn.

Harvesting (Syrup).—When seed are in hard dough stage.

Harvesting (Silage).—In hard dough stage.

Care.—When pastured or fed green there is danger of poisoning to livestock.

Rotation.—Small grains usually do not do well following it.

References.—U. S. D. A. Farmers' Bulletins 1158, 1389.

SOYBEANS

Varieties.—For hay, in Piedmont, Valley and Mountain sections, Virginia and Wilson. In Coastal Plains section, Virginia, Wilson, Laredo, Old Dominion, and Pine Dell. For silage, Mammoth Brown, Tarheel, and Biloxi. For hog pasture, Dixie, Haberlandt, Tokio, and Mammoth Brown.

Uses.—Seed, hay, green manure, hogging off, and silage

Vitality of seed.—The germination of two-year-old seed should be tested before sowing.

Weight per bushel.—60 lbs.

Response to lime.—Not necessary, but helps, especially on heavy soils.

Soil adaptation.—Do not plant without fertilizer on land that produces less than 20 bu. corn per acre.

Fertilizer requirement.—200 to 300 lbs. of superphosphate or 0-12-5 per acre.

Inoculation.—Should be inoculated every year for about three years on land on which they have not grown before.

Time of planting.—For seed, May 15th to June 15th; for silage, same as for corn; for hay, May 15th to July 15th; for green manure, May 15th to July 15th.

Rate of planting.—Different varieties have different size seeds. Small and medium seeded varieties, 3 to 6 pecks per acre. Large seeded varieties, 6 to 8 pecks per acre. In rows, one-third this amount.

Method of planting.—Drilled in rows 24 to 40 inches apart, or broadcast with wheat drill, or by hand.

Cultivation.—When in rows, cultivate shallow as for corn. Broadcast beans are helped by a light harrow about the time they are coming up if there is a crust on the ground.

Harvesting (Seed).—When the leaves have fallen and pods are brown and dry.

Harvesting (Hay and Silage).—When the lower leaves begin to turn yellow and pods are about half filled.

Care.—Plant very shallow (about 1 inch), and if a crust forms on land before they come up, break it with a harrow.

Rotation.—1st year, corn and crimson clover;
2nd year, soybeans;
3rd year, wheat;
4th and 5th years, clover and grass.

References.—Virginia Experiment Station Bulletin 235.
U. S. D. A. Farmers' Bulletin 1125, 1121 and 1289.

TIMOTHY

Description.—A perennial semi-bunch grass. Best adapted to the Piedmont and western section of the State.

Uses.—Primarily for hay. Does not stand grazing well.

Vitality of seed.—5 to 6 years.

Weight per bushel.—45 lbs.

Fertilizer requirement.—200 to 400 lbs 4-12-4 where there is no fertilizer residue as when sown on well fertilized grain. Topdress old stands as growth begins in spring with 200 lbs. of equal parts quick acting nitrogen and 16 per cent superphosphate, if land is not fertile.

Response to lime.—Is helped and lime should always be used when clover is sown with it.

Soil adaptation.—Heavy soils such as clays and loams. Does not do well on sandy soils.

Rate of planting.—10 to 15 lbs. per acre alone; 6 to 8 lbs. in mixtures.

Method of planting.—Usually seeded in mixture with sapling clover. The timothy with wheat in the fall and the clover on the wheat in the spring. Cleaner stands are obtained by seeding the mixture alone in August.

Harvesting (Hay).—When in full bloom or slightly after.

Rotation.—1st year, corn;
2nd year, small grain;
3rd year, timothy and sapling clover;
4th year, timothy and sapling clover.

Reference.—U. S. D. A. Farmers' Bulletins 1254 and 1151.

BRIGHT TOBACCO

Varieties.—To be harvested by cutting, Gold Leaf, Warne, Adcock, Flannigan; to be harvested by pulling, Cash, Jamaica Wrapper, White Stem Orinoco.

Fertilizer requirement.—1000 lbs. 3-8-3 for the soils of the Piedmont with heavy clay subsoils. For the more sandy soils of both the Coastal Plains and the Piedmont, 1000 lbs. 4-8-6 or 2-8-5.

Response to lime.—Injury; 400 or 500 lbs. of magnesium limestone on very sandy soils prevents "sand drown."

Soil adaptation.—Light sandy or sandy loam soil. The best soils usually have an open yellowish subsoil.

Rate of planting.—5,000 hills to acre.

Method of planting.—Reset plants from a bed between May 15th and June 15th.

Cultivation.—Cultivate 3 or 4 times using wings to leave some list at last working.

Harvesting.—Harvest by pulling bottom leaves as they ripen. This necessitates planting pulling varieties and topping high.

Rotation.—1st year, tobacco;
2nd year, wheat;
3rd year, red top;
or
1st year, tobacco;
2nd year, rye.

References.—Virginia Experiment Station Bulletin 233.
Virginia Extension Division Bulletin 62.
U. S. D. A. Farmers' Bulletins 1352, 1356, 1494.

DARK FIRED TOBACCO

Varieties.—Lizzard Tail, Narrow Leaf Orinoco, Kentucky Yellow, Little Dick.

Fertilizer requirement.—500 to 1,000 lbs. 3-8-3 per acre drilled in row.

Response to lime.—Use in sufficient quantities to assure clover in the rotation.

Soil adaptation.—Loamy soils with red clay subsoils are best.

Time of planting.—May 15th to June 15th.

Rate of planting.—5,000 hills per acre.

Method of planting.—Reset plants from a bed.

Cultivation.—3 or 4 times, leaving a good size list.

Rotation.—1st year, tobacco;
2nd year, wheat;
3rd year, grass and clover;
4th year, grass and clover.

References.—Virginia Experiment Station Bulletins 206, 231.
U. S. D. A. Farmers' Bulletins 1356, 1425, 1494.

SUN-CURED TOBACCO

Varieties.—Narrow Leaf Orinoco, Lizard Tail Orinoco, Little Orinoco, and Kentucky Pryor, named in order of preference.

Fertilizer requirement.—500 to 1,200 lbs. of a fertilizer analyzing 3-8-3 or 4-8-6. The thinner and more sandy soils require the largest applications and the most potash.

Response to lime.—Should be used in the rotation but not applied directly to the tobacco.

Soil adaptation.—Well drained sandy loams are best.

Time of planting.—May 15th to June 15th.

Rate of planting.—5,000 plants per acre.

Method of planting.—Reset from beds.

Cultivation.—3 or 4 times leaving it ridged or hilled up.

Rotation.—About same as for dark fired tobacco.

References.—U. S. D. A. Farmers' Bulletins 1356, 1425, 1494.
Virginia Experiment Station Bulletin 242.

TURNIPS

Varieties.—Purple Top, Yellow Aberdeen, Rutabagas.

Uses.—Human food, livestock.

Vitality of seed.—5 years.

Weight per bushel.—56 lbs.

Fertilizer requirement.—4-8-4, 300 to 500 lbs. per acre.

Response to lime.—Will grow on acid soils but responds some to lime.

Soil adaptation.—Loam, not too high in organic matter. Will grow on most any type of soil.

Time of planting.—1st to 25th of July for purple top. Some varieties may be seeded later.

Rate of planting.—5 lbs. per acre.

Method of planting.—Broadcast.

Harvesting (Feed).—In late fall after light frost.

Care.—Very little care is required. Harvest and cut roots and tops and put in cellar or cover with dirt. Do not let them freeze.

Rotation.—May be seeded with crimson clover.

HAIRY VETCH

Description.—Sometimes called Winter Vetch, Russian Vetch, etc. The best winter annual legume cover crop for the western part of the State and does well in the east.

Uses.—Hay, pasture, soil improvement, and seed.

Vitality of seed.—3 years.

Weight per bushel.—60 lbs.

Fertilizer requirement.—200 to 400 lbs. superphosphate. Use some potash on sandy soils.

Response to lime.—Responds to lime but will grow on fairly acid land.

Soil adaptation.—Any well drained soil.

Inoculation.—Inoculation necessary where it has not been grown before. Cross inoculates with garden peas.

Time of planting.—August 1st to November 1st, depending on section of State.

Rate of planting.—20 to 30 lbs. per acre usually mixed with ½ to 1 bushel small grain.

Method of planting.—Sow broadcast in mixture with small grain. Contains some hard seed that may come up in later grain crops.

Harvesting (Seed).—When lower pods are fully ripe. Put in cocks and thresh when cured.

Harvesting (Hay).—Cut when first pods are well developed.

Note.—Differs from common vetch in that it shatters more readily and the seed are smaller and nearly black. It starts rather late in the spring.

Rotation.—Of much value as a winter cover crop to be harvested or turned under in the spring. Seed are high now.

References.—U. S. D. A. Farmers' Bulletins 1476, 1030, 1250, 1142.

OTHER VETCHES

There are a number of other vetches besides hairy vetch. None of them are recommended for Virginia. Common vetch and purple vetch are the best known of these.

WHEAT

Varieties.—Smooth: V. P. I. No. 112, Forward, Leap's Prolific, Little Red, Fultz; bearded: V. P. I. No. 131, Fulcaster, Stoner, Red Wonder, Mediterranean.

Uses.—Human food and occasionally hay or cover crop.

Vitality of seed.—2 to 7 years.

Weight per bushel.—60 lbs.

Fertilizer requirement.—At seeding 200 to 400 lbs. 4-12-4 for soils of average fertility. On the better soils, particularly where manure has been used, the same amount of 16 per cent superphosphate. Topdress as growth begins in spring where straw is likely to be too short.

Response to lime.—Responds to use of lime in rotation.

Soil adaptation.—Does best on heavy loams of good fertility.

Time of planting.—About time of first killing frost.

Rate of planting.—4 to 6 pecks per acre.

Method of planting.—Broadcast with grain drill.

Harvesting (Grain).—Harvest when stalk is brown and grain in dough stage.

Rotation.—1st year, corn;
2nd year, wheat;
3rd year, clover and grass;
4th year, clover and grass;
or
1st year, corn followed by crimson clover or vetch;
2nd year, soybeans or cowpeas;
3rd year, wheat;
4th year, clover and grass;
5th year, clover and grass.

References.—Virginia Experiment Station Bulletins 216, 222.
Virginia Experiment Station Circular 3.
Virginia Extension Circular E-210.
U. S. D. A. Farmers' Bulletins 1168, 1224, 1498.
U. S. D. A. Bulletin 1074.

PART II

CROP ROTATIONS RECOMMENDED FOR VIRGINIA

U. S. D. A. Farmers' Bulletin 1475 says in effect that cultivation counts about one-third, manures and commercial fertilizers about one-third, and crop rotation about one-third, in producing a crop.

A good rotation will: (1) help to control weeds, insect pests, and diseases; (2) may aid in maintaining the supply of organic matter in the soil; (3) may aid in maintaining the soil nitrogen supply; (4) often saves labor; (5) keeps the land occupied with crops a greater part of the time; (6) allows for crop alternation; (7) regulates the use of plant food from the soil; (8) systematizes farming; and (9) increases crop yields.

The following results of an experiment conducted by the Virginia Experiment Station, Blacksburg, Va., show the effect of a rotation on yield and cost of production:

Average yield and cost per bushel of corn at Blacksburg, Va., from different cropping systems and treatments, given for first eight-year and second eight-year period of experiments.

Rotation or cropping system		200 lbs. floats yearly *16 tons manure every 4 yrs.		No fertilizer	
		Yield corn per acre	Cost per bu. to produce	Yield corn per acre	Cost per bu. to produce
		Bushels		*Bushels*	
Corn every year	1914–1921	39.73	$0.56	23.91	$0.86
	1922–1929	31.02	$0.72	11.90	$1.73
Corn in 4-year rotation:					
1 st year, corn 2nd year, wheat 3rd year, clover and grass 4th year, clover and grass	1914–1921	50.87	$0.36	35.16	$0.46
	1922–1929	56.37	$0.33	25.34	$0.64

*In all cases the manure was applied in the winter before planting corn.

A good rotation should carry at least one legume. The following are offered as types. There are many others which may be more suitable to local conditions. Wherever *corn* is written, any other cultivated crop may be inserted, and wherever *wheat* is written, any other small grain may be inserted.

ROTATIONS FOR GRAIN AND GRASS FARMS

1. 1st year, corn
   2nd year, wheat, with sweet clover sown on it in spring and turned down the following spring for corn again
2. 1st year, corn
   2nd year, wheat
   3rd year, clover
3. 1st year, corn
   2nd year, wheat
   3rd year, clover and grass
   4th year, clover and grass
4. 1st year, corn and crimson clover
   2nd year, soybeans or cowpeas
   3rd year, wheat
   4th year, clover and grass
   5th year, clover and grass
5. 1st year, corn and cowpeas, soybeans
   2nd year, wheat
   3rd year, clover and grass
   4th year, clover and grass

ROTATIONS FOR TOBACCO FARMS

(a) Dark and Sun-Cured Tobacco:
1. 1st year, tobacco
   2nd year, wheat
   3rd year, clover and grass
   4th year, clover and grass
   5th year, corn

Two rotations on farm:
2. 1st year, tobacco
   2nd year, wheat
   3rd year, clover
   and
   1st year, corn
   2nd year, wheat
   3rd year, grass and clover
   4th year, grass and clover

BRIGHT TOBACCO ROTATIONS

A—One year rotation tobacco followed by rye
B—1st year, tobacco
   2nd year, wheat, followed by rye to be turned under
C—1st year, tobacco
   2nd year, wheat
   3rd year, red top

A bright tobacco rotation should be planned so as to provide that the organic matter of the soil be kept up from non-leguminous crops.

A separate rotation should be provided for the general food and feed crops, and this land improved by the use of legumes.

COTTON

A—1st year, peanuts
   2nd year, cotton with crimson clover at last cultivation
   3rd year, corn with crimson clover at last cultivation
   4th year, soybeans with rye as winter cover crop
B—1st year, cotton with crimson clover at last cultivation
   2nd year, corn
   3rd year, small grain (wheat, oats, rye)
   4th year, clover and grass
C—1st year, cotton with crimson clover at last cultivation
   2nd year, corn and cowpeas or soybeans
   3rd year, winter oats or wheat with soybeans as catch crops

PEANUTS

A—1st year, peanuts with rye as a cover crop
   2nd year, cotton with crimson clover as a cover crop
   3rd year, corn with crimson clover as a cover crop
   4th year, soybeans with rye or crimson clover as winter cover crop
B—1st year, peanuts
   2nd year, corn and soybeans with crimson clover at last cultivation
   3rd year, soybeans followed by rye to be plowed under in spring

References.—U. S. D. A. Farmers' Bulletins 1250, 1475.
Virginia Experiment Station Bulletin 253.

HAY AND PASTURE MIXTURES FOR VIRGINIA

It has been the usual practice in this state to sow timothy and other grasses with small grain in the fall and then to sow clover on the grain in the spring. This practice does very well on the fertile, well limed soils. How-

ever, experiments have proved that late summer seeding of grasses and clover usually result in better stands; clean of weeds and briers.

Results of experiments at Blacksburg, Virginia, in 1909, when good stands of grass were obtained in all cases:

	August Seeding	Spring Seeding
Plat 1	2.44 tons per acre	2.28 tons per acre
Plat 2	1.52 tons per acre	1.16 tons per acre
Plat 3	2.32 tons per acre	2.14 tons per acre
Average	2.10 tons per acre	1.86 tons per acre

HAY MIXTURES

Unless grass is grown for a market which demands hay of a particular class, it will be found more profitable to sow mixtures of several grasses than to sow only one kind.

Some good mixtures follow:

Light loam or sandy soils:

Tall oat grass	11 lbs.
Orchard grass	14 lbs.
Medium red clover	8 lbs.

On bottom lands where a permanent meadow is desired add to this mixture 12 lbs. of meadow fescue.

Strong loam or clay soils:

Timothy	10 lbs.
Red top or alfalfa	5 lbs.
Sapling clover	8 lbs.

Wet bottom lands:

Timothy	8 lbs.
Red top	3 lbs.
Meadow fescue	12 lbs.
Alsike clover	5 lbs.

PASTURE MIXTURES

Strong loams and clay soils:

Kentucky bluegrass	10 lbs.
Red top	3 lbs.
Orchard grass	10 lbs.
Alsike clover	3 lbs.
Red clover or alfalfa	5 lbs.

Wet bottom lands:

Red top	3 lbs.
Meadow fescue	12 lbs.
Alsike clover	5 lbs.
Timothy	8 lbs.

Light loam or sandy soils:

Tall oat grass	8 lbs.
Orchard grass	10 lbs.
Red top	3 lbs.
Red clover	6 lbs.
Lespedeza	12 lbs.

Poor land and gullied hillsides:

Sheep fescue	6 lbs.
Red top	3 lbs.
Orchard grass	10 lbs.
Japan clover	10 lbs.
Alsike	3 lbs.
Bermuda grass—about a bushel of chopped roots	

Note.—Always sow Japan clover in the spring.

References.—Virginia Experiment Station Bulletin 193.
U. S. D. A. Farmers' Bulletins 943, 1094, 1254, and 1151.

LAWNS

The kinds of grasses to use—

The following are some good mixtures:

2 parts Kentucky blue grass
1 part Red top
2 parts Perennial rye grass

For general purposes in all sections of the state.

1 part Red top 2 parts Perennial rye grass 1 part Red fescue 2 parts Kentucky blue grass	Sandy soils (add some chopped up Bermuda grass roots in southeast part of state.)
1 part Rough-stalked meadow grass 2 parts Kentucky blue grass 1 part Red fescue	For shady spots in the lawn.

One part White Dutch clover may be added to any of these mixtures.

The above are very good general purpose mixtures. There are other mixtures that would be satisfactory. When it is not convenient or desirable to buy the different kinds of seed and mix them, ready-mixed seed may be obtained from reliable seedsmen. Mention should be made of the grasses you want in the mixture especially, in ordering these ready-mixed grasses.

Soils.—A good lawn cannot be obtained unless the soil is fertile. A fertile soil is one containing an abundance of organic matter and an abundance of available plant foods, nitrogen, phosphoric acid, and potash. If the soil is freshly excavated clay, it is advisable to haul good loamy topsoil and cover it three or four inches.

Organic matter may be furnished by using leaf mold from the woods, or by using well-rotted manure. The manure should be so completely rotted as to show no coarse stalks or straw. Apply the manure or leaf mold at the rate of ½ ton per 1,000 square feet. If more time can be taken, cowpeas may be sown in the spring and disked or spaded under in August to furnish organic matter. The grass should be sown right afterwards. The soil should, of course, be well drained.

Fertilizer.—Apply 25 pounds of a complete fertilizer such as 4-12-4 or 4-8-4 to each 1,000 square feet before seeding. Sow in two directions in order to get uniform distribution.

Lime.—Lime is of questionable value on lawns. It promotes the growth of clover and helps bluegrass. It also promotes the growth of weeds and if used very extensively damages such grass as Red Top. Fifty pounds of hydrated lime per 1,000 square feet applied once in five or six years is enough in any case.

Seeding.—Seeding may be done in the spring from March to May, or in the late summer from August to October. Make a compact level seed bed 2 to 4 inches deep, containing no clods larger than a guinea egg. Sow 2 to 3 pounds of one of the above recommended mixtures of seed per 1,000 square feet. Sow in two directions in order to get a good distribution of the seed and rake in carefully afterwards. If manure, leaf mold, or fertilizer is used it should be applied and worked in before seeding. If the ground is dry at the time the seed should begin to come up, water abundantly and keep watering until the grass has made a good start.

Spring seeding is more likely to be bothered with weeds.

Weeds.—A good stand of grass and regular clipping is the best way to keep out weeds. Some weeds may be cut out by hand. A saturated solution of copperas (iron sulphate) if sprinkled on such weeds as chickweed and dandelion, will kill these weeds and not injure the grass. For killing chickweed the sprinkling should be done in the early spring. This water solution of copperas badly corrodes any kind of metal, so the utensil used should be

carefully washed afterwards. This solution will also stain the grass, but does not hurt it otherwise.

Clipping.—Keep clipped about 1½ inches from the ground. Ordinary lawn grasses may be clipped too close. On the other hand, do not allow grass to get too tall before clipping, but clip regularly.

Watering.—Wet the ground to a depth of 3 or 4 inches about once a week in dry weather. Frequent light waterings are not advisable.

Renovating old lawns.—It is often advisable to plow up old lawns and start over. Where the old lawn is not plowed up, apply ½ ton of well rotted manure and 15 to 20 pounds of some such fertilizer as 4-12-4 per 1,000 square feet in the spring. Some seed may be sown and scratched in with a rake on thin and bare spots.

Maintenance.—Topdress with fine well-rotted manure or leaf mold at the rate of ½ ton per 1,000 square feet and at the same time use 15 to 20 pounds of a good complete fertilizer. Repeat this every few years in the spring. Lawn grasses use much nitrogen, and if the grass is not dark green and is not growing rapidly, a top dressing of 4 to 5 pounds of nitrate of soda or sulphate of ammonia per 1,000 square feet once or twice during the growing season will help. Be careful to apply the sulphate or nitrate evenly or it will burn the grass. A very good way is to dissolve it in water and sprinkle it on. If it is not dissolved in water, the lawn should be sprinkled immediately afterwards so as to get the fertilizer down to the ground and off the leaves.

Good lawns cannot be obtained and kept unless the land is fertile and without some care. There is more or less expense attached to maintaining a good lawn.

RECOMMENDATIONS FOR IMPROVING OLD ESTABLISHED PASTURES

I. For beef cattle and sheep pastures:

Topdress in the spring with 300 pounds superphosphate per acre, until a good sod is established. Three consecutive applications will usually establish a good sod. Phosphate encourages the growth of white clover, which helps to keep up the nitrogen supply.

Apply one ton of ground limestone every fourth or fifth year. If there are bare spots, reseed with a pasture mixture.

On thin, gray soils lacking in potash, 0-12-5 should be used instead of superphosphate.

For increasing the grazing immediately use 100 to 125 pounds of quickly available nitrogenous material in addition as a topdressing in early spring. Repeat in the summer if necessary.

II. For high-producing dairy cows:

Add nitrogen from some readily available source to the recommendations for beef cattle, at the rate of 30 to 50 pounds to the acre, depending upon the value of the product sold.

Reference.—Virginia Experiment Station Bulletin 204.

GOOD SEED

It is important to know what classes seed as good or bad, because *good* seed is vital in economical crop production and profitable farming.

The following are the important points to consider in determining the value of good seed:

1. **Adaptability and yielding ability of the variety.**—Many crop varieties are not adapted to Virginia; and some of those that are yield better than others.

2. **Ability to grow.**—A high percentage of the seed must germinate and it must produce strong, healthy, young plants that will start off rapidly.

3. **Freedom from weed seed.**

4. **Purity.**—Meaning free from cracked seed, dirt, straw, etc.

5. **Freedom from disease.**—Usually it cannot be told whether there is some disease present on the seed by simply looking at the seed.

6. **Freedom from other crop seed and other varieties.**

7. **Freedom from crosses of other varieties.**—It is not always possible to tell this by looking at the seed.

8. **Maturity.**—Indicated by the plumpness and size of the kernels.

9. **Uniformity of size of seed.**—Uniform size seed feed more regularly through a seeder, look better, and usually sell better.

Some of the nine qualities may be recognizable by the experienced buyer upon examination of the seed. To be sure of all these qualities, the seed crop must be seen growing in the field and then a sample must be germinated and analyzed in the laboratory after the crop has been harvested, threshed, and cleaned. It is advisable to buy Certified seed when the certification has been based on these field, germination and laboratory inspections. Seed associations in various states now give certification based on these things. There is such an association in the state, with headquarters at Blacksburg.

LEGUMES

A survey of the state in 1923 showed that only 1 acre in 15 of the cultivated land was planted to legumes. Soil fertility is one of the basic problems of profitable farming, and the proper use of legumes is the basis of maintaining soil fertility. All cultivated land should have at least one legume in each rotation, except special crops, such as bright tobacco and certain truck crops.

Soil and Climatic Requirements for Some Legumes Grown in Virginia

(Prepared by Harvey S. Clapp)

Name of legume	Section of state in which it does well	Type of soil to which best suited	Moisture requirements	Lime requirements	Humus requirements
Red Clover	All sections	Clays and loams	High	High	High
Alfalfa	All sections	Clays and loams	Very high	High	Very high
White Dutch Clover	All sections	Sands to clays	Moderate	Moderate	Moderate
Alsike	All sections	Clays and loams	Resistant to damp soils	Moderate	Moderate
Crimson Clover	Eastern half	Sands and loams	High	Low	Low
Vetch, Hairy	All sections	Sands to clays	Moderate	Low	Low
Soybeans	All sections	Sands and clays	Moderate	Moderate	Low
Cowpeas	Central section	Sands to loams	Moderate	Low	Low
Lespedeza	Eastern half	Clays to sands	Low	Low	Low
Sweet Clover	All sections	Clays and loams	High	High	Low
Austrian Winter Peas	Eastern half	Clays and loams	Moderate	Low	Moderate

CROSS INOCULATION OF LEGUMES

(Note: Cross marks indicate which legumes are inoculated by bacteria from other legumes. For example, alfalfa is inoculated by bacteria from bur clover, sweet clover, and black medic.)

	Bur Clover	Alfalfa	Sweet Clover	Black Medic	Red Clover	White Clover	Alsike Clover	Crimson Clover	Vetch	Garden Pea	Canada Field Pea	Austrian Winter Pea	Garden Bean	Soybean	Cowpea	Partridge Pea	Peanut	Lespedeza	Beggar Weed
Bur Clover	+	+	+	+															
Alfalfa	+	+	+	+															
Sweet Clover	+	+	+	+															
Black Medic	+	+	+	+															
Red Clover					+	+	+	+											
White Clover					+	+	+	+											
Alsike					+	+	+	+											
Crimson Clover					+	+	+	+											
Vetch									+	+	+	+							
Garden Pea									+	+	+	+							
Canada Field Pea									+	+	+	+							
Austrian Winter Pea									+	+	+	+							
Garden Bean													+						
Soybean														+					
Cowpea															+	+	+	+	+
Partridge Pea															+	+	+	+	+
Peanut															+	+	+	+	+
Lespedeza															+	+	+	+	+
Beggar Weed															+	+	+	+	+

Legumes may be divided into four groups: summer annuals, winter annuals, biennials, and perennials.

Summer Annuals	Winter Annuals	Biennials	Perennials
Soybeans	Crimson Clover	Red Clover	Alfalfa
Cowpeas	Vetch	Mammoth Clover	White Clover
Velvet Beans	Bur Clover	Sweet Clover	Alsike Clover
*Lespedeza	Austrian Winter Pea		Lespedeza Sericea
Hubam Clover			
Canada Field Pea			
Mung Bean			

*If properly handled, it will reseed itself in some sections of the state in fall and act as a perennial.

Of the summer legumes named other than lespedeza, only soybeans and cowpeas are important in Virginia. Bur clover is not so well adapted to Virginia conditions as the other three winter legumes named.

Of the crops commonly grown in Virginia and named above, alfalfa, sweet clover, vetch, and soybeans should *never* be sown without inoculation on land on which they have not been grown before. Often other of the above crops are benefited.

References.—U. S. D. A. Farmers' Bulletins 1250, 1496.
Virginia Experiment Station Bulletin 253.

EFFECT OF FERTILIZERS ON INOCULATION

Information is frequently requested in regard to the influence of fertilizers on inoculation when the inoculated seed is seeded in direct contact with the fertilizer. The experiments conducted by the Agronomy Department, State Agricultural Experiment Station, Blacksburg, Virginia, on this question show that none of the fertilizers used affected soybean inoculation. The fertilizers used were as follows: acid phosphate, 200, 300, and 400 pounds, respectively, per acre; muriate of potash, 100 pounds; sulphate of potash, 100 pounds; nitrate of soda, 100 pounds; ammonium sulphate, 100 pounds; dried blood, 100 pounds; and basic slag, 300 pounds. In all instances the fertilizers were placed in the row with seed which had just been inoculated with the soybean bacteria.

Observation and experience indicate that inoculation on *no* legume is injured when inoculated seed is sown in contact with fertilizer.

LIME

Lime will give paying results on practically any soil and in any section in Virginia if properly used. It is very important but does not take the place of fertilizer. Both fertilizer and lime should be used. The following table gives a few facts of general application.

Commercial forms	Fineness	*Rate of application	Time and method of application	Frequency of application	Benefits	Indications of needs
Ground limestone	Ground limestone, marl, oyster shells and other carbonate materials should be ground so all will pass through a 20-mesh screen with some of the finer material removed. A 20-mesh screen is slightly finer than an ordinary fly screen.	2 tons	Apply any time, but for quickest results land should be limed a short time before a legume is to be sown. Spread broadcast and mix well with the first 3 or 4 inches of soil.	If used at the rate of 1 ton of burnt lime or its equivalent, apply once in about six years. One-half this amount on Coastal Plains. Smaller quantities applied more frequently give more economical results.	1. Makes clover and other legumes grow. 2. Improves the physical condition of the soil. 3. Helps in the proper decomposition of organic matter. 4. Corrects soil acidity. 5. Probably makes the commercial fertilizers used more available. 6. Acts as a plant food for such crops as alfalfa.	1. Failure to get crops of clover and other legumes. 2. The encroachment and growth of such plants as briers, sorrel, wild daisies, broomsedge, plantain (buckhorn), poverty grass, pine trees, etc.
Marl		2 tons				
Oyster shells		2 tons				
Hydrated lime (water slaked)		1⅓ tons				
Burnt lime		1 ton				

*One-half of these amounts on sandy soils with sandy subsoils, such as are found all over the Coastal Plains east of Richmond.

References.—Virginia Experiment Station Bulletins 237, 253.
U. S. D. A. Farmers' Bulletins 1365, 1283, 1142.

TABLE OF FACTORS FOR CONVERTING ONE FORM OF LIME TO ANOTHER WHEN CHEMICALLY PURE

Burned	× 1.32 =	Hydrated	Hydrated	× 1.35 =	Carbonate
Burned	× 1.79 =	Carbonate	Carbonate	× .56 =	Burned
Hydrated	× .76 =	Burned	Carbonate	× .74 =	Hydrated

LIME EQUIVALENTS

Amounts of different kinds of lime that are equal in neutralizing power.
(Based on base equivalents.)

BURNT Limestone or shell of 90% purity	HYDRATED Limestone or shell of 90% purity	GROUND Limestone, shell or marl of 90% purity	GROUND Dolomite, 30% $MgCo_3$; 60% $CaCo_3$
Pounds	*Pounds*	*Pounds*	*Pounds*
500	660	895	837
1,000	1,320	1,790	1,674
1,500	1,980	2,685	2,511
2,000	2,640	3,580	3,348
2,500	3,300	4,475	4,185
3,000	3,960	5,370	5,021
3,500	4,620	6,265	5,858
4,000	5,280	7,160	6,695

THE pH METHOD OF DETERMINING THE ACIDITY OF SOILS

In measuring the acidity of soils one of the standard lime requirement tests or hydrogen-ion tests is usually used. The degree of acidity found is expressed by what is known as the pH values. An interpretation of pH values will not be attempted other than to illustrate what a few of the pH values mean.

Acid	Neutral	Alkaline
pH 4 — pH 5 — pH 6	pH 7	pH 8 — pH 9

As illustrated above, a reading of pH 7 shows the soil to be neutral. A reading of pH 8 or above shows the soil to be alkaline, and one of pH 4, 5 or 6 shows it to be acid. A reading of pH 6 shows 10 times more acidity than pH 7; likewise a reading of pH 5, 100 times more acidity than pH 7; and a reading of pH 4, 1000 times more than pH 7; a reading of pH 8 shows 10 times more alkalinity than a reading of pH 7, etc.

Composition of the Principal Fertilizer Materials

Material	Phosphoric acid	Nitrogen	Potash	Availability
SUPPLYING PHOSPHORIC ACID:	*Per cent*	*Per cent*	*Per cent*	
Superphosphate	16.0—20.0			Quick
Treble superphosphate	40.0—50.0			Quick
Basic slag	13.0—18.0			Quick
Raw rock phosphate	26.0—35.0			Very slow
Ammonium phosphate	20.0—61.5	11.0—21.0		Medium
Steamed bone meal	22.0—30.0	1.0— 2.5		Medium
Ground bone (raw)	20.0—25.0	2.5— 4.0		Very slow
SUPPLYING NITROGEN:				
Nitrate of soda		15.5—16.0		Quick
Sulphate of ammonia		19.0—20.5		Quick
Dried blood (high grade)		12.0—16.0		Medium
Dried blood (low grade)	3.0— 5.0	10.0—11.0		Medium
Concentrated tankage	1.0— 2.0	11.0—12.5		Medium
Tankage (bone)	11.0—14.0	3.0— 6.0		Slow
Dried fish scrap	6.0— 8.0	7.0—10.0		Slow
Cottonseed meal	1.5— 2.0	6.5— 7.5	2.0— 3.0	Slow
Castor pumace	1.0— 1.5	5.0— 6.0	1.0— 3.0	Slow
Calcium cyanamide		19.0—22.0		Quick
Urea		46.0		Quick
Lana saipeter		26.0		Quick
SUPPLYING POTASH:				
Sulphate of potash			48.0—52.0	Quick
Muriate of potash			48.0—60.0	Quick
Kainit			12.0—16.0	Quick
Potassium nitrate		13.0	46.0	Quick
Manure salts			20.0—30.0	Quick
Sulphate of potash-magnesium			25.0	Quick
Wood ashes	1.0— 2.0		2.0— 8.0	Medium
Tobacco steme	0.5— 1.5	2.0— 4.0	4.0— 9.0	Medium

GENERAL FERTILIZER RECOMMENDATIONS FOR VIRGINIA

These recommendations are for land that will ordinarily produce per acre: corn, 30 bushels; wheat, 12 to 15 bushels; hay, 1 ton; dark tobacco, 600 pounds; bright tobacco, 650 pounds; cotton, ½ bale; pasture, one cow to 5 acres; and average yields of other crops. Vary the amount when the land is more or less fertile.

Piedmont

I. Upland soils with red or brown subsoils:

	Pounds per acre		
	Nitrogen	Phos. Acid	Potash
Corn	[1]8 to 12	32	8
Small grain	[1]8 to 12	32	8
Perennial legumes	8	48	16
Annual legumes	00	32	8
Grass or grass and clover mixed	[1]8 to 12	32	8
Tobacco—Dark	32	80	32
Bright	40	100	40
Sun-cured	32	80	32
Cotton	24	48	24
Pasture	0	48 to 80	0

II. Upland soils with yellow or mottled subsoils:

Corn	[1]8 to 12	32	10
Small grain	[1]8 to 12	32	10
Perennial legumes	8	48	20
Annual legumes	0	32	10
Grass or grass and clover mixed	[1]8 to 12	32	10
Tobacco—Dark	30	80	50
Bright	30 to 40	80	60
Sun-cured	40	80	60
Cotton	[1]24	48	32
Pasture	0	48 to 80	0

III. Bottom land soils more or less well drained:

Corn	8 to 12	32	10
Small grain	8 to 12	32	10
Perennial legumes	8	48	20
Annual legumes	0	32	10
Grass or grass and clover mixed	[1]8 to 12	32	10
Tobacco—Dark	30	80	50
Pasture	0	48 to 80	0

IV. Dark colored bottom land soils often poorly drained:

Corn	[1]0	32	10
Small grain	[1]0	32	10
Annual legumes	0	32	10
Grass or grass and clover mixed	[1]0	32	10
Pasture	0	48 to 80	0

Coastal Plain

I. Sandy loams, silt loams, clay loams, and loams:

	Pounds per acre		
	Nitrogen	Phos. Acid	Potash
Corn	[1]16	32	16
Small grains	[1]16	32	16
Perennial legumes	8	32	24
Annual legumes	0	32	16
Grass or grass and clover mixed	[1]16	32	16
Tobacco—Bright	30 to 40	80	60
Sun-cured	40	80	60
Cotton	[1]24	48	36
Peanuts	8	32	16
Pasture	0	48 to 80	12 to 20

II. Sands, loamy sands, and sand hills:

Corn	[1]20	40	20
Small grains	[1]20	40	20
Perennial legumes	20	40	20
Annual legumes	0	40	20
Grass or grass and clover mixed	[1]20	40	20
Tobacco—Bright	40	80	60
Cotton	[1]24	48	36
Peanuts	8	32	24

III. Peats and mucks:

Corn	16	24	24
Annual legumes	0	16	20
Oats and rye	16	24	24

Limestone Valleys and Uplands

I. Upland soils from limestones:

	Pounds per acre		
	Nitrogen	Phos. Acid	Potash
Corn	[2]8 to 12	32	8
Small grain	[2]8 to 12	32	8
Perennial legume	8	48	16
Annual legumes	0	32	8
Grass or grass and clover mixed	[2]8 to 12	32	8
Tobacco—Burley	32	80	32
Pasture	0	48 to 80	0

II. Upland soils from sandstone and shales:

Corn	[2]8 to 12	32	10
Small grains	[2]8 to 12	32	10
Perennial legumes	8	48	20
Annual legumes	0	32	10
Grass or grass and clover mixed	[2]8 to 12	32	10
Pasture	0	48 to 80	0

III. Bottom land soils:

Corn	8 to 12	32	10
Small grains	8 to 12	32	10
Perennial legumes	8	48	20
Annual legumes	0	32	10
Grass or grass and clover mixed	[2]8 to 12	32	10
Pasture	0	48 to 80	0

[1] Sixteen to 20 pounds mineral nitrogen as side or topdressing.
[2] Fifteen to 25 pounds of mineral nitrogen mixed with an equal amount of superphosphate for topdressing old stands.

Where more than 15 pounds of nitrogen is recommended, one-third should be from organic sources.

Note.—Where 6 tons of manure or more is used all nitrogen and potash at seeding time may be dispensed with.

Lime should be used frequently enough to assure clover in the rotation.

Crops should be grown in rotation in order to obtain the full benefit of the fertilizer.

When a good crop of legumes of any kind is turned under the nitrogen may be dispensed with.

Nitrogen seems to pay on pasture sods under conditions of intensive grazing.

HOME MIXING OF FERTILIZERS

1. Field experiments do not show a regular increased yield of crops for home-mixed fertilizers over factory-mixed goods carrying the same amount of plant food.

2. Home mixing is recommended: (a) where money can be saved by mixing at home; (b) when a fertilizer is desired which contains plant food in different proportions than can be bought in factory-mixed goods; (c) when it is desirable to have in a fertilizer sources of plant foods of known difference in degree of availability.

Example.—In bright tobacco fertilizers it is desirable that the nitrogen be obtained from at least two sources, one of these being a quickly available inorganic fertilizer, such as nitrate of soda, and the other a more slowly available organic fertilizer, such as blood, tankage, or cotton seed meal.

Table for Computing Fertilizer Formulas from Materials of Known Composition

Per cent in material	Per cent desired												
	½	1	2	3	4	5	6	7	8	9	10	11	12
2	500	1000	2000										
3	333	667	1334	2000									
4	250	500	1000	1500	2000								
5	200	400	800	1200	1600	2000							
6	167	333	667	1000	1333	1667	2000						
7	143	286	572	858	1144	1430	1716	2000					
8	125	250	500	750	1000	1250	1500	1750	2000				
9	111	222	444	667	889	1111	1334	1556	1778	2000			
10	100	200	400	600	800	1000	1200	1400	1600	1800	2000		
11	91	182	364	546	728	910	1092	1274	1456	1638	1820	2000	
12	83	166	333	500	667	833	1000	1167	1334	1500	1666	1833	2000
13	77	154	308	462	616	769	924	1077	1232	1384	1538	1692	1845
14	71	143	286	430	570	715	860	1000	1143	1286	1430	1570	1715
15	67	133	267	400	533	667	800	933	1067	1200	1333	1467	1600
16	62	125	250	375	500	625	750	875	1000	1125	1250	1375	1500
17	59	118	235	353	470	588	706	824	940	1059	1176	1294	1410
18	55	111	222	333	444	556	667	778	889	1000	1111	1222	1333
19	53	105	210	316	421	526	631	737	842	947	1053	1158	1263
20	50	100	200	300	400	500	600	700	800	900	1000	1100	1200
21	48	95	190	285	381	476	571	667	762	857	952	1047	1142
22	46	91	182	273	364	455	546	636	727	818	909	1000	1091
23	43	87	174	261	348	435	522	609	696	783	870	957	1044
24	42	83	166	249	332	422	500	583	666	749	835	917	1000
25	40	80	160	240	320	400	480	560	640	720	800	880	960
47	22	43	86	127	170	212	253	298	340	383	425	468	511
48	21	42	84	125	168	208	250	294	336	375	417	458	500
50	20	40	80	120	160	200	240	280	320	360	400	440	480

In using this table one looks in the first vertical column for the figures representing the percentage content of the material used and in the first horizontal column for the percentage wanted, then reads down to the point where the two lines converge and the figure there given will represent the amount of the material to use in making a ton of the mixture wanted.

Example.—Wanted, a mixture containing 3 per cent nitrogen, 8 per cent phosphoric acid, and 3 per cent potash. The following materials are to be used: 16 per cent superphosphate, 16 per cent nitrate of soda, and 50 per cent muriate of potash.

Proceed thus: As the nitrate contains 16 per cent, find 16 on the vertical column and follow across to column headed 3 and the number 365 at their intersection is the weight of nitrate of soda required. In a like manner for phosphoric acid, follow line 16 to column 8 and 1000 is the weight of superphosphate required. For the potash, follow line 50 to column 3 and 120 is the weight of muriate of potash required. We thus have

375	pounds nitrate of soda
1000	pounds superphosphate
120	pounds muriate of potash
1495	
505	pounds filler
2000	pounds, or one ton of 3-8-3 fertilizer.

The filler may be sand or any other waste material, and is put in to bring the weight to a ton.

AMOUNT OF PLANT FOOD REMOVED FROM THE SOIL BY CROPS

Crops	Yield per acre	Nitrogen, lbs. per acre	Phosphoric acid, lbs. per acre	Potash, lbs. per acre
Alfalfa, Hay	2 tons	92.00	21.20	58.40
Barley	25 bus.	36.20	14.67	23.30
Buckwheat	15 bus.	26.50	10.50	20.00
Clover Hay	2 tons	84.80	22.00	74.80
Corn	30 bus.	43.00	18.00	26.30
Cowpea Hay	1½ tons	58.50	15.60	44.10
Meadow Hay	1½ tons	49.00	12.30	50.30
Oats	30 bus.	36.70	12.94	30.80
Rye	15 bus.	24.50	13.00	21.00
Soybean, Hay	1½ tons	69.60	20.10	32.40
Tobacco	800 lbs.	38.00	8.00	100.00
Wheat	15 bus.	24.00	10.55	14.40
Potatoes	100 bus.	23.50	10.75	38.25

AMOUNT OF MANURE PRODUCED BY STOCK

The various classes of farm animals will produce about the following quantities of solid and liquid manure during a year, viz.:

	Solid manure	Liquid manure
Horse	12,000 lbs.	3,000 lbs.
Cow	20,000 lbs.	9,000 lbs.
Sheep	700 lbs.	350 lbs.
Pig	1,800 lbs.	1,200 lbs.
Poultry (1,000 lbs. live wt.)	8,600 lbs.	

COMPOSITION OF MANURE

Animal	Water	Nitrogen	Phosphoric acid	Potash
	Per cent	*Per cent*	*Per cent*	*Per cent*
Sheep	59.52	.77	.39	.59
Calves	77.73	.59	.17	.53
Pigs	74.13	.84	.39	.32
Cows	75.25	.43	.29	.44
Horses	48.69	.49	.26	.48
Poultry	57.0	1.31	.40	.54

CARE OF MANURE

Manure should be handled so as to prevent leaching. This is a simple matter; all that is necessary is to keep it under a shed so that rain cannot fall on it; or preserve it in a concrete pit so that anything that is washed out will be caught in the bottom of the pit. One of the best ways to preserve manure is to allow it to accumulate in the barn, adding enough bedding each day to keep the animals dry and clean. The packing by the animals prevents leaching and the liquids are absorbed by the bedding.

Where manure has to be removed daily for sanitary purposes, as in dairy barns, haul to the field immediately or store in a concrete pit.

TREATMENT OF SMUTS IN SMALL GRAINS

Crop	Kind of smut	Seed treatment
Wheat	Stinking	Powdered copper carbonate dusted over the surface of the grain at the rate of two ounces per bushel. A barrel churn or similar receptacle may be used in the dusting operation. Grain may be sown immediately after treatment or stored indefinitely.
	Loose smut	Soak grain in cold water for four hours, next temper in water held at 120° F. for one minute, then treat in water held at 129° F. for ten minutes. Spread grain on granary floor in thin layer to dry. If grain is not thoroughly dry at time of seeding, set drill to allow for swelling.
Barley	Covered and loose smut usually occur together in most fields	Ceresan or other chemical mercury dusts used in the same manner and proportions as copper carbonate for stinking smut prevention, will control covered smuts for all varieties, and both covered and loose smuts of the varieties Tennessee Winter and Arlington Awnless.
Oats	Covered and loose smut usually occur together in most fields	Use Ceresan or Smuttox in the same manner as recommended for barley.

References.—Virginia Extension Circular E-210.
Circulars, Extension Division — The Control of Stinking Smut of Wheat, and The Control of Barley and Oat Smuts.
U. S. D. A. Farmers' Bulletin 939.

TREATMENT OF TOBACCO SEED FOR WILDFIRE AND BLACKFIRE

Directions.—Make a 1 to 1000 solution of bichloride of mercury (poison) by dissolving the bichloride tablets in water. Ask any druggist for the right size tablets. Make solution up in a glass or stone vessel. Pour seed in and let soak for exactly 15 minutes. Remove seed and wash well in clean water, then let dry at ordinary room temperature.

Precautions.—(1) Put plant bed in fresh place each year. (2) If old canvas is used, boil it for one hour before putting it on. (3) Do not put tobacco back on the same land more often than once in three years if there is disease in the crop. (4) Do not use tobacco stalks or refuse on tobacco land or plant beds.

References.—Virginia Extension Bulletin 90.
Virginia Experiment Station Bulletin 228.

A TREATMENT OF SEED POTATOES FOR SCAB

1. Dissolve 4 ounces of bichloride of mercury (corrosive sublimate) in 5 gallons of hot water, then add enough water to bring the total up to 30 gallons.

2. Place the seed in the solution and allow to remain for 1½ hours, then remove and allow to dry after which they may be cut and planted.

3. In preparing the solution and treating the seed, only glass, stone, or wooden vessels should be used.

4. Seed treatment alone will not control scab if the land is infected. When the land is infected the potato crop should be kept off it for 4 or 5 years.

Precautions.—Bichloride of mercury is a deadly poison. Potatoes cannot be used for eating after being treated.

References.—Virginia Experiment Station Bulletin 217.

CONTROL OF WEEVIL IN GRAIN

1. Thresh small grain early and store in a deep bin.

2. Thoroughly clean out the corn crib by May 1st. Treat the corn kept after this with carbon bisulphide.

Carbon Bisulphide Treatment:

1. Use 1 pound of the liquid for each 20 bushels of grain. It may be bought at any drug store.

2. Place the grain in a close bin, box, or barrel; then pour the liquid on the surface and cover with old bags, paper, or anything. Or the liquid may be placed on the top of the grain in shallow containers such as pie plates.

3. After 24 hours remove the covering and allow to air.

Precautions.—Carbon bisulphide is very inflammable. No sparks, open lights, or fire of any kind should be allowed near the substance or the treated grain until the fumes have disappeared.

Moth balls or tobacco scattered through seed corn or other seed will keep "weevil" away. Moth balls will render any grain unfit for eating.

References.—U. S. D. A. Farmers' Bulletins 1029, 1270, and 1275.

CONTROL OF THE MEXICAN BEAN BEETLE

There are a number of treatments. An effective and simple one is: 2 pounds of magnesium arsenate in 100 gallons of water; or in smaller quantities, 1 ounce (5 level tablespoonfuls) of magnesium arsenate in 3 gallons of water. The spray must reach the under side of the leaves.

The application should be made when the beetles first appear and be repeated at intervals of a week or ten days, depending on the weather. Failure to apply the material before the young insects hatch and begin to spread will usually result in the loss of the crop.

References.—U. S. D. A. Farmers' Bulletins 1497 and 1407.

POISON FOR TOBACCO WORMS

When tobacco is small, an application of 3½ pounds of arsenate of lead per acre will be efficient. Full grown tobacco should receive not less than 5 pounds per acre. The arsenate of lead should be mixed with equal parts of wood ashes and dusted on the tobacco while the dew is still on. It is recommended that a dust gun with a fan at least 8 inches in diameter should be used so as to give a good distribution.

WEEDS

A few of the most common and troublesome weeds in Virginia are discussed briefly below. For a more complete discussion of these and other weeds see references.

BERMUDA GRASS
(*Capriola dactylon*)

Description.—A perennial mat grass spreading by long surface-creeping stems and underground root-stocks. Often called wire grass. A ring of white hairs at base of each leaf blade and underground roots distinguishes it from crab grass. Stalks short and crowned by a cluster of 3 to 5 fingers arranged like rays of an umbrella and originating at same point. Stems flattened. Considered a pest in cultivated crops. A good grass in pastures and lawns.

Control.—Root-stocks killed by exposure to severe winter cold and it cannot stand shading. With these things in mind one method of controlling is to plow the land shallow late in fall and follow with a shading crop such as soybeans. The soybeans should be followed by small grain and this by a clover crop.

References.—U. S. D. A. Farmers' Bulletins 1254 and 1125.

BROOM SEDGE
(*Andropogon virginicus*)

Description.—A coarse, bunched perennial growing to a height of 3 to 5 feet. Spreads by light seed carried far by the wind. Seeding time, August to October.

Distribution.—A bother chiefly in meadows and pastures.

Control.—Cut in late July or early August. If thick on land, put in cultivated crop then in clover and grass mixture. Improve the fertility of the soil with lime, legumes, and fertilizer.

References.—U. S. D. A. Farmers' Bulletin 660.
U. S. D. A. Bulletin 461.

CHESS OR CHEAT
(*Bromus secalinus*)

Description.—An annual or winter annual which spreads by seed carried mostly in small grain. Seeds from June to August. Looks like oats when young. Grows from 2 to 3 feet tall. A heavy seeder and the seed when buried in soil retain vitality for years, accounting for belief that oats turn to cheat.

Distribution.—In small grain, especially oats.

Control.—Sow clean seed. Mow before seed mature. Seed will float on water and may be separated from wheat by putting them in water and skimming off the floating seed. Sowing oats in the spring will clean out most of the cheat seed.

References.—U. S. D. A. Farmers' Bulletins 1119 and 1433.

CHICKWEED
(*Alsine media*)

Description.—Other names are starweed, winterweed, birdweed. A heavy seeding annual which blooms and seeds the whole year. Begins to show prominently in late winter and continues prominent until May. A slender, many-branched, creeping, viney, pale green plant which often forms a tangled mat. Seed carried by animals and in clover and grass seed.

Distribution.—Gardens, lawns, meadows, and winter growing crops.

Control.—In gardens, constant hoeing and hand-weeding. In lawns, or

with such crops as peas, strawberries and grain, spraying in the early spring with a saturated solution of copperas (iron sulphate). The spraying has to be repeated.

Reference.—U. S. D. A. Farmers' Bulletin 1250.

CRABGRASS

(Syntherisma sanguinale)

Description.—Sometimes called finger grass. An annual which spreads by seed and by rooting at the lower joints. Matures seed from August to October. The seed will remain alive in the ground for years. Seed head consists of 3 to 6, and sometimes as many as 10 fingers, several inches long and generally purplish or reddish-brown, arranged in a whorl like the fingers of the hand. Seed carried by animals, in hay, and in clover and grass seed.

Distribution.—Cultivated crops, gardens, and lawns.

Control.—Clip or pull to prevent seeding. In cultivated crops use hand labor and burn the parts.

References.—U. S. D. A. Farmers' Bulletins 1125 and 1240.

OX-EYE DAISY

(Chrysanthemum leucanthemum)

Description.—A perennial which spreads by seed. The seed are carried in hay, grass and clover seed, and by animals. Blooms from May to October and seeds from June to November. Each stalk bears a single bloom with a yellow center about ½ inch in diameter, from which radiate 20 to 30 pure white rays.

Distribution.—Meadows, pastures, and waste places.

Control.—Cut often enough to prevent seeding. Work land in cultivated crops for several years.

Reference.—U. S. D. A. Farmers' Bulletin 660.

DODDER

(Cuscuta arvensis)

Description.—Other names are love vine, strangle weed. An annual which spreads by seed. The seed are carried in grass and clover seed and will live in the ground from 2 to 7 years. A rather pretty, delicate, yellow vine, growing as a parasite usually on the clovers or alfalfa. Seeds from July to October.

Distribution.—Usually in clover and alfalfa.

Control.—Sow clean seed. Cut out and burn before any seed mature.

References.—U. S. D. A. Farmers' Bulletins 1161 and 1283.

HAWKWEED

(Hieracium aurantiacum)

Description.—Sometimes called devil's paintbrush. A small perennial plant, 1 to 2 feet tall and unbranched, erect and covered with short black hairs. Stems without leaves, except an occasional bract. Leaves clustered around the base. Cluster of showy yellow flowers at top of stem. Only a few of the flowers open at one time. Spreads by seeds and runners as with strawberries. Forms a dense mat which smothers other grasses.

Distribution.—Most troublesome in pasture land. Not hard to control in cultivated crops.

Control.—An application of dry salt thick enough to cover the plants thinly will kill it, but the grass does not recover from the salt for about six months.

Reference.—Annual Report Virginia Experiment Station 1917-18.

JOHNSON GRASS

(Holcus halepensis)

See Part I of bulletin.

Control same as for quack grass.

References.—U. S. D. A. Farmers' Bulletins 1476 and 1148.

MORNING-GLORY

(Ipomoea hederacea)

Description.—An annual purple, white, or pink flowered vine resembling the sweet potato vine. Spreads by seed which remain alive in the soil from one year to another. Scattered in corn stover and such seed as soybeans.

Distribution.—Gives most trouble in cultivated crops such as gardens, corn, etc.

Control.—Chop out the crop with hoe before the morning-glory begins to run. Prevent seeding.

NUTGRASS

(Cyperus rotundus)

Description.—Also known as coco. A perennial spreading by seed and tuber-bearing root-stocks. Slender, smooth, three-sided stem 6 to 18 inches tall, and leafless, except for 3 or 4 bracts at the seed head. Several rays 2 to 3 inches long to the seed head, each of which in turn has from 4 to 9 short spikes bearing seed. Produces seed from August to November.

Distribution.—Troublesome in cultivated crops. The small tubers often shipped clinging to garden plants and nursery stock; and the seed are common in grass and clover seed and baled hay.

Control.—Prevent seed from maturing. Hoe-cut the plants and follow with a winter crop to be grazed and turned under. Plowing without cutting it with a hoe will not control.

PLANTAIN

(Plantago lanceolata)

Description.—Also called buckhorn, ripple, etc. A perennial which spreads by seed. Matures seed from May to November. A cluster of leaves at base from which arises a slender, strong, five-grooved, hairy stem, topped by a seed head the shape of a pistol ball. Stem 6 to 15 inches tall. So familiar a description is hardly necessary.

Distribution.—Pastures, meadows, and lawns. Carried in hay, and grass and clover seed.

Control.—Sow clean seed. Cut out of lawns with spud. Badly infested meadows should be plowed under and put to a cultivated crop before reseeding.

QUACK-GRASS

(Agropyron repens)

Description.—Also known as couch-grass, witch-grass, wheat-grass, etc. A perennial spreading by seed and creeping jointed root-stock. To the casual observer it looks like any grass until it heads and then has appearance of

a thin-headed variety of wheat. Closely resembles perennial rye-grass. May be identified by seed heads, claws at base of leaf encircling the stem, sharp leaves with curious constriction near tip, mass of underground root-stocks, and its bristly-looking appearance when growing in bunches.

Distribution.—All crops on the better soils, hoed crops and waste places. Likes cool moist climate and is found more largely farther north that Virginia.

Control.—A bad pest and almost impossible to eradicate in wet weather or early spring. Cannot be entirely controlled by cultivation, but if plowed in hot, dry weather in mid-summer, clean cultivated until winter, then followed with a smother crop, it will be reduced. Spray with solution of calcium chlorate (1½ pounds per gallon of water), just before the bloom stage. Apply enough spray to thoroughly wet all the above-ground vegetation. Repeat when new growth begins. Usually requires two to three applications.

References.—U. S. D. A. Farmers' Bulletin 1307.
U. S. D. A. Bulletin 461.

SHEEP SORREL
(Rumex acetosella)

Description.—Also called sour weed, sour grass, field sorrel, etc. A perennial plant which spreads by seeds and underground root-stocks. Single stems 3 inches to a foot in length rising from a cluster of leaves at base. Seed head gives a reddish cast to the field. Leaves have a rather pleasant acid taste.

Distribution.—Often comes in alsike clover seed. Found in meadows and pastures.

Control.—Cultivate and enrich the ground and correct the acid condition by the use of lime.

CANADA THISTLE
(Cirsium arvense)

Description.—Also called creeping thistle, small-flowered thistle, etc. A perennial spreading by seed and long, white, underground root-stocks which send up new plants at intervals. These underground roots lie deep in the ground and sometimes attain a length of 15 or 20 feet. Slender, erect, grooved, woody, nearly smooth stems from 1 to 4 feet tall; a cluster of flowers at the top of the stalk, the topmost ones opening first. Differs from other thistles in that it is the only one having running underground roots, and is found in patches rather than single scattered plants.

Distribution.—Of most trouble in meadows, pastures, and waste places.

Control.—Very difficult to control on account of its spreading underground roots. Constant and continued chopping from June to September, the time it blooms and seeds, will finally kill it. Spreads in hay and straw, clover and grass seed, and by its creeping roots. Spray with solution of calcium chlorate (1½ pounds per gallon of water) just before the bloom stage. Apply enough spray to thoroughly wet all the above-ground vegetation. Repeat when new growth begins. Usually requires two to three applications.

WILD ONION
(Allium vineale)

Description.—Sometimes called garlic. So common and well known a description is unnecessary. A perennial spreading by underground bulbs, and

by bulblets (seed) produced at the head of the stem, and carried in small grain seed.

Distribution.—Most trouble in small grain fields, meadows, and pastures.

Control.—Plow land deep in late fall when plants are a foot high, turning tops and all under completely and deep. After thorough preparation in spring, plant to a cultivated crop like corn in check rows. Keep the crop clean. Repeat until the wild onions are destroyed. Other means of controlling may be more practical under certain conditions.

References.—U. S. D. A. Farmers' Bulletins 1410 and 1125.

General References.—Books: "Manual of Weeds," by Ada Georgia. Published by the Macmillan Company, New York.

CHEMICAL WEED CONTROL

Many chemicals have been tried in the eradication and control of troublesome weeds which are difficult to eradicate by cultivation. Of those tested, sodium chlorate and calcium chlorate have proven of most value.

Sodium chlorate in combination with organic matter is highly inflammable, ignites easily, and burns with explosive rapidity. For this reason it is dangerous to handle. When using this material care must be taken to avoid fire. Never allow it to dry on clothing; wash immediately.

Utensils should be thoroughly washed both inside and outside when the job is completed. Avoid dropping any material in the buildings.

Calcium chlorate eliminates the fire hazard by absorbing moisture from the atmosphere.

These materials are very useful in eradicating patches of perennial weeds, such as quack grass, Canada thistle, Bermuda grass, etc.

Dissolve 1 pound of sodium chlorate or 1½ pounds of calcium chlorate per gallon of water and apply as a spray, just before the bloom stage. Apply enough spray to thoroughly moisten all vegetation. Repeat the treatment when new growth appears. It usually requires two to three sprayings.

Do not disturb the area by cultivation before treating. The treated area should be left undisturbed during the killing process. Disturbing the area in any way lessens the effectiveness of the chemical.

COMMON WEIGHTS AND MEASURES

Avoirdupois Weight

27 11/32 grains = 1 dram
16 drams = 1 ounce
16 ounces = 1 pound
2,000 lbs. = 1 short ton
2,240 lbs. = 1 long ton

Dry Measure

2 pints = 1 quart
8 quarts = 1 peck
4 pecks = 1 bushel
36 bushels = 1 chaldron

Liquid Measure

4 gills = 1 pint
2 pints = 1 quart
4 quarts = 1 gallon
31½ gallons = 1 barrel
2 barrels = 1 hogshead
1 teaspoonful = 1/6 ounce
1 tablespoonful = ½ ounce
16 fluid ounces = 1 pint

Circular Measure

60 seconds = 1 minute
60 minutes = 1 degree
360 degrees = 1 circle

Long Measure

12 inches = 1 foot
3 feet = 1 yard
5½ yards = 1 rod
5,280 feet = 1 statute mile
320 rods = 1 statute mile

Square Measure

144 square inches = 1 square foot
9 square feet = 1 square yard
40¼ square yards = 1 square rod
43,560 square feet = 1 acre
40 square rods = 1 rood
4 roods = 1 acre
640 acres = 1 square mile

CAPACITY OF SILOS

Approximate capacity of cylindrical silos for well-matured corn silage in tons.

Depth of silo, in feet	Inside diameter of silo, in feet					
	10	12	14	16	18	20
20	26	38	51	67	85	105
24	34	49	66	87	110	135
28	42	61	83	108	136	169
30	47	67	92	119	151	186
32	51	74	100	131	166	205
34	56	80	109	143	181	224
36	--	87	119	155	196	242
38	--	94	128	169	213	261
40	--	101	138	180	229	282
44	--	---	172	208	264	325
48	--	---	---	---	299	368

MEASURING HAY

South Dakota Method

Rick Stack:

Obtain the number of cubic feet by substracting the width from the overthrow, dividing the result by 2, multiplying this result by the width and this product by the length.

(The overthrow is the distance in linear feet and inches from the ground on one side of the stack, directly over and opposite to the ground on the other side of the stack.)

Round Stack:

Obtain the number of cubic feet by multiplying the circumference (taken at base of stack) by itself and the product of the height, and divide by 25.

Nature of hay	Cubic feet of hay in a ton	
	Settled 30 to 60 days	Settled more than 60 days
Clean alfalfa	512	422
Clean timothy and clover	512	422
Clean native blue, joint, alkali or salt grass or wheat grass or mixed	422	343

Hay In Mow

Multiply the length by height by width in yards and divide by 15, if hay is well packed. If hay is shallow or rather loose in mow, divide by 18. These figures should vary from 15 to 18, depending on the packing. Quotient will be approximate number of tons.

Quartermaster Method

Add the width of the stack to the overthrow, divide by 4, multiply the result obtained by itself and the product of the length, which gives the number of cubic feet in the stack.

Straw—1,000 cu. ft. = 1 ton.

DETERMINING CAPACITIES OF BINS, CRIBS, ETC., IN BUSHELS OF PRODUCTS

Compute cubic feet by multiplying length by width by height for square or oblong bins, or 3.1416 by radius squared by height for cylindrical bins.

Multiply by 4 and divide by 5 to find number of bushels. If corn is in the ear, deduct one-half from the result.

NUMBER OF PLANTS TO AN ACRE

Distance apart	No. of plants	Distance apart	No. of plants	Distance apart	No. of plants
3 x 3 in.	696,960	4 x 4 ft.	2,722	13 x 13 ft.	257
4 x 4 in.	392,040	4½ x 4½ ft.	2,151	14 x 14 ft.	222
6 x 6 in.	174,240	5 x 1 ft.	8,712	15 x 15 ft.	193
9 x 9 in.	77,440	5 x 2 ft.	4,356	16 x 16 ft.	170
1 x 1 ft.	43,560	5 x 3 ft.	2,904	16½ x 16½ ft.	160
1½ x 1½ ft.	19,360	5 x 4 ft.	2,178	17 x 17 ft.	150
2 x 1 ft.	21,780	5 x 5 ft.	1,742	18 x 18 ft.	134
2 x 2 ft.	10,890	5½ x 5½ ft.	1,417	19 x 19 ft.	120
2½ x 2½ ft.	6,960	6 x 6 ft.	1,210	20 x 20 ft.	108
3 x 1 ft.	14,520	6½ x 6½ ft.	1,031	25 x 25 ft.	69
3 x 2 ft.	7,260	7 x 7 ft.	881	30 x 30 ft.	48
3 x 3 ft.	4,840	8 x 8 ft.	680	33 x 33 ft.	40
3½ x 3½ ft.	3,555	9 x 9 ft.	537	40 x 40 ft.	27
4 x 1 ft.	10,890	10 x 10 ft.	435	50 x 50 ft.	17
4 x 2 ft.	5,445	11 x 11 ft.	360	60 x 60 ft.	12
4 x 3 ft.	3,630	12 x 12 ft.	302	66 x 66 ft.	9

ACREAGE, YIELD, PRODUCTION, AND VALUE OF IMPORTANT CROPS

Oats

Year	Acreage	Yield	Production	Value
1926	198,000	26.0	4,536,000 bus.	$3,047,000
1927	186,000	21.5	3,999,000 bus.	2,559,000
1928	182,000	25.5	4,641,000 bus.	2,970,000
1929	167,000	23.0	3,841,000 bus.	2,573,000
1930	200,000	26.0	5,200,000 bus.	2,260,000

Barley

Year	Acreage	Yield	Production	Value
1926	14,000	31.0	434,000 bus.	$391,000
1927	12,000	24.0	288,000 bus.	294,000
1928	14,000	29.0	406,000 bus.	345,000
1929	18,000	28.0	504,000 bus.	398,000
1930	24,000	25.0	600,000 bus.	522,000

Buckwheat

Year	Acreage	Yield	Production	Value
1926	16,000	22.0	352,000 bus.	$334,000
1927	14,000	21.0	294,000 bus.	273,000
1928	17,000	19.2	326,400 bus.	310,000
1929	15,000	19.5	292,500 bus.	290,000
1930	15,000	12.8	192,000 bus.	168,000

White Potatoes

Year	Acreage	Yield	Production	Value
1926	124,000	94	11,656,000 bus.	$16,318,000
1927	130,000	152	19,760,000 bus.	25,688,000
1928	151,000	143	21,618,000 bus.	10,809,000
1929	128,000	134	17,184,000 bus.	21,419,000
1930	143,000	102	14,582,000 bus.	15,312,000

Sweet Potatoes

Year	Acreage	Yield	Production	Value
1926	43,000	125	5,375,000 bus.	$5,375,000
1927	43,000	135	5,805,000 bus.	4,934,000
1928	44,000	144	6,336,000 bus.	4,435,000
1929	45,000	149	6,705,000 bus.	6,034,000
1930	47,000	80	3,760,000 bus.	2,760,000

Hay (Tame)

Year	Acreage	Yield (tons)	Production	Value
1926	979,000	1.01	992,000 tons	$19,344,000
1927	1,077,000	1.37	1,472,000 tons	25,552,000
1928	1,063,000	1.37	1,451,000 tons	22,200,000
1929	1,037,000	1.32	1,372,000 tons	21,292,000
1930	959,000	.62	596,000 tons	13,350,000

Rye

Year	Acreage	Yield	Production	Value
1926	43,000	13.5	580,000 bus.	$650,000
1927	42,000	11.8	496,000 bus.	570,000
1928	46,000	13.5	621,000 bus.	745,000
1929	53,000	11.8	625,000 bus.	700,000
1930	56,000	13.0	650,000 bus.	748,000

Wheat

Year	Acreage	Yield	Production	Value
1926	697,000	16.5	11,236,000 bus.	$14,850,000
1927	697,000	12.2	8,381,000 bus.	11,042,000
1928	673,000	14.5	9,758,000 bus.	15,173,000
1929	706,000	12.8	9,960,000 bus.	11,200,000
1930	644,000	15.5	9,982,000 bus.	9,683,000

Corn

Year	Acreage	Yield	Production	Value
1926	1,694,000	27.5	46,585,000 bus.	$39,597,000
1927	1,628,000	28.5	47,967,000 bus.	44,130,000
1928	1,626,000	27.5	44,715,000 bus.	44,715,000
1929	1,522,000	29.0	44,138,000 bus.	44,138,000
1930	1,568,000	11.5	18,032,000 bus.	18,934,000

Cotton

Year	Acreage	Yield (lbs.)	Production	Value
1926	93,000	264	51,000 bales	$3,927,000
1927	64,000	230	31,000 bales	2,170,000
1928	79,000	265	44,000 bales	4,004,000
1929	88,000	258	48,000 bales	4,080,000
1930	88,000	228	42,000 bales	2,016,000

Peanuts

Year	Acreage	Yield (lbs.)	Production	Value
1926	138,000	990	136,620,000 lbs.	$5,875,000
1927	152,000	810	123,120,000 lbs.	5,686,000
1928	152,000	929	141,054,000 lbs.	6,904,000
1929	160,000	913	146,080,000 lbs.	4,840,000
1930	147,000	665	97,755,000 lbs.	2,051,000

Tobacco

Year	Acreage	Yield (lbs.)	Production	Value
1926	196,000	725	137,025,000 lbs.	$24,076,000
1927	177,000	723	127,971,000 lbs.	22,928,000
1928	180,000	580	104,864,000 lbs.	16,778,000
1929	168,500	650	109,500,000 lbs.	19,162,000
1930	183,000	581	106,500,000 lbs.	9,163,000

Soybeans (Total production for beans)

Year	Acreage	Yield	Production	Value
1926	26,000	14	364,000 bus.	$462,000
1927	23,000	14	322,000 bus.	644,000
1928	21,000	13	273,000 bus.	546,000
1929	20,000	9.0	180,000 bus.	441,000
1930	20,000	7.5	150,000 bus.	360,000

FROST DATA FOR VIRGINIA

Station and County	No. of years' record	Average date of last killing frost in spring	Average date of first killing frost in autumn	Average length of growing season (days)	Latest date of killing frost in spring	Earliest date of killing frost in autumn
Alexandria, *Arlington*	11	Apr. 6	Oct. 23	199	Apr. 29	Oct. 9
Arcola, *Loudoun*	6	Apr. 14	Oct. 14	193	Apr. 27	Oct. 7
Blacksburg, *Montgomery*	29	Apr. 29	Oct. 7	160	May 29	Sept. 14
Bedford, *Bedford*	12	Apr. 9	Oct. 26	200	Apr. 24	Oct. 1
Birdsnest, *Northampton*	9	Mar. 29	Nov. 13	229	Apr. 30	Nov. 9
Bristol, *Washington*	14	Apr. 20	Oct. 17	180	May 14	Sept. 30
Burke's Garden, *Tazewell*	25	May 8	Oct. 3	148	June 9	Sept. 14
Cape Henry, *Princess Anne*	43	Mar. 22	Nov. 6	245	Apr. 6	Nov. 2
Charlottesville, *Albemarle*	27	Apr. 7	Oct. 29	208	Apr. 24	Oct. 9
Danville, *Pittsylvania*	5	Apr. 11	Oct. 11	195	Apr. 28	Oct. 11
Diamond Springs, *Princess Anne*	12	Apr. 5	Nov. 8	216	Apr. 26	Oct. 30
Farmville, *Prince Edward*	10	Apr. 16	Oct. 24	191	May 12	Oct. 13
Fredericksburg, *Spotsylvania*	27	Apr. 12	Oct. 23	193	May 11	Oct. 2
Hot Springs, *Bath*	28	May 1	Oct. 10	159	May 29	Sept. 13
Lexington, *Rockbridge*	28	Apr. 22	Oct. 15	176	May 22	Sept. 29
Lynchburg, *Campbell*	45	Apr. 28	Oct. 27	201	May 17	Oct. 2
Marion, *Smyth*	18	Apr. 25	Oct. 10	167	May 15	Sept. 16
Norfolk, *Norfolk*	48	Mar. 21	Nov. 17	237	Apr. 21	Oct. 15
Richmond, *Henrico*	23	Apr. 5	Oct. 29	208	Apr. 26	Oct. 2
Rocky Mount, *Franklin*	24	Apr. 15	Oct. 19	191	May 15	Oct. 1
Roanoke, *Roanoke*	13	Apr. 16	Oct. 22	192	Apr. 25	Oct. 7
Staunton, *Augusta*	29	Apr. 24	Oct. 17	175	May 22	Sept. 22
Warsaw, *Richmond*	27	Apr. 11	Oct. 25	196	May 11	Oct. 2
Williamsburg, *James City*	30	Apr. 9	Oct. 9	204	May 11	Oct. 13
Winchester, *Frederick*	9	Apr. 12	Oct. 12	199	Apr. 25	Oct. 7

Exhibit O.

Blacksburg, Virginia.
Nov. 10, 1932

Mr. T. T. Curtis,
Orange, Virginia.

Dear Mr. Curtis:

I understand that you are to hold a meeting of your advisory board on the 14th at which time their plan of work for the coming year will be developed. I hope they will see fit to continue some phase of the clover project, which you will of course, understand includes all legumes. I hope too that they will see fit to do some work on pasture improvement and good seed.

I realize that there is a considerable acreage of clover and other legumes produced in Orange county. However, I am confident that the growth of more biennial and perennial legumes are necessaryfor the best interests of the county. I also know that if the acreage is to be materially increased that you and your board will have to continue to stress their importance.

With as many dairymen as you have in the county I feel sure that more sweet clover or sweet clover and orchard grass could be used to advantage, as early spring and late fall pasture. For most economical milk production I also feel that many of your dairymen could afford to improve some of their pastures.

I realize that such projects do not show results as quickly as some others, however, I know they are basic in such a county as yours; therefore, I trust that some phase of them will be adopted in their program.

Please do not feel that I am trying to direct the activities in your county. I am simply calling your attention to the importance of them and offering you the assistance of the agronomy department in carrying them out, if we can be of service to you.

Should any phase of agronomy work be included in the plan for Orange county with which you desire our help, I will appreciate your advising us as early as convenient in order that we may include your request in our plan of work for 1933.

Sincerely yours,

W. H. Byrne
Extension Agronomist, VPI

WHB/hw

Exhibit P.

Blacksburg, Virginia.
Nov. 11, 1932

Mr. W. A. Alexander,
Rocky Mount, Virginia.

Dear Mr. Alexander:

I understand that you are having your committee meeting on Nov. 17 to make your annual plan of work. At this time I wish to urge you to continue your soil improvement program on a long time basis. We realize that this project is a long time one and does not show as quick results as many other projects. However, we feel more keenly than ever the necessity of such work. I believe you should continue along the same lines which you have started in Franklin - that is placing much emphasis on soil erosion and building up soil fertility. I would like to urge you to continue the alfalfa, clover and pasture projects which you have going in your livestock section, and the lespedeza projects on the less fertile type land. I also believe that you should consider taking these projects onthrough and complete the crop rotation using each crop as a definite demonstration. I believe this is a better way of working in the rotation rather than starting out telling the cooperators that you want a rotation demonstration. Several of the counties are using this individual crop demonstration and working it through a rotation with rather outstanding results. I hope you will consider this in making your annual plan.

Along with the soil improvement program a good seed project would fit in nicely. In the past this phase of agronomy work has not been pushed as it deserves. Work for the last two years with certified seed demonstrations has very definitely proven the superiority of good seed. I trust that you will bring this phase of work before your committee and have them give it serious consideration.

If we can be of assistance to you in either planning or carrying out your agronomy program we are ready to help in any way we can. However, if you adopt a program on which you desire our help we would like to know as soon as possible what type of work you intend carrying out so that we can include it in our program.

Trusting that you and your committee will give these projects your serious consideration, I am, with verybest wishes,

Very truly yours,

W. H. Daughtrey
Assistant Agronomist, VPI

WHD/hw