

ANNUAL REPORT
1929
AGRICULTURAL - ENGINEERING



AN ELECTRIFIED DAIRY FARM

PROJECT NO. 10
VIRGINIA POLYTECHNIC INSTITUTE
EXTENSION DIVISION
DEPARTMENT OF AGRICULTURAL ENGINEERING
Annual Report
December 1, 1928 - November 30, 1929

Blacksburg, Virginia,
December 12, 1929.

Mr. John E. Hatcheson,
Director, Extension Division,
Virginia Polytechnic Institute,
Blacksburg, Virginia.

Dear Mr. Hatcheson:

I am submitting herewith annual report of the extension work in agricultural engineering, in accordance with Project No. 10, Cooperative Extension Work in Agriculture and Home Economics, for the period beginning December 1st, 1928 and ending November 30th, 1929.

CHANGES IN EXTENSION ORGANIZATION

The only change made in the extension organization during the year was the employment of a full time specialist to handle the farm building project. The demands from other departments, farm organizations and individual farmers of the state, for assistance in farm structures had grown to such an extent, that it was found necessary to make one man responsible for this project.

We were fortunate in securing the services of H. H. Gordon for this work. For the past two years Mr. Gordon has been farm representative of the Portland Cement Association in Virginia. In his former capacity he cooperated closely with this department and the County Agents. Previous to

his employment by the Portland Cement Association he was extension agricultural engineer for the North Carolina Extension Division. In assuming his duties with the Extension Division he has the advantage of two years successful experience in working with practically every County and Home Demonstration Agent in the state.

Professor J. A. Waller, Jr., has devoted most of his time to the water supply and terracing projects but has found some time to handle requests for help on water power development. Professor Waller has done outstanding work in handling the farm water supply project. It is believed that the results secured on this project will compare favorably with those in any state. He is determined to make his two projects the best handled in the United States.

Professor Chas. E. Seitz, in addition to the general direction of all department activities, namely, residence instruction, research and extension, has devoted the major part of his time to the rural electrification project. He has also handled the drainage and irrigation projects.

S. H. Byrne, a senior agricultural student, has assisted with the farm building project by devoting his spare time to drafting work, tracing and blue printing.

RELATION TO TEACHING AND EXPERIMENTAL WORK

The closest of relations exist between the extension work in agricultural engineering and the resident instruction and research divisions. This is largely due to the fact that all three divisions are under the direction of the extension agricultural engineer, who is head of the department. Through the resident instruction work the department is training agricultural engineers for extension work and for industries especially concerned with agriculture such as the farm implement and electrical industries. For example seven of the department's recent graduates have been employed by electrical companies in Virginia to take charge of the companies agricultural service work.

The agricultural engineering curricula at V. P. I. has become recognized as the best outlined four-year course in the country. Twelve state colleges have asked us for help in outlining similar courses and several of these institutions have adopted courses modelled after ours. With only one man engaged in full time research work in agricultural engineering progress is naturally slow. There is urgent need for more research work in agricultural engineering.

The resident instruction work of the department is handled by Professors V. R. Hillman, P. B. Potter and E. H. Chestnutt. Professor Hillman has rendered valuable help in the extension program by assisting in the Club Short Courses, Farmers' Institute, Institute of Rural Affairs and Rural Electrification Short Course.

Professor Potter has also rendered valuable aid in the extension program by assisting with the various short courses and conferences. His most important assistance however has been the handling of the several sewing machine schools which were given in a number of counties in the state.

Professor D. C. Heitshu is now devoting his full time to experiment station work. He is handling investigations in farm machinery. He has aided in the extension program by assisting with the State Short Course for Club boys, farm machinery demonstrations at the Farmers' Institute, lectures at Institute of Rural Affairs and several tractor courses given by tractor companies.

While Professor Heitshu is the only member of the department staff giving his full time to research work for the experiment station, other members of the staff are carrying on some research studies independent of the experiment station. The results of all such studies will be used in extension work.

Professor Seitz has made a study of rural electrification development in Virginia. He is continuing the studies on the surface irrigation of potatoes and apple orchards. He has also made brief studies of a number of specific uses of electricity in agriculture, namely: electric water systems, stationary spray plants for orchards, mechanical grading of potatoes, electric operated apple grading machinery, removing spray residue from fruit by washing, electric water heaters for poultry. Magazine articles have been prepared on each of these subjects.

Professor Hillman will this year finish his study on "Rural Rates and Policies." This will be used as a thesis for his M. S. in agricultural engineering. He is continuing his study of feed grinding in cooperation with the Dairy Department.

Professor Potter has made a study and is now preparing a thesis to be presented toward a professional degree in agricultural engineering. The subject of his study is "A Plan and Layout For Experimental Plots to Determine Spacing and Depths of Tile."

Professor Chestnutt is continuing his study of "Virginia Farm Homes." A thesis on this subject will be submitted next year for a M. S. in agricultural engineering.

Professor Gordon is conducting a study on "Mechanical Refrigeration for Small Dairies" as a minor thesis for a M. S. degree in agricultural engineering and a study of "Apple Storage Under Virginia Conditions" for his major thesis.

L. L. Koontz, a graduate student completed his study of the "Isolated Electric Light Plant" and received his M. S. degree in June.

J. K. Alvis, a graduate student, completed his study of "Fuel Economy of Gas Tractor Engines" and will receive his M. S. degree next June.

E. Shulcum a graduate student is conducting a study on "The Relation of Soil Drainage to Crop Growth" as his major thesis for a M. S. degree in agricultural engineering.

The most urgent need for improving agricultural engineering work in Virginia is: a properly equipped agricultural engineering building at the college for offices, class rooms, and class and research laboratories. The department is seriously handicapped for lack of adequate quarters to handle its resident instruction, extension instruction and research activities; a rural electrification specialist to handle the rural electrification project; a farm machinery specialist to instruct farmers in methods of reducing production costs with machinery and to organize agricultural engineering club work; provision by the experiment station for research in farm structures, soil erosion, drainage and irrigation, and farm home labor saving equipment.



*Extension Crew
Water Supply Campaign, Albemarle Co.*

Classification of Project No. 10 - Agricultural Engineering

5.

Project No. 10 - Agricultural Engineering is divided into the following sub-projects:

Sub-Project 10-A, Land Reclamation

- 10-A-1, Land Drainage
- 10-A-2, Terracing
- 10-A-3, Land Clearing
- 10-A-4, Irrigation

Sub-Project 10-B, Farm Home Conveniences

- 10-B-1, Farm Water Supply
- 10-B-2, Farm Sanitation
- 10-B-3, Farm Home Equipment

Sub-Project 10-C, Rural Architecture

- 10-C-1, Farm Structures
- 10-C-2, Farmstead Planning
- 10-C-3, Rural Community Plans

Sub-Project 10-D, Farm Operating Equipment

- 10-D-1, Gas Engines and Tractors
- 10-D-2, Farm Implements

Sub-Project 10-E, Rural Electrification

- 10-E-1, Rural Line Extensions
- 10-E-2, Farm Water Power
- 10-E-3, Individual Light Plants



*Motor Driven Pump.
Pittsylvania County.*

Water Supply Project.

*Electric Power is Ideal
For Pumping Water on
The Farm.*

Summary of Chief Problems in Agricultural Engineering Work in Virginia.

1. Land Drainage:-
Proper drainage of cultivated farm lands for economic production.
2. Soil Erosion:-
Prevention of soil washing to minimize the loss of fertility and top soil which eventually leads to the abandonment of the land for farming purposes.
3. Land Clearing:-
Removal of stumps and other obstructions from cultivated lands in order to reduce the cost of cultivations, seeding, etc.
4. Irrigation:-
Preventing losses from drought by surface irrigation and insuring maximum production of intensive truck crops by overhead irrigation.
5. Farm Home Conveniences:-
Raising the standard of living on the farm by the use of such labor saving devices and conveniences as: running water, electric lights heat, sewage disposal, etc.
6. Farm Buildings:-
Properly designed and constructed farm buildings, ^{for economic production} the use of economical and permanent building materials, proper arrangement for the most economical use of labor and equipment.
7. Farm Power and Machinery:-
The reduction of production costs and the consequent increased income from the efficient use of labor saving machinery and power.
8. Rural Electrification:-
The extension of rural lines to give the farmers advantage of central station electric service; the efficient use of this electric power for improving the standards of living in the home and the reduction of labor costs on the farm; the development of small water power plants and the use of individual gas engine plants where central station service is not available.

The Sub-Projects which are to be emphasized during the current crop year are:

1. Terracing
2. Farm Water Supply
3. Farm Buildings
4. Rural Electrification

The factors which have determined placing emphasis on these six sub-projects are: *and the state goals are;*

Terracing. - Soil washing is a serious menace in at least 26 of Virginia's counties. Surveys conducted in typical counties show that a large proportion of the land is eroding and this erosion must be checked or the land abandoned. Farmers in these counties are not practicing terracing to the extent they should. *The U. S. Bureau of Soils report that soil erosion carries away 20 times as much plant food material every year is permanently removed by crops.* *But must know their cultivated lands if they are to succeed.*

See page 5

Farm Water Supply. - Census figures indicate that only approximately 5% of the farm homes of the state have running water. This is the first convenience that should be installed in the farm home, as running water is essential to the well being of the housewife and the rest of the farm family. Since a higher standard of living on the farm is the ultimate aim of all extension work, this project cannot be stressed too strongly.

See page 5 -

Farm Buildings. - The 1925 U. S. Census values farm buildings in Virginia at over \$286,000,000. This is an increase of over 18 million dollars for the period 1920 to 1925. In other words during this period new buildings were constructed at the rate of over $3\frac{1}{2}$ millions in value per year. From county agent reports it is estimated that farmers are building from plans furnished by this department at the rate of $1\frac{1}{2}$ millions in value per year. This plan service is greatly appreciated by the farmer. Since farm buildings represent such a large part of the farm investment in the state (approximately 38% of the value of all land, machinery, and livestock) this project deserves to be stressed.

See page 5 -

Rural Electrification. - The nation-wide studies made on the application of electricity to agriculture as well as the results of studies in this state have awakened widespread interest in rural electrification. There can be little question of the desirability of electric service on the farm if for no other reason than raising the standard of living on the farm. It has however been demonstrated that electric power can also be used to advantage for many farm uses. *operation* There is a growing demand for help on this project. The Extension Division can be of distinct service to the farmers in securing line extensions and *making* proper use of this form of power. *electric power.*

See page 5

STATE GOALS

The ultimate state goals and goals for the year for each of the projects to be emphasized this year are:

Terracing. - The ultimate goal of this project is to have a system of terraces on every farm having land that is subject to erosion.

The state goals for the year are to hold terracing schools in eight (8) counties and instruct 1000 farmers on this subject. *To organize terracing 4-H clubs in 5 counties.*

Farm Water Supply. - The ultimate state goal of this project is to have running water in every farm home in the state.

The state goal for the year is to put on water supply campaigns in eight (8) counties and influence 500 farmers or farmers' wives to install running water in the home. *of installing* *instruct* *in method*

Farm Buildings. - The ultimate state goal of this project is to secure the general adoption of better standard of farm building construction whereby the buildings erected will result in greater farm operating efficiency, better architectural styles and the utilization of more permanent structural materials. An additional aim is to secure the general adoption of a distinct type of farm home that will combine beauty and utility.

The state goal for the year is to supply plans for modern farm buildings to fifteen hundred (1500) farmers.

Rural Electrification. - The ultimate state goal of this project is to have electric service available to all farmers of the state where it is economically justifiable.

The state goal for the year is to extend electric service to 500 additional farmers. *at least two agricultural engineers with previous experience for work on rural electrification - to publish at least one bulletin on rural electrification.* *plans* *to secure rural service departments with qualified agricultural engineers in charge in at least two additional electric companies.*



*Modern Dairy Barn
Replaces The Old
Spottsylvania County.
Farm Structures Project.*

METHODS OF TEACHING SUBJECT MATTER

The methods of teaching the subject matter in agricultural engineering are by:

A. Short Courses and Meetings, which are given when scheduled and consist of illustrated lectures, moving pictures, laboratory work and talks at meetings.

B. Publicity and Propaganda, which is handled through correspondence, bulletins, circular letters, newspaper and farm journal articles, and exhibits at fairs.

C. Field Projects and Demonstrations, which consist of supplying technical information and services to individuals, communities and organizations in the state through actual field demonstrations.)

Individuals, county or home demonstration agents, or community organizations make application to the department for the services of the specialists. The individual project is visited, in company with the county agents, surveys and other notes are made and a detailed report, plans and suggestions furnished. Demonstrations consist of visits and meetings at projects under construction and at finished projects, in order to instruct on methods and show results obtained. (The specialist endeavors to instruct in such a way that those in attendance at the demonstration can carry out the practices recommended without further assistance. Many of the projects are self-advertising, such as improved farmsteads, new farm homes or other buildings, new operating equipment, water systems, and other conveniences in the home; and reclamation projects, such as drained fields, terraced hillsides and cleared land.)



*Teaching Terracing
Through Field Dem-
onstrations.*

Halifax County.

Terracing Project.

RESULTS OBTAINED

A. SHORT COURSES AND MEETINGS

Short Courses:-

Twenty-four (24) short courses were held at which instruction in agricultural engineering projects was given. The following is a brief summary of these short courses:

Rural Electrification Short Course:-

This was the most outstanding short course held by the department. This course was designed mainly for men and women engaged in the advancement of rural electrification to properly train them to more adequately handle the many problems involved in serving farm customers. It is felt that if the representatives of the Power Companies who deal with farmers, are properly trained, the farmer in turn will secure better service. So in training these representatives we are indirectly aiding the farmer.

This was the first course of the kind in the South and was attended by over 100 representatives of Electric Power Companies in this and adjoining states. The course was pronounced by all a big success and the college was asked to make it an annual event. A program of this short course is included in the project report on rural electrification.

Sewing Machine Schools:-

Sixteen (16) sewing machine schools were held in nine (9) counties at which 118 women were instructed on the proper care and repair of sewing machines. Ninety-four (94) old machines were repaired at these 16 schools.

These schools were a new form of extension activity attempted this year. These schools or clinics were given in cooperation with the home demonstration agents. They were conducted by having a group of women bring in their sewing machines to a central meeting place where they themselves cleaned, adjusted and repaired the machines under the direction of the specialist.

Professor Potter carried on this activity as a part of his work in household engineering. He had previously done this kind of extension work in Ohio while connected with the Ohio State University.

This work was begun in Virginia by holding two schools for home demonstration agents--one meeting at the Jamestown Camp for the eastern district and one at Salem for the western district. By giving the agents a special school in advance they were in better position to organize schools in their own counties. This training also enabled them to give valuable assistance to the specialist at the respective schools. The home demonstration agents were required to completely clean and adjust a machine just like the women were required to do in each school.

Short Courses and Meetings (Cont'd)

11.

The following is the schedule of Sewing Machine Schools held this year:

<u>County</u>	<u>: Schools</u>	<u>: Date</u>	<u>: Machines</u>	<u>: Attendance</u>
<u>Eastern District</u>	<u>: Jamestown camp</u>	<u>May 18</u>	<u>: 12</u>	<u>: Agents - - 8</u>
<u>Western District</u>	<u>: Salem</u>	<u>: June 24</u>	<u>: 12</u>	<u>: Agents - -10</u> <u>Women - - 3</u>
<u>Franklin</u>	<u>: Glade Hill</u>	<u>: June 25</u>	<u>: 3</u>	<u>: Children - 2</u> <u>School not held.</u>
	<u>: Boone Mill</u>	<u>: June 26</u>	<u>: - - -</u>	<u>: Rains, bad roads.</u> <u>Women - - -4</u>
	<u>: Gold Mind</u>	<u>: July 17</u>	<u>: 3</u>	<u>: Men - - - 3</u> <u>Women - - -4</u>
	<u>: Endicott</u>	<u>: July 18</u>	<u>: 4</u>	<u>: Men - - - 3</u> <u>Women - - - 5</u>
	<u>: Boone Mill</u>	<u>: July 19</u>	<u>: 5</u>	<u>: Men - - - 2</u>
<u>Loudoun</u>	<u>: Leesburg</u>	<u>: July 8</u>	<u>: 5</u>	<u>: Women - - 5</u> <u>Women - - 7</u>
	<u>: Purcellville</u>	<u>: July 9</u>	<u>: 6</u>	<u>: Men - - - 2</u>
	<u>: Pleasant</u>			<u>Women - - 5</u>
	<u>Valley</u>	<u>: July 10</u>	<u>: 5</u>	<u>: Men - - - 2</u> <u>Women - -12</u>
<u>Goochland</u>	<u>: Columbia</u>	<u>: July 12</u>	<u>: 11</u>	<u>: Men - - - 3</u>
<u>Campbell</u>	<u>: Rustburg</u>	<u>: July 15</u>	<u>: 8</u>	<u>: Women - -10</u>
	<u>: Evington</u>	<u>: July 16</u>	<u>: 3</u>	<u>: Women - - 3</u>
<u>Dinwiddie</u>	<u>: Dinwiddie</u>	<u>: Aug. 5</u>	<u>: - - -</u>	<u>: Nobody showed up</u> <u>Women - - 5</u>
	<u>: Ford</u>	<u>: Aug. 6</u>	<u>: 5</u>	<u>: Men - - - 1</u>
<u>Brunswick</u>	<u>: Lawrenceville</u>	<u>: Aug. 7</u>	<u>: 3</u>	<u>: Women - - 2</u> <u>Women - -10</u>
	<u>: Dundas</u>	<u>: Aug. 8</u>	<u>: 7</u>	<u>: Men - - - 6</u>
<u>Mecklenburg</u>	<u>: Boydton</u>	<u>: Aug. 10</u>	<u>: 2</u>	<u>: Women - - 1</u>
<u>9</u>	<u>: 16</u>	<u>: Totals</u>	<u>: 94</u>	<u>: 118</u>

Two weeks after one agent held her school she said she could get 50 machines for another school.

Three months after one school the agents reported the women were still talking about it.

One woman hauled her machine 14 miles to have it "fixed". It had been out of commission for a year after having been "overhauled" by a travelling expert at a cost of \$5.00.

Two machines that had been thrown away were taken from coal houses, put through the school and made to work at less than a dollar's worth of repairs. These machines were to be given to 4-H clubs after being repaired. No single machine was turned away from a school as impossible to repair. It is estimated that \$30.00 worth of small repairs--needles and oil was sold at cost to women at these schools.

From the standpoint of interesting the women and teaching them sewing machine care and adjustments the schools were a complete success. But from the standpoint of reaching numbers the schools were a failure. Except in the case of two or three schools the women were not organized and were not informed as to what they should do nor as to the benefits they would receive. In one case notices were sent too late to inform the women of the date. In another case something went wrong and the women didn't show up at all. Schools were held at places where the women could not or would not come out in numbers sufficient to make a school worth while. More care and attention on the part of the agents in organizing future schools will result in better attendance. If these weaknesses can be corrected and larger schools held it is recommended that the work be tried another year. A subject matter outline of this project is included in the exhibit section of this report.

State Short Course:-

One hundred and twenty-five (125) boys were given four days instruction in agricultural engineering subjects during the eleventh annual Boys and Girls State Short Course at V. P. I. in July. Instruction in the following subjects were given at this short course:

Agricultural Engineering Profession	Water Systems
Gas Engines	Rope Work
Tractors	Soil Erosion
Water Supply	Farm Machinery

Tri-County Short Course, Cape Henry:-

Eighty (80) boys were given instruction in rural electrification. Electrical equipment was demonstrated by the agricultural engineer of the Virginia Electric & Power Company.

Adult Camp, Jamestown:-

One hundred (100) farmers and farm women were given instruction in household engineering at this camp.

Juvenile Camp, Jamestown:-

Forty-eight (48) children were given instruction in rope tying and splicing at this camp.

Stafford County Short Course:-

Twenty-five (25) boys were given instruction at this camp on rope tying and the cleaning and sharpening of tools. In the rope work they were taught how to tie the important knots, how to splice rope and how to make halters. In the tool work they were instructed how to properly clean and sharpen saws.

Chatham County Short Course:-

Thirty-four (34) boys were instructed in rope tying, splicing and halter making at this short course. Such work as this and tool work seems to be in great demand. There should be more of it done. Many requests were received for instruction at club short courses but men were not available for all of these courses. There is definite need for an agricultural engineering specialist to handle club projects, short courses, etc.

Tractor Schools and Demonstrations:-

Representatives of the department lectured at the Caterpillar Tractor Company School at Roanoke and the field demonstration and short course held by this company at Suffolk. About 50 were in attendance at each of these meetings.



*Part of Group at Rural Electrification Course
V.P.I.*

Meetings:-

Twelve extension and at least 40 other meetings were attended by representatives of this department. The agricultural engineers made talks at 38 of these meetings that were attended by 3185 farmers.

One of the most important of these meetings was the Institute of Rural Affairs and Farmers' Institute, held at the college in July. The following subjects were discussed by representatives of this department and outstanding agricultural engineers from other states. All sessions were well attended.

Problems Arising From the Application of Modern Machinery in Farming - Prof. C. O. Reed, Ohio State University.

Effects of Machinery on Production Costs - Prof. V. B. Hillman, V. P. I.

The Adaption of Machinery to Crop Production - Prof. S. P. Lyle, Georgia State College.

The Business Management of Farm Machinery - Prof. C. O. Reed.

The Place of the Tractor and Power Machinery in Virginia's Farming - Prof. D. C. Heitshu, V. P. I.

The Rural Electrification Problem - Geo. W. Kable, National Rural Electrification Project.

How Electric Power May Be Applied to Farming - Prof. E. W. Lehmann, University of Illinois.

Selecting the Home Water Supply - Prof. J. A. Waller, V. P. I.

More Power to the Farm Home - Miss Eloise Davidson, National Electric Light Association.

Water and Air in Relation to Comfort and Health - Prof. P. B. Potter, V. P. I.

Some meetings of special importance attended by representatives of this department were:

Annual meeting of the American Society of Agricultural Engineers. Delco Light Convention. Annual meeting of the Public Utility Association of Virginia - meeting, State Agricultural Advisory Council, meeting, State Agricultural Commission, meeting - National Advisory Council for Research in Mechanical Farm Equipment, state rural electrification conference and Governor's Rural Electrification Committee.



*A Sewing Machine School
Boochland County.*

B. PUBLICITY AND PROPAGANDA

"Approximately 13 per cent of farm and home practices changed due to extension teaching trace to the influence of news articles originating with the extension service. The low cost to the extension service, combined with relative high returns, accounts for the news services yielding the largest returns per unit of cost of any extension method. The cost of influencing the adoption of practices through news stories is 50 per cent less than by any other extension agency." This quotation is taken from Technical Bulletin No. 125 of the U. S. Department of Agriculture, entitled--"Relative Costs of Extension Methods Which Influence Changes in Farm and Home Practices," and indicates the value of news articles.

The head of the department has devoted considerable time to the preparation of magazine and farm journal articles. Fifty articles have been prepared for publications and at least 25 news items for the daily press. The following is a list of articles prepared for farm journals and magazines:

SOUTHERN PLANTER

Farm Storage of Fruits and Vegetables
 Let Water Power Do Your Pumping
 A Silo For Every Dairy Farm
 Light and Power From the Farm Stream
 Drain the Wet Land (Tile Drainage System)
 The Far Reaching Effects of Farm Machinery
 Should the Farmer Buy a Motor Truck?
 Drain the Wet Land (Depth and Spacing of Tile)
 Cooling Milk By Electricity
 Accurate Weighing On the Farm
 Good Concrete Construction on the Farm
 Elements of Painting
 Machinery Speeds Up Farm Operations
 Silos A Good Investment
 Farm Electric Service Making Progress
 Lime Spreaders
 The Hydraulic Ram
 Soil Erosion Expensive
 Fencing the Farm
 Radio A Necessary Farm Appliance
 Tractors Popular
 Explosives Furnish Farm Power
 Septic Tanks
 Sewage Disposal
 Health
 Painting Farm Equipment
 Running Water for the Farm Home
 Heating the Farm Home
 The Farm Motor Truck
 Drain the Wet Land
 The Road Drag

Repairing Machinery
Electricity on the Dairy Farm
Is Your Soil Washing Away?
Ninety Years of Farm Machinery Development
Motorizing America's Agriculture

ELECTRICITY ON THE FARM MAGAZINE

Water For Crops When Needed
Warming Water For Poultry
Surface Irrigation on Eastern Farms
Virginia Making Progress in Rural Electrification
A Modern Water System Essential to Health and
Happiness On The Farm
Stationary Spray Plants For Orchards
Mechanical Grading and Sizing of Potatoes
Mechanical Grading of Fruit
Washing Fruit For Spray Residue Removal

COUNTRY GENTLEMAN

Pumping By Water Power
Lighting Poultry Houses Pays for Electric Service
Surface Irrigation in the East

ELECTRICAL SOUTH MAGAZINE

Virginia's Progress in Rural Electrification
Virginia's Rural Electrification Short Course

In addition to the above numerous news items have been prepared for the daily press of the state.

Summary of results obtained under publicity and propaganda:-

3600 Letters written
11 Circular letters written
1230 Circular letters sent
14,580 Bulletins sent
38,000 Bulletins sent by Farm Engineer of P.C.A.
1408 Farm Building Plans sent out
80 Counties visited by specialists
11 Home Demonstration Agents assisted
70 County Agents assisted
50 Articles written for farm journals and magazines
25 news articles for daily papers.

Sub-Project 10-A-Land Reclamation
10-A-1. Land Drainage

Only the most urgent requests for field assistance were taken care of on this project.

Eleven (11) drainage surveys were made and plans prepared for the tile drainage of 685 acres. In addition several hundred letters were written and bulletins on drainage mailed to farmers asking for information on this project.

10-A-2. Terracing

Seven (7) terracing schools were held in as many counties at which 340 farmers attended the lectures and 480 the field demonstrations. Fifty-four (54) acres were terraced at these schools. In addition the engineer gave five demonstrations in three counties at which 26 acres were terraced.

This is the second year that this project has been handled through county-wide schools. Previously the terracing work was handled as personal service or demonstrations for individual farmers. Too few farmers were being reached in this way. In order to reach more farmers and eliminate as far as possible, too much personal service, the school idea was adopted.

The plan followed in these schools was: one week was allotted to each county in which a school was held. Monday, Tuesday and Wednesday nights were given over to lectures on terracing followed by a general discussion. The lecture covered the importance of terracing farm lands, method of constructing terraces, plowing and cultivating fields after they have been terraced and lantern slides and films showing the various steps in laying out and constructing terraces.

Tuesday and Wednesday were devoted to preparations for the field demonstrations to be held on Thursday. At the field demonstrations on Thursday the whole day was devoted to the actual surveying and construction of terraces. The farmers in attendance got actual practice in using the level. A home-made drag was built and used at each demonstration. Other implements such as the disk plow, disk harrow, plow, and steel terracer were also used. An effort was made to so instruct those in attendance that they would be able to lay out and construct terraces on their own farms.

The rainy weather during the fall while these schools were in progress kept the attendance down and the schools were somewhat disappointing in attendance. We are not satisfied that the schools as conducted are the best methods of handling this project. An effort will be made the coming year to give more attention to the training of a few men in each county who can be certified as good terracers and can do terracing for farmers in their communities. It is felt that some such method will get better results. On the next page is a summary of the terracing schools.

SUMMARY OF TERRACING SCHOOLS - 1929

Date	County	Night Talks	Attendance	Demonstration	Terraces Built	Number feet of Terraces	Number of Acres Terraced
Sept. 30-							
Oct. 3	Campbell	24	100	100	2650 (3)		10
Oct. 14-							
Oct. 17	Prince Edward	47	50	50	2175 (4)		6
Oct. 21-							
Oct. 24	Pittsylvania	62	125	125	1400 (3)		5
Oct. 28-							
Oct. 31	Appomattox	22	70 (rain)	70 (rain)	4900 (5)		15
Nov. 4-							
Nov. 7	Halifax	87	50	50	3475 (4)		10
Nov. 11-							
Nov. 14	Mecklenburg	36	10	10	Rain		Gave work on level.
Nov. 18-							
Nov. 21	Brunswick	62	75	75	2925 (5)		8
	TOTALS	340	450	450	17,525 (24)		54

Terracing Work Other Than Schools

Prince Edward	- 8 Acres	- 1825'	(3 terraces)
"	5 "	1000'	(2 "
"	4 "	500'	(2 "
Appomattox	1 "	275'	(1 "
Lunenburg	8 "	3200'	(4 "
	26	7100'	-12

TERRACING PROJECT

18-A



*Constructing Terrace with Tractor
and Steel Grader
Halifax County.*



*The Completed Terrace
Pittsylvania County.*

10-A-3, Land Clearing

No work of any major importance has been done on this project. However many of our bulletins on the use of explosives in land clearing, have been sent to farmers requesting them. At our suggestion the Farmers Produce Exchange of Richmond are now handling explosives for farmers.

10-A-4, Irrigation

There is considerable interest in irrigation throughout the state. Numerous letters have been received from farmers requesting information on this subject. The government bulletin on Surface Irrigation For Eastern Farms has been mailed to all farmers interested in this subject.

Two project demonstrations on irrigation have been continued. The potato irrigation study and demonstration at the Eastern Shore Experiment Station and the apple orchard demonstration in Shenandoah County.

The surface irrigation project at the Eastern Shore Experiment Station showed encouraging progress this year. Studies were made on irrigating Irish potatoes, sweet potatoes, peas and corn.

Potato Irrigation Study:-

In the Irish potato irrigation experiment a check was made on 100 hills of potatoes watered as compared to 100 hills left unwatered. The increase on the 100 hills watered was at a rate of 34 bushels per acre.

In the sweet potato irrigation experiment on the basis of a 100 hill count the increase due to irrigation was at the rate of 98 bushels per acre for the first harvest and 91 bushels an acre for the second harvest.

The corn and pea tests both showed substantial increases in favor of irrigation. These tests will be continued over a period of years to try and determine the advantages of surface irrigation on potatoes and other crops raised on the Eastern Shore.

Orchard Irrigation Study:-

This was a splendid year to test the value of irrigation in the Valley of Virginia. Splendid results were secured on the apple orchard irrigation project at Mt. Jackson. The Strathmore Orchard Company installed a large pumping plant year before last but this was the first year it was put in use.

Two thousand (2000) apple trees out of 3400 trees in one block were irrigated this season. Mr. Wissler, manager of this orchard says:

"I have paid the entire cost of my irrigation system this one year in the increase size and quality I have secured from irrigation. At a very conservative estimate I figure that irrigation has increased the volume of the crop this year from 35 to 40 per cent. The irrigated fruit had considerably less russet than the fruit not watered.

"The difference in size of the irrigated and dry fruit was very apparent when going over the grading machines. For instance the apples from the dry section of the orchard were passing through the small rings on the grading machine while the apples from the irrigated section were going over the larger rings.

"Some idea of the increase in size due to irrigation may be had by comparing my first carload of Staymens last year with the first car this year. The following shows the comparison:

First car Staymens shipped Oct. 5, 1928

180 bushels of $3\frac{1}{2}$ inch minimum)	
182 " " 3 to $3\frac{1}{2}$ inch)	No irrigation but plenty
271 " " $2\frac{3}{4}$ to 3 inch)	of rain.

First car Staymens shipped Sept. 30, 1929

423 bushels of $3\frac{1}{2}$ inch and up)	
108 " " 3 inch " ")	Irrigated.
32 " " $2\frac{3}{4}$ " " ")	

It is seen from the above that most of Mr. Wissler's apples this year were in the $3\frac{1}{2}$ inch and larger sizes. The increase in size being attributed entirely to irrigation and being more than enough to pay for the entire cost of installing the irrigation system.



*Irrigating The Orchard
Shenandoah County.*

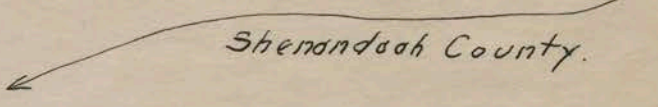
20-A.

IRRIGATION PROJECT

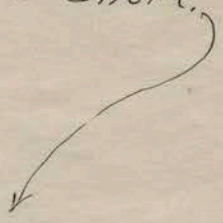


Pump House on Strathmore Orchard Irrigation Project.

Sherandoah County.



Sweet Irrigating Potatoes on Eastern Shore, Accomac County.



Sub-Project 10-B-Farm Home Conveniences:-

10-B-1. Farm Water Supply

This has been the most successful year to date for the water supply project. Water supply campaigns were conducted in seven (7) counties during which four hundred and twenty-nine (429) farmers were given assistance and advice on securing running water in the home.

In addition to the farmers reached in the seven special water supply campaigns one hundred and ten (110) farmers in thirty (30) counties were given help. This makes a total of 539 water supply surveys for 1929 as compared to 205 for 1928. The specialist in charge of this project feels that this is the most important project he is handling and this work continues to be his main source of inspiration. Twenty-six of the water supply jobs were handled by the two other extension specialists.

No accurate check-up has been made on the number of water systems installed as a result of this work. It is often several years before the systems as recommended are completed. However a good percentage of the systems have been installed this year. In some counties the percentage of systems installed will total at least 85% in two years. This work will be followed up for about five years and the number of installations reported for each year.

We now feel that the method followed this year is the best plan for reaching the farmers on this project and the most successful from the standpoint of results secured, economy of the specialist's time, and saving in travelling expenses.

The tables on the next page show the counties in which work was done during the campaigns.



*The Ram Is Ideal
For Pumping Water
On The Farm.
Rockingham County.
Water Supply Project.*

SUMMARY OF 1929 FARM HOME WATER CAMPAIGNS

TYPES OF JOBS RECOMMENDED

No.	County	Date	Rans	Gravity	Windmill	Gas.Eng.	Elec.	Hand Force	Gen.Info.	Water Wheel	City	Total
1.	Pittsylvania	April	16	2	4	14	2	8	10	1		63
			S.A;D.A:									
2.	Rockingham	May	12	19	7	12	62	15	21	1		151
3.	Amherst	June	13	4		6	6	8	9			47
4.	Montgomery	July	5	3		4	2	5	1			21
5.	Albemarle	Aug.	15	6		19	10	6	10			73
6.	Stafford	Sept.	1		2	12	4	7	3			29
7.	Buckingham	Sept.	10	2	8	15	2	5	2			45
	TOTALS		72	36	21	62	88	54	56	1	1	429

FARM WATER SUPPLY PROJECT 22-A.



The simple Barrel Tank For Gravity Supply will eliminate much needless water "toting."
Albermarle County.

The windmill and Gravity Tank are Great labor Savers and make a satisfactory Farm Water system.

Carroll County. →



10-B-2. Farm Sanitation

Information on sewage disposal and general sanitation is given to all farmers who are reached on the water supply project. No special field work has been done on this project other than by the concrete specialist. He handled forty (40) septic tank jobs. Several articles on sanitation have been written for the Southern Planter and numerous letters answered. All farmers asking for information on this project are sent the State Department of Health bulletins on "Protecting the Farm Water Supply", and "Sewage Disposal."

As the State Department of Health are active in promoting rural sanitation and have sanitary officers in a number of counties, most field work is turned over to them, especially in counties having sanitary officers. Several county schools have been given assistance by this office on the design of sewage disposal systems.

10-B-3. Farm Home Equipment

The most important work done under this project was the sewing machine schools, an account of which appears under the "Short Courses and Meetings," section of this report. Instruction has also been given on household equipment at the Jamestown adult camp, Farmers' Institute, and at several meetings. This is a project worthy of more attention but lack of sufficient personnel prevents more work on this important subject.



*A Spring made safe from
Pollution by concrete.
Rockingham County.
Sanitation Project.*

SUB-PROJECT-10-C-BURAL ARCHITECTURE

10-C-1. Farm Structures

Greater progress has been made on the farm structures project than any previous year. This progress is due in large measure to the employment of an agricultural engineer to devote his full time to this work. Fourteen hundred and four (1404) farmers have been supplied plans of farm buildings. The farm building specialist has worked with 28 county agents and assisted 90 farmers in 31 counties.

For several years the Dairy and Food Division of the State Department of Agriculture have been stepping out of their field by supplying plans for dairy barns and milk houses and at times plans for other farm buildings. This service conflicted with our work and caused considerable friction and criticism, especially since their plans differed from those supplied by this office. One of the first assignments of the engineer upon taking over this project was to work out an arrangement with the Dairy and Food Division whereby they would use only plans designed and prepared by this office.

After several conferences an arrangement was made whereby all old plans were discarded and standard plans were prepared by this department that met the approval of all concerned. The Dairy and Food Division will therefore discontinue preparing plans and use only plans prepared by this department. It is felt that this is a worth while accomplishment and will result in greater harmony and much better service to the farmers of the state.

Cooperative arrangements have been made with the Maryland-Virginia Milk Producers Association whereby they will use the standard plans designed by this department. Special plans have been prepared for this association, detailing the remodelling of old barns so that they may comply with a milk ordinance just going into effect. Close contact with officials of this association will be maintained and all possible help and cooperation given their 12,000 dairymen membership.

The Richmond Health Department which has had very rigid milk requirements of their own have been slow to cooperate with other departments or agencies. However they have agreed to accept the plans furnished by this department. This means that all markets in the state are now accepting our plan service and we are now in a position to help the prospective builder regardless of his market.

A complete set of new poultry house plans have been prepared according to specifications furnished by the Poultry Department. These plans include: standard laying house and equipment, standard brooder house, outdoor roosting shed, and outdoor wash hopper.

The demand for information and plans for common fruit storage houses has become so great that a cooperative study with the horticultural department has been started to determine the requirements for a successful and economical fruit storage house for Virginia conditions. The division of agricultural engineering of the U. S. Department of Agriculture is cooperating by loaning

10-C-1. Farm Structures (Cont'd)

instruments and will later advise with us on designs. When the study is completed apple storage house plans will be prepared embodying the best of design.

Help was given the Hot Springs Corporation on the Design of stables for 150 saddle horses. Seventy-five thousand dollars (\$75,000) will be expended by this corporation on model barns to house their valuable riding stock.

Mechanical refrigeration on the dairy farm is becoming an important problem in Virginia. Numerous requests have been received from dairymen for information on this subject. A study of mechanical refrigeration for small dairies is now under way in cooperation with the Dairy Department. When this study is completed the department will be in a better position to intelligently advise the dairymen of the state on their milk cooling problems.

Plans Designed and Drawn During the Year

1	Bull Pen	1	Sheet
7	Dairy Barn Plans	14	"
6	Dairy House Plans	6	"
1	Dairy barn ventilation plan	1	"
2	Poultry Laying House Plans	4	"
1	Brooder House Plan	1	"
1	Outdoor Roosting Shed	1	"
1	Outdoor Wash Hopper	1	"
1	Apple Packing and Storage House Plan	2	"
1	Septic Tank Plan	1	"
1	Reservoir and Cistern Plan	1	"
1	Garage Plan	1	"
1	Special General Purpose Barn	1	"
2	Barn Remodelling Plans	2	"
1	Dairymen Exhibit Plan	1	"
1	Fair Exhibit Plan	1	"
1	Home Water System	1	"
1	Interstate Early Potato Plan	1	"
1	Map of Christiansburg	1	"
1	Model Closet	1	"
1	Storage Cellar	1	"
1	Fireproof Vault	1	"

A complete revision of our farm building plans was made and a list of the plans available was prepared and published for the use of the county agents. It is felt that our plan service is in much better shape than ever before. We are now in position to be of greater service to the farmers of the state in farm buildings. This service will be improved as rapidly as possible.

RURAL ARCHITECTURE PROJECT



Apple Storage House
Rural Community Plans Project,
Bedford County.



A modern Dairy Barn
Farm Structures Project



A Remodeled Barn and
new concrete Silo,
Culpeper County
Farmstead Planning Project.

10-C-2. Farmsstead Planning

In dairy barn planning the location with respect to other buildings and for convenience and labor saving is of prime importance. City ordinances in most instances play an important part making it advisable to visit the place when possible and advise as to the most suitable location as well as one that will pass the requirements from a sanitary standpoint. In this connection 20 farms were visited and building sites chosen for dairy barns, milk houses and silos. This work was done in 14 counties.

In the instance of John L. Pratt, Sherwood Forest Farms, Fredericksburg, Virginia, help was given in planning and locating a new dairy layout the initial cost of which was \$30,000.00 with the idea in mind of adding additional units costing probably \$20,000.00 or a total of \$50,000.00.

At Waterloo, Culpeper County, Virginia, help was given Capt. A. Spindler in remodelling old buildings, planning and arranging new buildings, on a 2300 acre farm devoted to horse breeding. The location of the buildings for convenience, sanitation and looks was gone into, and sewage disposal system laid out.

In Mecklenburg County, help was given Mr. E. G. Moss in an entire farm layout. While development will be slow due to lack of finances, Mr. Moss has his plan and can go ahead with a layout suitable to his location and type of farming as finances permit. Plans were furnished for the buildings also.

In Warren County, Mr. J. L. Phillips was helped with the layout of several new buildings for convenience with respect to farming operations and purpose for which buildings were to be used.

There is a growing demand for this type of work and a careful study of it should be made and more help given.



*An attractive Barn
Layout.
Stafford County,
Farmstead Planning Project.*

10-C-3. Rural Community Plans

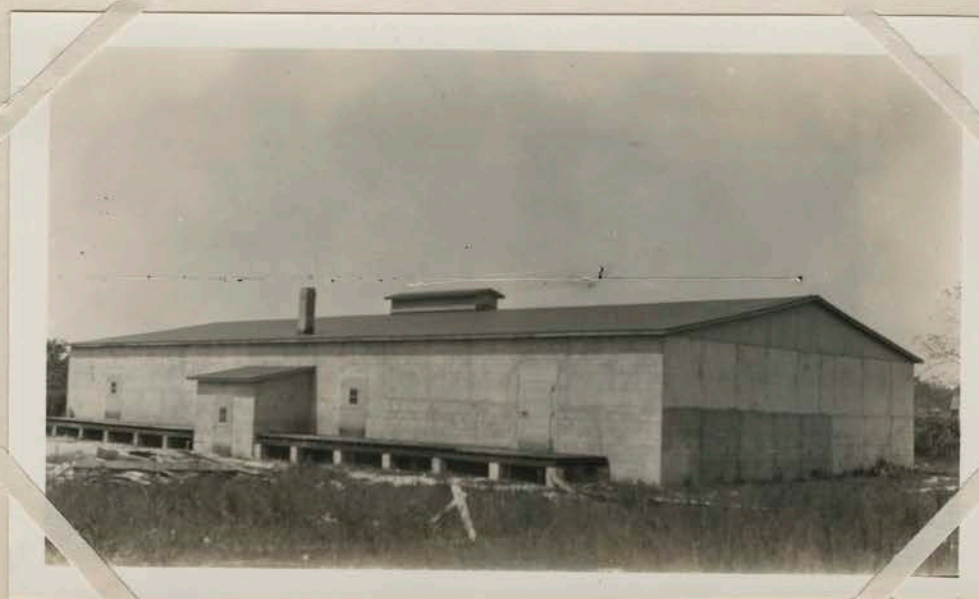
The most outstanding piece of work done on this project was the preparation of plans for a large milk receiving plant for the Valley of Virginia Milk Producers Association at Harrisonburg. The officials of this organization asked for our assistance on this project and in cooperation with the Dairy Department complete plans were prepared. According to the manager of the association we saved them from \$5,000 to \$8,000. The contract for the construction of this plant was let for \$22,000.00 and will be completed this winter.

Another job of interest on this project was a survey and map of Amelia Court House and community for the location of industrial plants. As this is a rural community we were called in to help plan this development. This community is actively engaged in trying to interest industries to locate there, believing that the more industries they have, the better will be the local market for agricultural produce.

Another project was the preliminary survey of the grounds selected near Petersburg for a district 4-H Club camp. Plans are now being prepared for bunk houses, dining rooms, and commissary all to be of log construction. Plans for septic tanks are also being made. The business men of Petersburg are financing this project. The city has donated the land bordering on Shield's lake. When completed this will be one of the finest camps of the kind in the country.

Assistance was given the town of South Hill in the design of a community swimming pool. Assistance by correspondence and through furnishing bulletins, plans, etc. was also given numerous other communities.

Plans and specifications were furnished for the erection of a sweet potato storage house in Accomac County. This house as shown in the picture below is one of the most modern in the state. It is constructed of cinder block, stuccoed and has a modern heating plant and electric cold storage.



*Sweet Potato
Storage House,
Accomac County.*

*Rural Community Plans
Project.*

Sub-Project-10-B-Farm Operating Equipment

10-B-1. Gas Engines and Tractors

The only work done on this project was the instruction given at the state club encampment at V. P. I. and at the Caterpillar Tractor Company school. One hundred and twenty-five (125) boys were given instruction on gas engines and tractors during the four day course at V. P. I. Members of the staff also lectured to the farmers and dealers in attendance at the Caterpillar Tractor Company school at Roanoke.

10-B-2. Farm Implements

With the exception of the instruction given at the boys short course and lectures given at the Institute of Rural Affairs and Farmers' Institute no work has been done on this project. There is however great need for extension work in farm implements and this project should be pushed. It is impossible to do any more work with the present personnel.



*Part of Farm Machinery
Demonstration at Farmers
Institute. V.P.I*

Farm Implements Project.



Sub-Project 10-E-Rural Electrification

10-E-1. Rural Line Extensions

Outstanding progress has been made under this project. The most important development was the adoption of a standard state-wide plan for making rural line extensions into new territories. This plan in brief is:

Electric Power Companies will construct at their expense electric line extensions along highways and the consumer or consumers guarantee a monthly consumption of energy equal to a certain percentage (usually 2%) of the cost of the line constructed along the highway to serve the consumer or consumers. The following example illustrates how this rural extension plan works out in practice:

The cost of constructing a given line extension along a highway to serve ten customers is \$1,000. The monthly guarantee on the entire line extension is 2% or \$20.00, and since there are ten customers, the monthly guarantee for each customer is \$2.00. The customer receives service at the company's standard rates and guarantees his consumption to equal at least \$2.00 per month.

Eighteen (18) Power Companies furnishing over 90 per cent of the electric service in Virginia have voluntarily adopted this standard plan. It is believed by all who have made a close study of rural electrification that this is one of the best line extension plans anywhere. Before this plan was adopted every company had different plans and practically all required the farmer or rural consumer to pay for the construction of the line and then pay a high rate which made it impossible to make much progress in rural line extensions. The new plan is fair to all parties concerned and has already resulted in many line extensions being made. It has been endorsed by agricultural organizations and the State Agricultural Commission.

The Governor's committee which worked out this standard plan in making their report to the Governor recognized four elements as necessary in the pioneer working out of the problems of rural electrification. These are:

1. A. - Rural Consumers educated to the practical use of electricity in the operations of the rural home and business.
2. B. - Utility or other Agencies to supply electric current, under conditions as favorable as possible to the rural consumer and in sympathy with his problems. These are represented by the several electric supplying utility companies.
3. C. - An Educational Agency in the field of rural electrification which can on the one hand instruct and guide the farmer in the use of electricity and at the same time assist the utility companies in understanding and working out the problems of serving the rural consumers of electricity. The Agricultural Engineering Department of V. P. I. is regarded as the agency best suited to perform this function.

10-E-1. Rural Line Extensions. (Cont'd)

The need for a distinctive educational agency to promote and aid rural electrification and to stand in an impartial position between the consumers and the utility companies in dealing with the practical engineering problems of rural electrification is expressed in the general functions of V. P. I. as represented by its department of Agricultural Engineering. That department, together with its contacts with the Agricultural Extension Service and the County Agricultural Agents, is preeminently adapted to perform this educational service. Its organization should be strengthened, if necessary, to enable it to adequately perform this function.

4. D. - A Supervisory and Judicial Agency through which policies and methods of extending rural electrification may be laid down and through which the operation of utilities may be supervised and checked as occasion may require. The State Corporation Commission is the State body charged with this function.

Cooperation with Power Companies

It is impossible at this time to give accurate figures on the number of farmers connected for electric service during the year but it is known that over 1,000 miles of rural lines have been built and several hundred farms connected.

This department has consulted with several of the companies during the year and has been instrumental in securing a number of line extensions into farming territory. Studies have been made of irrigation as previously referred to and numerous articles prepared on various farm uses of electricity. A milk refrigeration study has been started and a state-wide survey is now under way to determine the number of rural customers and miles of rural lines in the state. There is urgent need for an additional man to assist in this rural electrification program.

During the year three additional agricultural engineering graduates of V. P. I. were placed with electric power companies in the state, to handle rural service work. This makes seven of our graduates now employed by four companies. These men are all working directly with the farmer and cooperating with the extension division. They are all doing splendid work and are a very important factor in advancing rural electrification. Mr. R. E. Choate, Agricultural Engineer of the Appalachian Electric Power Company at Roanoke and an agricultural engineering graduate of V. P. I. has made a brief report of his work for us. A copy of his report is included in the exhibit section of this report and indicates the nature of the work the agricultural engineer is handling with the Power Companies.

Rural Electrification Short Course

In carrying out the educational recommendations of the Governor's committee a three-day rural electrification short course was held at V. P. I. in June and attended by over 100 representatives of Power Companies. This short course was a distinct success. A complete program of the course is included in the "Exhibit" section of this report.

10-E-2. Farm Water Power Development

While no special effort was made to push this type of work all requests were taken care of as promptly as possible. It is very interesting work but lack of money to finance the installation on the part of the farmer limits the results obtained. It is true, though, as with some other projects, the work done may bring results years afterwards.

During 1929 there were fifteen (15) hydro-electric surveys made. The ones in Grayson and Tazewell Counties are the most promising at this time. There will be three jobs completed this year in Frederick, Grayson and Pulaski Counties.

The following table shows the counties in which water power surveys were made:

HYDRO-ELECTRIC SURVEYS MADE IN 1929

No.	County	No. of Surveys
1.	Albemarle	1
2.	Allegheny	2
3.	Amherst	1
4.	Augusta	1
5.	Bedford	1
6.	Floyd	1
7.	Grayson	1
8.	James City	1
9.	Louisa	1
10.	Mecklenburg	1
11.	Nettoway	1
12.	Smyth	1
13.	Stafford	1
14.	Tazewell	2
15.	Wythe	1

WATER POWER PROJECT

31-A



Concrete Dam to
impound the water,

Pulaski County.

Wood Flume to convey the
water to Power Plant.



An overshoot water wheel
on a Farm Water Power Project,
Grayson County

10-E-3. Individual Light Plants

Numerous letters of inquiry have been answered on this project but no field work of importance has been done. The light plant demonstration on the Hubbard farm near Blacksburg has been completed. This project was a study of a four cylinder light plant. The object of the study was to obtain reliable information on the possibilities and limitations of an isolated electric light plant; the operating cost was determined with practical equipment used under actual farm conditions.

This study was made by L. L. Koontz and published as his major thesis for a degree of master of science in agricultural engineering. The following data were taken from this report and represent the savings made possible with power from the plant as compared to previous methods:

WASHING MACHINE DATA

Hours saved in doing the wash	209.16/yr.
Cost of labor (hired help) saved	\$36.40/yr.
Value time saved at 25¢/hr.	<u>\$52.29/yr.</u>
Total saving per year	\$88.69

IRONING DATA

Time saved	211.6 hrs./yr.
Cost of hired labor saved	\$45.12
Value time saved at 25¢/hr.	<u>\$54.15</u>
Total saving per year	\$99.27

CHURNING DATA

Time saved	55.26 hrs./yr.
Cost of labor (saved)	\$14.40
Value time at 25¢/hr.	<u>\$13.80</u>
Total saving per year	\$28.20

HOUSECLEANING DATA

Figuring time and labor saved at 25¢/hr. we get a saving of 24¢ per room per cleaning. Assuming that the room is cleaned 3 times per week we get a total saving of \$37.44 per year.

Note: Cost of current is not figured in arriving at these savings.

10-E-3. Individual Light Plants (Cont'd)

Conclusions Drawn From Light Plant Study.

1. Too much weight cannot be placed on the results obtained from this study thus far due to the short period of the test.
2. The test should be continued for a number of years (life of the plant, if possible), and additional equipment, such as milk cooling, milking machines, dairy refrigeration, incubators and brooders, tested along with the present equipment.
3. The isolated gas-engine-driven electric light plant is a satisfactory piece of farm equipment. However, not as desirable as central station service where the latter can be obtained.
4. The farmer should endeavor to increase the kwhr. load, thereby reducing the kwhr. cost. However, the kwhr. cost from an isolated light plant can probably never be reduced to the cost of central station service.
5. The use of such appliances as washing machine, iron, churn, vacuum cleaner, wall cleaner and chore motor is both practical and profitable.
6. When refrigeration is used, some method should be employed to reduce the number of times the light plant is required to start.
7. Where large equipment is to be used, producing a rather constant load, it would probably be more profitable to increase the capacity of the battery, thus making it possible to raise the "cut in" point on the plant above 300 watts.

MISCELLANEOUS

The department is constantly being called upon for advise on problems of all kinds. In so far as it does not seriously interfere with our principal projects we give consulting advice on miscellaneous problems. Consulting assistance has been rendered practically every department of the agricultural college on numerous projects.

Some of the more important miscellaneous projects were as follows:

Preparation of a report on Rural Electrification and Engineering for the State Agricultural Commission.

Report for the Governor's Rural Electrification Committee for the state-wide Rural Line Extension Plan.

Report for National Advisory Council on Research in Mechanical Farm Equipment.

Plans for a stationary spray plant on one of Governor's Byrd's orchards at Timberville.

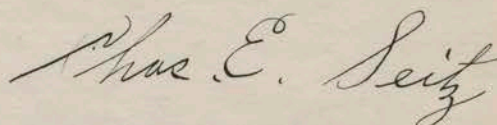
OUTLOOK

This has been the most successful year of agricultural engineering work and a high standard of accomplishments has been set. Every effort will be made however to make the coming year even more successful.

The demands being made upon the department for service are becoming greater each year and the only possible way to meet these increased demands is to maintain a high type of trained personnel. No expansions of projects will be possible this year unless additional engineers are added to the staff. The results secured this year are due to the policy adopted of concentrating attention on a few projects, with one man responsible for a limited number of projects. By being able to concentrate on one or two projects much greater progress can be expected from each staff member.

The same phases of the work will be stressed during the coming year. Only such changes in their organization and conduct will be made as can be accomplished without additional help. An effort will be made to strengthen the terracing project as we are not entirely satisfied with the present method of conducting this project. No new sub-projects will be taken up unless an additional specialist is added.

Respectfully submitted,



Agricultural Engineer
Head, Department of Agr'l. Engineering

EXHIBITS

RURAL ELECTRIFICATION PROJECT OUTLINE
PROGRAM RURAL ELECTRIFICATION SHORT COURSE
RURAL ELECTRIFICATION REPORT ON ROANOKE DISTRICT
By R. R. Choate

ORGANIZING SEWING MACHINE SCHOOLS - OUTLINE

FARM STRUCTURES PROJECT - OUTLINE
LIST OF FARM BUILDING PLANS - BOOKLET

TERRACING PROJECT OUTLINE
TESTIMONIAL LETTERS ON TERRACING SCHOOLS
TERRACING SCHOOL POSTER

FARM WATER SUPPLY PROJECT OUTLINE
LETTERS USED IN WATER SUPPLY CAMPAIGN
TESTIMONIAL LETTERS ON WATER SUPPLY CAMPAIGN
WATER SUPPLY CAMPAIGN POSTERS

AGRICULTURAL ENGINEERING
Sub-Project IV.

Rural Electrification

OBJECT: To aid farmers in securing electric service on the farm, and to demonstrate the use of electricity in improving living conditions on the farm, and for performing various farm operations.

IMPORTANCE: Electric energy on the farm offers a means of reducing some of the farmer's labor and power costs. Electricity in the farm home will be a Godsend to the farm housewife and will be an important factor in improving living conditions on the farm.

PROCEDURE: Promote the project in the county by means of meetings, demonstrations, bulletins, newspaper articles, and other publicity means. The men and women agents should cooperate on this project.

The Agricultural Engineering Department will:

1. Furnish the agent with instructions on methods of handling this project, supply bulletins or data for distributions, furnish educational publicity material for use in the county papers.
2. Send an engineer to the county to make a survey of the community and advise on best methods of securing electrical service; secure the cooperation of the electric power companies.
3. Secure cooperation of electric companies and induce them to maintain rural service departments with qualified agricultural engineers in charge.
4. Prepare a bulletin on Electricity on Virginia Farms.
5. Work out a plan for Rural Line Extensions for approval by State Corporation Commission.
6. Stage at least one Rural Electrification Short Course for instruction of rural service men with electric companies and others interested.

The County Agent will:

1. Promote the project in the county by distributing the publicity material, etc. furnished by the department.
2. Select a group of farmers in a community who are interested in securing electricity on their farms, and arrange for the engineer to visit their farms. Arrange for meetings of the interested farmers.
3. Obtain a record of the results gathered in the county due to the work on the project. Keep records over a series of years.

RESULTS: Results will be measured by the number of farms securing electric service; labor saving equipment and other conveniences installed; reduction of labor and power costs by the use of electricity; companies organizing rural departments, etc.

Rural Electrification Short Course

OBJECT

The course is designed mainly for men and women engaged in the advancement of rural electrification. It is open to all interested in the subjects under discussion.

REGISTRATION

Those desiring to attend the course are requested to register by mail at once. This is desirable as it is necessary to know the approximate number of persons to provide for. There will be no registration fees connected with the course.

ACCOMMODATIONS

Lodging can be secured at Green's Hotel, Old Brick House, University Club, or private homes. Meals can be had at the hotel, restaurants, or college dining hall.

Write the Agricultural Engineering Department, V.P.I., Blacksburg, Virginia, indicating preference for accommodations.

To reach Blacksburg, take the Norfolk and Western to Christiansburg, where automobile transportation can be procured to Blacksburg, a distance of eight miles.

First Annual Rural Electrification Short Course

TO BE HELD AT

Virginia Polytechnic Institute

*Wednesday, Thursday, Friday
June 12, 13, 14, 1929*



*Agricultural Engineering Department
Virginia Polytechnic Institute*

*The Public Utilities Association of Virginia
The N. E. L. A. and Manufacturing Companies
Cooperating*

SESSIONS IN AUDITORIUM
AGRICULTURAL EXTENSION BUILDING
V. P. I.
BLACKSBURG, VIRGINIA

RURAL ELECTRIFICATION PROGRAM

Program

Wednesday, June 12th

MORNING SESSION

- 8:30—9:30—Registration.
9:30—Address of Welcome, Dr. J. A. Burruss, President, V.P.I.
9:50—"Rural Electrification in Virginia," Chas. E. Seitz, Head Agricultural Engineering Department, V.P.I.
10:10—"A Program for Rural Extensions"
W. E. Wood, President, Virginia Electric Power Company.
J. W. Hancock, Division Manager, Roanoke and Lynchburg, Division, Appalachian Electric Power Company.
Lewis Payne, General Manager, Virginia Public Service Company.
L. E. Long, General Manager, Shenandoah River Power Company.
10:50—"How Can the County Agent Assist in the Rural Electrification Movement?" John R. Hutcheson, Director, Extension Division, V.P.I.
11:15—Discussion.
11:30—"Electric Power a Logical Development in American Agriculture," George W. Kable, Director, National Rural Electric Project.
12:00—Discussion.
12:30—Intermission.

AFTERNOON SESSION

- 1:30—"Requirements of Electrical Equipment for the Farm Home," Miss Eloise Davidson, Research Department, National Electric Light Association.
2:00—Discussion.
2:15—"Rural Electrification in the United States," Dr. E. A. White, Director, National Committee on Relation of Electricity to Agriculture.
2:45—Discussion.
3:00—"Rural Line Construction," W. I. Whitefield, Manager, Roanoke Division, Appalachian Electric Power Company.
3:30—Discussion.
4:00—"Contracts and Rates," C. N. Schoonmarker, Virginia Public Service Company.
4:30—Discussion.
7:00—"Good and Bad Practice in Farm Lighting," W. C. Brown, National Lamp Works, General Electric Company.
7:30—Discussion.
8:00—"Rural Electric Movies, "Romance of Sleepy Valley," American Farm Bureau Federation; "Yoke of the Past," General Electric Company.

Thursday, June 13th

MORNING SESSION

- 8:30—"Irrigation by Electricity," W. H. Coles, President, Skinner Irrigation Company.
9:00—Discussion.
9:30—"Electricity and the Poultry Industry," H. L. Moore, Extension Division, V.P.I.
10:00—Discussion.
10:15—"Electric Brooding, Incubation and Poultry House Lighting," Geo. W. Kable, Director, National Rural Electric Project.
11:00—Discussion.

- 11:30—Inspection of V.P.I. Poultry Plant and Electrical Equipment.
12:30—Intermission.

AFTERNOON SESSION

- 1:30—"Electric Water Systems for the Farm," Professor P. B. Potter, Agricultural Engineering Department, V.P.I.
2:00—Discussion.
2:30—"The General Purpose Portable Farm Motor," F. T. Smith, Industrial Department, General Electric Company.
3:00—Discussion.
3:30—"Peak Loads on the Farm" (Methods of Building a Profitable Rural Load), Geo. W. Kable, Director, National Rural Electric Project.
4:00—Discussion.
4:30—"Demonstration of the Rural Electric Truck," L. T. Wood, Agricultural Engineer, Virginia Electric Power Company.
5:00—"Demonstrations of Farm Electric Equipment," Agricultural Engineering Laboratory.
7:00—Dinner. Address, F. W. King, Vice-President, Virginia Public Service Company.
"Cooperation of Individual Light Plant Dealer and Electric Utility Companies," J. E. Waggoner, Public Relations Department, Delco Light Company.

Friday, June 14th

MORNING SESSION

- 8:30—"Electricity and the Dairy Industry," Professor C. W. Holdaway, Head Dairy Husbandry Department, V.P.I.
9:00—Discussion.
9:30—"Electric Milk Cooling and Storage on the Farm," C. W. Pegram, Dairy Manufacturing Specialist, Extension Division, V.P.I.
10:00—Discussion.
10:30—"Electric Milking Machines and Separators," P. M. Reaves, Dairy Husbandry Department, V.P.I.
11:00—Discussion.
11:30—"Electric Feed Grinding Equipment," Professor V. R. Hillman, Agricultural Engineering Department, V.P.I.
12:00—Discussion.
12:30—Intermission.

AFTERNOON SESSION

- 1:30—"Methods of Merchandising Electrical Equipment to the Farmer"
As Viewed by Sales Manager of Electric Company," L. F. Riegel, Virginia Electric Power Company.
2:00—Discussion led by N. F. Lawler, Virginia Public Service Company.
2:30—"As Viewed by Manufacturers of Farm Electrical Equipment," J. W. Savage, Merchandising Department, General Electric Company.
3:00—Discussion led by C. G. Hillier, Mansfield Works, Westinghouse Electric and Manufacturing Company.
3:30—"As Viewed by Rural Service Field Man," R. R. Choate, Agricultural Engineer, Appalachian Electric Power Company.
Remainder of afternoon to round table discussions and demonstrations of equipment.

November 26, 1929.

RURAL ELECTRIFICATION IN THE ROANOKE DISTRICT
OF THE APPALACHIAN ELECTRIC POWER COMPANY - 1929

By

R. R. Choate, Rural Service Engr.
Appalachian Electric Power Company, Roanoke, Va.

The first Rural Service Department of the Appalachian Electric Power Company was established in the Roanoke District on November 1, 1928. At this time I was placed in charge of the Rural Service Department of our Company. My experience in practical Rural Electrification seemed very limited, although I had completed the Agricultural Engineering Course at Virginia Polytechnic Institute and a four months' training course on Rural Electrification given by General Electric Company.

In this article I wish to give you a brief summary of the work we have experienced in the Roanoke District during the past year, 1929.

After beginning work with our company I spent some time studying the set-up of the Power Company organization before contacting the rural customer. Much valuable information was gained by studying the history of the development of rural electrification in our Company, rural line construction, rural line costs, application of rates for the different service made available for our customers, and the relation of one department to another in the company which affected either directly or indirectly the type of service we had to offer the rural people in our territory.

Our first step in dealing with the rural people was to make a survey of the existing farm customers in the Roanoke District to obtain pertinent data on each for our record files. The first visit to each farm customer served two purposes:

1. Making contact with the customer and explaining our company's recently established Rural Service Department for aiding the farm customers in the application of electricity on the farm and to assist our customers in securing the type of electrical appliances best suited for their needs.

2. To secure accurate data on the customer's present use of electricity and his need for further appliances and uses.

From the first survey of the existing farm business on our rural lines the following figures will give an indication of the farm customers' consumption of current and revenue during the year 1928. These are average figures taken from the total amounts.

Number of farm customers receiving electric service at the
end of the year 1928 - - - - - 194

Number of farm customers connected for electric service
less than one year - - - - - 62

Average total number of KWH consumed per customer for
the year 1928 - - - - - 1,003.3

Average amount of revenue paid per customer for the year
1928 - - - - - \$53.48

Year	Lighting		D. U. R.		Power	
	KWH	Amount	KWH	Amount	KWH	Amount
1928	67,317	\$6,103.59	56,634	\$1,966.66	70,699	\$2,305.49
Total						
		KWH	Amount			
		194,650	\$10,375.74			

It was estimated that there were 10% more farm customers on our rural lines than the above figures indicate, as some of these customers were overlooked during the survey and classed with non-farming resident customers.

When each farm customer was first called on it was explained how the Rural Service Department would be glad to assist the customers in solving their electrical problems without any responsibility to the consumer whatever. Each farmer was given a copy of the magazine "Electricity on the Farm", a monthly magazine which is educational and instructive in furnishing first-hand information on the value of electricity at work on the farm. The Company sends this magazine monthly to all its farm customers.

The attitude of the rural people toward the power company in general is very satisfactory. We find that the progressive Virginia farmer is interested in electrical merchandise for his home and his business, where it can be used at a profit, in time and effort saved, and as a means of contributing to his personal pride and satisfaction.

The farmer is an entirely different prospect from the city man, the man of industry or the college graduate, and in order to deal successfully with him, we must talk his own language, in terms he understands. Mr. Farmer is not interested so much in the fact that the power company will have to install a 3 kilowatt transformer and give him 220-110 volt service or that he is buying a motor that will use 200 or 500 watts or that it will take 3 kilowatts to grind four bushels of oats. He wants to know what the equipment will cost in dollars and cents and what it will save for him in dollars and cents or hours of labor. The farmer and his wife know the value of money and both know what work is. Although they do not care a great deal about technical terms which may be used, however, the farmer can be gradually educated to understand the more common electrical terms used. Nevertheless we should always talk in a language which he understands in order to attain his interest.

At the completion of our first farm survey, December 15, 1928, we had a list of 18 dairy farmers using electric milking machines in the Roanoke District. The total number of cows kept by these farmers were 654 head. Twenty-one farmers using electric current owned a total of 317 cows or an average of about 16 cows per customer who did not make use of the electric milking machine.

During the past year 14 additional dairy farmers have begun using the electric machines which bring the total number of electrically operated milkers up to 32, used to milk approximately 864 cows daily. This shows an increase of over 77% in the use of electric milkers used by our farm customers during the past year. Although the greatest increase is due to new customers added to the line the past year. About 100 farm customers, about one-third of those served, are interested in some phase of the dairy business. The other types of farms are classified as general, truck, fruit, and poultry farms.

An automatic electric water pumping system is one of the first installations considered by rural people using the hand pump or spring. The survey of 307 farms now using electric service in the Roanoke District bring out the following information in regard to water systems used by farm people:

Total number visited	307
Springs, wells, and hand pumps used	104
Gasoline engines used for water pumping	29
Gravity systems	32
Rams	17
City water systems	10
Number using electric water systems	115
Number using all other systems	192
Total number of farms using gasoline engines for water pumping and other power jobs	58

The above figures are correct for the farm business up to December 1, 1929. The number of electric water systems installed and gasoline engines replaced during the past twelve months has been very good.

Four farm customers that used electric motors for filling silos this year state that the cost of operation and convenience of the motor for power jobs on the farm are far superior to the tractor or gasoline engine, and it is an interesting fact to note that all of these farms use tractors for field work and cultivation of crops.

Three home-made electric dairy sterilizers have been installed. That is, the customer ordered an electric emersion heating coil and had the proper size galvanized tank made to suit his own needs for sterilization.

Many other applications of electricity have been applied to the farm, such as electric ranges, refrigerators, and small household appliances, the use of which is steadily increasing each month.

We have established a Farm Demonstration Room in our Roanoke office of the Appalachian Electric Power Company, where local dealers and manufacturers are allowed to place certain electrical appliances, such as a portable electric farm motor, automatic electric water pumping system, feed grinding mill, utility motor, and milking machine, for the purpose of demonstrating to the farmer this equipment in actual operation. The Colonial Home within the office was designed to furnish an outstanding example of the modern electric ranges and refrigerators, and the last word in an electrically equipped kitchen. The lecture room connected with it will seat about fifty people. It is an excellent place for the home economist to conduct group demonstrations. A cordial invitation is extended to all of our customers to make use of this practical laboratory in order that they may receive the maximum benefit from their electric service. This enables the farmer to come to us for first-hand information that he may be interested in, and at the same time the Rural Service Man can be of advantage to the farmer by helping him select the type of equipment best suited to his individual needs. The average farmer learns by observations, as he does very little reading about electrical applications. The Rural Service Man is in a better position to help the farmer solve his problems and thereby win his confidence where he does not have the responsibility of actually closing sales, although he may often work with the salesman in his territory.

Besides demonstrating certain electrical applications in operation we give the farmer circulars and literature explaining the use of electricity on the farm, show him pictures of electrical installations used by his neighbors, refer him to maps, charts and records which show the type of farms served in our territory and call his attention to farmers who may be considered as having model electrified farms.

Through the Rural Service Department we keep in close touch with the work carried on by the State Extension Division Service, Agricultural Engineering Department of the Virginia Polytechnic Institute, Farmers' Organizations, and County Farm Agents, who are directly interested in rural electrification as one important phase in the development of the rural communities in our State.

We found that there were a number of people along our old rural lines that were not connected for electric service. In order to acquaint these people with our present rural extension plan a visit was made to each prospective customer to find out the existing conditions and the reasons why more customers could not be connected for service, principally between the small towns and villages along these lines. The farm record card was used to record the data of all prospective customers interviewed.

For the past three months I have made a close survey of the Roanoke-Finsastle rural line, approximately twenty-five miles in length, to find out

the number of existing homes along this line that were not connected for electric service. The following report covers about 75% of this line:

Total number of homes visited - - - - -	54
Total number that have signed contracts for electric service in the past ninety days - - -	28
Total monthly guarantee signed for by the twenty-eight customers - - - - -	\$97.23
Average minimum monthly guarantee per customer	\$ 3.47
Total number of meters installed to serve customers added - - - - -	38
Number of farm customers added to the line - - -	26

We expect to cover all of our rural territory each line in a similar manner as described in the report of the Roanoke-Fincastle line in order to add as many prospective customers to the existing lines as possible. In the different farming sections of our rural territory we are helping certain farmers who own the various types of farms, such as dairy, fruit, truck and general, equip their farms with all the electrical labor saving devices suited for their needs and use these as model electrified farms for the purpose of demonstrating to our farm people the actual electrical equipment in operation.

It is hoped by giving the rural people the proper type of supervision and assistance we will be able to build up a rural load which will be profitable to the consumer as well as to the Power Company.

Circular No. 11

ORGANIZING SEWING MACHINE SCHOOLS

In order that all details concerning the conduct of a sewing machine school may be clearly understood this information sheet is presented. It is written chiefly to home demonstration agents and group leaders in charge of the organization of these schools, and they are requested to explain these details to the women who are interested.

THE OBJECT of a sewing machine school is to teach women how to CLEAN, ADJUST and CARE for their sewing machines. No attempt is made to teach stitching or the use of attachments.

ONE ALL-DAY SESSION is necessary for a single school. Ordinarily the work begins at nine in the morning and is finished at four in the afternoon. One hour is taken out at noon for lunch. The morning period is given over to cleaning the machines and the afternoon, to lecture and adjustments. At the end of the session each woman has her machine cleaned and adjusted, ready to take back home.

THE GROUP that is organized for an individual school should consist of about twelve women with their machines. It is not profitable to hold a school for less than ten, and impossible to handle more than fourteen. There is no objection to visitors if the room is sufficient to accommodate them.

NO MACHINE WITHOUT ITS OWNER WILL BE WORKED ON AND NO ONE WILL BE ALLOWED TO WORK ON A MACHINE THAT IS NOT THERE AT THE BEGINNING OF THE SESSION.

In addition to her sewing machine, each woman should bring her lunch, an apron, a square foot of white muslin or sheeting, and a spool of No. 50 white thread for sample stitching, a piece of cheese cloth or old flour sack for cleaning, together with extra needles, oil can, screw driver, etc. For convenience in transportation the drawers of the machine should be left at home, and the head may be removed from the stand and laid in the seat of the car. The stand may be hauled in the car or tied on the running-board.

It is necessary for the home agent or group leader to provide a central meeting place and see that every woman in the group gets there on time with her sewing machine. A fairly large room with light, heat and ventilation is absolutely necessary for twelve machines and space in which to work. A gallon of gasoline and a bottle of sewing machine oil must also be furnished.

The sewing machine specialist will have charts, instruction sheets, tools and other equipment, together with a limited supply of belts, needles and small parts that may be sold at cost.

AGRICULTURAL ENGINEERING

Sub-Project II.

Farm Structures

- OBJECT:**
1. To enable the farmer to secure the best type and design of farm structure for the money expended.
 2. To promote better farm buildings both from the architectural as well as utility standpoint.
- IMPORTANCE:** Farm buildings in the state increased in value from \$268,080,748 in 1920 to \$286,136,184 in 1925. This department's plan service will assist the farmers to get the most out of the approximately three and one-half million dollars expended annually in farm structures.
- PLAN OF WORK:**
- The Agricultural Engineering Department will:
1. Prepare new plans for farm structures as rapidly as possible.
 2. Cooperate with the Division of Agricultural Engineering, U. S. Department of Agriculture by using as many plans designed by that office as are adapted to Virginia conditions.
 3. Prepare a mimeograph booklet listing all available plans.
 4. Rewrite Poultry Housing Bulletin.
 5. Prepare circulars for construction methods to supplement plan service.
 6. Cooperate with Portland Cement Association in giving county agent assistance with concrete problems.
 7. Supply county agent with plans, bulletins, specifications, bills of material, etc.
 8. In cases of community projects, such as packing houses, storage houses, fair buildings, etc. Give field assistance.
 9. Secure the cooperation of all interested agencies, such as lumber dealers and manufacturers, contractors, architects, etc.
- The County Agent will:
1. Promote the project in the county by distributing the publicity material supplied by the department.
 2. Make efficient use of plan booklet and send to the department for plans needed by the farmers.
 3. Keep a record of the farm buildings constructed in the county, costs, alterations made in plans, etc.
- RESULTS:** Results will be measured by number of plans furnished, new buildings constructed, old buildings remodelled, etc.

COOPERATIVE EXTENSION WORK
IN
AGRICULTURE AND HOME ECONOMICS
STATE OF VIRGINIA

Va. Agri. and Mech. Col.
and Poly. Inst. and the
U. S. Dept. of Agri.
Cooperating

EXTENSION SERVICE
AGRICULTURAL ENGINEERING DEPT.

LIST OF FARM BUILDING PLANS

For a number of years the agricultural engineering department has been preparing and sending out plans for all types of farm structures. These plans are the best designs obtainable and adapted by actual use to Virginia conditions. All plans embody the advice of specialists in every line concerned. In addition to plans prepared by this department, a number of plans are listed that have been prepared by the Division of Agricultural Engineering of the United States Department of Agriculture.

These plans are free to the farmers of Virginia. As the cost of preparing these plans is considerable, it is requested that only plans that are actually needed be asked for. If a plan is needed for a type of structure not listed, write for information, as new plans are constantly being prepared. Several plans for modern farm homes are now in preparation. A number of plans are also on file that are not listed here.

Ordering Plans

When ordering plans, specify the kind of building and the plan number. For example--if a farm house is wanted and plan A-1 seems to fill the requirements, write the department asking for Farm House Plan, No. A-1.

Address all correspondence and requests for plans to--Agricultural Engineering Department, V. P. I., Blacksburg, Virginia.

LIST OF PLANS

FARM HOUSES

Plan No.

A-1 A seven room semi-bungalow, 26' x 28'. Furnace room, wash room, and vegetable cellar in basement. First floor--living room, dining room, kitchen, office or bedroom. Second floor--three (3) bed rooms and bath. Ample closets on both floors.

Plan No.

- A-2 Six room farm cottage, 24' x 26'. Two stories. First floor-- living and dining room, kitchen, wash room and laundry. Second floor--three (3) bed rooms and bath, sleeping porch. Basement-- furnace room, vegetable room and large room.
- A-3 Small farm cottage. One story, 22'-6" x 32'-4". Two (2) bed rooms, bath, large combination living room, dining room and kitchen. Storage cellar and wash room in basement.
- A-4 Small one story farm cottage, frame construction, 24' x 32'. Two bed rooms, kitchen, combination living and dining room. Screened porch at one corner. Cistern in basement.
- A-5 Farm tenant house, one story, frame construction, 28' x 30'. Two bed rooms, kitchen and back porch.
- A-6 Five room, two story farm house, frame construction, 24' x 30'. First floor--kitchen and dining room combined, living room, hall, front and rear porch. Second floor--two bed rooms, bath, hall closet.
- A-7 Seven room, two story farm house, frame construction, 28' x 30'. First floor--living room, dining room and kitchen. Second floor-- four (4) bed rooms and bath. Basement.
- A-8 One story frame construction. 29' x 50'. Combined living and dining room, two bed rooms, bath, kitchen, wash room and laundry, living porch, small entrance porch, cellar with furnace flue.
- A-9 Two story frame construction. 23' x 25'. Combined living and dining room, kitchen, wash room, and laundry in first story. Three (3) bed rooms, bath and sleeping porch in second story, cellar with furnace flue, large front porch.
- A-10 One story frame construction. 28' x 36'. Living room, dining room, kitchen, bath, two (2) bed rooms, sleeping porch, small cellar for furnace, storage cellar, front porch, rear screened porch.
- A-11 One story frame construction. 25' x 30'. Combined living room and kitchen, two bed rooms, bath, enclosed rear porch, front porch, cellar with furnace flue, (alternate plan, living room, combined kitchen and dining room, one bed room, bath, enclosed rear porch, front porch, cellar under part of house, no furnace flue.)
- A-12 One story frame construction. 18' x 30'. Combined living room and kitchen, 1 bed room and bath, front and rear porches, no cellar, concrete foundation.
- A-13 One story frame construction. 25' x 25'. Living room, combined kitchen and dining room, 1 bed room, front porch, bath room and rear porch designed to be built with the house or as an addition. No cellar, concrete foundation.
- A-14 One story frame construction. 20' x 32'. Combined living and dining room, kitchen, 2 bed rooms, no cellar, pier and girder foundation, fireplace.

Plan No.

- A-15 One story frame construction. Living or recreation room, dining room, kitchen, cook's bed room or store room, wash room, shower bath, toilet, lavatory and lockers, front porch, cellar 11' x 12' for stores, concrete foundation, gable roof, heated by stove or fireplace. Approximately 22' x 42' with 6' x 19' projection in front. By using double deck bunks this house may be adapted to house 8 to 16 men without mess facilities.
- A-16 One story frame construction. 24' x 28'. Living room, 3 bed rooms and bath, front porch, small rear stoop, no cellar, concrete foundation, gable roof, heated by stove. To house 3 to 6 men.
- A-17 One story frame construction, three (3) bed rooms, living room, dining room, bath and sleeping porch. Wash room and laundry and kitchen in small rear wing. Basement with vegetable cellar.

DAIRY BARN

Plan No.

- B-1-a Standard 36' dairy barn, gambrel roof, of length to suit any size herd. Cows facing out. Feed room attached at side. Hay loft, capacity one ton per foot length. Alternate floor plan for Richmond city requirements with milk and feed room at end of barn but separated from main cow section by 12' passage-way.
- B-1-b Same as B-1-a but with cows facing in.
- B-2 Cinder block twenty (20) cow barn, 36' x 69'. Cows facing out. Hay mow with self supporting gambrel roof extending over milk and feed room.
- B-3 One story shed roof barn for 6 cows, 18' x 31'. Feed room in one end.
- B-4 20 cow dairy barn, 36' x 64', cows facing out, gambrel roof, large hay mow capacity.
- B-5 One story gable roof barn for 28' cows, 36' x 58'. Cows facing out. Scissors truss construction.
- B-6 Same as above but for cows facing in.
- B-7 One story gable roof, 34' x 61'-6". Cows facing out.
- B-8 One story gable roof, 34' x 45'. Cows facing in. 20 cows.
- B-9 4 cow barn, 18' x 30', calf pen, hay storage, gable roof.
- B-10 Home made wood stanchions.

MILK HOUSES

- B-11 Milk house, 13' x 22'. Boiler room, work table, testing table, separator and wash sink in one room. Screened sunning shelf.
- B-12 Milk house, 12' x 32', three rooms, separator room, boiler room, and general room.

Plan No.

- B-13 Milk house for V. P. I. 12' x 30'. Three (3) rooms, boiler room and coal bin, washing and testing room, separator room with weighing room attached. Loading platform and can rack.
- B-14 Milk house, 18' x 26'. Three (3) rooms and cold storage or refrigerator room. Suitable for 20 to 40 cows where the milk is bottled.
- B-15 Milk house, 15' x 20'. Boiler room, and wash room. Suitable for butter-making.
- B-16 Milk house, 21' x 27'. Milk room, wash room, office, boiler room and toilet room.
- B-17 Milk house, 12' x 14'. One room. A plan suitable for farm with a herd of from 25 to 30 cows and arranged for handpower butter-making equipment.
- B-18 Milk house, 10' x 20'. Perhaps the best all around milk house for dairies shipping milk or cream. Boiler room, wash room, milk room. Conveniently arranged and relatively inexpensive. Adapted to dairies of from 10 to 30 cows.
- B-19 Milk house, 27' x 31'. A plan designed for those farms producing certified milk or a special grade of milk from 40 to 100 cows. Besides the usual facilities for bottling milk and cleansing utensils, it contains a dressing room and showers for the milkers.
- B-20 Milk house, 14' x 24'. Fully equipped for handling a bottle milk business with from 25 to 50 cows. Milk room, wash room, boiler room, refrigerator.

BEEF BARN

- C-1 Two story frame barn 36' x 84', self supporting gambrel roof. Capacity 55 head. Hay mow capacity, 84 tons. 6 feet feed alley through center of barn, with feed mangers on each side. Feed room in corner of barn.
- C-2 Beef cattle feeding shed 25' x 70', two story frame barn. Self supporting gambrel roof. Capacity, 30 head. Hay mow capacity, 60 tons. Feed alley at one side with manger. Feed room and box stall at end.
- C-3 Beef cattle feeding shed, capacity, 100 head. Feed alley through center with manger on each side. OPEN ON ALL SIDES.
- C-4 Beef cattle barn, 30' x 60'. Two story. Two feed troughs in center of one side. Feed alley through center with feed racks and troughs on each side. Feed room at end.
- C-5 V. P. I. beef cattle barn 30' x 80'. Two story frame barn. Gambrel roof. Storage bin on second floor. Concrete floor feed alley through center with stalls, bull pens and feeding pens on each side. Feed room near one end.

Plan No.

9641-5

- C-6 Beef cattle shed, 30' x 96'. One story frame barn. Gable roof. Feed alley through center with sheep pens on one side and box stalls on one side. Concrete feed alley. Dirt floor in pens and stalls.
- C-7 Beef cattle barn approaches to loft floor.
- C-8 Cattle shed, 20' x 68' with 20' x 24' ell. 50 head loose cattle. L shaped, open front, gable roof, concrete foundation.
- C-9 Cattle barn, (closed type), 36' x 72'. 2 stories, 48 to 68 head loose cattle, concrete paved central feed alley with feed troughs and hay racks on each side, mow capacity 100 tons loose hay, gambrel roof, concrete foundations. (Feed room 20 x 20 feet shown connected to two 14' diameter silos).
- C-10 Cattle stock.
- C-11 Dipping vat for cattle.
- C-12 Cattle feeding rack.
- C-13 Self feeder for cattle.
- C-14 Dehorning chute.

HORSE BARN

- D-1 Gambrel roof horse barn for 6 head. 34'- 0" x 26'- 0". 4 stalls, 2 box stalls. Harness room, feed room. Feeding room in center of barn. Hay capacity, 24 tons.
- D-2 Ten mile barn, 60'- 0" x 36'- 0". Gambrel roof construction. Feed room. Harness room, feed alley through center. Hay capacity, 60 tons.
- D-3 Gambrel roof horse barn, 36' x 40', 2 box stall, 6 hitch stalls. Feed bin and harness room.
- D-4 Horse barn, 34' x 42'. 2 stories, 3 single, 4 double, 1 box stall, harness room, grain bin 450 bu., corn crib 500 bu. ear corn, mow capacity 50 tons, 4 feet central feed alley, gambrel roof, concrete foundations and wall to window sills.

SHEEP BARN

- E-1 Two story frame sheep barn, 20' x 44', gable roof. Capacity 50 sheep. Central feed alley with manger on each side. South side open. Hay capacity--12 tons.
- E-2 One story sheep shed, 20' x 50', gable roof, 70 sheep. South side open. Feed alley across center.

Plan No.

- E-3 Sheep barn, 16' x 48'. 2 stories, 50 to 60 loose sheep, feed rack in center, mow capacity loose hay. Self supporting frame on concrete piers, gable roof. Sides covered with boards and battens.

POULTRY HOUSES AND EQUIPMENT

- F-1 Combination roof poultry house, 30'- 0" x 18'- 0". Laying house for 130 hens. Bill of materials.
- F-2 Shed roof poultry houses. 20'- 0" x 14'- 0". 70 hens.
- F-3 Colony house (portable) 6'- 0" x 8'- 0", bill of materials.
- F-4 Portable brooder house, gable roof, 12'- 0" x 14'- 0". 600 chicks first two weeks, 300 to 400 afterward.
- F-5 Portable brooder house, shed roof, 12' x 14'.
- F-6 Incubator house, 10'- 0" x 24'- 0". Gable roof.
- F-7 Open air poultry houses. 6'- 0" x 10'- 0". Portable.
- F-8 Long dry mash hopper. Self feeder. Dry feed hopper, dry mash self feeder, buttermilk self feeder.
- F-9 Details of: Small self feeder, portable chick feeder, fattening crate and trap nest.
- F-10 Roost and nest construction.
- F-14 Cinder block laying house, combination roof, 20' x 40'.
- F-15 Multiple unit laying house. New Jersey type. Shed roof. 20' x 40'.

HOG HOUSES AND EQUIPMENT

- G-1 Dipping vat for hogs with bill of material.
- G-2 East and West type half monitor roof hog house, 20' x 44'. 13-6' x 8' pens with individual doors. 4 feet central alley way. Feed room in one end. Concrete floor.
- G-3 Shed roof movable hog house, 6 $\frac{1}{2}$ ' x 8'. Light frame construction.
- G-4 A shaped movable hog house, 6' x 8'.
- G-5 Gable roof type hog house, 26' x 62', 14-8' x 10' pens. Feed room and scale room in one end. 6 feet alley way through center.
- G-6 Half monitor, V. P. I. hog house, 60'- 0" x 24'- 0".
- G-7 Hog house, 7' x 8'. Bill of materials. Colony house, on runners or skids. Gable roof, batten doors open on both sides of roof.

Plan No.

- G-8 Hog house, 20' x 36'. Bill of materials. 12 pens 6' x 8', 6 on either side of 4 feed alley. Movable division partitions with hinged fenders. Gable roof, concrete foundations, alternate types of pen floors. Windows in end and side walls. Sliding doors from each pen to feeding yard.
- G-9 Hog house, 8' x 36'. Bill of materials. 6 pens 6 x 8' in one row, no feed alley. Movable division partitions with hinged fenders. Box car types of roof, concrete foundations. Alternate types of pen floors. Windows in end and one side. Sliding doors from each pen to feeding yard.
- G-10 Arkansas self feeder for hogs. Size for 50 to 60 shoats.
- G-11 Two way self feeder for hogs; for shelled corn and ground feeds.
- G-12 One way self feeder for suckling pigs.
- G-13 Hog shipping crate, frame. Bill of materials on drawing. Three sizes shown, for hogs weighing 150 - 175, 250, 500 lbs.
- G-14 Hog alfalfa feed rack. Bill of materials on drawing. 10' x 3' feed rack for hogs. On skids or runners. Tight trough to catch fine hay which may sift through slatted immediately above.
- G-15 Breeding crate for hogs. Bill of materials on drawing. Dimensions 10 x 2-1/2 feet. Adjustable.
- G-16 Hog house, gable roof, 22'- 3" x 45'- 8". 12 pens 7' x 8' 4". 6 on either side of 6 foot feed alley. movable division partitions with hinged fenders, gable roof, windows in both sides over doors from pens to exercise yards. Concrete foundations and floors, chimney for stove, frame superstructure.
- G-17 Hog loading chute on wheels. Bill of materials on drawing. 20 feet long, 2 feet wide, sides 3 feet high.
- G-18 Wooden smoke house, 6' x 8'. Bill of materials. Frame construction with concrete foundations, gable roof, concrete fire box on outside with terra cotta duct to house.

GENERAL PURPOSE BARN

- H-1 General purpose barn, T-shaped frame. Front wing two story, self supporting gambrel roof, 36' x 60'. Four single standing horse stalls. 3 double standing stalls. 2 feed rooms. 2 bull pens and central driveway. Hay capacity, 60 tons. Standing stalls facing in. Rear wing--gable roof feeding shed, sides open, 34' x 96'. 6 foot central feed alley with feeding mangers on each side, capacity, 96 head.

Plan No.

- H-2 General purpose barn. Two story frame construction, 32' x 40'. Self supporting gambrel roof. 8' central feed alley, on one side 3 box stalls, feed room and harness room, on other side, beef cattle compartment for 12 head.
- H-3 General purpose barn, two story, frame construction, 28' x 45'. Self supporting gambrel roof. At one end two box stalls, and two standing stalls facing 10 feet cross driveway. Hay capacity, 30 tons.
- H-4 General purpose barn, two story frame construction, 36' x 68'. Self supporting gambrel roof. 10' central driveway. At one end, four standing stalls, facing out and two box stalls. At other end, ten cow stalls facing out and four pens. Feed room in center. Partition separating house from cattle compartment. Hay capacity, 68 tons.
- H-5 General purpose barn, two story construction, 36' x 73'. Self supporting gambrel roof, 8 feet, central driveway. At one end, 14 cow stalls facing out (two rows). At other end and separated from these by a partition are 4 box stalls with outside doors, 2 grain storage rooms, harness and feed room. Hay capacity, 73 tons.
- H-5-a Four suggestive floor plans for general purpose barn, 36' wide.
- H-6 One story frame hay barn, 30' x 60', self supporting gambrel roof. Capacity, 90 tons.
- H-7 General purpose barn, gambrel roof, 4 stalls, machinery room, driveway.
- H-10 Gable roof general purpose barn for 2 horses and 1 cow. 24'-0" x 18'-0".
- H-12 Hay barn, 60'-0" x 50'-0" (with feeding shed).
- H-13 Hay barn, 30' x 60', double sheds open on all sides.
- H-14 General purpose barn, 36' x 91'. Bill of materials. Two stories, basement provides for 3 single and 1 double horse stalls, 2 box stalls, pen for 7 calves, 27 cow stanchions, 8 feet. Center driveway, water trough, harness room, horse stair, feed room. Concrete bridge to second floor. Second floor contains grain storage space and 3 grain bins 136 bu. each, drive and vehicle storage space, mow with 70 ton capacity. Gable roof, concrete floor and basement walls to window sills.
- H-15 General purpose barn, 56' x 64'. Bill of materials. 4 double horse stalls, 1 box stall, 5 cow stanchions facing in, pens for 65 sheep, 4 grain bins 300 bu. each, crib for 300 bu. ear corn, mow extends from ground to ridge with 58 tons capacity, gambrel roof 26 foot span with 15 foot shed on each side. Concrete foundations, board and batten exterior.

Plan No.

- H-16 Hay shed. Bill of materials. To be built in 16 foot sections or bays 28 feet wide, capacity 20 tons loose hay per section. Trussed framing on concrete piers. Lower half open, upper half closed with boards and battens, gable roof.
- H-17 General purpose bank barn suitable for building on side of hill. 24' x 32'. Main floor for implements, etc. Hay loft, basement under 1/2 of barn with shed attached for beef cattle.

MACHINERY AND SHOP STRUCTURES

- I-2 Machinery shed, 22' x 60', open front, combination roof, can be built in 12 foot sections.
- I-3-a Workshop and implement shed, 22' x 54', horizontal siding. Workshop in one end, 14' x 22'. Closed shed, 20' x 22', sliding doors, open shed, 20' x 22'.
- I-3-b Workshop and implement shed. Same as I-3-a, except that it provides for vertical siding.
- I-4 Machinery shed 18' x 48', gable roof, closed with sliding doors on front. Vertical siding, floor space free from posts. Can be built in 12 foot sections.
- I-5 Farm repair shop and machinery shed, 24' x 50', gable roof, scissors truss, can be built in 10 foot sections. Repair shop, 16' x 24', double doors on front provide for work bench, forge, tools, etc. Machinery shed, 24' x 34' with closed sliding doors on front and large sliding door at end.

STORAGE HOUSESCORN CRIBS

- J-1 2000 bu. corn crib, gable roof, frame construction, 32' x 28'. 12 foot driveway through center. 8' wide bins on each side.
- J-2 500 bu. corn crib, 12' x 16'. Granary in gable.
- J-3 Corn crib and granary, 26' x 36'. Bill of materials. Two cribs 8' x 36' separated by a 10' concrete paved driveway. Space is provided over the driveway for the storage of grain. Capacity 3,540 bu. ear corn and 2,710 bu. grain. Gable roof over whole. Designed for use with portable elevator, shelling trench and ventilation shafts. A special feature is the provision for racks which facilitate the drying of soft or immature corn.
- J-4 Portable granary, 10' x 14'. Bill of materials. Capacity 780 bu. grain, rat-proofed, gable roof, boards and battens for side covering, provided with skids or runners for moving.

Plan No.

- J-5 Granary, 14' x 24'. Bill of materials. Two bins each end of building, total capacity, 1,800 bu. grain, space provided in center for cleaning seed, rat-proofed, gable roof, concrete foundations.

POTATO AND VEGETABLE STORAGE HOUSES

- J-6 500 bu. sweet potato storage house, 12' x 16'.
- J-7 Sweet potato storage house, 40' x 100'. Bill of materials. 15,500 bu. in bulk or 12,000 bu. in crates, frame structure, gable roof, concrete foundations, building divided into three compartments each containing 18 slatted bins, 6 on each side and 6 in center with two 3'6" aisles, provision for 6 stoves, floor and roof ventilators, windows in sides.
- J-8 Sweet potato storage house, 16' x 29'. Bill of materials. 1,000 bu. in crates, frame, gable roof, pier and girder foundations.
- J-9 Sweet potato storage house, 20' x 40'. Bill of materials. 2,500 bu. in bulk or 2,000 bu. in crates, frame structure, gable roof, concrete foundations, 9 slatted bins on each side with 3' aisle. Provision for one stove, floor and roof ventilators, windows in sides.
- J-10 Fruit and vegetable storage cellar, arch roof, 10' x 13'. Bill of materials. 220 bu. concrete construction, to be built under ground.

APPLE STORAGE

- J-11 Cinder block apple storage house, 32' x 50'. One story, capacity 5000 to 7000 bu.
- J-12 Cinder block apple storage house. Same type as L-1, 20' x 30', 1500 bu. capacity.
- J-13 Apple storage cellar, 30' x 68'. Cinder block walls, reinforced concrete roof. 7000 bu. capacity.
- J-14 Apple storage cellar, same construction as L-3, but 20' x 30'. 1500 bu. capacity.

LIME STORAGE

- J-15 Lime storage house, frame construction, 70 ton capacity, 14' x 24'.
- J-16 Lime storage house, frame construction, 10' x 64'.
- J-17 Lime storage house, frame construction, 14' x 24'. 90 ton capacity.

ICE HOUSES

- Plan No.
 J-18 Ice house and milk room, 14' x 20', frame construction.
 J-19 Small inexpensive ice house, 12' x 16', frame construction.

MANURE STORAGE HOUSES

- J-20 Covered manure shed, 14' x 22', concrete and frame construction. Driveway through center. Bill of material.

APPLE PACKING HOUSES

- K-1 Apple packing house, frame construction, 40' x 80' with 20' shed on one end. Empty barrel storage--second floor.
 K-2 Apple packing house, frame construction, 50' x 100'. Receiving shed at one end. Empty barrel storage--second floor.
 K-3 Apple packing house, 60' x 90'. Barrel storage above. Driveway through basement. Receiving shed on one side. Shipping shed at other side.

TOBACCO BARNs

- L-1 Tobacco stripping and packing house, 24' x 42'. Designed for Chatham Experiment Station.
 L-2 Tobacco barn, 18' x 27'. Frame construction.
 L-3 Concrete tile tobacco barn, 17'10" x 17' x 10'.

FAIR EXHIBIT BUILDINGS

- M-1 Fair exhibit building, 40' x 60'.
 M-2 Fair exhibit building for New Kent County Fair Association, 30' x 80'.
 M-3 Fair exhibit building for Charles City County Fair Association, 50' x 84' with basket ball court.
 M-4 Fair exhibit building for Orange County Fair, 74' x 151' with dancing pavilion.
 M-5 Fair exhibit building, 50' x 120', frame construction.
 M-6 Poultry exhibit building, 24' x 64'.

MISCELLANEOUS STRUCTURES AND EQUIPMENT

- Plan No.
- N-1 Construction details for gambrel roof, braced rafter type, 36' wide, barn frame.
- N-2 Construction details for gambrel roof, truss type, barn frame, 36' wide.
- N-3 Construction details for scissors truss for a 34' span.
- N-4 Home made lime spreader for attaching to wagon.
- N-5 Improved rag doll germinator---Godkin.
- N-6 Tobacco wagon rack, 14' to 13' long, 3'8" wide, 2'6" high above wagon body.
- N-7 Concrete stove.
- N-8 Weighing scale fence.
- N-9 Reenforced concrete reservoir, 4000 gallons capacity, 11' x 13'.
- N-10 Single chamber septic tank, concrete.
- N-11 Movable fence for sheep and hogs.
- N-12 Farm construction for concrete feeding and watering trough.
- N-13 Concrete hog wallor.
- N-14 Concrete feeding floor, 10' x 25'.
- N-15 Home water works, suction pump on sink in kitchen. For shallow well. Bill of material.
- N-16 Home water works. Force pump at well. Sink in kitchen. small tank over sink in attic. Bill of material.
- N-17 Home water works. Same as N-16 but with hot water tank connected to kitchen range. Bill of material.
- N-18 Home water works. Same as N-17 with bath room fixtures.
- N-19 Home water works. Gas engine driven force pump at well. Storage tank above well. Hot and cold water in kitchen and bath room.
- N-20 Three water systems. Pneumatic, hydro-pneumatic, and gravity.
- N-21 Stave silo. Details of construction of home made silo.
- N-22 Wooden hoop silo. Details of construction of home made silo.

List of Farm Building Plans

Plans available for distribution in Virginia

By

Agricultural Engineering Department
Virginia Polytechnic Institute

AGRICULTURAL ENGINEERING

Sub-Project I.

Terracing

OBJECT: To spread the teaching and practice of terracing for the purpose of preventing soil erosion, conservation of soil moisture and improvement of the soils.

IMPORTANCE: Soil erosion occurs to some extent in practically every county of the state. In at least 25% of the counties it constitutes a serious problem. Soil erosion results in considerable loss of fertility. Soil scientists say erosion takes 20 times more out of the soil than does the growing of crops. If not checked in time, erosion will necessitate the ultimate abandonment of the land.

Investigations conducted in Charlotte County show that 89% of the farm land is subject to erosion and that over 4000 acres were abandoned to cultivation last year as a result of excessive erosion.

PLAN OF WORK: Promote terracing through terracing schools which include demonstrations, meetings and propaganda. The county agent will assume leadership in all terracing activities in his county. Definite demonstrators will be selected in communities from farmers requesting aid in terracing. These demonstrators will agree to advertise the meeting in their community, provide necessary tools and power, and agree to complete the terraces as laid out.

The County Agent will:

1. Promote the project in his county by distributing the publicity material, etc. furnished by the department.
2. Select reliable farmers in different communities who have land in need of terracing, and who agree to follow instructions.
3. Make all necessary preliminary arrangements for holding demonstrations or schools. Advertise the demonstration.
4. Obtain a record of the results secured in his county due to the work of this project.

The Cooperating Demonstrator will:

1. Record results of terracing relative to crop yield, land value, etc.
2. Help county agent secure an interested group of men at the demonstration.
3. Report on other terracing work done as a result of his demonstration.
4. Help his community to practice extension teaching in terracing and uphold extension standards set out in demonstrators agreement.

The Agricultural Engineering Department will:

1. Supply county agent with educational publicity material for use in local papers; supply bulletins and other information on

- terracing for distribution; furnish agents with complete instructions on method of handling this project.
2. Send an engineer to the county to assist the agent in handling the school; the engineer will assist the agent in giving instructions on handling the level, building terrace drag, and constructing at least one model terrace at each demonstration; help the agent with the solution of any particular soil erosion problem that may arise.

GOAL:

To insure each county, men experienced in terracing who can take care of the terracing needs of the county, so that the agents future effort in terracing will be purely instructional and advisory. Results will be measured by number of men trained to do terracing, and number of acres terraced as a result of demonstration.

INSTRUCTIONS TO DEMONSTRATOR

Cooperative Demonstrator _____ Co. Agt., _____

History of the piece of land

Crop grown in 1925	Yield per acre
1926 _____	" " " _____
1927 _____	" " " _____
1928 _____	" " " _____

Topography _____ Soil type _____

The assistance given you in terracing is being given for the purpose first of helping you to save or rebuild the top soil on your farm, and second for the purpose of influencing other farmers in your community to adopt the same extension practices. This would result in building up a fertile soil in your community.

As a cooperating demonstrator it is expected that you will study the terracing bulletin to be secured from your county agent, and apply the methods they present.

Your terraces should be built at least 20 feet wide at the base, and 2 feet high in the middle as soon as possible after work has started.

It is necessary to build all fills over gullies extra heavy. The terraces outlets must be big and generous.

You should farm terraced land as nearly as possible with the terraces at least for the first year.

During the first rain storm after building, it is important that you visit your terraces prepared with a shovel to help prevent any breaks.

You should encourage your neighbors to terrace and you are expected to report to your county agent on a blank furnished by him the results of your terracing. This report will give information on cost and benefits of terracing.

Gladys, Virginia
December 11, 1929

Mr. J. A. Waller, Jr.
Blacksburg, Va.

Dear Mr. Waller:

I am glad of the opportunity to tell you what I think of the system of terraces you built on my farm this fall.

I do not consider any phase of agricultural improvement of more vital importance to the state than this work. Personally I have suffered more from erosion than any destructive agency on my farm. Your system of terraces solves this problem nicely.

I consider the method of demonstrating this work, the terracing school, as an ideal arrangement, since it reaches so many at one time.

Thanking you again for your assistance and trusting we may have the pleasure of having you with us again, I am

Cordially yours,

(Signed) W. T. Oakes

Chase City, Virginia
Nov. 19, 1929

Mr. J. A. Waller, Jr.,
Specialist in Agr. Eng.,
Blacksburg, Va.

Dear Jack:-

I appreciated your help last week and enjoyed your visit but am awfully sorry I did not succeed in getting out larger crowds. I am very glad that you taught me how to lay off the terraces myself so that I can go ahead with it now.

Some of the paint manufacturers have a motto, "Save the surface and you save all." This can aptly be applied to terracing for if we check soil erosion, we not only save the land but we maintain fertility and by wise handling, our farmers can increase fertility at less cost.

In this section that is rolling, and where many farmers do not practice good systems of crop rotation, the loss from erosion is fearful. The best way to check this in my opinion is by terracing altho some people think that the seeding of grasses and other cover crops will check or control it. It may check it but not control it as effectively as the two combined, i. e. terracing the land and then seeding the cover crops.

With kind regards, I am

Very truly yours,

(Signed) N. H. Williams,
County Agent

HALIFAX COUNTY TERRACING SCHOOL

Farm Demonstration Agents of the Extension Division, Virginia Polytechnic Institute, have secured the services of the Extension Specialist in Agricultural Engineering to instruct the farmers in their counties in the use of the level, how to lay out terrace lines and how to construct terraces. There will be a meeting Monday, Tuesday and Wednesday nights beginning at 7:30 o'clock and a big field demonstration on Thursday. The schedule for your county is as follows:

Monday Night, November 4th, Turbeville School
Tuesday Night, November 5th, North Stanton School
Wednesday Night, November 6th, Rosa School

THE FIELD DEMONSTRATION will be held Thursday, November 7th, beginning at 9:00 A. M., on the farm of Mr. H. T. Crews. This place is located eight miles North of Halifax on the Lynchburg road.

Farmers in this section of the state can do no more important work than preventing their soil from washing away. Terraces accurately laid out and properly constructed do this very effectively. Come out to the night meeting nearest you and to the field demonstration.

C. L. HALL, COUNTY AGENT
Halifax, Virginia

AGRICULTURAL ENGINEERING
Sub-Project III.

Farm Water Supply & Sanitation

- OBJECT: 1. To demonstrate the most practical methods of securing running water and other conveniences in the farm home.
2. To improve the sanitary conditions around the home and thereby help the health of the whole family.

As the ultimate object of the extension work is to improve the farm home life, this project should be the most important in extension work.

- PROCEDURE: 1. Promote the project in the county by county wide campaigns which will give every farm owner an opportunity to know how, and at what cost, running water can be put in his home.
2. Teaching farmers the fundamentals of different types of water systems.
3. Enlisting the enthusiastic support of local leaders.
4. Instructing local plumbers as to class of work generally put in in such campaigns and ask them to cooperate with the farmers.
5. Make this a definite and thorough piece of work so that it will continue under its own momentum.

LOCALITY: This project should be carried to practically every Virginia County. There is immediate need for it in about 90% of the farm homes. Campaigns will be held in the following counties this year:

Pittsylvania
Rockingham
Amherst
Montgomery
Albemarle
Stafford
Spotsylvania
Buckingham

- PLAN OF WORK:
- A. County and Home Demonstration Agents' Duties.
1. To make a survey of the county to determine the number of farms having running water in the farm home.
2. To list hardware dealers, plumbers, well drillers, and other local agencies through which pumping equipment is handled.
3. To list all county preachers, school principals, bankers, county stores, newspapers, and any other agencies through which the farmers may become informed concerning the campaign.
4. To give purpose and date of campaign in all talks and interviews.

5. To list requests for assistance on water problems received as result of publicity.
6. To conduct the follow up work and get the record of results.
- B. Specialists' Duties:
 1. Supply all educational and publicity material to agencies willing to give cooperation.
 - (a) Write weekly articles for newspapers.
 - (b) Make placards for stores, banks.
 - (c) Write agent's letters to farmers on their revised list.
 - (d) Write notices to all preachers, plumbers, dealers, school principals.
 - (e) Write District Extension Agent and School Superintendent, County Supervisors, Advisory Council.
 - (f) Get notices in all county post offices.
 - (g) Write Virginia State Chamber of Commerce (Mr. Nelson, Director of Publicity), Plumbers Association, National Association of Farm Equipment Manufacturers, Water Supply Department.
 - (h) Get stamp for agents' letters in county, stickers for letters. Big canvas for back of car.
 - (i) Get up mimeographed card for agents' to keep requests on.
 2. Visit all farm homes, from which an inquiry has been received, for the purpose of making complete survey of proposed water system.
 3. Furnish each farmer having survey made with data taken and a bill of material for installation.

RESULTS:

Campaign results will be measured by:

1. Number of water systems installed during 12 months following date of survey.
2. Number of water systems improved during 12 months following date of survey.

COOPERATIVE EXTENSION WORK
IN
AGRICULTURE AND HOME ECONOMICS
STATE OF VIRGINIA

Vs. Agri. and Mech. Col.
and Poly. Inst. and the
U. S. Dept. of Agri.
Cooperating

EXTENSION SERVICE

THE FARM HOME WATER SUPPLY CAMPAIGN
FOR
ROCKINGHAM COUNTY

Many farm homes in Rockingham county do not have running water. Without this convenience they lack one of the greatest home comforts.

The farm and home agents have made arrangements with the Agricultural Engineering Department, Extension Division, V. P. I., for the services of an engineer for the period May 6th - May 18th. The engineer will visit each farmer who requests his service and make a survey of the conditions. From a study of those conditions the most suitable and practical water system will be recommended and a bill of material for each job supplied. There will be no charge for this service and any one who contemplates the installation of a water system, or expects to have his present system changed within the next two years, should take advantage of this opportunity.

Please fill out the inclosed card which requires no postage and mail either to Miss Mary Fred Claytor, Home Demonstration Agent, or S. M. Cox, County Agent, Harrisonburg, Virginia. This card must be returned before May 6th.

A similar service has been given in one or two other counties in the state and in one county more than one hundred surveys and estimates have been completed. We want the farmers of Rockingham to have the same opportunity to secure satisfactory running water systems in their homes.

yours for further service,

S. M. Cox,
County Agent.

Mary Fred Claytor,
Home Dem. Agent.

9682

COOPERATIVE EXTENSION WORK
IN
AGRICULTURE AND HOME ECONOMICS
State of Virginia

Virginia Agri. & Mech.
College and Poly. Inst.
& United States Dept. of
Agri., Cooperating.

EXTENSION DIVISION

Blacksburg, Virginia

Date _____

_____:

It was a pleasure to be of some service to you in connection with your water supply problem.

Enclosed you will find a sheet, copy of which we mailed today to the company indicated, showing the data we took. It is in the nature of a letter to be sent to some pump or plumbing company in Virginia which makes a speciality of selling and installing this type of farm equipment. The enclosed sheet is for you to use in getting quotations from your local dealer or plumber to compare with the prices being mailed to you.

If you find that you need additional information, please write us as often as is necessary to thoroughly understand the installation.

Hoping that you can get this job completed promptly and that you will call on us through your county agent when in need of other agricultural engineering assistance, I am

Yours very truly,

J. A. Waller, Jr.
Specialist in Agricultural Engineering

JAW:P
Enc.

No. 9625

COOPERATIVE EXTENSION WORK
IN
AGRICULTURE AND HOME ECONOMICS
STATE OF VIRGINIA

Virginia A. & M. College & Polytechnic Inst. & the U.S.D.A. Cooperating
EXTENSION SERVICE

Dear Friend:

J. A. Waller, Jr., Agricultural Engineer,
Extension Division, V. P. I., is in the county to make sur-
veys, recommendations and estimates in connection with the
farm home water supply campaign.

We expect to be in your community about
_____. We cannot state definitely
the exact day that we will visit you, but try to be at home
on the above date, the day before and the day after. As there
are a large number of surveys to make, it will be impossible
to make a second visit.

Trusting that we can be of some real ser-
vice to you, we are

Very sincerely yours,

_____, Farm Agent

_____, Home Agent

EXTENSION DIVISION
VIRGINIA POLYTECHNIC INSTITUTE
BLACKSBURG, VIRGINIA
DEPARTMENT OF AGRICULTURAL ENGINEERING
Farm Home Water Supply Engineering Service

Date _____

Gentlemen:

Please quote Mr. _____ whose
address is _____ on a hydraulic ram installation to operate under the
conditions stated below.

1. Normal flow of spring in gallons per minute _____
2. Vertical fall in feet from spring to ram location _____
(This is total fall and includes depth of ram pit)
3. _____ feet of additional fall can be secured in _____ feet of distance.
4. Depth in feet of pit in which ram will be placed. _____
5. Distance in feet from spring to ram location _____
6. Vertical lift in feet from ram to tank _____
(This is total elevation from ram in pit to top of tank on tower)
7. Distance in feet from ram location to tank _____
8. Distance in feet from tank to house _____
9. Type and size of tank recommended _____
10. Type and height of tower recommended _____
11. Number of gallons of water needed per day _____
12. Installed job is (is not) wanted. Owner will _____

(For double acting rams the following is included)

13. Normal flow of branch (drive water) in gallons per minute _____
14. Vertical fall in feet from dam to ram site _____
(This is total fall and includes height of dam and depth of ram pit)
15. _____ feet of additional fall can be secured in _____ feet of distance.
16. Height of dam in feet _____
17. Distance in feet from dam to ram site _____

Please send this prospect sufficient literature, including a ram catalog, to thoroughly inform him
on the subject. Explain in detail the use of a standpipe.

Hoping that you will handle this request in your usual prompt manner, I am,

Yours very truly,

J. A. WALLER, JR.,
Specialist in Agricultural Engineering

EXTENSION DIVISION
VIRGINIA POLYTECHNIC INSTITUTE
BLACKSBURG, VIRGINIA
DEPARTMENT OF AGRICULTURAL ENGINEERING

Farm Home Water Supply Engineering Service

Date _____

Gentlemen:

Please quote Mr. _____ whose
address is _____ on a water pumping outfit which will operate satis-
factorily under the conditions stated below. The type of job recommended is a _____

(Jobs where vertical lift is less than 22 feet)

1. Source of supply _____
2. Well has been tested to flow _____ gallons per minute.
3. Vertical distance in feet from water level to pump location _____
4. Horizontal distance in feet from water level to pump location _____
5. Gallons of water required per minute _____
6. Size tank desired _____ gallons.
7. Maximum pressure in pounds in pressure tank _____
8. Elevation in feet of bottom of elevated storage tank above pump _____
9. Power recommended _____ voltage _____ phase _____ cycle
Automatic control _____
10. To prevent freezing, pump will be placed in _____
Tank will be placed in _____
11. Installed job is (is not) wanted. Owner will _____

(For deep well jobs the following is included)

12. Type and depth of well _____
13. Distance in feet to low water level _____
14. Inside diameter of casing in feet _____
15. Frostproof cover over job so discharge can be above ground will (will not) be used. If
not, figure on set length pump.
16. For this drilled well a pit will (will not) be used for set length.

(For windmill jobs the following is included)

17. Regarding obstructions within 500 feet radius _____
18. Height in feet of tower necessary to place wheel 15 feet above obstructions _____
19. Height in feet tank must be to give desired pressure _____
20. Type and size tank desired _____

Please send this prospect sufficient literature to thoroughly inform him on the subject.
Hoping that you will handle this request in your usual prompt manner, I am,

Yours very truly,

JAMES A. WALLER, JR.,
Specialist in Agricultural Engineering

Axton, Virginia
June 10, 1929

Mr. James A. Waller, Jr.
Blacksburg, Virginia

Dear Sir:

I can't begin to tell you how I appreciate your work. Since you and my county agent, Mr. Stone, were here I have installed a double action Rife hydraulic heavy duty No. 10 ram with a complete satisfaction. I am using water for all purposes and in a short time the tank is overflowing again with spring water with a capacity of 1000 gallons. The distance from the tank to the ram is 1000 and 33 feet with a 120 foot elevation.

Yours truly,

J. D. Heffinger
Axton, Va.

Chatham, Va.
Nov. 18, 1929

Mr. J. A. Waller
Blacksburg, Va.

Dear Jack:

In checking over the list of applicants for service in the "Home Water System" campaign, of which there were 73, I find that twenty three have complied with the recommendations made. Not all of these are water systems installed, but they were visited and given assistance either on some system which they already had or recommendations were made other than what they had in mind. I consider it just as great service to the individual to advise against a certain project if after checking it, (as it is to advise for the project) if the conditions are found to be inadequate for the success of the project, therefore I am reporting those.

I consider the campaign as one of the very best and most far reaching in its benefits, of any campaign I have ever attempted since I have been in the Extension work. Of course we do a great many things that possibly equal or exceed this in remuneration to the farmer but as for the satisfaction and contentment it brings I know of nothing that any where near approaches it.

In this connection I feel that I should put in a word in regard to the terracing school. This type of work is greatly needed in Pittsylvania county, and these schools in my estimation are playing a large part in getting the farmers to realize the importance of terracing.

In closing I want to say that I feel greatly indebted to you for the help you have given in all of my engineering problems, and I assure you it has been a real pleasure.

With all good wishes, I am

Yours very truly,

(Signed) - J. E. Stone, Co. Agent

Rockingham County Farm Home Water Supply Engineering Service

Farm and Home Demonstration Agents of the Extension Division, Virginia Polytechnic Institute, have secured the services of the **EXTENSION SPECIALIST IN AGRICULTURAL ENGINEERING** to make accurate surveys, proper recommendations, and approximate estimates as to the cost of a complete water system for any farmer in this county who applies to the agents for this service. This service is free and will be available

MAY 6th-18th

If you expect to install a new water system or improve your present one during the next year, have your survey made at this time. Get in touch with your farm or home agent now. No requests will be handled that are not received before this time.

S. M. COX, Farm Agent, Harrisonburg, Va.

MISS MARY F. CLAYTOR, Home Agent, Harrisonburg, Va.

Office in Court House

