

-ANNUAL REPORT-
-1932-

Agricultural Engineering Department
Extension Division, V. P. I.
Blacksburg • Virginia

ANNUAL REPORT

PROJECT NO. 10

AGRICULTURAL ENGINEERING DEPARTMENT

EXTENSION DIVISION

VIRGINIA POLYTECHNIC INSTITUTE

December 1, 1931 to November 30, 1932

Blacksburg, Virginia
December 23, 1932

Director John R. Hutcheson
Extension Division
Virginia Polytechnic Institute
Blacksburg, Virginia

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, Virginia Polytechnic Institute, for the period beginning December 1, 1931 and ending November 30, 1932.

GENERAL DISCUSSION

In spite of economic conditions the demands for engineering service from farmers have continued to grow. The nature of engineering service is such that considerable individual attention is necessary and this often means personal service to the farmer. However, a certain amount of personal service is not only necessary but advisable as it is through the successful individual project cooperator that a method is best demonstrated. Other farmers are not slow in seeing the results of a successful demonstration on their neighbor's farm and there is a considerable spread of influence from such projects.

We are attempting to place as much of our work as possible on a basis that will instruct larger groups and cut down individual personal service to a minimum. We are having some success in this effort through our terracing schools and demonstrations, rural electrification meetings, water supply campaigns, and farm structures work with the Dairy & Food Division and farmers' cooperative organizations.

It is difficult to place a dollars and cents value on our projects but we feel that as never before our work has been of great economic importance to the farmers of the state. For example, as explained in more detail under the farm structures project, we have furnished plans for new farm buildings to 2641 farmers. A conservative estimate of the value of buildings actually constructed from these plans during the year is \$1,000,000. Our plans are standard and have the approval of all agencies in the state. Dairy barns can now be built from these plans that will pass all inspection, for one-half to one-third less than the barns formerly built before a standard plan service was available. This has resulted in thousands of dollars saving to the dairymen of the state. The barn improvement work with the 50 dairymen around Staunton alone was estimated by the local plant manager to have increased the income of the 50 dairymen by at least \$30,000. Without the improvements suggested these dairymen would have lost between \$55,000 and \$60,000 income.

While it is not practical to place a definite cash value on terraces, it is known that the extension terracing program is worth thousands of dollars annually in soil, crops and fertility saved and increased production on the land terraced. Likewise it is difficult to place cash values on the farm water supply and rural electrification projects, yet it is generally recognized that anything that tends to reduce the labor and improve the living conditions of the farm housewife and family, is of inestimable value. The educational efforts along these lines have been very successful and several hundred additional farm homes are now enjoying such conveniences as result of our work this year.

In the irrigation work of the department alone, the five irrigation demonstration orchards, according to estimates of the owners, increased their income this year by over \$30,000 as a direct result of irrigation. Irrigation on a number of truck farms and general farms has meant savings of thousands of dollars to farmers of the state.

During these difficult times farmers are making every effort to reduce costs and it is here that the engineer has been able to be of valuable assistance. It is gratifying indeed to the extension specialists in agricultural engineering that they have been able to point out to the farmer definite ways of cutting costs and increasing incomes. Agricultural engineering extension work has amply justified its place in the agricultural extension program this year.

ORGANIZATION

The extension personnel for the year has consisted of Chas. E. Seitz, agricultural engineer, J. A. Waller, associate agricultural engineer, and H. H. Gordon, assistant agricultural engineer. Several members of the resident instruction and research staff have also given some assistance on extension projects.

Prof. Seitz has handled the rural electrification, irrigation and drainage extension projects. He has also been responsible for writing the radio talks. As head of the agricultural engineering department, he has directed all three phases of department activities, namely; resident instruction, research, and extension. This has necessarily taken a considerable part of his time. However, the various members of the research and instruction staff of the department have devoted some time to purely extension activities, as outlined in this discussion.

Prof. Waller, associate agricultural engineer, has devoted full time to extension work during the year. He has been responsible for the extension projects in terracing, farm water supply, and farm water power.

Prof. Gordon, assistant agricultural engineer, has devoted full time to extension work during the year. He has been responsible for the extension project in farm structures and has assisted with the stationary spray plant and farm development projects.

Mr. S. H. Byrne, instructor in agricultural engineering, while employed by the resident instruction division, devoted over one-third of his time to the extension project in farm structures. He assisted Mr. Gordon in drawing plans, preparing blue prints, preparing the Farm Building Plan Booklet, and answering letters. He also prepared and delivered several radio talks.

Prof. V. R. Hillman, full time resident instruction staff, did some extension work. He assisted with the rural electrification project by making some studies for us, especially an extensive study of hot water heating. He also assisted with Boys' Short Course, made some field extension trips, answered letters on this project and prepared several radio talks on the subject of rural electrification.

Prof. P. B. Potter divides his time between resident instruction and research. He assisted with extension work to the extent of delivering most of the radio talks for the department. He also helped with the Boys' Annual Short Course and the answering of letters on the home equipment project.

Prof. J. W. Sjogren divides his time between resident instruction and research. He assisted with the Boys' Annual Short Course, answered letters on the farm operating equipment project and prepared several radio talks on this project.

SUMMARY OF EXTENSION SPECIALISTS' TIME

Specialist	Days : In : Field	Days : In : Office	Agents : Visited	Counties : Visited	No. Visits : To Counties	Letters : Written	Farmers : Contacted
Seitz	110	175	16	18	68	1841	348
Waller	155	123	41	40	83	1294	1128
Gordon	176	101	44	55	180	632	522
	441	399	101	113	531	3767	1998

Cooperative Agencies

In conducting the projects and work in agricultural engineering the specialists have cooperated with the following specialists, departments and agencies:

The County Agent on all projects.
Horticultural specialist on apple storage, orchard irrigation, and stationary spraying.
Vegetable specialist on sweet potato storage and green house construction.
Poultry specialist on poultry house construction.
Dairy specialist on dairy barn, milkhouse and creamery construction.

Agricultural Economist on the farm development project.
Soils and Agronomy specialist on the farm development project.

Person of ag. exp. assistance

Home Economics Department on the water supply project.
County Advisory Boards in handling terracing project.

On handling the farm structures project the specialist cooperated with the Dairy & Food Division, Maryland Extension Service, Maryland & Virginia Milk Producers' Association, Valley of Virginia Milk Producers' Association, Blue Ridge Milk Company, Richmond Milk Producers Cooperative Association, Norfolk Milk Producers' Association and the Cities of Haynesboro and Newport News.

In handling the rural electrification project we have cooperated with the Appalachian Electric Power Company, the Virginia Electric & Power Company, and several dealers and manufacturers of equipment.

PLAN OF WORK - LONG TIME PROGRAM

The long time program of work in agricultural engineering contemplates work in all the various sub-projects which for convenience in reporting, etc., are classified as follows:

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

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-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

PLAN OF WORK FOR 1932

In the Plan of Work for 1932 major emphasis was placed on the following sub-projects:

1. Farm Structures
2. Terracing
3. Farm Water Supply
4. Rural Electrification
5. Farm Development

These projects are fully discussed immediately following. After taking up these five major projects, the work accomplished not in the plan for 1932 is discussed in detail.

WORK ACCOMPLISHED IN PLAN OF WORK FOR 1932

1. FARM STRUCTURES PROJECT

This project is handled by a full time specialist who not only prepared complete plans, blue prints, specifications and bills of materials, but also spends the greater portion of his time in field work consisting of visits to the farms for an actual survey of the conditions to be met, and advice on the ground as to the best procedure and plans. The specialist cooperates very closely with other departments, more particularly the Horticultural, Dairy, and Poultry Departments, both in preparation of plans and recommendations and also in actual field work. He also cooperates very closely with the various city and state Health Departments, and such marketing organizations as the Maryland & Virginia, Valley of Virginia, and Richmond Cooperative Milk Producers' Associations.

Results

In spite of the severe business depression, drought and generally bad conditions on the farm, there has been a greater demand on the specialist's time and for plans than in any previous year. Not only has the interest in building been greater, but observation in the field shows conclusively that a greater proportion of the plans are actually being used and more actual construction being carried on than at any time during the past several years. This may be explained in two ways: first, in the case of dwellings and general farm buildings, because of greatly reduced building costs, both for materials and labor, and second, in the case of dairy structures, because of more stringent health department regulations, making construction necessary to preserve a place on the greatly oversupplied markets.

With lumber as low as \$8.00 and \$10.00 in some sections and skilled labor available as low as \$1.00 per day, and in extreme cases, even for board and lodging, every man who can manage at all is building new or replacing old buildings. Added to these are the many city people who can no longer pay high rents and are moving to the country, building low priced homes and providing as much of the living as possible from the garden and small farms. Never in recent years has it been possible to build as cheaply and many are taking advantage of the situation either from choice or necessity.

With large surpluses of milk on the markets, the Health Departments see an opportunity to weed out dairymen with unsatisfactory conditions on their places or force desired improvements. The necessity of holding their one dependable source of income is causing the dairymen to respond to these demands. On the Washington milkshed for instance, few and fortunate are those producers who have not had to spend from \$1,000.00 to \$5,000.00 for improvements, principally buildings.

Work Accomplished In Plan (Con'd.)

1. Farm Structures Project

During the past year plans have been sent to farmers on request as follows:

Dairy plans	1065
Poultry plans	1092
Storage plans	55
General purpose	62
House plans	28
Hog buildings and equip.	62
Miscellaneous	277
	2641

This is the largest number of plans ever furnished in one year by this department and a very conservative estimate of the value of buildings actually constructed from these plans is \$1,000,000.00 at present low prices.

In addition the specialist has spent 176 days in the field, making 180 visits to 55 counties, working with 49 agents and 1 home agent. On these visits he helped farmers with 477 projects, and made contacts with 75 other men, such as dairy inspectors, directly interested in farm building projects. 632 letters were written, 291 bulletins on building mailed out, and approximately 25,000 miles traveled on official work. In addition to building work the following jobs were taken care of by the farm building specialist for other specialists: water supply - 15, terracing work - 3, irrigation jobs - 4, and stationary spray plants - 5. Twenty-two visits to men cooperating in the farm management and improvement project were also made.

New plans have been prepared as follows:

Stock plans - B-41 - Brine cooling hook-up for cooling milk
 B-42 - Retail milk plant, 250-400 gallon capacity
 C-13 - Creep feeder for calves
 F-17 - Egg grading room
 I-11 - Implement shed
 N-28 - Trench silo
 N-29 - Simple flue heated hotbed
 N-30 - Sash green house

Redesigned - A-1 - Seven-room farm house
 A-3 - Four-room " "
 F-15 - Standard laying house
 F-16a - 200-300 chick brooder house

Work Accomplished In Plan (Con'd.)

1. Farm Structures Project

Retraced - B-1 - 30-cow gambrel roof dairy barn
 L-7 - Implement shed
 H-4 - Homemade lime spreader
 A-18 - 2 sheets of 10-room brick house

Remodeling-26-cow dairy barn, Carlsbrook Dairy Farm,
 Paces, Virginia
 34-cow dairy barn, R. C. Lewis, Clifton
 Station, Virginia
 7-cow dairy barn, M. J. Williamson,
 Bedford, Virginia
 12-cow dairy barn, Mrs. G. F. Peters,
 Cobham, Virginia
 General purpose barn, J. F. Trumbo,
 Midland, Virginia

Special plans - 7-room brick house
 Revised floor plan for house A-18
 Log cabin - 4 rooms and bath
 Office building - Eastern Shore Exp. Sta.
 Farm Bureau warehouse, Staunton, Va.
 Horse and storage barn
 Main building for proposed district 4-H Club Camp
 Log community house, Fluvanna County
 General purpose barn floor plan
 26-cow dairy barn addition, John Barrett,
 Manassas, Virginia
 20-cow dairy barn addition, J. T. S. Hoge,
 Hoge's Store, Virginia
 50-cow dairy barn addition, Mrs. Josephine Cowne,
 Catlett, Virginia
 Drawing table
 Cheese plant, Woodstock, Va.
 Roanoke County State Fair booth
 Montgomery County State Fair booth
 Bathroom and port cochere additions, Percival
 Lewis, Manassas, Va.
 34' alternate framing detail for $1\frac{1}{2}$ story
 masonry barn
 25,000 bushel community apple packing house,
 Crozet, Virginia
 Norfolk surplus milk plant
 Dairy house with basement, W. G. Houston,
 Fairfield, Virginia
 Suffolk Community sweet potato storage house
 floor plan
 34' x 50' general purpose barn floor plan
 10-cow, 2-story masonry dairy barn and dairy
 house, Capt. Pitzer, Appomattox, Va.
 Special poultry house, J. B. Lintner, Leesburg, Va.
 Cow testing guide for Dairy Department

1. Farm Structures Project

Church for Elk Creek, Grayson County, seating capacity 500 with Sunday school rooms

Total - 43 plans, 60 tracings.

Byrne - 25 drawings, 37 tracings

Gordon - 18 " , 23 "

Dairy PlansState Dairy and Food Division

Relations with the State Dairy & Food Division and its inspectors have been most satisfactory. Regulatory work requires practically all of their time and beyond furnishing 141 of our mutual plans they did no educational work. On the other hand, they called on the Extension Service frequently for help with plans and remodeling work. All inspectors show a spirit of the heartiest cooperation and all differences and jealousies that existed in the past seem fully ironed out.

Maryland Extension Service

As was stated last year the fact that Washington is the principal market for both Virginia and Maryland dairymen led to the adoption by Maryland of plans prepared by us for that market. The farm building specialists of both Extension Services keep in close touch with each other, and any revisions, changes in plans, or new plans are carefully gone over and mutually agreed upon. In this way recommendations for the entire market are in accord, and the plan service is strengthened by the wider viewpoint and experiences obtained in this way.

Maryland & Virginia Milk Producers' Association

The closest cooperation is maintained with the Maryland & Virginia Milk Producers' Association, the largest users of our dairy plans. A number of the monthly meetings of the dairy inspectors for the District of Columbia are attended, to keep in touch with the Health Department regulations and maintain friendly relations. These are usually followed by several days in the field with the association fieldman, both on new construction and remodeling jobs. Since the majority of the dairy building work is on this market, this work is very important. The Secretary of the Association in his annual report has the following to say:

"The dairy barn and dairy house plans prepared for the Association by the Agricultural Engineering Department of V. P. I. have become increasingly popular, so that during the last year practically all of the new barn and dairy houses built by dairymen in the Washington Milk Shed have been built according to these plans. The splendid cooperation of the Agricultural Engineering Departments has made this service possible and the real assistance rendered by the engineers has been invaluable to our producers.



40 cow two-story
masonry dairy barn
for Washington
market. Plan B-2.
As result of stan-
dardization of
plans cost of such
structures has been
reduced from \$250.00
per cow to \$85.00
per cow.

20 cow two-story
masonry dairy
barn. Loudoun
County. Plan B-2



20 cow one-story
masonry dairy
barn, Loudoun
County. Plan B-34

Work Accomplished in Plan (Con'd.)

1. Farm Structures Project

These plans have the approval of the Washington Health Department and enable the shippers to make permanent improvements, knowing that they will not have to be changed in the next year or two as was so often the case with the buildings put up before these approved plans were available."

In this connection it should be stated, that since this plan service was started three years ago, no dairyman following plans prepared by this department has had to make changes other than the addition of ceiling in the barns, a recent requirement. On the other hand, dairymen who built before the plan service was started have in almost all instances had either to rebuild entirely or spend hundreds and in many cases thousands of dollars remodeling. A conservative estimate of the amount spent on such changes the past year on this market alone would be \$400,000.00 (\$500,000.00 would probably be nearer right), a very large part of which might have been prevented had a plan service such as is now in use been available. From this it can readily be seen that our plan service is worth many thousands of dollars to the dairymen of the state.

A further value which should not be overlooked, is that the standardization of plans has also resulted in standardization of building costs. Before the plan service was started costs of \$250.00 and even \$300.00 per cow were not unusual. Today barns which receive just as high a score, frequently higher, are being built for half that amount. In fact the average cost per cow on the Washington Market where the job is let on contract is between \$85.00 and \$100.00 per cow. Where barns have been built by the farmers themselves, prices as low as \$50.00 per cow for the complete building layout have been reported.

From the foregoing it can readily be seen that the dairy work alone more than justifies the specialist's time.

Valley of Virginia Milk Producers' Association

While close contact has been kept with this association aside from preparing one shipper for the Washington market, the principal service rendered has been in connection with remodeling the old plant for a receiving plant for grade A milk for Northern markets. A very satisfactory receiving plant was obtained for one-fourth the cost of a new building, making the borrowing of additional money for building and equipment unnecessary.

Much work preparing individual producers for production of Grade A milk for these new markets is in prospect for next year.

Dairy Remodeling to enable farmers to retain Philadelphia Market

The farm buildings specialist was requested to help in preparing about 80 Augusta County dairymen for the Philadelphia Market. These are small dairymen with herds ranging from 6 - 20 cows, with dairy-



Two-story frame dairy barn and milk house.
Prince William Co. Plans B-1, B-24



A very satisfactory small one-row dairy barn
for 10 cows. Plan B-38



Work Accomplished in Plan (Con'd.)

1. Farm Structures Project

ing as a side line and little if any equipment. A premium of 80 cents per hundred pounds of milk was offered to those who would improve their equipment and conditions enough to make Grade A milk.

A preliminary survey showed that such improvements would cost about three to six months premiums on the volume of milk produced, but if not made would mean the loss of the market. Visits were made to all of the dairymen and suggestions for improvement made on the ground together with estimate of materials and cost. As a result practically every dairyman made the improvements and as a result of low prices for butter fat the premium amounted to more than the price of the milk itself. A conservative estimate of the increased income of these 50 dairymen as a result of this work was placed at \$30,000.00 by the manager of the plant. Had the improvements not been made the market would have been lost for this volume of milk making a total loss of \$55,000.00 to \$60,000.00.

These dairymen are now being inspected by the State Dairy & Food Division who states many of them can easily make Grade A milk for Virginia markets. He considers the results secured on this project "remarkable" and far beyond his expectations.

Richmond Milk Producers' Cooperative Association

Work with the Richmond Association has consisted largely in help with proposed codification of Health Department requirements, and conferences with Health Department in effort to secure codification to eliminate as much as possible the personal element in dairy inspection. Some progress has been made along this line and assurance has been given that it will be carried to a satisfactory conclusion. The market being oversupplied, little building work has been done with the exception of dairy houses. Plans supplied have been almost entirely through the Health Department.

Norfolk Milk Producers' Association

Help was given the Norfolk Association in planning their surplus milk plant which has resulted in a saving of from \$1500.00 to \$2000.00 per month in handling charges, office rent, etc. While a volume of only 200 gallons per day was anticipated, as high as 2,000 gallons have gone through the plant under unusual conditions. Close contact has been maintained with the Health Department who use our plans in all cases where building is required.

Waynesboro

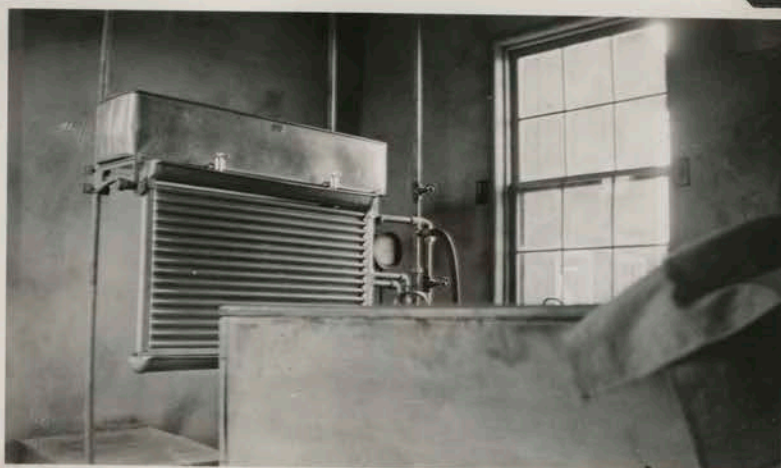
Help was given a group of retail producers on the Waynesboro market, who planned cooperative marketing to reduce overhead, cut-price competition, etc. The success of this operation was largely dependent on changes in the ordinance to prevent competition from B grade raw



Dairy barn interior, Washington market.
Note neat finish



Standard masonry dairy house. Plan B-22



Interior view of dairy house showing cooling
equipment

Work Accomplished In Plan (Con'd.)

1. Farm Structures Project

milk. A revised ordinance was drawn up and presented to the City Council in an effort to secure this change. Cooperative marketing was started, but it is too early to predict results.

Newport News

Help was requested by ten retail producers on the Newport News market with plans for a cooperative distributing plant with a capacity of 500 gallons of milk daily. Because of cut-price competition the price of milk to the consumer has dropped from 16¢ per quart to 10¢. The proposed plant is an attempt to reduce overhead, and prevent price cutting. Help with planning this plant is being given. Work on both the Waynesboro and Newport News projects are in cooperation with the Dairy Department.

Dairy Refrigeration

Many requests for help on dairy refrigeration have also been met. As a result of two years study definite and authoritative recommendations could be made and very satisfactory results are being obtained on this project. Proper cooling of milk is rapidly becoming one of the greatest problems in the dairy business, and deserves much and careful consideration.

Plan Service

Only two new plans have been added to the stock dairy plans the past year, indicating that our files are now reasonably complete. The plans as before stated are giving entire satisfaction and are resulting in uniformity in construction and greatly reduced costs.

Horticultural PlansSweet Potato Storage

This work was done in cooperation with the Vegetable Gardening Specialist. In Caroline County, two 1,000 bushel sweet potato houses were erected by individuals, and one 5,000 bushel community house. The work was started by Smith-Hughes teachers in the two communities, before county agent work was resumed in the county, and they are largely responsible for the success of the project, although since his arrival the agent has taken an active interest. Being cooperative community projects considerable help was given on these projects.

In Halifax County another cooperative project consisted of remodeling of a flue-cure tobacco barn into sweet potato storage. About seven growers were interested in this project.

In Princess Anne County thirty-four existing houses were visited to check up on ventilation. Of the thirty-four, twenty-one proved lacking in ventilation and recommendations for improvement were made. In most cases these recommendations were carried out.

12,000 bushel
Irish potato
storage cellar,
Central State
Hospital. Peters-
burg, Va.

Plan J-13



1000 bushel,
individual sweet
potato storage
house. Plan J-8.
Virginia has many
such houses.

Combination
apple packing
and common
storage house.
Plan K-5. This
plan has given
most excellent
results.



Work Accomplished in Plan (Con'd.)

1. Farm Structures Project

Practically all of the storage houses operating in the state were visited during the curing season, and a close check made on ventilation, length of time required for complete curing, etc., made. In all cases satisfactory cures were obtained where the potatoes were handled according to directions.

The use of electricity for curing sweet potatoes is also being checked. Recommendations were made for installation in two, 2500 bushel houses, one for the curing and storing period, while the other was installed too late for curing, but will be used during the storage period. Excellent results may be expected, but cost may prove a limiting factor.

Help was also given on two large Irish potato storage houses. One at the State Farm, the other The Central State Hospital, Petersburg. Plans were followed in detail at the State Farm, but only partially at Petersburg, This being particularly true on ventilation. Results will be watched with interest.

Sash Greenhouses

This is a new project in cooperation with the Vegetable Gardening Specialist. Small and very economical greenhouses are constructed from hothead sash for starting and growing plants. Plans were prepared for houses costing \$100.00 or less and about five have been or will be constructed this fall and winter. Plans for simple flue heated hot beds for starting plants were also prepared. Much interest is being shown over the state in such work and it promises to be a very worth while project.

Apple Storage and Packing Houses

Only one combination apple packing and common storage house was built this year, due largely, no doubt, to lack of finances. Those already built report excellent results, and considerably increased income, because a profitable truck trade may be spread over a longer period of time. For example, one grower who built last year at a cost of \$3,000.00 reports that his house enabled him to sell 3,000 bushels of apples at 50 cents a bushel this season that would otherwise have gone to waste. In other words he made \$1500.00 more than he anticipated as a result of his storage house. This is a common experience.

Estimates were secured for a cold storage plant with a capacity of 30,000 barrels of apples. This will be a cooperative community project, serving a community considerably removed from satisfactory storage. The plant while costing \$75,000.00 is no doubt a practical proposition and it is to be hoped that the plans will mature.

Plans were prepared and help given on a 25,000 barrel, community apple packing plant at Crozet, in connection with the cold storage plant there. This building was used for the first time this fall.



Augusta County Farm Bureau Warehouse. Special
plan prepared on community project



5,000 bushel cooperative cinder block sweet
potato storage house
Caroline County

FARM BUILDING PROJECT

Work Accomplished in Plan (Con'd.)

1. Farm Structures Project

Meat Packing and Storage

Help was given on a fireproof meat packing plant to take care of slaughtering, curing and storing an average of 25 hogs per day. Recommendations for building materials and details were worked out, and the plant will be constructed during the next few months.

Six radio talks were given on this project and the following lectures:

Freshman class - "Extension Work in Farm Buildings"
 Horticultural Seniors - "Common Storage for Apples"
 4-H Club Boys - "Farm Building Plan Service"
 Dairy Engineering - "Mechanical Refrigeration for Dairies"
 Dairy Short Course - "Dairy Buildings and Equipment"

Bulletins

The following bulletins relating to this project were mailed to farmers requesting them:

50 Hog Houses
 65 Poultry House Construction
 100 Equipment for Farm Sheet Piling
 100 Pit Silos
 125 Potato Storage and Storage Houses
 50 Homemade Silos
 50 Self Feeder for Hogs
 50 A Simple Hog Breeding Crate
 300 Poultry Houses
 100 Farm Dairy Houses
 75 Beef Cattle Barns
 50 Principles of Dairy Barn Ventilation
 100 Practical Hog Houses

Farm Building Plan Book

For several years the county agents have been calling for a plan book showing in miniature the principal plans carried in stock by the department, and giving a brief description of all available plans. This was finally attempted and a very attractive 110 page booklet gotten up in loose leaf form, so that additions may be made from time to time. The most popular plans were selected and reproduced in miniature by planograph. The Bureau of Agricultural Engineering, U. S. D. A., cooperated by furnishing roto-prints of a number of their plans which we carry in stock. The resulting booklet is not only very attractive but very practical as well. The county agent keeps it on his desk and when approached for plans can refer to it and help the farmer decide what he needs. Working blue prints are then ordered by the agent. The booklet was very enthusiastically received by the agents and will no doubt stimulate interest in building plans.



Small sash greenhouse designed for early plant
growers. Such houses can be built for \$100.00
or less.



Monolithic concrete silo. These
silos are being built for about
\$2.50 per ton capacity

Work Accomplished in Plan (Con'd.)

1. Farm Structures Project

Farmstead Planning

Work on farmstead planning, as last year, was confined to selection of sites for dairy buildings, this being an important part of the dairy building work. On all field visits in regard to dairy barns the proper location of the dairy barn is selected by the specialist.

The following bulletins on farmstead planning were mailed from this office:

400 Beautifying the Farmstead
75 Planning the Farmstead

Community Buildings

There is an increasing interest in cooperative and community projects. Some of those worked on during the past year are:

6,000 bushel community sweet potato storage house - Caroline Co.
25,000 bushel community apple packing plant, Crozet
35,000 barrel community cold storage plant, Big Island
Valley of Virginia Milk receiving plant, Harrisonburg
Norfolk Cooperative Surplus Milk Plant
500 gallon distributing plant, Menomonic Colony, Newport News
1500 bushel community sweet potato storage, Halifax
District 4-H Club buildings, Petersburg
Potato storage, State Farm and Central State Hospital
Cold storage plant, State Farm
Cooperative milk distributing plant, Waynesboro
Farm Bureau warehouse, Staunton

Outlook

The greatly lowered cost of building will no doubt result in considerable construction work on the farms of the state during the coming year.

Interest in this project is becoming more evident each year. It is work of great value that is recognized by the farmer, probably more so than any other of the department's projects. Work will be continued along the same lines as in the past. However, an attempt will be made this year to contact all building and supply dealers, lumber manufacturers, etc., with the object of thoroughly acquainting them with the services rendered on this project and secure better cooperation and use by such agencies of plans furnished by this department.

[illegible]

2. TERRACING PROJECT

It is becoming increasingly evident that more farmers and county agents are beginning to realize the value of terraces to control soil erosion. Inquiries about terraces and requests for demonstrations are coming from counties which until recently have shown no interest. While there is very serious soil erosion in Southside Virginia there is also considerable loss in every county in the state. Soil types and farming practices in the bright tobacco counties make soil erosion especially severe there. The results being more noticeable during periods of intense rainfall. It is not generally appreciated that thousands of acres of formerly productive Virginia land are now entirely abandoned. This is a basic and fundamental problem and merits the expenditure of much energy and money to bring about a solution. How far can we afford to let soil erosion go?

Fortunately terraces can be marked out and constructed with no outlay except for man and team labor. It makes an excellent project to stress at this time. This department can furnish plans for making a level and a terracer.

The Value of Terracing

It is difficult to place any money value on a terrace. The question is asked--how much is a terrace worth? There are numerous variables which enter in to make this impossible. A more accurate measurement might be to state that a terrace is worth a certain percentage of the land it is on. Intensity of rainfall, type of soil, method of cultivation, slope of land, and kind of crops are variables hard to figure.

On some land, but for terraces, the soil would all wash away. In other words, if the land is worth \$80.00 per acre, the terraces should be credited with the most of this amount since they are alone responsible for saving the soil fertility, moisture and even the soil itself. Other cases may show that terraces placed on slow grades of sodded fields are not as important.

In another light terraces may save fertility and soil improvements, which when allowed to waste, amount to several times the average value of the land, the farmer often not realizing that he is trying to replace this plant food each year. The statement can conservatively be made that the extension terracing program is worth thousands of dollars to the farmers of the state annually in soil, crops, and fertility saved and increased production on the land terraced.

This year's work consisted of holding adult meetings and demonstrations, boys' terracing clubs and establishing terracing demonstration farms in five counties.

Methods Used in Conducting Adult Terracing Demonstrations

Aside from a number of individual adult terracing demonstrations the major part of this work was done under the county organization plan.



Working terracing project with County Organization Committee. Mecklenburg Co.

Organization plan.



Terracing demonstration before County Agricultural Committee chairman Mecklenburg County

Adult.



Adult terracing demonstration showing completed terrace and another marked out. Grayson County

TERRACING PROJECT

Mecklenburg County is one county in which the Extension rural sociologist reorganized the County Advisory Board. The terracing specialist met with the sociologist and the chairmen of the various district committees. The project was outlined and a demonstration was given before these chairmen and others. Following this demonstration each district agricultural chairman requested a demonstration in his district. Later eight (8) demonstrations were held in the county--one in each of the eight districts.

The agricultural chairman in each district, working with the county agent, made all local arrangements and in many ways assisted the terracing specialist. Only local equipment was used in building the terraces. The entire field was laid out and at least one terrace was completed if weather conditions permitted.

Working this project in counties where organization work is effective is much simplified and future work will be done along this line as far as practical.

Results

Not being able to complete the water supply work until about October the terracing work had a late start. However, quite a little is yet to be done this winter.

Fourteen (14) visits were made to nine (9) counties where 22 demonstrations were given. At these demonstrations 99 terraces with a total length of 52,935 feet were laid out. Terraces with a total length of 7250 feet were actually built. 196 acres were terraced and 355 people witnessed the demonstrations.

Four radio talks were given and 450 terracing bulletins mailed out.

Methods Used in Conducting Terracing Schools

The county agent selects at least two (2) young farmers who are awake to the advantages of terracing and enrolls them in a two-day school held at some convenient time and at some central point.

About one day is devoted to the inside or theoretical part of the subject and one day to instrument work and actual terrace surveying and construction.

The purpose being to prepare these young men to do their own work, and work for other farmers for pay. The outlook is exceptionally good.

Results

Realizing that neither the county agent nor the specialist can reach enough farms to effectively control soil erosion, schools for adult



clab

Boys Club Terrace Construction Demonstration
Mecklenburg County



Adult

Adult Terrace Construction Demonstration
Grayson County



clab

Boys Club Terracing Demonstration.
Finishing Terrace. Mecklenburg County

2. Terracing Project

farmers are being started. The last of September a school was conducted in Mecklenburg County. Eighteen farmers were present. Both theory and practice were given. For a while, when demonstrations are to be given in districts where these men live, they will be asked to do the work under the supervision of the specialist. Later on they should be able to do terracing work unassisted.

Method Used in Conducting Terracing Clubs with Boys

Contact is made with several agricultural instructors through the county agent. About 200 boys are enrolled.

Three visits of about one hour each are made to each school (winter months) for the theoretical part and at least one visit in the fall for the practical work. Much interest is shown and the outlook is encouraging.

It is extremely difficult to get this work in counties where there are no agricultural schools. The agents state that they are allowed time for barely any club work.

Results

About twice as many boys were given instruction in soil erosion control methods this year as compared with last year. Boys are naturally interested in instrument work and when they become qualified to do work of this nature they should be of great help to the county agent and to the farmers of their respective counties. The specialist met with each group three times for the instructional or indoor part of the course and at least once for the field or practical part of the course. Every opportunity will be given these boys to assist with future demonstrations whenever this work is being done near them. Charlotte County enrolled 100 boys in six schools. Dinwiddie had a total of 57 boys in three schools, and Prince George County enrolled 50 boys in two schools--a total of 207 boys receiving instruction in soil erosion control.

Special Short Course

Terracing was given at the Hampton-Sydney Short Course. Forty-two boys were enrolled. This number together with the regular boys work totaled 249 boys.

Outlook

For adult work the outlook is more encouraging than usual. It is gratifying to see more interest. These farmers are being told that now is the time to hold their soil so that they will be ready for big yields when prices are better. The outlook for adult schools is about the most promising part of this project. Requests from other counties have been received and several other schools will be held after January 1. The



Terracing Class.
Hamden-Sydney
4-H Short Course

Short Course



Short Course

Adult School

Campbell County terracing group at Hamden-Sydney 4-H Short Course



Adult Terracing School.
Hecklenburg County

[illegible]

Work Accomplished in Plan (Con'd.)
2. Terracing Project

specialist plans to put considerable time on the development of this phase of the project. The outlook for the boys club work is exceedingly good. This will be developed as far as time will permit. The idea of model terraced demonstration farms appears to be good. This is just being started and has obvious advantages. Mecklenburg, Franklin, Dinwiddie, Campbell, and Henrico Counties, have these farms. Several days each year will be spent at each of these farms to lay out, construct and maintain terraces.

3. FARM WATER SUPPLY PROJECT

In many sections of Virginia 1932 was considered a drier year than 1930. This in a measure accounts for the relatively large number of requests received for this service. In dry years it is particularly necessary to have an ample water supply for the family, stock and farm crops.

According to the 1930 census only about 5 per cent of Virginia farm homes have water piped to bathrooms. It is especially important to have good sanitary conditions in these times of economic distress. Many of the other states lead Virginia in this respect and definite efforts are being made to improve this standing.

Most every farm woman recognizes that a good supply of fresh water is the greatest farm convenience. In many cases it is a simple and inexpensive problem to secure it, but the average farmer has little information on the subject. The specialist can often save the farmer a great deal in advising him how to avoid costly errors. For instance--one farmer was about to lay a long pipe line over a hilly country without regard to air pockets which invariably form. It never occurred to him that all water has air in it and that it seeks the high places in the pipe line, eventually cutting off the flow of water entirely. Another farmer was just ready to build a large concrete reservoir too low for good service. He overlooked the loss of head or pressure due to the friction of water flowing through the pipe line.

Farmers show their appreciation of this service and the reaction the specialist gets is most encouraging.

Results

Almost twice as many surveys were made this year as were made in 1931. As has been the case for about five years most of this work was done by the county campaign method. This saves a very considerable amount in travel expense and brings the cost of each survey to a low figure.

The county agent by publicity and letters advises the farmers in his county of this service and gets a list of all farmers



This family obviously needs a water system. A survey has been made and a small hydraulic ram will supply all water requirements.

patrick County

This ram uses branch water to pump spring water and it doesn't mix. The ram is lifting water 75' high and through a distance of about 1000'. The supply at the house is abundant. A tower and tank will be put up next.

Patrick County



wishing advice on water supply. A date is then set and the specialist visits all the farmers in the county requesting help. Surveys are made on each farm and recommendations made for the most practical method of securing running water. Farm water supply campaigns were conducted in twelve (12) counties as follows: Augusta, Carroll, Craig, Fairfax, Franklin, Grayson, Greenville, Isle of Wight, Nelson, Patrick, Southampton and Washington. In these twelve counties 182 surveys were made. In a total of 32 counties 226 surveys were made. Ashurst, Bedford, Campbell and Patrick Counties required three (3) visits each.

A careful survey of the conditions found on each farm from which definite and practical suggestions were made.

The different kinds of water supply surveys were as follows:

Electric systems	42
Gasoline engine systems	26
Gravity systems	44
Hand power systems	6
Hydraulic ram systems	83
Windmill	11
Bathroom plans	16

226

In addition to the above quite a large number of requests were handled by mail. Also 350 farmstead water supply bulletins were mailed out. Two radio talks were given on water supply.

While in many cases the installation is started almost immediately following the survey, a number must delay action for a while but take advantage of having the specialist visit them while in the county. Practically all the figures and suggestions given will remain correct.

Special

About two weeks were spent with the engineer in charge of installing the Blacksburg water system. Help was given in connection with locating the pumping plant, figuring size of pumps and motors, delivery and discharge lines, and location, footing, size, etc., of reservoir.

Outlook

Water supply is both convenient and necessary. Many of the requests received are prompted by the desire to have modern sanitary conveniences in the home and barn. Other requests are occasioned by a real necessity for stock water to prevent sacrificing livestock. The project continues to be very popular and it is planned to continue with the county campaign idea in ten (10) counties during 1933.

Work Accomplished in Plan (Con'd)
3. Farm Water Supply Project

Farm Sanitation

Advice on sanitation is usually given on each farm where a water supply survey is made. Some septic tank surveys have been made when on other trips.

1 - Augusta County
6 - Fairfax "
1 - Grayson "
4 - Nelson "
2 - Montgomery "

Many of the counties have sanitary officers under the State Board of Health and in these counties this work is not emphasized by the extension specialist. Numerous letters relative to sanitation problems have been written.

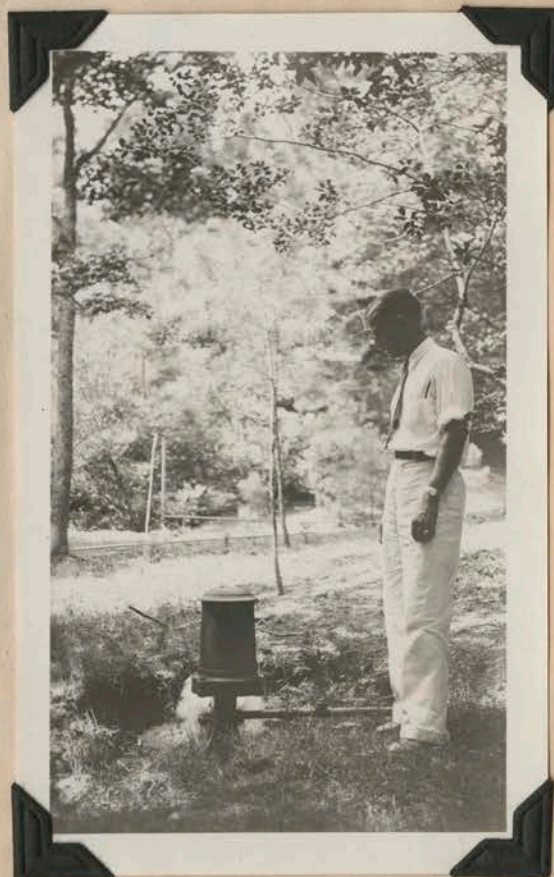
Seventy-five septic tank systems for country homes and fifty blue prints for septic tanks have been mailed out.

Outlook

This project is not a definite part of the plan of work. It is proposed to handle only such jobs as can be taken care of by correspondence or by surveys while on other work.

Large hydraulic ram supplying all water needed for large family and all live-stock. An artesian well is the water supply.

Isle of Wight County



4. RURAL ELECTRIFICATION

Rural Electric Service Departments

The major activity on this project during the year has been cooperative work with the rural service departments of the two leading electric power companies. As the electric power companies are the agencies through which the farmer must secure his electric service, it is important that these companies have a proper appreciation of their obligations and opportunities in serving the farmers.

Our efforts are therefore being placed on educating the officials of these companies in the importance of establishing rural service departments with qualified agricultural engineers in charge. These engineers do educational work with the farmer in cooperation with the local county agents and other rural educational agencies. After the establishing of the rural service department and the employment of the agricultural engineer, it is then necessary that we give considerable time to these young engineers in getting them started working properly to do the most good for the farmers in their territories. This type of educational work is very slow at best, but very definite and gratifying progress has been and is being made. These rural service men prepare weekly or monthly reports and send copies to this office. Samples of these reports are included in this discussion.

About thirty trips were made to sixteen different counties and some 300 farmers contacted by the specialist in this project. About 20 conferences were held with power company representatives and project demonstrations were established on a number of farms. Previously established demonstration farms were also visited. On these farms special demonstrations are being conducted on such uses as electric sterilization of milk utensils, milk refrigeration, overhead and surface irrigation, ensilage cutting, etc. Seven radio talks were given, several articles written, numerous letters answered and several hundred of our bulletin--"Rural Electrification in Virginia"--were distributed. In the three districts of the A. E. P. Company where cooperative educational rural service work is being conducted 57.46 miles of rural lines were built during the year to serve 490 additional farm customers. The three agricultural engineers working for the company in these districts visited and advised with 3501 farmers during the year.

Two additional rural service departments were established by the Virginia Electric & Power Company and agricultural engineering graduates of V. P. I. placed in charge. These departments were established in the Richmond and Suffolk districts. This company now has four agricultural engineers doing educational work. Two men are working in the Norfolk district, one in the Suffolk district and one in the Richmond district.

Appalachian Electric Power Company

This company now has three agricultural engineers cooperating with us in the three main districts of the company, namely; Roanoke, Lynchburg and Bluefield.

Roanoke Division A. E. P. Company

The rural service department in this district is in charge of E. H. Choate, agricultural engineer. This territory includes parts of the following counties:

Roanoke
Botetourt
Bedford
Franklin
Henry
Eastern end of Montgomery
Craig

Mr. Choate was employed in November 1926 when this work was started in this district. We have used this district as a demonstration as well as a sort of field experimental laboratory for rural electrification. The rural service accomplishments in this district have attracted national attention and as a direct result of the accomplishments in this district we have been able to get other districts of the A. E. P. Company and the Virginia Electric & Power Company to organize rural service departments.

Mr. Choate was instrumental in getting electric service to 173 additional farm customers in this territory during the year. He actually visited and advised with 878 farmers.

The table on the next page shows the development of rural service since this work was begun in 1926.

Some of the more important projects on which Mr. Choate has cooperated with us are orchard irrigation, overhead irrigation, stationary spray plants, general crop irrigation, milk sterilizers and ensilage cutting. The irrigation projects in this territory are discussed under irrigation in this report, namely the Hopkins and Ikenberry orchard irrigation projects, the Woody alfalfa irrigation project, the Bradley corn irrigation project. Several other irrigation projects will be developed the coming year as there is considerable interest in irrigation in this territory. The Ikenberry stationary spray project, discussed under stationary spraying, was also in this district. As a result of this project several other orchards in this district are now planning stationary spray plants.

Silo Filling

Four farmers in Botetourt County used a portable farm electric motor cooperatively for the first time this year to fill their silos. These farmers were well satisfied with the electric motor and have now purchased a portable farm motor cooperatively for silo filling and other work. The farmers figured that electric power cost them about half what tractor power cost to fill their silos.

APPALACHIAN ELECTRIC POWER COMPANY

Roanoke District

DATA ON RURAL LINE DEVELOPMENT AS OF DECEMBER 1, 1932

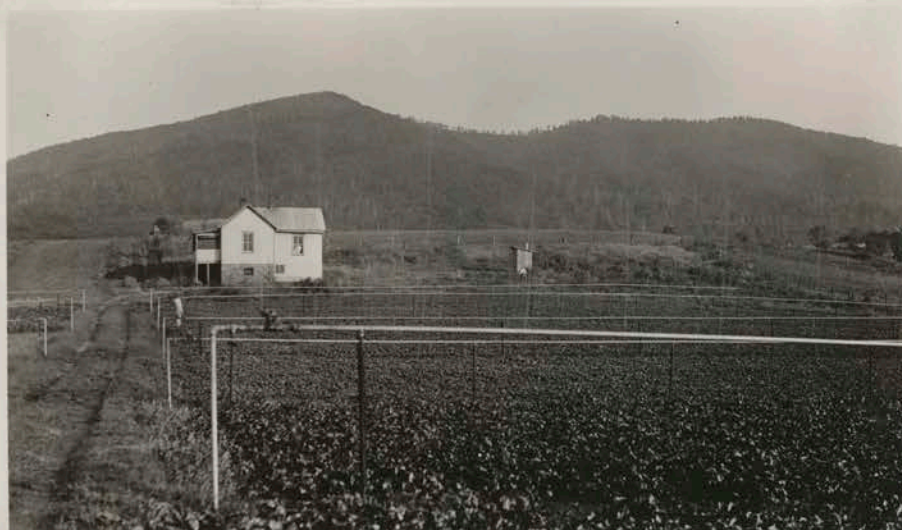
	Year	
	1931	1932
Number of miles of rural line in the Roanoke District	222	232
Number of miles of rural line extensions made	12	10*
Total number of rural customers	3472	3645**
Total number of rural customers added on rural lines each year	300	173
Average number of customers gained per mile of new rural line	10	8
Total number of farm customers	421	459
Average kilowatt-hour consumption per farm customer per year	1230	1335
Average rate per kilowatt-hour for all farm service	\$0.645	\$0.042
Annual revenue per farm customer	\$54.76	\$56.07
Total annual kilowatt-hour consumption by farm customers	517,630	612,661
Average cost per mile of rural line built	\$1500.00	\$1150.00
Approximate total amount spent on rural line construction	\$18,539.00	\$14,829.46*

*The total amount spent on rural line construction in 1932 includes ten miles of new rural line plus the expense for transformers, services or other equipment used for connecting new customers on existing rural lines.

**In the year 1932 rural territory located near Martinsville, Va., which includes service for several communities in Henry and Franklin Counties, was transferred from the Bluefield District of the Appalachian Electric Power Company to the Roanoke District, and this report does not include existing customers served on rural lines in this territory. On December 31, 1932, a revised report will be made up to include the territory served in the vicinity of Martinsville.



Cutting ensilage with 5 H. P. electric motor on farm in Botetourt County. Five farmers cooperated in the use of this motor for ensilage cutting.



Overhead irrigation system on Sanderson truck farm in Botetourt County. 15 H. P. motor furnishes power to pump 115 g. p. m. of water for irrigation. This farmer's home is completely electrified.

COOPERATIVE SILO FILLING PROJECT
(Botetourt County)

	L.T. Flora Hace, Va.	C.L. Sifford Hace, Va.	B.P. Obenshain Hace, Va.	W. M. Bradley Troutville, Va.
No. of Silos :	1	1	1	1
Filled and Tonnage :	3 - 110 tons	1 - 80 tons	1 - 65 tons	3 - 100 tons
Hrs. Required :	1	1	1	1
to Fill Silo :	25	15	20	25
No. Men and Teams Used :	4 teams	3 teams	3 teams	2 teams
Cost of Electricity :	125 K.W.H. \$3.00	80 K.W.H. \$1.65	70 K.W.H. \$1.95	110 K.W.H. \$2.50
Comparison of:				
Electric Cost:	All agree: that elec: tric power cost:			less than tractor
with Tractor:	power for: this work.: Estimated			: about one-half.
Cost :	1	1	1	1

Hopkins-Woody Rural Line

A brief description of this typical rural or farm electric line is given as follows to illustrate how the farmers adapt electric power to their operations.

This line was built in 1930 through a farming community in Botetourt County, a distance of 3.6 miles to serve 20 farms and one store. The first 1.1 miles of this line was three phase to take care of an orchard irrigation load, and the remaining 2.5 miles was single phase construction. The line is 6900 volts and the cost per mile was approximately \$1320.00.

All twenty of the farm homes are wired and have electric lights and the usual small household appliances. In addition to the electric lights and small household appliances the following equipment has been purchased by the farmers on this line:

Name of Equipment	Number	Connected Load in Watts	Approximate Cost
Ranges	3	21,500	\$450.00
Residence refrigerators	6	1,140	1350.00
Radios	10	1,250	750.00
Water pumping systems---			
Farmstead and irrigation	9	5,000	1250.00
Milk coolers	1	550	600.00
Dairy water heater and sterilizer	1	5,000	75.00
Milking machines	5	3,750	1500.00
Portable Motor (5 H.P.)	1	3,750	200.00
Portable Motor (10 H.P.)	1	7,450	175.00
Small Utility Motors (churns, washing machines, tool grinders, etc.	10	2,000	200.00
Orchard irrigation system complete (40 H.P.)	1	29,840	5000.00
		82,220	\$12550.00

Stationary Spring Plant

3750
85,970

750
1331.40

Work Accomplished in Plan (Con'd.)
4. Rural Electrification Project

This particular rural line begins at Mr. C. S. Ikenberry's farm. Mr. Ikenberry has his orchard irrigation, stationary spray plant and apple packing house operated electrically. As conditions improve more and more uses will be made of electric power to enable these farmers to cut costs and improve farm products as well as their living conditions. We expect to keep a detailed record of the developments on these farms resulting from electrical service. (Weekly report page 23-a)

Lynchburg Division, A. E. P. Company

The rural service department in this district is in charge of L. M. McGhee, agricultural engineer. This territory includes part of the following counties:

Albemarle
Amherst
Nelson
Campbell
Bedford

Mr. McGhee has been working this district for a little more than two years. He is doing considerable work with poultry farmers, especially electric brooders, incubators, water systems, etc. His work is just getting well organized. During the year 20.56 miles of rural lines were built in his territory and 187 rural customers were given service of which 72 were actual farmers. He contacted 1350 farmers during the year.

The table on the next page shows the development in rural electric service in this territory.

Bluefield Division, A. E. P. Company

The rural service department in this district is in charge of L. L. Koontz, agricultural engineer. This territory includes part of the following counties:

Montgomery
Fulaski
Wythe
Giles
Bland
Tazewell
Smyth

Mr. Koontz has worked in this territory for two full years. He has devoted considerable time this year to making a card survey of all farm customers. He has worked on special dairy equipment, feed grinding and food storage problems with the farmers. He has also been active in exhibiting farm electrical developments at the county fairs in his territory. During the year he contacted 1273 farmers in his territory and completed 571 farm survey cards.

APPALACHIAN ELECTRIC POWER COMPANY

Lynchburg, Virginia

DEVELOPMENT OF RURAL ELECTRIFICATION AS OF DECEMBER 1, 1932

	Year	
	1928	1931
Number of miles of rural line in Lynchburg District	80	100.28
Number of miles of rural line built	11	20.28
Total number of rural customers	1,000	1,172
Total number of rural customers added to line each year	112	172
Total number of farm customers	166	197
Average number of rural customers added per mile of new line	2,340	2,370
# Average kw.-hr. consumption per farm customer per year	.029	.032
# Average rate per kw.-hr. for all farm service	\$69.75	\$89.79
# Annual revenue per farm customer	389,708	499,146
# Total annual kw.-hr. consumption by farm customers		611,621
# Approximate average cost per mile of rural line built		\$1,275
Approximate total amount spent on rural line construction		\$25,958

These figures include the consumption of the T. F. Ryan Estate, which amounted to 166,982 kilowatt hours at a cost of \$3,064.90.

This figure on construction cost per mile is higher than average cost runs due to six miles of line which was constructed of material which has been in stock for some time and was bought when prices were high.

4. Rural Electrification Project

The following table shows development of rural service in the two years Mr. Koontz has worked in this territory.

RURAL SERVICE DATA
(Bluefield Div. A. E. P. Co.)

No. miles rural lines built in 1931	71
No. miles rural lines built in 1932	27.1
Total miles rural lines to date	358.1
No. of farm customers added in 1931	230
No. of farm customers added in 1932	245
Total number of farm customers to date	1250
No. of farm contacts made in 1931	1050
No. of farm contacts made in 1932	1273

The electrification of the Waltonsale Dairy farm in this territory is typical of the type of work being done with dairymen by Mr. Koontz. This farm is one of 12 on a rural extension made about the middle of 1931. The owner of this farm asked for advice in electrifying his farm so the agricultural engineer has worked very closely with the management of this farm in adapting electricity to various jobs as they arose until at present it is one of the most completely electrified dairy farms in this territory. The following are the uses of electricity on this farm:

Household Uses

Electric Refrigeration
 " Range
 " Iron
 " Washing Machine
 " Toaster
 " Waffle Iron
 " Sweeper
 " Radio
 " Curling Iron
 " Space Heater
 " Percolator
 " Lights

Farm Uses

Electric Portable Farm Motor for
 Silo Filling, Feed Grinding, etc.
 Electric Dairy Refrigeration -
 90 gallons of milk per day capacity
 Electric Dairy Sterilizer
 (16 crate capacity)
 Electric Bottle Washer
 Electric Milking Machine
 Electric Water System
 Electric Cow Clippers
 Electric Lights

The electric dairy sterilizer was specially built for this farm which was having trouble with high bacteria count in their milk. Since the installation of this electric sterilizer the bacteria count has been lowered to 5,000 and held constant. This method has proven cheaper than the chemical sterilization "BK" method formerly used. A temperature of 180 degrees F. is held for 20 minutes which insures positive sterilization.

Some of the advantages claimed for this method of sterilization are: It does a considerably better job of sterilization than most other types; is not dependent on the human element for uniformly good results day after day; leaves the utensils dry, minimizing rust and further growth of bacteria; no attention is necessary; labor, dirt and fire hazards are greatly reduced; economical in operating cost; reasonable in first cost and can be built by farmer on the farm where used.

Virginia Electric & Power Company

This company has been doing some rural service work for several years principally in the Norfolk Division. Up until this year, however, the work has been under the direction of the merchandizing department. This set-up did not prove satisfactory for best results and upon the recommendation of this office the work was reorganized this year. The rural service engineers are now directly responsible to the Divisional Managers and their work entirely educational. They do not attempt to make any sales whatever but act in a consulting capacity with the farmers in all engineering problems.

The extension agricultural engineer in charge of this project held a conference at Richmond with the managers and all officials of the V. E. P. Company and presented the method of doing educational rural service work with farmers that the extension division was advocating. This conference did considerable good in giving these officials a better idea of how the work should be handled.

Several other conferences were held during the year with the officials of this company at which various details were discussed. A conference was also arranged between the Roanoke Division of A. E. P. Company and the Division Manager of V. E. P. Company at which the Roanoke territory method of handling rural service work was explained. After this conference the officials of V. E. P. were convinced that our recommendations were correct.

The attitude of this company now was expressed by the President, Mr. J. C. Holtzclaw, in his final instructions to the two new agricultural engineers employed this year. He said, "In your work with the farmers you may forget that you are being paid by this company. I want you to determine how best you can be of service to the farmers in our territory and give them all the assistance possible, that will enable them to become successful farmers. In the end our company will profit if the farmers in our territory are prosperous."

Mr. J. S. Hamilton, agricultural engineer, was employed this past summer to work in the Richmond District and E. T. Swink, agricultural engineer, was employed to handle the Suffolk District. Mr. B. J. Blair, agricultural engineer, was employed to assist Mr. Harper in the Norfolk District. All these men are graduates in agricultural engineering at V. P. I. Some time of the extension agricultural engineer of V. P. I. was devoted to advising with these men on methods of handling their work. A news item relating to the work of these men is included on the next page of this report.

Agricultural Engineers Aid Farmers

They Devote Their Time in Demonstrating to Rural Customers the Advantages of Electricity in the Home and On the Farm—State Fair Exhibit Features Electric Farm Aids

DURING the last five years, rural electrification projects have been so extended that a large area of the territory in which the Virginia Electric and Power Company operates now has electric service available for farm use. In order that rural customers in this territory may get the maximum of comfort and convenience from the use of electric service, the company has added to its staff specially trained agricultural engineers who are devoting all of their time in demonstrating to the farmers and rural customers the many economies and advantages in the use of electricity in the home and on the farm.

In selecting these agricultural engineers the company was guided very largely by the recommendations of Prof. C. E. Seitz, head of the Experimental Extension Bureau at V. P. I. in Blacksburg. The engineers selected have had the benefit of Professor Seitz' wide experience in State agricultural work.

The primary object of the rural engineers' work is to promote the interest of the farmer in doing his work more economically and more efficiently. Their work is not restricted to electrical applications, but, because of the training and experience that these men have had in all lines

of agricultural work, the farmer is given the benefit of their assistance in many other problems that he may have. While the work has been carried on only a few months, the results have already become apparent.

The agricultural engineer's job is not one of sales, but of service, and the activity of these engineers is meeting with much favor in those districts where they are located. Farmers and rural customers in the vicinity of Norfolk are being served by George Harper; those near Suffolk by E. T. Swink, and those in the western part of the territory by J. S. Hamilton, located at Richmond.

Rural Exhibit at Fair

Departing from the usual display of electric appliances, the Virginia Electric and Power Company devoted its entire exhibit at the Virginia State Fair this year to rural electrification, featuring only such equipment as would be of practical use and interest to the farmer.

The exhibit was supervised by J. S. Hamilton, who is now in charge of rural electrification work in the Richmond district. Mr. Hamilton was assisted by

(Continued on Page 352)

ENGINEERS SERVING VEPCO RURAL CUSTOMERS



GEORGE HARPER
Norfolk



J. S. HAMILTON
Richmond



E. T. SWINK
Suffolk

AGRICULTURAL ENGINEERS AID FARMERS

(Continued from Page 348)

George Harper of Norfolk and E. T. Swink of Suffolk. The equipment displayed consisted of an electric brooder, an ensilage cutter, a feed grinder driven by a 5 H.P. electric farm motor, an electric burglar alarm for poultry houses, an electric water system, a combination fuel and electric range, an electric water heater, a portable fractional horsepower electric motor, an electro-static lamp for electrocuting flying insects, a miniature model of an overhead irrigation system, and electrically heated hot beds.

In addition to the electrically operated and controlled hot beds, an old-fashioned hot bed was shown for comparison. Both types were planted at the same time and given the same attention. The plants in the electrically heated bed broke ground in forty-eight hours, while it took the plants in the manure bed four days to break ground. The plants in the electric bed were much stronger and healthier than those in the manure hot bed.

An interesting miniature model of an overhead irrigation system was shown with an electric motor supplying the power for pumping the water from the reservoir to the irrigated field. This model was a reproduction of a large installation even to the streams of water spraying over real plants in the cultivated field.

The display attracted many State Fair visitors, especially those from the rural districts. Practically the same equipment was exhibited at the Four Counties Fair at Suffolk, Va.

Work Accomplished in Plan (Con'd.)
4. Rural Electrification Project

Norfolk and Portsmouth Division, V. E. P. Company

Mr. G. E. Harper, agricultural engineer, has been in charge of the rural service work in the Norfolk and Portsmouth Division for several years. Mr. Harper has done splendid work and is very highly regarded by the farmers in his territory. This territory includes Norfolk and Princess Anne Counties. Some of the most outstanding accomplishments in his territory during the year are as follows:

Nineteen and one-half miles (19½) of new rural lines were built on Farm "C" extension plan. These lines take care of 46 new farm customers with service available to approximately 25 prospective customers. There are now 668 farms being served by this company in this division.

Progress was made in lowering the cost of rural line construction by lengthening the spans and other economies.

A study on the cost of milk cooling with electricity on two large dairy farms. (Report in Exhibit Section of this report.)

The magazine "Electricity on the Farm" was sent to all of the farm customers in Norfolk and Portsmouth Divisions.

Considerable work was done in helping the farmers to install proper wiring and especially protective starting switches for motors on their farms.

Records are being kept at the present time to determine the cost of milking cows electrically and curing sweet potatoes with electricity.

We installed sixteen 500 watt strip heaters in a house 20' x 40'. The curing period extended from November 2 to November 18, during this period 2500 bushels of potatoes were cured using 3,010 K. W. H. of electricity. The cure was very uniform throughout the house and the customer and many of his friends were very well pleased with the result.

Four electric steam boilers were installed on dairy farms. These small boilers are designed to meet the requirement of the average dairyman.

The advantages of these electric boilers are: Low initial cost, cheap operation, a short period of time to heat the water to boiling and making steam, sanitation, does not occupy much space, and requires practically no labor to operate.

Records are being kept of an electrical hay drying plant on the Bay View farms. This year corn ensilage was dried and fed cows. This procedure looks very promising but is still in the experimental stage.

Suffolk Division, V. E. P. Company

The rural service work was organized in this division the past summer with E. T. Swink, agricultural engineer, in charge. This territory includes Hantsmond, Isle of Wight, Surry, Sussex and Southampton Counties.

The engineer has not completed the farm survey of this territory as yet so we cannot report on the number of farmers being served.

About 3.1 miles of rural lines have been built since he started work and eleven farm customers added. Arrangements have been completed for the construction of an eight mile extension which will add about 60 rural customers, 30 of which will be farmers.

Mr. Swink gives a brief report of his activities since starting work as follows:

"Since June 16, I have spent practically all of my time visiting our farm customers and making first contacts. In this first visit, I explain the farm engineering service being offered by the company and that we cooperate with the V. E. P. I. extension division in this work. I discuss any question on equipment that they might ask or any other farm engineering problem that comes up in the course of our conversation. Although the cotton and peanut markets have put many of our farmers in a distressing financial condition, they seem to appreciate the company's interest in them and I believe that this attitude is worth a lot to the company.

"I have spent a great deal of time studying dairy equipment and especially water heating and sterilizing equipment. Records have been kept on the combination electric water heater and sterilizer which is installed in one of our small dairies, and I shall include a report on its first three months of operation in my November report.

"The sweet potato crop is becoming more important in this territory and I have spent quite a lot of time with Mr. Gillette, County Agent, in making provisions for curing and storing this crop. We have assisted many farmers in building inexpensive curing houses to house unmarketable potatoes so that they would be encouraged to grade their potatoes and market only No. 1 potatoes. A number of farmers have their own curing houses and those that do not are storing in the community house in Suffolk. Although my work in helping with these houses does not have any significance in rural electrification, it does bring me in better contact with the farmer and may mean more electric curing houses in the future.

"The electrically equipped house on Mr. W. T. Wright's farm is being operated but a stove was used in conjunction with the electric heaters during part of the curing period. Mr. Wright could

4. Rural Electrification

not operate his electric heaters on the proper rate at first and therefore he had to use the stove to keep down expenses. However, he now has an electric refrigerator which entitled him to a rate that makes the use of electric heat in his storage house desirable. I believe that several curing houses can be electrified in the Suffolk District next year if we obtain satisfactory results from the houses being electrically heated this year."

Richmond Division, V. E. P. Company

Mr. J. S. Hamilton, agricultural engineer, was placed in charge of the rural service work of the Richmond District in September. He works in the following counties:

Henrico
Goochland
Hanover
Prince George
Chesterfield
Dinwiddie

Twenty-two (22) miles of rural lines have been built in this territory during the year with 57 farm customers added. There is now a total 497 farms receiving electric service from this company in this territory.

Mr. Hamilton has spent most of his time to date in visiting the farmers, making a farm card survey and getting acquainted generally with his territory. He supervised the preparation of the rural electric exhibit at the State Fair which was prepared at our suggestion. He has worked with the dairy farmers on dairy equipment and the State Farm on sweet potato curing.

The following is a brief report of the rural electrical exhibit at the State Fair:

AGRICULTURAL EXHIBIT AT THE STATE FAIR

By

Virginia Electric & Power Company

The equipment exhibited consisted of an electric brooder, a Pappe ensilage cutter, a Letz feed grinder driven by a S. E. P. electric farm motor, an electric burglar alarm for poultry houses, an electric water system, a combination fuel and electric range, an electric water heater, a portable fractional horse power electric motor, an electrostatic lamp for electrocuting flying insects, a miniature model of a Skinner overhead irrigation system and electrically heated hotbeds.

A comparison was made between the old fashioned manure hotbed and the new electric hotbed. Two identical hotbed frames were

made. One was heated by manure and the other was heated by the new Westinghouse electric hotbed heater. They were both planted at the same time and given the same attention. The plants in the electrically heated bed broke ground in 48 hours, while it took the plants in the manure bed 4 days to break ground. The plants in the electric bed were much stronger and healthier than those in the manure hotbed.

It was estimated that the plants grown by the use of electric heat could be transplanted earlier and the vegetables gathered and marketed about 10 days earlier than those grown in the manure bed. This allows the farmer to get his products on the market at a time when prices are at their highest.

The miniature model of a Skinner overhead irrigation system was shown in connection with an electric motor supplying the power for pumping the water from the reservoir to the irrigated field. This model was the exact duplicate of a large installation even to the streams of water spraying over real plants in the cultivated field.

Outlook

Gratifying progress in the organization of the rural service work with power companies has been made this year. Work along this line will be continued until all companies are completely organized to render their farm customers agricultural engineering service. An attempt will be made this year to get the Virginia Public Service Company to organize their work along the lines of the other two companies. As conditions improve the V. E. P. Company expects to add more agricultural engineers until they have at least one agricultural service man for each of their seven districts.

Individual demonstrations of electrical uses that enable the farmer to reduce costs and increase income will be continued on farms in cooperation with the rural service departments.

Farm Water Power

Under conditions where central station electricity is not available at reasonable rates and where there is adequate fall and flow it is practical to make individual or community installations. Some very fine locations are visited. However, due to the rather large money outlay, only a small percentage of these surveys actually develop into installations.

No effort is being made to develop this project, only urgent requests being answered.

Results

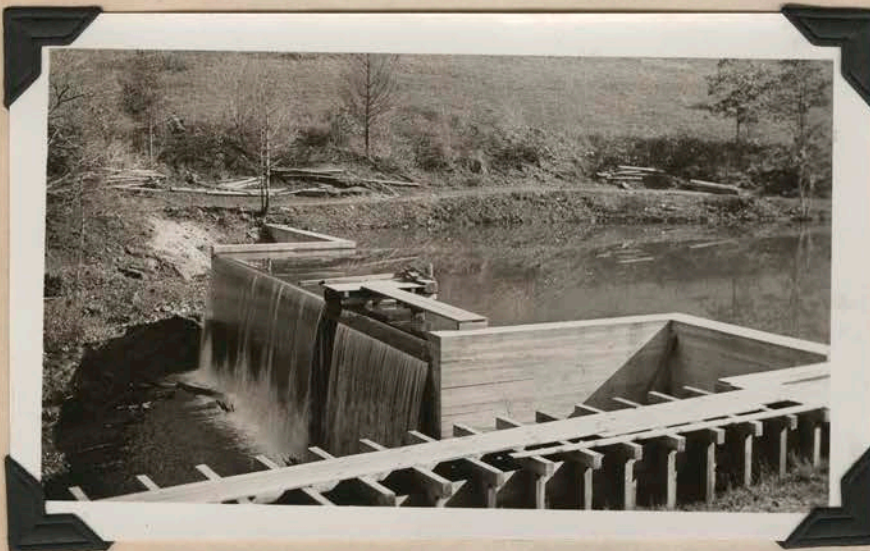
Twenty-seven (27) farm water power surveys were made in eighteen (18) different counties. Some of these locations have excellent

Work Accomplished In Plan (Con'd.)
4. Rural Electrification Project

possibilities, but it is unlikely that many will be completed within the next few years. They were all direct requests.

Outlook

The department anticipates doing nothing more than to take care of urgent requests. If possible these requests will be handled when the specialist is in the section on other work. It is only in sections where high line electric service is not available that farm water power development is advisable. The work will be confined to such areas.



Mill dam for water power
development at Willis



Water power plant of
R. Moore, Patrick Co.
Turbine, generators,
etc., in shed.

[illegible]

5. FARM DEVELOPMENT PROJECT

This project is a cooperative one between the Bureau of Agricultural Engineering, U. S. D. A., the agricultural engineering department, V. P. I., and the agricultural economics department, V. P. I. Its purpose is to promote the adoption of improved engineering practices in farm organization on typical Virginia farms by--(1) A survey of the farm showing present conditions and practices, together with income, (2) Suggested improvements in physical layout, cropping practices and sources of income to make it more profitable, (3) Complete records showing practices adopted and increase in income as a result.

Sixteen farms were selected for this project representing as nearly as possible typical types of farming for the different sections of the state. In order to secure immediate results progressive men were chosen as co-operators, although it is realized such work can be of more benefit to less progressive farmers. However, it was felt convincing results must first be secured to convince less progressive farmers that the idea is practical and worth while.

selected previously
Farms chosen are as follows:

advisory

- J. W. Sanderson, Hollins - Truck farm
- J. A. Jackson, Cloverdale - Poultry farm
- W. M. Bradley, Troutville - Dairy and general farm
- C. S. Ikenberry, Daleville - Orchard and general farm
- George Carr, Charlottesville - Dairy farm
- Ira Fraye, Earlysville - General farm
- J. C. Ballard, Decora - General farm, orchard and trucking
- G. A. Dunlop, Charlottesville - General farm
- E. F. Showalter, Harrisonburg - General farm
- J. H. Burner, McGaheysville - General farm
- J. H. Horsley, Stapleton - General farm and beef cattle
- A. W. Showalter, Tabb - Poultry and general farm
- J. S. D. Cummings, Hampton - Poultry and dairy
- H. E. Yoder, Oyster Point - Dairy farm
- R. T. Etheridge, Back Bay - General and truck farm
- F. E. Reader, Lynnhaven - Dairy farm

A detailed map of each farm was made by the Bureau of Agricultural Engineering, U. S. D. A. Farm records were then secured by the agricultural economics department, and a soil survey made by the soils department. This gave a record of present practices together with adaptability of the soils to different crops.

Specialists from the various departments were then called into consultation and a set of recommendations drawn up for changes in cropping program which should result in increased income. Physical conditions were considered by the agricultural engineering department and improvements in field layout, drainage, terracing, buildings and equipment, etc., suggested. In other words a complete long time program was worked out with a definite goal in view.

Work Accomplished in Plan (Con'd.)

5. Farm Development Project

While a very late start was made on this project, and many of the farming operations already started before definite recommendations could be made, a recent visit to all of the farms shows that these recommendations are being carefully and favorably considered by these men, and in many cases considerable progress made toward carrying them out. (A sample copy of recommendations and map is included in the Appendix of this report.)

Improvements made are as follows:

- (Overhead irrigation system installed on 22 acres.
- J. W. Sanderson (Terracing done to prevent erosion.
(Improved cultural practices as result of Vegetable
(Gardening Department's help.
- J. A. Jackson - Poultry flock being gradually increased and cattle decreased as recommended. Rotation to reduce plowing and increase roughage worked out. Irrigation planned.
- W. M. Bradley - Irrigation installed and used in corn and alfalfa. (See under irrigation project). Addition built to dairy barn. Electrical equipment added. Dairy equipment improved. More land bought.
- C. S. Ikenberry - Stationary spray plant installed resulting in 30% saving in labor, more timely and effective spraying. Irrigation of orchard practiced resulting in greatly increased yield. (See under irrigation project).
- George Carr - Tractor for belt work and preparation of seed bed purchased. More alfalfa planted and steps taken to follow rotation and cropping systems suggested.
- Ira Fraye - Dairy herd reduced and poultry being increased as rapidly as buildings can be provided. Field layout and crop rotation started. Hog enterprise reduced as recommended.
- G. A. Dunlop - Because of share cropper this project is just getting under way. Owner will operate in future. A large amount of fencing is being done at present, fields are being cleared of brush and seeded to cover crops, six pure bred sows and boar have been purchased and preparations are being made for building barn. Mr. Dunlop says, "I've found out already that you men know my farm and what is best for it better than I do and I expect to follow your advice to the letter."
- J. R. Horsley - Recommendations just being made.
- J. H. Burner - Dairy being reduced and poultry increased.
- E. P. Showalter - Poultry and turkey business being increased.

Work Accomplished In Plan (Con'd.)

5. Farm Development Project

- A. W. Showalter - Dairy herd reduced, poultry and turkeys being rapidly increased at a profit.
- J. D. S. Cummings- Abortion hit herd making isolation dairy barn necessary. Also sale of some cows and purchase of better. Poultry flock being culled by agent. Labor savings effected. Large amount of clearing and ditching done, together with rearrangement of fields.
- H. E. Yoder - New 60 cow dairy barn built. Thirty-five additional acres of drainage installed. Gullies filled in, 12 acres of land cleared, cropping practices followed.
- H. T. Etheridge - General purpose tractor and equipment purchased. Hogs increased and being fattened on beans and pasture plus only $1\frac{1}{2}$ bushels of corn. All hogs sold on highest market of year. Very high yield of potatoes, 96 barrels per acre and good profit.
- E. H. Reader - Progress being made in working out rotations and field arrangement.

Outlook

All cooperating parties who are familiar with this project believe it promises great possibilities and offers the best method yet devised for doing real effective extension work with the individual farmer. After another year's results we will be in a better position to pass judgment. Until we have another year's results we will not enlarge the project to include other farmers.

WORK ACCOMPLISHED NOT IN PLANIRRIGATION

There is a growing interest in the subject of irrigation. Considerable time has been spent on this project this year and there are many requests for assistance on file in the office, especially from fruit growers. We can be of great assistance to our fruit growers, especially in directing them in proper methods of irrigation, thereby enabling them to increase their profits. Irrigation will no doubt be adopted as one of the important operations on more and more Virginia orchards.

Results

The specialist in charge of this project made four radio talks on the subject, prepared a paper and film strip on orchard irrigation for the State Horticultural meeting, wrote several articles on irrigation, answered a number of letters and surveyed 16 orchards, totalling 1245 acres in seven counties. Eleven surveys were also made for the overhead or surface irrigation of general farm and truck crops totalling 277 acres. The following bulletins were sent out on this project:

- 150 - Surface Irrigation for Eastern Farms
- 100 - The Border Method of Irrigation
- 100 - The Corrugation Method of Irrigation
- 200 - Spray Irrigation for Eastern States

The cash value of increased yields resulting from irrigation in the five demonstration orchards was estimated by the owners at \$30,000.

The following is a discussion of some of the regular irrigation demonstration projects on which we have been working for several years or have started this year.

Orchard IrrigationStrathmore Orchard Irrigation Project. (Shenandoah County)

This is the fourth year of irrigation in this orchard. Extensions have been made so that 125 acres can now be irrigated. Mr. Wissler, the manager of this orchard is still enthusiastic about the advantages of irrigation.

Mr. Teske, extension horticulturist, and Mr. Dickenson, local county agent, made a check on irrigation this season in Mr. Wissler's orchard. Two winesap trees were selected, one of which was irrigated and one which was not. These trees were on the same type soil, both 29 inches in trunk circumference a foot above the ground, and both had the same

treatment other than water. In other words the trees were as near identical as could be selected. The following chart gives the result of this check.

<u>Non-Irrigated</u>	<u>Irrigated</u>
Total - 3278 apples = 6 crates	Total - 2990 apples = 15 crates
-628 drops = 1 crate	137 drops
2650 run over grader only	168 were under 2"
472 went over the 2" eliminator	684 " " 2 1/4"
None were over 2 1/2"	785 " " 2 3/4"
Poor color and poor quality	925 " " 2 3/4"
	145 " " 3" and over
	High color and excellent quality

(Due to trouble with the grader 142 apples in the irrigated check were left in the brush of the grader. Most of these were large apples.)

Mr. Wissler states that the irrigated tree in this check was not a good example as the average was much better than this and in the irrigated orchard as a whole he got much better results than this check would indicate. However, even this shows up very well and demonstrates the great value of water at the right time.

The following letter from Mr. Wissler gives some of the results of his irrigation for the last two seasons:

Strathmore Farm & Orchard Co.
Mt. Jackson, Virginia

Mr. Chas. E. Seitz
Blacksburg, Va.

Dear Sir:

In view of your splendid cooperation which has made possible the irrigation of our orchards it is my pleasure to outline for you my impressions and experiences of the past two years, which of course were an almost normal one and one of severe drought.

You of course know that our plant was installed in 1929 and I believe that I have written you my experiences up to the season of 1931. I will therefore start from this point.

Season of 1931

After the severe drought of 1930 I was very anxious to see the difference in condition during the 1931 season of the irrigated blocks as compared with the non-irrigated blocks. From the first swelling of the buds in the spring what I had hoped for and suspected was very apparent. On the irrigated trees the buds were more than twice as



1.

2.

3.

1. Heavy laden irrigated apple tree
2. Large apples on irrigated tree
3. Pipe outlet and flame for conducting water



4.

5.

6.

4. Irrigated tree (note heavy foliage)
5. Unirrigated tree (note light foliage)
6. Large apple is 3-1/4". Average size taken from irrigated tree in view No. 4. Small apple 2-5/8 inches - average size taken from unirrigated tree - view No. 5

Scenes on this page are in C. S. Ikenberry Orchard, Botetourt County

large and in much greater profusion despite the fact that the irrigated trees had the previous year borne ten times the tonnage, and I might add right here that at no time since I have started irrigating have I done any thinning other than the removal of defective apples late in the season. The second very obvious observation was the marked difference in the size and vigor of the open blossom. This was especially true of the old saps. In many cases saps had so suffered from the drought that the blossoms were imperfect, having misshapen petals and at times only two or three. In many instances several of the Staymans would be dwarfed or entirely missing. All through the season the irrigated fruit was larger, firmer and of a markedly better skin texture.

You will of course remember that 1931 was almost an average wet year, but you also know that our average wet years at best have many short dry periods. Whenever there was the slightest indication of the soil becoming even temporarily dry I put on water. The last result that I noted while the apples were on the trees was about as pleasing as any. You no doubt recall how much trouble was experienced in 1931 in getting sufficient color. Many orchardists lost over half of their crop because of leaving them hang for this purpose. The irrigated blocks began to color at a normal time and finished beautifully. I had virtually no drop and a minimum of cracks. Doubt had been expressed by some as to how well this irrigated fruit would stand up in storage. I had a large block in the Terminal Storage in Washington, D. C. I allowed some Staymans, Yorks, Blacktwig and Saps to stay there until May. They stayed in perfect condition even showing no scab.

Season of 1932

After my heavy crop of 1931 in spite of my good crops since installing irrigation, I thought it highly improbable that I would get a good set in 1932 even though it was apparent that I had a good bud show. To my surprise my regularly irrigated area produced the greatest tonnage that it ever has and at the present time has another fine bud set. The quality, finish and size were as good if not better than at any other time, and the color by far the best that I have ever had. Again I had no drop.

As you know we have a capacity of around 1,000 g. p. m. I did not start pumping as soon as I should have this year, about July 16, and found it necessary to concentrate my work largely on a block of 3400 Staymans and Sap trees that had been regularly watered for several years and had on them much the best crop. As nearly as I can estimate, I pumped 25,000,000 gallons on this block at the approximate total cost pumping and distributing of .037 cents per thousand gallons. There is no doubt but that I increased my tonnage 900 per cent, and in most varieties I would not have had a marketable apple had I not irrigated.

I made some checks with old York trees. I found that I got a far better color and finish. You know our Yorks have been prone

to drop during their ripening. This drop seems to be greatly arrested. Certain varieties seem to respond to a greater degree than others, notably all Saps, but there is not space or time to go into that now. The development of cover crops to replace to a large extent fertilizers is also interesting, and the elimination of mice and reduction of leaf hoppers is no small item and only a few of many observations that appear true at this time.

To sum up I feel that our irrigation has been the most successful and profitable thing that I have ever undertaken and I am now planning to enlarge the plant. I would not buy, were I in the market for an orchard, which I am not, an orchard which could not be watered.

Another orchardist said to me the other day. "Frank, when you started irrigating I thought that you were the d--- f--- that I knew, but I completely changed my opinion and I am going to try to do some myself."

I know how busy you are but I do feel that some research work should be done in this state on irrigation. There is no information available on our conditions and we do not know where to start and where to stop to say nothing of a thousand other questions.

I wish to thank you again for all you have done and only ask that you will continue and if possible obtain the data which I feel confident an increasing number of orchardists will need. It is my sincere belief that in the near future irrigation will hold a place of great value to the orchardists of this area.

Sincerely,

(Signed) F. H. Wissler

Luray Orchard Project (Page County)

This is the third year of irrigation in this orchard. The following letter from Mr. Roudabush, owner, gives the results for the past season:

Luray Orchards
Luray, Virginia
November 15, 1932

Prof. Chas. E. Seitz
Extension Agr'l. Engineer
Blacksburg, Va.

Dear Prof. Seitz:

I have your letter of November 4 asking that I advise you regarding results and information received from operating my irriga-

Work Accomplished Not In Plan (Con'd.)
Irrigation

ting system this season for your use in preparing a talk before the Horticultural Society meeting this fall.

The results that I received this past season were very much more satisfactory than the former seasons that I have operated my plant and first I will tell you the reason for this. I have as you know a pumping capacity of 50,000 gallons now and have about 225 acres of orchard. Other seasons I have used this amount of water over the entire acreage and confining the use of the water to the immediate vicinity of the tree, but carrying it there in small ditches. I had to do this in order to cover over this amount of acreage with my capacity system. In doing this the results, I would say, were fairly satisfactory. It added some to the size of my apples and very probably saved some of my trees from dying during the drouth. However, I found that I could not get over my orchard fast enough for best results and the trees would be needing water very badly before I could get back to them again.

This year on account of the low prices of apples I at first decided that I would not irrigate at all as my apples were rather scattered and not a very heavy crop any way, except for one block of 50 acres, which had had a light crop in 1931. This block set a heavy crop this year. The latter part of July I decided that as this block had a heavy crop on and the weather continued dry that it would very probably pay me to irrigate this part of my orchard. So I started my irrigating system and operated it for about 30 days, 13 to 15 hours per day and watered all the time on this 50 acre block, watering about 15 acres from each outlet and as soon as we got over it once we would start right back again. So this block was watered over once about every six or seven days, and instead of carrying the water to each tree as I had done before, as I had plenty of water for watering this block, I flooded it all over and let the ground take in just as much as it would and then leave that outlet and go to another. By flooding this piece as I did this season the results were very satisfactory. I increased the size of my apples several times compared with the other trees close by which had no water. I also got wonderful color and finish on my apples in the particular block while the apples in the adjoining blocks were poorly colored, lots of sunburn and just poor quality in every way.

I have also found out that I have not started watering early enough. On account of the expense of irrigating and the very low prices for apples I had left off starting my plant as late as possible to save this expense, but believe this is a serious mistake and after the apples stop growing on account of the lack of moisture it takes ten days or two weeks to get them started again. I do not think the results are as good as if the apples are kept growing rapidly from the start. So I think the irrigating should be started as soon as the early spring and winter moisture are gone from the ground and not depend on the summer showers practically at all unless

of course they are plentiful, which we have not had for the past several years. I know now that I should have started irrigating this season about the 20th of June but did not start until about a month later. I also find that I have not been watering late enough in the season and the trees should be watered practically up until harvest time as the apples make wonderful growth in the latter part of the season if there is moisture available.

In summing up my experience over the past three years of operating my irrigating system I would say that in the first place that the capacity of the irrigating system should be about 50,000 gallons an hour for each 50 acres of orchard. Of course this would depend somewhat on the soil but as my soil has a stiff clay bottom and holds water well I do not believe any soil would need any less than this, and if it is a loose or porous soil it would need quite a bit more.

In the second place, the ground should be flooded and given time for the water to soak down deep instead of being carried to the tree in ditches.

Third, that the irrigating should be started early in the season before the trees or fruit have in any way become checked in growth by lack of moisture.

Fourth, that irrigation should continue until late in the season, stopping just in time so that the ground will get solid enough for the apples to be hauled out of the orchard.

As you can see from the above I think that my plant is far too small and I am expecting to increase my capacity to at least 150,000 gallons per hour instead of my present capacity of 50,000 gallons. That would give me about 70 to 75 acres to each 50,000 gallons per hour capacity, which is a little less than I would recommend, but I am doing this as my orchard very seldom has a full crop on all blocks any one year so practically each year there will be 50 to 75 acres that I will not water as the set would be too light to do so. So I figure that this capacity will give me, after my system is increased, about 50,000 gallons per hour to each 50 acres of orchard. I think that very probably even more than this could be used to advantage.

Yours very truly,

(Signed) Luray Orchards
By - M. E. Roudabush, Owner

J. G. Hopkins Orchard Project (Botetourt County)

This is the third year of irrigation in this orchard. Irrigation was started July 30 this year and continued for 62 ten hour days. The cost of the electric current for pumping was \$320.00. About 75 acres were irrigated. The trees in this orchard are from 35 to 50 years old and do not respond to water as would younger trees, but Mr. Hopkins states that his irrigation this season enabled him to double his yield. He figures that irrigation increased his yield in this orchard by 5,000 bushels. He also reports that the bud formation for next year's crop is splendid.

C. E. Ikenberry Orchard Project (Botetourt County)

This is also the third year of irrigation in this orchard. Mr. Ikenberry reports of this season's results as follows:

"Eight acres of 22 year old apple trees were irrigated by gravity. The application was made as soon as drouth threatened and continued day and night until apple harvest--a total of six weeks. The volume of water was around 80 gallons per minute. The trench system was used. The results were striking. Yorks packed from this orchard averaged 50% above 2 $\frac{3}{4}$ inches with 30% above 3 inches. Staymen packed, averaged 50% above 2 $\frac{3}{4}$ inches with 45% above 2 $\frac{3}{4}$ inches. Both Yorks and Staymans colored well and packed out about 85% No. 1 apples."

Mr. Ikenberry also irrigated eight acres with his stationary spray plant. He says, "These trees are twelve years old. The capacity of the plant was 20 gallons per minute. Two hundred (200) gallons of water were applied to each tree through the hose attached to hydrants. This was repeated each week for five weeks of ten hour days. The cost was 80 cents per day for power and one man to place the hose. The results were not so striking as the gravity system due to the fact that the capacity was lacking. It proved very practical, however, and was a profitable investment. We estimate that the crop of Delicious was increased 30% both in volume and quality. The apples packed out well in size and color."

Hurt Orchard Project (Wythe County, H. L. Bonham, Owner)

Mr. Bonham installed an irrigation system in this orchard near Wytheville this year. Surveys have also been made for two other orchards belonging to Mr. Bonham which he expects to equip for irrigation next year. This orchard is about 40 acres in area and about 187 feet elevation above the source of water supply. A 150 g. p. m. cylinder pump located a few feet from the stream is operated by a Fordson tractor. Two thousand feet of 4 inch pipe line carry the water to the main points of distribution in the orchard.

This plant was installed too late in the season for best results. Irrigation was begun about July 30 and continued night and day for about 60 days. Only a part of the orchard having a good set of fruit



1.

2.

1. Pipe outlet. Note cap for shaling off water.
2. Outlet of one of main lines in orchard. Water is distributed to trees by furrows.



3.



4.

3 & 4. Mr. Bonham holding heavy laden branch of irrigated apple tree.



5.

6.

5. Wood flume used to convey water over low gully in orchard to other side.
6. Top view of flume shown in view 5.

Scenes in the H. L. Bonham Orchard near Wytheville, Virginia

ORCHARD IRRIGATION PROJECT

was watered. The capacity of the pumping plant was too small to get as much water as needed for best results on the acreage irrigated but even so Mr. Bonham was well satisfied with the results secured.

Mr. Bonham reports as follows:

"It is difficult to measure the exact results, as I left no check plot to compare with, but as best I can estimate, my saving for this year's crop will fully equal the cost of putting in and operating the system.

The cost of putting in the system was	\$1794.00
The cost of fuel, oil and labor was	732.00
The depreciation on tractor was	100.00
	\$2626.00

"I estimate we got out of this year's crop fully enough by way of increased size and quality of the fruit to fully off-set this entire cost of the investment and operating same."

Field Crop Irrigation Project

Several surveys for the irrigation of field crops have been made this year and a number of farmers have been given information on irrigation.

Several of these farmers have made good use of small streams to beat the drouth of this summer. The following two examples show what some of these farmers think of irrigation.

Mr. W. M. Bradley, a dairy farmer of Botetourt County, irrigated an 8 acre field of ensilage corn with splendid results. Although he did not start his irrigation until late in the season, Mr. Bradley was able to almost treble the yield of ensilage corn. The value of the increased yield was more than sufficient to pay for the installation and operating costs of his irrigation system.

In telling me of the results of his irrigation Mr. Bradley said, "I more than doubled the yield of the ensilage corn I irrigated this season. My biggest mistake was that I did not start my irrigation earlier in the season. If I had started irrigation earlier, I would have increased the yield much more, but even so, the late irrigation paid me well. I am convinced that irrigation of ensilage corn will pay me practically every year as there is seldom a year in which we get sufficient rainfall for a maximum yield of ensilage corn."

Mr. Bradley had a small pump which did not have sufficient capacity for irrigation, so he purchased an additional pump and connected them both to his 5 horse power portable electric motor. These two pumps, together, deliver about 80 gallons of water a minute. The water is pumped from a small stream through about 1,000 feet of 5 inch pipe to the corn field 75 feet higher than the stream. The pipe is second-hand boiler tubing purchased locally at a very low price. The water is distributed in the corn field through shallow furrows along the corn rows.



5 H. P. portable farm motor hooked to two pumps on the Bradley farm in Botetourt County. Pumped water for irrigation of 8 acres ensilage corn. This motor also used for cutting ensilage.



Ensilage corn on Bradley farm. Corn rows in rear received water. Row in foreground did not. Irrigation in this field increased the yield about 3 times.

The cost of the irrigation plant including pumps, pipe and all labor was approximately \$140.00. This figure does not include the portable electric motor which is used for ensilage cutting and other farm power jobs. The pumps were started July 15 and operated 25 days. The electric bill for pumping amounted to approximately \$12.00.

According to Mr. Wills, the local county agent, the yield was increased at least three times as a result of irrigation. If the yield were only doubled due to irrigation the increase would be 30 tons. Authorities say that \$4.00 a ton is a fair value to place on ensilage this year. Irrigation, therefore, returned Mr. Bradley at least \$200.00 or about \$60.00 more than the cost of installation and the cost of operation.

Mr. J. T. Woody, another dairy farmer in Botetourt County, installed a pump late in the season to use for irrigating alfalfa. A 10 horse power motor drives a pump that delivers about 180 gallons per minute. The water is pumped from a small stream through several hundred feet of 3 inch pipe to the alfalfa field where it is flooded over the field by gravity. The pump, motor, pipe and all labor cost about \$300.00.

Mr. Woody says, "I did not get my irrigation outfit installed soon enough in the season to get the best results. I irrigated only a part of the ten acres, but next year I expect to put in larger pipe for the main line and use the present main for distribution pipe lines so that I can irrigate the whole ten acres. Irrigation enabled me to get four cuttings of alfalfa on the part watered while I only got two cuttings on the part not watered. The irrigation increased the yield by 5 tons. At \$20.00 a ton this increase amounts to \$100.00. My electric bill for pumping was \$30.00. If I had started my irrigation soon enough and had covered the whole ten acres I feel that the increased yield would have been sufficient to pay for the entire cost of my plant. With irrigation I can get 5 cuttings of alfalfa a season and average one ton to the acre for each cutting."

Truck Crop Irrigation

Eight surveys were made for the irrigation of truck crops. In most cases these projects called for the installation of overhead or spray irrigation lines.

Sanderson Truck Irrigation Project

This demonstration has been running for three years. It was written up in detail in last year's report. Mr. Sanderson reports that he now has 22½ acres under overhead irrigation. He has expended over \$6000.00 on this installation. He does not owe a cent on this investment and has paid for the installation out of the returns from his truck crops, while at the same time getting a good living. His home is completely equipped with electric appliances.



Irrigated alfalfa on Mr. Woody's farm in Botetourt County. Alfalfa in foreground was not irrigated while that in background had received one irrigation at time of this picture. 10 H. P. electric motor operates a 100 g. p. m. pump on this project.

This year was extremely dry and the irrigation on this farm paid well. Mr. Wanderson will make money out of this year's operations while most truck farmers in his section that do not have irrigation, will lose due to the dry weather.

Outlook

Requests are now on file in the office for irrigation surveys for fourteen different orchards.

One prominent apple grower recently stated that he lost at least 10,000 barrels of apples in one of his 150 acre orchards due to the dry season. He said he would have to get water or retire from the apple business. On most of these orchards it is a big problem to secure water and practically all orchard irrigation projects call for detailed surveys and careful planning.

Experience in orchard irrigation so far has shown that maximum results from the standpoint of yield, grade, color, size, health of the trees and fruit development can only be secured when sufficient moisture is available during the growing months. The Western grower has had a big advantage over the Eastern grower, in that by irrigation he is assured of sufficient moisture at the proper time to produce best results. By irrigation, where practical, the Eastern grower may have the same opportunity to produce a large crop of fruit of good quality and color, even in dry years.

There is a growing interest in this subject and considerable time of the specialist will be given to this project during the coming year.

LAND DRAINAGE

On account of the economic condition of the farmer, this project has not been stressed. While a great deal of drainage of cultivated fields is needed in the state, low prices do not justify very much of an expenditure for drainage. Farmers have been advised to put in surface drainage until conditions improve. Such drainage can be accomplished without any cash expenditure. In some few cases tile drainage surveys were made and on at least two farms the tile drainage systems proposed are being put in.

Results

Three drainage surveys were made for tile drainage systems totalling 120 acres. Three surface drainage systems were planned for the drainage of 166 acres.

Mr. H. E. Yoder, one of our farm development project demonstrators has now drained several fields on his farm. He has his own

Land Drainage

ditching machine and drains at least one field each year. He tiled drained a 30 acre field this past winter. Plans were prepared for the drainage of another 35 acre field. Work has already been started on this project. This will be the fourth field Mr. Yoder has drained. He says he is going to keep at this work until he has his whole farm drained as he says, drainage is the best investment he can make on his land.

A survey was also made for the City Farm of Newport News. The plans call for the tile drainage of a 75 acre field. Mr. Yoder expects to do the ditching work for this project as the City Farm is near his property.

A number of letters on drainage have been answered and the following bulletins have been mailed out on request:

100 Farm Drainage
200 Drain the Wet Land
150 Tile Trenching Machinery

Outlook

As the proper tile drainage of land entails considerable expense this work will not be stressed until economic conditions improve. Very little tile drainage work is now being done or will be done by farmers until conditions improve. Farmers will be urged, however, to plan adequate surface drainage as there is considerable loss from cultivating poorly drained land in wet years. This loss can largely be prevented by proper surface drainage. Tile drainage surveys will only be made under exceptional conditions, and when the farmer has decided to actually install the tile.

FARM HOME EQUIPMENT

Professor Potter has given ten radio lectures this year on the subject of farm home equipment. Help was given some of the Extension women on plans for the state fair exhibit. A number of letters have been answered on this subject and bulletins mailed out.

The rural service engineers with the power companies were instrumental in having considerable equipment installed in farm homes during the year. These men work in close cooperation with us on the rural electrification project.

The following bulletins relating to this project were sent out during the year:

400 Farm Home Conveniences
150 One Register Furnaces
200 Operating a Home Heating Plant
200 Methods and Equipment for Home Laundering

Outlook

There is great need for work on this project which is of such great importance to the farm home. However, limited personnel prevents any active field work being done. As in the past we will have Prof. Potter deliver radio talks and answer letters in reference to this project.

FARM OPERATING EQUIPMENT

Gas Engines and Farm Implements

A four-day short course with lectures dealing with these subjects was given at the State Club Short Course. Forty boys were instructed at this short course. Six radio talks on farm equipment were given and a number of letters answered giving specific information on farm implements. The following bulletins were sent out:

- 100 The Gas Tractor in Eastern Farming
- 75 Practical Hints on Running A Gas Engine
- 100 Laying Out Fields for Tractor Plowing
- 150 Choosing A Tractor
- 100 Motor Trucks on Corn Belt Farms
- 150 Minor Articles of Farm Equipment
- 100 Harvesting Hay with Sweep Rake
- 200 Haymaking
- 150 Care and Repair of Farm Implements (Plows and Harrows)
- 150 Care and Repair of Farm Implements (Mowers, Reapers, Binders)
- 200 Labor Saving Practices in Haymaking
- 150 The Efficient Operation of Threshing Machines
- 150 The Use of Machinery in Cutting Corn
- 150 Effective Haying Equipment and Practices

Stationary Spray Plants

Virginia with its many rough hillside orchards offers ideal conditions for the effective and economical use of stationary spray plants. Many of these orchards are so steep as to make spraying with portable rigs extremely difficult. Others are so rough that portable rigs are quickly racked to pieces; and in many others the distance to water is so great as to cause a very serious loss of time in refilling the portable rig. It is in such orchards that the stationary spray plant shows up to best advantage and results from its use are very satisfactory.

Modern stationary spray plants have been installed and operated in several Virginia orchards in recent years. The results in these orchards conclusively prove their value. Interest among Virginia orchardists in this subject continues to grow. Seven orchards were surveyed for installation of stationary plants this year. Two of these have been installed and used this season. Mr. W. A. Ourd of Crozet, installed a plant in a 90 acre orchard and Mr. C. S. Ikenberry of Daleville installed one in a 40 acre orchard.



Stationary spray mixing and pumping plant on C. S. Ikenberry orchard.
Consists of concrete two-chamber spray mixing tank, high pressure
spray pump and electric motor.

Work Accomplished Not in Plan (Con'd.)
Farm Operating Equipment

Ikenberry Spray Project

Mr. Ikenberry's stationary spray system was installed this season in a 35 acre orchard. It consists of a two-compartment concrete tank for mixing the spray material and a heavy duty pressure spray pump which is operated by a 5-horse power electric motor. This equipment is located in a small shed, built for the purpose, near a gravity water supply. The distribution system consists of a main pipe line leading from the pumping plant through the orchard, with lateral pipe lines leading off from the main line at regular intervals. These laterals are equipped with faucets to which the hose is attached for spraying.

Most of the work was done by the owner's own labor and second-hand boiler tubing was used for the pipe line. A new pump was bought but a second-hand motor was purchased. The total cost of materials, equipment and installation was \$740.76.

Mr. Ikenberry reports his season's results as follows:

"In my opinion the greatest advantages are applications quickly at the proper time and the thoroughness of the spraying. I am highly pleased with the system and can heartily recommend the installation of stationary plants where sufficient water is available and where orchard is compact."

Field Spray Meetings

A field meeting was held in the Ikenberry orchard during the summer at which representatives of the Horticultural and Agricultural Engineering Departments gave talks on spraying. Mr. Ikenberry demonstrated his plant at this meeting, which was attended by 40 growers.

A talk and demonstration of a stationary spray system was also given at the Farmers' Institute. About 50 interested fruit growers attended this meeting and field demonstration. Several of them expressed a determination to install stationary spray plants in the near future.

Outlook

Virginia fruit growers, faced as they are with unsettled markets, low prices, lowered yields due to drouth injury, and increasing spray requirements with mounting costs, must take close stock of their expenses, reducing them in every possible way without reducing efficiency. The very material savings in labor and cost of spraying together with the increased efficiency made possible by stationary spray plants is appealing to the progressive grower. Numerous requests for assistance on this project have been received. We look for continued and greater interest and predict many installations in the near future.



Spraying in Ikenberry orchard with stationary spray plant. Pipes carry the spray from the pumping plant to all parts of the orchard.

Work Accomplished Not In Plan (Con'd.)

MISCELLANEOUS ACTIVITIES

Correspondence

During the year 1967 individual letters were written and 5,000 circular letters sent out dealing with the extension projects. Seventeen news articles were also prepared.

Radio Talks

Radio talks have been given four times a month throughout the year. Until this fall each man was responsible for writing a certain number of talks. At the suggestion of the Director of Radio Broadcasting one man was made responsible for writing the talks and one man for giving them. Professor Seitz now writes the radio talks and Professor Potter reads them on the radio program.

The following radio talks have been given during the year:

Engineering in Agriculture
Electricity in the Home
Dairy Sterilization
Building Materials for the Farm
Rural Sanitation
Helping the Farmer plan His Buildings
Electric Lights from Farm Streams
Items in Home Planning
Can High School Boys Run Terraces
Farmers Suffer from Rainfall
Unusual Agricultural Uses of Electricity
Selecting the Right System for your Water Supply
Manufactured Rain for Crops
Mechanical Refrigeration for Dairies
Equipment for Fertilizer Distribution
This Household Engineering Business
Heating Water with Electricity
Modern Equipment for Corn Growers
Wife Savers
The Garden Tractor in Virginia
Home Laundry Investigations
Irrigation in the Eastern States
Suggestions for Farm House Planning
How Some Virginia Farmers Use Electricity
What Kind of Silo Shall I Build
Temperature--What do You Know About It
Household Instruments--Little Used
Erosion Control
Farm Machinery Repair
Silo Filling
Equipment for Harvesting Lespedeza
Equipment for Cleaning and Grading Seed
The American Society of Agricultural Engineers
Save the Soil You've Got



Dam for Fish Pond - Top View
Campbell County



Fish Pond Showing Reservoir Before Filling.
Also Dam.

Campbell County

Radio Talks

Timely Building Repairs on the Farm
How Some Farmers Beat the Drouth
Heating the Home
Engineering the Household
How Hot is your Cooking
Orchard Insurance by Irrigation
Spraying with Less Money

Professor Seitz made three National Radio Broadcasts over N.B.C. hookup.

One from Schenectady, N. Y. - "Irrigation in The Eastern States"
One from Albany, N. Y. - "The American Society of Agricultural Engineers"
One from Chicago, Ill. - "Power in Agriculture"

Rural Church Plan

A delegation of twelve farmers from the Elk Creek County visited the office and requested assistance in planning a rural church to replace one that burned. Plans and specifications were prepared for these people and the new church is practically completed. This church will also be used for all community gatherings and is especially planned for holding such meetings.

Advisory Committee Meeting of College Division of American Society of Agricultural Engineers

Prof. Seitz, as chairman of the College Division of the A. S. A. E. until June 1932, presided at a meeting of the Advisory Committee of this group held at Washington, D. C. in April. At this meeting plans were made for the College Division meeting of A. S. A. E. in June, for the Conference of Extension workers in Agricultural Engineering at Columbus, Ohio, in June. Plans were also made at this meeting for the Conference of Research workers in Agricultural Engineering held at Columbus, Ohio.

Annual Meeting of American Society of Agricultural Engineers, Ohio State University - June

As Chairman of the College Division, A. S. A. E., Mr. Seitz presided at the College Division Session of the annual meeting. Messrs. Waller, Byrne, Sjogren, Hillman, and Potter attended the conference of Extension Workers and conference of Research workers held at the Ohio State University immediately preceeding the annual meeting.

Prof. Seitz assumed the duties of President of the American Society of Agricultural Engineers at this meeting for the year 1932-1933.

Meeting - North Atlantic Section of A. S. A. E.

As president of the National Society, Prof. Seitz attended the meeting of the North Atlantic Section in Albany. His address on Agricultural Engineering before the banquet was broadcasted over the N. B. C. National hookup.



Suction reservoir, transformers, pump house,
and treating room. Blacksburg Water Works



300,000 gallon main reservoir near Country
Club House. Blacksburg Water Works

Meeting - Power and Machinery and Structures Division of A.S.A.E.

Prof. Seitz attended the Division meetings at Chicago. While there he made a National broadcast over W. J. J. B. on Power in Agriculture.

President's Conference On Home Building and Home Ownership

Prof. Seitz represented the A. S. A. E. at this conference which was attended by several thousand delegates from all over the United States.

Town of Blacksburg Water Supply

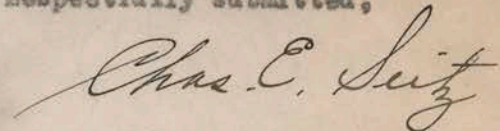
Considerable consulting engineering assistance was given the engineer in charge of the new Blacksburg water supply which cost about \$30,000 to install.

Plans were made of an open air theater for a rural school in Charlotte County. Two fish ponds, a swimming pool, and three dams for farm reservoirs were planned for farmers. A survey was made for a rural graveyard.

OUTLOOK

We are constantly getting calls from other departments, farmers, organizations, etc., for miscellaneous engineering services that do not come under any of our regular projects. Assistance is only rendered on such requests when it does not conflict with our regular work and when such assistance will mean a real service to the promotion of good will for agricultural extension work. We expect to continue to receive such requests and will handle them according to their individual merits and so far as such assistance will not interfere with our regular project work.

Respectfully submitted,



Chas. E. Seitz
Extension Agricultural Engineer

PART II

EXHIBITS

1. FARM STRUCTURES PROJECT.

Sample material used in farm building plan booklet
Dairy barn requirements

2. TERRACING PROJECT

Letter from County Agent regard terracing demonstration
Material used in terracing schools and terracing clubs
Letter from agricultural instructor in regard terracing
schools

3. FARM WATER SUPPLY PROJECT

Sample of circular letters used in farm water supply
campaign
Letter from farmer regard water supply
Questionnaire used in a study of hydraulic ram

4. RURAL ELECTRIFICATION PROJECT

Data on milk cooling plant - Coleman Dairy
Data on milk cooling plant - Lakeside Dairy
Sample weekly reports of agricultural engineers, A.E.P.Co.

Report of E. H. Cheate, Roanoke Division
Report of L. M. McGhee, Lynchburg Division
Report of L. L. Keontz, Bluefield Division

Sample monthly reports of agricultural engineers, V.E.P.Co.

Report of G. H. Harper, Norfolk Division
Report of E. T. Swink, Suffolk Division
Report of J. S. Hamilton, Richmond Division

5. FARM DEVELOPMENT PROJECT

Project outline
Sample map of farm and report of cooperator's farm

AGRICULTURAL ENGINEERING DEPARTMENT
EXTENSION DIVISION, VIRGINIA POLYTECHNIC INSTITUTE
AND
BUREAU OF AGRICULTURAL ENGINEERING
UNITED STATES DEPARTMENT OF AGRICULTURE COOPERATING

FARM BUILDING AND EQUIPMENT PLANS

Compiled By

H. H. Gordon, Asst. Extension Agricultural Engineer
S. H. Byrne, Instructor in Agricultural Engineering

Prepared Under the Direction of Chas. E. Seitz,
Head, Agricultural Engineering Department, V. P. I.

Va. Agri. & Mech. College and Poly. Inst. and U. S. Dept. of Agr. Cooperating

INTRODUCTION

The object of this book is to provide extension workers, building supply dealers and other interested agencies with a ready reference to the plans available for distribution. For a number of years the Agricultural Engineering Department has been preparing and sending out plans for all types of farm structures. These plans represent the best designs available, and have been prepared with the help of specialists in every line concerned. A large number of these plans have been designed in the department especially to meet conditions as they exist in Virginia. Plans from other states adaptable to Virginia conditions have also been included, as well as a considerable number of designs prepared by the Bureau of Agricultural Engineering, U. S. Department of Agriculture. All of the plans listed have been very carefully prepared or selected to meet conditions as they exist in this state, and may be safely used.

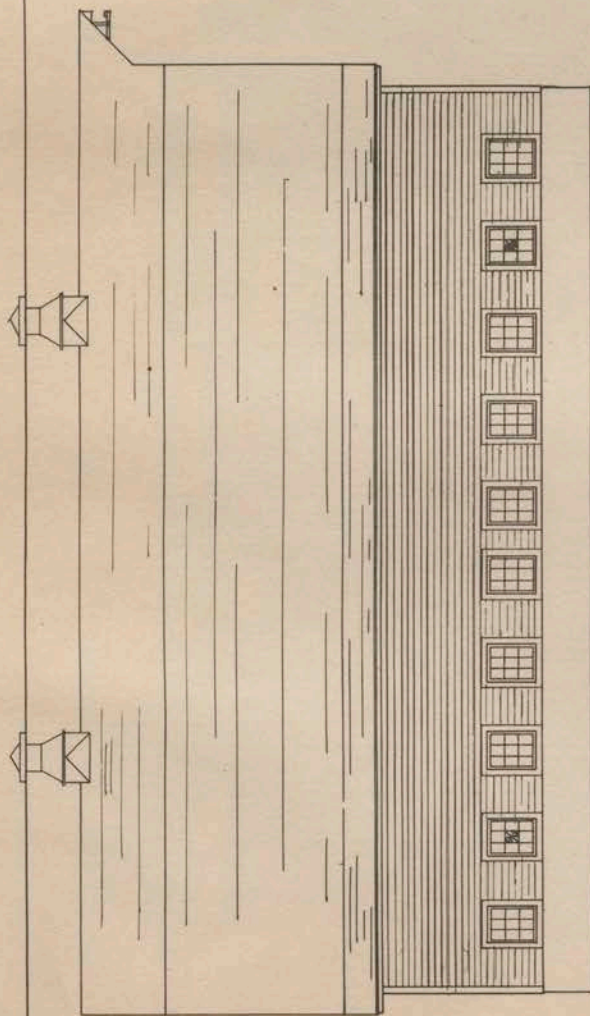
Descriptions of farm structures and equipment for which plans are available are given, and where such structure or equipment is illustrated in this booklet, the description is marked thus *. Bills of materials are available in most cases.

These plans are free to the farmers of Virginia. However, the cost of preparing these plans is considerable and it is requested that only such plans as are actually needed be ordered. Should a plan be needed for a type of structure not listed, write for information as new plans are constantly being prepared and a number of special plans not listed are also on file and available.

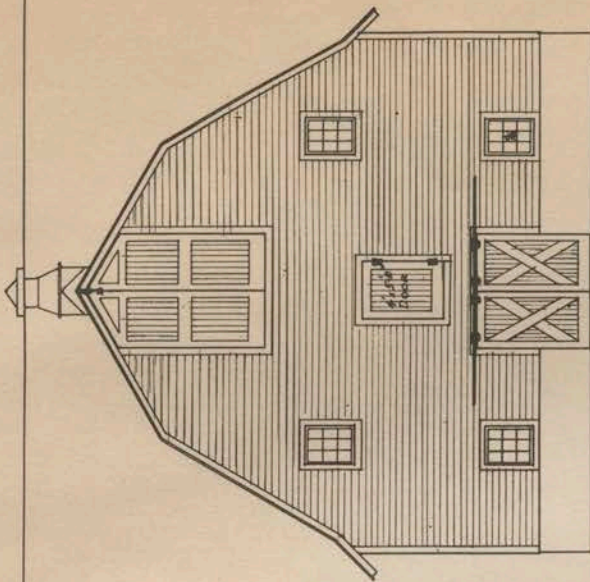
In ordering plans, wherever possible, please order by number. When in doubt be sure to give enough information to enable us to choose the most suitable plan for your conditions. For instance in the case of dairy barns give: (1) Type of barn desired, that is, one-story or two-story; (2) Size herd to be accommodated; (3) Market to be supplied, etc. In the case of other plans follow the same general procedure. Plans furnished will be large size working blue prints, not the miniature duplicates illustrated in this booklet.

Under no circumstances should the illustrations in this booklet be removed. To do so will destroy the value of the booklet as a reference, since duplicates are not available.

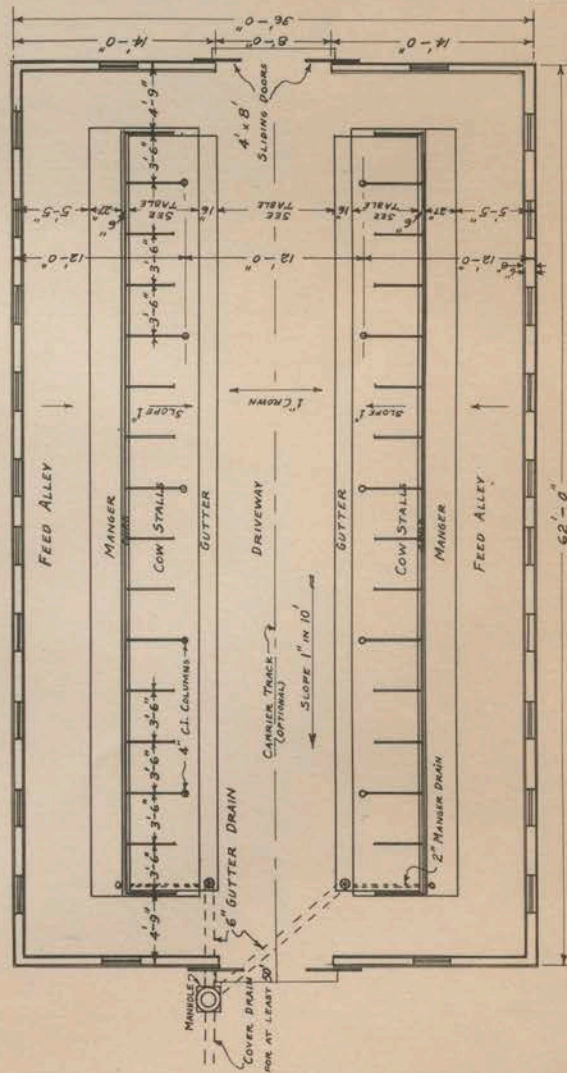
Address all correspondence and requests for plans to: Agricultural Engineering Department, Extension Division, V. P. I., Blacksburg, Virginia.



SIDE ELEVATION



END ELEVATION



PLAN
SCALE $\frac{3}{16}'' = 1'-0''$

	STANDARD BARN LENGTHS					
	Number of stalls	10	20	30	40	50
Length of Barn	28'	44'	62'	80'	98'	

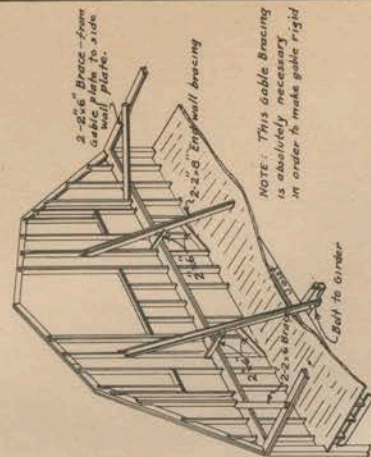
BREED	LENGTH OF PLATFORM REQUIRED FOR DIFFERENT BREEDS		
	SHORTEST	LONGEST	AVERAGE
Jersey	48 Inches	56 Inches	54 Inches
Guernsey	50 "	58 "	56 "
Ayrshire	50 "	58 "	56 "
Holstein	54 "	62 "	60 "
Shorthorn	54 "	62 "	60 "

BREED	WIDTH OF DRIVEWAY WITH DIFFERENT BREEDS		
	SHORTEST	LONGEST	AVERAGE
Jersey	9'-0"	7'-8"	8'-0"
Guernsey & Ayrshire	8'-0"	7'-4"	7'-8"
Holstein & Shorthorn	8'-0"	6'-8"	7'-0"

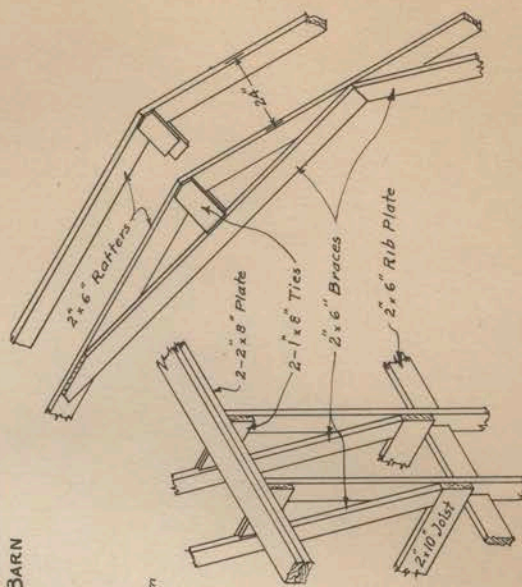
DAIRY BARN

AGRICULTURAL ENGINEERING DEPT.
EXTENSION DIVISION VPI.

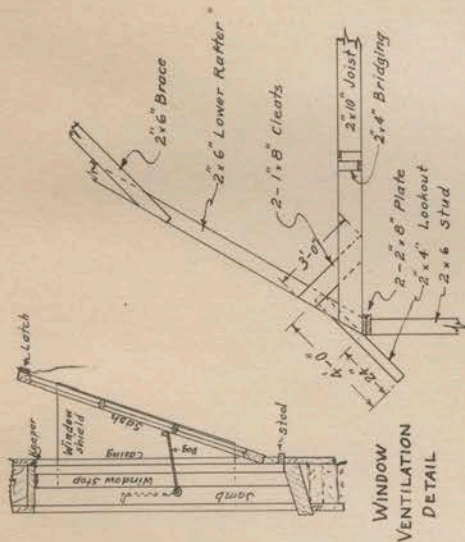
Drawn by S.H.B. Sheet 1 of 2 Refer to Number: B-1
Traced by " Jan. 1932
Approved by C.E.S.



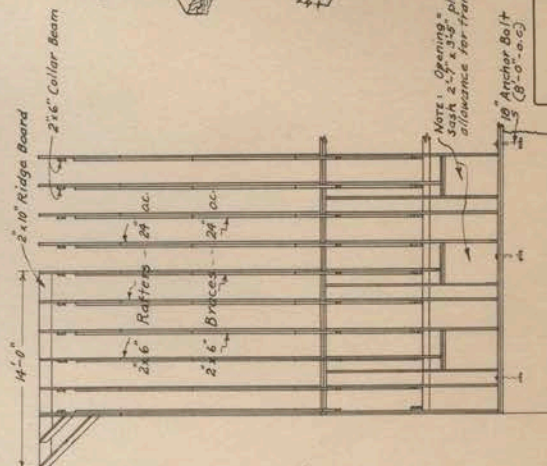
END WALL BRACING



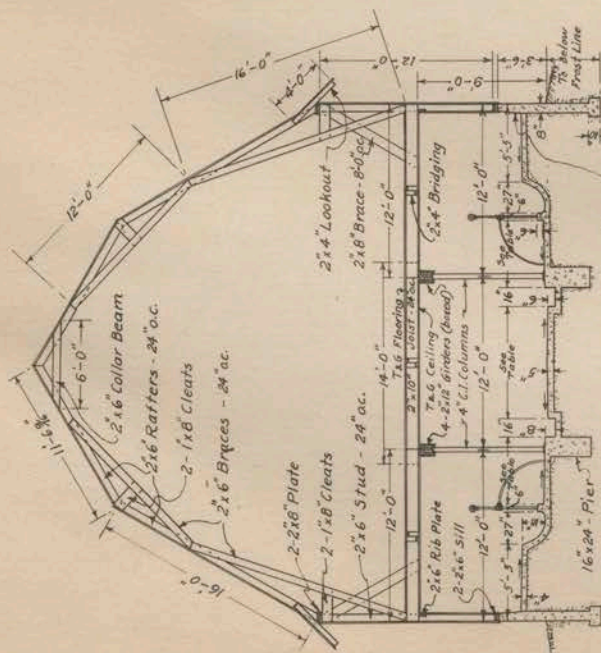
RAFTER BRACING DETAILS



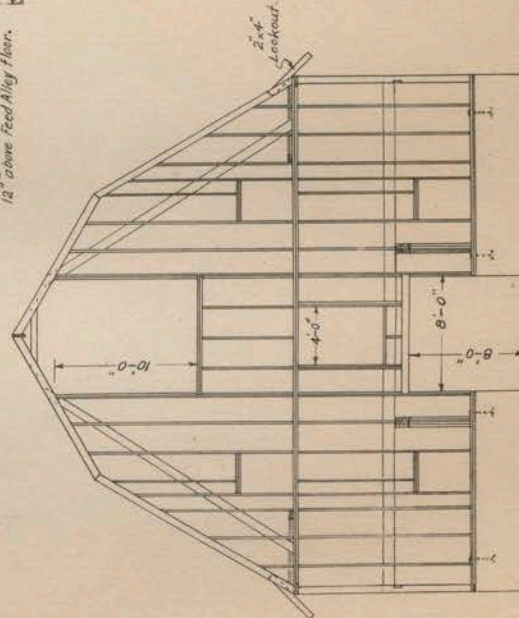
ALTERNATE FRAMING DETAIL
1½ STORY BARN



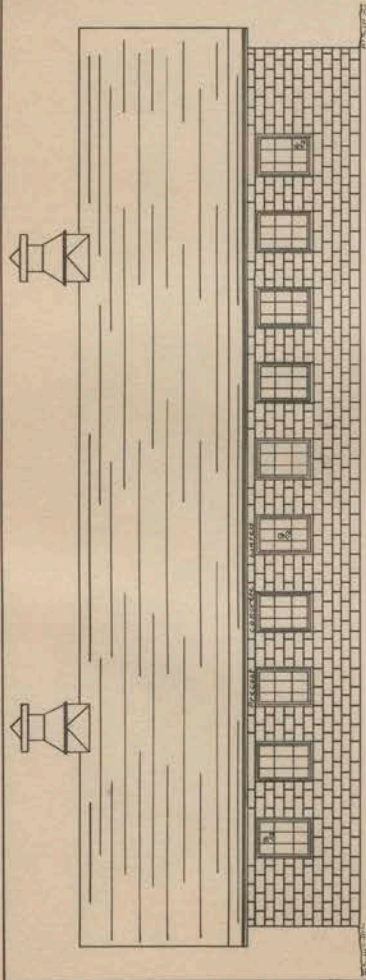
SIDE FRAMING



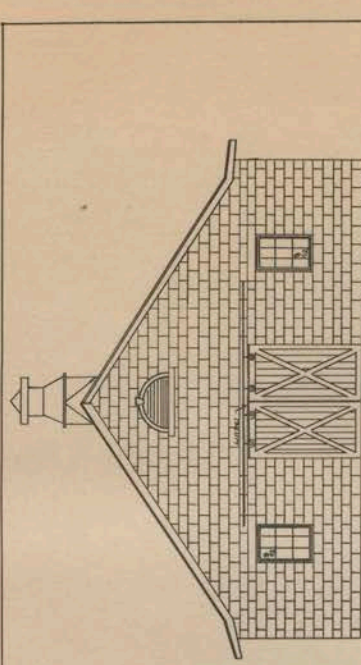
CROSS-SECTION



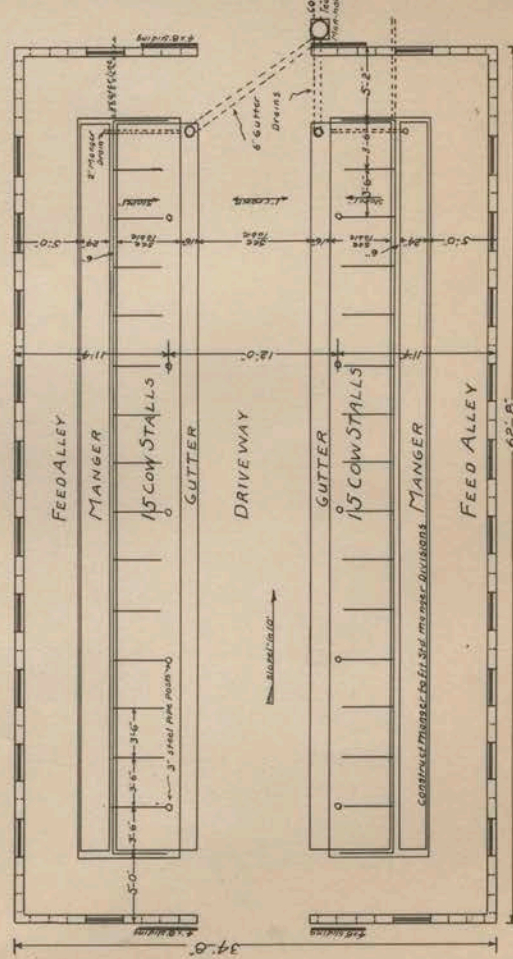
END FRAMING



SIDE ELEVATION Scale 1/4"=1'-0"

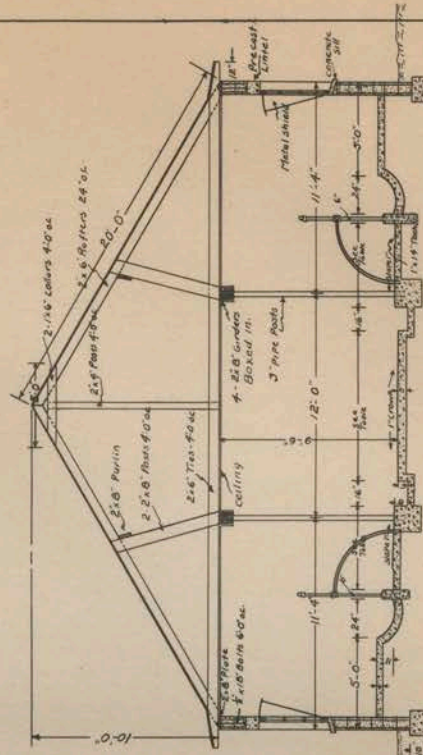


END ELEVATION Scale 1/4"=1'-0"



FLOOR PLAN Scale 1/4"=1'-0"

STANDARD-BARN-LENGTHS.						
NUMBER OF STALLS	10	20	30	40	50	
LENGTH OF BARN (with gang way)	28'	46'-8"	62'-8"	80'-0"	97'-4"	



CROSS SECTION Scale 1/4"=1'-0"

~ LENGTH OF PLATFORM REQUIRED FOR DIFFERENT BREEDS ~

Breeds	Shortest	Longest	Average
Jersey	20	30	25
Guernsey	20	30	25
Holstein	20	30	25
Shorthorn	20	30	25

~ WIDTH DRIVEWAY FOR DIFFERENT BREEDS ~

Breeds	Shortest	Longest	Average
Jersey	8'-0"	10'-0"	9'-0"
Guernsey	8'-0"	10'-0"	9'-0"
Holstein	8'-0"	10'-0"	9'-0"
Shorthorn	8'-0"	10'-0"	9'-0"

AGRICULTURAL-ENGINEERING-DEPT.
EXTENSION-DIVISION-VPI.
STATE-DAIRY & FOOD-DIV. RICHMOND
Virginia STANDARD
MASONRY. DAIRY BARN.
Drawn by H.H. Gordon
Traced by J.C. Smith
Approved by J.C. Smith
Sheet 1011
Oct. 1930
Number
B-34.

COOPERATIVE EXTENSION WORK
IN
AGRICULTURE AND HOME ECONOMICS
State of Virginia

Va. A. & M. Col.
& Poly. Inst. &
U. S. Dept. of Agri.
Cooperating

EXTENSION SERVICE

Information Series No. 1

June 1932

DAIRY BARN REQUIREMENTS

The passage of a new dairy law by the last legislature, effective in June 1930, has caused greatly increased interest in dairy barns. This interest is not only in new construction, but in remodeling as well, to meet the requirements of the law. Smaller dairymen particularly are affected by this law, and the need for information by so large a number makes a mimeographed sheet of this kind advisable.

This law enforced by the State Dairy and Food Division applies to all markets not having an ordinance with requirements more rigid than those laid down by the law. This means practically all markets except the larger cities. The law applies only to whole sweet milk and sweet cream, and not to sour cream or milk by-products. Nor does it apply to the dairyman with two cows or less, except in so far as is necessary to produce clean market milk.

There are two principal city markets whose requirements are more rigid than those of the state law. These markets attract a great many shippers of the state. Below are given the State Dairy and Food Division requirements; also the requirements of these two city markets, Washington, D. C. and Richmond.

The State law provides for three grades:

Grade A scoring at least 80 points on the official score card, 40 of which must be for methods. The maximum bacterial count shall not exceed 100,000 per cubic centimeter for this grade.

Grade B scoring at least 70 points, 35 of which shall be for methods. Maximum bacterial count not exceeding 200,000 per cubic centimeter.

Grade C scoring 50 points, 30 of which shall be for methods. Bacterial count not to exceed 1,000,000 per cubic centimeter. For the purposes of this discussion Grade A only need be discussed.

STATE BARN REQUIREMENTS:

A separate stable shall be provided for dairy cows. If hay is stored above, a tight floor must be provided in hay loft.

Light: There shall be not less than 4 square feet of glass per cow uniformly distributed.

Air and ventilation: There shall be not less than 500 cubic feet of air space per stall. Tilting, adjustable windows or other adequate ventilation approved by inspector required.

Floor: Floor and gutters to be of concrete, graded to drain properly and kept in good repair. Covered terra cotta drains for distance of 50' from barn required.

Stanchions: All barns in which cows are to be housed permanently must have swinging stanchions.

Manure: Barn to be cleaned thoroughly at least once daily and manure carried to fields, or stored not less than 50 feet from barn.

Location of barn: Dairy barn should be located at least 50 feet from other buildings housing animals and 100 feet from privies and hog pens.

Toilet: Sanitary toilet according to State Board of Health specifications required.

Milk House: Milk house must be a separate building not directly connected to barn or dwelling. Must be of adequate size to take care of handling and storage of milk with room for proper washing and sterilization of all utensils. Floor shall be of concrete properly drained. Milk room must be ceiled and painted. Building must be well lighted, ventilated and properly screened. Building shall be kept clean and used for no other purpose except care of milk and utensils.

Boiling water or steam must be provided for proper sterilization. Water supply must be pure, easily accessible, adequate, safe and sanitary.

WASHINGTON BARN REQUIREMENTS:

Location: Dairy barn must be located at least 50 feet from other buildings housing animals and 100 feet from poultry houses, hog pens and privies. Straw ricks are not allowed within 25 feet of barn and if in barn lot must be fenced off.

If other livestock is kept in dairy barn, a tight partition must be provided with no connecting doors or openings and this portion of the stable cleaned daily.

Light: Not less than 4 square feet of glass per cow, uniformly distributed.

Air and ventilation: Not less than 600 cubic feet of air space per stall. Tilting, adjustable windows dropping in at least 8" at the top required.

Floor: Entire floor, including gutters and mangers, must be of concrete, smooth and graded to drain properly. Gutters at least 6 inches deep and 16" wide. Covered terra cotta drains for a distance of 50 feet from barn are required.

Where cows face in the distance between cow platform and wall including gutter must be at least $4\frac{1}{2}$ feet. Where cows face out the distance between cow platforms including gutters must be at least 9 feet.

Stalls and stanchions: Stalls shall allow at least 3'-6" for each cow and stanchions shall be metal.

Manure: Barn to be thoroughly cleaned at least once daily and manure pit located not less than 50' from barn.

The barn must be ceiled tight beneath the joists and girders boxed. Where the barn is of frame construction the walls must be ceiled inside also. Walls of non-absorbent material to window sills are required where cows face in, and for a distance of one foot above feed alley floor where cows face out.

Milk House:

Location: A separate 3-room building not less than 10 feet or more than 50 feet from dairy barn. Walls must be of non-absorbent material for $3\frac{1}{2}$ feet, and ceiled from that point and overhead. Floor must be of concrete and floor area in both milk and wash room must not be less than 7' x 9' or equivalent in each case. Light should amount to 10% of floor area. Ceiling ventilation must be provided in both milk and wash room. Doors and windows screened.

Provision must be made in milk room for cooling of milk to 50 degrees or below and insulated storage to hold at this temperature. Metal sterilizing cabinets of ample size, boiler of ample capacity and double wash tank required. Water and steam to both sections of wash tank required and steam line to cooler if cooler is not placed in cabinet for sterilization.

Boiler room should not connect with wash room. Toilet if in boiler room must have outside door and be connected to septic tank approved by State Health Department. Privy must be box and can type.

RICHMOND BARN REQUIREMENTS:

Location: Dairy barn must run north and south and be located at least 100 feet from other buildings housing animals. Only milk cows are allowed in barn.

Light: Six light 10/12 single sash window opposite each cow, and each end alley.

Air and ventilation: Not less than 600 cubic feet of air space per stall. For ventilation an opening 12" x 24" under each window covered by cheese cloth, or other adequate ventilation, such as King system, approved by inspector. Tilting windows not acceptable.

Floor: Concrete throughout, smooth, graded to drain properly. Gutters shall continue through wall of barn and connect outside in open concrete drain for distance of 75 feet.

Stalls and stanchions: Metal stalls, stanchions and posts required.

Loft floor shall be tongue and grooved. Ceiling of walls and underneath joists desirable but not compulsory.

Milk House

Location: Not less than 12' from barn and connected by open covered passageway. Milk room, wash room, and boiler room required. Steam for sterilization required.

The above gives briefly the requirements of the principal markets. However, it might be well to say that any one contemplating going into the dairy business or remodeling to get on a better market should by all means first consult the inspectors of the State Dairy and Food Division, Richmond, Virginia, or the inspector of the market he expects to supply. The inspector will be glad to come and help select and approve the location, and discuss in detail matters connected with the market with which the dairyman should be familiar. Such procedure often saves much trouble and expense, and guarantees that the finished job will be approved and accepted by the inspector.

METHODS: A few words about methods might also be worth while. Cows must be kept clean, udders and flanks brushed and washed before each milking.

Each milking must be removed to dairy immediately, filtered and cooled. Milk inspected by state must be cooled to 70 degrees. For Washington, to 50 degrees or lower and stored at or below 50 degrees. When transported it should be iced or cans jacketed and arrive at as nearly original temperature as possible. Markets vary on this from 50 to 60 degrees.

Utensils and strainers to meet approval of inspector. Herd to be tubercular tested at least once a year and reactors removed. Milk from diseased or injured udders not acceptable.

Milkers must be healthy and cleanly, and not be allowed to milk if exposed to contagious diseases.

Milk not to be used for two weeks prior to calving or until normal after calving.

This discussion should serve to acquaint the dairyman with the general requirements of his particular market and enable him to build and produce accordingly. Plans, further information and assistance may be obtained from the Agricultural Engineering Department, Extension Division, V. P. I., either through the County Agent or by mail direct.

Chase City, Virginia
November 16, 1932

Mr. J. A. Waller, Jr.
Agr'l. Engineering Dept., V.P.I.
Blacksburg, Virginia

Dear Jack:

I regard terracing as one of the most important projects we are trying to carry on and my Agricultural Advisory Board agrees with me.

The Board knows the danger of soil erosion and they seem to be more willing to lend their support as well as encouragement to this project. Without their help, I could not have secured the attendance of seventeen young men at the terracing school in September.

At a meeting of one of our community agricultural committees, I mentioned that during the year, I had assisted eight farmers to terrace some of their land. One member spoke up saying, "This is an important work and it may be that you earned the county's part of your salary in this one undertaking". Another spoke up saying, "You know I never realized how many fields in the county needed terracing until I attended the demonstration last spring at Nichols' farm and realized the importance of this work". This man terraced several fields on his farm following the demonstration.

While many farmers do not follow instructions as carefully as they should, do not build their terraces wide enough or high enough, and do not properly maintain them, this does not prove that this project is not needed but it simply means that more educational work must be done, more favorable sentiment created, so that farmers will not fail to do their part well.

I appreciate your good help and I believe we must train more and more young men in this work.

Very truly yours,

(Signed) H. H. Williams
County Agent

COOPERATIVE EXTENSION WORK
IN
AGRICULTURE AND HOME ECONOMICS
State of VirginiaVa. A. & M. Col.
& Poly. Inst. &
U. S. Dept. of Agri.
Cooperating

EXTENSION SERVICE

THE IMPORTANCE OF SOIL EROSION CONTROL
1st Club MeetingA. Definitions:

1. Soil erosion is the washing away of soil. Where the moving water is fairly uniformly distributed over the surface, the upper soil is washed away over wide areas; this form of erosion is known as sheet washing. Where channels are washed down the slopes by the concentration of large volumes of water, gullying occurs. Sheet washing is not so noticeable as gullying, and for that reason many farmers do not consider it very harmful. Sheet washing finally develops into gullying.
2. The broad base ridge terrace (Mangum) consists of a broad ridge of earth thrown up across the hillside and having a slight grade in the direction of its length.

B. Farmers suffer tremendous losses:

1. Loss of Soil: Found behind dams, fences and other water obstructions. Geologist states 10,000 years are needed to make one foot of soil. (.007' in 70 years). Depletes high land. Deposits sand on low land.
2. Loss of Plant Food: Not less than 126,000,000,000 pounds from fields and pastures each year. Loss to farmers for nitrogen, phosphorus, and potash alone \$200,000,000 annually; twenty-one times more plant food washed out annually than crop uses. Valuable humus and organisms go.
3. Loss of Moisture: Subsoil not retentive or absorbtive. Crops suffer worse in dry seasons. Terraces distribute moisture more uniformly. Gullies act as drainage ditches - lower water table. Ideal terrace should be level with tile drainage.
4. Loss by Flooding: Stream beds filled up. Water runs to streams faster than formerly. Streams do not have sufficient capacity - banks must overflow. Drown or damage crops.
5. Loss of Scenic Beauty: Gullies are very ugly. If land can't be held start proper trees and grow timber such as black locust. Fifteen per cent slopes are too steep to cultivate. Slopes over 10% should be in pasture or trees.

C. Losses can be Checked:

1. Rotation of crops. Use cultivated crops only one or two years.
2. Plow deep and subsoil. Increases water holding capacity by adding humus, manure, etc.
3. Contour plow and plant. Keep rows against slope of field. Do not run rows straight.
4. Build and maintain terraces at least 20' broad and 18" high where possible. Terracing is the best method of control when field is in a cultivated crop.

11,733
Agr'l. Eng. Dept.,
V. P. I.,
Blacksburg, Va.

COOPERATIVE EXTENSION WORK
IN
AGRICULTURE AND HOME ECONOMICS
State of Virginia

Va. A. & M. Col.
& Poly. Inst. &
U. S. Dept. of Agri.
Cooperating

EXTENSION SERVICE

LAYING OUT TERRACES
2nd Club Meeting

- A. 1. Outlets: Woods, road ditch, old gulley, open ditch. Prevent end of terraces and outlets from washing by sowing heavy grass or by small rock retarding dams. Use two outlets for each terrace where practical.
2. Field Slopes: Take several slopes to determine average slope of field. From this slope the spacing of the terraces is determined. See 4 below.
3. Starting Point: Always start at highest point in field and work toward bottom. It is usually better to begin about half way between the ends of the terraces.
4. Spacing of Terraces: Establish first terrace from four to five feet, vertically, from highest point in field. Special local conditions may necessitate changes but in general terraces are spaced as follows:

For slopes from	0 - 5 %	three vertical feet apart			
"	"	"	5 -10 %	four	" " "
"	"	"	10 -15 %	five	" " "

5. Grades: A variable grade ranging from no grade to 6" per 100' is usually suggested. Seldom is more than 6" per 100' used in any portion of the terrace. Remember that the water in the terrace should be made to run slow enough to get the water off the land without carrying the soil with it. Also, more moisture will be absorbed by the soil.
6. Rod Holding: Rods reading in feet and inches are usually used, but often ones graduated to feet, tenths, and hundreds of feet are used. The farm rod has a target which is moved up when moving toward the outlet and down when working in the direction of the head of the terrace. The rod should always be held on average ground--not in a hole or on a clump of dirt. It should always be 25' from the last hole.
7. Marking Terrace Line: For short lines stakes are often used, but on field jobs it would take too many stakes. Therefore, a light grubbing hoe or a mattox is used to dig a small hole at each place the rod is held when the reading is correct. These marks are usually made 25' apart and the distances are usually paced.
- B. 1. Note Keeping: When the target is used the rodman establishes the grade and changes it as he sees fit. But when no target is used the instrument man writes down the reading at the starting point, decides what the grade should be and changes it as needed. The readings are set down and checked off when the place is marked.

COOPERATIVE EXTENSION WORK
IN
AGRICULTURE AND HOME ECONOMICS
State of VirginiaVa. A. & M. Col.
& Poly. Inst. &
U. S. Dept. of Agri.
Cooperating

EXTENSION SERVICE

THE CONSTRUCTION AND MAINTENANCE OF TERRACES
3rd Club MeetingA. Building the terrace.

1. Mark the terrace channel (water course) with a furrow - throw furrow down hill. Just plow up holes or stakes.
2. The center of the terrace ridge is found by plowing another furrow one-half the width of the proposed terrace, below and exactly parallel to first furrow. Use rod or any measured pole. One man walks in first furrow as guide, holding end of rod in front of him, and another man walks behind the 10 foot mark (for 20 foot terrace) on rod. The team follows close to the lower man and plows up his tracks. This gives two furrows the same distance apart.
3. The terrace ridge is now made by simply plowing around, or to, this lower furrow. When using homemade terracer or light commercial terracer plow about three rounds before using terracer. Now go about two rounds with terracer and make ridge as high as possible. Next put the plow ahead and the terracer behind it, plowing and dragging until the upper or first furrow is reached. Blue prints for making the homemade terracer can be furnished. Extensions may be added for wide terraces. The lower portion of the terrace ridge should taper to the field slope below it. Just above the channel, or first furrow, considerable soil may be shaved off this corner and moved over on the ridge. The terrace should be extra strong at the outlet.

B. Plowing and planting terraced fields.

1. Plowing terraced fields is not difficult. Usually the terraces are plowed up as high as possible first and then the land between them plowed. A good practice is to back furrow about a 10 foot strip above each terrace. Some farmers plow the field as formerly and later build up the terraces.
2. Methods of planting terraced fields are several.
 - a. Just as without terraces. This pulls terraces down badly.
 - b. Begin row crop on terrace ridge of middle terrace and run all rows parallel to this row above and below it. This throws short rows on outside of field.
 - c. Begin first row on ridge of first or upper terrace, planting other rows above and parallel to it to edge of field and below and parallel to it until next terrace below is reached. Run short rows into lower terrace. Then begin again on ridge of second terrace and run rows parallel until third terrace is reached, running short rows into third terrace, and so on. This method is most widely practiced.

COOPERATIVE EXTENSION WORK
IN
AGRICULTURE AND HOME ECONOMICS
State of Virginia

Va. A. & M. College
& Poly. Inst. &
U. S. D. A. Cooperating

EXTENSION SERVICE

Instructions: 1. Answer questions, except 5 and 6, opposite and below "Ans."
Use back of this sheet for 5 and 6. 2. Be brief. 3. Write so it can be read.
4. Use pen or pencil. 5. You may refer to any bulletins or papers which have
been given you. 6. Sign your name on your paper and return to instructor.

1. (a) What is soil erosion? Ans.

 (b) What evidence have you that this is a serious problem in your section?
 Ans.
2. Name at least four different losses caused by soil erosion.
 Ans.
3. Name several ways farmers have of checking these losses.
 Ans.
4. Give general description and dimensions of a terrace and state its purpose.
 Ans.
5. Describe briefly but exactly how terraces are laid out, step by step.
 (Answer on back of this sheet.)
6. Give exactly the various steps in building terraces. (Answer on back of this
 sheet.)
7. What benefits do farmers get from terraces? Ans.
8. (a) What is meant by a variable grade? Ans.

 (b) What is about the maximum grade a terrace should have? Ans.

 (c) What determines the spacing between terraces? Ans.
9. (a) Why are outlets so important? Ans.

 (b) What places make good outlets? Ans.
10. (a) How would you plow a field that is terraced? Ans.

 (b) How would you plant a row crop in a terraced field? Ans.

Note: Soil erosion is probably the greatest single agricultural problem in your
county. From the talks and literature you have had on this subject, do you feel
that you have gained some useful information? Ans.

Name: _____

CHARLOTTE COUNTY PUBLIC SCHOOLS

Agricultural Department

H. M. Collins, Instr.

Charlotte C. H., Va.

April 23, 1932

Mr. J. A. Waller
Agricultural Engineer
Blacksburg, Va.

Dear Mr. Waller:

I would like to say in behalf of the students and myself that we sincerely appreciate your visits to us.

I feel that a great deal of good has been accomplished through these meetings.

Looking forward to having you again, and with best wishes, I am

Yours very truly,

(Signed) H. M. Collins

#12765

COOPERATIVE EXTENSION WORK
IN
AGRICULTURE AND HOME ECONOMICS
State of Virginia

Va. A. & M. College
& Poly. Inst. & U.S.D.A.
Cooperating

EXTENSION SERVICE

FARM HOME WATER SUPPLY CAMPAIGN
FOR
CARROLL AND GRAYSON COUNTIES

The farm and home demonstration agents in Carroll and Grayson counties are conducting a Farm Home Water Supply Campaign.

It is known that less than 10% of the farm homes in Virginia have running water. In many instances it can be installed without much expense, and on some farms a good water system is an economic necessity. The purpose of this campaign is to visit each farm home, from which a request for this service has been received, make a survey of all conditions involved, and recommend the proper system for these conditions and the approximate cost of same. Running water is the greatest convenience a farm home can have.

If you expect to install some kind of a system this year or next, or if you plan to change your present system, get in touch with either of the agents whose names appear below before Tuesday, February 16, 1932.

An agricultural engineer from the Extension Division, V.P.I. will make the surveys, beginning February 16. All requests must be in before that date.

Hoping that you will be prompt in requesting this free service, we are

Yours very truly,

Mrs. C. S. Ferguson

Mrs. C. S. Ferguson, Home Dem. Agt.,
Galax, Virginia

D. T. Painter

D. T. Painter, Farm Dem. Agent,
Independence, Virginia

12,929

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

FARM HOME WATER SUPPLY CAMPAIGN
FOR
AUGUSTA COUNTY

The farm and home demonstration agents in several of the counties have made arrangements with the Agricultural Engineering Department, Extension Division, V. P. I., for the services of an engineer for the period from April to September 1932. Augusta County has secured the week of April 11. The engineer will visit each farmer who requests this service and make a survey of the conditions. From a study of these conditions the most suitable and practical water system will be recommended and quotations secured from local dealers. There will be no charge for this service and any one who seriously contemplates the installation of a water system, or expects to have his present system changed within the next year, should take advantage of this opportunity.

Many farm homes in Augusta County do not have running water. Without this convenience they lack one of the greatest home comforts. Less than 10% of our farm homes have complete water systems.

A similar service has been given in ten or twelve other counties in the state and it is not unusual to receive over 50 requests from a county. We want the farmers of Augusta to have the same opportunity to secure satisfactory running water systems in their homes. Your request must reach the farm agent or the home agent by April 11.

Yours for more water systems,

Ruth Jamison

Miss Ruth Jamison, Home Agent
Staunton, Virginia

Claudville, Virginia
September 19, 1932

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

My dear Mr. Waller:

I feel that you may be interested in knowing that the No. 2 double action Gawthrop ram which I had installed sometime ago, following very carefully your survey and advice is still giving excellent service. It is pumping approximately 1500 gallons of water per day every day to my residence which is a distance of eleven hundred feet and with an elevation of over 90 feet above ram. Has never given slightest trouble.

Wish to thank you again for your assistance, advice and your splendid cooperation.

With best wishes, I am

Cordially yours,

(Signed) Merritt Bateman

DATA TO BE USED IN A STUDY OF THE HYDRAULIC RAM UNDER
ACTUAL OPERATING CONDITIONS

1. Owners name _____ Address _____
 2. Make of ram _____ Size _____
 3. Single or double acting _____
 4. Kind of supply _____ Flow in G. P. M. _____
 5. Elevation from ram valve to water level in tank _____
 6. Fall from spring to ram _____
 7. Type and size of drive reservoir or standpipe _____
 8. Distance from spring or branch to drive reservoir or standpipe _____
Size and kind of supply pipe _____
 9. Distance from drive reservoir or standpipe to ram _____ Size and kind
of drive pipe _____
 10. Distance from ram to tank _____ Size and kind of discharge
pipe _____
 11. Distance from spring to ram (for double acting jobs) _____
Size and kind of pipe _____
 12. Actual waste from ram in gallons per minute _____
 13. Actual discharge in tank in gallons per hour _____
 14. Number of valve strokes per minute _____
 15. How long has ram operated _____
 16. What has been total cost for repairs _____
- Remarks on:
- Ram location _____
- Pipe lines (life of) _____
- Tower and tank (size, height, age, etc.) _____
- Air supply (pressure tank service) _____
- General service rendered _____
- Problems arising from use of ram _____
-

COLEMAN DAIRY

G. C. COLEMAN

Indian River Road, Norfolk, Va.

DATA ON MILK COOLING PLANT

On April 25, 1931, a submeter was installed on the milk cooling plant of the Coleman Dairy on Indian River Road, for the purpose of determining the amount of electricity required to cool and keep the milk produced on this farm until ready for market.

The meter was installed on an automatic Creamery Package machine operated by a $7\frac{1}{2}$ H. P. motor.

This dairy is equipped to handle altogether certified milk, and his surplus milk is pasturized at another plant before sold as Grade A milk.

The milk is run over the cooler immediately after milking and then bottled at around 35 degrees. The morning milk is packed with ice and loaded on the delivery wagons. The evening milk is cooled to approximately 34 degrees immediately after milking and then stored in a cold room 12 feet long, 10 feet wide, and 7 feet high, which maintains a temperature of approximately 38 degrees over night and ready for the next morning delivery.

The meter was read monthly, and an accurate record was kept as to the amount of electricity used and the amount of milk sold from this farm.

The figures below show by months the gallons of milk sold, total kilowatt hours used, the kilowatt hours used per gallon of milk, the average cost per kilowatt hour, and the average cost of electricity per gallon of milk sold for the thirteen month test period.

Date	Gallon Per Mo.	KWH Used Per Mo.	KWH Used Per Gal. Milk	Avg. Cost Per KWH	Net Cost Per Gal. of Milk
Apr. 22 to					
May 22, '31	8,178	1,061	.1302	3.7¢	.482¢
June 23	9,007	1,377	.1529	3.7¢	.566¢
July 23	9,015	1,565	.1737	3.7¢	.643¢
Aug. 22	9,113	1,664	.1823	3.6¢	.656¢
Sept. 23	8,239	1,617	.1965	3.4¢	.668¢
Oct. 23	7,538	1,403	.1867	3.7¢	.671¢
Nov. 23	8,076	1,243	.1540	3.7¢	.563¢
Dec. 23	7,049	1,058	.1500	3.8¢	.570¢
Jan. 23, '32	8,687	1,162	.1341	3.7¢	.496¢
Feb. 23	10,337	1,282	.1238	3.7¢	.461¢
Mar. 23	9,790	1,186	.1191	3.7¢	.441¢
Apr. 23	9,914	1,187	.1178	3.6¢	.424¢
May 23	10,422	1,445	.1385	3.6¢	.498¢

For the above thirteen months this dairy produced a total of 115,365 gallons of milk and used a total of 17,210 Kwh. of electricity to cool and store this milk.

An average of 8,575 gallons of milk per month and an average of 1,324 Kwh. per month.

The average Kwh's. used per gallon of milk was .1491.

The average cost of electricity was 5.66¢ per Kwh.

The average cost per gallon of milk produced was .546¢ per gallon or slightly over 1/2¢ per gallon.

LAKESIDE DAIRY

B. H. DARDEN & SON

Great Bridge Boulevard, Norfolk, Va.

DATA ON MILK COOLING PLANT

On April 25, 1931, a submeter was installed on the milk cooling plant of the Lakeside Dairy for the purpose of determining the amount of electricity required to cool and keep the milk produced on this farm at the proper temperature to make the highest quality of marketable milk possible.

The milk produced on this farm is cooled with a York Machine operated by a 5 H. P. motor with a 1 H. P. motor brine pump and a 1 H. P. motor water pump which furnishes the plant with all the well water required at an approximate temperature of 60 degrees. This 1 H. P. motor water pump also furnishes all the water needed for 250 cows in the barn and pasture and 12 head of team, on an average of approximately 4,000 gallons per day.

The dairy is equipped to produce altogether certified milk, but due to market conditions he has to sell a large per cent of the milk as Grade A, which is required by law to be pasteurized at a temperature of around 142 degrees before marketed.

The evening milk is cooled immediately after milking to approximately 34 degrees and stored in the cold room, which is 12 feet wide, 12 feet long, and 7 feet high and kept at an approximate temperature

of 38 degrees. The morning milk is cooled immediately after milking to around 34 degrees and then it is pasteurized and cooled to around 100 degrees with circulating water before it is run a second time over the aerator and cooled to 34 degrees, and it is then stored in the cold room for evening delivery.

This plant also makes all the ice needed to pack the milk for market and all the ice used in the home. In the summer months the plant makes from 400 to 600 lbs. of ice per day. For the thirteen month test period, he averaged better than 200 lbs. of ice per day.

The figures below include the electricity used on the three motors (5 H. P. York Machine, 1 H. P. brine pump, and the 1 H. P. water pump), a total of 7 H. P. to cool the milk, make an average of 200 lbs. of ice per day, and pump on an average of 4,000 gallons of water per day for the stock. With all this included, the average cost of electricity per gallon of milk produced on this farm was .492¢, or approximately 1/2¢ per gallon of milk.

<u>Date</u>	<u>Gallon Per Mo.</u>	<u>KWH Used Per Mo.</u>	<u>KWH Used Per Gal. Milk</u>	<u>Avg. Cost Per KWH</u>	<u>Net Cost Per Gal. of Milk</u>
Apr. 25 to					
May 25, '31	13,500	2,518	.1866	2.90¢	.551¢
June 25	13,950	2,921	.2093	2.65¢	.556¢
July 25	13,500	2,891	.2141	2.70¢	.578¢
Aug. 25	13,950	3,093	.2145	2.41¢	.517¢
Sept. 25	13,950	3,293	.2360	2.32¢	.547¢
Oct. 25	13,500	3,325	.2463	2.29¢	.564¢
Nov. 25	13,950	3,094	.2219	2.47¢	.548¢
Dec. 24	13,500	2,972	.2201	2.50¢	.550¢
Jan. 25, '32	13,950	3,568	.2467	2.32¢	.570¢
Feb. 25	19,500	3,462	.1775	2.26¢	.401¢
Mar. 25	19,500	3,385	.1735	2.45¢	.425¢
Apr. 25	20,150	3,385	.1679	2.16¢	.366¢
May 25	19,500	3,414	.1750	2.30¢	.402¢

For the thirteen month test period this farmer produced a total of 202,400 gallons of milk and used 41,321 Kwh. of electricity. An average of 15,570 gallons per month and an average of 3,178 Kwh. of electricity per month.

The average Kwh. used per gallon of milk was .204 Kwh.

The average cost of electricity during this test period was 2.44¢ per Kwh.

The average cost per gallon of milk produced was .492¢ per gallon, or less than 1/2¢ per gallon.

It is interesting to note that 57.6% of the electricity used on this farm was used by the milk plant, and this farmer used electricity for every practical purpose, such as cooking, milking machines, filling silos, feed grinding, tool grinding, lights, etc.

APPALACHIAN ELECTRIC POWER COMPANY

Roanoke, Virginia

December 2, 1932

REPORT WEEK ENDING NOVEMBER 30, 1932

Mr. W. I. Whitefield
Appalachian Electric Power Co.
Roanoke, Virginia

Dear Sir:

The following calls have been made this week:

Existing customers	20
Dealers or manufacturers merchandising electrical equipment	<u>2</u>
	22

W. H. Camper, Mill Creek, Virginia, was furnished assistance on location of yard lighting and inside lighting for a barn which was wired this week.

Mr. Roy F. Dowdy and I have changed a total of 18 customers using the lighting and D. U. R. rates to the one meter D. S. rate during the past week.

Attached to the report for this week is a copy of the data on Rural Line Development which has been prepared for the State Agricultural Engineering Department. The information contained in this report is based on figures assembled from our records for the past twelve months ending December 1, 1932. This report will be revised on December 31 to include the past twelve months of the year 1932.

It may be of interest to note the comparison of the figures listed in the table for the years 1928, 1931 and 1932. The total number of rural customers served has steadily increased each year, and a corresponding increase is noted in the number of farm customers that have received electric service.

The average kilowatt-hours per farm customers has materially increased each year, while the rate per kilowatt-hour for all farm service has shown a gradual decrease.

Progress has been made by the reduction of the average cost per mile of rural line; however, it is of importance to note that the number of rural customers connected per mile of line has decreased.

The drought during the summer of 1932 materially reduced the total crop yield of farm products throughout our territory; however, the use of irrigation on orchard, truck and dairy farms was noted.

APPALACHIAN ELECTRIC POWER COMPANY

Roanoke, Virginia

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The first motor driven orchard stationary spray plant was installed by a farm customer who obtained excellent results from the use of this equipment.

Eleven farm customers installed automatic electric water heaters in their homes during the year.

Records have been kept on dairy electric water heaters and sterilizers, filling silos with the portable 5 H. P. motor, hotbed heating, milk cooling, irrigation for different type farms, and other electrical equipment in use on farms.

Throughout the year 1932 the Rural Service Department has co-operated with the programs of work carried on by the State Agricultural Engineering Extension Service, County Agricultural and Home Demonstration Agents. Mr. Chas. E. Seitz of the Agricultural Engineering Department, Virginia Polytechnic Institute, has ably assisted in the economical development of electrical applications on farms, such as surveys for irrigation installations, orchard spraying, cost of milk cooling, and other power equipment.

Yours very truly,

(Signed) E. R. Choate

REC/JD

APPALACHIAN ELECTRIC POWER COMPANY

Lynchburg, Virginia

December 1, 1932

REPORT FOR WEEK ENDING NOVEMBER 30, 1932

Mr. J. E. Jackson
Appalachian Electric Power Co.
Lynchburg, Virginia

Dear Sir:

The following calls have been made this week:

Prospective rural customers	9
Existing rural customers	23
Dealers or manufacturers of electrical equipment	5
Total	37

T. W. Gaines, Monroe, was advised on installing a half horse power, 220 volt motor on an air compressor for cleaning purposes.

J. E. Candler, Timberlake Road, is interested in installing an electric refrigerator in his lunch room and store. This installation and applicable rates were explained to Mr. Candler.

T. L. Wyatt, Timberlake Road, was assisted in locating a specially built 110 volt motor to replace a D. C. motor on his present water system.

Mrs. C. W. Thornhill, Rustburg, was advised on installing an electric water heater for her poultry house drinking fountains. Mrs. Thornhill is also very much interested in another 300-egg electric incubator.

R. C. Henley, Timberlake Road, was assisted in making a layout for the installation of an electric water system which he expects to install in the near future.

H. E. Thompson, Timberlake Road, has recently installed an automatic water system using a one-third horse power motor. He is also very much interested in an electric range. The installation and operation of this has been explained to him very thoroughly.

I have been in touch with several of the local electrical dealers in regard to an advertising program for such electrical appliances as our customers in rural and farming districts would be interested in.

Very truly yours,

LMM/B

(Signed) L. M. McGhee
Agricultural Engineer

APPALACHIAN ELECTRIC POWER COMPANY

Bluefield, West Virginia

REPORT FOR WEEK ENDING NOVEMBER 19, 1932

Attention: Mr. Herman E. Kirchner

Mr. Thomas Bambith, Pulaski, Virginia, is considering the installation of 5-500 chick electric brooders and electric poultry water warmers. Estimated increase load - 4000 watts. Mr. Bambith is removing the hot water incubator from the building that he plans to convert into electric brooder house.

The Hoge Brothers are considering installation of central spray plant to supply the four orchards at Hoges Store, Virginia. They are also considering irrigation if the source of supply available proves sufficient.

Discussed plans, costs, etc., for slaughter house, refrigeration, etc., with Mr. Keifer, Crowgey and Mr. Gordon, building engineer from V. P. I. From the present available data the installation looks very favorable. If the installation goes in it will mean an increase revenue of \$35.00 to \$50.00 per month for our Company.

P. C. Smith, Dairy farmer, Princeton Road is increasing his dairy from 12 cows to 30. He is very much interested in using electric equipment throughout the plant. Am cooperating with Mr. Smith in planning the building construction to accommodate electric dairy refrigeration, electric dairy sterilization, water pumping and heating.

Mr. D. B. Musser, Valley Tourist Camp, Athens, Virginia, is replacing his present tourist cabins with brick cabins. Mr. Musser is considering equipping each cabin with electric hotplate, instantaneous clamp on water heater and pay meter, so the cabin renter can pay for the current as he uses it.

Discussed motor installation with Mr. Hendrix, Wytheville, Virginia. Mr. Hendrix is at present operating a No. 110-10 inch steel Burr Mill and 18 inch Stone Burr mill with a tractor. His present operating cost ranges from \$25.00 to \$30.00 per month for oil and gas alone.

The 2600 watt electric incubator arrived at Galax this week, will be installed in Morris Produce Company building first of next week.

(Signed) L. L. Koontz

Agricultural Engineer

LLK-WA

VIRGINIA ELECTRIC & POWER COMPANY

Norfolk District

Norfolk, Virginia
December 1, 1932

W. E. Brown

G. H. Harper

NOVEMBER REPORT OF FARM SERVICE BUREAU
NORFOLK AND PORTSMOUTH

1. The potato house for Mr. H. L. Dudley was filled and the current turned on November 2. A very uniform temperature in the house was maintained during the curing period, which ended November 18, in spite of the fact that the weather conditions were very irregular outside. 3,010 k. w. h. were used to cure the 2,500 bushels of potatoes. The county agent and several farmers in Princess Anne have visited this installation and commented very favorably on the uniform cure of the potatoes in this house.

2. The Diamond Springs Experiment Station informed us that due to the cut in the appropriations from the State that they are unable at the present time to buy any additional equipment for the hot bed installation. They are willing to conduct the experiment and pay for the equipment at a later date if it proves satisfactory. Our problem is to find some means of financing the cost of installation at the present time.

3. In answering an inquiry for a water heater for Mr. Carter's Dairy we found that this customer is in need of a milk cooling system. He thought very favorably of the plans and recommendations of installation that we gave him. We expect that Mr. Carter will make this installation this spring or early summer.

4. Information was also given to Mr. Simmons concerning a refrigeration and a pasteurizing system for his dairy.

5. The dairy farmers are much concerned over the cut in the price of milk. Most dairymen are having a hard battle to consume the recent price cut.

6. We have contacted several nursery men this month and find they have need for excessive heat under their propagating benches. Klehm's Virginia Nursery is changing its location and Mr. Klehm says he will try some of the hot bed cable next spring in his new beds.

(Signed) G. H. Harper
Agricultural Engineer

VIRGINIA ELECTRIC & POWER COMPANY

Suffolk District

November 30, 1932

AGRICULTURAL ENGINEER'S REPORT OF NOVEMBER 1932

Mr. C. A. Cutchins of Franklin, Virginia, is planning to irrigate a small tract of one or two acres of land this spring. I have been working with Mr. Cutchins in planning this project and the size of the installation will depend largely on his success in getting a sufficient water supply. The only water available will be from an artesian well and this will probably limit the installation to a portable outfit, using the Skinner system.

I have assisted Mr. Jesse McClenny of Franklin in selecting his equipment for his new dairy and milk plant and also in planning his buildings. Mr. McClenny is also a very extensive poultry farmer as well as a crop farmer. He produces and grinds practically all the feed used for his poultry and dairy business. He expects to market his own poultry and dairy products beginning next year, by retailing in nearby cities, thereby dividing the middle man's profit between the producer and the consumer.

Mr. J. G. Rose of Carrsville, Va., is interested in a feed mill and an electric motor with which to drive it. He is a general farmer and wants to grind feed that he produces on his farm for his dairy cows, chickens and hogs. I recommended that he get a single phase, five horsepower portable motor and a roughage mill of the proper size. I gave him information on several makes of this equipment and also dealers' names.

The new 16,000 egg electric incubator on Mr. J. C. Matthews' farm is now in operation adding about 2½ Kw to his connected load.

The peanut market is down to a new low of 1¢ per pound for average farmers' stock as the new crop is being marketed. This is far below the cost of production and the farmers have had two growers' meetings trying to devise some means of marketing their present crop for at least the price of the cost of production. No plan has been definitely adopted as yet. The Cooperative Peanut Marketing Association which was organized and chartered this summer, is now receiving peanuts from its members and if this organization is a success this year, it is hoped that the majority of the peanut growers will join the association next year.

REPORT ON COMBINATION ELECTRIC DAIRY WATER HEATER AND STERILIZER

The combination electric water heater and sterilizer which was built and installed in Mr. J. C. Matthews' dairy has been in operation three months and its current consumption has been recorded through a separate meter.

This outfit consists of a square tank made of 16 gauge sheet metal with a trough built into the bottom of the tank. The tank is built into a wood box and has one inch of asbestos cement insulation between the two materials. The tank is 30" x 30" square and 25" deep and the trough in the bottom is 6" deep and 6" wide. A 3 Kw General Electric immersion heating element is screwed into the end of this trough from the outside and is controlled by a three heat snap switch. The lid to the tank is also insulated with 1" of asbestos cement with galvanized metal on the inside. The inside of the tank was painted with metallic aluminum paint to prevent rust. A dairy thermometer is located in the top of the tank. The complete outfit was constructed at a cost of approximately \$45.00.

The operation of this type of water heater and sterilizer is very simple and fits in well with the regular routine of operations in a small dairy. Water for washing purposes is heated while the operator is milking and cooling the milk. The hot water is drawn from the tank through a faucet located just above the immersion heater, always leaving about 30 gallons of water over the heating element in the trough. The utensils are packed into the tank as they are washed and the amount of water left in the tank produces steam for the sterilization. The operator completes the work about the dairy while the utensils are being sterilized at a temperature of 150 degrees F. to 170 degrees F., for a period of 25 to 30 minutes. The lid is then partly opened and the tank serves as a clean, dry place for storing the utensils until they are needed again.

The sterilizer was installed August 17 and has been in continuous operation since then. The meter was read November 17, 763 kilowatt hours of current being used during the three months period for heating all of the water used and for sterilizing all the equipment and bottles for an average of 12 cows. This amounts to 8.4 kilowatt hours per day or .64 kilowatt hours per cow per day.

The advantages of this type water heater and sterilizer over the other types for a small dairy are:

1. First cost is much lower.
2. Operating cost is reasonable, and comparable to the other types.
3. It is clean, there being no fuel to handle.
4. Refrigeration costs are lowered because no heat is given off from the water heater.

5. Saves time and labor because its operation fits in perfectly with the regular routine of operation in a dairy.

In building another outfit of this type, I would make the following changes:

1. Use a 5 KW heating element for the same size tank to speed up the sterilizing operation.
2. Use rock wool for insulation in place of asbestos to lower the cost of construction.
3. Build the outside box of galvanized metal instead of wood.
4. Use a thermostat control to add to the efficiency.

This type of water heater and sterilizer is especially adapted to a small dairy with a 15 cow herd or less. The Edison General Electric Co., has recently built 25 electric sterilizers operating on the same principle of the one just described and they now have them out on test in dairies in various sections of the country. These tests have shown up well and it is probable that a sterilizer of this type will soon be on the market.

(Signed) E. T. Swink
Agricultural Engineer

VIRGINIA ELECTRIC & POWER COMPANY

Richmond District

AGRICULTURAL ENGINEERING REPORT
ENDING NOVEMBER 30, 1932

During this period 33 calls were made on our farm customers and 4 calls made on the dealers of Richmond.

The Westinghouse Manufacturing Company are distributing their hot bed heater through the T. W. Wood and Son Seed Store here in Richmond. I am working in cooperation with Mr. DuVaul of the T. W. Wood Seed Company on the new installations of these hot bed heaters. When they sell one of these heaters they notify me and I aid the buyer in building his bed and operating it to its best advantage. We have succeeded in installing four electric hot beds in this area during the last month. Post and Soanec, Florist, have installed two hot bed heaters. They are attempting to propagate Meloo Begonias in their electric hot bed. Up until this year, they have had to buy these plants at a cost of \$30.00 per 100 plants. If we are successful in rooting this plant with our hot bed it will mean a considerable saving to this florist. The bed hasn't been in operation long enough yet to determine whether or not it will be successful but we believe it will be.

Mr. J. E. Wilber of Dumbarton, Virginia, is attempting to root rose plants in the electric hot bed he has installed. He has never been successful with his old manure hot bed. His electric hot bed seems to be the solution to his problem because the plants are healthy and apparently are thriving. This experiment also hasn't progressed far enough to determine the actual results.

Mr. H. K. McConnell of Richmond, Virginia, has installed a General Electric hot bed. He is using this bed for experimenting purposes. He isn't growing any particular plant but is growing various plants in an effort to determine just what can be expected from an electric hot bed.

I have talked to Mr. J. S. Mosher, Richmond, Virginia, who had two electric hot beds in operation last year. He had trouble in eliminating hot spots in his bed. He has agreed to allow me to make a few changes in the construction of his hot bed when he is ready to start operating them this year.

Mr. A. W. Broadus of Tunstall, Virginia, has installed a water heater, a 1-1/2 H. P. refrigeration system and a 1/2 H. P. water system in his dairy barn. He has wired for a 5 H. P. electric motor which will be installed in the future.

I have been out to see Mr. Philip Harrison of Glen Allen, Virginia, who is planning to go into the poultry business. I gave him the plans for

VIRGINIA ELECTRIC & POWER COMPANY

Richmond District

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his poultry house and have interested him in using electric brooders. The plans I gave to Mr. Harrison are the plans sent out by the Virginia Polytechnic Institute, Extension Department. I also helped Mr. Harrison plan his wiring system which included the wiring of 3 small out-houses in addition to his poultry house.

The activities in rural electrification in the Richmond District have shown a marked increase during this period and we are now getting to the point where we can see actual results obtained from the services of the agricultural engineers.

Efforts to secure the enlarged copies of the State County Maps have been unsuccessful at the present date but we hope we will have them in a few weeks. We want these maps so that we can draw our existing and proposed rural lines on them. As soon as the maps are obtained, we shall go ahead with this work.

(Signed) J. S. Hamilton
Agricultural Engineer

JSH/LA

AGRICULTURAL ENGINEERING EXTENSION

Project: Farm Development

Leader : C. E. Seitz

Object: To promote the adoption of improved engineering practices in farm organization on typical Virginia farms.

Procedure: 1. Cooperate with Agricultural Economics Department, Agronomy Department and other interested departments of V. P. I., and the Bureau of Agricultural Engineering of U. S. Department of Agriculture.
2. Select 17 or 20 typical farms in the state for demonstrations.

Locality: Seventeen farms have been selected in the following counties: Princess Anne, Warwick, Henrico, Albemarle, Botetourt, Rockingham and Appomattox. Plans for development will be worked out in February and visits to farms made at certain intervals throughout year.

Plan of Work:

A. County Agents' Duties:

1. Help select farms for demonstrations.
2. Assist various specialists in formulating program of development.
3. Confer and advise with farmer in carrying out recommended improvements, rotations, etc.
4. Conduct follow-up work and get records of results.

B. Specialist's Duties:

1. Assist in selecting farms for demonstration.
2. Cooperate with other parties in making plans for the development of the farms.
3. Make detailed estimates of, plans for, and supervise construction of such improvements as may be recommended when and if they are constructed by the farm owner.

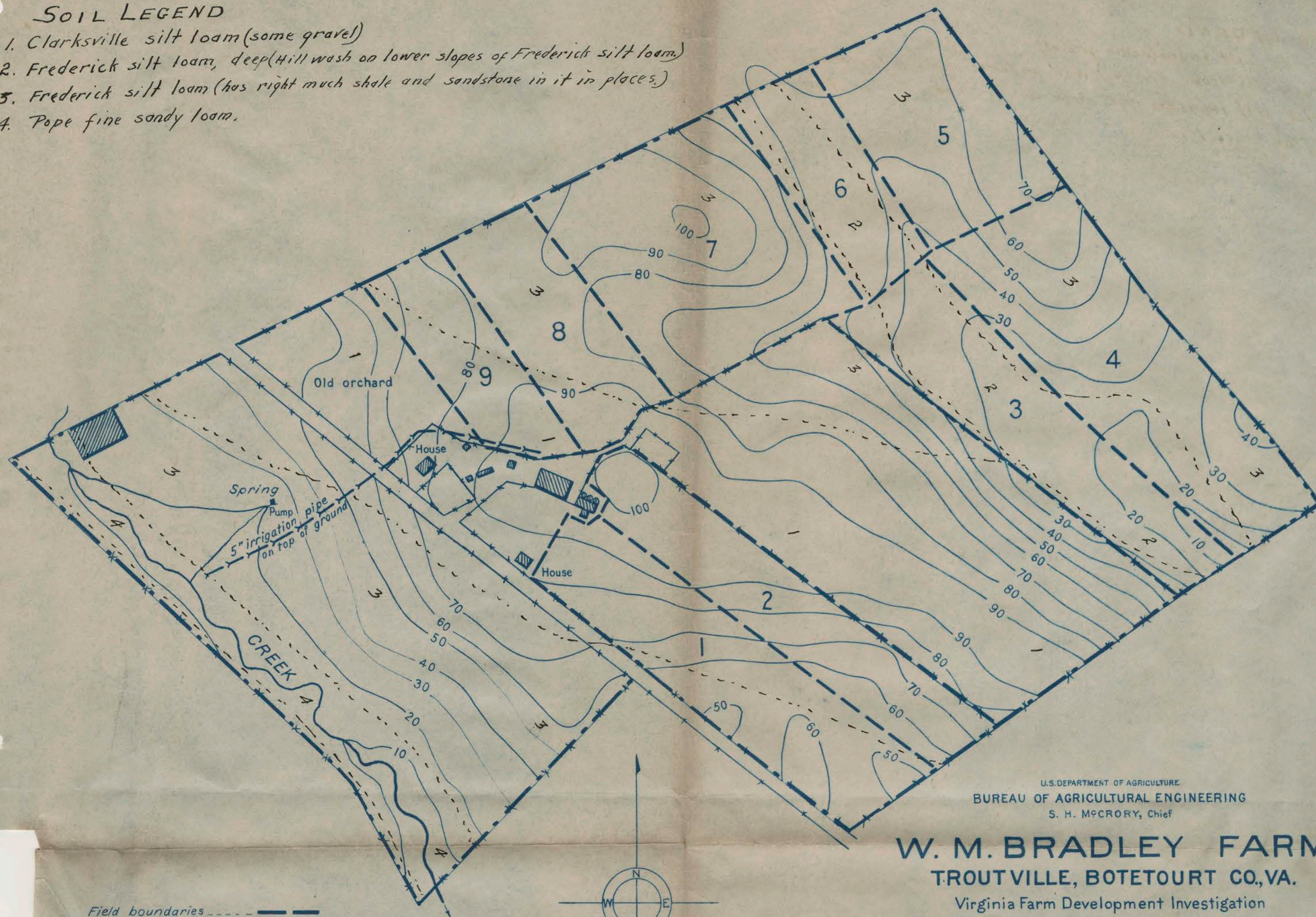
C. Other Cooperators:

1. The Department of Agricultural Economics of V. P. I. will obtain farm records of each farm, keep cost and income records throughout the life of the demonstration and cooperate with other parties in developing plans for and improvement of these farms.
2. The Agronomy Department of V. P. I. will make soil surveys of each farm and assist in developing plans for crop rotations, improvement, etc.
3. Other departments, such as Dairy, Poultry, etc., will assist in making recommendations in regard to developing plans in their particular fields.
4. The Bureau of Agricultural Engineering, U.S.D.A. will make necessary field surveys of selected farms, prepare and provide maps of the same and cooperate with other parties in preparation of plans for the development of these farms.

Results: Results will be measured by improved income, crops, layout, etc., resulting from following recommended development.

SOIL LEGEND

1. Clarksville silt loam (some gravel)
2. Frederick silt loam, deep (Hill wash on lower slopes of Frederick silt loam.)
3. Frederick silt loam (has right much shale and sandstone in it in places.)
4. Pope fine sandy loam.



Field boundaries -----
 Property lines -----
 Fences -----
 Irrigation pipe -----
 Height above datum ----- 40
 Field numbers ----- 2

U.S. DEPARTMENT OF AGRICULTURE
 BUREAU OF AGRICULTURAL ENGINEERING
 S. H. McCORMY, Chief

W. M. BRADLEY FARM TROUTVILLE, BOTETOURT CO., VA.

Virginia Farm Development Investigation

G. R. Shier, Junior Agri. Engineer

Prepared under the direction of
 Geo. R. Boyd, Senior Drainage Engineer

In cooperation with
 Virginia Polytechnic Institute

1931

SCALE OF FEET

100 50 0 500 1000

FARM DEVELOPMENT PROJECT

W. M. Bradley, Troutville, Va.

Soils

1. Clarksville silt loam. Probably the poorest upland limestone soil in the Valley. This means though that it is better than most of the sandstone and shale soils.

2. Frederick silt loam deep. A good soil for general farm crops. Has a loamy top of good depth and a clay loam subsoil.

3. Frederick silt loam. Not quite so good as No. 2, though a very good general purpose soil. Not as good as Hagerstown for pasture.

4. Pope fine sandy loam. A well drained, rather poor bottom soil. Requires more potash than the hill limestone soils since it is derived mainly from sandstone and shale material washed in.

Two tons of ground limestone or its equivalent would take care of the lime requirements for all crops on the uplands soil except alfalfa. Alfalfa should receive somewhat more the first application. Lime should be repeated about every 4 or 5 years. Except where considerable quantities of manure has been all the hill soils should contain some potash in the fertilizer.

Summary of the Receipts and Expenses for Year Ending December 31, 1931

Average Capital	\$14,616
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Receipts

Increase in capital	878
Crop sales	138
Livestock sales	16
Livestock products sold	4,953
Total receipts	\$ 5,959

Farm Expenses

Current expenses	4,333
Farm income	1,626
Interest on average capital @ 5%	731
Labor income	895

Strong points of the business

1. Fair size of business
2. Good cows
3. Good labor distribution
4. Good price for milk

Factors limiting the income

1. Operator away from the farm
2. Crop yields no better than average
3. Cropping system apparently not yet recovered from the effects of the drouth.

Recommendations

1. Increase cows to 30 or more
2. Put fields 3, 4, 5, 6, 7, 8 into alfalfa
3. Keep the corn silage near the barn

Physical Improvements

Since the cropping program contemplates putting all of the land in the back part of the farm in alfalfa, leaving the pasture as it is at present, and raising the ensilage in Fields 2 and 8, as at present, no changes are recommended in the present field boundaries.

The power on this farm is furnished by a Fordson tractor and two horses. The tractor is used for plowing and for belt work. The only tractor equipment used is a disc plow. With the greater part of the farm put down in alfalfa, but little year-around power will be necessary, so that it is recommended that the tractor be sold, electric power used for belt work, silo filling and for hoisting hay into the loft, and that extra teams, as required, be hired during haying and silo filling seasons. This should result in a considerable saving as it costs in the neighborhood of \$300 per year to own a tractor, and there will not be enough work on this farm to justify this expense.

Fertilizer Recommendations for the Crops Suggested

	<u>Pounds Per Acre</u>		
	<u>Nitrogen</u>	<u>Phos. Acid</u>	<u>Potash</u>
Corn	*8 to 12	32	8
Perennial legumes (alfalfa)	8	48	16
Pasture	0	48 to 60	0

* Top or side dressing with 100 pounds of quick acting nitrogen fertilizing material where no manure is used.

It is well to top dress alfalfa every 3 or 4 years with several hundred pounds of the phosphate-potash fertilizer unless large quantities of manure are used and in that case only phosphate may be necessary.

Pastures could be economically though slowly improved by top dressing with several hundred pounds of phosphorus per acre. If more rapid improvement was needed use some nitrogen in the fertilizer or else some manure.

