1940
ANNUAL REPORT
EXTENSION WORK

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

ANNUAL REPORT

PROJECT NO. 10

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AGRICULTURAL ENGINEERING DEPARTMENT

EXTENSION DIVISION

VIRGINIA POLYTECHNIC INSTITUTE

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December 1, 1939 to November 30, 1940

Blacksburg, Virginia
January 18, 1941

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

Dear Director Hutcheson:

I am submitting herewith annual report of 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, 1939 and ending November 30, 1940.

Respectfully submitted,

Chas E. Seitz

Chas. E. Seitz
Extension Agricultural Engineer

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Agricultural Engineering Department
Extension Division
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DEPARTMENT ORGANIZATION

The agricultural engineering department at V.P.I. is organized as three major divisions; namely, Resident Instruction Division, Research Division and Extension Division. The Extension Agricultural Engineer is administrative head of the department and as such is responsible for the supervision and direction of all three divisions of work. Since the resident instruction and research divisions are so closely related to the extension program, the staff personnel of these two divisions is listed in this report along with the extension personnel.

PERSONNEL AND STAFF ASSIGNMENTS:

Extension Division

Chas. E. Seitz, extension agricultural engineer, as administrative head of the department has been responsible for directing the work of all three divisions of the department; namely, extension, resident instruction and research. The time spent in general administrative duties has been more than offset by the time and assistance contributed to the extension program by the resident instruction and research personnel of the department. Professor Seitz is paid 1/3 by the College, 1/3 by the Agricultural Experiment Station, and 1/3 by the Extension Division. This is a very satisfactory arrangement as he devotes about 1/3 of his time to each of these three divisions.

In addition to his administrative duties, Mr. Seitz has been responsible for the major extension project in rural electrification and the sub-projects in drainage and irrigation. Professor Seitz devoted considerable time during the first half of the year to supervision of the construction of the Home Economics building which was built as a W.P.A. project. He prepared the proposal for this project and secured its approval. This was a $50,000 project. The building was completed in time for the opening of the fall session in September. This unit connects to the new agricultural engineering building which has also been completed during the year. Professor Seitz served as chairman of the engineering committee on Soil and Water Conservation, Collaborator of the Federal Soil Conservation Services, and directed the cooperative soil and water conservation research program with the Soil Conservation Service and the Tennessee Valley Authority.

Mr. Jas. A. Waller, Jr., associate extension agricultural engineer, is responsible for the extension project in erosion control. He has devoted his full time during the year to this project. Mr. Waller receives three-fourths of his salary from the Soil Conservation Service. He has the title of extension soil conservationist and is the contact or liaison officer between the Extension Division and the Soil Conservation Service. Mr. Waller is now serving as Secretary of the State Soil Conservation Committee.

Mr. G. D. Kite, assistant extension agricultural engineer, is employed full-time by the Agricultural Extension Division. He has been responsible for the extension project in farm structures. He has also handled the extension work in farm water supply; assisted with the drainage and irrigation projects and handled general extension engineering problems for the department.

Mr. E. T. Swink, assistant agricultural engineer, has been employed on a full-time basis by the Agricultural Extension Division. He has been responsible for and has devoted his full time to the extension project in rural electrification.

Mr. C. F. Wilkinson, Jr., assistant extension agricultural engineer, is responsible for the farm structure drafting work in the department. He works with G. D. Kite, extension specialist in farm structures. He handles the design and preparation of farm structure plans of all kinds, of which several thousand are sent to farmers annually. Buildings constructed from these plans total in value well over a million dollars annually.

Mr. W. H. Dickerson, assistant agricultural engineer, is employed by the Extension Division on a special allotment from the T.V.A. for runoff and watershed studies and special demonstration in engineering methods of erosion control, in the T.V.A. area of Virginia.

Mr. C. Wheary, a student in agricultural engineering, has been employed on a part-time basis as a student assistant in the drafting department. Upon graduation in June a senior student, R.M. Ritchie was employed part time on this work.

Several other students have been used from time to time in the drafting department and paid from college or N.Y.A. funds.

Resident Instruction and Research

Mr. P. B. Potter, associate professor, is employed one-half time by the college and one-half time by the Experiment Station. He is responsible for the research work in household equipment and resident instruction work in this subject. His contribution to the extension program has been in a consulting capacity to members of the department and other departments on technical phases of their work, and conducting the six-weeks summer course in household electrical equipment. He has handled a number of the radio talks for the department and correspondence related to household equipment. He has

also assisted in the supervision of the construction of the agricultural engineering building and the home economics building.

Mr. J. W. Sjogren, assistant professor in agricultural engineering, is employed five-sixths of his time by the college and one-sixth by the Agricultural Experiment Station. He is responsible for the resident instruction and research work in farm power and machinery and related subjects. He has assisted with the extension program to the extent of answering correspondence relating to his speciality, preparing radio talks, and consulting advice.

Mr. U. F. Harp, instructor in agricultural engineering, was employed July 1 by the college to handle the instruction work in soil and water conservation and related subjects. He will assist with the extension project work in this subject whenever possible. He assisted with the rural electrification short course and Institute of rural affairs.

Mr. J. W. Weaver, Jr., assistant professor, is employed on a cooperative arrangement between the college and the U.S.D.A. Bureau of Agricultural Chemistry and Engineering. Mr. Weaver is in charge of the cooperative investigations in rural electrification. This program has a very close and direct relation to our extension project in rural electrification. Mr. Weaver assisted with the rural electrification short course and Institute of Rural Affairs.

Mr. J. H. Lillard, Jr., assistant agricultural engineer of the Agricultural Experiment Station, devotes his full time to the research program in Soil and Water Conservation being conducted with Bankhead-Jones Act funds. This research work is fundamental to our extension project in erosion control. The results of this work will give us basic data to use in our extension work. Mr. Lillard has assisted in the extension program in preparing radio talks and answering correspondence in relation to his work.

Mr. H. T. Rogers, soils technologist of the Agricultural Experiment Station, is assisting Mr. Lillard in the soils analysis work connected with the soil and water conservation research project. He has given several radio talks for the Extension Division. Mr. Jesse Elson, formerly of the S.C.S. took over Mr. Roger's duties while Mr. Rogers was on leave for graduate study at Iowa State. Mr. Rogers returned to duty August 1 and Mr. Elson has continued on duty on a part-time basis.

Mr. R. E. Brown, assistant agricultural engineer, S.C.S., is assigned the department by the S. C. S. to assist with the cooperative research work in Soil and Water Conservation.

Mr. D. W. Cardwell, hydraulic engineer, is also assigned the department by the S.C.S. to assist with the research work in Soil and Water Conservation. Mr. Cardwell devotes about one-fourth of his time to the work here at this Station and the balance of his time to the hydraulic

studies being conducted by the S.C.S. in the Danville, Virginia areas and the Americus, Georgia area.

Mr. W. N. Linkous is employed on an hourly basis as laboratory assistant in the Soil and Water Conservation research project.

Mr. Emanuel Azar has been employed by the Experiment Station as a research assistant in soil and water conservation during the year.

Miss Nell Webb, department secretary, is employed by the college but handles all of the extension correspondence. The stenographic work of the department has grown too heavy for one person to handle. Miss Dorothy Richardson, the part-time stenographer, is taking college work in home economics. Miss Richardson does stenographic work primarily for the research men of the department. Miss Richardson resigned Sept. 1st. and Miss Joyce Mannon was employed to handle this work.

Mr. Melville Price, janitor mechanic, is employed by the college and Experiment Station. In addition to his janitor duties, he assists with general mechanical equipment maintenance. Mr. Price resigned July 1st. and was replaced by C.A. Shepherd.

Mr. (Chas.) Vernon McCoy, was employed July 1 by the college as general mechanic for the department.

In addition to the regular research and teaching staff as listed above, several graduate students and undergraduate student assistants are employed on various research and teacher projects which have some relation to our extension program.

PLAN OF WORK - LONG TIME PROGRAM

The long time program of extension in agricultural engineering contemplates work in all phases of agricultural engineering.

The main projects in agricultural engineering are classified as follows:

10 A - Soil and Water Conservation
- A-1 - Erosion Control
- A-2 - Land Drainage
- A-3 - Irrigation
- (A-4 - Land Clearing) out

10 B - Rural Architecture
- B-1 - Farm Structures
- B-2 - Farmstead Planning
- B-3 - Rural Community Plans and Miscellaneous

10 C - Rural Electrification
- C-1 - Rural Line Extensions
- C-2 - Farm Water Power
- C-3 - Individual Light Plants } out

10 D - Household Engineering
- D-1 - Farm Water Supply
- D-2 - Farm Home Equipment
- D-3 - Farm Sanitation

10 E - Farm Operating Equipment
- E-1 - Farm Implements
- E-2 - Gas Engines and Tractors

PLAN OF WORK FOR 1940

In the plan of work for 1940 major emphasis was placed on the following three projects:

1. Rural Electrification
2. Soil Erosion Control
3. Farm Structures

Plan of Work (Cont'd)

The following are the principal factors which determine the inclusion of these projects for major emphasis in the year's program:

Soil Erosion Control: - Soil erosion is a major problem in a large section of the state. It is the most serious of any agricultural problem in the Southern Piedmont section. The present Federal Administration has recognized the seriousness of the erosion problem and is aggressively pushing an erosion control program in the state. The TVA is also aggressively supporting an erosion control program. This has been a major project in agricultural engineering for years and with all the Federal aid now available this project has received greater emphasis than ever before. Terracing as an aid in erosion control on cultivated slopes has been proven the most practical first step in erosion control and emphasis has been placed on this method for control on cultivated land.

Farm Structures:- Buildings on farms constitute about one-third the value of all farm property. This project has been developed over a long period of years and the value of the work done under the project amounts to millions of dollars. Through properly designed and constructed buildings on farms by the use of the department's plan service the farmers are able to save thousands of dollars annually in building costs and secure the most efficient and economical type of structures. There is a greatly increased interest in better rural homes and the department has been preparing more farm house plans to meet the demand for simple, inexpensive but well designed farm homes. The service rendered under this project is of untold social and economic value to the farmers of the state.

Rural Electrification:- This has been a major extension project of the department for a number of years. The creation of the TVA and the Rural Electrification Administration has greatly stimulated interest of farmers in electric service. All this has resulted in greater demands than ever before from farmers for information and assistance in this field. Rural electrification offers greater possibilities for the improvement of rural life and standards of living than any one thing that could be done for the farmer. The emphasis placed on this project has been well justified by the progress made during the year.

WORK ACCOMPLISHED - 1940

10-A Soil and Water Conservation
A-1 Erosion Control

General Background

Soil erosion control practices have not been so widely adopted in Virginia as to prevent this project from being of very great importance. The Virginia Agricultural Extension Division is very deeply and seriously concerned with it. The Federal government through such of its agencies as the Soil Conservation Service and the Agricultural Adjustment Administration is effectively attacking this problem and the results it is getting are gratifying. The farmers themselves are cooperating with government agencies and in many cases are applying erosion control practices on their own initiative.

As far as Virginia is concerned, considerable emphasis has been placed on soil erosion control for perhaps 30 years. This has been done mainly through the V.P.I. Agronomy Department by recommending definite crop rotations with grasses, clovers and small grains included, and through the V.P.I. Agricultural Engineering Department by demonstrating the laying out and construction of terracing.

Prior to the Spring of 1934 the terracing program advanced slowly due to limited personnel and equipment. After the Soil Conservation Service started in Pittsylvania County in 1934 the state erosion control work received tremendous impetus and many practices other than crop rotations and terracing have been successfully applied.

Just before the establishment of the Soil Conservation Service in Virginia, local or county terracing associations were organized in ten counties. These associations operate one 40 horse-power Diesel tractor and 9' blade terracer each. Trained agricultural engineers are in charge of these units and the two operators. A charge per hour sufficient to liquidate the outfit is made. They have been fairly successful. These associations were organized by and are administratively responsible to the Extension Service and technically responsible to the Soil Conservation Service.

In order to reach still more farmers the Soil Conservation Service was permitted to write agreements on farms not in camp or demonstration areas. These farms represent different types and are located where a maximum number of farmers can reach them for observation. At this time there are approximately 80 of these cooperators. In several cases the counties where these farms are located have become a part of some Soil Conservation District. In this case these agreements are turned over to the district supervisor's office and will be reported by the district conservationist.

The Extension Soil Conservationist makes an earnest effort to maintain close cooperation with the SCS Camps and areas and Soil Conservation Districts. The SCS personnel is most cooperative and the camp, area and district engineers are very helpful to the County Soil Conservation Associations. They want terrace outlets to use ECW labor on and the associations can secure more terracing work when they have free labor to offer on terrace outlets. ECW Camps are in most cases very popular with farmers.

Methods of Attack Being Made on Soil Erosion Individual Demonstrations

The old familiar way of laying out all the terrace lines it was thought the farmer would build and then building one as a demonstration appears at the moment to be obsolete. During the last five years very little of this has been done. In 1939 perhaps 5000 feet have been run by the specialist. The county agent still finds time to do a little terracing for his farmers and the agricultural engineers in charge of the county terracing units do quite a bit of layout work and the farmers build the terraces with his own team and tools. There are no figures available on the number of feet surveyed or built. An AAA cooperator gets $1.50 for each 200' of properly built terraces.

County Terracing Associations

In 1934 county terracing associations were organized in ten counties. They were Albemarle, Brunswick, Campbell, Charlotte, Dinwiddie, Halifax, Mecklenburg, Nottoway, Pittsylvania and Prince Edward Counties. The Dinwiddie Association closed down in 1938. In 1939 the Albemarle outfit paid its way out and liquidated. This year the Prince Edward Association paid its way out and is now being liquidated. The Brunswick Association can be liquidated and probably will be next year. The Pittsylvania Association can be closed out with considerable cash balance. The Campbell and Mecklenburg Associations have permanent extension men as engineers in charge and are receiving substantial financial help from the county board of supervisors. The Charlotte Association could probably be closed out without loss. The Halifax and Nottoway outfits are in good mechanical shape but owe considerable money. They would like to continue until their indebtedness is reduced. In view of all conditions being considered, the specialist has made this recommendation. It is obvious that many farmers are willing to pay up to $3.50 per hour for the services of these outfits. It appears unfair to deny them the benefits of this service. Yet, due to the inability of the associations to secure further outside financial help (the units are unable to pay out without it), and the fact that little profitable work will be secured before April of 1941, it seems best to dispose of all outfits. Present demands for this type of equipment by large contractors may facilitate this action.

Since it appears unwise to attempt to put the charge per hour above $3.50, and since every outfit has had the benefit of a subsidy, in the nature of the services of an agricultural engineer (and some associations direct appropriations from county supervisors), perhaps this is the wrong approach to

terracing. Would it be better to use this money to buy a large number of small terracers to be drawn by farm power with some local man trained to do the layout work? It is a contraversal matter.

Contribution by State Soil Conservation Committee

In March 1939 the State Soil Conservation Committee cooperated with the terracing associations in Charlotte, Halifax, Nottoway and Prince Edward Counties in supplying funds for an agricultural engineer for the months of April, May and June. These associations were selected because they were in more urgent need of assistance than the others. The specialist supplied the agricultural engineers. This assistance carried these associations over the spring terracing season and did much to place them in better financial conditions as well as to render a good service.

For the months of October and November the State Soil Conservation Committee made another appropriation sufficient to continue an agricultural engineer in Nottoway and Halifax Counties. The money was used to good advantage and these two associations were financially benefitted. No additional help from any source is anticipated. Only Campbell and Mecklenburg Counties have agricultural engineers in charge of this work.

Excessively High Operating Costs

No one factor has contributed so much to the financial burden these county terracing associations are attempting to overcome as the rediculously high charges made for parts used in making repairs and for labor furnished by dealers. The charge made for the simplest parts is astonishing. Firms doing contracting work where usually good profits are expected may be able to absorb these charges. County terracing associations rendering a fine service on a cooperative basis at a minimum cost cannot operate profitably without some form of subsidy. Since this is generally unsound, the alternative is to liquidate.

Special Extension-SCS Cooperative Demonstration Farms

As an outgrowth of the Soil Conservation Service demonstration and camp area cooperative agreements, a relatively small number of agreements have been written outside of these areas. Farms of different types and well located were selected. The object was to spread erosion control practices over a larger area for other farmers to study and adopt. A table showing the names and addresses of these cooperators will follow. Last year a total of 59 were reported. Further in this report will be found a progress report on these special farms.

Soil Conservation Districts

The Soil Conservation Service organized in Virginia in 1934 set-up, during the course of several years, four demonstration areas near Chatham, Appomattox, Charlottesville and Harrisonburg. These are now on a maintenance basis and the personnel from these areas is going to the new Soil Conservation

10-A Soil and Water Conservation (Con'd)
A-1 Erosion Control

Districts. ECW Camps are now located in Soil Conservation Districts and in Amelia, Bedford, Charlotte, Culpeper, Franklin, Grayson, King and Queen, Louisa, Mecklenburg, and Rockbridge Counties. These counties are in districts and the men from the camps and areas are all writing agreements whether they were previously agronomists, soils men, foresters, biologists or agricultural engineers. The state is divided into two areas. Roughly Area # 1 is north of the James River and Area # 2 is south of the James River. The camps are about equally divided between the areas. A more detailed list of these camps is given later in this report.

The State Soil Conservation Districts Act (Senate Bill No. 38) became operative July 1, 1938. It is possible now to cooperate with farmers in all parts of the state through organized Soil Conservation Districts. At present the Soil Conservation Service is the chief cooperating service. It appears that Federal appropriations made to the Soil Conservation Service may be spent only in duly constituted soil conservation districts.

In the first two and one-half years the following soil conservation districts, with the counties included in each district indicated, have been organized:

Tidewater - Caroline, Essex, Hanover, King and Queen, King William, Mathews, and Middlesex

Thomas Jefferson - Albemarle, Louisa (less a small area), Goochland, and Nelson

Southside - Brunswick, Charlotte, Halifax, Lunenburg, and Mecklenburg

Piedmont - Amelia, Nottoway, Powhatan, and Prince Edward, & Dinwiddie

Natural Bridge - Botetourt (less Pinecastle district), and Rockbridge

Blue Ridge- Bedford, Franklin, and Henry, & Pittsylvania

Shenandoah Valley - Augusta, and Rockingham

Culpeper County - Culpeper, Madison, and Orange

Northern Neck - Lancaster, Northumberland, Richmond and Westmoreland

Robert E. Lee - Appomattox, Buckingham and Campbell

New River - Carroll and Grayson

James River - Chesterfield, Henrico and Prince George

Lord Fairfax - Frederick

Much time was spent with the different terracing associations in training new engineers, holding annual meetings of the membership and directors meetings. Also, six new engineers had to be secured during the year. Assistance was given in locating extra work for the machines to do during non-terracing seasons.

In addition to the above, 1 survey for an earth dam, 2 sewage disposal surveys, 4 small drainage surveys, 10 water supply surveys were made. Also, 3000 feet of terraces were laid out.

Outlook

The demand for terracing is very good indeed. This demand depends on agricultural conditions in general and tobacco prices in particular. The terracing units are in very fair mechanical condition and ready to meet this demand. The machines in Campbell, Nottoway and Mecklenburg Counties are comparatively new.

The bottle-neck of this work is the matter of furnishing engineering service to lay out and check terrace construction. To keep the charges within reasonable limitations it is clear that these charges should not exceed $3.50 per hour. It has been determined that this charge is not sufficient to pay for the services of an agricultural engineer, other operating charges, including frequent and very expensive repair bills and to liquidate the original cost of the equipment. From the beginning the Rural Rehabilitation Service, the Soil Conservation Service, the Agricultural Extension Division or the State Soil Conservation Committee has furnished funds to employ agricultural engineers to take direct charge of the work of these associations. Funds from none of these sources are now available.

These conditions have made it necessary in most cases to consider liquidating all assets this winter. In all likelihood Brunswick, Charlotte, Halifax, Nottoway, Pittsylvania and Prince Edward County Associations will be entirely out of the picture one year hence. Brunswick and Prince Edward County Associations are virtually out now. Campbell and Mecklenburg Associations, due to having an engineer on the Extension payroll, will be able to continue this service.

With the release of some of the specialist's time which at present is being devoted to the county terracing associations, it will be possible for him to take on more requests for water systems, drainage and irrigation. However, with the organization of more soil conservation districts, this extra time may be reduced.

In point of total counties in Virginia, the state is not half organized into soil conservation districts. Forty-four counties are now included in districts. It is not expected that all counties want to be or should be included. However, the next year or two will complete the most urgent part of the organizational work. The office work will continue to increase and more time must be devoted to it.

10-A Soil and Water Conservation (Con'd)
A-1 Erosion Control

The following is a list of ECW Camps operating under the SCS as a work agency.

First Group

Camp No.	Town Near	County
No. 15	Moneta	Bedford
No. 16	Sandy Level	Franklin
No. 17	St. Stephens Church	King & Queen
No. 19	Brandy	Culpeper
No. 24	Amelia	Amelia

Second Group

No. 18	Boswell's Tavern	Louisa
No. 20	Galax	Grayson
No. 21	Keysville	Charlotte
No. 22	Clarksville	Mecklenburg
No. 23	Lexington	Rockbridge

Camps in the first group were moved in 1939.
Camps in the second group were moved in 1940.
Each camp must be moved in the third year to a new location.
All camps must be in Soil Conservation Districts.

Future Organizations

It is quite unlikely that any additional county soil conservation associations will be organized. Certainly not for the purpose of buying the present type to heavy terracing equipment.

There are 44 counties now included in Soil Conservation Districts. They are the best agricultural counties in Virginia. Other districts will be organized and a good number of new counties will be added to existing districts. This work of organizing soil conservation districts will taper off in the next few years. It is not anticipated that all of the mountain counties will want to be included in soil conservation districts.

Miscellaneous Activities of the Extension Soil Conservationist

The specialist makes a conscientious effort to keep in contact with area, district and camp officers and to keep relationships at their present highly satisfactory level.

As Secretary to the State Soil Conservation Committee the specialist keeps all records, minutes of meetings and handles the special appropriation made by the state for organizing soil conservation districts. This accounting work means more time spent in the office than formerly.

RECEIPTS AND EXPENDITURES

Virginia Terracing Associations — Year Ending November 30, 1940

Name of Terracing Association	Income		Expenses								
	Terracing	Other	Wages	Fuel	Lub.	T. & M.	Deprec.	Ins.	Misc.	Int.	Payment on Prin.
Albemarle			13.13	1.00	6.01	10.42		49.44			
Brunswich	684.38	252.00	275.90	47.56	40.50	36.14	427.84	43.83	54.98	7.56	555.36
Campbell	1634.25	1052.70	858.86	154.67	69.56	106.83	713.85	74.59	56.55	106.12	
Charlotte	504.00	556.50	480.35	57.01	53.95	273.56	669.84	23.60	51.45	32.16	
Halifax	1489.68	646.36	896.25	118.05	65.66	286.94	756.00	80.22	118.46	41.92	554.68
Mecklenburg	635.52	1194.49	642.49	96.83	81.47	103.93	605.59	32.85	170.58	135.45	1157.10
Nottoway	1168.16	1587.78	1138.07	190.21	4.60	120.27	525.99		412.96	34.20	
Pittsylvania	1082.03	3053.59	1322.80	160.85	185.59	449.85	792.00	52.35	114.06		
Prince Edward	359.18	615.70	317.65	91.14	9.61	56.30	378.00		61.35		300.00
Total	7557.20	8959.02	5945.50	917.32	516.95	1709.30	4869.11	356.88	1054.75	357.41	2567.14

ANALYSIS OF OPERATIONS

Virginia Terracing Associations — Year Ending November 30, 1940

Name of Terracing Association	Terracing				Other Services				
	Number of Farms	Feet of Terrace	Acres Protected	Cost Per Acre	Road Grading		Earth Moving		Other
					Hours	Miles	Hours	Cu. Yds.	
Albemarle	3				50				
Brunswick	5								
Campbell	64	222797	638	2.56	188	50.1	5	132	
Charlotte	34	79550	257	1.90	49				
Halifax	36	251520	592	2.52	44	7.1	56½		
Mecklenburg	36	90450	233	2.81	164	17	56		
Nottoway	40	185050	527	2.30	191	24	157	6260	
Pittsylvania	69	110025	287	3.60	373	33.1	402	12000	
Prince Edward	13	36400	190	2.25	10	5	111	400	
Total	300	975792	2724	2.56	1069	136.3	787½	18792	

Note: Unusual work was 154 hours moving snow in Brunswick and Mecklenburg Counties.

10-A Soil and Water Conservation (Con'd)
A-1 Erosion Control

Summary of Results

The Extension Specialist, acting also in the capacity of Extension Soil Conservationist and Secretary to the State Soil Conservation Committee, in summarizing, presents a varied list of activities.

1.

a. Miscellaneous activities include 17 surveys covering water supply, irrigation and drainage jobs. These are included in another specialist's report. If more county terracing associations are liquidated next year and State Soil Conservation Committee work becomes no more exacting than it has been this year, perhaps more time can be devoted to handling additional farm water supply, drainage and irrigation requests.

b. Most time has been spent with the county terracing associations than with any other phase of the specialist's program. Seven associations are now operating. Three associations have discontinued - two of these having successfully paid their way out. Of the seven still operating two have paid out and will likely liquidate next year. Perhaps three of the remaining five could sell out without loss. The other two are receiving county financial help and have an agricultural engineer in direct charge and on the Extension Division payroll. In brief, it is thought that eventually these associations will be able to close out with practically no loss. It would not be surprising to know that three or four of them will close out the coming Spring. No slacking of the demand for terracing is noticed.

c. Recognition and appreciation must be given to the State Soil Conservation Committee for coming to the aid of four associations. This Committee appropriated sufficient funds to supply an agricultural engineer in Charlotte, Halifax, Nottoway and Prince Edward Counties during April, May and June. Again in Halifax and Nottoway Counties during October and November. The specialist supplied the engineers and assisted in training them.

2.

a. As Extension Soil Conservationist, reports are made on special Extension-SCS cooperative demonstration farms not in camp or demonstration areas or in soil conservation districts. Close contacts as possible are made with camps, area officers and district personnel.

3.

a. As Secretary to the State Soil Conservation Committee the specialist has kept all accounts and records pertaining to the appropriation made by the state for organizing soil conservation districts. All correspondence, invoices and payrolls in con-

nection with this fund are handled by him. About 20 educational meetings were held with a total attendance of about 310. Forty-four counties are now organized into twelve conservation districts.

In addition to the above, assistance was given in holding referenda, hearings and special elections of supervisors for these districts.

b. The specialist assisted with the engineering recommendations for the district program and work plan in two soil conservation districts, as a member of the State Engineering Sub-Committee.

c. Finally, the specialist made every effort to keep relationships between the Extension Division, Soil Conservation Service and State Soil Conservation Committee at the present high level.

10-A Soil and Water Conservation (Con'd)
A-1 Erosion Control

The following tabulation is a summary of the Extension Soil Conservationist's time for the year 1940:

Days in field	146
Days in office	145
Different agents visited	35
Different counties visited	44
Number visits to counties	97
Letters written	619
Radio talks	1
Surveys made	11
Miles traveled	21928
Counties operating terracing units	8
Annual meetings of County Soil Conservation Associations	9
Attendance	140
Meetings of directors of County Soil Conservation Assns.	25
Attendance	148
Feet of terraces built by Associations	975792
Miles of terraces built	185
Acres of land protected	2724
Miles of farm roads graded	136
Cu. Yds. of earth moved	18792
Individual farms worked on	300
Cost per acre for terracing	$2.56
Enhanced value of farm land due to terracing	$[illegible]154.00
County associations with self-liquidated units	3
Farms under special Extension-SCS demonstration agreements.	88
Soil Conservation District completely organized	12
Number of counties in Soil Conservation Districts	44
Educational meetings held in proposed districts	21
Attendance of educational meetings	410

Orange - Tidewater Soil Cons. Dist.
Red - Thos. Jefferson Soil Cons. Dist.
Blue - Southside Soil Cons. Dist.
Yellow - Natural Bridge Soil Const. Dist.
Green - Piedmont Soil Cons. Dist.
Black - Blue Ridge Soil Cons. Dist.
James River

Purple - Shenandoah Soil Cons. Dist.
Brown - Culpeper County Soil Cons. Dist.
~~Purple Check~~ Blue - Northern Neck Soil Cons. Dist.
Red Check - Robert E. Lee Soil Cons. Dist.
Green Check - New River Soil Cons. Dist.
Black Check - ~~James River~~ Soil Cons. Dist.
Blue Ridge

1940

Green - Organized counties having BCW camps but no terracing equipment.
Black - Organized counties having terracing equipment but no BCW camps.
Red - Organized counties having terracing equipment and BCW camps.

Sloping ridge of terrace (Charlotte Court House).

Making last back-cut of terrace (Charlotte Court House).

Making first cut on terrace through heavy vegetation (Prince Edward County).

Building ridge of terrace (Prince Edward County).

Finishing channel of terrace (Mecklenburg County).

Final cut on terrace channel (Mecklenburg County).

Making back-cut on terrace (Prince Edward County).

Making final back-cut on terrace (Mecklenburg County).

Completing terrace (Mecklenburg County).

Cutting a terrace channel (Prince Edward County).

Building ridge of terrace (Prince Edward County).

Making final back-cut to terrace (Prince Edward County).

Constructing farm road (Nottoway County).

Leveling farm road (Nottoway County).

Cutting farm road drainage ditches (Nottoway County).

Shaping up farm road (Mecklenburg County).

Cutting new farm road (Campbell County).

Finishing farm road (Mecklenburg County).

Off-terracing season grading job. Loading large scraper (Pittsylvania County).

Unloading scraper-leveling dirt (Pittsylvania County).

Field leveled-finished job (Pittsylvania County).

Off terracing season - grading tennis courts (Prince Edward County).

Grading recreational grounds (Prince Edward County).

Grading finished (Prince Edward County).

Water line ditch cut with terracer at big labor-saving cost (Nottoway County).

Final water line ditch before laying pipe (Nottoway County).

Off-terracing season - grading lot (Prince Edward County).

Making recreational grounds (Prince Edward County).

Finished tennis courts (Prince Edward County).

Making entrance to farm (Halifax County).

Grading farm entrance (Halifax County).

Operating crew (Halifax County).

Operating crew (Charlotte County).

Operating crew (Prince Edward County).

Operating crew (Nottoway County).

A-2 Land Drainage

Farm drainage is one of the minor projects of the extension agricultural engineers. During this year G. D. Kite, Assistant Agricultural Engineer, made surveys on twenty-seven farms that were located in many sections of the state. These surveys were for areas of 2 to 20 acres.

Every farmer indicated his appreciation for the fine services rendered to him by the Extension Division in such a way as having an engineer for the purpose of giving assistance on such problems. Each of the 27 farmers were definitely planning to install the drainage system this year.

In every case the system that was recommended was more efficient and less expensive than the system which the farmer indicated he would have installed had he not been able to secure the services of the specialist. This is another example of reliable information at the proper time, saving money for the farmer.

Outlook

There will be a continued need for assistance to farmers on their drainage problems. As farms get smaller in size the owners see the need for reducing the waste land caused by wetness. In many cases as land ownership changes, the new owner plans immediately to drain the wet spot or the swamp to give more acreage for cultivation and for improved appearance of his farm. Similar situations will no doubt continue indefinitely.

Limited personnel prevent much stress being placed on this project. Only urgent requests will be taken care of the coming year. It is expected that the S.C.S. will take care of drainage in the various districts. Recommendations for drainage have been incorporated in all the Work Plans and Programs of the various districts.

A-3 Irrigation

Garden irrigation demonstrations were conducted on seventeen farms in connection with some of the rural electrification projects. The summary of these demonstrations appear under the rural electrification section of this report. The farms on which records were kept of the small garden irrigation sprinkler showed an interest on the investment of 409.7 percent as a result of irrigation.

Irrigation studies are now being conducted here on the Experiment Station farm to determine the equipment best adapted for Virginia conditions. These studies should make available some valuable information to use in our extension program.

10-A Soil and Water Conservation (Con'd)
A-3 Irrigation

Outlook

Irrigation is becoming more popular each year. The demonstrations conducted on the use of a small sprinkler with the farm water system for garden irrigation have shown the value of this practice. When further information is available from the studies being conducted, a bulletin on the subject will be published giving full instructions on installing and using the garden sprinkler equipment. Such a publication will greatly aid the spread of garden irrigation.

10-B RURAL ARCHITECTURE

B-1 Farm Structures

Virginia farmers continued to improve their buildings this year as was indicated by the large number of requests for building plans. Thirty-three hundred plans for farm buildings were furnished to farmers of the state to aid them in planning and constructing convenient, economical and permanent buildings. This number of plans was an increase of 23 percent over the number of plans mailed in 1939.

The value of buildings constructed by those plans was estimated at more than $750,000. Other buildings valued at 50 to 100 percent of that figure were constructed without the aid of the V.P.I. plans. In almost every instance, the buildings that were constructed by the V.P.I. plans were more suitable, convenient and permanent than the other buildings.

The plans that are furnished by the Agricultural Engineering Department are designed by specialists who have made a careful study of the requirements for the many different types of farm buildings. The building specialist while on field trips always makes a careful study of new and old buildings in search of new ideas in arrangement and construction details and to obtain information on new materials. Therefore, the V.P.I. plans are up to date in arrangement, construction details and economy.

The building specialist made 235 farm visits for the purpose of assisting the farmers in selecting the building plan most suitable to his needs, in recommending the location for the proposed buildings and giving assistance in reading the blueprints and in actual construction work. This type of assistance was given on all types of farm buildings including apple storages, sheep barns, general purpose barns, house remodeling, etc.

In addition to the information given direct to the farmer in person, several hundred letters were written giving certain information on materials, type of construction, location, etc. Four news articles pertaining to buildings were written.

The dairy farmers again headed the list for constructing the most new buildings. This construction required a greater portion of the building specialist's time than any other group. The requirements as set up by the Health Department and the State Dairy and Food Division and the many cities and towns make it necessary for much supervision in the construction of dairy barns and milk houses. 1137 plans for dairy barns and milk houses were mailed to the dairymen.

In the Washington milk area, forty barns having an average of thirty-two stalls and forty milk houses were constructed. The approximate investment in buildings and dairy equipment was $250,000. This is a fair example of the increased demand for dairy products in all parts of the state.

10-B Rural Architecture (Con'd)
B-1 Farm Structures

In the southwest territory more than fifteen barns of small sizes will be completed before the end of the year. The Hampton Roads and Richmond areas are having a proportinate amount of construction.

A special silo construction program was sponsored by the Carnation Company in Carroll and Grayson Counties. The building specialist gave much assistance to that project. The farms in those counties are rather small in comparison to farms in other counties. The financial status of the farmers was rather low. Therefore, it was necessary for the farmers to obtain sufficient information and supervision so that they could use much local material and inexperienced labor, including themselves, in the construction of their silos. The program was very successful. Seventeen silos of wood and monolithic concrete were constructed by the farmers themselves using local materials as much as possible. One farmer constructed an 18 ton combination concrete and wood silo for a total cash expenditure of $35.00. Another farmer dug a trench silo having a capacity of 28 tons for a cost of $7.25.

Special plans were prepared for two 4-H camp buildings, one to be located in Norfolk County and one in Albemarle County. The Albemarle camp is under construction and is to have one large building to be used as the dining and recreation hall, two bath houses and four bunk cabins, each to house 16 children and two leaders.

The addition to the Halifax County Agricultural Office Building was completed in the summer. All county agricultural agencies are now housed in this building. There is sufficient space for all agencies and the arrangement provides for maximum efficiency.

Outlook

Farm building construction is expected to continue at the same rate for the next several years. More farmers are realizing the importance of the information which they can obtain from the V.P.I. Extension Division. Thus, new contacts are made each year in this phase of work. New buildings will be required to replace those buildings that are destroyed by fire and that have become unsafe for future use because of poor construction and no maintenance and to meet the need for new farming systems.

Farm Building Plan Service

This service is maintained by the Agricultural Engineering Department and the Extension Division, cooperatively, for the purpose of supplying the farmer with farm building plans to aid him in constructing conveniently arranged, economical and permanent buildings. These plans are simple and complete with the necessary details and the bill of materials. Farmers may obtain copies of these plans, which are suitable for all sections of the state, without charge by writing to the Agricultural Engineering Department.

At the present time there are 423 standard building plans available. This number includes fifty-five plans that were purchased this year from the Bureau of Agricultural Engineering in Washington, D.C. to make our list up to date with the new booklet "Farm Building Plans for Southern States."

This new booklet was issued by the Bureau of Agricultural Chemistry and Engineering, U.S.D.A., Washington, D.C. during the summer. The plans illustrated in that booklet were selected by representatives of the twelve southern states. Of the 160 plans included in that booklet, twenty-six plans were contributed by this department.

One hundred and thirty copies of that booklet were received by this department for distribution to every farm agent in the state. Additional copies have been requested so that each home agent may also have a copy. Almost all farm agents have a copy of the State Farm Building Plan Book that was issued five or six years ago. With these two plan books available in every agent's office and with the 369 plans available, the Virginia farmers have one of the best farm building plan services in the country.

A new Ozalid Developer, blue-line print machine, was purchased last year. This machine reproduces from the original plan an extra good print of the plan. Reproductions can be made at a faster rate in this new machine than could be made in the old machine.

This plan service is supervised by G. D. Kite, Assistant Agricultural Engineer. Mr. C. F. Wilkinson, Assistant Agricultural Engineer, is in charge of the drafting room. His duties are to supervise the drafting that is done by two part-time student draftsmen and to assign student assistants to reproduce and mail the plans that are requested. These draftsmen are needed to redraw certain plans that become out of date and that have become too badly damaged for reproducing new prints.

Charts, tables, etc. were prepared by the draftsmen for the teaching members of the Agricultural Engineering Staff. This work was rather small in comparison to the regular drafting work. Plans for a concrete garage for the departmental cars and trucks were prepared in the drafting room.

List by Groups of Plans Furnished Virginia Farmers

Farmhouse plans	67
Dairy Barns and Equipment	1137
Beef Cattle Barns and Equipment	99
Horse Barns and Equipment	36
Sheep Barns and Equipment	18
Poultry Houses and Equipment	1141
Hog Houses and Equipment	225
General Purpose Barn	131
Storage Building and Equipment	154
Machine Sheds and Shop Buildings	48
Tobacco Barns and Equipment	10
Public and Camp Building and Equipment	56
Special Plans	88
Miscellaneous Building and Equipment	169
Total	3379

10-B Rural Architecture (Con'd)
B-1 Farm Structures

New Plans in File (Purchased from Bureau of Agricultural Engr., Washington)

10 - Farmhouse Plans
6 - General Purpose Barn
1 - Horse Barn Plan
3 - Dairy Barn Plans and Equipment
5 - Beef Cattle Barns and Equipment
3 - Sheep Barn Plans and Equipment
8 - Storage Building Plans and Equipment
3 - Poultry House Plans and Equipment
1 - Tobacco Barn Plans
2 - Machinery and Implement Sheds
2 - Hog House and Equipment
7 - Public Building Plans
4 - Miscellaneous
55 - Total

New Standard Plans Drawn

B-1.80 11' x 17' Goat Milking Barn
B-3.14 10' x 20' Masonry Milk House
B-3.16A 12' x 28' Masonry Milk House
B-5.53 5' x 5' Cattle Breeding Rack
F-5.13B Details for Multiple Unit Laying House
N-7.11 2' x 6' Bulletin Rack

Standard Plans Redrawn and Retraced

B-3.16 12' x 32' Masonry Milk House 1
B-1.26 20-cow 1½-Story Dairy Barn 2
B-1.51 20-cow 2-Story Dairy Barn 2
B-3.15A 12' x 28' Milk House 1
B-3.16A 12' x 28' Masonry Milk House 1
B-1.52 20-cow 2-Story Masonry Dairy Barn 2
B-1.20 20-cow 1-Story Dairy Barn 2
B-1.21 20-cow 1-Story Masonry Dairy Barn 2
B-1.25 20-cow 1½-Story Masonry Dairy Barn 2
D-1.16 30' x 70' 1½-Story Horse Barn 1
D-1.11 26' x 34' 2-Story Horse Barn 1
K-2.12 4' x 4' Homemade Electric Brooder 1
G-3.11 3' x 6' Two-way Hog Self Feeder 1
H-1.12 32' x 40' 2-Story General Purpose Barn 2
H-1.17 18' x 24' 1-Story General Purpose Barn 1
H-1.14 36' x 50' 2-Story General Purpose Barn 2
H-1.18 36' x 40' Gable roof General Purpose Barn 1
J-1.11 8' x 16' 500 Bu. Corn Crib 1
J-2.31 36' x 40' 5400 Bu. Apple Storage House 2
J-2.51 16' x 30' 1000 Bu. Vegetable Storage House 1
J-8.11 Trench Silo for Capacities for 6 to 24 Cows 1
K-2.11 24' x 40' Repair Shop and Machinery Shed 1

10-B Rural Architecture (Con'd)
B-1 Farm Structures

Standard Plans Redrawn and Retraced - Con'd.

M-3.12 44' x 62' Log Community Building
M-3.15 25' x 42' Frame Club House
M-4.11 8' x 12' Roadside Market
M-5.11 3½' x 5½' Stone Out-door Fireplace

Special Plans

S_h-3-40-2 Plans for a House
S_a-3-40-3 Plans for Remodeling House
S_n-3-40-4 Plans for Proposed Garage
S_j-3-40-5 Plans for granary and corn crib
S_b-3-40-5 Dairy Plant for Hollins College
S_d-3-40-6 Horse Barn
S_m-6-40-1 4-H Club Bath House
S_m-6-40-2 4-H Club Bunk House
S_m-7-40-1 4-H Club Dining Hall
S_j-7-40-2 Storage House
S_m-7-40-3 Design for Concrete Bridge
S_m-8-40-1 Floor plan of Tramp Shed
S_m-8-40-2 Plans for County Office Building
S_m-9-40-1 County Agricultural Office Building
S_m-9-40-2 4-H Club Dining Hall
S_m-9-40-3 4-H Club Bunk House
S_m-10-40-1 Complete Plans for Entire 4-H Club Camp
S_m-11-40-1 Complete Plans for 8-Room Farm House
S_m-12-39-2 County Agricultural Office Building
S_b-12-39-1 Milking Parlor
S_h-12-39-3 General Purpose Barn
S_m-1-40-1 Addition to Halifax County Office Building
S_m-1-40-2 General Purpose Barn
S_m-1-40-3 Two-story County Agricultural Office Building
S_h-1-40-4 Plans for a House
S_h-1-40-5 Construction Details for Gambrel Roof Barn - 16' - 38' wide
S_m-2-40-1 County Agricultural Office Building
S_b-4-40-2 Goat Milking Barn and Stand
S_a-4-40-3 House Plans
S_f-4-40-4 Poultry House Plans
S_h-4-40-5 General Purpose Barn
S_d-4-40-6 Storage House for Vegetables
S_h-4-40-7 Sheep Barn
S_m-4-40-8 County Office Building
S_n-5-40-1 Livestock Market
S_n-5-40-2 Bulletin and File Rack
S_b-3-40-1 Arrangement of Dairy Barn Silo and Feed Room

Counties in which the Specialist worked on the Farm Building Program.

10-B Rural Architecture
B-1 Farm Structures

Termite Control

Very little work was done on this project this year. Some requests for information on termite control were received from home owners in scattered sections of the state. Most of these requests were answered by sending the home owner a copy of the bulletin entitled "Termites."

Fifteen homes were visited to make recommendations for repair or other control measures, depending on the type and condition of the house. All these visits were made while in the particular communities on other phases of work. One meeting and demonstration was held in Albemarle County with 22 persons in attendance. The persons who attended the meeting seemed to show much interest which was probably aroused by their experience with termite damage.

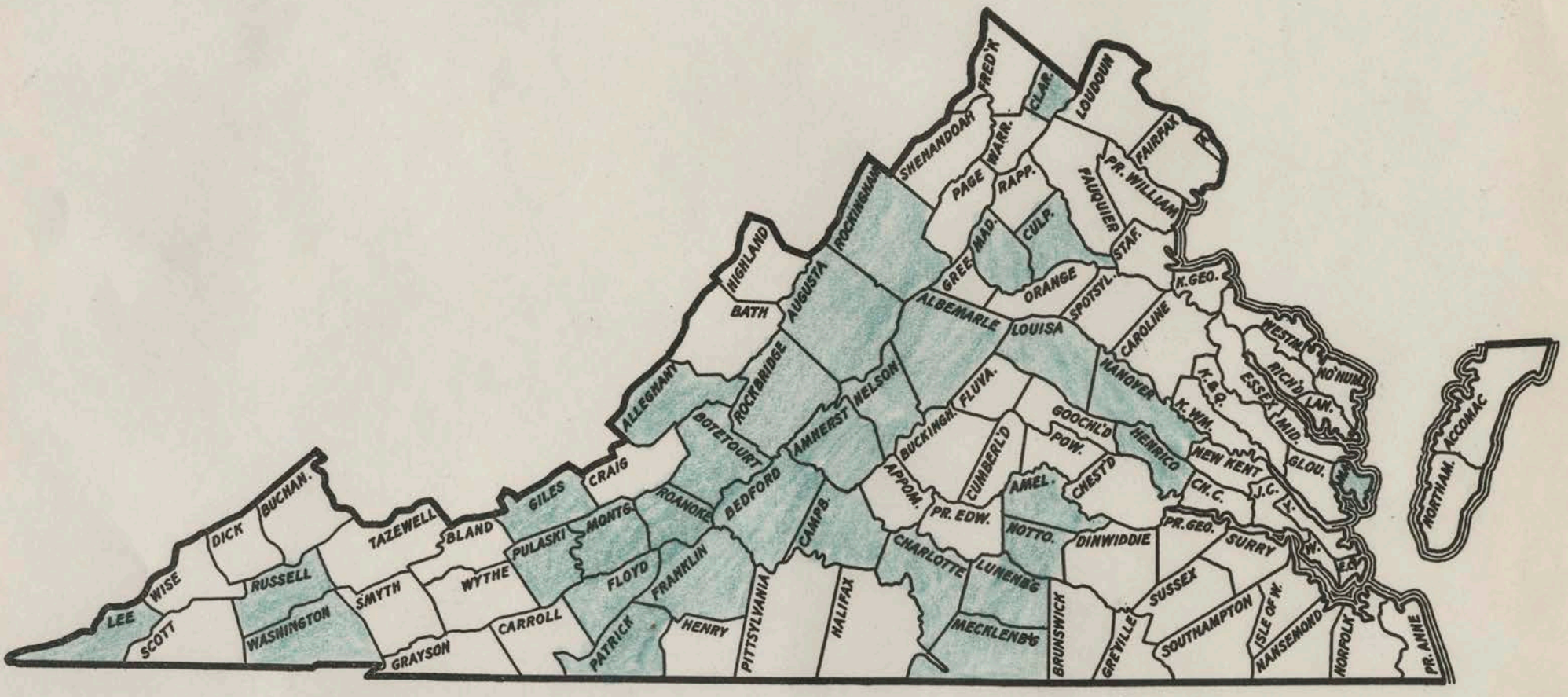
At many of the homes visited the owner told of his experience with a commercial termite control company that made an estimate on the job for his house. In the majority of cases a good carpenter could remedy the cause for the termite damage in several days. These recommendations by the specialist saved the home owners over $100 each.

Statistical Report of the Specialist's Activities and Accomplishments:

Agents visited	120
Different agents visited	57
Days in office	138
Days in field	151
Miles traveled (in personal car)	20,926
Letters written	1220
Plans mailed	3379
Bulletins mailed	4395
Farms visited	411
Meetings participated in	9
Attendance	183
News articles	7
Radio talks	3
4-H camps attended	2
Regional county agent meetings attended	4
Specialists meetings attended	6
Leaders interviewed	37
Result demonstrations visited	70
Other farms visited	85
Method demonstrations given	238
Attendance	350
Other meetings attended	8
Attendance	157
Meetings at demonstrations	2
Attendance	107
Approximate number of persons reached directly by program	7272

Farm Visits According to Type of Work:

Farm buildings	235
Water systems	98
Drainage	27
Termite control	15
Stationary spray systems for orchards	8
Irrigation	4
Sewage disposal	2
County agricultural office building	4
Electric fence	1
Farm machinery	2
Farmstead planning	1
Water power development	1
Locker cold storage plant	1
Flood control	1
4-H camp buildings	3
Terracing and strip cropping	3
Lime grinding plant and equipment	2
Miscellaneous	3
Total	411



Counties in which the Specialist made Water System Surveys.

General Engineering Activities

Other extension projects on which assistance was given by G. D. Kite, Assistant Agricultural Engineer, were earth dam construction for farm reservoirs and fish ponds, hydro-electric surveys, lime grinding equipment for county cooperative lime plants, irrigation, farm sewage disposal, fencing, soil conservation, 4-H camp handicraft classes and farm machinery.

One stationary spray system for a 70-acre orchard was designed. This system will be installed during the winter. One 4-H camp in Albemarle was planned. This project included designing the buildings and establishing the building locations. The construction will be supervised during the winter months. Another 4-H camp that is to be located in Norfolk County was tentatively planned, including buildings and their location. A campaign is now underway to raise money with which to build that camp.

Two 4-H camps were attended during the summer at which time classes in rope work were taught. The Nelson-Amherst camp was attended for four days and the Shenandoah Camp for three days. Thirty-eight boys were given instructions on tying knots, splicing rope and making calf and cow halters. The result of this activity was very gratifying. The specialist assisted with the recreational activities at both camps.

A group of 4-H club boys at Powell's Fort Camp, Shenandoah County, who were very much interested in learning to tie knots, to splice rope and to make calf halters. (Rope Handicraft Class).

An attractive and economical cinder block, one-story milking barn and milk house for producing grade A milk. This barn is recommended when feeding barn is available. (Plan B-1.21 and B-3.16A)

A two-story, brick dairy barn and a brick milk house in Richmond area for producing grade A milk. This barn has a concrete mow floor for fire protection to cows.

This cinder block, one-and one-half story gambrel roof dairy barn and milk house is typical set-up for Washington milk area. (Plan B-1.25 and B-3.16)

The Halifax County Agricultural Office Building after the building was remodeled and enlarged by plans furnished by the Agricultural Engineering Department.

A farm apple storage building constructed in Wythe County by plans furnished by Agricultural Engineering Department. Located on highway to facilitate roadside marketing.

An 18 ton silo built with farm materials on a Carroll County farm for a cash outlay of $35.00.

Wood stave silos built of farm lumber cut in local shop. Capacity 22 tons. Approximate cost - $100.00 each.

A 10 ft. x 35 ft. monolithic concrete silo built by farm labor at a cost of $200.00. Located on Grayson County farm. Capacity 63 tons.

A Culpeper County farm home before remodeling.

The same farm home after it was remodeled by plans furnished by the Agricultural Engineering Department.

10-C RURAL ELECTRIFICATION
C-1 Rural Line Extensions

The Project and Personnel

The extension project in rural electrification has been conducted by E. T. Swink of the Agricultural Engineering Department, under the supervision of C. B. Seitz, head of the department. The specialist is employed full time by the Agricultural Extension Division. In addition to handling the extension project in rural electrification, the specialist has assisted in teaching the regular department course in rural electrification, collaborated on the department research program, and conducted field studies on farm electrical equipment installations to secure data essential in supporting the extension program.

The extension project for 1940 has been planned around the three broad objectives which were set up in 1937 and which have constituted the general program since that time. During 1940 greater emphasis has been placed on objectives No. 3. They are:

1. To get central station electric service extended into unserved rural areas through cooperation with the various agencies available for extending the service.
2. To assist new rural consumers of electricity in securing safe, economical and adequate wiring.
3. To promote the use of electricity on the farm to an economical advantage through educational means such as lectures, demonstrations and the dissemination of literature.

More rural communities without central station electric service continue to become interested in securing it. The specialist has worked with such communities, when requested, advising the necessary steps to take in order to secure service on the most equitable basis. The program of the Federal Government, through the Rural Electrification Administration, has provided an impetus to the line construction program and its publicity has kept the rural people interested. Therefore, the needs have increased for an expanded activity in assisting with the farm wiring work and education in the selection, care and use of equipment most desirable in making electricity serve the farm people to the fullest advantage.

The specialist has cooperated closely with all other agencies effected in carrying out this program, as will be shown later in this report. These agencies include other extension workers in the field, the public utilities, electric cooperatives, Rural Electrification Administration, Bureau of Agricultural Chemistry and Engineering, U.S.D.A., State Corporation Commission, manufacturers of electrical materials and equipment and their distributors. Considerable time was also given to special problems and installations which were used for result demonstrations or were of interest to a community.

10-C Rural Electrification (Con'd)
C-1 Rural Line Extensions

Publications

The need for educational literature relative to rural electrification and the use of electricity in agriculture is more important than ever. It is an effective and essential tool in carrying on the extension program in Virginia. In addition to material previously prepared, the following circulars were prepared by the specialist and used in the furtherance of the educational program:

1. "An Electric Water System for the Farm", Extension Circular E-3.24 reprinted March 1940 (previous supply exhausted).

2. "Instructions for Building, Installing and Operating a Homemade Electric Brooder", A mimeographed circular prepared primarily for 4-H club boys.

3. "An Electric Hotbed for Virginia Farms", a multigraph circular giving recommendations and instructions for building and operating electric hotbeds.

A garden irrigation demonstration installation in Campbell county

Summary of State Wide Progress in Rural Electrification

The most immediately tangible evidence of the progress made in rural electrification in the state during the year is the number of miles of new rural distribution lines constructed and the number of new rural users that are connected. The tabulation which follows gives a year by year summary of this progress and the specialist assisted and cooperated with the electric service organizations responsible for the progress shown.

	1936	1937	1938	1939	1940	1941
Miles of new lines built	725	1,755	2,977	3,215	2,425	1,851
Total miles of line in operation	6,724	8,480	17,457	13,482	16,856	18,789
Number of Rural customers connected to new lines	3,128	7,289	9,519	11,331	8,187	6711
Number of new customers connected to old lines for first time.	1,460	3,683	3,973	5,171	5,229	7501
Total rural customers connected during the year	4,888	10,972	13,492	16,502	12,386	14202
Total number rural customers being serviced December 1	45,307	56,279	69,771	76,450	93,368	104703
Average number customers per mile on new lines	4.3	4.1	3.2	3.5	3.4	3.5

Note: A regoning of rural territory in accordance with a ruling of the Federal Power Commission makes the 1939 data on total rural lines and total rural customers slightly out of line with other years' figures. The totals for 1940 are correct in that adjustments from this ruling have been completed.

The Status of Rural Electrification in Virginia

As was predicted in the 1939 outlook, the total miles of line to be constructed in 1940 showed a slight decrease compared with the 1939 total. The statistics reveal however that during the last five years the number of miles of rural lines in Virginia has increased more than 2½ times and the number of rural families receiving service during this period has doubled. Although some of the electric service organizations have no accural classification of customers that would reveal the number of farms receiving service, it is estimated that approxi-

farms

mately 45,000, or approximately 25%, are now connected to central station lines. It is further estimated that only 65% of the farms that have service available are using it, and therefore, approximately 65,000 or about 36% of the farms in the state either have electric service or have it available. The fact that a large portion of the 187,000 farms in Virginia are occupied by negroes and white families with sub-marginal incomes, greatly increases the percentage of farms having electricity that are actually financially able to take the service.

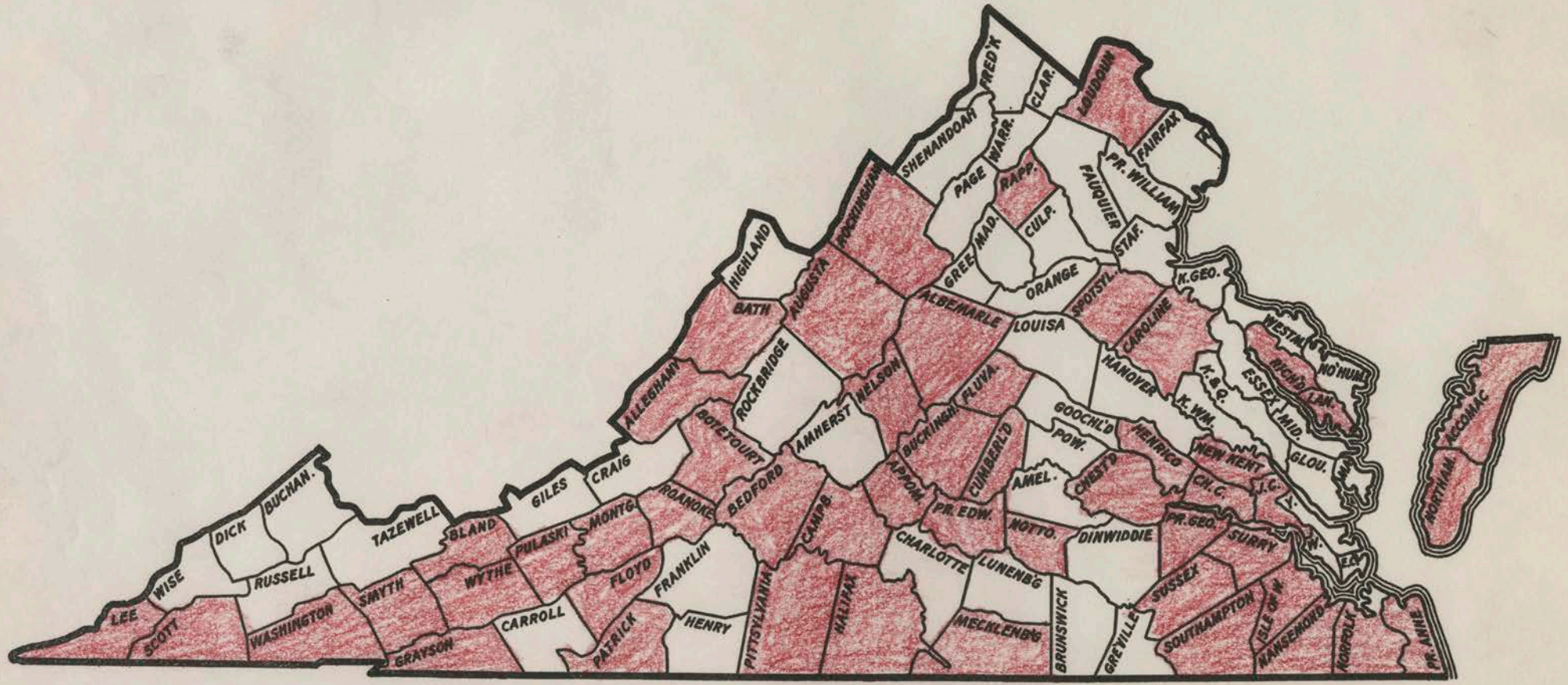
The rural lines that were constructed in 1940 consisted mainly of short extensions to existing lines, since most communities now have trunk lines through or near them. This trend will continue and, therefore, the problem of increasing importance is that of carrying out a more intensified program of education on the wise and economical use of electricity in agricultural production and rural living. The true value of electric service and what it will mean to the farmers receiving it will depend largely on this program.

10-C Rural Electrification (Con'd)
C-1 Rural Line Extensions

Statistical report of specialist's activities

The follow ng is a statistical report of the specialist's activities in carrying out the 1940 Extension program in rural electrification:

Days in office	147½
Days in field	147½
Miles traveled	18284
Extension agents visited	81
Counties visited	49
Visits to counties	103
Individual letters written	790
Radio talks given	2
News articles written	17
Conferences held in field	39
Extension organization committee meetings	15
Leader training meetings held in field:	
Adult	11
Attendance	394
4-H	10
Attendance	875
Leaders interviewed	137
Result demonstrations visited	19
Other farm homes visited	113
Method demonstrations conducted	60
Attendance	2911
Meetings at result demonstrations	2
Attendance	48
Total number planned meetings in field	83
Total attendance	4228
Other meetings in which specialist took part	21
Attendance	6005
Special demonstration exhibits	7
Number persons reached through special exhibits	17500
Estimated number of persons reached directly through project	28000



Counties in which the specialist worked in carrying out the 1940 rural electrification project. Other counties were reached through leader training, demonstration, and 4H club work.

A result demonstration of electric barn type hay dryer in Pulaski County. The small building in the foreground is on skids and houses the hay hoist and 5 h.p. motor.

View of building which houses stoker, boiler, fans and controls for delivering heated air into hay mow. The large duct connecting this building to barn contains hot water radiators over which is blown 12,000 cu.ft. of air per minute.

The Program of the Private Utilities

The private electric utilities operating in Virginia consist of three large companies operating in approximately 90% of the state's 100 counties, and a number of small private utilities and municipalities, each serving a comparatively small area. With the exception of one large utility serving Southwest Virginia, these organizations have slowed down their line building programs, usually limiting new extensions to short lines from existing facilities. This is due largely to the fact that electric cooperatives are now available to practically all geographical areas and since the revenue requirements on the new cooperative lines are lower than on the private utility lines, the cooperatives are extending the service into as many new rural areas as possible.

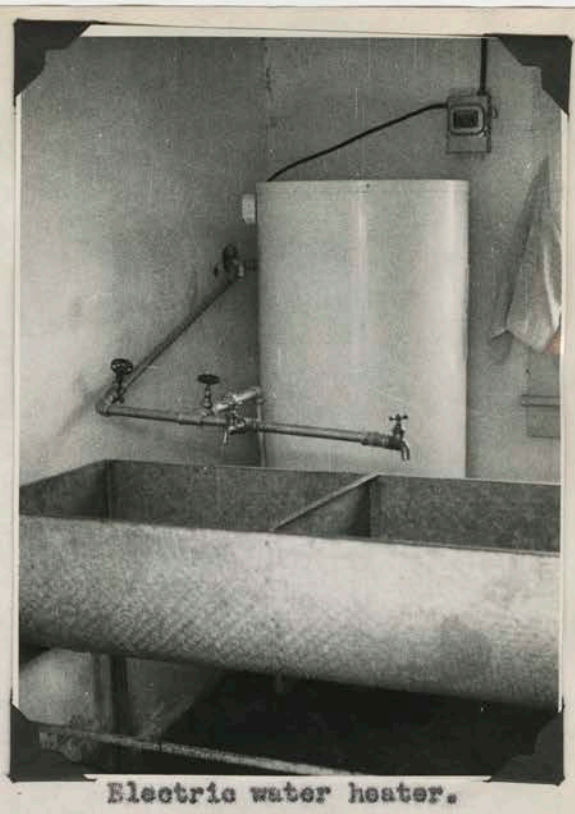
During the last five years the utilities all greatly expanded their rural distribution systems and built new rural lines on what was considered to be the lowest possible revenue requirements. The chief concern of these organizations now is to build up the profitable use of electricity on the farms they now serve to a point where the lines will operate at a profit. For this reason, and also because the utilities recognize the fact that a prosperous rural community makes the urban center serving it prosperous, they are cooperating with the extension service and other educational mediums in a sound educational program on the use of electricity in agricultural production and in the farm home. Fortunately, the low electric rates in effect with most of these utilities make this program economically and socially desirable for the rural people of the state. The private utilities as a group are, therefore, improving the training of their personnel and cooperating to the fullest extent with the specialist in planning and carrying out a sound educational program.

The Rural Electrification Administration Program in Virginia

The Rural Electrification Administration has continued to expand its program of building rural lines in Virginia through the year 1940. During this year, three new cooperatives energized their first section of lines. Survey and organizational work was begun on one new project. As of December 1, 1940, there are 13 R.E.A. financed electric cooperatives in operation, and two private utilities have borrowed funds from R.E.A. for building rural line extensions. If and when the new cooperative on the Eastern Shore is given an allotment of funds with which to construct lines, it appears unlikely that any new cooperatives will be organized in the near future. A survey of the state shows that an electric cooperative is within reach of every rural area that is not considered adequately served by a private utility.

There has been no significant change in revenue requirements on new lines to be constructed with R.E.A. funds during the year. Probably the most outstanding change of policy has been to include the customer's servide

Electric utensil sterilizer.



Electric water heater.

Cinder block barn and milk house.

VIEWS OF EQUIPMENT ON A MODERN ELECTRIFIED DAIRY FARM IN SMYTH COUNTY.

Electric Milk Cooler.

Counties in which R. E. A. financed lines have been constructed and energized

Counties in Which surveys are being made for R.E.A. lines

entrance equipment in the cost of line, thereby reducing the amount of money that the new user must invest in wiring by $6 to $15. Another new development is the limited service plan which R.E.A. has introduced, whereby a member not financially able to take service at the established minimum rate, may secure limited service at $1 per month. The low cost equipment which R.E.A. has developed to make this possible consists of a dry 600-watt transformer, a low-cost underground service cable and service entrance facilities for about four small appliance and light outlets. This new plan has not been tried to any extent in Virginia as yet and therefore its value is still undetermined. One of the biggest problems confronting the electric cooperatives is getting more of those who signed for service to take it now that it is available. It is hoped that these new developments will aid in the solution of this problem.

Coordination of Extension and Rural Electrification Administration Educational Programs

Relations between the Extension Service and the Rural Electrification Administration have steadily improved since this Federal agency was established in 1935. As a result of this condition, every effort has been made to coordinate as far as possible the educational programs of the two agencies. Due to the very limited utilization personnel of the R.E.A., very little assistance has been given by R.E.A. headquarters in Washington in carrying out the program in the field. Due largely to the suggestions and recommendations of the extension specialist, six of the electric cooperatives have employed utilization representatives to handle their educational programs in the areas they serve and to cooperate with the extension specialist in carrying out his program in the field.

During the past year the specialist has assisted the cooperatives with lectures and demonstrations on wiring, selection, use and care of equipment, brooders, lighting and feed grinding. This work has been carried on in a manner approved by the R.E.A. and whenever possible, in cooperation with a utilization representative from Washington.

Specific recommendations have been made to R.E.A. for improving the situation as regards available personnel in an effort to better coordinate the programs of the two agencies so that they may both better serve the people of the state.

Cooperation with the State Corporation Commission

The electric cooperatives operating in Virginia are required by law to secure a charter of incorporation and are therefore subject to regulation by the State Corporation Commission in a manner similar to that of the private utilities. The extension specialist has had numerous occasions to request the services and cooperation of the Commission in answering questions regarding rates, territorial boundaries, and revenue requirements on line extensions. Relations between the extension service and the Commission are cordial and cooperative, resulting in a mutual assistance between the two agencies.

Group of boys holding toy electric motors they built at the Chatham 4-H Camp. The motors all run as the smiles would indicate.

A Pittsylvania County 4-H boy building a homemade electric chick brooder at the Chatham 4-H Camp.

10-C Rural Electrification (Con'd)
C-1 Rural Line Extensions

Participation of Manufacturers and Distributors of Electrical Equipment in Educational Program

One of the most vital and necessary phases of the rural electrification program is the development and manufacture of dependable farm electrical equipment, and properly informing the rural public about how it can serve them to an economical advantage. In putting on method demonstrations in the field, it is necessary to have good equipment and proper facilities to operate it. The electric service organization serving the community cooperates by providing the facilities, and the manufacturers or their local distributors usually provide the equipment. Under this arrangement the rural people learn to know reliable distributors who can be contacted later regarding the equipment and the extension service is relieved of the time, trouble, responsibility and expense of providing the equipment necessary for satisfactory demonstrations.

Most manufacturers or their distributors are glad to cooperate in the educational program for several obvious reasons. This type activity provides an added avenue through which they can discover faults in the equipment or secure suggestions that would improve its design or operation. Some such suggestions have been made by the specialist which have resulted in improvements in the equipment, lower the cost to the farmer who buys it, and more satisfactory and economical operation after it is installed on the farm.

Summary of Some of the Specialist's Activities in Carrying out the 1940 Rural Electrification Project

1. Leader Training Work

a. Adult

The training of leaders is an important part of the educational program in rural electrification. A total of 11 leader training meetings for adults, with an attendance of 394, were held in the field during the year. At these meetings instruction was given in remodeling lamps, lighting, wiring, program organization, and the proper application and use of farm electric equipment. In addition to the leader training meetings, 137 leaders were interviewed in conferences in the field, assisting them in planning and carrying out the various projects on which they were working.

b. 4-H Club Work

The need for education in rural electrification in the 4-H clubs of the state is urgent and important with the rapid increase in the number of farms receiving electric service. The importance of electricity as a tool in modern farming and rural life is such that the future farm men and women should be given as much training as possible in its use. Lack of personnel and available time has handicapped the development of this program. The specialist conducted 10 leader training meetings in the field with a total attendance of 875 4-H club members and leaders during the year. One summer 4-H camp was attended by the specialist and instruction was given on farm

Three different makes of small electric hammer mills being demonstrated in Smyth County.

Feed grinding demonstration in Wythe County.

DEMONSTRATING USES
OF ELECTRICITY IN
AGRICULTURAL PRODUCTION

Electric sweet potato curing house being used for result demonstration in Princess Anne County.

Apparatus for recording data inside sweet potato house shown at left.

10-C Rural Electrification (Con'd)
C-1 Rural Line Extensions

lighting, water supply, brooding and miscellaneous uses of electricity in agricultural production. A short course in rural electrification was also given for 4-H leaders during the regular 4-H encampment at V.P.I.

The National 4-H Rural Electrification Contest was entered by Virginia this year and proper literature was supplied club agents and leaders for their use in offering the project to their club members. A total of 7 counties had eligible winners in the contest and the state winner was awarded a trip to the 4-H club congress in Chicago where she competed for national honors. This contest is a well planned and organized project providing a wonderful educational medium which should be further developed and encouraged in this state.

2. Farm Wiring Program

Many farmers of Virginia who have received electric service for the first time during the last year have profitted from the work of the extension service on farm wiring. This is especially true in communities where large numbers were receiving service, usually through cooperatives, and where an organized program with wiring contractors was promoted. Community meetings were held and the advantages and necessity for safe, adequate wiring were explained. This has resulted in safer, more adequate wiring at a lower cost than could have been possible without the program.

The 4-H clubs and F.F.A. chapters offer an opportunity for a valuable program in training farm youth to do simple farm wiring. This would make it possible for many farmers to get additions made to their wiring systems at low cost, enabling them to make a fuller and more economical use of electricity in their farm operations.

3. Demonstration Exhibits

It is estimated that a total of approximately 17,500 farm people and rural leaders were reached through special demonstration exhibits during the year. Seven such exhibits were set up in the state either by or in cooperation with the extension service. Four of the exhibits were a part of the R.E.A. farm equipment tour which will be discussed in detail in this report. The other three exhibits were in the agricultural engineering building at V.P.I. during the summer months when rural groups visited the campus for the Institute of Rural Affairs, 4-H Short Course and the short course for rural service workers.

4. Result Demonstrations

The result demonstration is proving to be a valuable medium for providing accurate information on actual farm installations of equipment in local communities. The information secured is also valuable for use as data to use for news stories and other publicity. The result demonstrations conducted this year under the supervision of the specialist included electric

Poultry equipment.

Poultry equipment.

VIEWS OF DEMONSTRATIONS CONDUCTED WITH THE REA FARM EQUIPMENT TOUR.

Feed processing equipment.

sweet potato curing houses, feed grinders, brooders, soil pasteurization, garden irrigation and soil heating. A total of 19 of these demonstrations were visited by the specialist during the year. Meetings were held at two of these demonstrations with an attendance of 48.

5. Method Demonstrations

The specialist conducted 60 method demonstrations during the year with a total attendance of 2911. These demonstrations were on wiring, lighting and various electrical equipment used in farm operations. Whenever possible, these demonstrations were held on farms where the equipment had a practical application.

Probably the most outstanding method demonstrations conducted during the year were a series of six county-wide demonstrations on feed grinding in Pulaski, Wythe, Smyth, Grayson, Floyd and Montgomery Counties. The small electric hammer type feed grinders were demonstrated and their operating cost explained to over 350 farmers at these demonstrations. A questionnaire filled out by those attending the demonstrations showed that 87 farmers were interested in, and had need for the equipment.

Plans are under way for expanding the activity of method demonstrations on a better planned and organized basis in 1941.

6. Supplementary Research Work

In order that the specialist might have accurate and up-to-date information for use in carrying out the extension project in rural electrification, a limited amount of supplementary research work is necessary. Studies are being made in the rural electrification laboratory of the agricultural engineering department on egg cooling, soil pasteurization, germicidal lamps for sterilizing dairy utensils, garden irrigation and hay drying. The specialist has kept in close contact with this work and has collaborated with the other engineers who are making the studies.

The result demonstrations provide information of research value which can be used for improving the equipment and its application. The improvements which have been made in electric brooders and sweet potato curing house design are largely the result of this type research.

7. Annual Rural Electrification Conference

The value of an annual conference of executives and supervisors responsible for the rural electrification program in the field is increasing in importance. The agricultural engineering department again sponsored this annual conference in 1940. The conference was held on the campus on September 9 and 10. Approximately 150 persons attended the meetings. Topics of current interest and importance relating to rural electrification were

A view of apparatus being used to teach the fundamentals of pumps and to test the comparative efficiencies of farm water systems at the short course for rural service men and dealers.

Part of the class of 78 rural service men and dealers being brought up to date on water systems at the short course.

discussed by outstanding men. Sixteen men from out of the state who are considered authorities in their respective fields appeared on the program.

In addition to the technical information made available through this conference, one of the most valuable contributions that came from it was the improved relations between the representatives of the private utilities, electric cooperatives and other agencies. The friendly discussion of problems common to all and the social contacts that are made are doing much to eliminate the ill will which has existed between some of these groups.

8. Short Course for Field Men

Numerous supervisors and field men engaged in rural electrification work in the state have for some years been requesting the agricultural engineering department to give a short course of intensive training to bring them up to date on equipment developments and applications. Most of the electric service organizations, including cooperatives, have personnel who contact their farm customers regarding the use of electrical equipment. In response to these requests from the field, a three-day short course was offered for these men, following the annual conference. The subjects of water supply, feed grinders, farm electric motors and electric brooders were covered in detail. Both lectures and laboratory demonstrations were used in teaching the course.

The manufacturers of equipment were asked to cooperate and assist with this short course. Fifteen specialists representing leading manufacturers brought equipment and assisted with the course. A total of 78 rural service men, supervisors and dealers registered for the course. Many favorable comments were received and numerous requests have been received urging that a similar course be offered here next year. A copy of the Rural Electrification Conference program and short course outline is included in the exhibit section of this report.

9. R.E.A. Farm Equipment Tour

The Rural Electrification Administration is centering much of its utilization program around a traveling display of farm and home equipment. This display is sponsored by R.E.A. and leading manufacturers are cooperating by sending trailers along with it, demonstrating their line of farm electric equipment. The extension service in each state cooperates with the R.E.A. and the electric cooperatives in assisting with the arrangements and demonstrations. The display consists of two large tents, one of which houses local dealer displays and the other is used as an auditorium for lectures on subjects relating to the uses of electricity.

The farm equipment tour was in Virginia from April 15 to May 2, 1940. A total of four two-day demonstrations were put on in the state. These were held at Chase City, Blackstone, Dayton and Chilesburg. The specialist assisted with this entire program, giving lectures and equipment demonstrations at each place. R.E.A. personnel who operate the tour estimated

that a total of 16,000 persons visited it during the demonstrations in Virginia. A copy of a typical program is included in the exhibit section of this report.

10. Program Planning Meeting with Electric Service Organizations

The interest and enthusiasm evidenced by those attending the annual conference and short course this year has prompted us to plan similar events for next year. The type of extension program that is most effective in rural electrification extension work involves the close cooperation of the electric service organizations who operate in the rural areas of Virginia. In order that the extension project for next year might be planned with the full support and cooperation of these organizations, the specialist invited one representative of each organization to a round-table conference this fall to discuss and plan these activities.

This conference was the first of its kind and was well received and supported by the electric distributors. It was held in Roanoke and 15 representatives attended. Plans were discussed and approved for the annual conference, short course and cooperative demonstrations. Proper committees were appointed to function in making all these activities more effective and successful.

11. Special Meetings and Activities

a. A.S.A.E. Meetings

The specialist attended the annual fall meeting of the American Society of Agricultural Engineers in Chicago last December and appeared on the rural electrification section program, presenting a paper entitled "Results of a Survey of Electric Sweet Potato Curing Houses in the South." He also attended the Southern Section Meeting of the A.S.A.E. held in connection with the Agricultural Workers Conference in February. A paper, "Student Training for Rural Electrification Work" was presented at this meeting.

b. University of Tennessee Short Course

The specialist was invited to teach a special three-weeks short course at the University of Tennessee by the Tennessee Agricultural Extension Service at Knoxville. Fortunately, it was possible to take annual leave at that time in order to teach this course in rural electrification to a group of Tennessee County and Home Agents. This experience proved valuable and will be helpful in conducting the extension project in Virginia.

c. R.E.A. State-wide Meeting, Charlottesville

The R.E.A. held a state-wide meeting of project managers, directors and extension workers in Charlottesville in July. The extension specialist attended and assisted with this meeting. Its purpose was to discuss the

status of and territory served by the R.E.A. projects in the state and to make plans for new allotments and line extensions for the ensuing fiscal year.

d. Electric Sweet Potato Curing Houses

The use of electricity as a heat source in sweet potato curing and storage houses is increasing in Virginia and other southern states. Improved methods of installing and controlling the heaters are being used to an advantage. The specialist assisted in designing an automatic electric heating system for the 25,000 bushel cooperative curing house in Caroline County this fall. This installation is now the largest of its kind in the country, having a connected operating load of 64 kilowatts.

e. Barn Hay Dryers

The low cost barn type hay dryer developed by the T.V.A. has been introduced in Virginia this year. Several meetings on the subject were held in Southwest Virginia last winter. One installation was made in Smyth County and Pulaski County and they have proven successful and satisfactory. It is expected that morewidespread interest in this new use for electricity in agricultural production will follow this year. The specialist expects to conduct several illustrated meetings on the subject this year and will design hay drying systems and recommend the proper blower equipment when requested.

Summary of Results

The results of the extension project in rural electrification as discussed in this report may be summarized as follows:

(a) Cooperated with rural groups and electric service organizations in promoting the extension of new rural distribution lines. A total of 2425 miles of new lines were constructed and energized during the year and 12,386 rural consumers were connected for electric service for the first time.

(b) Conducted a leader training program in which 21 meetings for adult and 4-H club leaders were held in the field with an attendance of 1269. The short course for field men in utilization work and personal work with individuals in the field has improved the training and qualifications of these men to be of greater service to the farmers in the territories they serve. Approximately 80 such employees of electric service organizations benefitted from this activity.

(c) An organized farm wiring program was carried out in areas where large scale line building was in progress. As a result of this program, it is conservatively estimated that the rural people who wired their premises saved 20% in wiring costs and got a safer and more adequate wiring system that they otherwise would have secured. In carrying out this program, local personnel of the electric service organization involved, received training and experience that will enable them to continue the wiring program on the short line extensions that will be built in the future.

10-C Rural Electrification (Con'd)
C-1 Rural Line Extensions

(d) A total of 60 planned method demonstrations were conducted in the field with an attendance of 2911 persons. These demonstrations were on planning wiring and the selection and use of electric equipment in farm operations.

(e) During the year 113 farm homes were visited in connection with the various activities of the specialist. Some of the purposes of these visits were: water system surveys; visiting result demonstrations (19); conducting method demonstrations and advising on special equipment installations

(f) A total of 83 planned meetings of all types were conducted in the field with a total attendance of 4228 persons. The specialist attended and took part in 21 other meetings with an attendance of 6005 persons. The specialist either sponsored or assisted with seven special exhibit demonstrations with an estimated attendance of 17,500 persons. Summarizing these activities, approximately 28,000 persons were reached directly through the project program during the year.

(g) The specialist prepared two circular type bulletins for use in the extension project and wrote 17 news articles and magazine stories during the year.

(h) A series of three "News Letters" containing data and information of interest were prepared and sent to a mailing list of 100 persons engaged in rural electrification work throughout the state.

(i) Surveys made by some of the electric service organizations show that farmers with electric service are rapidly putting electricity to work. The electric iron, radio, washing machine, refrigerator and water system are most popular in order. It is estimated that the number of electric brooders being operated in the state increased 50% during the year. Small electric feed grinders and other equipment essential in agricultural production are being purchased and used to an economical advantage. These uses for electricity on the farm have proven practical and desirable and the need for the educational extension program on their wise selection and use increases as more farms receive electric service.

Outlook

The statistics on rural line construction for 1940 show a decline as compared with the mileage of lines constructed in 1939, which was predicted in the 1939 report outlook. The lines constructed in 1940 were for the most part short extensions from existing lines. This trend will continue next year when electric service will be extended into many small communities which now have trunk lines passing near them.

One of the biggest problems confronting electric service organizations is the large number of farms along existing lines which are still not connected. It is estimated that for every three farms that have service, there is one which could but does not have electricity from existing facilities. In many cases, the farms without service are not taking it because of the lack of information on the cost and advantages

of electricity. The R.E.A. and private utility officials are very anxious for a cooperative educational program to aid in solving this problem and an effort will be made in 1941 to accomplish something in this direction.

In the face of the present national emergency it is fortunate that a large percent of the state's farms have central station electric service, or have it available. It is the opinion of many prominent authorities that electricity is making an immeasurable contribution in rebuilding the south's agriculture and raising living standards in rural areas. The inherent characteristic of its being able to produce heat, light, power and cold makes electricity the universal fuel, and a potent tool for the use of the southern farmer in further diversifying his agricultural enterprises. Electric rates competitive with or lower than other fuel costs removes the only real obstacle to its widespread use on the farm.

There is now no question about the electric brooder being superior in every way to all other types. The only problem now is to make certain that every farmer and poultryman knows this fact. Most farmers know that ground grain produces better results when fed to animals than whole grain - the problem now is to show them the advantages of and economics of the small electric feed grinders in order that they might derive additional benefits from their electric power. Garden irrigation with a simple low-cost farm home water system has proven its value and this may prove to be the most effective tool in encouraging every farm to produce a year-round food supply and reduce the number of trips to the grocery store.

The outlook for 1941 from the standpoint of rural electrification is the best yet. The demonstration program being planned for the coming year is designed to take information to thousands of farmers which will enable them to broaden their live-at-home program and secure more of the benefits which the intelligent use of electricity can give them.

Summary of the Activities of the Rural Electrification Research Engineer on the Cooperative Research Program

Garden Irrigation

Small rotating sprinklers were used in conjunction with the electric water system for supplemental irrigation of gardens on 17 farms during the 1939 gardening season. Favorable results were reported in most of these cases even though rainfall was about normal, and the following tabulation of results was obtained on four of these farms where rather complete records were kept.

Garden Irrigation Summary

Garden area (sq.ft.)	8,275
Area irrigated (sq.ft.)	4,925
Total hours of irrigation	45
Total water applied (gallons)	9,000
Total water applied (rainfall equivalent - inches)	2.93
Average hours per application	3.25
Frequency of applications (dry weather)	1 every 76 hours
Average gallons water per application	660
Average rainfall equivalent per application (inches)	.21
Irrigated crop yield (qts. dry measure)	436
Unirrigated crop yield (qts. dry measure)	286
Irrigation increased production (percent)	52.4
Vegetables sold for or valued at (dollars)	135.40
Irrigation increased crop value (dollars)	44.13
Total electricity consumed (kw.hrs.)	15.0
Total electricity cost (dollars)	.45
Irrigation equipment cost (dollars)	10.02
Depreciation on equipment (dollars)	1.71
Labor for irrigating (hours)	6.125
Labor cost (dollars)	.92
Total annual cost of irrigation (dollars)	3.08
Profit (dollars)	41.05
Interest on investment (percent)	409.7

Results from the 1940 season have not been so favorable to irrigation and have not been fully collected for study and summarization.

Soil Pasteurization

Field tests of the newly designed and improved Virginia Soil Pasteurizer were conducted on C. E. Graham's farm near Abingdon, Virginia last March. Results showed that the fuel (electricity) cost of the Virginia pasteurizer for treating tobacco plant beds was 1.96 cents per square foot while the year previous (1939) Mr. Graham burned his tobacco beds with a fuel (wood) cost of 2.78 cents per square foot. Thus the electric pasteurizer reduced the fuel cost for treating the beds by .62 cents per square foot.

These and similar tests at the Virginia Agricultural Experiment Station showed that the electric pasteurizer killed 98.15 percent of all weed seeds by comparing the weed growth in treated and untreated areas. Likewise, plants in the treated area grew more vigorously, were of a better color and larger than those of same age and variety in untreated areas.

Electric Soil Pasteurizer developed in the agricultural engineering department and demonstrated in Washington County.

Results obtained in control of weeds by electric soil pasteurizer. Section of tobacco plant bed at left was pasteurized and section at right was not. Note dense growth of weeds in right side of bed.

Treating Dairy Utensils for Bacteria Reduction with Germicidal Lamps

An experimental cabinet, enclosing six germicidal lamps, for the bactericidal treatment of dairy utensils has been constructed. Preliminary tests of this equipment show a need for improvements in the design of the cabinet, but the following observations have been made from tests conducted so far.

The lamps have been found to have a definite germicidal effect and minimum exposure periods of 25 minutes have reduced in every case the number of micro-organisms below the maximum as set by the American Public Health Association. Germicidal lamps have the advantage of very low operating cost, about 1/10 of a cent per 10 gal. can per treatment. These lamps have the disadvantage of high initial and replacement costs, though they are rated at six months life of continuous service. The complete cabinet cost $125.00, which is from $25.00 to $50.00 below the present cost of commercial electric equipment of the most popular type.

Egg Cooling on the Farm and at Grading Stations

Studies to determine the effectiveness of various types of electric egg cooling equipment and the value of cooling eggs, both on the farm and at grading stations, were initiated early in the summer of 1940.

Indications, from these studies, are that cooling eggs on the farm and maintaining proper conditions for the eggs at grading stations, will improve the quality of eggs marketed to some extent. Further studies will be conducted to determine the practicability of this enterprise.

An Electric brooder with a fine brood of barred rock broilers. Average weight 2 pounds in eight weeks. Mortality approximately 2%.

10-C Rural Electrification (Con'd)
C-2 Farm Water Power

The rapid expansion of central station electric service into rural areas has rapidly decreased the interest in developing small individually owned water power plants. Occasional requests are made for surveys or information on equipment and such requests are handled by the specialist. The development of such plants is now economically unfeasible where regular service is available in the community and hence nothing of a promotional nature is being done to create interest in this project.

Outlook

Requests will undoubtedly continue to come in for assistance and advice on the development of water power sites. In such instances, assistance will be given and proper recommendations will be made. The economics of this type power will naturally limit its further development to areas where there is no possibility of central station service being made available in the near future.

C-3 Farm Light Plants

The individually owned farm light plant is in somewhat the same position as the water power plant. Low rates on central station power lines automatically make the small light plant economically unfeasible where regular service is within a reasonable distance. Work on this project has consisted of supplying literature and information as requested and analyzing costs of this type service at meetings in the field.

Outlook

The economic feasibility of the small light plant as compared with central station service automatically limits interest in this project to farm people who live in areas where the possibility of securing regular service is remote. Requests for assistance and information should be satisfied and the project should be continued since this will continue to be a source of electric power for many rural people.

10-D Household Engineering
D-1 Farm Water Supply

Farm Water System Project

This phase of the agricultural engineering extension program is a minor project. The program was planned to make surveys, whether individual or county campaigns, when such requests were received. The county farm and home agents seem to be too busy with other phases of the extension program to devote much time on this project. One hundred and sixteen surveys for several different types of water systems were made and recommendations were given accordingly. Most of those surveys were made when the specialists were in the respective counties on some other phase of work.

The farm agent in Mathews County had a very successful water system campaign. He arranged for the assistance of a specialist and gave much publicity to the project. During the week of the campaign 35 surveys were made and the necessary recommendations given to the home owners. The interest shown by those owners indicated that at least 50% would install the systems in the very near future. The remaining owners were financially unable to make the installations at present but indicated their desire to plan that improvement as a future project.

Farm Water System Surveys by Different Specialists

Specialist's Name	Electric Pump	Gravity Flow	Hydraulic Ram	Cistern	Spring Enclosure	Well Location	Total
E. T. Swink	2						2
J.A.Waller,Jr.	5		5				10
G. D. Kite	62	14	16	4	1	1	98
W.H.Dickerson	2	2	1	1			6
Total	71	16	22	5	1	1	116

Each system survey would include an investigation of the quantity and quality of the supply, the measurement of the elevation of the supply above or below the house to which the water was to be supplied and of the distance the water was to be piped, and an estimation of the quantity that would be needed.

Recommendations for each system would include directions for covering source of supply for sanitary purposes, the size of pipe for the entire system, the size of pump or ram to install, depending on the situation, and where to locate the pump or ram and how to house it to prevent freezing. Frequently the cost of the installation would be estimated. In many instances recommendations would be given at the same time for the proper sewage disposal system to be most practical for the particular situation. Recommendations were given by letter to more than 40 persons who wrote to the office and described their particular situation.

10-D Household Engineering (Con'd)
D-1 Farm Water Supply

The number of persons contacted by the specialists of this department on water system installations is very small in comparison to the number of installations made each year. The utility companies have their engineers working on load-building campaigns and the commercial pump companies have their salesmen in every county. Those men are very active in increasing the number of electric pump installations.

Considering the services offered by those commercial companies, it is very necessary that the Extension Division have engineers available to cooperate with those companies when called upon and to give the necessary information. Some people desire the necessary information pertaining to their proposed system before they are approached by the so-calld high pressure salesman. The extension agricultural engineer is needed very much by those home owners who cannot have electric systems and who may have the possibilities of a gravity, hydraulic ram, windmill, gas engine and pump or a cistern system.

More than 60 percent of all types of farm houses in Virginia do not have water systems. A greater percent of this number are in the low income farm or tenant house class. Much work is yet to be done on this phase of work. The main reasons for such a large number of homes being without water systems is the lack of financial means to purchase the pump, etc. and the attitude of the landowners to spend the least amount of money on the comfort of his tenants and laborers.

Farm Home Equipment

Work on this project should be developed. There is urgent need for a sound educational program, especially with the farmers of the state securing electric service for the first time. It is hoped that provision can be made for a qualified home equipment specialist to work in cooperation with our rural electrification program.

The most important work done on this project was the six weeks leader training short course in household equipment conducted during the summer by the department at the college. Some twenty home demonstration agents, home economics teachers and farm security home agents attended this school and received intensive instruction in the selection, use, care and repair of household equipment. This course was conducted by Professor Potter of the teaching staff. Miss Victoria Harris of the R.E.A. assisted for one week with the course. The leaders taking the course are now much better equipped to do educational work in household equipment.

Exhibits and demonstrations in household equipment were staged at the summer meeting of the Institute of Rural Affairs. The department held demonstrations in remodeling old lamps for electric service, lighting fixtures, household refrigeration and electric cooking. A number of the home demonstration agents, representives of one of the electric service organizations and a home economics specialist of the R.E.A. assisted with these exhibits and demonstrations. Some 1500 farm women and men attended these exhibits and demonstrations. There was a great amount of interest shown by the women, as a number of them came back each day of the three days to attend the demonstrations.

10-E Farm Operating Equipment
E-1 Farm Implements

The only extension work in farm machinery during the year was done by the teaching staff. This work consisted of a farm machinery exhibit at the Institute of Rural Affairs, answering inquiries relative to farm machinery, preparing and mailing a circular on "The Use of the Combine in Virginia," and giving a radio talk. Several field demonstrations were conducted on the use of the barn hay drier in cooperation with the Experiment Station.

Extension Circular A-E, 1, entitled "The Small Combine in Virginia" was published and about 500 copies mailed to agricultural leaders. This circular summarized the results of a state-wide survey of combine operators.

Several makes of tractors and improved machinery were demonstrated at the Institute of Rural Affairs meeting. Some 1500 farmers and farm women visited these demonstrations and exhibits.

Hay drying equipment was installed in three barns on farms for demonstrations and studies of forage drying using low cost hay drying. These installations proved satisfactory and the demonstration created considerable interest in Southwest Virginia. On one farm the farmer made use of artificial heat in the drier with good results. About 40 tons of alfalfa hay were cured in this system. Cost of operation ran on an average basis of about $2.40 a ton of dry hay, or $2.00 for electricity (at 2¢ per k.w.h.) and $0.40 for coal (at $2.00 per ton). All of the hay when cured was of good quality, being bright green and leafy. The owner was well pleased with the operation of the equipment and the quality of the hay.

Outlook:

There is need for an active extension project in farm machinery. Until funds can be secured for the employment of an extension specialist in this field, our work will necessarily be limited to work that can be done by the teaching staff here at the college, and answering letters of inquiry, etc.

COOPERATION WITH FEDERAL AGENCIES

In conducting the several extension projects in agricultural engineering every effort has been made to secure the cooperation of Federal agencies concerned.

Works Project Administration Project No. 2 - Erection of Home Economics Building

Professor Seitz and members of the department staff supervised the construction of this building which was constructed with the W.P.A. labor that had constructed the agricultural engineering building. The home economics building was completed during this year. Classes were held in the building beginning with the fall quarter.

National Youth Administration, (N.Y.A.)

A number of students have been employed for various duties during the year by the department. These students, in the main, render a valuable service.

Rural Electrification Administration, (R.E.A.)

Cooperation has been maintained with the Rural Electrification Administration in conducting the extension work in rural electrification which is outlined in another section of this report. Conferences have been held with the view of getting an even closer tie-up with this agency in regard to the cooperative employment of personnel for extension education work.

Soil Conservation Service

Both extension and research projects in soil and water conservation were conducted in close cooperation with the S.C.S. The extension work is described in another section of this report. Funds are being contributed by this service for the cooperative research studies.

Tennessee Valley Authority

Cooperation has been maintained with the Agricultural Division of the T.V.A. in conducting research and extension work in the T.V.A. area of Virginia. Cooperation with the Commerce Division has been had in conducting research work in hay drying. This work is described in other sections of this report. Funds are being contributed by the T.V.A. for the cooperative investigation in soil and water conservation.

Cooperation with other agencies

Farm Security Administration

Plans for farm buildings in the low cost group have been furnished the F.S.A. at their request. A number of conferences have been held with F.S.A. workers in farm building improvement.

U.S.D.A. - Bureau of Agricultural Chemistry and Engineering

Cooperation has been maintained with the Bureau in enlarging the farm building plan service and conducting the cooperative research projects in rural electrification. Funds are being contributed by this bureau for the research studies.

Other organizations

In addition to the Federal agencies listed, the specialists have worked with the following organizations, etc. in conducting the various projects in agricultural engineering:

State Corporational Commission
Electric Service Organizations
Electric Equipment Manufacturers
Electric Equipment Dealers
Farm Machinery Mfgs. and Dealers
Farm Bureau
Grange
Southern States Cooperative
Valley of Va. Milk Producers Ass'n.
Maryland & Virginia Milk Producers Ass'n.
State Dairy and Food Division
City Health Dairy Inspectors
Clover Creamery
Southern Dairies
Carnation Milk Company
County and Home agents
Agri. High School teachers
individual farmers

MISCELLANEOUS PROJECTS AND ACTIVITIES

The following are some of the activities of the extension personnel which have a direct bearing on the extension program in agricultural engineering.

Assistance Rendered Other Departments

Considerable assistance such as consulting engineering advice, blue printing, drafting, shop work, etc. has been rendered other departments of the college, Experiment Station, and Extension Division.

Correspondence

During the year 5,530 individual letters were written and 3,600 circular letters were sent out in furtherance of the agricultural engineering projects.

Articles for Press

Twenty-nine (29) articles on agricultural engineering subjects were prepared for publication in the daily and weekly papers and Farm Journal.

Radio Talks

"Studies of Run-off From Small Fields"
"Farm Fences"
"Painting Farm Buildings"
"Explosives on the Farm"
"The Small Combine in Virginia"
"The Agricultural Engineer and Farm Conservation Problems"
"Hints on Building Foundation Walls"
"Garden Irrigation"
"Rainfall and Runoff in Relation to Soil Erosion"
"Stationary Spray Systems For Orchards"
"Facts on Feeding Floors"
"The Present Status of Terracing in Virginia"
"Electric Hotbeds on the Farm"
"Lowering The Cost of Grinding Corn",

These radio talks were prepared and delivered by staff members in furtherance of the agricultural engineering projects.

Miscellaneous Projects and Activities (Cont'd)

Publications

The following bulletins or circulars were published during the year and used to advantage in the furtherance of the agricultural engineering projects:

"Progress Report of Soil and Water Conservation Investigations"
"Preliminary Observation and Runoff from Small Agricultural Watersheds"
"A Comparison of the Effect of Certain Cropping and Fertilizer and Manuring Practices on Soil Aggregation of Dunmore Silt Loam"
"Electric Hotbeds for Virginia Farms"
"An Electric Water system for the Farm" (revised)
"A Study of Electric Roasters"
"The Small Combine in Virginia"
"Farm Operating Efficiency Investigation in Virginia"
"Plans for Farm Buildings For Southern States"

Bulletins Mailed

Some 5000 bulletins on agricultural engineering subjects were mailed to farmers during the year.

State Engineering Committee on Soil Conservation

Professor Seitz, as chairman of the engineering sub-committee on soil conservation held meetings at which Engineering Work Plans and programs were prepared for the Culpeper County, Northern Neck, and Shenandoah Valley Soil Conservation Districts.

Southern Plan Book - U.S.D.A.

The department of agriculture issued during the year a "Plan Book for Southern States". A number of Virginia plans appear in this booklet. This booklet was sent to all county and home agents in the state, additional copies are available for sale with the Superintendent of Documents, Washington, D. C.

Research and Investigational Activities - Bulletin

The entire staff collaborated in the preparation of a bulletin covering progress reports of the various research and investigational activities in agricultural engineering. All these studies have a direct bearing on our regular extension projects. The bulletin was completed and will be published in December as a bulletin of the Virginia Polytechnic Institute.

Statistical Summary of Extension Activities of Department Head

Days in office	229
Days in field	67
Miles traveled	12,493
Extension agents visited	16
Counties visited	15
Number visits to counties	41
Individual letters written	700
Number circular letters written	10
Number circular letters mailed	3,517
News articles written	5
Conferences held:	
Field	79
Office	150
Extension organization committee meetings	9
Leader training meetings:	
Adult	10
Attendance	1025
Leaders interviewed	201
Result demonstration visited	13
Other farm homes visited	20
Method demonstration conducted	5
Attendance	1500
Number planned meetings in field	5
Attendance	190
Other meetings in which specialist took part	16
Attendance	4630
Special domonstration exhibits	6
Attendance	1640
Estimated number of persons reached directly through project	8580

Persons Reached Through Projects, etc.

In conducting the extension work in agricultural engineering, the specialists and other members of the department personally reached some 45,000 persons. Some of the ways in which these people were reached follow:

Leaders interviewed	525
Leader training meetings	63
Attendance	2582
Result demonstrations visited	94
Other farms or homes visited	844
Method demonstrations conducted	324
Attendance	5071
Other meetings attended	80
Attendance	11,042
Meetings at demonstrations	9
Attendance	345
Special demonstration exhibits	13
Attendance	19,140

Miscellaneous Projects and Activities (Cont'd)

Farm Shop Improvement Project

This project was continued from last year. A college staff member held numerous meetings in the field, visited a number of agricultural high school shops for the purpose of instructing and conducted short courses for Vocational Agricultural teachers in farm shop practices.

State Lime Grinding Plant

Demands for ground limestone have so increased in the state that the Commissioner of Agriculture found it necessary to increase the output of this grinding plant in Appomattox county. The rural electrification specialist and other members of the agricultural engineering department gave material aid to the state department in working out details for the power supply and equipment for the new plant. Comparative costs of electric and diesel power were submitted and recommendations made for the new plant. This work involved considerable negotiations with manufacturers the Central Virginia Electric Cooperative and the Rural Electrification Administration.

Soil and Water Conservation Investigation

Professor Seitz supervised these studies which are being conducted as an Experiment Station project in cooperation with the Soil Conservation Service and the Tennessee Valley Authority. Professor Seitz in collaboration with the research staff completed a progress report of the research in Soil and Water Conservation. This was published in multigraph form during the year.

Cooperative Work with T.V.A.

The Agricultural Engineering Department has a cooperative agreement with the Agricultural Relations Department of T.V.A. for conducting soil and water conservation studies in the counties of Southwest Virginia drained by the Tennessee River. This is primarily a research project and the results are reported through the Experiment Station.

The department has cooperated in the Extension Demonstration program in the T.V.A. area in the following ways during 1940:

(1) Preparing maps of proposed Special Demonstration Areas. Two maps of this kind were made during the year using aerial photographs and planimetric sheets. These maps showed the extent of the areas, roads, rivers, streams, etc. They were used by the assistant agents to locate Demonstration Farms, calculate areas and to secure other information desired by the T.V.A. for the consideration of the projects.

(2) Preparing enlarged maps of Demonstration Farms. This was done for the Tazewell County Demonstration Farms at the request of the agent and assistant agent. These men found the farm maps traced directly from aerial photographs too small for practical use in helping farmers plan

farm layouts, crop rotations, etc. Enlarged tracings were made from the aerial photographs and prints supplied to the assistant agent and farmers.

(3) Tile drainage surveys. Drainage surveys were made on seven farms in the T.V.A. counties during the year. Bottom land too wet to produce crops or even pasture except in dry seasons is common in this area. Frequently this condition can be remedied by tile drainage. Such land when properly drained is often the most productive on the farm and may take crops from steep and less productive fields.

One means of soil and water conservation - row crops on the bottom, permanent pasture and hay on the slopes. Here a land use adjustment was made possible by tile drainage. The bottom field was too wet to cultivate and would produce pasture only in a dry season. A tile drainage system was installed in the winter of 1937-1938. Satisfactory corn crops were produced the past two summers. The top field in the picture was used for corn, but is now a permanent meadow, maintained by the use of phosphate fertilizers. The field on the side of the slope is a permanent pasture. This picture was made on a Russell County demonstration farm.

(4) Water system surveys. Visits were made to eight farms in the area in connection with surveys for water systems. Two hydraulic ram

surveys, three shallow well electric pump and three gravity surveys were made.

(5) Assisted with the demonstration of a small thresher developed by T.V.A. This machine was developed by Mr. G. G. Filler of the Agricultural Industries Division, T.V.A., and was demonstrated by him in Lee, Scott, Washington, Bland and Tazewell Counties. The machine is useful in threshing small crops of small grains that large machines would not care to handle or could not reach. It is especially adapted for threshing clover, lespedeza, and grass seed.

The T.V.A. Trailer Thresher

This machine is built in the form of a two-wheel trailer, weighs about 1,500 lbs. and can be moved by a light truck or car. It provides its own power by a 7½ h.p. motor mounted on the frame of the machine. It has approximately one-half the capacity of the large machines commonly used in Virginia and can be run by a crew of four to six men. The machine is shown threshing red clover on a Tazewell County demonstration farm.

(6)Preparing and showing an exhibit on soil and water conservation. This exhibit was made up to show the erosion losses taking place in Southwest Virginia from land used for corn, wheat and permanent pasture. It was shown at fairs in Lee, Tazewell, Smith, Bland and Scott counties.

GENERAL OUTLOOK IN AGRICULTURAL ENGINEERING

Real progress has been made in the three main projects which were stressed during the year; namely soil and water conservation, rural electrification and farm structures. These three projects continue to demand attention and major emphasis will be placed on these projects during the coming year.

The nation-wide attention being given to rural electrification and soil and water conservation by the federal government has tremendously increased the demands upon the agricultural engineering department for advice and assistance in these fields. The department is meeting these demands as far as possible with its limited personnel. The rapid extension of rural electric lines by farmer cooperatives is creating a situation that will require more and more educational work in rural electrification if these farmer cooperatives are to be made self-supporting. With only one extension engineer available for this extension educational work, the department cannot begin to meet the demands for aid. Discussions are now under way with the R.E.A. with the object of working out a cooperative agreement whereby the R.E.A. will cooperate in the employment of an additional extension worker in rural electrification. If satisfactory arrangements can be made for such cooperation, the program can be advanced much more rapidly.

The rural electrification movement is also creating a demand from the farm women for more educational work in household equipment. One of the most pressing needs is for a full-time specialist to handle extension work in household engineering, such as farm water supply, home remodeling, sewing machine schools and general household equipment.

The Land Grant College Association together with other interests is working on a bill to present to Congress for funds for Rural Housing. If additional funds should be provided a great deal of good could be accomplished through an extension program in rural housing and farm structure.

The National defense activities is going to create a greater demand than ever for agricultural engineering extension aid. Since labor is already becoming scarce, the farmer will have to greatly increase his labor saving equipment in order to make a success during the coming year.

With the completion of the new agricultural engineering building the department now has the physical plant and equipment adequate to render

greater all-around service than during the past year. If additional extension personnel is provided, the results in the coming year should be the greatest ever in extension work in agricultural engineering.

Respectfully submitted

Chas. E. Seitz

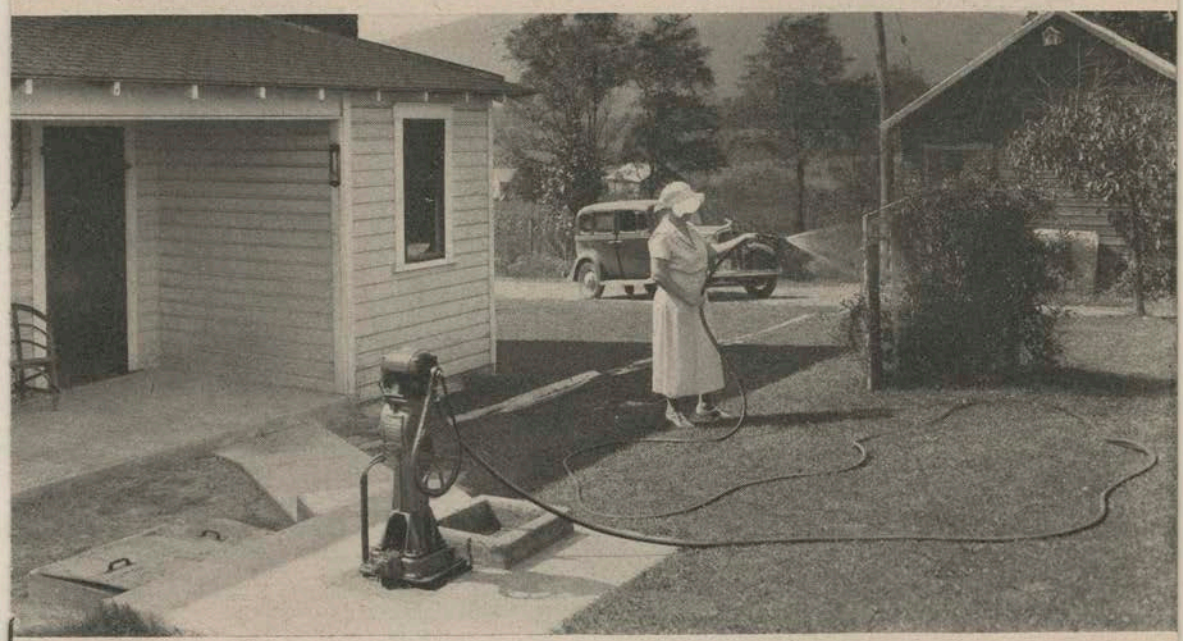
Chas. E. Seitz
Extension Agricultural Engineer

EXHIBIT SECTION

Revised March, 1940 Circular E-324

An Electric Water System For The Farm

By
E. T. SWINK
Assistant Agricultural Engineer
V. P. I. Extension Division



A typical deep well type automatic electric water system on a farm in Roanoke County, Virginia. The pressure tank is located in the basement of the house. The pump is equipped with an anti-freeze set length, access to which is made through the man-hole shown by the concrete well top. A portable cover is provided for the pump to protect it from the weather.

VIRGINIA AGRICULTURAL AND MECHANICAL COLLEGE AND POLYTECHNIC INSTITUTE
AND THE UNITED STATES DEPARTMENT OF AGRICULTURE, COOPERATING
EXTENSION DIVISION, JNO. R. HUTCHESON, DIRECTOR
BLACKSBURG, VIRGINIA
DISTRIBUTED IN FURTHERANCE OF THE ACTS OF CONGRESS OF MAY 8 AND JUNE 30, 1914.

An Electric Water System For The Farm

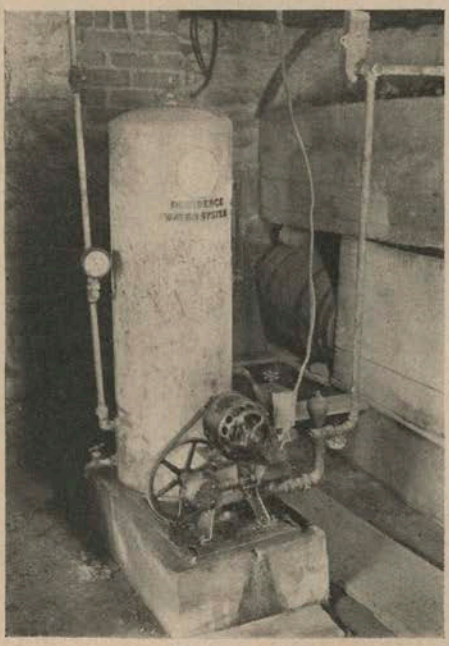
By

E. T. Swink

Agricultural Engineering Department

The first and most useful job that can be given to electricity on the farm is that of pumping water. Running water should be placed second only to electric lights in importance, and in many cases it should be given first choice where a choice must be made. There is no reason why the farm family with electric service should not have the labor-saving convenience of running water just as their city cousins do. To have an abundant supply of water at the turn of a spigot is of far greater value to the farmer because there are so many essential uses for water in the operation of a farm.

Health records show that typhoid fever and other diseases induced by poor sanitation are rapidly reduced in communities where definite steps have been made to improve the farm water supply. The use of electric water systems can often facilitate better sanitation.

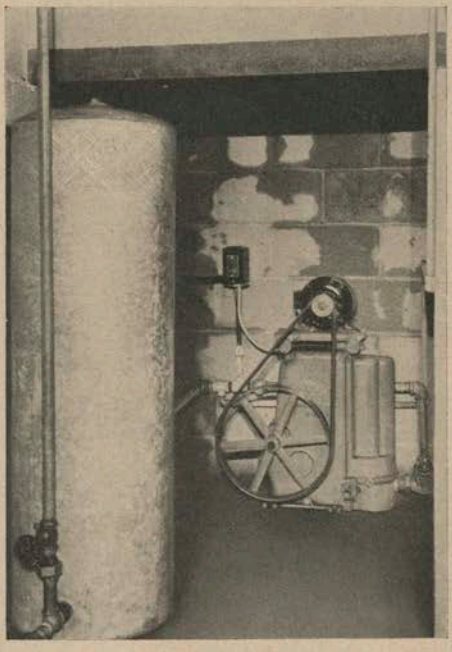


This shallow well pump was installed with a farm light plant on a Montgomery County, Virginia, stock farm eighteen years ago. Service from the power company was made available ten years later and an alternating current motor was installed in place of the direct current motor. It is still good for many years of dependable service.

The "hired hand" is generally referred to as the person doing most of the water pumping on the farm. This "hired hand," however, is usually the mother or housewife. Few people realize how much time and labor are required to hand-pump and carry water for the household. Actual studies show that the average American farm wife carries 20 tons of water each year and takes over 200,000 steps doing the task. This means an equivalent of 30 eight-hour days spent each year just carrying water. In many cases this same job is being done by an electric pump at less than one cent a day, or about $3.50 a year, for operating costs.

Tests at Iowa State College show that dairy cows with free access to water in drinking cups in the barn produce 6.14 percent more milk and 12.12 percent more butter fat than cows offered water twice a day at drinking troughs. The cup-watered cows drank 18.37 percent more water than the others. Records from dairy farm experiments lead to the same conclusion.

An egg contains 73.2 percent water and it can therefore readily be seen that better egg production results from having a constant supply of drinking water before the hens at all times.



A typical deep well pump installation supplying water from a well 125 feet deep. An abundance of water is always available for the residence, livestock and irrigation of the lawn and garden on this farm.

The following are outstanding advantages of having water available under pressure on the farm:

1. A safer and purer water supply, helping to protect the health of the family.
2. More efficient production of vegetables, of dairy, poultry, and other farm products, with less labor and increased farm income.

3. Facilities for irrigating the farm garden, assuring higher yields and protection against drought.
4. Good protection of farm buildings and property from the ever present danger of fire.
5. Complete modernization of the farm home.

It is surprising to note that less than 30 percent of those farm homes in Virginia which have electric service have been provided with water under pressure when it can be so easily and economically obtained. The cost of this farm improvement is so little that every electrified farm should at least provide running water in the kitchen and a connection for irrigating the garden. The installation of bath room fixtures and the extension of water pipes to other parts of the farmstead can be made as finances permit.

The purpose of this circular is to explain the installation and operation of electric pumps on the farm, hoping that the information will aid many Virginia farmers in obtaining the comforts and satisfaction of running water.

Types of Electric Pumps for Farm Use

There are two main types of automatic electric pumps for farm use: the cistern or shallow well pump, and the deep well pump. The shallow well pump is for wells or cisterns where the suction lift (vertical distance from water level to pump cylinder) is not over 20 feet. This type of pump may be installed at any convenient location in the house basement, outbuilding, or pump house. It is designed to maintain automatically a pressure of 20 to 40 pounds per square inch in the service pipes and is obtainable in capacities of 200 to 1,000 gallons per hour, using motors of 1/6 to 1 horsepower.

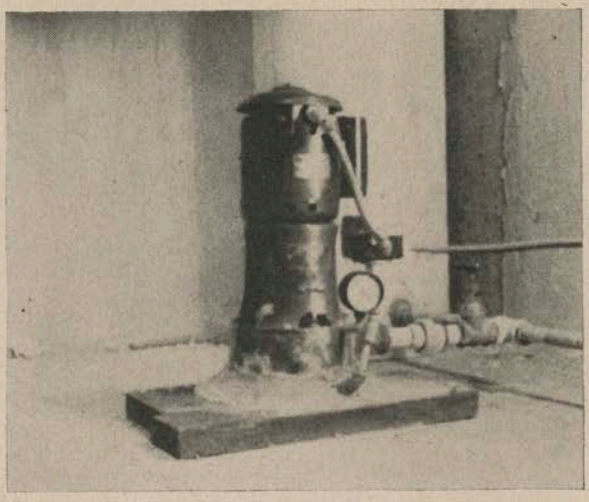
The deep well pump will pump water satisfactorily from any well. This type is larger and more expensive than the shallow well type and is used where the suction lift is over 20 feet. Deep well pumps are available in capacities of 100 gallons per hour and up, and require motors of 1/3 H. P. and larger, depending on the pump capacity and lift.

In addition to the conventional shallow and deep well pumps, there is also available a type of pump that will operate from shallow wells or from deep wells up to 120 feet deep. It is called the centrifugal jet pump, and consists of a vertically mounted centrifugal pump and motor located above the ground and connected by pipes to an ejector or jet below the water level in the well. The pump is similar in appearance to conventional vertical centrifugal pumps except that it has two discharge connections in the casting instead of one. One of these connections carries water to the pressure or storage tank. The other diverts part of the output of the pump to the jet located down in the well. The pressure in this line forces water through the jet nozzle at a high velocity, creating a vacuum which lifts water through the foot valve into the body of the jet and carries it upward to within suction distance of the centrifugal pump. This cycle is continuous during the operation of the pump.

The centrifugal jet type pump is available in sizes of ¼ H. P. to 5 H. P. with capacities from 200 gallons per hour to 4500 gallons per hour. The outstanding advantage of the centrifugal jet type pump is that it will pump from deep wells up to 120 feet without having to be located immediately over the well. This makes it possible to install the pump in the basement of the house or in some outbuilding, and pump from a well in the yard, thereby eliminating the necessity of building a frost proof pump house. When this is done, it is necessary to run two pipes from the pump to the well and these pipes must be increased in size according to the size of the pump and the distance from

the well to the pump. Care should be taken to see that these two pipes slope uniformly upward toward the pump, without dips, so that no air pockets will be formed in the line.

Complete information on the pump selected should be gotten from the manufacturer and the instructions for the installation and operation of the pump should be followed carefully.



A centrifugal jet type automatic electric water system with a 42 gallon pressure tank, installed in the basement of a farm home in Roanoke County, Virginia.

In some installations an electric motor can be applied to operate a pump already in use, in connection with a pressure tank or elevated storage tank, but each installation of this type presents individual problems which are so varied that no further discussion of them will be attempted.

Location of the Pump

A shallow well pump may be installed in any convenient location. Care should be taken to see that it is adequately protected from freezing, and this one reason makes the house basement a very desirable location. (See Fig. 1.) The electric wires and switch to the pump should be placed where they will be least liable to damage in case of fire on the premises, because one of the most valuable assets in having a water system is its value in fighting fire. It must be remembered that any machine requires some attention, and therefore the pump should be installed where it will be easily accessible for lubrication and maintenance.

The conventional deep well pump requires a rigid sucker rod from the pump head to the cylinder in the well and, therefore, it is necessary that the pump be located immediately over the well. A shelter or pump house must be provided to protect the pump from the weather and freezing (Fig. 2). This may be either a pump house above ground or a pit in the ground over the well. In either case, the shelter should be large enough to provide room for servicing the pump and the top or roof should be so arranged that the pump stock can be raised through it should it be necessary to remove the stock from the well.

Ventilation provisions should be made to keep down moisture in the room, thereby preventing rusting and deterioration of the pump and motor. Brick, concrete, cinder block or frame construction may be used, just so frost protection for the pump is assured. Provision should also be made for a drain from the pump house floor to prevent water from accumulating from leaks in the system or other sources and possibly draining back into the well.

The same general rules that apply to the shallow well pump should be observed in locating the centrifugal jet pump. If the centrifugal jet pump is to be located over the well, deep well pump location instructions will apply.

For all three types, it is necessary to locate the pump (1) at the proper place for good operation, (2) where it can be serviced easily, and (3) where it will be protected from moisture and freezing. All underground pipes should be placed well below the frost line and exposed pipes should be equipped with shut-off valves and drains for use in freezing temperatures.

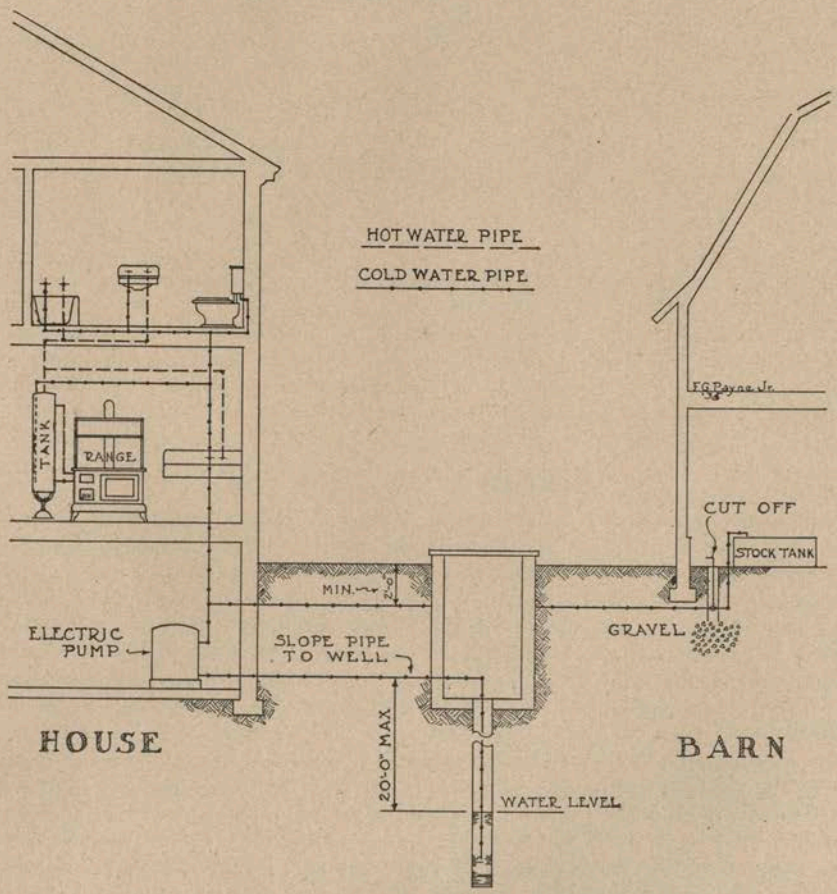


Figure 1.—Typical shallow well pump installation. The same general arrangement is applicable to the centrifugal jet pump installation in wells up to 100 feet deep.

Determining the Size of Pump

In buying an electric water pump, the most important item to consider is pumping capacity or size. It should be remembered that in general the operating costs are practically the same whether a 200 gallon per hour or a 300 gallon per hour pump is used to pump the same quantity of water. The larger pump costs more while it is running but does not run as long as the smaller pump. The small difference in price more than justifies the added capacity available for fire fighting purposes, garden irrigation and the assurance of more years of service from the pump. If a pump larger than present requirements demand is installed, future increased requirements are taken care of and the life of the pump will be much longer. At least a 42 gallon pressure tank should be used with the electric farm water system.

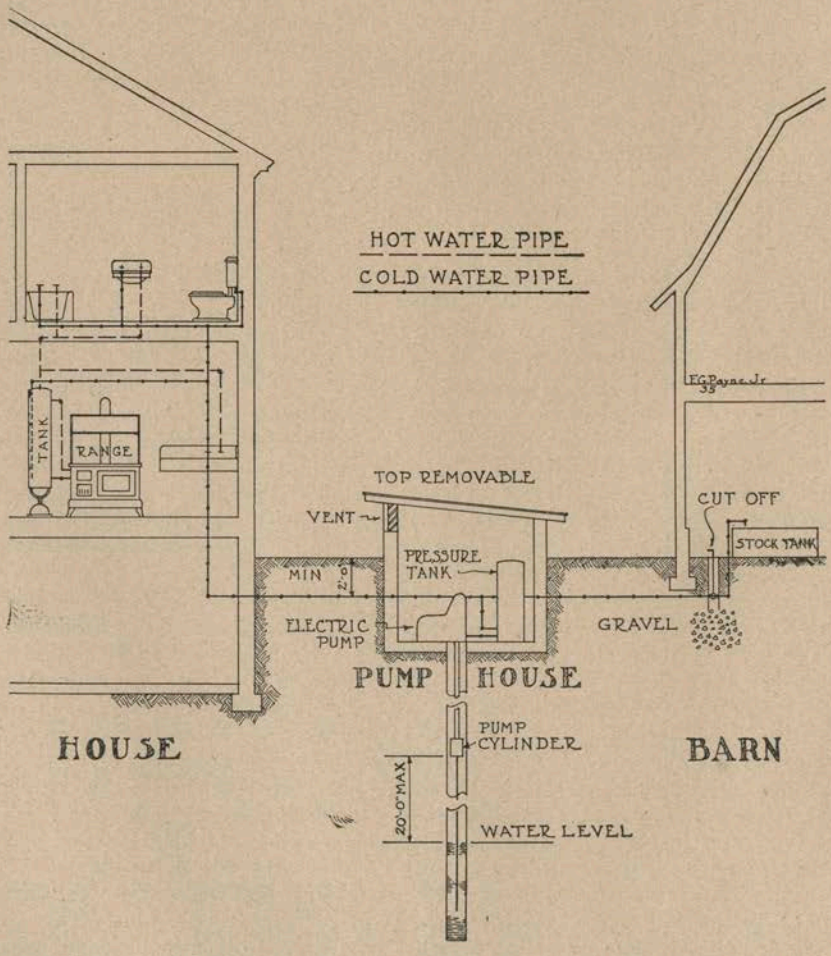


Figure 2.—Typical deep well pump installation.

The following table gives the average amount of water used daily in the average household or on the average farm:

1. Household services —

   (A) Per person — with complete bath room — 20 to 40 gallons
   (B) Per person — without bath room — 15 to 20 gallons
   (C) The following are requirements for various fixtures which are included in (A) and (B)

      (a) Toilet — 3 to 5 gallons each time flushed
      (b) Shower bath — 4 to 6 gallons per minute used
      (c) Washing machine — 2 to 3 gallons per lb. of dry clothes
      (d) Bath tub — 8 to 20 gallons each time used
      (e) Kitchen — 8 to 15 gallons per person per day
      (f) Lavatory — 1 to 1½ gallons each time used
      (g) Hydrant on lawn, ¾ inch hose nozzle, with the pressure tank operating at 20 to 40 lbs. — about 5 gallons per minute

2. Livestock and garden requirements —

   (a) Each cow — 10 to 15 gallons per day
   (b) Each horse — 10 to 15 gallons per day
   (c) Each hog — 1½ to 2 gallons per day
   (d) Each sheep — 1 to 2 gallons per day
   (e) Each 100 chickens — 5 gallons per day
   (f) Garden irrigation — 3 to 5 gallons per minute

From this table an estimate can be made of approximately how much water will be used on any farm under normal circumstances. It is wise and good practice to use the figure thus obtained as gallons per hour capacity rating of the pump that should be installed. In no case, however, is it advisable to install a pump smaller than 250 gallons per hour. The chief factor that might limit the size pump to be installed is the flow of the source of water supply. With either a well or spring, the normal flow in gallons per minute should always be checked before purchasing an electric pump. If a well is to provide the source of water, a pump should never be installed that has a greater pumping capacity than the flow of the well. For a spring with a small flow it is usually possible to build just below the spring a concrete storage reservoir where water can accumulate while the pump is not operating.

The automatic electric farm water system can be used to an economic advantage on many farms for irrigating home gardens and truck patches. Small rotary nozzles have been developed for operation on pressures of 20 to 40 pounds per square inch, which is the normal operating pressure of most automatic electric water systems. These nozzles require from 3 to 5 gallons of water per minute and will irrigate an area 50 to 70 feet in diameter. The cost of rigging up a portable irrigation unit using this type nozzle varies from $7.00 to $15.00, depending on the distance from the water system to the area to be irrigated.

Tests have shown that vegetable yields can be doubled even in wet years by applying small quanties of water during slack rainfall periods. In dry seasons this equipment will make a garden flourish where otherwise it would have been a complete failure. A shallow well system with a capacity of 340 gallons per hour or a deep well system with a capacity of 220 gallons per hour either to be equipped with at least a 42 gallon pressure tank, will provide facilities for garden irrigation in addition to normal water requirements on the average farm.

Cost of the Water Pump

The price of electric water systems, like all other commodities, varies with the size and quality of equipment and with the manufacturers. Reliable shallow well water systems complete with 42 gallon pressure tank, motor and controls, and having a capacity of 300 gallons per hour, are available at $65 and up. Deep well water systems complete with 42 gallon pressure tank, motor and automatic controls and having a capacity of 180 gallons per hour, may be bought at $90 and up. Smaller sizes are cheaper and larger sizes cost more; however, in no case is it recommended to use pumps smaller than these for average farm use. The centrifugal jet water systems are approximately the same in price as conventional deep well systems of similar capacities. It is always advisable to buy equipment that is known to be reliable and for which replacement parts can be easily obtained.

It is impossible to give an estimate on the cost of the electrical installation of the pump because no two installations are alike. The best plan is to call on the agricultural engineer of the local electric service organization or a local electrical or plumbing contractor for information on the particular installation in question. Either of these agencies will gladly furnish the information without obligation.

Cost of Piping

The cost of piping can be closely estimated, after it is known where the water is to be used about the farmstead. Lines between farm buildings, supplying water for normal uses and not over 250 feet in length, can be of ¾ inch pipe. Short service pipes within the house or other buildings can be of ¾ inch pipe also. One-inch pipe should be used for main lines of over 250 feet in length or where large quantities of water are to be used as in sprinkling large lawns or irrigating gardens. It is advisable to obtain the free advice of the electric service organization or the Virginia Agricultural Extension Service on the size of pipes necessary for a particular installation.

Operating Costs

Numerous tests have been made on electric water pumps in practical operation in all sections of Virginia. These tests show that a shallow well pump will consume from 1 to 1½ units (kilowatt-hours) of electricity in pumping 1,000 gallons of water. Similar tests on deep well pump installation show that from 1½ to 2½ units of electricity are consumed in pumping 1,000 gallons of water. The variation in the amount of current consumed in different installations is due to differences in well depths, pressures maintained in the storage tanks, and efficiencies of pumps.

From the table on page 8 the amount of water to be used on a particular farm can be estimated, and also the cost of pumping it. The following example illustrates this procedure: Suppose that the well on the farm in question requires a deep well pump using 1½ units of electricity per 1,000 gallons and water is to be pumped for the following:

5 people @ 30 gallons each per day	150 gallons
8 cows @ 12½ gallons each per day	100 gallons
4 horses @ 12½ gallons each per day	50 gallons
30 hogs @ 2 gallons each per day	60 gallons
30 sheep @ 1 gallon each per day	30 gallons
200 chickens @ 5 gallons per 100 per day	10 gallons
Total daily water consumption	400 gallons

For the month's water consumption:

$$400 \times 30 = 12{,}000 \text{ gallons per month}$$

Total units of electricity used per month:

$$12 \times 1\frac{1}{2} = 18 \text{ units or kwh}$$

Assume the cost of electricity for the pumping to be 4 cents per unit or kwh (the average cost to Virginia farmers):

$$4 \text{ cents} \times 18 = 72 \text{ cents per month or } 2\frac{1}{3} \text{ cents per day}$$

It would require from one to two hours to pump 400 gallons of water with a good hand pump and much additional time and labor in walking to the pump and carrying the water to the place where it is used. It would be difficult to employ a hired hand to do this job for 2⅓ cents a day.

Care and Maintenance

It is very important that the electric pump be properly installed, according to manufacturers' recommendations. Most newer model pumps are designed to operate in an oil bath and require no lubrication except the changing of this oil once or twice each year. Pumps properly installed with ample frost protection require practically no attention other than lubrication and will give continuous service for many years with negligible maintenance cost or attention. When repairs or adjustments are needed, they should be made by the pump dealer or someone familiar with the operation of the equipment.

Conclusion

When an electric water system has been installed on the farm, the first and most important step has been taken in modernizing the farm home. Complete bath room outfits are available for as little as $50 and the necessary approved sewage disposal system can be installed cheaply, using a homemade septic tank. Plans for these tanks are available through the county farm and home agents, local health officers, and the V. P. I. Extension Division. These agencies are also glad to give assistance in planning the entire water system and sewage disposal plant. The farm water supply and sewage disposal system should be carefully planned and the proper size and type of equipment and pipes must be used in order to assure satisfactory service for a long period of years. No improvement can be made on the farm that will pay larger dividends in health, happiness and convenience than the installation of an automatic water system.

HOMEMADE ELECTRIC CHICK BROODER PROJECT

For 4-H Club Members

OBJECT: To learn and demonstrate the proper use of the electric brooder by constructing and installing an approved type of brooder and successfully brooding chicks with it.

Note: This project can be the beginning of a series in the practical use of electricity in poultry production, to be followed by the poultry lighting project and then another brooding project.

SUPERVISION: The project is to be selected under the advice of and in collaboration with the 4-H club agent. The rural representative of the local electric service organization will assist the club member in planning and supervising the project. The extension specialists in poultry and rural electrification will give as much direct supervision as possible,

TIME: This project may be started at any time during the year; however, it should be planned so that the project can be completed by the end of the club year. The exact time of starting the brood should be determined by the disposition to be made of the chicks brooded. This should be carefully discussed with the club agent.

RECORDS: A complete record of the project is to be kept showing the following information:

1. Cost of completed homemade brooder.
2. Cost of installing the brooder.
3. Number, breed and cost of chicks started.
4. Daily record showing information on the attached daily record form.
5. Summary of daily operating records.
6. Number kwh used for brood.
7. Total cost of feeds.
8. Total cost of electricity used.
9. Total hours of labor required.
10. Number of chicks at end of brooding period.
11. Financial statement of project.

PROCEDURE: The following procedure is suggested for carrying out this project:

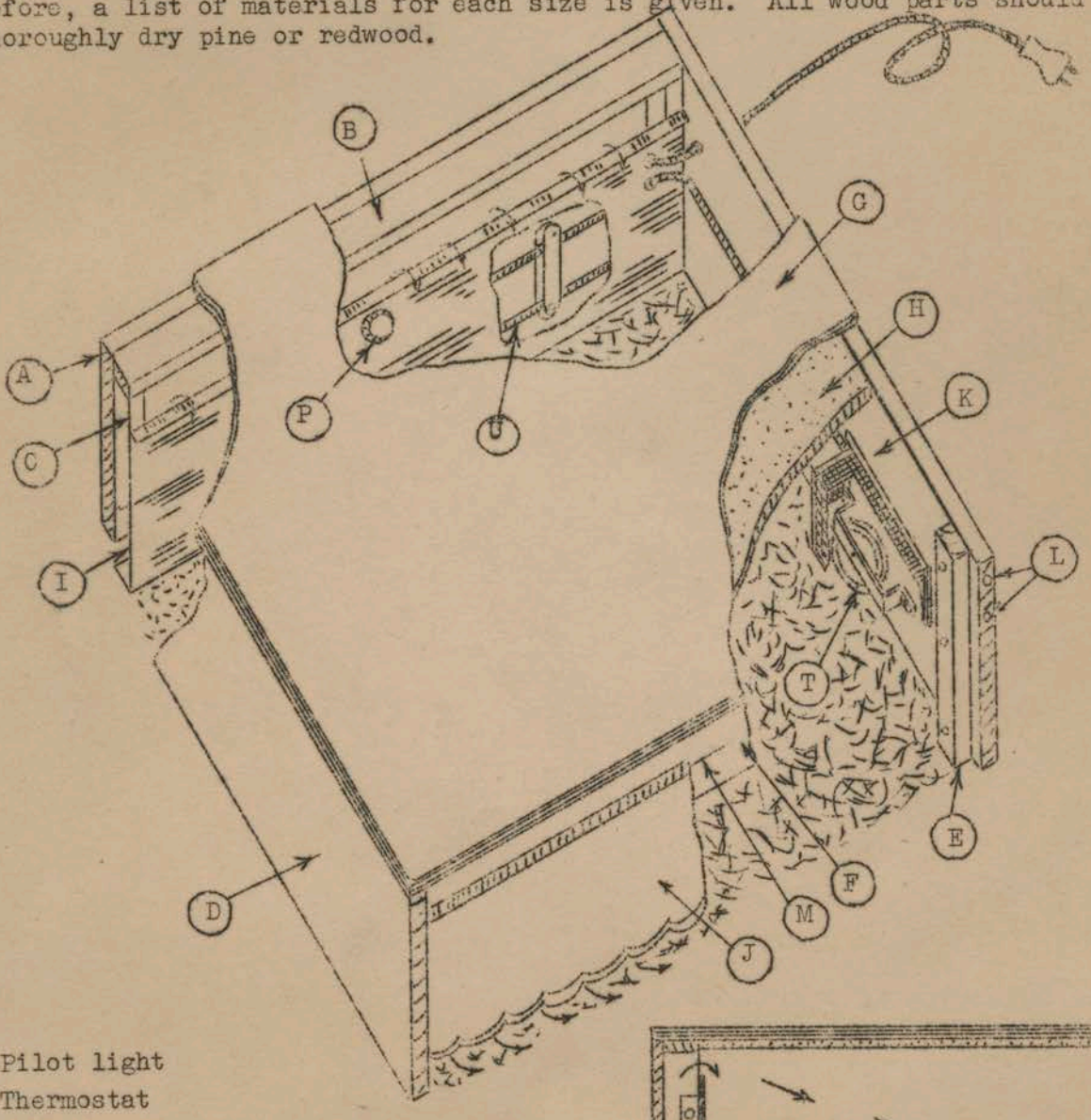
1. Secure several good bulletins on the use of the electric brooder and study them.
2. Check up on the brooder house or room to be used for the brooder and see that it will be satisfactory.
3. Secure all materials necessary for constructing the homemade brooder.
4. Order the proper number of state certified and pollorum tested chicks for the size brooder to be used.
5. Construct and install the brooder according to instructions. (Consult the electric service man in your community for suggestions and advice).
6. Get the electric service man to check voltage, advise the proper size wire to the brooder house and install sub-meter on brooder.
7. Follow instructions closely in operating the brooder and caring for the chicks.

INSTRUCTIONS FOR BUILDING, INSTALLING AND OPERATING

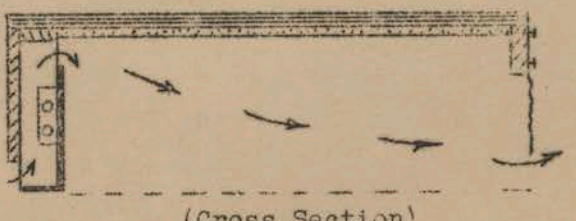
A HOMEMADE ELECTRIC CHICK BROODER

E. T. Swink, V. P. I. Extension Division

This homemade brooder is easy to build and is scientifically designed so that it will give good brooding results. Tests at the Agricultural Experiment Station at V.P.I. show that it will give good results at any season of the year. Fresh air enters the slot at the back, passes over the electric heating coil and into the brooder, causing forced ventilation. The brooder may be built in two sizes and the procedure for assembling both sizes is the same. The No. 1 brooder will brood 75 to 100 chicks (depending on breed) and the No. 2 brooder will brood 125 to 150 chicks. The illustrations showing the various parts apply to either size brooder; however, the dimensions of the parts are different and, therefore, a list of materials for each size is given. All wood parts should be of thoroughly dry pine or redwood.



(P) Pilot light
(T) Thermostat
(U) Heating coil



(Cross Section)

HOMEMADE ELECTRIC BROODER

	No. 1	No. 2
(A)	Back: 28½" x 7½" x 3/4" (1)	34½" x 9½" x 3/4" (1)
(B)	Back top piece: 28½" x 1½" x 3/4" (1)	34½" x 1½" x 3/4" (1)
(C)	Back cleats: 7-3/4" x 1½" x 3/4" (2)	9¼" x 1½" x 3/4" (2)
(D)	Sides: 28½" x 8½" x 3/4" (2)	32" x 10" x 3/4" (2)
(E)	Front cleats: 8" x 1½" x 3/4" (2)	9½" x 1½" x 3/4" (2)
(F)	Front top piece: 28½" x 2-3/4" x 3/4" (1)	34½" x 2-3/4" x 3/4" (1)
(G)	Top plyboard: 28½" x 30" x 1/4" (1)	32" x 36" x 1/4" (1)
(H)	Celotex Ins.: 25½" x 28½" x 1/2" (1)	29" x 34½" x 1/2" (1)
(I)	*Baffle: 24 gauge tin, 28½" x 8" (1)	34½" x 9½"
(J)	Curtain: 30" x 6" wide (1)	36" x 8" wide

(K) 1 piece of 1/4" or 3/8" mesh hardware cloth for box around thermostat
(M) Curtain support: piece 9/32" screen door spring and soft wire
1 pound 6 penny nails
36 - 1⅝" #6 flat head wood screws
4 - 3/4" #6 round head wood screws
1/2 pint metallic aluminum paint
1/2 pint gray flat paint

ELECTRICAL MATERIALS FOR BROODER

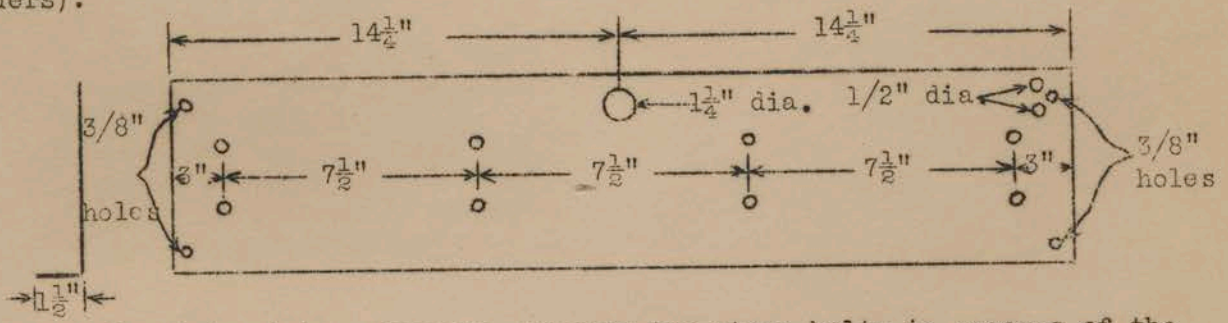
Note: THE COMPLETELY ASSEMBLED ELECTRICAL PARTS CAN BE PURCHASED FROM THE LYON RURAL ELECTRIC COMPANY, GREENSBORO, N. C. AT $4.75 FOR THE NO. 1 (CAT. NO. 100 HANDY UNIT) AND $5.50 FOR THE NO. 2 (CAT. NO. 150 HANDY UNIT). AN EDUCATIONAL DISCOUNT OF 25% IS ALLOWED IF THE ORDER IS PLACED THROUGH THE CLUB AGENT IF IT IS DESIRED TO BUY AND ASSEMBLE THE INDIVIDUAL PARTS, THEY WILL COST ABOUT $4.25 FOR THE NO.1 AND $5.00 FOR THE NO. 2 AND THE COMPLETE LIST OF PARTS NEEDED IS AS FOLLOWS:

No. 1	No. 2
Heating element: 220 watt, 110 volt low temperature coil	330 watt, 110 volt low temperature coil
Thermostat: 5 amp., 110 volt wafer type with ½" adjustment screw for side wall mounting	5 amp., 110 volt wafer type with ½" adjustment screw for side wall mounting
Pilot Light: 1 porcelain sign socket and 7½ watt bulb	1 porcelain sign socket and 7½ watt bulb
Insulators: 4 pair small flat porcelain cleats 2 small porcelain bushings	5 pair small flat porcelain cleats 2 small porcelain bushings
Wire: 8 ft. 2 wire # 18 rubber covered cord 2 ft. asbestos insulated # 18 wire for pilot light 2 ft. of loom 2 ft. 2 wire # 18 cord for thermostat circuit	8 ft. 2 wire # 18 rubber covered cord 2 ft. asbestos insulated # 18 wire for pilot light 2 ft. of loom 2 ft. 2 wire # 18 cord for thermostat circuit
Bolts: 8 - 3/16" x 1½" long round head stove bolts for mounting insulators 2 - 3/16" x 1½" round head stove bolts for heater terminals (2 extra nuts)	10 - 3/16" x 1½" long round head stove bolts for mounting insulators 2 - 3/16" x 1½" round head stove bolts for heater terminals (2 extra nuts)

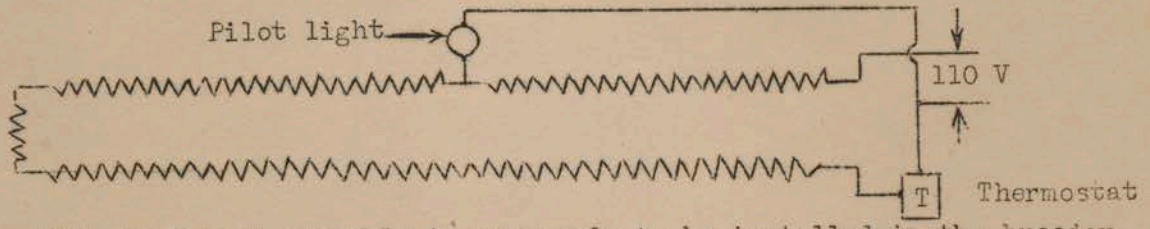
* If the electrical equipment is purchased already assembled, it will come mounted on this baffle.

INSTRUCTIONS FOR ASSEMBLING ELECTRICAL EQUIPMENT WHEN INDIVIDUAL PARTS ARE PURCHASED

Bend the tin baffle to L shape so that the short side will be 1½" wide. The 1½" side will form the bottom of the heating chamber and the other side will support the heating element and pilot light. Measure in three inches from each end of the tin baffle and lay off 3/8" holes for mounting the insulators, 1¼" hole for sign socket and 1/2" holes for the porcelain bushings according to the following sketch. (Same general arrangement for both size brooders).



Mount insulators loosely, placing two stove bolts in grooves of the pair and insulators on the end of baffle nearest the thermostat. Carefully stretch the heating coil around the insulators and fasten the two ends to the two terminal bolts in the end insulator. The coil should be taut and should not touch the tin baffle. Next, mount the sign socket, round insulators and connect the thermostat according to the following wiring diagram.



The electrical assembly is now ready to be installed in the brooder as the brooder is assembled.

ASSEMBLING THE BROODER

It is suggested that six penny nails be used for fastening the wooden parts together in order to hold them in place accurately and then use 1½ inch #6 wood screws to hold them rigidly and permanently. Fasten piece (B) to back board (A) and then attach cleats (C) to these two pieces. (Refer to Fig. 1 to be sure the various parts are properly placed). Next, fasten cleats (E) to sides (D), leaving a 3/4" space in front of the cleats for front piece (F) later. Next, fasten sides (D) to the ends of the unit formed by (A), (B), and (C). The front piece (F) is then fastened securely in place. Measure in eight inches from the front and up three inches from the bottom of right side (D) and bore a 1/4" hole for the adjustment screw of the thermostat to extend through to the outside. The assembled electric heating unit is then fastened in place and the

thermostat mounted over the hole inside (D). Bore another 1/4" hole through right side (D) near the end of the heating unit for the rubber cord to come through to plug into electric convenience outlet for power supply. Mount the wires to the thermostat (in loom) to side (D) with staples or mounting clamps to hold it rigidly in place. Bend a piece of 1/4" or 3/8" mesh hardware cloth to form a protective cage around the thermostat to protect it from being damaged. Next, screw the 7½ watt bulb into the sign socket. Carefully check all electrical connections and then plug in the brooder to see that it heats properly.

Fasten the piece of plywood top on the brooder and then turn the brooder upside down and prepare to install the insulating board. Carefully lay off the corners of the insulating board to be cut out so it will fit around the cleats on the sides of the brooder. The insulating board can be fastened to the top by either a good grade of glue or cement or with 1" x 3/8" stove bolts or both. Measure down from the top front of the brooder 1/2" and 2", respectively, on each side and mount 3/4" #6 round head screws (L) for supporting the curtain and hang the brooder curtain on a piece of soft wire. using the screen door spring to keep it taut. Paint the insulating board with metallic aluminum paint and the rest of the brooder with gray flat paint mixed with linseed oil.

INSTALLATION OF THE BROODER

Brooder House:

This brooder will operate satisfactorily in any type room, provided a few simple rules are followed. The No. 1 brooder should have a room with a floor area of at least 80 square feet and the No. 2 should have at least 110 square feet. The two other important requirements are a tight floor and plenty of window space on the front side for room ventilation. It is preferable to provide a double floor under the brooder and if the room or brooder house has a concrete floor, a false wood floor of 2" x 4" pieces on edge and tongue and grooved boards should be built over the concrete.

Wiring:

The size wire for the circuit from the main switch box or source of power to the brooder depends on the distance between the two points. For operating one brooder, the following wire sizes should be used:

Distance up to 500 ft.	2 #10 weatherproof wires
Distance 500 to 900 ft.	2 # 8 weatherproof wires
Distance 900 to 1500 ft.	2 # 6 weatherproof wires

The circuit should be fused with a 5 ampere fuse and the wiring should be installed by someone qualified to do the work or should be checked by a qualified person before the current is turned on the circuit. The electric service organization rural representative will gladly check the wiring and give advice on proper wiring for the brooder installation.

Location of Brooder in the Brooding Room:

This type brooder should be placed in the back center of the room with the back side of the brooder (heating chamber) next to the brooder house wall. Two or three inches of space should be allowed between the brooder and the wall to allow a free flow of fresh air to the opening at the heating unit. This space should be closed to prevent chicks from getting behind the brooder and no litter should be placed on the floor behind the brooder because it might close up the air slot at the heating unit, affecting the operation of the brooder.

Litter:

Any type of litter that will absorb moisture, such as peat moss, crushed corn cobs or stalks, chopped straw or peanut hulls may be used. Place 1½" or 2" of dry litter over the floor.

Adjusting the Brooder Thermostat:

The brooder should be turned on and the thermostat properly adjusted several hours before placing baby chicks under the hover to thoroughly dry and warm the brooder and floor under it. Plug in the brooder and turn the adjustment screw on the thermostat in a counter clockwise direction until the pilot light burns dimly (the light burns bright when the current is off the heating element). Keep the current on until the temperature at the thermostat is 100° F and then slowly turn the adjustment screw in a clockwise direction until the pilot light burns brightly. Turn the lock nut on the adjustment screw until it is tight, holding the setting at this point.

SUGGESTIONS FOR OPERATING THE BROODER

The three important points in operating the electric brooder are: (1) keep the brooder temperature so that the chicks are comfortable and do not crowd (100° F to start with), (2) always keep the windows or ventilators in the front of the house open to allow plenty of fresh air to enter the house, (3) change the litter often enough to keep it clean and dry. The top of this brooder may be kept clean by either placing layers of wrapping or newspaper over it, removing a layer as it gets dirty or by putting a 1½" wood rim around the top of the brooder and placing litter on the brooder top. The chicks will get on the brooder and either of these methods will be found satisfactory. As the chicks grow larger, the brooder can be raised on 1" strips to allow more head room inside. Ask the electric service organization for further suggestions and advice on the installation and operation of the brooder. His services are free and he wants to help.

RESULTS OF ELECTRIC BROODING DEMONSTRATIONS
PULASKI DISTRICT A.E.P. COMPANY, 1939

CHICKENS Name and address	County	Brooder Size	Capacity Set By Mfr.	Chicks Started	Breed	Chicks Raised	Days Brooded	Months	Brooder Temperature High-est	Brooder Temperature Low-est	Room Temperature High-est	Room Temperature Low-est	KWH Used	KWH per Chick	Total Cost
E.B.McChesney, Abingdon, Va.	Wash.	67"	500	415	R.I.Reds	395	54	Feb.Mar.Apr.	102F	90F	80F	38F	263	.63	$6.58
B.H.White, Max Meadows, Va.	Wythe	67"	500	510	PlylRock	498	51	Feb.Mar.Apr.	105F	92F	64F	24F	267	.52	6.68
A.T.Harman, Floyd, Va.	Floyd	67"	500	508	White Leg.	472	37	Apr.May	102F	90F	90F	40F	139	.27	3.48
W.H.Dickerson, Willis, Va.	Floyd	67"	500	400	White Leg.	394	49	Mar.Apr.	100F	90F	70F	30F	366	.90	9.15
O.W.Harman, Floyd, Va.	Floyd	67"	500	510	White Leg.	469	32	Apr.May	100F	98F	----	----	152	.30	3.81
S.B.Alderman, Floyd, Va.	Floyd	4'x6'	600	615	White Leg.	567	42	Apr.May	96F	76F	86F	50F	92	.15	2.30
R.A.Bane, Bland, Va.	Bland	4'x 4'	400	232	Dark Cor.	214	32	Apr.May	88F	72F	86f	50F	146	.63	3.65
R.B.Painter, Cripple Creek, Va.	Wythe	56"	350	204	Ply.Rock	204	32	Mar.Apr.	100F	98F	----	----	156	.76	3.90
A.E.Peery, Cambria, Va.	Montg.	56"	350	250	N.H.Reds	244	51	Mar. Apr.	101F	76F	68F	36F	113	.45	2.82
J. M.Crockett, Wytheville, Va.	Wythe	56"	350	208	N.H. Reds	206	20	Mar. aApr.	97F	90F	-----	----	110	.53	2.75
HH. Price, Max Meadows, Va.	Wythe	56"	350	156	Ply.Rock	153	47	Mar.Apr.May	100F	90F	72F	26F	152	.97	3.80
A. E.Peery, Cambria, Va.	Montg.	4' x4'	350	250	N.H.Reds	244	46	Mar.Apr.	98F	70F	64F	36F	154	.61	3.35
R. E. Groseclose, Marion, Va.	Smyth	42"	300	255	Bar.Rocks	249	45	Mar.Apr.	100F	68F	72F	36F	83	.32	2.08
TURKEYS															
A.E.Peery, Cambria, Va.	Montg.	56"	175	150	M.Bronze	149	32	May, June	100F.	74F	70F	42F	45	.30	1.13
A.E. Peery, Cambria, Va.	Montg.	4'x 4'	175	150	M.Bronze	149	32	May, June	96F	78F	70F	42F	78	.52	1.95
Mrs.Grover Boothe, Pulaski, Va.	Pulaski	56"	175	136	M.Bronze	134	24	May, June	102F	90F	70F	42F	84	.61	2.10
Mrs.Grover Boothe, Pulaski, Va.	Pulaski	50"	175	136	M. Bronze	134	24	May, June	102f	90F	70F	42F	80	.60	2.00
Mrs.Grover Boothe, Pulaski, Va.	Pulaski	56"	175	184	M. Bronze	181	27	June, July	102F	90F	80F	42F	96	.52	2.40
Mrs.Grover Boothe, Pulaski, Va.	Pulaski	50"	175	195	M. Bronze	190	27	June, July	102F	90F	80F	42F	90	.46	2.25

AVERAGE BROODER DATA FOR CHICKENS

Average number chicks started ...347
Average number chicks raised ...332
Average number of brooding days . 42

Average brooder temperature (high)... 99F.
Average brooder temperature (low) ... 84.6F
Average room temparature (high) 75.2F
Average room temperature (low) 36.6F

Average KWHrs. Used per Brood 168.7
Average KWHrs. Used per Chick Started 468
Average KWHrs. Used per chicks raised 508
Average Electric Cost per chick started ... $.0117
Average Electric COST PER CHICK Raised ... $.0127

AVERAGE BROODER DATA FOR TURKEYS

Average number turkeys started ..158
Average number turkeys raised . . 156
Average number of brooding days. 28

Average bro oder temperature (high). 100.7F
Average brooder temperature (low) .. 85.3F
Average room temperature (high) 73.3F
Average room temperature (low) 42.0F

Average KWHrs Used per Brood 78.8
Average KWHrs per Turkey Started 497
Average KWHrs used Per Turkey Raised 504
Average Electric Cost per Turkey Started . $.012
Average Electric COST PER TURKEY Raised .. $.013

DAILY BROODER RECORD

Name:	Address:	Elec. Service Organization:
Make Brooder:	Size:	Wattage:
Chicks Started:	Poults started:	Bread:

Date	Brooder Temp.	Room Temp.	Dead Chicks	Meter Reading	Remarks

COOPERATIVE EXTENSION WORK
IN
AGRICULTURE AND HOME ECONOMICS
STATE OF VIRGINIA

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

EXTENSION SERVICE

Blacksburg, Virginia
April 2, 1940

Dear Agent:

Enclosed is a copy of the instructions and details of the 1940 Rural Electrification Contest. I hope you will look it over and plan to have a good number of entries from your 4-H clubs this year.

We are making an effort to give more direct assistance in rural electrification activities with 4-H clubs this year. The chick brooder project, to be followed later by a portable motor project, and then this fall a poultry lighting project, we think will be of material aid in getting better entries in the contest. We have had a state winner for the last two years but in neither case has this winner stood high in national competition.

Mr. Swink plans to discuss the contest at the summer short course camps that he assists with this year and will give instructions that we think will be helpful. Additional copies of the enclosure will be sent on request and we shall be glad to give you any other material or assistance that we can.

With best wishes, I am

Yours very truly,

Chas. E. Seitz

Chas. E. Seitz
Extension Agricultural Engineer

CES:nw
Encl.

COOPERATIVE EXTENSION WORK
IN
AGRICULTURE AND HOME ECONOMICS
STATE OF VIRGINIA

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

Blacksburg, Virginia
March 29, 1940

EXTENSION SERVICE

Dear Agricultural Instructor:

The enclosed instructions for building, installing and operating a small homemade electric brooder have been prepared by E. T. Swink of this department and are suggested to you as a shop project for boys who have poultry projects and who also have electric service available at their homes.

You will note that two sizes of the brooder can be built and that a discount of 25% will be allowed on the electrical unit, provided you order for your students. This discount should take care of all the other materials necessary for building the brooder. This type brooder was used in our brooder tests here at the poultry department and proved satisfactory. You can figure on about 3/4 kwh per chick brooded during the spring and about 1¼ to 1½ kwh per chick brooded during the winter months. The electric service organizations are anxious to cooperate with you in seeing that any brooders you build are properly installed and have proper wiring for good voltage. Do not hesitate to call on their rural representative in your area to assist you in this connection.

This project should strengthen any boy's poultry enterprise and make his effort both more interesting and successful. It can be followed next fall by a lighting project with pullets. The attached record sheet is self-explanatory and it should, of course, be carefully kept for the boys' record book.

Mr. Swink will be glad to supply you with additional copies of this outline and give you any direct assistance that he can in supervising the operation of any brooders that you might build and install. He will appreciate your advising him in case you build one or more of these brooders in order that he might keep in touch with their operators.

Yours very truly,

Chas. E. Seitz

Chas. E. Seitz
Extension Agricultural Engineer

CES:nw

PROGRAM

For

ELECTRICAL SCHOOL

Sponsored By the

VIRGINIA ELECTRIC AND POWER COMPANY

In Cooperation With The

STATE EXTENSION SERVICE AND DEALERS

New Kent Courthouse----------Tuesday, May 7

Charles City Courthouse----------Wednesday, May 8

Toano----------Thursday, May 9

MORNING PROGRAM BEGINS AT---- ---------- 10:30 a.m.
Farm Electrical Equipment

AFTERNOON PROGRAM BEGINS AT---------- 1:30 p.m.
Home Lighting and Kitchen Equipment

Lunch from 12:30 p.m. to 1:30 p.m.

MORNING PROGRAM

10:30 a.m.--------Introductory Remarks
Mr. C. W. Richards, County Agricultural Agent
State Extension Service

10:40 a.m.--------Greetings
Mr. George F. Duborg, Manager, Williamsburg District
Virginia Electric and Power Company

10:45 a.m.--------Home Made and Commercial Electric Brooders
Mr. H. R. Linkous, Agricultural Engineer
Virginia Electric and Power Company

11:00 a.m.--------The General Purpose Farm Motor
Mr. J. S. Hamilton, Agricultural Engineer
Virginia Electric and Power Company

11:15 a.m.--------Garden Irrigation
Mr. E. T. Swink, Assistant Agricultural Engineer
Virginia Polytechnic Institute

11:30 a.m.--------Demonstration of Feed Grinding and Garden Irrigation
Inspection of Farm Electrical Equipment

12:30 p.m.--------Lunch

AFTERNOON PROGRAM

1:30 p.m.---------Introductory Remarks
Miss Mabel Massey, County Home Demonstration Agent
State Extension Service

1:40 p.m.---------Greetings
Mr. George F. Duborg, Manager, Williamsburg District,
Virginia Electric and Power Company

1:45 p.m.---------Selection, Use and Care of Kitchen Equipment
Miss Page Drinker, Home Economist,
Virginia Electric and Power Company

3:15 p.m.---------Sound Slide Film, "Light on the Farm"

3:45 p.m.---------Display of Electrical Appliances
Open Discussion

ANNOUNCEMENT AND PROGRAM OF RURAL ELECTRIFICATION CONFERENCE AND SHORT COURSE

THEME: The Economic Use of Electricity for Improving Farm Income

Agricultural Engineering Department

Virginia Polytechnic Institute

Blacksburg, Virginia

CONFERENCE—SEPTEMBER 9 - 10

SHORT COURSE—SEPTEMBER 10 - 13

ANNUAL STATE RURAL ELECTRIFICATION CONFERENCE AND SHORT COURSE

The rapid development of rural electrification and farm electric equipment in Virginia and the nation makes it desirable and necessary for leaders in this great work to get together and discuss current problems of mutual interest. An annual conference to meet this need was initiated by the V. P. I. Agricultural Engineering Department in 1929. In recent years, due to the construction of a new agricultural engineering building and other interruptions, this annual event has not been held. Excellent facilities are now available in the new agricultural engineering building and nearby dormitories. It is planned to hold such conferences annually in the future.

Men of national prominence have been secured to speak on present day rural electrification problems. The conference program has been planned to be of interest and value to electric utility and cooperative officials and managers, as well as field men and dealers engaged in promoting the intelligent use of electricity in the home and on the farm.

A short course will be given for field men, dealers, and others immediately following the conference. Latest developments in farm electric equipment will be explained by factory experts and excellent laboratory facilities will be available for intensive and thorough training on the equipment studied. This course offers a splendid opportunity for men engaged in promoting the use of electricity to an economical advantage on the farm to be brought up to date on their knowledge of equipment and its uses.

DIRECTIONS AND ACCOMMODATIONS

Immediately on arrival in Blacksburg those attending the conference or short course should go to the registration desk in the lobby of the new agricultural engineering building and register. There will be no registration fee or other expense for the conference or short course except living costs while in Blacksburg. Complete information on living quarters and meals can be secured at the registration desk.

Arrangements have been made for those attending to occupy one of the new student dormitories located conveniently to the agricultural engineering building. Rates for these rooms furnished and equipped for occupancy will be 75 cents per person per day. Comfortable quarters may also be had in private homes and at the William Preston Hotel. It is urged that reservations for rooms be made in advance by returning the card (no postage required) accompanying this program.

Meals may be had in the faculty apartment dining hall at $1.25 per day or 35 cents for breakfast, 45 cents for luncheon, and 65 cents for dinner. Meals may also be secured at local restaurants and hotels at reasonable rates.

PROGRAM
RURAL ELECTRIFICATION CONFERENCE

Agricultural Engineering Building
Virginia Polytechnic Institute
Blacksburg, Virginia

Monday, September 9. Registration and assignment to rooms, 10:30 to 12:30

Monday Afternoon Session

2:00 Welcome to Campus — Dr. Julian A. Burruss, President, Virginia Polytechnic Institute

2:10 The Economic Situation and Agricultural Outlook — Dr. H. N. Young, Head, Agricultural Economics Department, V. P. I.

2:30 Discussion

2:40 Connecting Prospective Consumers Along Existing Lines — Frank Peebles, Operations Division, R. E. A., Washington, D. C.

3:00 Discussion

3:10 How Manufacturers are Promoting the Use of Farm Electric Appliances — G. E. Mullin, Manager, Farm Merchandising Department, General Electric Company, Bridgeport, Connecticut

3:30 Types of Farm Electric Motors and Why — B. P. Hess, Manager, Rural Electrification Department, Westinghouse Electric and Manufacturing Company, Pittsburgh, Pennsylvania

4:00 Discussion — Leo Schirtzinger, District Manager, Century Electric Company, Cincinnati, Ohio

4:15 Effective Dealer Cooperation — H. P. MeGargee, American Gas and Electric Service Corporation, New York

4:45 Discussion — Hobart N. Grubb, Equipment Dealer, Wytheville, Virginia

5:00 Inspection of Rural Electrification Exhibits

Evening Session

7:30 National Progress in Rural Electrification — S. P. Lyle, In Charge Agricultural and Home Economics Section, Extension Service, U. S. D. A., Washington, D. C.

8:00 Discussion — H. L. Garver, In Charge Rural Electrification Research, Bureau of Agricultural Chemistry and Engineering, U.S. D.A., Washington, D. C.

8:15 Illustrated Discussion Panel on Important Farm Electric Uses (Five-minute discussion per topic. Each speaker has had several years of experience in farm electrification with electric service organizations. General questions and discussion from the floor to follow the completion of these five-minute talks.)

1. Water Systems — F. L. Bocock
2. Truck Farm Irrigation — J. J. Bass
3. Farm Garden Irrigation — R. J. Blair
4. Dairy Utensil Sterilization — S. M. Beane
5. Soil Sterilization — E. T. Swink
6. Soil Heating — P. W. Smith
7. Electric Brooding — A. W. Cook

8. Hay Drying — J. W. Weaver
9. Electric Fences — James Hamilton
10. Portable Farm Motors — P. V. Kelsey
11. Feed Grinding and Ensilage Cutting — John Sumner
12. Potato Curing and Storage — G. W. Harper
13. Fruit Storage — C. K. Kirkland
14. Poultry Lighting — H. B. Linkous
15. Milk Cooling — L. M. McGhee
16. Farm Yard Lighting — W. J. Gillespie

TUESDAY, SEPTEMBER 10

Morning Session

9:00 Rural Electrification from the Executive's Viewpoint — N. M. Argabrite, Vice-President, American Gas and Electric Service Corporation, New York

9:30 Discussion — J. G. Holtzclaw, President, Virginia Electric and Power Company, Richmond, Virginia

9:45 Importance of Trained Personnel In Farm Electrification — R. H. Driftmier, Head, Agricultural Engineering Department, University of Georgia

10:15 Discussion — Julius Hall, Jr., Head, Sales Promotion Department, Appalachian Electric Power Company, Bluefield, West Virginia

10:30 The Agricultural Significance of a Coordinated Rural Electrification Research and Educational Program — C. J. Hurd, Director, Agricultural Engineering Division, Tennessee Valley Authority, Knoxville, Tennessee

11:00 Discussion — J. O. Knapp, Director, West Virginia Agricultural Extension Service, Morgantown, West Virginia; C. E. Brehm, Director, Tennessee Agricultural Extension Service, Knoxville, Tennessee

11:20 Publicity That Sells — George W. Kable, Editor, Electricity on the Farm, New York

11:50 Discussion — L. L. Koontz, Rural Supervisor, Appalachian Electric Power Company, Pulaski, Virginia

12:00 Adjourn for Lunch

Afternoon Session

2:00 Farm Utilization Program of the R. E. A. — Oscar W. Meier, Agricultural Adviser, R. E. A., Washington, D. C.

2:30 Discussion — J. E. Smith, Superintendent, Mecklenburg Electric Cooperative, Chase City, Virginia

2:45 Economics of Cooling Eggs on the Farm — Cecil Rogers, Senior Supervisor, Division of Markets, U. S. D. A., Washington, D. C.

3:15 Discussion — J. W. Weaver, Research Engineer, Agricultural Engineering Department, V. P. I.

3:30 Possibilities and Markets for Quick Frozen Foods — Harry Carlton, Market Investigator, Agricultural Experiment Station, University of Tennessee, Knoxville, Tennessee

3:50 Advantages of Frozen Foods to the Farmer and Electric Service Organizations — H. W. Sterling, Eastern Shore Public Service Company, Salisbury, Maryland

4:20 Discussion on Quick and Sharp Freeze Refrigeration

4:30 Acceptance of Approved Electric Practices on the Farm — J. P. Schaenzer, Rural Service Division, Edison Electric Institute, New York

5:00 Adjournment of Conference

SCHEDULE
RURAL ELECTRIFICATION SHORT COURSE
Agricultural Engineering Building
September 10-13, 1940

The following short course has been planned to provide intensive training and up-to-date information on the design, operation and installation of some of the most popular farm electric equipment. The course will be taught by members of the agricultural engineering department staff with the cooperation and assistance of prominent factory experts. Several of the national authorities appearing on the conference program will also assist with this short course, in addition to the ones listed for special topics.

TUESDAY EVENING

7:30 to 8:30 How to Promote the Use of Electric Motors on the Farm — B. P. Hess, Manager, Rural Electrification Section, Westinghouse Electric and Manufacturing Company

8:30 to 9:30 How to Promote a Farm Water System Program — H. F. Miller, Sales Manager, Farm and Suburban Division, Goulds Pump Company

WEDNESDAY, SEPTEMBER 11

Morning Session

8:30 to 12:00 Lectures, Demonstrations, and Laboratory Work on ***Farm Electric Motors and Controls*** — V. P. I. Agricultural Engineering Staff, assisted by:

1. B. P. Hess — Westinghouse Electric and Manufacturing Company
2. Leo Schirtzinger — Century Electric Company
3. R. A. Haworth — Cutler-Hammer Company
4. C. N. Brubaker — Browning Manufacturing Company

Afternoon Session

1:30 to 5:00 Lectures, Demonstrations, and Laboratory Work on ***Farm Water Systems*** — V. P. I. Agricultural Engineering Staff, assisted by:

1. G. E. Henderson — Agricultural Engineering Department, T. V. A.
2. C. C. Heller — Dayton Pump Company
3. H. F. Miller — Goulds Pump Company
4. C. J. Bergh — Jacuzzi Pump Company
5. T. C. Smith — F. E. Meyers Pump Company

Evening Session

7:30 to 8:30 How to Promote the Use of Electric Brooders — George A. Westbrook, Distributor, Lyon Rural Electric Company, Charlotte, North Carolina

8:30 to 9:30 How to Promote Electric Feed Grinders — N. H. Wilkin, C. S. Bell Company, Hillsboro, Ohio

THURSDAY, SEPTEMBER 12

Morning Session

8:30 to 12:00 Lectures, Demonstrations, and Laboratory Work on ***Electric Brooders*** — V.P.I. Agricultural Engineering Staff assisted by factory representatives from:

1. Lyon Rural Electric Company
2. Shenandoah Equipment Corporation
3. Trumbel Manufacturing Company
4. Buckeye Manufacturing Company
5. Oakes Manufacturing Company

Afternoon Session

1:30 to 5:00 Lectures, Demonstrations, and Laboratory Work on ***Electric Feed Grinders*** — V. P. I. Agricultural Engineering Staff assisted by factory representatives from:

1. C. S. Bell Company
2. Meadows Manufacturing Company
3. O. B. Wise Pulverizer Company
4. J. I. Case Company

Evening Session

7:30 to 9:30 Planning Effective Load Building Programs — E. T. Swink, Discussion Leader — Entire group to participate

FRIDAY, SEPTEMBER 13

Morning Session

8:30 to 9:30 Refrigeration for Frozen Foods on the Farm — G. E. Mullin, Jr., Lecture and Demonstration

9:30 to 10:30 Garden and Truck Farm Irrigation — J. W. Weaver, Lecture and Demonstration

10:30 to 11:00 Dairy Utensil Sterilization — S. M. Beane, Lecture and Demonstration

11:30 to 12:00 Soil Heating — E. T. Swink, Lecture and Demonstration

Afternoon Session

1:30 to 2:30 Electric Barn Hay Dryer — J. W. Weaver, Lecture and Demonstration

2:30 to 3:00 Electric Uses for the Dairy Farm — Agricultural Engineering Department

3:00 to 3:30 Electric Uses for the Poultry Farm — Agricultural Engineering Department

3:30 to 4:00 Electric Uses for the General Farm — Agricultural Engineering Department

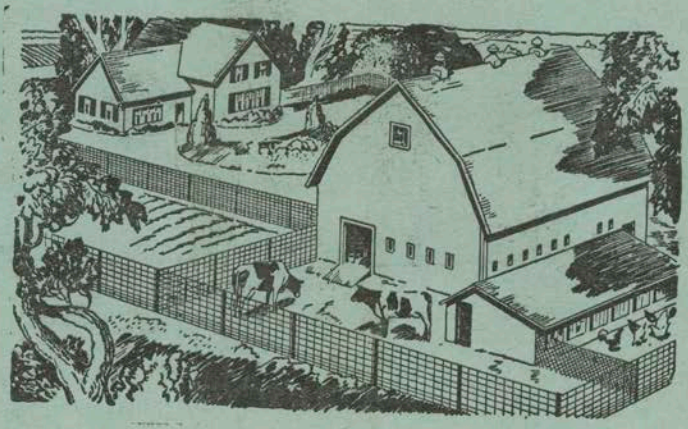
4:00 to 4:30 A Forward Look — J. P. Schaenzer

4:30 Adjournment

PROGRAMME

REA

Farm Equipment Show



Electricity—man's most economical servant—is now at work on the farm. See these exhibits that will show how to make power your slave

© Harris & Ewing

ELVA BOHANNON

PROGRAMME

R. E. A.

FARM EQUIPMENT

TOUR SHOW

O. T. DRIGGS' FARM 3 MILES WEST

CHASE CITY ON STATE HIGHWAY 49

APRIL 15 AND 16

—Sponsored By—

MECKLENBURG ELECTRIC COOPERATIVE

Chase City, Va.

PROGRAMME

MONDAY NIGHT, APRIL 15

7:00 Open house. Inspection of exhibits.

8:00 Introduction, W. P. Coppinger, REA.

8:05 Welcome, J. E. Smith, project superintendent.

8:10 Response, D. W. Teare, Farm Tour Manager.

8:25 "As You Light It." Play directed by Mrs. C. W. Gregory, Jr. Cast: Dr. R. A. Dodd, Howard H. Beales, Mrs. J. E. Smith, Miss Margaret Mason and James Gordon Craig.

8:55 Electricity on the Farm, E. T. Swink, State Extension Rural Electrification Specialist.

9:15 Lighting Magic, Mr. Erlinson, REA.

9:35 Movies, "The River."

10:00 to 11:00 Inspection of exhibits.

TUESDAY MORNING, APRIL 16

10 to 11 Inspection of exhibits by school children

11:00 Demonstrations on midway, 4-H Clubs and vocational agricultural students, under D. W. Teare, Farm Tour Manager and Earl T. Swink, V. P. I.

In Tent

11:00 Home Economics classes, school children from project

11 to 3 Appliance demonstration, Elva S. Bohannon

PROGRAMME

TUESDAY AFTERNOON, APRIL 16

Tour Exhibits of Midway, D. W. Teare, Tour Manager, cooperating with E. T. Swink.

1:30 General Assembly, introduction of program, W. P. Coppinger, REA, Master of Ceremonies.

1:35 Automatic water supply, Mr. Eddy, REA engineer

2:00 Farm Bath Room, Miss Evelyn Bloome, REA Home Economist.

For Women—In Tent

2:25 Cooking Demonstration, Plug-In Appliances, Elva S. Bohannon, REA Home Economist.

2:50 Kitchen Planning, Miss Sally Guy Davis, Extension District Agent, V. P. I.

3:25 Laundry Demonstration, Miss Evelyn Bloome, Farm Tour Home Economist.

Demonstration for Men—On Midway
Conducted by D. W. Teare and E. T. Swink

2:15 Electricity in Dairy Production

2:45 Electricity in Poultry Production

3:15 Electricity in General Farming

4:00 Electricity in Fruit and Vegetable Growing

4 to 8 Open for Inspection

TUESDAY NIGHT, APRIL 16

8:00 Introduction of Program, W. P. Coppinger of REA

8:05 "Can a Farmer Afford Electric Service," D. W. Teare, Farm Tour Manager.

8:20 Competitive cooking duel, R. E. Walker, J. E. Smith, under supervision of Mrs. Elva S. Bohannon, REA

9:05 Unusual Uses of Electricity, Mr. Bixby, REA Engineer

9:30 Awarding of Prizes

10:00 Open House

MECKLENBURG ELECTRIC COOPERATIVE

Chase City, Virginia

J. E. Smith, Project Superintendent, Chase City, Va.

Officers

W. F. Lawson, President

W. S. Adkisson, Jr. Vice-President

W. H. Copley, Secretary-Treasurer

Directors

L. M. Crews, Red Lawn, Va.

W. H. Copley, South Hill, Va.

W. F. Lawson, Chase City, Va.

W. S. Adkisson, Jr. Clover, Va.

R. A. Owen, Chatham, Va.

L. B. Hudson, Halifax, Va.

J. W. Fitzgerald, Chatham, Va.

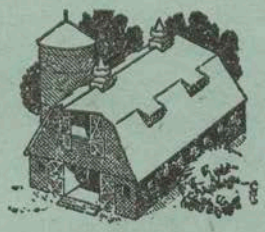
C. C. Clary, Gasburg, Va.

P. F. Weaver, Emporia, Va.

J. E. SMITH, PROJECT SUPERINTENDENT

MECKLENBURG ELECTRIC COOPERATIVE

CHASE CITY, VA.



The REA Farm Equipment Show

is brought to you by REA, through the Mecklenburg Electric cooperative, Chase City, Va., the State Agricultural Extension Service, leading manufacturers and local dealers.

Now that electricity is available for the farm, it is up to the farmer to make use of this tremendous force, which in the form of lightning frightened primitive man, but now, harnessed in the form of electrical power, becomes the farmer's co-worker and helper.

The Farm Equipment Show will teach you how to use this newly available power for your convenience, pleasure and profit.

Four

Humidified Hot Air

THE ROANOKE TIMES, ROANOKE, VIRGINIA: MONDAY MORNING, DEC

Electrical Utensil Sterilizers

EMBER 18, 1939.

Urged For Dairy Farms

TYPE COMPARED TO OTHER KIND

Advantages Cited by E. T. Swink, of Blacksburg

BLACKSBURG, Dec. 17 (AP).—Advantages of humidified hot air electric utensil sterilizers for dairy farms over other types of equipment for the same purpose, under certain conditions, are described in a new extension service bulletin by E. T. Swink, assistant agricultural engineer.

On the basis of experiments with both commercial and homemade electric sterilizers, Swink advances the following suggestion:

Does Uniform Job

"The humidified hot air electric utensil sterilizer will do a positive and uniform job of killing bacteria on dairy utensils.

"The advantages of this type equipment merit the consideration of any dairy operator where the equipment is adaptable.

"It is essential that adequate electric wiring be provided for the economical operation of either sterilizing or water heating units, consult a good electrician, or the rural service engineer of the electric service company serving the farm.

"Be sure that the sterilizer unit meets the necessary specifications so that it will be approved by the dairy inspector.

"The operating cost of electric sterilizers and water heaters will depend on the amount of electricity already being used and the available electric rate. For this information, see the rural service engineer of the local electric service organization or write the V. P. I. extension division, giving complete details."

This type sterilizer is a cabinet large enough to hold all the utensils to be sterilized at one time, and is constructed of rust and corrosion resisting metal over a wood or metal frame, with at least two inches of mineral wool insulation, or the equivalent, on all sides.

Heat is produced by electric strip or space heaters at the bottom of the cabinet; a baffle plate over the heaters helps maintain a uniform temperature throughout the cabinet. The heaters are controlled by an adjustable thermostat outside the cabinet, and a thermometer installed in the top of the cabinet shows the temperature of the air inside. Angle iron racks hold the utensils.

Leave Until Needed

One of the principal advantages of this type equipment is that the daryman can simply wash and rinse his utensils and place them in the sterilizer. The heat, evaporating the water left on the utensils, performs the sterilization, and the utensils can be kept sterile by leaving them in the cabinet until they are needed. The operator is saved the labor of drying his cans and other equipment, and less electricity is required than if the utensils are put in dry.

Auxiliary methods must be used to supply hot water needed in the dairy room, except in the case of a small combination sterilizer that also heats up to three gallons of water. This unit is adapted to use on farms where up to eight cows are milked.

"Under some conditions," the engineer advises, "it is to the advantage of the dairy operator to have a local tinsmith build the humidified hot air sterilizer. It is often possible to build a unit locally cheaper than it can be bought commercially. The size of the cabinet needed is sometimes so large that the door of the milk house will not permit its passage; therefore it is necessary to assemble the sterilizer in the milk house. Where a homemade unit is to be built, care should be taken to obtain the proper materials and the service of a mechanic who is qualified to go a good job."

The bulletin lists a number of advantages of the electric sterilizer, where it is adaptable to a farm, over the steam boiler, with either a steaming jet or steaming cabinet, which has been the most popular approved method heretofore in Virginia.

COOPERATIVE EXTENSION WORK
IN
AGRICULTURE AND HOME ECONOMICS
STATE OF VIRGINIA

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

EXTENSION SERVICE

Blacksburg, Virginia
October 28, 1940

Dear Sir:

In accordance with requests made at the feed grinding demonstrations you attended last week, I am enclosing a summary of the data secured at the demonstration. These demonstrations were sponsored by your county agent and Mr. E. T. Swink of the Agricultural Extension Service, in cooperation with the Appalachian Electric Power Company and feed grinder distributors. Further information on feed grinding equipment may be secured through any of these agencies.

Yours very truly,

Chas. E. Seitz

Chas. E. Seitz
Extension Agricultural Engineer

CES:nw
Encl.

A.E. 50

The feed grinding demonstration which you attended last week was one of a series of six such demonstrations held through Southwest Virginia. Each of the hammer mills that were used in these demonstrations was operated by a 5 horse power single phase electric motor. A record was kept of all the grain ground at the demonstrations and the data secured has been summarized in the form of a table showing the average grinding capacity and grinding cost, using various size screens for all common grains.

As was pointed out at the demonstration, the finer feed is ground, the slower the grinding rate and the more it costs to grind. This point is evident in the tabulated data shown on this sheet, which was prepared by averaging the data secured at each demonstration.

In the final drawing from the registration cards filled out at the demonstration, the name of Mr. J. E. Leonard, R.F.D. #2, Marion, Virginia was drawn and he will be presented with the 1/4 horse power portable electric motor which was donated by the Appalachian Electric Power Company for this purpose.

SUMMARY OF FEED GRINDING DEMONSTRATION DATA

Grain	Size Screen (Inches)	Average Bushels Per Hour	Grinding Cost Per Bu. @ 2½¢ per KWH
Wheat	1/4	35	1/2¢
"	3/16	28	3/5¢
"	1/8	25	4/5¢
Barley	1/4	32	2/5¢
"	3/16	30	1/2¢
"	1/8	24	4/5¢
Oats	1/4	40	2/5¢
"	3/16	36	1/2¢
"	1/8	22	4/5¢
Rye	1/8	18	1-1/8¢
"	1/16	15	1-2/3¢
Buck wheat	3/16	30	1/3¢
"	1/8	18	3/4¢
Shelled corn	1/4	40	1/3¢
"	1/8	28	3/5¢
" (meal)	1/16	18	1-1/3¢
Ear corn	1/2	50 (ears)	2/5¢
"	3/8	33 (ears)	3/5¢
"	1/4	22 (ears)	4/5¢