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ANNUAL REPORT

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Agricultural Engineering Department

Extension Division, V. P. I.

Blacksburg • Virginia

Office

ANNUAL REPORT

PROJECT NO. 10

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AGRICULTURAL ENGINEERING DEPARTMENT

EXTENSION DIVISION

VIRGINIA POLYTECHNIC INSTITUTE

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December 1, 1935 to November 30, 1936

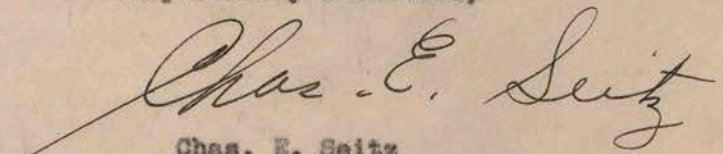
Blacksburg, Virginia
January 9, 1937

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, 1935 and ending November 30, 1936.

Respectfully submitted,


Chas. E. Seitz
Extension Agricultural Engineer

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ANNUAL REPORT

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Agricultural Engineering Department
Extension Division
Virginia Polytechnic Institute

December 1, 1935 to November 30, 1936

DEPARTMENT ORGANIZATION

The department of agricultural engineering at V. P. I. is organized into the three major divisions of Extension, Resident Instruction and Research with the extension agricultural engineer head of the department. As both the resident instruction and research divisions have a close relation to the extension program, the entire staff personnel is listed in this report.

PERSONNEL AND STAFF ASSIGNMENTS:

Extension Division

Chas. E. Seitz, extension agricultural engineer, as administrative head of the department has been responsible for the direction of all three divisions of the department, namely extension, resident instruction and research. The time spent in administrative and related duties has been more than offset by the time and effort contributed by the resident instruction and research personnel.

In addition to administrative duties, Mr. Seitz has been responsible for the major extension project in rural electrification and the sub-project in drainage and irrigation. He has devoted considerable of his time to Emergency and related projects, working with governmental and state agencies such as the Soil Conservation Service, the Tennessee Valley Authority, the Works Progress Administration, the Rural Electrification Administration, State Planning Board, State Corporation Commission and serving on numerous committees, etc.

Mr. James A. Waller, Jr., associate extension agricultural engineer, has been responsible for the extension project in erosion control. He has devoted his full time during the year on this project. Since July Mr. Waller has received 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. H. H. Gordon, assistant extension agricultural engineer, who has been on leave of absence serving as state director of Rural Rehabilitation, was recalled in May to devote one-third of his time to extension work in charge of the farm structures project. He continues as state director of Rural Rehabilitation, devoting two-thirds of his time to this work.

Mr. M. M. Johns, assistant extension agricultural engineer in charge of the farm structures project in the absence of Mr. Gordon, resigned in May to accept a position with the University of Tennessee as extension specialist in rural electrification. His resignation necessitated the recalling of Mr. Gordon to a one-third time basis.

Mr. J. J. Bass, assistant agricultural engineer, was employed June 1 to take Mr. Johns' place and assist Mr. Gordon with the farm structures project. Mr. Bass is devoting full time to extension work and in addition to the farm structures project, he is responsible for the extension sub-projects in farm water supply and farm home equipment.

Mr. E. T. Swink, assistant extension agricultural engineer, devotes half his time to extension work and half to resident instruction and research. He has devoted all his extension time to the rural electrification project for which he is responsible. Most of his extension time during the year has been devoted to instructing county agents and farm organizations in methods of making rural electrification surveys for application of R. E. A. funds and general educational work in rural electrification. He has handled the resident instruction classes in rural electrification and assisted with the farm power and machinery classes. For the Agricultural Experiment Station he has conducted a research study in chick brooders and published a bulletin on this subject and conducted several other research projects.

Mr. V. R. Hillman, associate professor on the resident instruction staff, was devoting one-fourth of his time to extension work in farm structures. He resigned last December to accept a position with the Soil Conservation Service as chief agricultural engineer in the state.

Mr. S. H. Byrne, assistant professor of agricultural engineering, was employed January 1 to take Professor Hillman's place. He devoted one-fourth of his time to extension work answering correspondence in relation to farm structures and work on the farm building plan booklet. The first of November Mr. Byrne was placed on full time resident instruction basis.

Mr. F. G. Payne, architectural draftsman employed by the college, has devoted practically all of his time to extension work. He handles the drafting work in connection with the design of all farm building plans and supervises the draftsmen employed by W.P.A. on the farm building plan booklet. He also assisted in the preparation of plans and proposals as well as the supervision of the construction of the agricultural engineering laboratory unit as a W.P.A. project. Effective November 1 the Extension Division took over one-third of Mr. Payne's salary.

Resident Instruction and Research

Mr. P. B. Potter, associate professor, devotes one-half his time to the resident instruction division and one-half to the research division. He is responsible for the resident instruction work in soil and water conser-

vation and related subjects and the research program in household engineering. His main contribution to the extension program was in handling radio talks for the department and consulting advice to the extension specialists in home equipment and related problems.

Mr. J. W. Sjogren, assistant professor in agricultural engineering, devotes half his time to the resident instruction division and half to the research division. He is responsible for the resident instruction and research work in farm power and machinery and related subjects. His main contribution to the extension program has been in consulting advice to the extension specialists, answering letters related to farm machinery and preparing plans, etc., on lime burning and grinding which have been used in the drought relief project.

Mrs. J. J. Bass, Jr., research assistant employed by the agricultural experiment station, devotes her full time to assisting Professor Potter in his research project in household engineering.

Mr. J. H. Lillard, Jr., assistant agricultural engineer, was employed January 1 by the Agricultural Experiment Station. Mr. Lillard devotes his full time to research work in soil and water conservation. He is responsible for the Bankhead-Jones Act research project in soil and water conservation. The research work contemplated and part of which is now under way is fundamental to our extension work in erosion control. The results of this research will give us basic data to use in our extension work.

Mr. H. T. Rogers, soils technologist, was employed July 1 by the Agricultural Experiment Station to assist Mr. Lillard in the soils analysis, etc., connected with the Bankhead-Jones Act project in soil and water conservation.

Mrs. H. C. Rucker, department secretary, is employed by the college but handles all the extension correspondence for the department. She has had the assistance of Miss Katharine McDonald since July 1, who is now handling most of the stenographic work in connection with the research program.

Mr. Reuben B. Hicks, graduate assistant in agricultural engineering, is working on a research study in erosion control in connection with our research project in soil and water conservation.

Miss Catherine Slusser, graduate student, is working on a thesis project in household engineering under the direction of Professor Potter.

Mrs. R. B. Swope, graduate fellowship student, is also working on a thesis study in household engineering under Professor Potter.

Mr. A. C. Foster, a senior student, is doing some drafting work and handling the blue printing in connection with the farm building project.

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
- 10 B - Rural Architecture
 - B-1 - Farm Structures
 - B-2 - Farmstead Planning
 - B-3 - Rural Community Plans
- 10 C - Rural Electrification
 - C-1 - Rural Line Extensions
 - C-2 - Farm Water Power
 - C-3 - Individual Light Plants
- 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 1936

In the plan of work for 1936 major emphasis was placed on the following three projects:

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

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The following are the principal factors which determined 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 with three established soil erosion areas and thirteen CCC camps doing erosion control work under the direction of the Soil Conservation Service. 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.

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.

COOPERATING AGENCIES

In conducting the extension work in agricultural engineering during the year the specialists have cooperated with the following agencies, departments, etc.:

County Agents: - All county projects have been conducted in close cooperation with the county agents.

Home Demonstration Agents: - All farm housing, water supply and related home improvements projects were carried on in close cooperation with the home agents.

Horticultural Department: - The projects in apple packing and storage plants, stationary spray plants, fruit and vegetable storage, such as sweet potato curing, and storage houses and related projects were carried on in cooperation with the horticultural and vegetable gardening specialists.

Poultry Department: - The farm structures project relating to poultry houses and equipment was conducted in cooperation with the poultry specialists.

Dairy Department: - The farm structures project relating to dairy plans and equipment was conducted in cooperation with the dairy specialists.

Agronomy Department: - The project in soil erosion control and farm operating equipment was conducted in cooperation with the agronomy specialists.

United States Bureau of Agricultural Engineering: - The farm development project was conducted in cooperation with the agricultural economics specialists of V. P. I. and the United States Bureau of Agricultural Engineering.

Soil Conservation Service: - The agricultural engineering specialists cooperated closely with the soil conservation service in the erosion control area demonstrations and the CCC erosion camp work.

State Department of Agriculture: - The farm structures specialists cooperated closely with the State Dairy and Food Division on the dairy barn and house plan project.

Farm Organization: - The farm structures project relating to dairy plans was conducted in close cooperation with the Maryland and Virginia Milk Producers' Association in the territory covered by this association. In the rural electrification project the specialists cooperated with the state grange and farm bureau.

State and City Health Departments: - The farm building specialists cooperated with the state and city health departments in conducting the dairy plans project and the farm sanitation work.

Virginia Corporation Commission: - The rural electrification project was carried on in cooperation with the state corporation commission.

Rural Electrification Administration: - The rural electrification specialists cooperated closely with the R. E. A. in conducting rural electrification surveys for the county agents as requested by the R. E. A. and the U. S. director of Extension.

Electric Power Companies: - In conducting the rural electrification project the specialists cooperated with the various electric companies in the state.

Tennessee Valley Authority: - Close cooperation was maintained with the TVA in conducting the farm development project and soil conservation work and handling certain phases of research in rural electrification.

State Planning Board: - The department cooperated closely with the state planning board. A member of the department served on this board.

Federal Emergency Agencies: - The department cooperated with a number of the emergency agencies as outlined under Emergency Activities in this report. Rural Rehabilitation, FERA, WPA, AAA, SCS, PWA, etc., were some of these agencies.

SUMMARY OF EXTENSION SPECIALISTS' TIME

Specialist:	Days in Field:	Days in Office:	Different Agents Visited	Different Counties Visited	No. Visits To Cos.	No. Visits to Agents	Letters Written
Seitz	88	198	6	15	55	6	1015
Waller	163	111	33	32	168	142	712
Swink	109	187	48	47	100	74	461
Bass	97	57	54	52	107	111	393
Johns	80	55	47	39	66	55	472
Gordon	47	19	43	43	47	51	143
Byrne	4	271	2	2	2	2	345

WORK ACCOMPLISHED - 1936

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

Substantial progress has been made in extension work in erosion control during the year. A comprehensive engineering research program in soil and water conservation has been set up under the Experiment Station which will include fundamental research work on controlled plots at the college and field experiments and demonstrations on the college farm and in the SCS and TVA areas. This research work has been closely correlated with the extension program and has for its primary object the securing of facts that will enable the extension service to strengthen its program.

Practically all the extension effort during the year has been devoted to cooperation with the SCS and the county soil conservation or terracing associations. One extension agricultural engineer has devoted his full time to this project. The method of handling this work is described in detail as follows:

Organization of County Soil Conservation Associations:

Eighteen months ago it was made possible for the Soil Conservation Service to work thru Emergency Conservation Works Camps in a limited number of areas outside of the project on demonstrational areas. At that time there was a demonstrational area in Pittsylvania county and one in Appomattox county. Since then the area in Albemarle county has been added, making a total of three demonstrational areas at this time.

This expansion of the state soil conservation program made it necessary to organize county soil conservation associations in all counties which would logically be entitled to receive benefit from the ECW camps which were being established. The camps are located near the following towns and are known by the name of the town--Crewe, Appomattox, Rocky Mount, Ridgeway, Church Road, Clover, South Hill, Rustburg, Lynchburg, Berea, Danville and Chatham. The labor from these camps is supposed to be used within a road radius of fifteen miles and this area is known as the camp area.

Prior to the establishment of these camps and camp areas, county terracing associations had been set up in Albemarle, Brunswick, Campbell, Charlotte, Dinwiddie, Halifax, Mecklenburg and Prince Edward counties. These associations are incorporated. The above eight associations were purely Extension organizations. When the Soil Conservation Service entered the picture and suggested that the names of the associations be changed from "Terracing" to "Soil Conservation", articles of association, by-laws, etc., were examined, found substantially the same and the request agreed to. It



Building terraces in Brunswick County



Road construction work in Prince Edward sub-
marginal area

EROSION CONTROL

was thought that the new title would be more inclusive and more fully described the work which would be done. While our county "terracing" associations and "soil conservation" associations are one and the same organization it is still necessary, in most cases, to refer to them as "terracing" associations to distinguish them from the soil conservation associations set up in about all counties under the Soil Conservation and Domestic Allotment Act. Also because bank accounts, financial papers, charters, etc., were originally made out in the name of "terracing" associations and too much effort and expense would be involved in attempting to make this change. With new associations, however, they have been named "soil conservation" associations. This applies to the two new organizations perfected this past October -- Nottoway Soil Conservation Association and Pittsylvania Soil Conservation Association. This makes a total of ten county associations. Each has a 40 HP Diesel tractor and large terracer.

In addition to the ten counties mentioned above having associations and terracing units, the following counties were organized into soil conservation associations but have no large terracing equipment: Amherst, Appomattox, Bedford, Franklin, Henry and Stafford.

Since no work-ECW labor or SCS supervision was to be done except for farmers who were members of the county association and since it was agreed that this was a function of the Agricultural Extension Service the Extension Soil Conservationist did the work of organizing these eight additional counties. The six without terracing units mentioned above and the new ones--Nottoway and Pittsylvania.

In starting an organization in any county it appears desirable to call an informal meeting of from 25 to 75 leading farmers known to be more or less interested in soil conservation. At this time a temporary chairman and secretary are appointed, minutes are kept and the whole subject thoroughly discussed. When there is no more discussion and it seems a good thing for the county a motion is made and carried to proceed with an organization. If the county has six magisterial districts seven directors are elected, one from each district and one public director recommended by this body and appointed by the Director of Extension. These directors together with designated representatives of the Extension Service and Soil Conservation Service constitute the local or county soil conservation association working under the state soil conservation advisory committee. This committee is made up of the Director of Extension, the Director of Experiment Stations and the State Coordinator of the Soil Conservation Service.

Before this meeting is through six auxiliary committees are suggested. Some times the directors prefer to pick these committeemen more leisurely. Sometimes the chairmen are elected by the group who pick the other members later and occasionally the membership of the different committees is more or less completed at this meeting. Of course, good workers can always be added.



Sampling soil on demonstration farm in
Charlotte County.



Cleaning river channel, Miller School -
Albemarle County

EROSION CONTROL

The six auxiliary committees are:

(1) Information and publicity. To this committee should be entrusted the duty of acquiring all information available as to soil erosion and giving the necessary publicity thereto, including educational work in the schools.

(2) Promotion of membership, contracts, and cooperation. This committee should be composed of the strongest members of the Association, and should serve to promote membership among land owners and farm operators in the territory of the Association, and particularly to promote their active cooperation in signing of contracts and in giving other aid to the soil conservation program. This committee also may aid the Soil Conservation Service and the A.A.A. in adjustment of contracts within the territory of the Association.

(3) Farm management committee. This committee would study the application of new methods of farm management practice as related to effective erosion control and aid in adapting such practices to local conditions. As an example, this committee might study the application of strip cropping methods, concerning which there is a minimum of research data available, but a very large amount of practical experience in which the local farmers could be very helpful to us. Pasture management and grazing control are other matters in which this committee would have value.

(4) Business committee. In those states where F.E.R.A. is now cooperating with the Extension Service in the use of terracing equipment bought from Federal funds, a committee should be appointed to organize cooperative use of this terracing equipment, and particularly in connection with the amortization payments. The President and Treasurer should be members of this committee and the latter should keep all accounts and records, collect all fees in connection with the work done, and pay such fees to the proper agencies. If desired, provision may be made for legal bond. This committee will further serve to route the equipment and determine priority of use. Likewise it should organize association activities for purchase of lime, seed, and other materials where such are needed in furtherance of erosion control work.

(5) Forestry committee. A committee should be appointed to cooperate with the State Forester, State Extension Forester, and local forestry workers for promotion of sound forest care and use. This has particular reference to organizing work for protecting wood-lands from fire, diseases, insects, cattle, etc.; cooperative marketing of woodland products, promotion of community forests, and similar concrete activities designed to bring about an integration of forest management practice with farm management.



Laying out and building terraces in Pittsylvania County



Cutting terrace channel - Pittsylvania County

(6) Committee on recreation and wild life. This committee would contact the proper representative of the State Conservation Department and would cooperate with local sportsmen, hunting clubs, etc., to promote an understanding and interest in wild life, fish conservation and recreation generally. Roadside planting could be furthered by this committee as an aid to attracting tourists and summer visitors and thereby adding to community income as well as community pride in erosion control achievement.

After the main meeting has adjourned the directors remain for election of officers. A president, vice-president and secretary-treasurer must be elected. If a terracing unit is to be used the assistant county agent in soil conservation is made secretary-treasurer.

This county soil conservation committee will develop land use policies and principles of local farm management, in accordance with the general policy of the Soil Conservation Service. This local committee must meet the approval of the State Advisory Committee.

In counties where a large tractor-terracer outfit is in use the work in the county is largely a matter of terracing and using camp labor on terrace outlets. Where there is no terracing unit in a county the local committee concerns itself with securing camp labor on gully control, pasture improvement work, selection of special demonstration farms, etc.

There are a total of sixteen county terracing or soil conservation associations in the state. The ten having terracing units have been incorporated under the laws of Virginia.

Conservation Work Outside of Demonstration or Camp Areas:

At a meeting of the directors of Extension, State Coordinators and Extension Soil Conservationists from all Southeastern states doing soil conservation work, held in Lynchburg September 1 - 2, it was agreed that two kinds of demonstrations would be conducted. This refers to work done in counties not in project or camp areas and where there are existing associations. (1) A limited number of complete demonstrations--probably one demonstration to each magisterial district. These demonstration farms to be handled just about as they are in the demonstration areas. (2) Demonstrations embracing special practices on as large a number of farms as possible -- terracing, gully control, pasture work, etc.

Since this meeting complete demonstrations have been started in Charlotte and Amherst counties. Charlotte was already organized and Amherst county was organized for this special purpose. Eighteen demonstration farms are being used in Charlotte county and six in Amherst county. It is realized now that eighteen farms are too many. These farms were selected by the



Hauling soil from river bank on Miller School farm in Albemarle County.



Dumping soil from river bank on low lands on Miller School farm, Albemarle Co.

EROSION CONTROL

county soil conservation association with the help of the county agent. When the list is made up these farmers are invited to meet with the county agent, Extension Soil Conservationist and specialists from the Extension Agronomy Department and Soil Conservation Service. The farms are of different types, sizes, etc. and typical of the section. The project is thoroughly explained to them and when they are asked whether or not they are interested the answer is unanimously affirmative.

Soils men from the SCS map their soils. Engineers plot their farms as to area, fields, slopes, etc. Agronomists go over each farm with the owner and work out a system of farming. The practice is working well and is expected to expand. The essential thing is to secure good co-operators. No doubt a number of other counties will be added in 1937.

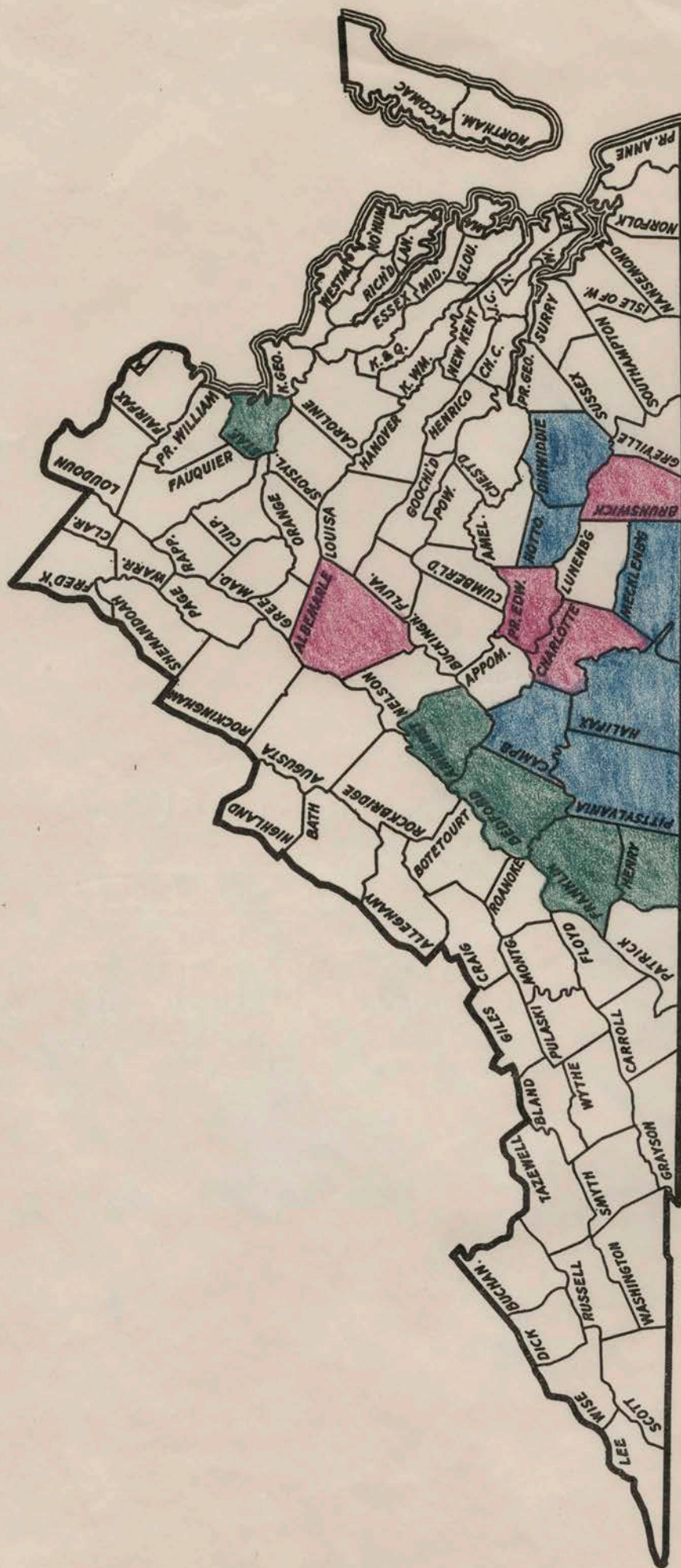
Financial:

In the beginning it was planned to follow other Southern States in asking the county boards of supervisors to underwrite the purchase of terracing equipment. The unit, consisting of a 40 HP Diesel tractor and a 9 foot blade terracer, had a retail delivered price of \$4200.00. Before any outfits were actually bargained for two of the dealers agreed to supply a limited number on a lease basis of \$150.00 per month. During the spring and summer of 1935 seven Caterpillar outfits were put in use -- one in Albemarle, Campbell, Charlotte, Dinwiddie, Halifax, Mecklenburg and Prince Edward counties. One Cletrac tractor and Austin terracer was placed in Appomattox and one in Brunswick county. The Appomattox unit was returned to the dealer when the SCS established a demonstration area in the county in which government equipment would be furnished. The Brunswick tractor was replaced recently by a McCormick-Deering tractor. The same terracer was bought for cash.

During September of this year McCormick-Deering tractors and Caterpillar terracers have been secured in Nottoway and Pittsylvania counties.

Nearly a year ago loan applications were made to the Resettlement Administration for funds with which to refinance terracing units in Albemarle, Campbell, Charlotte, Dinwiddie, Halifax and Mecklenburg counties. Last week these checks were delivered to Campbell, Charlotte, Dinwiddie and Mecklenburg counties. Checks for Albemarle and Halifax counties have not been received but are expected shortly. Last spring an application for a loan to refinance the Prince Edward unit was made to the Baltimore Bank for Cooperatives. It was received promptly. They received 60% of the appraised value of the unit, the Virginia Tractor Company taking a second lien of about \$1100.00. This second lien has been paid off.

In September loan applications were made to the Baltimore Bank for Cooperatives to purchase for cash terracing units for Brunswick, Nottoway and Pittsylvania counties. Checks for these three units came through promptly. When checks for Albemarle and Halifax counties come through all ten units will be operating on a 3% interest basis and much easier terms.



Organized counties having ECW camps but no terracing units

Organized counties having terracing units but no ECW camps

Organized counties having ECW camps and terracing units

One Federal Home
Albemarle, Appomattox and Pittsylvania counties have demonstration areas. Appomattox and Pittsylvania counties have ECW camps in these areas. Albemarle county does not have a camp.

Cooperative Duties with Soil Conservation Service:

Since July the Extension Soil Conservationist has worked in very close cooperation with the Soil Conservation Service. Numerous visits and conferences have been held in the Danville, Lynchburg and Charlottesville offices. In every instance courteous, enthusiastic cooperation was offered.

Work in counties outside camp or demonstration projects (Charlotte and Amherst), securing camp labor, exhibit used at county fairs, tours, and other cooperative projects between the Agricultural Extension Service and the Soil Conservation Service occasion many contacts.

Since September the Soil Conservation Service has paid one-half of the salaries of all (eight) assistant county agents in soil conservation. The other half being paid by the Extension Service. A joint meeting of these assistants with SOS men will be held during the coming winter.

County Terracing Associations:

The following are the county terracing associations that are in operation at this time:

Albemarle Terracing Association, Inc., Charlottesville, Va. - McNeil Marshall, Asst. County Agent in Soil Conservation

Brunswick Terracing Association, Inc., Lawrenceville, Va. - ^{W. F. Martin} T. D. Jones, Asst. County Agent in Soil Conservation

Campbell Terracing Association, Inc., Rustburg, Va. - C. L. Tune, Asst. County Agent in Soil Conservation

Charlotte Terracing Association, Inc., Charlotte, Va. - P. A. Robinson, Asst. County Agent in Soil Conservation

Dinwiddie Terracing Association, Inc., Dinwiddie, Va. - ^{T. A. Rose} (Unit temporarily doing road work in Cumberland submarginal area)

Halifax Terracing Association, Inc., Halifax, Va. - ^{H. R. Linkous} (Unit temporarily doing road work in Appomattox-Buckingham submarginal area)

Mecklenburg Terracing Assn., Inc., Boydton, Va. - J. E. Smith, Asst. County Agent in Soil Conservation

Mottoway Terracing Association, Inc., Blackstone, Va. - ^{E.} W. H. Dickerson, Asst. County Agent in Soil Conservation

Pittsylvania Terracing Association, Inc., Chatham, Va. - T. M. Jackson, Asst. County Agent in Soil Conservation

Prince Edward Terracing Association, Inc., Farmville, Va. - ^{T. L. Tyler} P. V. Kelsey, Asst. County Agent in Soil Conservation

At Large J. G. Rosenberger

RESULTS FROM TERRACING ASSOCIATIONS

County	No. of Farms	No. of Terraces	No. of Feet Terraced	No. of Acres Protected	Average Cost per Acre	Hours of Work other than Terracing
Albemarle	11	61	50,075	340	1.05	1,231
Brunswick	47	248	234,133	614	1.67	33
Campbell	68	338	235,900	561	2.73	365
Charlotte	99	430	280,995	1017	1.65	445
Durham	30	176	123,175	365	1.31	439
Halifax	36	426	244,364	605	2.43	223
Mecklenburg	64	533	338,595	696	3.06	151
Montgomery	12	82	64,900	151	3.37	14
Pittsylvania	7	59	32,475	71	3.39	10
Prince Edward	51	168	115,700	342	2.06	914
TOTALS	425	2,835	1,720,302	4,762	2.13	3,850

* These outfits have operated only two months.

† These outfits have done contract work outside their counties.

Miscellaneous work done: Grading golf greens, tree pulling, ditching, stump pulling, road building, yard grading, channel cutting for terrace outlets (SCS), leveling old terraces, sub-soiling, fence row cleaning, disking, stream clearing, sloping stream banks.

Outlook:

With the demand for terracing and other soil conservation work steadily increasing prospects for 1937 are exceedingly bright. A really big service is being done. The ECW camps are cooperating splendidly and all contacts and associations are most pleasant.

With the interest rate cut in half and a longer period provided for repayment of terracing equipment financial embarrassments are largely removed. Work other than soil or moisture conservation is more abundant and this is a much needed source of income during the dull summer and wet winter months. The Resettlement Administration at Farmville through its submarginal areas in Appomattox-Buckingham, Cumberland and Prince Edward counties is very cooperative in this respect. This work is a substantial help in meeting monthly loan repayments. A greater volume of this work is anticipated for 1937. All told, the coming year should be a very fruitful one for accomplishments in the extension phases of soil conservation.

The research program set up as a Bankhead-Jones act project together with the cooperative research contemplated with the Soil Conservation Service and the T.V.A. should give us basic information upon which to base a sounder extension program in the engineering phases of soil and water conservation.



Completing terrace in Pittsylvania County

A-2 - Land Drainage

A considerable increase in requests for drainage developed during the year but due to lack of time and personnel only a few of the most urgent requests were taken care of. Applications for drainage surveys are on file from some 15 counties for the coming year.

Surveys were made on ten farms for the tile drainage of some 350 acres of land. Recommendations were made after a preliminary survey for outlet channels to drain three large farms in Augusta county. This ditch was constructed and resulted in the drainage of 200 acres of rich bottom land that had been rendered impractical for farming due to poor drainage.

Approximately 500 acres of good land was made available for crops in Madison county through recommendations for straightening, deepening and sloping the banks of the creek channel.

Approximately 100 acres were likewise protected and made safe for farming in Rockbridge county.

An examination was made of a stream in Highland county that will need straightening to protect several hundred acres of farming land.

A survey and recommendations were made of about 150 acres of low land on the Miller School in Albemarle county. The river which runs through this low ground overflowed the banks last year and did considerable damage to the best farming land on the Miller School farm. The farm manager is following the recommendations made by the extension specialist in the widening and sloping of the river banks and the clearing of the channel. The tractor and terracer owned by the Albemarle county terracing association is doing the work on this farm which will protect this valuable farm land.

Outlook:

There is a very noticeable increase of interest in land drainage throughout the state. As conditions improve more and more farmers write us for information and assistance on this subject. Applications are already on file for assistance on this project from some 15 counties. This work will have to be continued as a minor project, however, due to lack of sufficient personnel. The most urgent and important jobs will be taken care of as far as possible while specialists are in the community on other projects.

A-3 - Irrigation

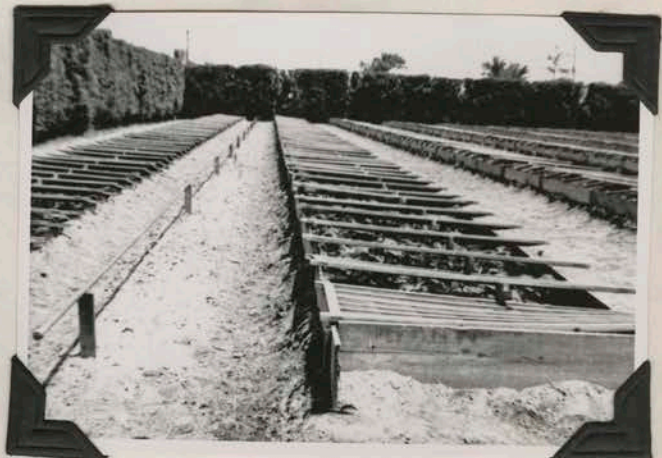
The constantly recurring drought periods and the number of successful irrigation demonstration projects that have been conducted in the past have increased the interest in irrigation.

Due to lack of personnel only a limited amount of time was spent on this project. Several orchard irrigation surveys have been made for some 200 acres. In Washington county there has been considerable interest in irrigation of cabbage. Surveys were made for two farms where surface irrigation systems were installed for cabbage. A survey for the irrigation of three acres of strawberries was made in Shenandoah county. One of the most modern, up-to-date overhead irrigation systems in the state was installed on five acres of truck crop land for Mr. B. C. Fernald of Gloucester County. An overhead irrigation system for about five acres was planned for the Boys' School farm at Covington, Virginia.

A visit was made to a number of truck farms using overhead irrigation in Roanoke, Botetourt, Norfolk and Princess Anne Counties with a representative of the Bureau of Agricultural Engineering of the U. S. D. A. These visits were made as part of a study by the U. S. Bureau to determine the costs, results, improvements, etc., in orchard irrigation practices.

Outlook:

Farmers of the state are rapidly realizing the value of irrigation. A number of requests for irrigation assistance in different sections of the state are on file and there will probably be a considerable increase in the number of acres irrigated during 1937. Considerable work will be done on this project, especially in orchard and truck crop irrigation during the coming year.



Overhead irrigation system in
Norfolk County

Irrigation of hotbeds in
Norfolk County

10-B RURAL ARCHITECTURE
B-1 Farm Structures

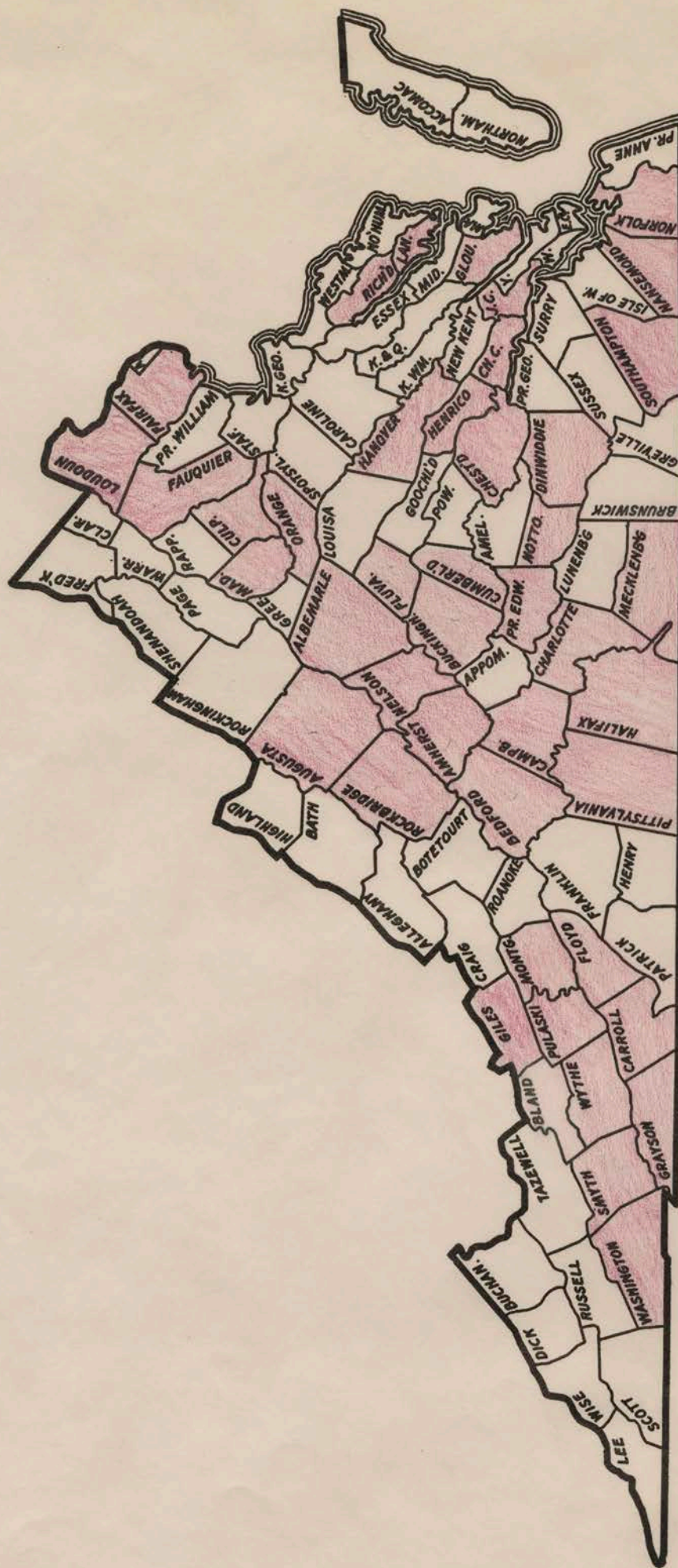
Many requests for aid in farm structures work have been received during the past year. When ever possible these have been answered by a visit along with the work in home water supply and related work done by the specialist. Advice was given on these visits concerning design of buildings, location and arrangement, and details of construction. Standard plans, drawn up by the department draftsman and kept on file, are available for all requests. Whenever the need warrants a special plan, the same is drawn up by the department draftsman. A large number of farm structures have been built from our standard plans within the last year. Also a considerable number of special plans have been prepared.

This project was handled for the first six months of the report year by Mr. Johns, a full time extension specialist. Mr. Johns spent 80 days in the field during the six-month period including visits to farms where a first-hand study of existing conditions was made, the basis for recommendations as to plans, specifications and locations for proposed buildings. In addition he spent 55 days in the office handling correspondence, directing the preparation of plans, bills of materials, etc. Actual plans were prepared in the office by a full time draftsman in close collaboration with the specialist.

In addition to cooperating very closely with specialists of all other departments of the institution as a consultant on all engineering problems, Mr. Johns spent a considerable portion of his time on sewing machine clinics with the home agents. Twenty-eight sewing machine clinics were held in all. Considerable time was also devoted to water supply problems and four stationary spray plant jobs were planned.

During the six month period Mr. Johns made 83 visits to 39 counties where work was done with 47 county and home agents. Four hundred and seventy-two letters were written, 34 meetings held with a total attendance of 760 and 11,790 miles traveled on official work. Mr. Johns sent out 891 farm building plans, together with 73 bulletins. Forty-eight farmers were helped with engineering problems in addition to those contacted in meetings and the 407 women aided through the sewing machine clinics.

In May, 1936 Mr. Johns accepted an offer from Tennessee, necessitating his replacement as Farm Building Specialist. Mr. Gordon, former Farm Building Specialist, who was serving as State Director of Rural Rehabilitation on leave of absence was recalled to devote one-third of his time to Extension work, continuing two-thirds on Rehabilitation. Mr. J. J. Bass, Jr., a recent graduate in agricultural engineering with considerable experience in planning work, was employed to assist Mr. Gordon and also to handle water supply work and drainage.



Counties in which farm structures work has been carried on by specialists from the Agricultural Engineering Dept.



Standard frame
two-story barn.
Washington market.



Standard masonry
dairy barn.
Washington market.



Thirty-cow barn
and dairy house.
Washington market.

During the 165 working days of the last six months of the year Mr. Gordon spent 47 days in the field and 19 days in the office, 11 days in excess of the one-third time expected of him. Portions of many other days not reported were devoted to correspondence, conferences, etc., on extension problems. Mr. Gordon limited his farm building work to the larger building jobs and to stationary spray plant and storage jobs, Mr. Bass handling practically all the water supply and drainage work and many of the building jobs which Mr. Gordon lacked the time to handle.

Mr. Gordon worked with 43 agents in 43 counties, making 47 visits. He also held or attended 27 meetings with a total attendance of 460, and traveled a total of 10,950 miles on official business.

Mr. Gordon prepared plans, bills of materials and estimates on four large stationary spray plant jobs, three of which are being installed at present. Help was given on eight dairy jobs, including two large milk plants. Advice was given on seven cold storage and refrigeration jobs. Fifty-nine farmers were helped with engineering problems in addition to those contacted in meetings and conferences. One hundred and forty-three letters were written, and 50 plans and 10 bulletins sent out.

SUMMARY

	<u>Field</u>	<u>Office</u>	<u>Agents</u>	<u>Counties</u>	<u>No.Visits to Cos.</u>	<u>Letters</u>
Johns	80	55	47	39	66	472
Gordon	47	19	43	43	47	143
Bass	97	57	54	52	111	393

Mr. Johns attended 34 meetings, total attendance 760. Sent out 891 plans and 73 bulletins. Traveled 11,290 miles by auto and 500 miles by rail on official business.

Mr. Gordon attended 25 meetings with total attendance of 460, sent out 50 plans, 10 bulletins, traveled 2,323 miles by rail and 7,625 miles by auto on official business.

Mr. Bass attended eight meetings with attendance of 740, sent out 1152 plans, 102 bulletins, traveled 11,967 miles by auto on official extension work.

Mr. Johns' Work	(Dairy building plans -	5
	(Farm div. " -	5
	(Water supply - - - -	14
	(Stationary spray plants	4
	(Sewing machine schools	28
	(Drainage - - - - -	2
	(Miscellaneous - - - -	15



Two views of the two-story community machine shop built by the Ottoman Farmers' Cooperative, Inc. in Lancaster County. The building houses a forge, wood working shop, metal working machinery and a seed cleaning mill.

	(Stationary spray plants	4
	(Dairy plans - - - - -	8
	(Cold storage - - - - -	7
Mr. Gordon's Work	(Drought program - - - -	28
	(Poultry plans - - - - -	4
	(Water supply - - - - -	3
	(Miscellaneous - - - - -	4
	(Dairy building plans - -	6
	(Farm div. plans - - - -	23
	(Water supply - - - - -	103
Mr. Bass' Work	(Irrigation - - - - -	7
	(Drainage - - - - -	6
	(Poultry - - - - -	11
	(Cold storage - - - - -	2
	(Miscellaneous - - - - -	18

Farm Building Plan Service:

About 350 standard plans are kept on file by the agricultural engineering department. A total of 3060 plans were sent to farmers requesting them. The structures erected from these plans will easily represent an investment of over one and a half million dollars. During the past year 32 of these plans have been retraced and revised. Fifty-six special plans have been prepared during the year, and eight new plans have been prepared and placed in the file. Mr. F. G. Payne, who is employed by the college, is in charge of the architectural drafting work for the department. He spent most of his time on purely extension work, such as designing and drawing new plans and revising old plans and giving general supervision of the W. P. A. draftsmen who were employed to work on the Farm Building Plan Book. This book was completed during the year. It contains samples in miniature of most of our more generally used plans. Each county agent was supplied a copy of this booklet for use as reference with his farmers in selecting plans for structures work.

The following is a list of new plans, revised and retraced plans, and special plans worked up by this department during the past year.

New Plans in File:

	<u>Prepared by</u>
B-3.71 Cheese factory	P.A.K.
J-1.17 Corn crib and granary	R.W.J.
J-2.73 Filter	W.H.D.
M-3.15 Community building	C.B.M.
M-3.53 Two-room, two-story family cabin	C.B.M.
M-3.54 Two-room, one-story family cabin	C.B.M.
N-6.32 Lamb and pig creep	J.J.B.
N-2.13 Pit privy	C.B.M.

BEFORE



AFTER



Farm Home Remodeling Project in Amherst County.



BEFORE



AFTER



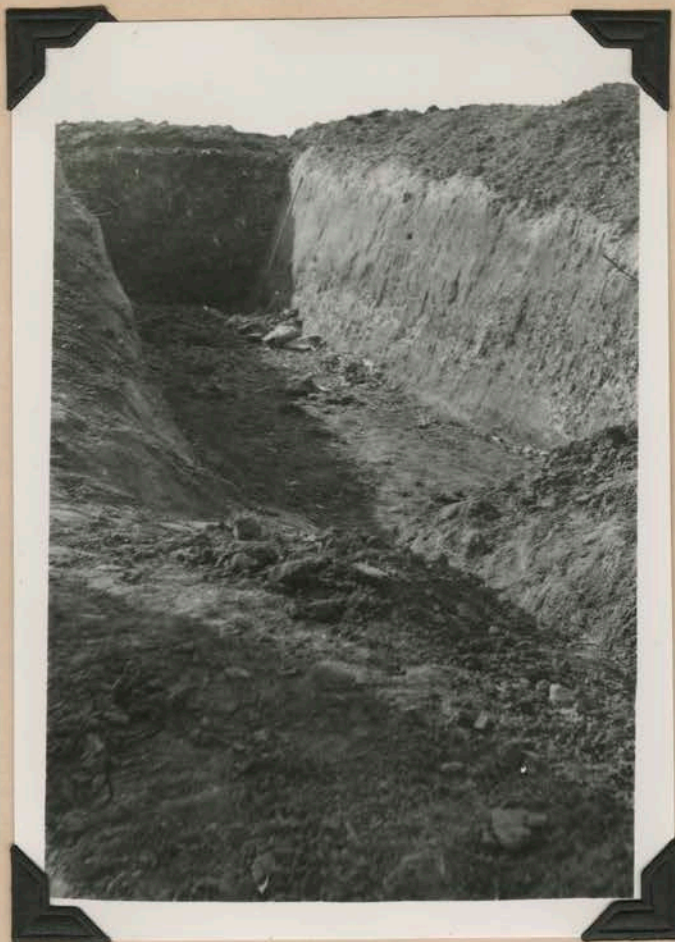
House Remodeling Project in Nottoway County, Virginia. Plans Furnished
by Agricultural Engineering Department.

Plans Revised and Retraced:

	<u>Prepared by</u>
B-1.17 Milking barn	S.R.M.
B-1.21 One-story dairy barn	S.R.M.
B-1.24 One-story masonry dairy barn	S.R.M.
B-1.51 Two-story dairy barn	S.R.M.
B-1.53 Two-story dairy barn	---
B-2.11 Milking barn and dairy house	A.G.F.
B-2.12 Masonry milking barn and dairy house	A.G.F.
B-3.15 Three-room milk house	W.H.D.
B-4.53 Face-in arrangement for barn	W.H.D.
C-1.12 Feeding barn for 20 head	P.A.K.
C-2.12 L shaped cattle shed	W.H.D.
C-5.11 Cattle stock	J.J.B.
D-1.13 Two-story barn, 10 horses	J.J.B.
D-1.14 Two-story barn, 8 "	S.R.M.
F-1.15 Multiple unit laying house	P.A.K.
G-2.11 Individual hog house	J.J.B.
H-1.12 General purpose barn	S.R.M.
J-2.31 Apple packing and storage building, 50 A	---
J-2.32 Apple packing and storage building, 100 A	---
J-3.11 Sweet potato storage building, 1000 bu.	---
J-3.12 Same as 3.11 - masonry	---
J-3.13 Multiple unit potato storage building	---
J-3.14 Same as 3.13 masonry	---
J-8.11 Trench silo	S.R.M.
K-2.12 Implement shed	W.H.D.
M-1.11 Monitor roof exhibit building	S.R.M.
M-1.12 Cable roof exhibit building	R.W.J.
M-5.11 Outdoor fireplace	P.A.K.
N-3.21 Homemade lime spreader	S.R.M.
N-4.11 Slaughter house and cooling shed	J.J.B.
N-4.22 Cattle dipping vat	S.R.M.
N-5.21 Homemade "V" drag	J.J.B.

Special Plans:

Remodeling dairy barn for F. Bell, Dublin, Va.	W.H.D.
Suggested market plans	P.A.K.
Built-in camp equipment for rural reservation reserve	P.A.K.
Horse shed, Rich Valley High School	A.G.F.



Two views of a trench silo
in Lancaster County



FARM STRUCTURES



Center drive corn crib in Orange County.
Plan J-1.12



Poultry house in Orange County. Plan F-1.15
with double length. Modern equipment throughout.

(Special plans con'd.)

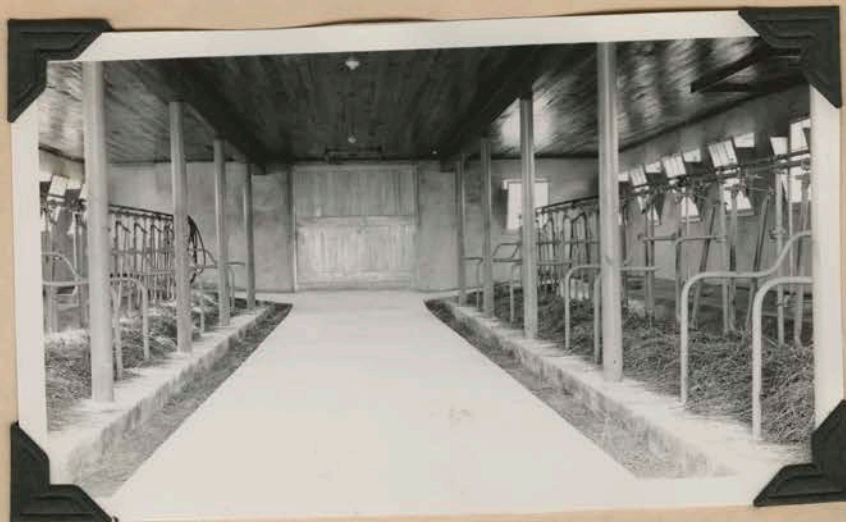
	<u>Prepared by</u>
Exhibition stand, War Memorial Hall, V.P.I.	S.R.M.
Four horse evener	F.A.K.
Dormitory for Botetourt camp, Mountain Lake	A.C.F.
Recreation for Botetourt camp	A.C.F.
Entrance and gate house, Giles Co. Fair Grounds	A.C.F.
Chatham Laboratory building	P.B.F.
Crimson clover seed stripper	J.J.B.
Potato grader	S.R.M.
Dairy building	J.J.B.
Evergreen dairy building, L. R. Dressler, Covington, Va.	P.A.K.
Earth dam with core wall, Rural Rehabilitation Reserve, Fairfax county	W.H.D.
Community house	J.J.B.
Pasteurizing plant	J.J.B.
Remodeling of Sharon Baptist Church near Danville	F.C.P.
Remodeling of residence for W. S. Green, Burkeville, Va.	F.C.P.
Bedroom addition to House "D"	F.C.P.
Log barn for J. R. Hutcheson	F.C.P.
Pole barn for J. R. Hutcheson	F.C.P.
Community center building	P.A.K.
Drawing boards for Extension office	F.C.P.
Remodeling of building for Mecklenburg county, Boydton, Va.	P.A.K.
Book rack	F.C.P.
Vegetable washing and storage building for Mr. Sanderson, Hollins, Va.	F.C.P.
Arts and crafts recreation building, Christiansburg, Va.	A.C.F.
Boykins community center	A.C.F.
Storage reservoir, Frank Jones, Washington, Va.	S.R.M.
Reservoir	A.C.F.
Residence for J. R. Horsley, Appomattox, Va.	F.C.P.
Community center remodel	A.C.F.
Chatham Hill recreation building	A.C.F.
Rich Valley High School plot plan	A.C.F.
Community center plan	F.C.P.
Tent frame for transient camp on campus	F.C.P.
Turkey shelter	P.A.K.
Rose Hill community gym	F.C.P.
Revised turkey shelter	A.C.F.
Addition to dairy barn, Stuarts Draft	A.C.F.
Grandstand, Giles county fair grounds	J.J.B.
Feed barn, M. K. Kendrick, Suffolk, Va.	S.R.M.
Dairy barn, Wm. Gladstone & Son, Cape Chas., Va.	A.C.F.



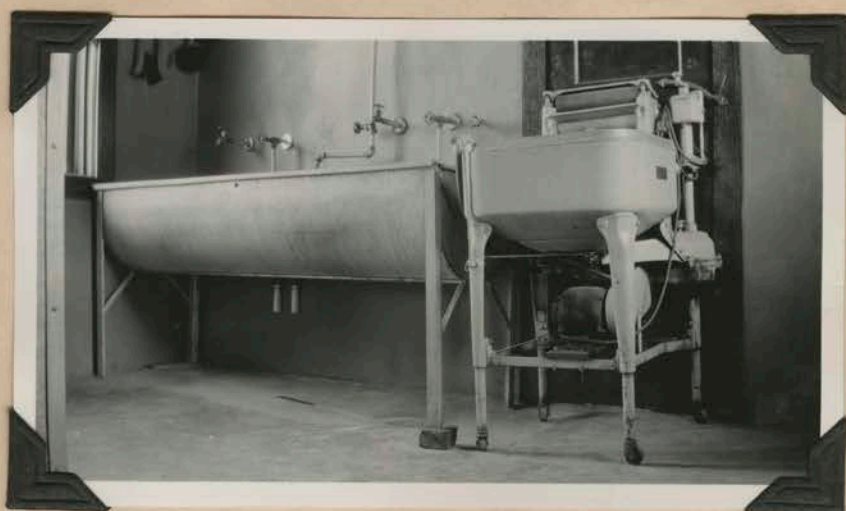
A bank type beef cattle barn in Smyth County. Completed in October 1936 according to plan H-1.22.



General purpose barn in Orange County. Completed in September 1936. According to plan H-1.14. Equipped with lights and running water.



Interior view of
standard dairy barn
- Washington market



Wash tank and washing
machine for washing
towels and suits.
Required by Washing-
ton market.



Dairy sterilizing
cabinet. Required
on Washington
market.

(Special plans con'd.)

	<u>Prepared by</u>
Recreation reserve plot plan	A.G.F.
County agent office building	P.A.K.
Alteration to six cow barn	A.G.F.
Calf barn	S.H.B.
Portable dairy for rural rehabilitation	P.A.K.
Assembly hall	P.A.K.
Sleeping lodge	P.A.K.
Agricultural engineering building plans for laboratory and office units	F.G.P.

Plans Sent out by the Department According to Divisions:

Farm house plans	126
Dairy barns and equipment	644
Beef cattle barns and equipment	47
Horse barns and equipment	21
Sheep barns and equipment	4
Poultry houses and equipment	1494
Hog houses and equipment	70
General purpose barns	85
Storage buildings and equipment	140
Machine sheds and shop buildings	18
Tobacco barns and equipment	3
Public and camp buildings and equipment	124
Miscellaneous buildings and equipment	216
Special plans	68

Total 3060

Outlook:

The year was very successful from the farm structures standpoint. The need for better farm structures is tremendous and is being realized more and more as time passes. Like many other projects in our agricultural engineering work, this project could well utilize the full time of a specialist. As economic conditions improve farm building work picks up so it is expected that 1937 will see a greatly increased demand for plans and assistance on this project.

10-C RURAL ELECTRIFICATION
C-1 Rural Line Extensions

The rural electrification project of the agricultural engineering department which includes research, extension and resident instruction has been handled by Mr. E. T. Swink. Although Mr. Swink is not employed by the Experiment Station a certain amount of research work is very essential in providing proper information for successfully carrying out the extension and college program. The following tabulation is a summary of the extension work in rural electrification for the year ending November 30, 1936:

Days in field	109
Days in office	187
Meetings held in field	21
Total attendance of meetings	714
Letters written	461
Bulletins distributed	705
Survey blanks used	775
Miles traveled	15163
Agents visited	48
Visits to agents	74
Counties visited	47
Visits to counties	100
Radio talks	3

A large amount of the field work during 1936 consisted of jobs that required considerable more office work than the field work last year. More outstanding of this was work on individual hydro-electric plants and private power lines. This factor accounts for the increase in the time spent in the office over last year.

Considerable time was spent the first part of the year in holding conferences and meetings with rural groups in cooperation with the county agents explaining the policies of the Rural Electrification Administration. At such meetings, the extension plan of the local utility was usually explained as well as the R. E. A. plan. If the group desired to work up a project, the procedure was explained to them and the necessary forms provided. Most counties in the state are now familiar with the R. E. A. plan and many of them made surveys of their projects and submitted them to the R. E. A.

Developments in Rural Electrification in Virginia During 1936

There has probably been more developments and progress made in rural electrification in Virginia during the last twelve months than in any similar period since 1929. A large number of conditions and influences have been responsible for this progress. The following definite reasons may be cited:

1. Rural people are becoming educated to the value of electric service in improving their social and economic well being.



Farmers Rural Utilities substation under construction near Bowling Green, Caroline County. This station will supply approximately 400 miles of distribution lines with current.

World Power Conference group, state officials and R.E.A. representatives inspecting substation at official opening.



2. The Federal Government, in establishing the Rural Electrification Administration has stimulated the movement by indirectly forcing the utilities to become more active in the extension of service and by financing the construction of lines on easy terms.
3. The efforts of the state college and State Corporation Commission to coordinate all agencies through education, conferences and planning.
4. The progressive attitude and interest of the leading utilities in extending service to rural areas.

No one of these reasons or conditions would exist without the other three, however, with the combination of all four, real impetus has been given to the rural electrification movement.

Cooperation with the State Corporation Commission

Many problems and differences of opinion have arisen during the year that required the services and efforts of an impartial mediator. The agricultural engineering department serving in an advising capacity has cooperated with the State Corporation Commission in performing this duty. Early this year a conference was called by the commission of all agencies interested in rural electrification in the state at which time many problems were discussed. Two committees were appointed at this time, one representing the farmer group and one representing the utilities in the state. The committees have served during the year with the agricultural engineering department and the State Corporation to iron out misunderstandings and difficulties that have arisen.

Much has been accomplished during the year through the cooperative efforts of the agricultural engineering department and the State Corporation Commission in the reduction and simplification of electric rates and the liberalization of rural line extension policies. The three largest utility companies operating in the state have made substantial reductions in rate schedules applying to rural customers and in all cases the rate structures have been simplified, - a step that this department has insisted on for years.

There had been an increasing need for a revision of the State Rural Extension plan which was formulated and adopted in 1929. Through the cooperative efforts of the agricultural engineering department and the State Corporation Commission this plan was revised and simplified in December 1935 and the minimum revenue requirement was reduced to 1% of the construction cost per month. Every utility in the state with the exception of one small company adopted this plan early this year. This represented a reduction of from 15% to 40% in the minimum revenue requirements of the utilities and established a uniform plan throughout the state. This was accomplished directly through the close cooperation of the department and the Commission and required many conferences with representatives of the utilities.

Since the minimum revenue required on new rural extensions is based

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

on the construction cost of the line, under the state rural extension plan, the agricultural engineering department and the State Corporation Commission have been swamped with complaints of high line cost estimates by the utilities. The State Corporation Commission has accepted the recommendation of the agricultural engineering department that a qualified and experienced agricultural engineer be added to the commission staff to handle such complaints. The agricultural engineer was employed by the commission July 15 and his main duty is to meet with rural groups and check line cost estimates made by the utilities that appear too high to the people affected. This is proving to be an effective method of solving such difficulties between the utility and rural groups. Two disagreeable situations in the state have already been cleared up through our cooperation with this engineer.

Educational Work with the Utilities

The various utilities in the state have called on the agricultural engineering department for assistance in many phases of their rural electrification work during the year. This included advice on load building programs, feasibility of certain extensions and educational advice and information on equipment installations. This cooperation has been particularly true of the two large utilities who employ agricultural engineers in their rural service work.

Two of the large companies have added additional agricultural engineers to their staffs and other trained personnel to the rural service departments to handle the increased activity in the extension of rural lines. It is apparent that some of the utilities who have not recognized the importance of rural service work are beginning to see the handicap under which they are working when they note the progress being made both in load building and line extensions by neighbor companies.

The utilities have cooperated with the department in carrying on research work by metering equipment in the field, supplying equipment operating data and supplying equipment for use here at the college.

The Activity of the Rural Electrification Administration in Virginia

During the last year the Rural Electrification Administration has established a more definite plan of operation. Since the establishment of this Federal agency there has been an enormous amount of interest in it in Virginia. The extension rural electrification specialist has assisted many groups in explaining the R. E. A. requirements for projects and in supplying survey material and instructions. A large number of projects were submitted to the R. E. A. and during the year, one project was approved and is now under construction. Tentative allotments have been made for projects in Craig county, the Shenandoah Valley and the Blackstone area, however, no construction has been started on these projects.

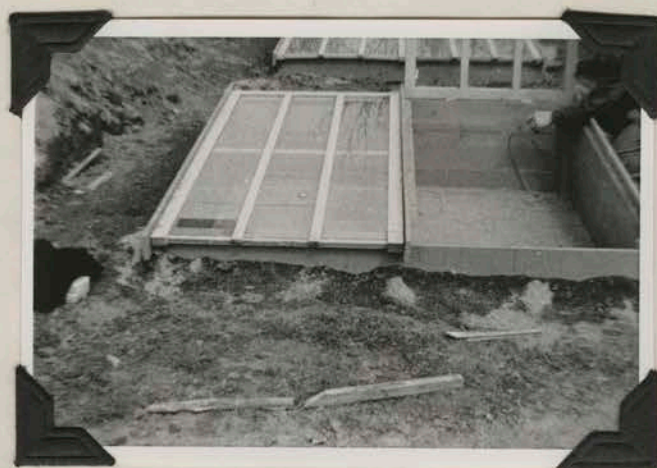
The R. E. A. project that is becoming a reality is the Farmers' Rural Utilities, a non profit corporation with headquarters at Bowling Green, Virginia. When completed it will consist of about 400 miles of line making



Excavation for a
permanent electric
hot bed.



Concrete frame
hotbed under con-
struction. Note
cinder insulation
in bottom.



Wood frame hotbed under
construction. Cinders
and sand are in place
and ready for the heat-
ing cable.

electric service available to approximately 1500 rural families. Approximately 100 miles of line were constructed during the year and about 125 customers are now receiving service. The project will serve parts of Caroline, Hanover, Spottsylvania and Orange counties.

The agricultural engineering department has been doing everything possible from an educational and advisory standpoint to assist the Farmers' Rural Utilities with their problems. Six educational night meetings were held by the rural electrification specialist in their territory explaining rates, operating costs of equipment and answering questions on wiring and wiring layout. The meetings were held in areas where the lines were either built or under construction and the average attendance was 66 persons per meeting. A sound-slide film on rural electrification was used along with pictures of installations on Virginia farms to show the uses of electricity on the farm. Blackboard illustrations were given to show how to compute bills and the cost of operating equipment. Literature was supplied those in attendance and a question period was included in the meeting. Special problems on individual farms were handled during the day. This work was all planned with the assistance of the local county agent at the request of the utility organization. This type of work is proving very helpful in getting customers to take and use the service quickly and intelligently. Since the organization has no trained personnel for doing this work, it appears that the agricultural engineering department can render its greatest service to such organizations in this way.

The Rural Electrification Administration has adopted the policy of establishing electrical demonstration farms on the projects they sponsor. We are cooperating with them in this activity by assisting in the planning of these farms and selecting the type of equipment most suitable to install under local conditions.

The Virginia Farm Power Board

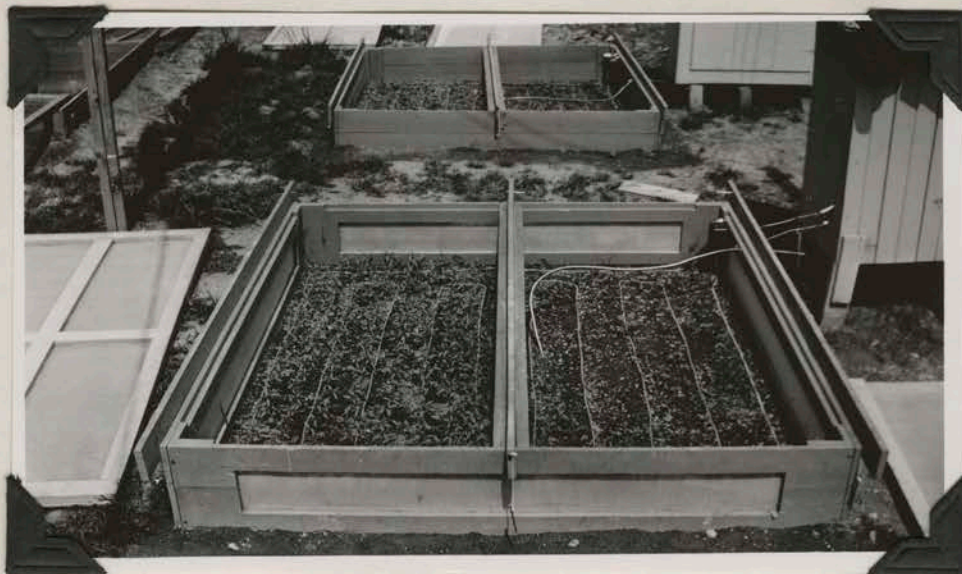
The Grange, Farm Bureau and the Rural Electrification Administration are now sponsoring a newly organized agency called the Virginia Farm Power Board. The purpose and policies of this organization have not been made clear, but it is apparently the organ of the F. B. A. in the state for the promotion of electric cooperatives. Since the organization is new and no tangible results have come from its activity, the agricultural engineering department has had no occasion to cooperate with it other than in the form of conferences.

State Meetings on Rural Electrification

Three general conferences were held in Richmond during the year under the sponsorship of the State Corporation Commission. The first of these conferences resulted in the committees already described being appointed. The other two were conferences of the committees and the Commission on problems in rural electrification that have arisen during the year.



Electric hotbeds under construction. Two beds have sashes in place. Note houses for instruments.



Tomato plants growing in the two portable wood frame hotbeds. Note difference in the #2 frame and arrangement of heating cable on surface of bed.

A two day rural electrification conference was sponsored by the agricultural engineering department at V. P. I. on November 13 and 14. The program of the conference is included in the exhibit section of the report. Every organization interested in rural electrification in Virginia including the Utilities, Farm Power Board, State Planning Board, State Corporation Commission, Rural Electrification Administration and the V. P. I. Extension Division represented with a total attendance of 45 persons. The two largest manufacturers of farm electric equipment had factory representatives present who contributed to the program. This was the second consecutive such meeting and it was voiced very valuable by all who attended. The organizations have requested that it be made an annual affair and the interest shown indicated that it would be justified next year.

Research Work in Rural Electrification Effecting the Extension Program

The rural electrification specialist has carried on several research projects on rural electrification during the year. Studies have been made on applications on which literature is needed for distribution in answering requests and doing educational work. The following projects have been worked on during the year:

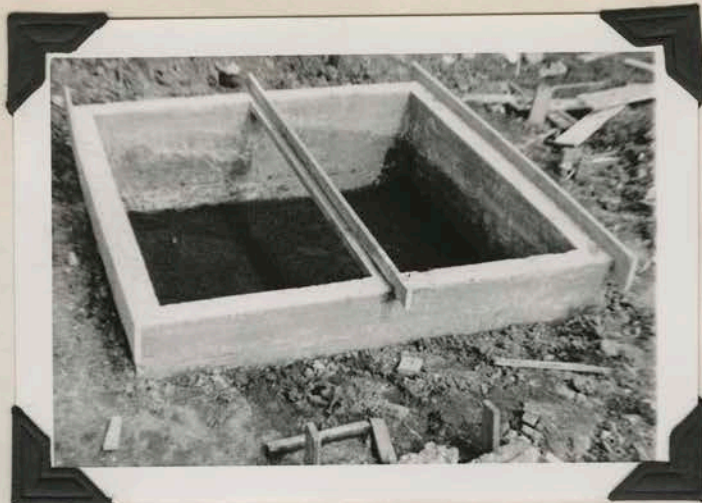
(1) Electric dairy sterilizers - This project was sponsored by the agricultural engineering department and the Tennessee Valley Authority. A report of the study is included in the exhibit section of this report which was printed for limited distribution. A bulletin for general distribution will be published later. It is hoped that the information obtained in this study will be sufficient to get electric sterilizing equipment officially approved by all health authorities supervising Virginia milk producers.

(2) Chick brooder studies - A study of the most common types of chick brooders was carried on by the agricultural engineering department with the cooperation of the poultry department during the year. The project was started in November 1935 and was concluded in June 1936. A farmers' bulletin has been published giving the results of the studies. A copy of this bulletin is included in the exhibit section of this report.

(3) Electric soil heating and sterilization - A study of electric hotbeds and electric soil sterilizers was started in January 1936 in cooperation with the plant pathology department. These studies are still under way and will be continued through the winter of 1936-1937.

(4) Farm cold storage - A study is now under way by the agricultural engineering department in cooperation with the Bureau of Agricultural Engineering U. S. D. A. on apple cold storage buildings and cooling equipment. Records are being kept on three buildings in Southwest Virginia where the study is being made. This will be continued through next year.

(5) Electric fence - Numerous requests have been received for



Concrete walled electric
hotbed under construction.



View of the eight
electric hotbeds being
studied. The small
houses are for meters,
switches and thermo-
meters.



Laying the heating
cable in a portable
electric hotbed.
The frame is knock-
down type. Note
the celo-glass
panels and thermo-
stat in corner.

RURAL ELECTRIFICATION

(Rural Line Extensions)

10-C Rural Electrification (Con'd)
C-1 Rural Extension Lines

information on electric fences. An electric fencing unit has been obtained by the agricultural engineering department and is being observed and checked in actual operation. A short circular will be printed later giving information on electric fences based partly on the results of our observations.

Publications

The following publications have been printed during the year by the rural electrification specialist:

Stencil #19,147 "A Study of Electric Dairy Sterilizers" by S. M. Beane T. V. A. and E. T. Swink, V. P. I. Agricultural Engineering Department (200 copies for limited distribution.)

Experiment Station Bulletin No. 306 "Chick Brooder Tests" by E. T. Swink (7500 copies for general distribution).

Stencil #18,747 "Progress Report on Chick Brooder Studies by E. T. Swink (200 copies for limited distribution).

Progress in Rural Electrification in Virginia in 1936

The combined forces of all agencies interested in rural electrification together with the better financial condition of rural people has resulted in more progress being made than in any one year since 1930. Briefly, this progress can be attributed directly to the following accomplishments which are discussed elsewhere in this report:

1. Revision of state extension plan reducing minimum guarantee to $1\frac{1}{2}\%$ of construction cost per month.
2. Educational work with rural groups.
3. Supplying facts based on research work.
4. Creation of Rural Electrification Administration resulting in competition for rural territory with utilities.
5. Better financial conditions of rural people.



Branch line leaving
6900 volt single
phase line.

New types of rural
line construction
being used by the
Utilities and R.E.A.



Secondary wires leaving
6900 volt transformer to
serve three customers.



Vegetable processing and cold
storage house. Second floor
is for storing empty contain-
ers. Sanderson truck farm,
Roanoke, Virginia.

RURAL ELECTRIFICATION
(Rural Line Extensions)

10-C Rural Electrification (Con'd)
C-1 Rural Extension Lines

The following tabulation shows the progress made by the utilities compared with statistics for 1934 and 1935:

	<u>1934</u>	<u>1935</u>	<u>1936</u>
Miles of line built	133.5	289.35	625.42
Total miles of line	5809.60	6098.95	6724.37
No. Rural customers added on new lines	---	---	3128
Customers added on existing lines	---	---	1460
Total rural customers added	1715	2327	4588
Total rural customers served	38092	40419	45307

The Farmers' Rural Utilities with headquarters at Bowling Green have constructed 100 miles of line to serve approximately 300 customers. This makes a total of 725.42 miles of line built in the state in 1936 to serve 3428 customers. Adding this figure to the 1460 customers connected on existing lines shows that 4888 rural families received electric service for the first time in 1936.

Practically all the utilities in the state have made reductions varying from 5% to 13% in addition to the reduction in minimum revenue guarantee required on new lines. The most outstanding progress has been made by the two larger companies who maintain rural service departments and employ trained agricultural engineers. An official of one of these companies states:

"Our Rural Service Department has been extremely active explaining the new plan to prospective customers, obtaining contracts, making surveys, obtaining rights of way, and otherwise assisting all possible in getting rural lines constructed. There has been little opportunity to devote much time to the strictly promotional and educational work of the agricultural engineer, but it is expected that this work will become increasingly important due to the large amount of rural line construction under way."

The following statistics in the activities of this company in rural electrification in 1934 and 1935 are interesting:

VIRGINIA ELECTRIC AND POWER COMPANY

DATA PERTINENT TO FARM CUSTOMERS - STATE OF VIRGINIA

	<u>12 Months Ended</u>			<u>%</u>
	<u>12-31-35</u>	<u>10-31-36</u>	<u>Increase</u>	<u>Increase</u>
Number of Farm Customers at end of period	1,837	2,099	262	14.26%
Average number of Farm Customers	1,831	1,968	137	7.48%
Kilowatt-hours delivered	4,610,297	5,185,250	574,953	12.47%
Revenue	\$137,485	\$147,287	9,802	7.13%
Average kilowatt-hours per farm Customer	2,518	2,635	117	4.65%
Average revenue per Farm Customer	\$75.09	\$74.84	- \$0.25	- .33%
Average kilowatt-hour cost per kwhr.	2.96¢	2.84¢	- .14¢	- 4.70%

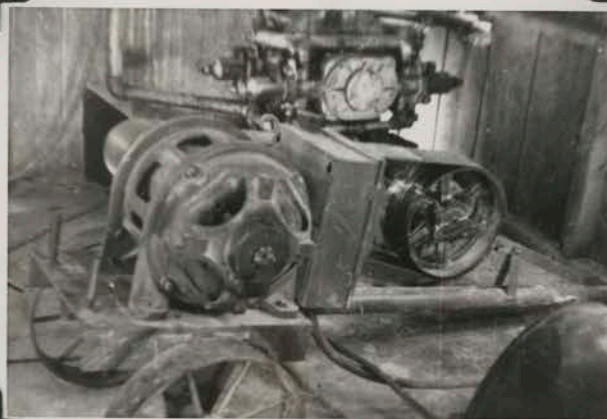
Most significant in the above tabulation is the decrease in the total revenue derived from farm customers and the decrease in average cost per kwh to 2.84¢. The average consumption per farm customer of 2635 is approximately three times the national average consumption on farms, and represents an increase of 4.65% over 1935.

Probably the most outstanding progress that has been made is the realization on the part of the utilities that there is a rural electrification job to be done and that it is their duty to do this job as far as possible. As a result of this, the companies are becoming better organized for promoting their rural programs on an intelligent and planned basis.

In addition to the progress made by the utilities, the program of the Rural Electrification Administration has made some progress in the state during the year, however, with the exception of the Farmers' Rural Utilities as reported above, no tangible results can be given on the R. E. A. projects.

A homemade electric brooder on a Wythe County farm. The picture shows the top of the brooder propped open.

This electric hotbed produces early plants on a Norfolk County truck farm.



A 15 HP portable electric motor operating a stationary spray plant on a Wythe County farm. This motor is also used for sawing wood, grinding feed and operating the apple washer and grader.

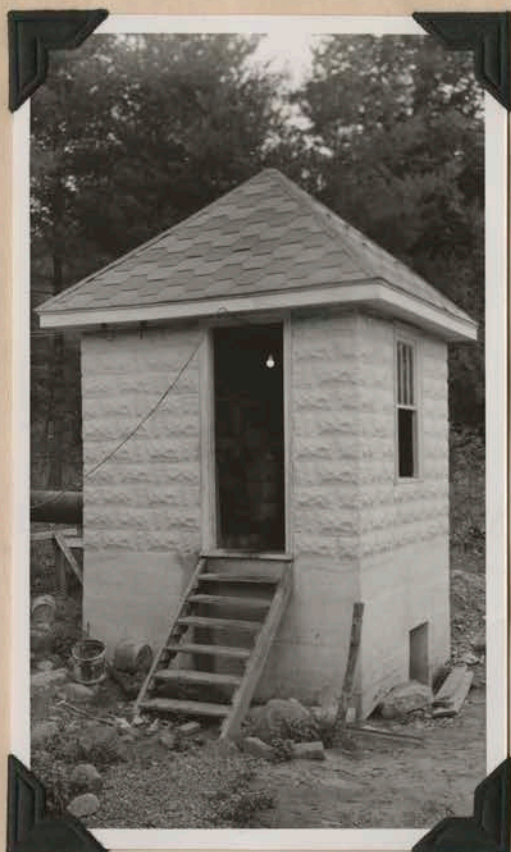
Summary of Results

The following results from the extension program in rural electrification were accomplished in cooperation with the other agencies in the state as discussed in this report:

1. The state rural extension plan was revised reducing the required minimum guarantee to 1½% of the construction cost, establishing a uniform minimum with all companies. This meant a reduction of from 15% to 40% in minimum guarantees and a saving of thousands of dollars to rural electric consumers.
2. Rate reductions were made with savings of from 5% to 15% on customer bills.
3. Rate structures were simplified.
4. Better organized rural service departments have been established with the utilities for a more rapid extension of rural lines.
5. Further reductions in line costs were affected.
6. More liberal policies were adopted on providing secondary services and private lines for customers.
7. The Electric Power Companies have built approximately 625 miles of rural lines to serve 3428 rural customers during the year. The Farmers' Rural Utilities Company has built 100 miles of rural lines to serve 300 customers.

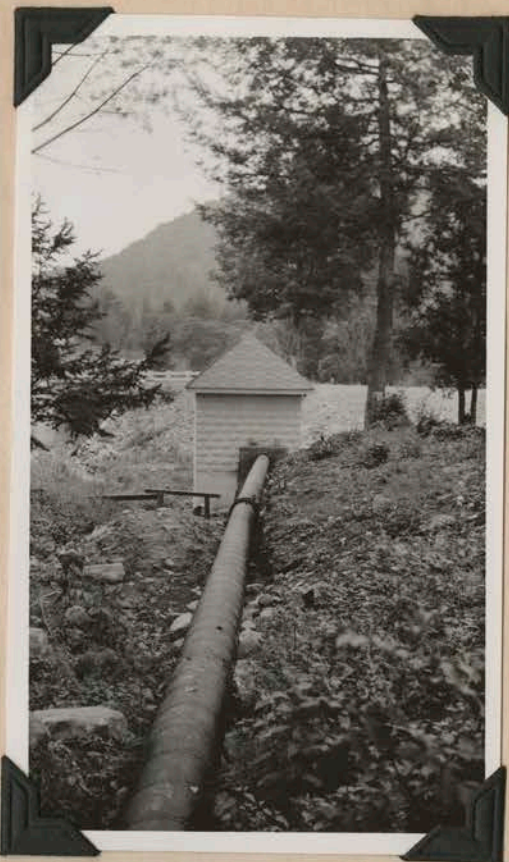
The extension specialists in rural electrification have accomplished the following results to forward the rural electrification program through direct extension work:

1. Five research problems were carried on that related to rural electrification extension work.
2. Three publications were printed on popular topics for educational use.
3. Twenty meetings were held in the field in the interest of load building and line extensions with an attendance of 734 farmers.
4. A better understanding of the program of the R. E. A. was established enabling a closer cooperation with that agency.
5. Further steps were taken to keep down the cost of rural lines and handling line cost complaints by succeeding in having the State Corporation Commission employ an agricultural engineer to investigate such complaints.



Generator house

Hydro-electric plant
on Muddy
Creek, Bath
County



Flume and power
house



Flume leaving diversion dam
in stream bed

6. Testimony was given in form of the cooperative Rural Electric Bill before the Senate Committee by one of the extension agricultural engineers which resulted in the passage of this bill by the last session of the State Assembly.

Outlook

This year just past has been a banner one in rural electrification in Virginia as was predicted in the outlook in the report last year. All indications are that 1937 will show still greater accomplishments in the state. Practically all the utilities are enlarging their rural service and line extension crews and are planning greater expansion next year. The minimum revenue requirement of 1% of the construction cost is making it possible to extend lines heretofore believed impractical. It is more than probable that construction will be started on one or more electric cooperatives during the year, opening a newer field of work.

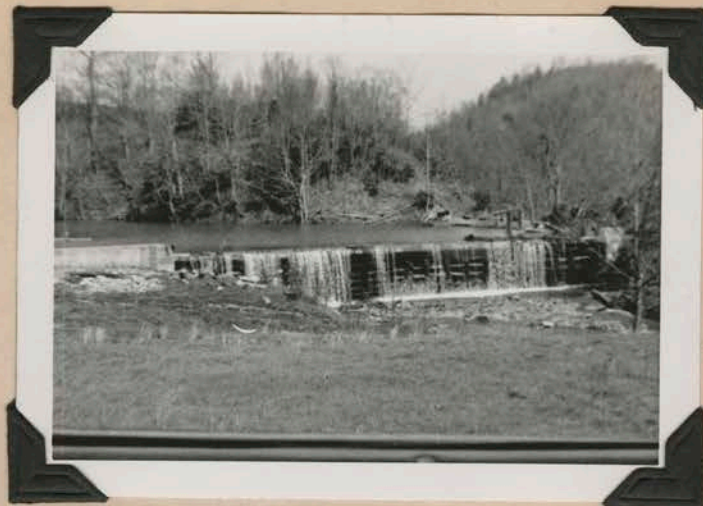
Rural people are becoming electrically conscious rapidly. However, experience is showing that more thorough and intensive educational work must be done to keep the program moving. For lines to be extended on a practical basis, the people must be taught to accept the service immediately and they must be advised how to use the service intelligently and to an economic advantage. There will certainly be a greater demand for this service from the agricultural engineering department than ever before, and especially in areas served by cooperatives and non-profit corporations. This work will also require the use of more simple and practical literature that should come from the results of local research work for it to be of most value to the people receiving it.

Therefore, it is safe to say that more people will receive service for the first time and obtain the advantage of electric power in 1937 than in any one year since 1930.

C-2 Farm Water Power

There are many sections of the state where the possibilities of obtaining high line service are remote, that offer some possibility of electricity for the farm from local water power. The agricultural engineering department has made field surveys of 31 hydro-electric power sites during the year at the request of the owners. These surveys were made in the following counties as indicated:

Bath	1
Appomattox	1
Lunenburg	1
Patrick	12
Bland	1
Washington	1
Scott	2
Grayson	1



Log dam and power house of hydro-electric project in Grayson County, between Galax and Independence.



This plant serves three residences and two filling stations.



Hydro-electric plant under construction on Dan River to serve Vesta community.



Views of hydro-electric plant under construction for
Beatie Williams near Stuart, Va.

RURAL ELECTRIFICATION (Farm Water Power)

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

Carroll	5
Bedford	2
Wythe	1
Floyd	3

Several of these plants have been or are being installed while many of the sites proved to be impractical for such reasons as: Not enough water; no fall available; site too far from owners home; too expensive to install and no funds available.

One of the most interesting hydro-electric jobs that was worked on during the year was on the headwaters of the Dan river in Patrick county. Mr. W. A. Cochran is the owner who also operates a mill. A 16" turbine is being installed that will operate a generator with an output of approximately 10 kw. Approximately three miles of distribution line is being constructed and about ten residences will receive electricity from this plant. Assistance was given Mr. Cochran in surveying the site, making suggestions for the installation of the equipment, surveying the distribution line and designing the distribution line. Photographs of this project are included in this report.

In many cases where the power site was not suitable for development, information was supplied the owner on other generating equipment. During recent years, a number of manufacturers are building small gasoline electric plants that sell for \$35 and up depending on voltage and capacity. In many cases, such plants will meet the needs of the farmer as well as a small hydro-generator and the installation cost is so low that the operating cost will be more than offset in the difference between installation costs.

Outlook

Requests for assistance in surveying and developing hydro-electric sites will continue to come as more farmers realize the possibilities of such developments and as farms change ownership. However, with the development of cheaper gasoline electric generators and the extension of more electric lines by the utilities, such requests are likely to decrease rather than increase in the near future.

10-D Household EngineeringD-1 Farm Water Supply

A large number of requests for farm water supply surveys which have been received during the past year have been sent in by farmers without any solicitation on the part of the county agent or specialist. A number of other requests have been sent in through the county agent or home demonstration agent.

Every request received has been acknowledged and then as soon as possible the specialist has visited the person from whom the request has come and has made a survey or given the necessary advice regarding the proposed water system. The specialist has been required to do a considerable amount of driving in his personal car due to the equipment that must be carried in doing this work and the impossibility of county agents or home demonstration agents being able to take the specialist to the farms where surveys have been requested.

Procedure:

Whenever requests have been made for help on home water supply the specialist visits the site of the proposed system and makes a complete survey of the situation to determine which type of system is best under existing conditions. After this is done the specialist figures the size pump or hydraulic ram needed, the size engine needed, if a pump is used, and the size and amount of pipe needed. The specialist gives this information, along with instructions on pump or ram installation, to the farmer who can proceed with the system installation.

Results:

A total of 139 farm water supply surveys were made in 43 different counties. The following are the types of water systems recommended by the specialist where water supply surveys were made:

	<u>Bass</u>	<u>Waller</u>	<u>Johns</u>
Hydraulic ram	33	13	Total
Automatic electric	15	2	of
Gasoline engine outfits	14	3	14
Gravity	13	2	Surveys
Hand pumps	5	1	
General kitchen and bath fixtures	23	0	
Water wheel pump	0	1	



Chart showing counties in which work has been done on water supply, irrigation and drainage



Concrete storage tank
on C. C. Umbarger's
farm, Marion, Virginia.
Water is pumped 1000'
from the spring to this
tank by a No. 30 Rife
ram. The milk house
shown below, 3000' from
the tank, is supplied
with water by gravity
from the tank.



FARM WATER SUPPLY

Since this help was mostly voluntarily requested we feel confident that most of the surveys and recommendations will result in actual installations in the near future. We know that many of the systems have already been installed according to recommendations.

Outlook:

The general upward trend in business is reflecting more and more in home improvement. Since water supply is so essential on the farm there will no doubt be a large number of installations in 1937. A number of requests are on hand which will be handled as soon as possible.

A specialist could well spend his full time on this project alone. Stress will be placed on this project as much as possible with limited funds available. There is a brighter and more encouraging outlook for home water supply in 1937 than ever before.



A hydraulic ram and overhead tank -- probably one of the most used and certainly one of the cheapest methods of home water supply.

D-2 - Farm Home Equipment

Close cooperation is maintained between this department and the Home Economics Department in helping the agents with their program in farm home equipment. Practically all the effort in this project was devoted to holding sewing machine schools.

Sewing Machine Schools:

In November a circular letter was sent to all home demonstration agents explaining the value of sewing machine schools and how to organize them. (Copy in the exhibit section). Forty-eight schools have been requested from twenty-three counties. This work was started last year and requests to date have more than doubled the request for that work last year. This shows the great interest of our farm women to take advantage of help offered in farm home equipment.

This project was handled by Mr. M. M. Johns, a full time extension specialist, who devoted the majority of his time to farm structures, farm water supply, drainage and stationary spray systems.

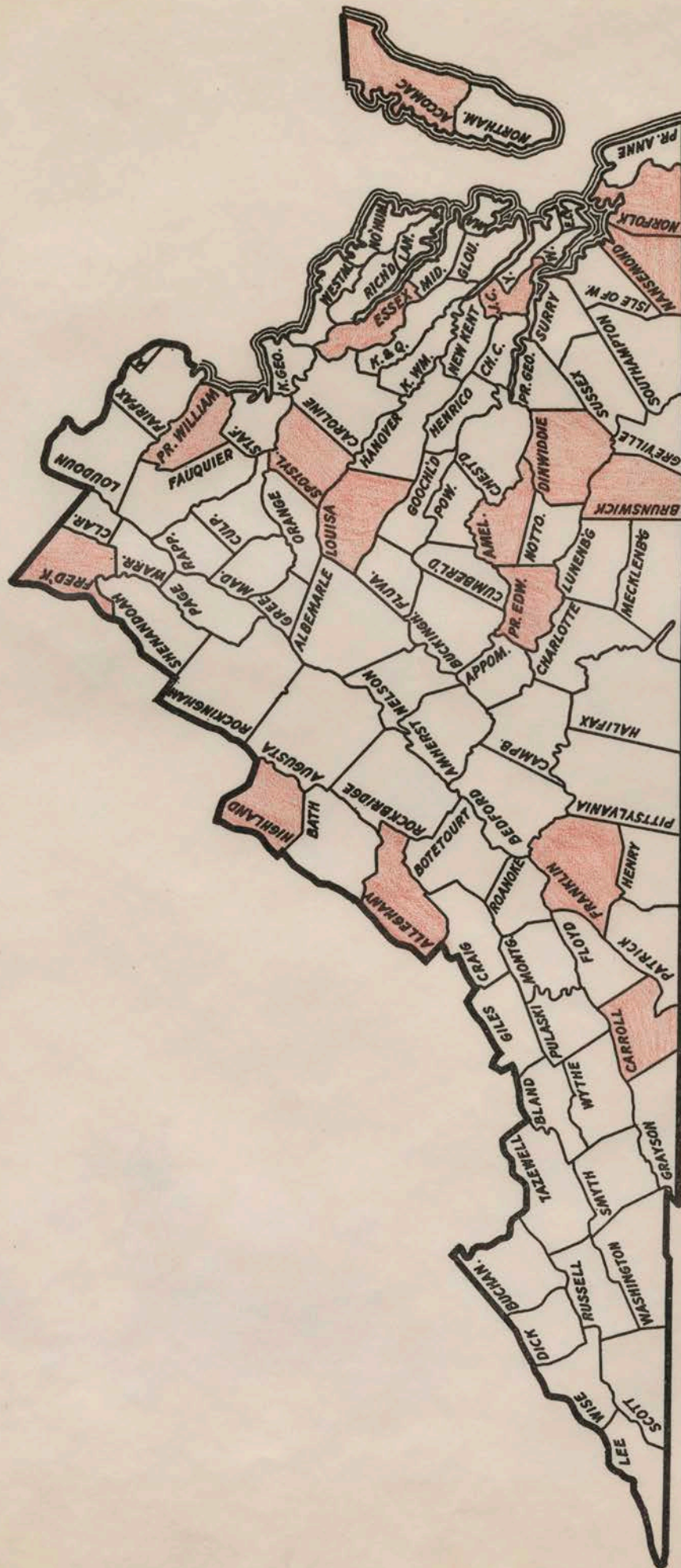
The specialist spent 31 days in the field holding sewing machine schools. He cooperated closely with the home demonstration agents in counties where such schools were held. He also cooperated with the sewing machine companies throughout the entire state.

Object: - To teach women how to clean, adjust and care for their sewing machines. To readjust sewing habits at home or in other words get the farm women "Sewing at home minded", as it once existed. No attempt was made to teach stitching or use of attachments. It is impossible for our home demonstration agents to teach sewing successfully unless their club members' sewing machines are in proper running condition.

Procedure of Project: - A number of home demonstration agents had requested help in holding sewing machine schools in their counties. Taking this into consideration the agricultural engineering department of the extension division wrote to home agents regarding this matter to determine the number of counties desiring such a project. Circular letter #17,789, which is exhibited in this report, was sent to all home agents, attached with this letter was Circular entitled, "Organizing Sewing Machine Schools".

The home agents selected all meeting places and put every effort forward to have the farm ladies on time which aided a great deal in making the project a success.

The specialist carried a tool kit, consisting of 14 gas squirt cans, 14 pie pans, 28 screw drivers, 14 small oil cans, needles for all makes of machines and charts showing the various adjustments on sewing machines. Sewing



COUNTIES IN WHICH SEWING MACHINE SCHOOLS WERE CONDUCTED

Note:

Five schools were conducted in	Louisa county, including one negro school.
Four "	" Prince William county.
Four "	" Norfolk county.
Two "	" Alleghany county.



Sewing Machine School held in Va. Elect. & Power Co. Bldg. in James City County

machine oil was sold to any one wishing to purchase same at store price which the specialist had to pay for it, same for needles and small parts. The specialist also carried with him a number of small parts for standard makes of machines.

One all day session was necessary for each school. All schools were supposed to have started at 9:30 o'clock and lasted until 4:30. The machines were cleaned thoroughly in the morning and the afternoon was spent in lecture and adjustments.

Results: - Through fine cooperation from the home demonstration agents we were successful in holding 28 schools. It must be said at this time that not a single district agent or home economist specialist attended any school in the state, which indicated their interest in such a project. Credit is due Miss Maude E. Wallace, State Agent, for the splendid assistance she rendered in making this project a success.

The following table shows the number of each make of sewing machine represented at the schools:

Singer	125	New Family	1
Standard	15	Southern Furniture	1
Franklin	14	Oricle	1
Minnesota	12	Spotless	1
New Home	11	Hartford	1
White	11	Richmond	1
Domestic	10	New Ideal	1
Davis	8	Chantangua	1
Wheeler-Wilson .	5	Jenning Champ ...	1
Elgin	5	Steinway	1
Faultless	3	Priscilla	1
Vertical Feed ..	3	Damascus	1
Helping Hand ...	2	Western Electric .	1
Bruce Rotary ...	2	Lantner	1
New Royal	2	Favorite	1
Mansion	2	Remington	1
Free	2	Peerless	1
Companion	1	Columbian	1
King	1		



School held in Prince
Edward County



School held in a
garage in Norfolk
County



Group of colored women
attending colored sew-
ing machine school in
Louisa County. Only
colored school held in
state.

In the following table the counties holding schools are listed according to the number of machines they had present at any one school.

<u>County</u>	<u>No. of Machines</u>	<u>Attendance</u>
Louisa	18	27
Norfolk	15	15
Louisa	13	15
Norfolk	11	13
Essex	11	15
Alleghany	11	15
Carroll	11	22
Alleghany	10	12
Dinwiddie	10	35
Prince William	9	45
Prince Edward	9	15
Frederick	9	13
Prince William	9	10
James City	9	12
Norfolk	9	13
Nansemond	9	12
Highland	8	12
Brunswick	8	10
Franklin	8	10
Prince William	7	12
Accomac	7	10
Louisa	7	10
Amelia	6	10
Louisa	6	7
Spotsylvania	6	7
Norfolk	4	10
Prince William	4	9
Louisa (colored)	8	15
Total 28 schools	-252	410

A number of newspaper articles are included in the exhibit section of this report which show the interest in various counties regarding the sewing machine schools.

TRANSPORTATION OF SEWING MACHINES



Transporting sewing
machine on rear of
buggy



Transporting sewing
machine on rear of
automobile seat



Transporting sewing
machine with "Ye
Cle Wagon and Mule"

The following is a summary of the sewing machine schools:

28 sewing machine schools
252 sewing machines cleaned, adjusted and
put in proper running condition
9 - 10 machines per school
37 different makes
89% peddled by foot
9% electric motorized
2% hand operated
53% over 10 years old
47% 10 years or less
100% in proper running and sewing condition at
end of schools
\$55.60 total cost of repairing all machines
(not including oil)

 $\$55.60 \div 252 = 22\text{¢}$ - cost per machine

Outlook: - There is a bright outlook for a sewing machine school project this coming year. It is felt that this project can make farm women extension service-minded more than any other one project. This statement was made by a large number of farm women worked with this year. This project is worthy of a full time specialist.

10-B Farm Operating Equipment
E-1 - Farm Implements

Experimental work related to Extension projects--

The department has conducted experimental studies in seed cleaning for the Virginia Seed Service and studies of seed harvesting. The results of these studies to date are used in our extension work.

Lime Kilns:

A trip was made to Wythe county to inspect the construction and operation of lime kilns. The wood burning type was used in this county. From the data obtained on this trip plans were drawn up showing the construction of wood burning lime kilns used in the drought areas where wood is available as a fuel. A mimeographed copy of "Lime Kiln Construction" is included in the exhibit section of this report.

A plan has also been made of the coal-burning kiln as used in Lee county. There is a demand for such plans in counties where coal can be secured for a moderate price. This type of kiln has proven very economical in Lee county.

Orchard Machinery:

A demonstration of orchard machinery was held at the Farmers' Institute during the summer when various types of orchard machinery was exhibited. This demonstration was attended by approximately 500 farmers.

Stationary Spray Plants for Orchards:

Eight stationary spray plants for orchards were planned by the extension specialist under this project. Plans, bills of materials and estimates were prepared. In at least one instance an entire large orchard was surveyed, mapped and the complete spray system layout given on the map. On the other jobs maps were already available to work from as the layout was simple enough not to require mapping. Several of the installations have been made and three are now in the process of being installed.

Outlook:

Farm machinery is an important phase of agricultural engineering extension that is in need of development. Its importance justifies the full time of a specialist who could hold extension schools on the selection, operation, care and repair of farm machinery. However, until such a man is available we shall continue to handle this work in the best possible way with the limited personnel. We shall continue making surveys for stationary spray installations as the requests come in for this work. When the agricultural engineering laboratory is completed we shall be able to hold farm machinery schools here at the college for dealers, agricultural teachers, farmers and others.



Two views of a permanent type lime kiln in Smyth County.
Cost, including compressor for drilling rock, \$750.00. Size
6 ft. in diameter, 25 feet high. Produces 3½ tons per day.
This kiln has been burning continuously since January 1936.

EMERGENCY AND RELATED PROJECTS

Rural Resettlement Administration, W.P.A. and S.C.S.

Emergency Drouth Relief Project:

Virginia was visited by a very serious drought beginning early in April and extending throughout the summer in at least one-third of the counties of the state. Serious drought damage was experienced in portions of many other counties. On July 1, Governor Peery appointed a State Drought Committee to coordinate the activities of the various agencies in the field which could be of help in the emergency. Acting upon the suggestion of Director Hutcheson a committee representing the following agencies were appointed by the Governor: The Extension Service, Public Welfare, Works Progress Administration, State Department of Agriculture, Soil Conservation Service, Resettlement Administration, and a prominent farmer from the drought section. At Director Hutcheson's request Mr. Gordon was made Secretary of the State Committee and charged with responsibility for all extension phases of the program. This required the major portion of Mr. Gordon's time during July, August and October.

In handling the Drought problem it became the State Committee's responsibility to contact the National Drought Committee and all Federal agencies working on the nation-wide drought program. The State Committee had to formulate policies and procedure for the State, organize county drought committees, and coordinate the efforts of all agencies within the state along drought relief lines. At its first meeting the State Committee decided to attack the drought problem along the following lines:

- (1) Reduced freight rates on livestock feed.
- (2) Emergency feed and seed loans through the Resettlement Administration.
- (3) Work opportunities through W.P.A. special quotas.
- (4) Work opportunities through the Soil Conservation Service.
- (5) More liberal interpretation of agricultural conservation regulations with regard to payments for soil building crops and practices.

The National Committee held the Extension Service and the Crop Reporting Service of the State Department of Agriculture responsible for data on which to designate official drought counties. Director Hutcheson through his county agents and Henry M. Taylor, Agricultural Statistician, through his crop reporters provided data on the basis of which fourteen extreme Southwest Virginia counties were officially designated. These counties were not only contiguous counties but joined similar drought areas in Tennessee, Kentucky and North Carolina. The counties were Lee, Scott, Wise, Washington, Russell, Dickenson, Buchanan, Tazewell, Bland, Smyth, Wythe, Grayson, Carroll, and Pulaski.

The problem being purely an agricultural problem involving agricultural people, the committee was particularly interested in developing a program that would result in a permanent benefit to agriculture and at the same time provide work for those needing it as close home as possible, and along agricultural lines, otherwise there would be a tendency to divert those normally engaged in agriculture to other activities with very harmful results to agriculture. To accomplish this end an agency was required having the right to work on private property.

Director Hutcheson suggested that the Soil Conservation Service be selected as the medium through which to handle the drought program. This was agreed upon. The Chairman and Secretary of the State Committee were directed to approach the Washington Office of the Soil Conservation Service with the suggestion that they set up a Federal project in the fourteen official counties to supplement work already being done by the T.V.A. along fertilization and erosion control lines. Fortunately Virginia's proposal was favorably received and \$100,000 or 1/15 of the entire sum available for such work was allotted to Virginia for work in these 14 counties. The burning, crushing and application of agricultural lime was the project selected in eight of the counties with gully and erosion control for those in which lime could not be practically produced.

The Governor was requested to appoint county committees in each of the officially designated counties composed of the county agent serving as chairman, the Rural Rehabilitation Supervisor serving as secretary, a member of the board of supervisors, and three representative farmers recommended by the county agent. These committees were appointed and made responsible for local policy, selection of projects, selection of drought sufferers to be aided through employment, and farms to receive applications of lime or erosion control work.

Mr. Gordon as secretary of the State Committee, Mr. Sidney T. Adair, Director of Labor Management for W.P.A., as chairman, and Mr. Lyman Carrier, State Coordinator for the Soil Conservation Service, were charged with responsibility for setting up the county committees and getting the projects under way. Each of the counties was visited and the plan carefully explained to the committee members. The program was readily accepted by all the counties except Tazewell which had not been seriously affected. Procedure for certification of labor was worked out with local W.P.A. and Welfare Offices and clerical and investigational help provided for expeditious handling of the program. In spite of delays in getting tools, dynamite and other necessary equipment, the project got under way within 30 days and under the direction of the Soil Conservation technical personnel over 20,000 tons of lime were burnt or ground and applied and an equivalent amount of erosion control work done. See summary on next page. Employment was provided 3,000 drought sufferers for a 60-day period, replacing in many instances their normal cash income destroyed as a result of drought. The Soil Conservation Service more than doubled the man years of work expected of it and the project received much favorable comment.

SUMMARY

LIME PRODUCTION				CONSERVATION PRACTICES							
COUNTY	NO. OF LIME KILNS	FUEL USED COAL TONS	FUEL USED WOOD CORDS	AMOUNT OF LIME BURNED GROUND	NO. OF PROJECTS	CHECK DAMS IN CULLETS	DAMN SLIPPING SQ. YDS.	SEEDED SQ. YDS.	WATERED SQ. YDS.	DIVERSION DITCHES LIN. FT.	REMAINING WALLS LIN. FT.
1. Bland	22			152	1510						
2. Buchanan					62					5,700	12,361
3. Carroll					25	813	59,509	60,355	57,880	13,935	
4. Dickenson					22	115				3,252	2,902
5. Grayson					50	1,711	22,906	132,000	115,200	3,000	
6. Lee	94	1516		1463	100						
7. Pulaski					26	762	116,050	115,050	59,200	8,525	
8. Russell	16	243.21		1176	971						
9. Scott	103	1550	18	5615							
10. Smyth	14			810	650						
11. Washington	36	500.25		1156							
12. Wise	14	516.15	50	1118	11	33			19,710	7,533	615
13. Wythe	7			560	14	324	20,007	22,129	20,639		
TOTAL	336	6125.61	60	16750	210	1,348	219,332	329,034	332,629	11,915	15,878

* Purchased by the farmers and spreaded by W.P.A. labor.

Twelve additional counties were officially designated in August but due to lack of funds and personnel could not be set up until October. In October additional allotments totalling over \$100,000 were secured by Soil Conservation for Virginia to be used in the twelve new counties. These counties were Montgomery, Giles, Roanoke, Botetourt, Rockbridge, Goochland, Powhatan, Chesterfield, Henrico, Hanover, New Kent, King William. Committees were set up in these counties in October by Messrs. Carrier, Adair, and Gordon and the projects are rapidly getting under way. Lime production being selected in the first five counties listed and erosion control in the remaining seven. As satisfactory results are expected as in the first 13 counties.

In spite of determined efforts on the part of the State Committee reduced freight rates could not be secured. Emergency seed and feed loans were made available to all counties suffering from drought whether officially designated or not, as were work and opportunities on regular W.P.A. projects.

It is felt that the drought project featuring as it did improved agricultural and soil conservation practices largely along agricultural engineering lines was one of the most constructive projects attempted during the year. Much valuable information was secured on the building of kilns and burning of lime, and benefits of the program will be seen for many years to come on the farms worked on. In addition, \$250,000 in wages were made available to bona fide agricultural drought sufferers.

So far as is known no other state adopted such a practical, well rounded and constructive approval to the drought problem.

W.P.A. Project 62-31-1200 - Erection of Agricultural
Engineering Building:

Plans were completed and a proposal prepared for the erection of laboratory units of an agricultural engineering building with W.P.A. funds in August 1935. Approval was received and actual work started on the first unit of this building January 15, 1936. Some sixty-five relief workers from the Montgomery Transient Camp were assigned to this project and worked until April when the camp was moved to the college farm about one mile from the building site. Beginning July 1, the camp which had been administered by the W.P.A. was transferred to the agricultural engineering department to administer and operate. This department, therefore, since July has been responsible for the handling of the camp as well as the supervision of the construction of the building project.

Two one-story laboratory units of the building have practically been completed to date. A proposal was prepared in August for the erection of one-half of the three-story front unit of this building which will provide for office quarters for the whole department staff as well as laboratory

and class room space. This project has been approved by the Washington office and funds are to be released for starting work on the front unit early in the new year.

An interesting phase of this project has been the training of the relief men for certain building skills. A number of the men have been trained as competent stone cutters, stone masons, cement workers, carpenters and related skills. The men have been interested in their work and have given satisfaction. A brief progress report of this project is included in the Exhibit Section of this report.

Rural Recreational Reserves, W.P.A.:

This project is sponsored by Mr. B. L. Hummel, Extension Rural Sociologist. The agricultural engineering department has prepared plans and specifications for practically all the construction work that has been proposed under this project. One of the extension agricultural engineers has given considerable field assistance on several of these projects.

V.P.I. Land Use Committee:

Professor Seitz has served as a member of this committee which has cooperated with the Resettlement Administration in the selection of marginal land areas for the state.

Farm Building Plan Booklet (W.P.A.):

Several architects and draftsmen were employed on W.P.A. funds to prepare miniature plans to include in the farm building plan booklet. This booklet has been completed and copies sent to all county agents in the state. The agents use this plan booklet as a reference from which farmers may select the plan needed and write the department for complete working drawings and specifications.

Virginia State Planning Board:

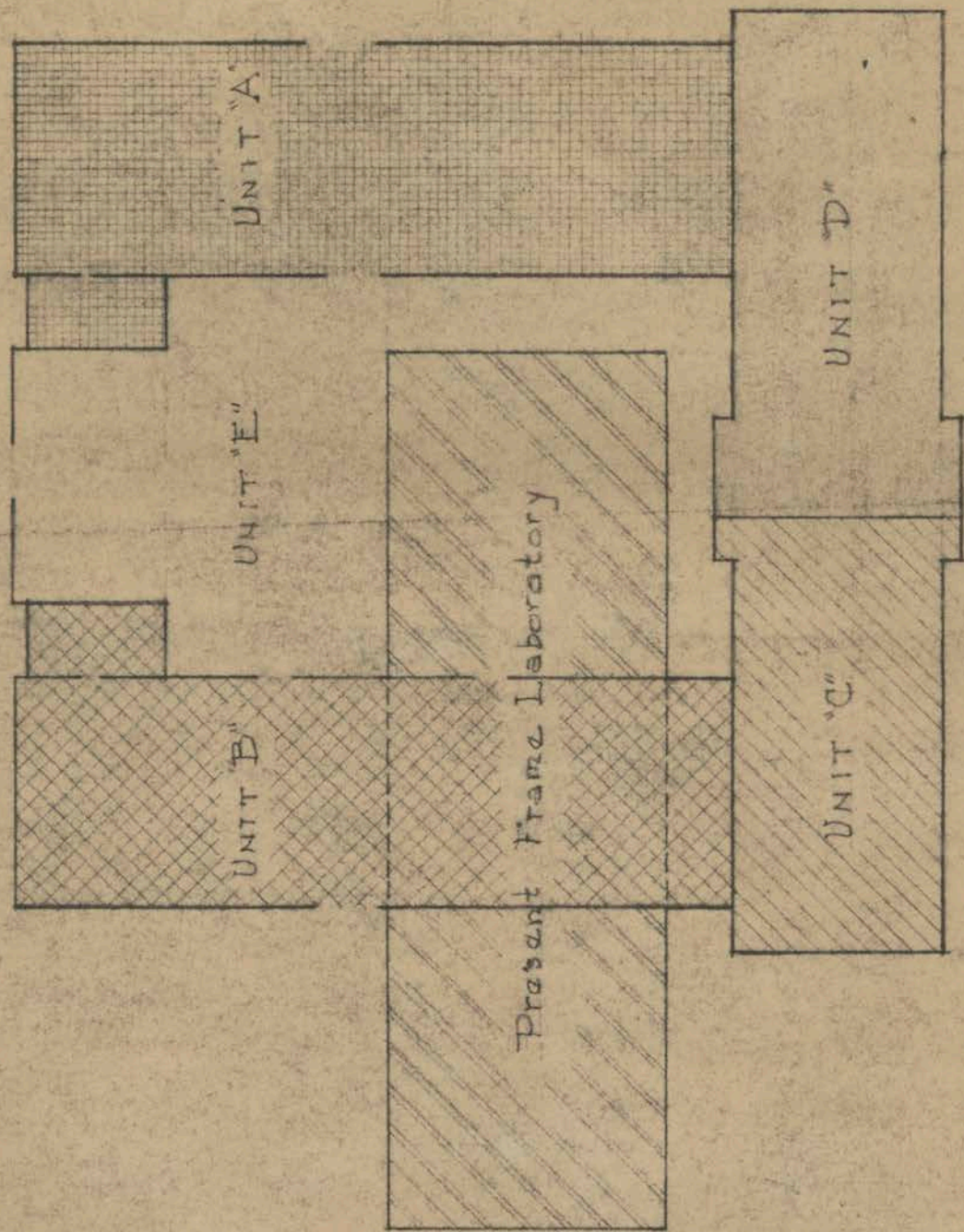
Professor Seitz has served as a member of this board by special appointment of the governor. He has assisted in the preparation of studies, reports, etc., of the board.

Student Employment (N.Y.A.):

Over a dozen students have been employed during the school year at various jobs in the office, assisting with research and extension projects and general work in the laboratories.

Tennessee Valley Authority:

The extension agricultural engineers have cooperated with the T.V.A. in their soil conservation program. A research project has been developed for run-off studies in the T.V.A. area of Virginia. A copy of this project is included in the exhibit section of the report.



AGRICULTURAL ENGINEERING BUILDING
Scale $\frac{1}{64}'' = 1'-0''$

MISCELLANEOUS ACTIVITIES

Other departments of the agricultural college make considerable demands upon this department for consulting advice and a great variety of services. Such work takes considerable time of members of the staff. We attempt to cooperate in every possible way in giving help to other extension departments.

Outside of the regular projects which are reported in previous pages the following is some of the miscellaneous work accomplished:

Correspondence:

During the year 3,541 individual letters were written and 2,500 circular letters mailed dealing with our agricultural engineering projects.

Articles for Press:

Fifteen articles on agricultural engineering subjects were prepared for the press and agricultural publications reaching farmers in the state.

Radio Talks:

The following radio talks were prepared and delivered by members of the staff:

- "Chick Brooder Selection"
- "Cooperation in Building Farm Terraces"
- "Butter to Market"
- "Agricultural Extension Work in Soil Conservation in Virginia"
- "Our Soil and Water Research Program"
- "Rural Electrification" (Dialogue)
- "Agricultural Engineering"
- "Improvements in Home Heating"

Bulletins:

The following bulletins were sent out upon request from farmers of the state:

- 65 - Drain the Wet Land
- 225 - Farm Terracing
- 100 - The Use of Logs and Poles in Farm Construction
- 75 - Construction of Chimneys and Fireplaces
- 125 - Farm Bulk Storage for Small Grains

- 175 - Surface Irrigation in the Eastern States
- 65 - The Operation and Care of the Combined Harvester
- 700 - Practical Hog Houses
- 110 - Farm Drainage
- 200 - Beef Production on the Farm
- 35 - Fire Protective Construction on the Farm
- 75 - Making Cellars Dry
- 100 - Spray Irrigation in the Eastern States
- 35 - Convenient Kitchens
- 55 - Protection of Buildings and Farm Property from
- 75 - Painting on the Farm
- 45 - Methods and Equipment for Home Laundering
- 50 - Small Concrete Construction on the Farm
- 150 - Simple Plumbing Repairs in the Home
- 225 - Farmstead Water Supply
- 150 - Storage of Sweet Potatoes
- 200 - Farm Plumbing
- 125 - Principles of Dairy Barn Ventilation
- 300 - Beef Cattle Barns
- 75 - The Corrugation Method of Irrigation
- 325 - Dairy Barn Construction
- 150 - Greenhouse Construction and Heating
- 50 - Cleaning Milk Machines
- 75 - Plain Concrete for Farm Use
- 100 - Border Method of Irrigation
- 250 - Gullies: How to Control and Reclaim Them
- 300 - Sewage and Sewerage of Farm Homes
- 250 - Farm Dairy Houses
- 135 - Operating a Home Heating Plant
- 35 - One Register Furnaces
- 300 - Plans of Rural Community Buildings
- 150 - Planning the Farmstead
- 50 - Tile Trenching Machinery
- 400 - Beautifying the Farmstead
- 35 - Harvesting and Storing Ice on the Farm
- 200 - Laying out Fields for Tractor Plowing
- 25 - Practical Hints on Running a Gas Engine
- 50 - The Gas Tractor in Eastern Farming
- 100 - The Use of Machinery in Cutting Corn
- 75 - Efficient Operation of Threshing Machines
- 150 - Labor Saving Practices in Haymaking
- 135 - Cooling Milk and Cream on the Farm
- 225 - Care and Repair of Farm Implements
- 125 - Haymaking
- 325 - Farm Home Conveniences
- 150 - Surface Irrigation for Eastern Farms
- 75 - Home Storage of Vegetables
- 200 - Homemade Silos
- 150 - Potato Storage and Storage Houses

- 175 - Harvesting Hay with the Sweep Rake
- 150 - Pit Silos
- 75 - Construction and Use of Farm Weirs
- 175 - Equipment for Farm Sheep Raising
- 125 - The Preservative Treatment of Farm Timbers

Meetings and Short Courses:

In addition to meetings held in connection with the regular projects the following were attended by some member or members of the staff:

Southern Agricultural Workers: Two members of the department attended the meeting of the S. A. W. at Jackson, Mississippi, and took part in the agricultural engineering section group discussions. While on this trip a visit was made to the Agricultural Engineering Department of the University of Georgia and Alabama Polytechnic Institute to secure information and ideas on research in soil and water conservation. On the return trip the T. V. A. was visited at Knoxville to confer on the cooperative research program in soil and water conservation.

World Power Conference: The head of the department attended the World Power Conference in Washington, D. C. as a representative and delegate of the college.

Up-Stream Engineering Conference: The head of the department attended the Up-Stream Engineering Conference at Washington, D. C. and took part in some of the discussions.

Regional Engineers Meeting, S. C. S.: A member of the department attended the regional agricultural engineers meeting held at Atlanta. This was a meeting of the leading engineers of the S. C. S. and the extension agricultural engineers from the colleges in the Southeastern division. Soil conservation programs both extension and research were discussed at this meeting.

Southeastern Electric Exchange: The head of the department appeared on the program for a discussion of rural electrification at the meeting held in Charleston, S. C. of all the electric utilities of the Southeastern states.

Virginia Aggie Engineer: Members of the department assisted the students in agricultural engineering in the preparation and publication of the first issue of the Virginia Aggie Engineer. This will be an annual publication of the students to be mailed to all county agents, agricultural teachers, school libraries, leading farmers, etc., and will offer a good means of advertising the work of the agricultural engineering department. It should be valuable in interesting more students in the agricultural engineering curriculum at V. P. I.

Jamestown 4-H Club Camp: J. J. Bass, Jr., Asst. Agricultural Engineer, spent four weeks during July and August, 1936 at the Jamestown 4-H Club Camp. The average attendance at these camps was about 175 boys and girls. A different group attended the camp each week.

The entire morning of each day was devoted to classes. An average of about 25 boys from 14 years of age to 18 years of age took the courses offered in agricultural engineering. These classes consisted of a thorough course in the use of the level and plane surveying. Field work was given and each student taught to use the level before leaving camp. Lectures were given and discussions held on soil and water conservation, home water supply, farm structures and rural electrification. Through the courtesy of the General Electric Company, who furnished us with a portable moving picture machine and film, a picture on the "Development of Rural Electrification" was presented to two of the camps.

A great deal of interest was shown in agricultural engineering by the boys attending camp, especially by those boys from counties where agricultural engineering work, such as terracing, is being done extensively.

GENERAL OUTLOOK IN AGRICULTURAL ENGINEERING

Substantial progress has been made in the extension program in agricultural engineering during the year. Greater progress has been made in the rural electrification and soil and water conservation projects than in any one previous year. The demands on the agricultural engineering department from various departments of the college, farm organizations, state and Federal agencies and farmers has grown to such an extent that the whole staff is overworked.

When the agricultural engineering building now under construction as a W. P. A. project is completed, the department will be in splendid shape from the physical plant standpoint to render much more effective service in all three divisions of its activities, namely; resident instruction, research and extension.

The most urgent need from the extension standpoint is for a full time specialist to handle the various lines of work related to household engineering such as farm water supply, home remodeling, sewing machine schools and general home equipment. The home demonstration agents have long been requesting more aid along these lines.

The extension work in rural electrification is of such great importance that a full time specialist should be available for this project. At present only the part time of a man is available. There is also need for extension work in farm machinery and 4-H club projects in agricultural engineering. A full time specialist could render valuable service in these projects.

The department has rendered a valuable service to the farmers of the state during the year. The staff as a whole has been loyal and has given unsparingly of their time and effort. The outlook as a whole for agricultural engineering extension work is very promising for greater service to the farmers of the state during the coming year.

Respectfully submitted,

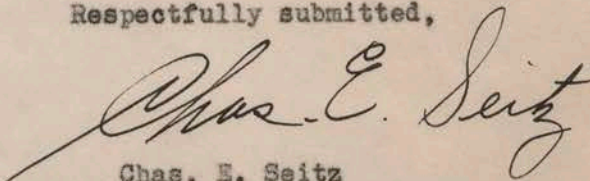

Chas. E. Seitz
Extension Agricultural Engineer

EXHIBIT SECTION

EXHIBIT SECTION

1. Application for loans from the Resettlement Administration for soil conservation work
2. Application for loans from the Baltimore Bank for Cooperatives for soil conservation work
3. Letter accompanying farm building plan book
4. List of electrical appliances and average energy consumption
5. "Rural Electrification in Virginia" -- Article by Mr. C. E. Seitz, published in Electrical South magazine
6. Report on Electric Dairy Sterilizers
7. Program of rural electrification conference
8. List of delegates attending rural electrification conference
9. Bulletin "Tests of Chick Brooders" by E. T. Swink
10. Letter sent to county agents in regard to State Corporation Commission employing an agricultural engineer to check costs of rural electric lines
11. Letter to home demonstration agents regarding sewing machine schools
12. Circular sent to home demonstration agents regarding sewing machine schools
13. Clipping from newspaper regarding sewing machine school in Louisa county
14. Circular on lime kiln construction
15. Report on conditions in the twenty-five designated drought counties of Virginia
16. Brief description of construction of agricultural engineering laboratory by W.P.A. labor
17. Research project of run off studies in cooperation with TVA

RESETTLEMENT ADMINISTRATION
RURAL REHABILITATION DIVISION
WASHINGTON, D. C.

Service Number _____

APPLICATION FOR A LOAN BY
A COOPERATIVE ASSOCIATION

(To conform with policies and provisions set forth in Executive Order 7143
and Administration Order 40)

1 GENERAL DESCRIPTION

a Name of Association _____

(Indicate which: A corporation organized and existing under the laws of
the State of _____ ; or an unincorporated association
organized and existing under the laws of the State of _____ ;
or a partnership or joint enterprise _____ ; or an unincorporated as-
sociation existing without any specific statutory authority _____ .)

b Community _____ County _____ State _____

c Amount of loan \$ _____. Dates and amounts of installment advances:

d Purpose of loan: Check item for which proceeds of this loan are to be
used, list services affected, and present the exhibit called for.

1 To refund present secured obligations (Exhibit C)

II To replace worn out or obsolete facilities (Exhibit D)

III To expand present services so as to serve larger demands of present
membership (Exhibit E)

IV To expand present services so as to serve demands of a larger membership (Exhibit F)

V To establish new services (Exhibit G)

VI For other purposes (Exhibit H)

e Number of families who will use the services:

Miles	RR CLIENTS		PROSPECTIVE		OTHER FAMILIES		
	:	:	:	RR CLIENTS	:	:	:
	:	:	:	:	:	:	:
Radius	White	Colored*	White	Colored*	White	Colored*	Total
	:	:	:	:	:	:	:
2½	:	:	:	:	:	:	:
	:	:	:	:	:	:	:
5	:	:	:	:	:	:	:
	:	:	:	:	:	:	:
10	:	:	:	:	:	:	:
	:	:	:	:	:	:	:
Total	:	:	:	:	:	:	:

*Check colored as chiefly: Negro__Indian__Mexican__Asiatic__

2 ANALYSIS OF EACH UNIT OF PROPOSED SERVICE. (PREPARE ADDITIONAL SHEETS OF
ITEM 2 FOR EACH UNIT OF THE-PROPOSED SERVICE.)

a Type of service rendered by this unit _____

b Name commodities or services to be produced _____

c Check whether these are temporary ____, seasonal ____ or permanent ____.

d Check whether this service is already available in the community. _____

Yes ____ No ____.

e Explain the necessity for and the social and economic benefits to be
obtained from this service. If it duplicates an already available
service, explain why the existing service cannot be made to provide
these benefits. (See Exhibit I)

f Assets to be acquired for this unit.

I If parts of land, buildings or equipment are to be used for this
unit and parts for other units, check here ____ and designate in
Exhibit J, the apportioned part that will be used by this unit.

II Describe and indicate ownership of available land on which the
service petitioned is to be established and/or conducted and give
details of how the land can be obtained. Give legal description,
location and amount of land. Identify as Exhibit K.

III Describe and give construction specifications of existing build-
ings that may be used for the community service. State number,
size, floor space, type, condition and possibilities for expan-
sion. Attach plans and specifications of all construction and
remodeling with estimates of cost. Identify as Exhibit L.

IV List and describe existing machinery, equipment and supplies in
the community, that can be used for the proposed service. State
how they may be obtained. Identify as Exhibit M.

V Prepare a list of donors and the appraised value of the items
they will donate, attaching the original donation agreements.
Donations may be in the form of cash, labor, material, land or
other non-cash items. Exhibit N.

VI Show miles distance to nearest shipping point by the various
methods of transportation available.

2 ANALYSIS OF EACH UNIT OF PROPOSED SERVICE. (PREPARE ADDITIONAL SHEETS OF
ITEM 2 FOR EACH UNIT OF THE-PROPOSED SERVICE.)

- a Type of service rendered by this unit _____

- b Name commodities or services to be produced _____

- c Check whether these are temporary ____, seasonal ____ or permanent ____.
- d Check whether this service is already available in the community. ____
Yes ____ No ____.
- e Explain the necessity for and the social and economic benefits to be obtained from this service. If it duplicates an already available service, explain why the existing service cannot be made to provide these benefits. (See Exhibit I)
- f Assets to be acquired for this unit.
- I If parts of land, buildings or equipment are to be used for this unit and parts for other units, check here ____ and designate in Exhibit J, the apportioned part that will be used by this unit.
- II Describe and indicate ownership of available land on which the service petitioned is to be established and/or conducted and give details of how the land can be obtained. Give legal description, location and amount of land. Identify as Exhibit K.
- III Describe and give construction specifications of existing buildings that may be used for the community service. State number, size, floor space, type, condition and possibilities for expansion. Attach plans and specifications of all construction and remodeling with estimates of cost. Identify as Exhibit L.
- IV List and describe existing machinery, equipment and supplies in the community, that can be used for the proposed service. State how they may be obtained. Identify as Exhibit M.
- V Prepare a list of donors and the appraised value of the items they will donate, attaching the original donation agreements. Donations may be in the form of cash, labor, material, land or other non-cash items. Exhibit N.
- VI Show miles distance to nearest shipping point by the various methods of transportation available.

Railroad _____ Truck _____ Water _____
Show State or U. S. highways Route No. _____ Nearest
shipping point _____

ITEM	Donations (See Exhibit N)	Contributed as membership subscriptions (See Exhibit O)	To be purchased with Cash member- ship sub- scriptions (See Exhibit O)	Proceeds from: RR loan (See Exhibit P)	Total
CASH	\$	\$	\$	\$	\$
LAND					
BUILDINGS					
EQUIPMENT					
MATERIALS					
SUPPLIES					
Totals	\$	\$	\$	\$	\$

- h Sources of Income. Show for each source of income, the unit or type of sale or charge, the number of units or amount to be sold or charged for annually and the total annual estimated income from the source.

[illegible]

- i Estimated annual operating expense.

Item of expense	Cost
Labor	
Materials	
Supplies	
Heat, light and power	
Repairs	
Salaries	
Taxes	
Insurance	
Depreciation	
Interest charges except for RA loans	
Amortization and interest on RA loans	
Other	
Total Expenses	\$

- | | | |
|---|---|---------|
| j | Estimated net annual income | \$_____ |
| k | Depletion or accretion of natural resources | \$_____ |
| l | Reserve for contingencies | _____ |
| m | Available Surplus | \$_____ |

3 RECAPITULATION OF ANALYSIS OF UNITS OF PROPOSED SERVICE

- a Value of donations (Total of 2g, all units shown) \$ _____
- b Value of membership subscriptions made op of land, building, material, labor, etc., in lieu of cash (Total of 2g, all units shown) \$ _____
- c Cash membership subscription (Total of 2g, all units shown) \$ _____
- d Amount of RR loan requested for buildings and structures (Total of 2g, all units shown) \$ _____
- e Amount of RR loan requested for other purposes (Total of 2g, all units shown) \$ _____
- f Total value of assets, including proposed loans \$ _____
- g Estimated annual income (Total of 2h, all units shown) \$ _____
- h Estimated annual operating expense (Total of 2i, all units shown) \$ _____
- i Estimated net annual income \$ _____

4 FINANCIAL STATEMENT OF PAST YEAR'S ACTIVITIES

- a Enclose as Exhibit A a financial statement of the last year's activities if the association was active.

5 FINANCIAL STATEMENT OF ANTICIPATED OPERATIONS OF COMING YEAR

- a Enclose as Exhibit B a forecast financial statement of the association for the coming year estimated on the basis of anticipated income and expense, indicating benefit to be derived from proceeds of loan.

6 AMORTIZATION

- a Loan for buildings or structures amounting to \$ _____ to be amortized over a period of _____ years with payments of principal and interest as follows:
- b Loan for other purposes than buildings or structures amounting to \$ _____, to be amortized over a period of _____ years with payments of principal and interest as follows:

7 TYPE OF SECURITY

- a Give detailed description.

8 ORGANIZATION

- a State type of organization_____.
- b Attach copy of state law, articles and certificate of incorporation or charter, constitution, by-laws, or partnership agreement under which the association will operate, specifying terms on which membership in the association is granted. (Exhibit Q)
- c Give names, positions and qualifications of officers who will manage the association. (Exhibit R)
- d Attach a copy of each form of marketing or other agreement and/or obligation now in effect with members and patrons. State number of each type and total amounts involved. (Exhibit S)
- e Attach a copy of each proposed form of marketing or other agreement and/or obligation with members and patrons. (Exhibit T)
- f Attach copies of contracts, leases, loan agreements, notes, mortgages or other evidence of obligations between the association and non-members or non-patrons. (Exhibit U)

9 GENERAL INFORMATION

a Maps

- I Outline on a state map, the location of the community service area. (Exhibit V)
- II Prepare a detail map showing the area within a 10 mile radius from the site of the service. Locate towns, roads, schools, public buildings and industries. Draw circles of $2\frac{1}{2}$, 5, and 10 miles radius, using the proposed site as a center. (Exhibit W)
- b Indicate availability of labor which may be required. (Exhibit X)
- c Existing facilities
- I Water supply for services. Give statement of quality and quantity and how provided. State if water has been tested and approved. If water is for condenser use, state range of temperature. Is there an abundance of water at all times or has supply been exhausted at any time? If so, give dates. Identify as Exhibit Y.
- II Types of power and fuel available.

Electricity_____ Coal _____

Gas_____ Other_____

-8-

10. LOAN AGREEMENT AND REQUEST FOR FUNDS
(for incorporated associations)

a The _____
association hereby requests a loan in the amount of
\$ _____ and agrees to use the proceeds of such
loan for the purposes stated herein and for no other purposes.
It further agrees to use all available funds, lands, building
materials and equipment set forth herein. It further agrees
that such enterprise or service will be so conducted under the
supervision of the Resettlement Administration as to protect
adequately the interests of its members or participants until
the loan herein requested has been repaid.

In Witness whereof said _____
_____ association has caused this instrument to
be signed by its president and its corporate seal to be hereto
affixed _____ day of _____ 1936.

By _____

President

(corporate seal)

b State of _____)
_____) ss.
County of _____)

On this _____ day of _____ before me personally
appeared _____ to me known, who being by
me duly sworn did depose and say he resides in _____
_____ ; that he is the president of _____,
the association de-
scribed in and which executed the foregoing instrument; that he
knows the seal of such Corporation; that the seal affixed to such
instrument is such seal; that it was so affixed by order of the
Board of Directors of said Corporation; and that he signed his
name thereto by like order.

Notary Public

(notarial seal)

-8a-

(alternate)

11 LOAN AGREEMENT AND REQUEST FOR FUNDS
(for unincorporated Associations or Partnerships)

a We, the undersigned, members and participants in the _____
_____ (Association, Partnership) and the duly author-
ized representatives of said (Association, Partnership) do hereby on
behalf of said (Association, Partnership) request a loan in the amount
of \$ _____ and agree to use the proceeds of this loan for the
purposes stated herein, and for no other purposes. We further agree on
behalf of the said (Association, Partnership) to use the available funds,
lands, building materials and equipment set forth herein. We further agree
on behalf of said (Association, Partnership) that such enterprise or service
will be so conducted under the Supervisor of the Resettlement Administra-
tion as to protect adequately the interests of the members or participants
therein until the loan requested herein has been repaid.

<u>Name</u>	<u>Title</u>	<u>Date</u>
-------------	--------------	-------------

_____	_____	_____
_____	_____	_____
_____	_____	_____

b State of _____)
County of _____) ss:

_____ , _____
and _____, being severally duly sworn, do de-
pose and say: that they have executed the above instrument on behalf of
the _____ (Association, Partner-
ship); that the deponents are members thereof; that the said (Association,
Partnership) is unincorporated; that in accordance with its by-laws, its
duly authorized representatives are designated in the following manner:

_____ ; that deponents were duly so designated and
specifically authorized to sign this instrument on behalf of said (Assoc-
iation, Partnership); that annexed hereto, and made a copy hereto is a
true copy of the authorization of the said (Association, Partnership)
designating deponents to act for said (Association, Partnership) in
signing this instrument.

Sworn to before me this _____ day of _____ 1936.

(notary seal)

Notary Public

-9-

We, the undersigned, recommend the approval of this application for funds from the Resettlement Administration for the establishment, operation, and/or maintenance of the cooperative service or enterprise herein petitioned, and declare that we know of no reason or condition which would involve disagreement of members or failure of this service.

a ON BEHALF OF THE EXTENSION SERVICE AND COMMUNITY:

_____	Date: _____
(County Agricultural Agent)	
_____	Date: _____
(Vocational Teacher of _____)	
_____	Date: _____
(Sponsor)	
_____	Date: _____
(Sponsor)	
_____	Date: _____
(Sponsor)	

b ON BEHALF OF THE RESETTLEMENT ADMINISTRATION:

Recommended by: _____	Date: _____
(County RR Supervisor)	
Recommended by: _____	Date: _____
(District RR Supervisor)	
Recommended by: _____	Date: _____
(State RR Director)	
Recommended by: _____	Date: _____
(Regional Director)	
Recommended by: _____	Date: _____
(Rural Rehabilitation Director)	
Approved by: _____	Date: _____
(Signing Officer for the Administrator)	

EXPLANATION
AND
SCHEDULE OF EXHIBITS

- A Financial statement of past year's business activities: Balance sheet and profit and loss statement certified by the accountant under oath that the statement is correct.
- B Forecast financial statement of anticipated operations of coming year: Balance sheet and profit and loss statement.
- C If the loan is to be used to refund present obligations prepare a schedule listing all liabilities and indicate those which are to be refunded. State the reasons for refunding these obligations and the benefits to be obtained through this refunding.
- D If the loan is to be used to replace worn out or obsolete equipment, describe the equipment to be replaced. If improved equipment is to be purchased, show how the reduced operating expenses to result therefrom, will amortize the loan.
- E If the loan is to be used to expand present services so as to serve larger demands of present membership, show the inadequacy of present facilities and show how the income will be increased through the expanded facilities sufficiently to amortize the loan.
- F If the loan is to be used to expand present services so as to serve the demands of a larger membership, show the inadequacy of the present facilities and show how the income will be increased through the expanded facilities to amortize the loan. Also show the part which the new membership will contribute towards financing the expansion.
- G If additional kinds of services are to be provided, make a complete analysis, using Part 2 of Form RA-RR 28 Revised. If some of the present assets of the association not now being used, can be made available for this additional service at no additional cost, do NOT include their value in this analysis.
- H Describe "other purposes" as set forth in 1 d VI.
- I Prepare a statement justifying the need for a proposed service by listing for each member and patron acreage and value of crops produced which it is intended to handle or process, and/or livestock available for improvement, and/or natural resources, raw materials or commodities, or other patrons which will entail use of the service to capacity and other features in connection with the proposed service, which will justify its economic needs.
- J Parts of land, buildings and/or equipment to be used by each unit.
- K Description and ownership of available land on which proposed service is to be established and/or conducted and how land is to be obtained. Legal description, location, and amount of land, appraisals of value of land by

an appraiser to be designated by the Regional Director.

- L Describe all buildings now available which can be used for the proposed service. Include plans and specifications and appraised value. Also show costs of remodeling, if this is necessary, as a separate item.
- M List and give description of existing machinery, equipment and supplies in the community that can be used for the proposed service. State how they may be obtained.
- N Prepare a list of donors and the appraised value of the items they will donate, attaching the original donation agreements. Donations may be in the form of cash, labor, material, land or other non-cash items.
- O Prepare a list of persons who will participate in the association by purchasing shares and/or contributing land, labor, materials, services, etc., in lieu of cash. Show under each subscriber, the amount of cash which he will subscribe and the items he will contribute in lieu of cash together with the appraised value of these items.
- P Prepare a list of items to be purchased with the proceeds of the requested RR loan.
- Q A copy of the state law and charter, constitution and by-laws, or agreement under which the association will operate, specifying terms on which membership in the association is granted.
- R Give name and position each officer in the organization is to hold. Show the qualifications of each proposed officer by listing his experience, and the other information that may be available.
- S Attach a copy of each form of marketing or other agreement and/or obligation now in effect with members and patrons. State number of each type and total amounts involved.
- T Attach a copy of each proposed form of marketing or other agreement and/or obligation with members and patrons.
- U Attach copies of contracts, leases, loan agreements, notes mortgages or other evidence of obligations between the association and non-members or non-patrons.
- V State outline map showing location of community service area.
- W Detail map showing the area within a ten-mile radius from the site of the service. Locate towns, roads, schools, public buildings and industries. Draw circle of $2\frac{1}{2}$, 5 and 10 mile radius, using the proposed site as center.
- X Indicate availability of labor which may be required.
- Y Description of water services. (See 9 c I)
- Z Give past history of successful and unsuccessful cooperatives in the community.

(Submit all applications, including exhibits, in duplicate.
One copy only need be verified with certified exhibits.)

No.

BALTIMORE BANK FOR COOPERATIVES

APPLICATION FOR LOAN

hereinafter referred to as the applicant, acting by and through its officers thereunto duly authorized by a resolution adopted by its board of directors (Exhibit A), hereby applies for a loan or loans under the provisions of the Farm Credit Act of 1935 of not exceeding in the aggregate the sum of \$..... at any one time outstanding and for such purpose makes the following representations, by direct statement and by answers to the questions asked in this form of application:

1. Has applicant previously made an application or applications for a loan or loans from the Federal Farm Board, the Farm Credit Administration, or any bank for co-operatives? (If this question is answered in the affirmative, state:
 - (a) Name of bank or agency to which application was made:
.....
 - (b) Date such application was made:.....
 - (c) Amount of loan(s):.....
 - (d) Amount of outstanding balance of loan(s):.....
2. In what business is applicant engaged? (Specific products handled and supplies distributed)
.....
3. Does applicant deal in:
 - (a) The products of members greater in value than those handled for non-members?
.....
 - (b) Farm supplies for members greater in value than those handled for non-members?
.....
4. (a) How many of applicant's members who have the right to vote are farmers?
.....
 - (b) How many of applicant's members who have the right to vote are not farmers?
.....
 - (c) If voting is by shares, what percentage of outstanding voting shares is owned by producers?
.....
5. Is applicant a member or stockholder of any organization or organizations?.....
(If so, state in the space below this question the name of each such organization and type of business transacted with and by it.)
.....
.....
.....

6. Is applicant involved in any litigation, pending in original courts or on appeal?
(If so, describe fully below.)

.....
.....
.....
.....
.....

7. (a) Does any obligation exist, or has any compensation been paid by applicant to any corporation, firm or individual, for representation of the applicant, in any manner, in regard to this application?

.....
.....

- (b) Have any legal or other charges been paid, or contracted, for services rendered in preparing this application or in obtaining for applicant the loan applied for?

.....
.....

(If either (a) or (b) is answered in the affirmative, state in the space below the question so answered the name of such party or parties, the amounts paid or agreed to be paid thereto, and the nature of the services rendered or to be rendered for such payment.)

8. Applicant will use the loan, if made, for the following specific purposes (and for none other, except with the prior written consent of the lender):

.....
.....
.....

9. Applicant offers to give the following as security for the loan:

.....
.....
.....
.....

Applicant states that there are no liens on any part of such security except taxes not now delinquent and the following:

.....
.....
.....

10. If the loan applied for (or any lesser amount) is granted, applicant will repay the loan in the following manner:

.....
.....
.....
.....

11. Applicant attaches hereto, as part of this application, the following documents:

EXHIBIT "A" Copy certified by its Secretary, of the resolution of its directors authorizing the filing of this application for a loan or loans.

EXHIBIT "B" Copy of its articles or certificate of incorporation with all amendments thereto; certified by the Secretary of State.

EXHIBIT "C" Copy of its by-laws now in force, which applicant represents were properly adopted; certified by its Secretary.

EXHIBIT "D" Copies of all marketing and/or purchasing contracts, such as, contracts between applicant and its members; between applicant's members, if associations, and actual producers; and between applicant and all agencies handling its commodities.

EXHIBIT "E" Copies of audit reports, for last three years if audits have been made. Audit report to include detailed current balance sheet, operating statement, and pertinent schedules. (If audits have not been made, submit copies of annual statements for past three years.)

EXHIBIT "F" Statements prepared by applicant consisting of:
(a) Balance sheet as at close of month preceding filing of this application.
(b) Operating statement covering period from date books were closed last to close of month preceding filing of this application.

EXHIBIT "G" Statement showing volume of business in terms of value and units for each of last three years.

EXHIBIT "H" Certificate showing the names and places of residence of applicant's officers, together with signatures of its officers authorized by the Board to execute documents required in connection with this application and/or loan.

12. (a) Applicant agrees that all papers, exhibits, audits and documents submitted with this application shall become the property of the bank.
- (b) In addition to all the provisions that may be included in any agreement or agreements covering any loans made, the applicant agrees to submit annually to the bank and at such other times as the bank may require, a statement of its condition in form approved by the bank and said applicant further agrees that the bank may, at any time while it is indebted to the bank, examine its books, records and accounts.
13. All statements herein and in the exhibits attached, including answers to questions and statements heretofore or hereafter submitted to the bank by applicant in connection with this loan, are statements of fact and representations made for the purpose of obtaining the loan and are warranted correct, and the undersigned officer of the association executing this application agrees that he has full knowledge of the provisions of Section 64 (a) of the Farm Credit Act of 1933 (* see below) and has made the representations and statements contained in this application and other documents herewith or hereafter submitted for the purpose of influencing the action of the Farm Credit Administration, the bank, or officials of either of them.

Applicant signs its name and affixes its seal hereto, by its officers duly authorized, this day of....., 19.....

ATTEST:

.....
Applicant

.....
Secretary

By.....
Its

(Attached corporate seal here)

STATE OF)
.....) SS.
COUNTY OF)

The undersigned, being duly sworn, deposes:

That he is an officer, namely, _____ of Applicant, in the foregoing application for loan; that he has read the foregoing application; that he knows the contents thereof; that the same is true to the best of his knowledge and belief.

Subscribed and sworn to before me this _____ day of _____, 19_____.

Notary Public in and for said County and State
(Attach notarial seal here)

(*) Section 64(a) of the Farm Credit Act of 1933 reads as follows:

"Whoever makes any material representation knowing it to be false, or whoever wilfully overvalues any property or security, for the purpose of influencing in any way, the action of Farm Credit Administration, or any division, officer, or employee thereof, or of any corporation organized under this Act, or in which a Production Credit Corporation organized under this Act holds stock, or of any regional agricultural credit corporation established pursuant to subsection (e) of Section 201 of the Emergency Relief and Construction Act of 1932, upon any application, advance, discount, purchase or repurchase agreement, or loan, or any change or extension of any of the same, by renewal, deferment of action or otherwise, or the acceptance, release, or substitution of security therefor, shall be punished by a fine of not more than \$5,000, or by imprisonment for not more than two years, or both.

ELIGIBLE BORROWERS FROM BANKS FOR COOPERATIVES
AGRICULTURAL MARKETING ACT AS AMENDED
SECTION 12, FARM CREDIT ACT OF 1935.

"(a) As used in this Act, the term 'cooperative association' means any association in which farmers act together in processing, preparing for market, handling, and/or marketing the farm products of persons so engaged, and also means any association in which farmers act together in purchasing, testing, grading, processing, distributing, and/or furnishing farm supplies and/or farm business services: PROVIDED, HOWEVER, That such associations are operated for the mutual benefit of the members thereof as such producers or purchasers and conform to one or both of the following requirements:

"First. That no member of the association is allowed more than one vote because of the amount of stock or membership capital he may own therein; and

"Second. That the association does not pay dividends on stock or membership capital in excess of 8 per centum per annum.

"And in any case to the following:

"Third. That the association shall not deal in farm products, farm supplies, and farm business services with or for non-members in an amount greater in value than the total amount of such business transacted by it with or for members. "

(Necessary policies of the Farm Credit Administration relating to the carrying out of the Acts relating to loans to cooperative associations, together with the soundness of proposed loans, the borrower's ability to repay, etc., will determine whether the Bank will make a loan in any particular case to an eligible borrower.)

EXHIBIT "A"

RESOLUTION OF THE BOARD OF DIRECTORS

of the

WHEREAS, this corporation is a cooperative association as defined by the Agricultural Marketing Act, as amended, and under its charter and by-laws has full power and authority to borrow money and to secure the same by mortgage, deed of trust, pledge or otherwise of its own property and of property delivered to it for marketing or otherwise; and all prerequisite steps and proceedings, acts and things preliminary to the adoption of this resolution have been taken and done in due and proper form, time and manner;

NOW, THEREFORE, BE IT RESOLVED, That the president and the treasurer and theof this association be, and each of them is hereby, jointly and severally authorized and empowered to obtain for and on behalf of the association, from time to time, from the Farm Credit Administration (hereinafter termed the "Administration") and/or from any bank or banks organized under Title II of the Federal Farm Loan Act, as amended, or organized under the Farm Credit Act of 1933 (each of which institutions is included in the term "bank" as hereinafter used in this resolution), a loan or loans not exceeding in the aggregate the sum of \$..... at any one time outstanding; and for such purposes: (1) to execute such application or applications (including exhibits, amendments, and/or supplements thereto) as may be required; (2) to obligate this association in such amounts, at such rates of interest, and on such other terms and conditions as the officer or officers so acting shall deem proper; (3) to execute and deliver to the lender or its nominee all such written instruments as may be required by the lender in regard to or as evidence of any loan made pursuant to the terms of this resolution; (4) to pledge, hypothecate, mortgage, convey, or assign property of this association of any kind and in any amount as security for any or all obligations (past, present and/or future) of this association to said lender; (5) from time to time to pay, extend or renew any such obligation or obligations; and (6) to re-borrow from time to time, subject to the provisions of this resolution, all or any part of the amounts repaid to the lender or lenders or any of them.

RESOLVED, FURTHER, That the said officers of this association, and each of them, be and are hereby jointly and severally authorized and directed to do and/or cause to be done, from time to time, all things which may be necessary and/or proper for the carrying out of the terms of this resolution.

RESOLVED, FURTHER, That the secretary of this association be and he is hereby authorized and directed to cast the ballot of the association in any and all proceedings for the nomination and/or election of any director of a bank for cooperatives in which the association is entitled to vote; provided, however, that prior to casting any such ballot on behalf of the association the secretary shall ascertain the views of the directors of the association and in casting such ballot shall reflect, as nearly as practicable, the views so ascertained.

RESOLVED, FURTHER, That the provisions of this resolution shall remain in full force and effect until a certified copy or copies of a duly adopted resolution or resolutions effecting a rescission or amendment, as the case may be, shall have been furnished to each lender to which the association is, at the time, obligated with respect to any loan or loans made under the provisions hereof.

- - - - -
C E R T I F I C A T I O N

I, the undersigned, as Secretary of the.....
Association hereby certify that the Board of Directors of such Association is composed of.....members, of whom.....(constituting a quorum)were present at a meeting thereof duly and regularly called, noticed, convened and held on the..... day of....., 19.....; that the foregoing resolution was duly adopted at such meeting by the affirmative vote of.....directors; and that said resolution has not been rescinded or amended in any way.

Dated this.....day of..... 19.....

.....
Secretary of.....

CERTIFICATE

OFFICERS*

(Signature)

COUNTY OF _____)

(7)

DIRECTORS

Name

Address

This image shows a single sheet of white paper with horizontal blue ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

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 14, 1936

To County Agents:

A revised book of available farm building plans is enclosed. This book was prepared at considerable cost for county agents only, and should be kept intact. The individual sheets will not be replaced, so please do not remove any.

You will note a change in the type of illustrations from those in your present plan booklet. This pictorial design was used in order to enable you to give the farmer a better idea, or picture, of the proposed building. The working plans for such may be secured, as in the past, by writing the Agricultural Engineering Department.

Descriptions for a large number of plans not illustrated are included. Please read the introduction and the first twenty-three pages in order to familiarize yourself with the existing plans, some of which have been prepared just recently. Please note the new number for each plan and use this when ordering same.

The farm house plans have not been described in this booklet. A separate book of these will be sent you at some future time (possibly early next spring). Until then, you may use your present book and the U. S. D. A. Bulletin No. 1738. If you do not have a copy of the latter, we will be glad to forward one.

Some may desire to use the front and back covers of the old book on the new one, since they are more rigid. The binding post spacing is such that this can be readily done.

We hope that you will make good use of this new plan book and that it will be of even more assistance to you in serving your farmers.

Very truly yours,

Chas. E. Seitz
Chas. E. Seitz
Extension Agr'l. Engineer

CES:R
Enc.

DEPT. OF AGRICULTURAL ENGINEERING

V. P. L. BLACKSBURG, VIRGINIA

19,354 Rev.

SOME FARM AND HOME USES OF ELECTRICITY

<u>Use</u>	<u>Average Size</u> <u>of Unit</u>	<u>Average Energy</u> <u>Consumption</u>
Brooder (chick)	450 watts	1/2 kwh/chick/mo.
Coffee percolator	500 watts	4 kwh per month
Churn	1/4 HP	2 kwh/100# butter
Concrete mixer	1/2 HP	1/2 kwh/cu. yd.
Cream separator	1/4 HP	1/2 kwh/100# milk
Curling iron	100 watts	1/2 kwh/month
Dish washer	150 watts	2 kwh/month
Elevating grain	1/2 to 5 HP	3 kwh/1000 bu.
Ensilage cutting	5 to 10 HP	1 kwh per ton
Fan (house)	40 watts	1-1/3 kwh/month
Fan (ventilating)	1/4 HP	5 kwh per month
Fanning mill	1/4 HP	1 kwh/100 bu.
Feed grinding	1/2 to 10 HP (fine) (coarse)	1 1/2 kwh/100# 1/4 kwh/100#
Electric fence	15 watts	3 kwh/month
Feed mixing		.12 kwh /100#
Hay baling	5 HP	2 kwh/ton
Hay hoisting	5 HP	3 kwh/ton
Heater (glow)	1000 watts	1 kwh/hour
Heating pad	150 watts	1 kwh/8 hours opr.
Hotbed	400 watts	150 kwh/mo.
Husking and shredding corn	5 HP	1 kwh/8 bu.
Incubator - 385 egg size	300 watts	1/4 kwh/chick
Incubator - 15000 egg size	2000 watts	.15 kwh/chick
Insect control	100 watts acre	5 kwh acre/mo.
Iron	600 watts	5 kwh/month
Ironing machine	1000 watts	10 kwh/month
Kitchen aid mixer	50 watts	2 kwh/month
Lighting barn	300 watts	4 kwh/month
Lighting house	800 watts	12 kwh/month
Lighting poultry house	40 watts/100 hens	3 kwh/100 hens/mo.
Lighting poultry -- Ultra-violet	60 watts/100 chicks	15 kwh/month
Milking machine	3 HP	2 kwh/mo/cow
Milk cooling and storage	1/2 HP	.1 kwh/gal./day
Pumping water (domestic)	1/4 HP	1 kwh/1000 gal.
Pumping water (irrigation)	3 to 40 HP	1 1/2 kwh/acre inch of water
Radio	60 watts	1 kwh/15 hrs. operation
Range	7000 watts	1 kwh/person/day
R efrigeration (household)	1/4 HP	30 kwh/month
Refrigeration (fruit and vegetable)	5 to 15 HP	500 kwh/month
Sewing machine	40 watts	1 kwh/20 hrs. operation
Sheep shearing	1/4 HP	2 kwh/100 sheep
Shelling corn	1/4 HP	1 kwh/5 bushels

(Over)

Spray plants	5 HP	6 kwh/acre
Sterilizers (dairy)	5000 watts	1/4 kwh/cow/day
Threshing	5 to 20 HP	30 kwh/100 bu.
Toaster	500 watts	4 kwh/month
Vacuum cleaner	60 watts	2 kwh/month
Water heating (dairy)	1500 watts	4 kwh/mo/cow
Water heating	1500 watts	30 kwh/person/mo.
Washing machine	200 watts	2 1/2 kwh/month
Water heater and sterilizer (dairy combined)	5000 watts	.3 kwh/cow/day

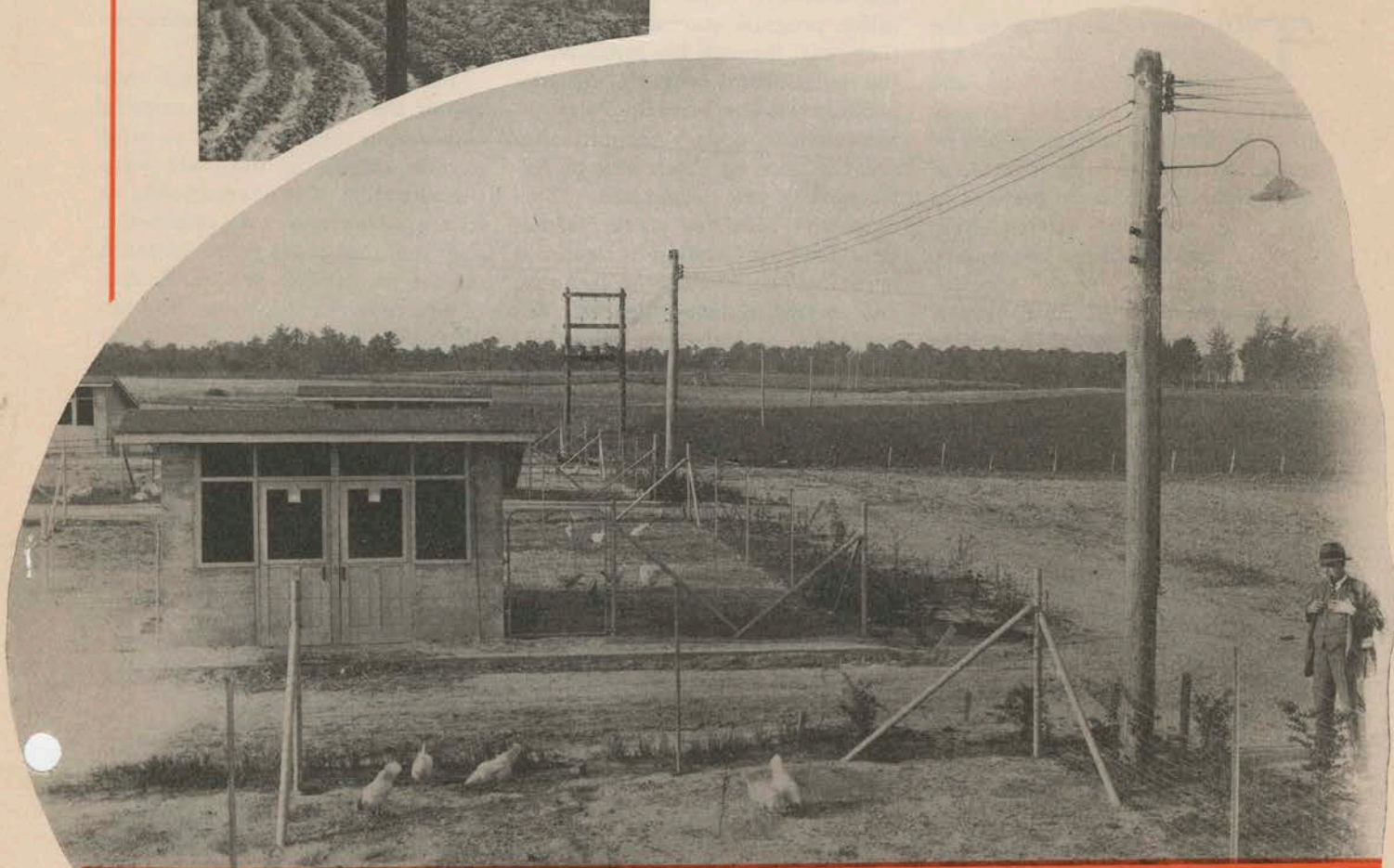
In the above listed uses, the size of unit and electrical energy consumption represent approximate average conditions. The energy used will, in many cases, be much less than here indicated. In other cases the consumption will run higher due to inefficient uses of equipment, using dull machines, operating over longer periods and other causes.

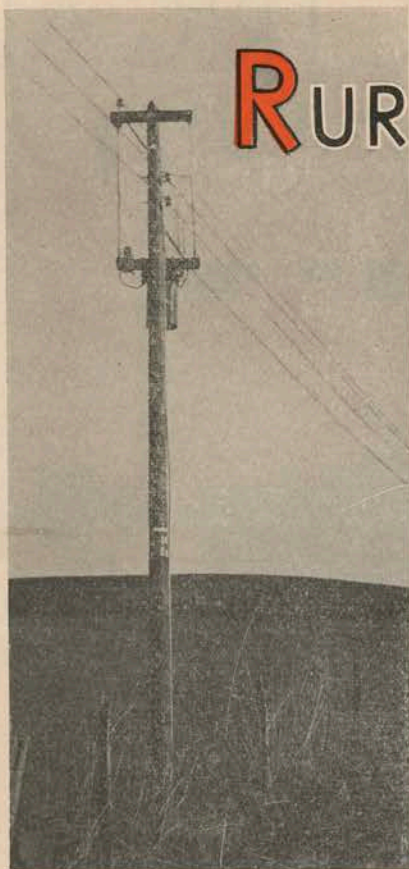
ELECTRICAL SOUTH

MAY, 1936



WITH more than seven thousand miles of rural distribution lines to be constructed in the South this year, to serve approximately forty thousand new customers, there is opened in this territory a tremendous potential market for wiring materials and devices and current consuming appliances of all kinds. Rural communities have become electricity conscious during the past two or three years, and are in a receptive mood. Dealers who "follow the rural lines" with aggressive sales efforts will find a steadily increasing market for electrical equipment and devices of all kinds





RURAL ELECTRIFICATION IN VIRGINIA

By Charles E. Seitz
Virginia Polytechnic Institute

ers, of whom at least 15,000 were farmers. Virginia leads all southern states, with the exception of Florida, in the percentage of farms served by electric companies. Only eleven states in the union had an average annual kilowatt hour consumption per farm larger than Virginia, and farm irrigation is practiced extensively in these eleven states, which accounts for their high farm consumption of electric energy.

Much of this progress can be traced directly to the rural electrification program started in 1924. In that year, through the initiative of the agricultural engineering department of the Virginia Polytechnic Institute, a state committee on the "Relation of Electricity to Agriculture" was organized. This committee consisted of representatives from the leading agricultural organizations, utility companies, and interested state agencies. The committee initiated an investigation of the possibilities of extending electric service to farms in the state, and sponsored the construction of an experimental rural elec-

tric line near Richmond. A number of electric equipment manufacturers cooperated with the committee by loaning electric equipment for installation on the farms connected to this line.

Comprehensive studies were made over a period of two years on these farms to determine the most profitable uses of electric service. The results obtained on this experimental line convinced the committee that rural electrification was practical over a large area of the state, and indicated the need for a statewide program of rural electrification.

The committee recognized that two of the most important steps in obtaining a wide extension of rural electric service in the state were the education of the farm people as to the advantages of electricity, and the continuation of research studies to develop profitable uses of electricity on the farm. The agricultural engineering department at V. P. I. was designated as the agency best prepared to continue the educational and research program. The committee, therefore,

THE cooperative effort on the part of state officials, agricultural organizations and utilities, in promoting the development of rural electrification in Virginia, has resulted in an increase of more than one thousand per cent in the miles of rural electric lines built in the state in the last decade.

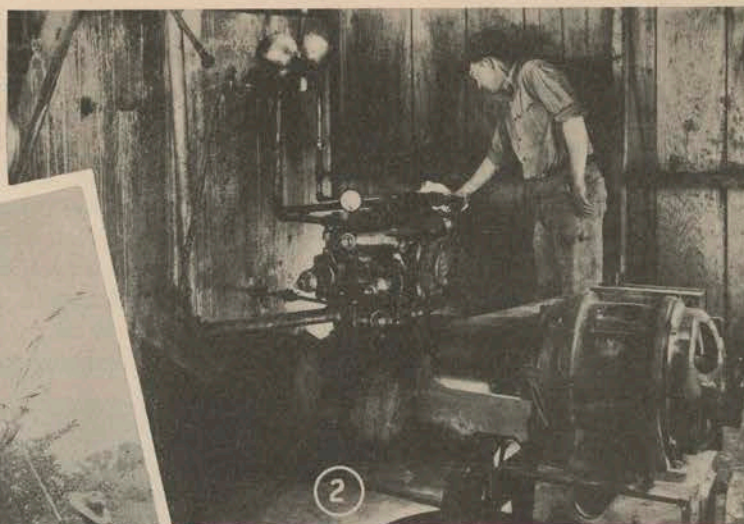
In 1924 there were approximately 500 miles of rural electric lines throughout the state, serving about 1,500 rural customers. By the end of 1935 more than 6,000 miles of rural lines were in operation, serving 45,000 rural custom-

Rural Electrification Progress of the Virginia Electric and Power Company

Year	Kwh	Revenue	Ave. Rate c per Kwh	Ave. No. of Customers	Ave. Annual Rev. per Cust.	Ave. Annual Kwh per Cust.
1929	903,866	\$ 59,952	6.63c	903	\$66.39	1,001
1930	1,363,587	74,546	5.46c	1,200	62.12	1,136
1931	2,516,108	106,664	4.23c	1,497	71.25	1,681
1932	3,260,701	128,910	3.95c	1,621	79.52	2,012
1933	3,421,571	131,119	3.83c	1,657	79.13	2,065
1934	4,093,766	138,141	3.37c	1,805	76.53	2,268
1935	4,610,297	137,485	2.98c	1,831	75.09	2,518



①



②

SHOWN here are several applications of electricity on Virginia farms:

(1) Spraying from a stationary spray plant in an orchard near Wytheville, Virginia. This method saves much time, labor and expense over the portable spraying method.

(2) This 15 hp portable motor operates the stationary spraying plant and a hammer mill.

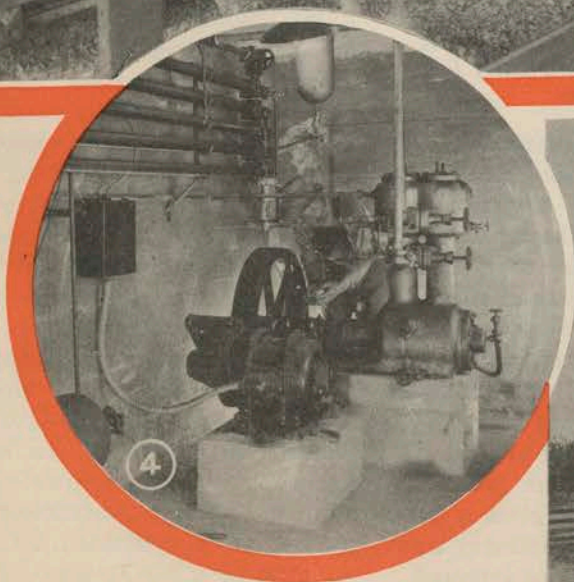
(3) These homemade electric brooders, on a Virginia farm, have been giving complete satisfaction and are less costly than some other types.

(4) Ammonia compressor operated by a 7½ hp motor, for refrigerating a fruit storage house on a farm near Wytheville, Virginia.

(5) Cold storage and packing house on a Virginia farm. The cold storage room has a capacity of 5,000 bushels. Second floor is used as a packing plant.



③



④



⑤

turned over the promotional and research program to the agricultural engineering department and decided that its original objective, the initiation of a rural electrification program, was completed. The committee was dissolved and the agricultural engineering department assumed the duties of promoting the program formulated by this early committee.

The first major objective of the educational program was to convince the utility executives of the importance of developing and extending their rural service as rapidly as possible. The two largest electric companies cooperated splendidly, and employed trained agricultural engineers to assist the farmers, and to cooperate with the state agricultural extension service in the application of the educational program. I am convinced that the efforts of these agricultural engineers were responsible for much of the progress in rural electrification achieved by these companies.

One of the serious obstacles preventing a more rapid expansion of rural service was the lack of a uniform policy on the part of the electric companies in making rural line extensions. In order to obtain service, the farmer was required to advance the money for the construction of the lines, and to pay a relatively high rate for the service supplied. In order to improve this situation, and to develop a uniform rural line extension plan, Governor Byrd called a meeting in 1929 of the various groups interested in the extension of electric service to the farms.

At this meeting the governor appointed a committee composed of representatives of the state college, the agricultural organizations, the state corporation commission, and the electric utilities. This committee, after considerable study, recommended a uniform plan under which electric companies would finance the construction of rural lines anywhere in their territory, to serve any individual or group of farmers, at rates applying in the cities or towns from which the extensions were built. The plan included a provision that the company would be guaranteed a month-

ly revenue, or rental, based on a percentage of the construction cost of the line. This plan was adopted by power companies supplying over 90 per cent of the electricity used in Virginia. The adoption of this uniform rural line extension policy resulted in increased construction of rural lines and removed one of the major obstacles to an effective educational program.

After the establishment of the



The type of construction shown here has reduced line costs and has made many rural line extensions possible

National Rural Electrification Administration as an emergency agency, with funds available for loans to states for the construction of rural electric lines, the Virginia State Corporation Commission employed a firm of consulting engineers to make a preliminary survey of the possibilities of building additional rural lines throughout the state with Federal aid.

This survey, though completed within a few weeks, gives a good background for a preliminary analysis of the results to be expected.

The survey indicated that 2,475 miles of rural lines could be con-

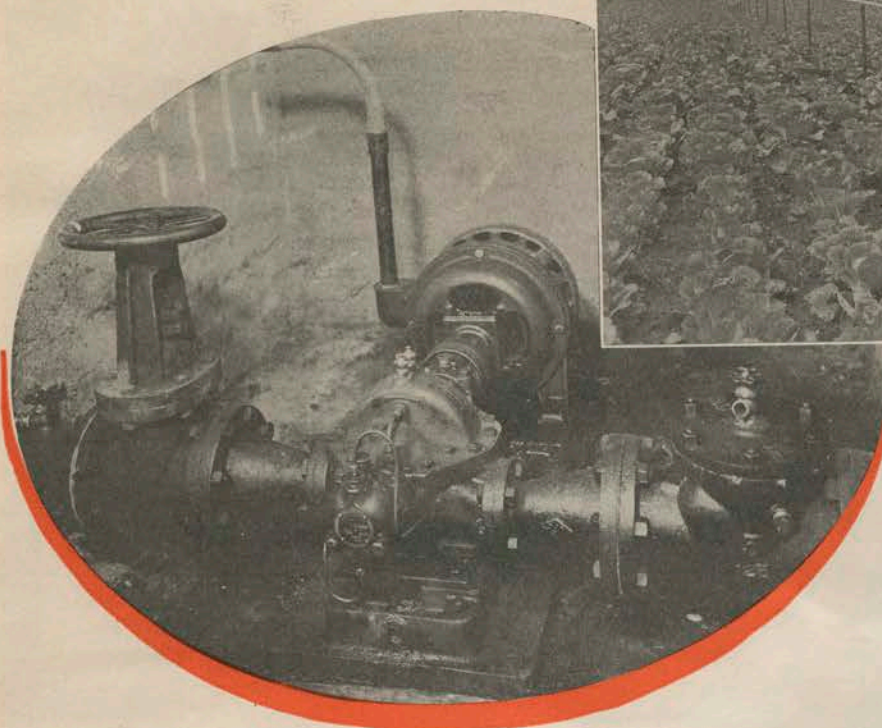
structed to serve 16,187 customers, a density of one customer for each .24 miles of line. The estimated cost of these lines was \$3,349,422. The revenue from this group of lines was estimated at \$320,860 per year, representing a gross return of 9.6 per cent on the required investment. The survey also indicated that there were additional extensions, totaling 3,467 miles, which would reach 15,200 customers, a density of one customer for each .23 miles of line. The construction cost of these extensions was estimated at \$4,502,644. The annual revenue from these lines was estimated at \$472,115, or a gross return of approximately 10.5 per cent on the investment.

At the request of the Rural Electrification Administration, meetings were conducted by the county agents in 51 counties during 1935, all of which were attended by the extension agricultural engineer from the state college. At these meetings the R. E. A. plan was explained and the farmers were advised of the proper methods of preparing rural line projects for submission to the R. E. A. Over 1000 miles of proposed rural lines were surveyed by this means and developed as R. E. A. projects. A number of the lines surveyed have already been constructed, or are under construction now by the utility companies.

One cooperative rural line company was formed—the Farmers' Rural Utilities, Incorporated. The R. E. A. allotted \$366,000 to this cooperative company for the construction of 406 miles of rural lines to serve 1,200 farms in several counties. The Virginia Electric and Power Company agreed to wholesale electric power to this cooperative company, which will retail the energy at the same rates available to the customers of the Virginia Electric and Power Company.

Last December at a meeting called by the State Corporation Commission, several of the larger electric companies reduced their minimum revenue guarantee to 1.5 per cent of the construction cost of the lines, effective January 1, 1936. The electric companies estimate that this lower guarantee will en-

The 15 hp motor and pump shown below furnish water for the irrigation system at the right, a thirty-acre truck farm near Hollins, Virginia



able them to build approximately 2,400 miles of rural lines in the next two years, to serve 10,000 additional customers. The reduction of the guarantee has stimulated activity in rural line construction to such an extent that most of the companies report that at present they cannot meet the demand for rural extensions.

The 1936 Virginia General Assembly passed an act sponsored by the Agricultural Conference Board of Virginia which will facilitate the organization and development of rural electric cooperative companies. Early in April at a conference of utility and farm representatives, called by the State Corporation Commission, the utility representatives pledged their cooperation to the farm leaders in the development of rural electric cooperative companies in areas not now adequately served by the private companies. The utility representatives indicated their willingness to wholesale power to any rural cooperative company organized under the new law, which becomes effective in June.

The State Corporation Commis-

sion has appointed a committee consisting of five representatives from the farm interests and five from the private utilities to work out details as to methods of procedure under this new rural cooperative law. Several cooperative companies have already been organized, in anticipation of the new act. The farm groups believe that this new act, together with the greatly increased activity of the private companies, will result in extending electric service to a large percentage of Virginia farms within the next few years.

It is obvious, after twelve years of observation, that education and research are of the greatest importance in extending rural electrification. Since the initiation of this movement in Virginia in 1924, the agricultural engineering department of V. P. I. has been conducting research and extension work in rural electrification, and training agricultural engineers for employment in this field. For several years special courses in rural electrification have been required of all students registered in the agricultural engineering curriculum. A

number of graduates are now engaged in rural electrification work with private utilities, the T. V. A., and state colleges.

The two largest utilities in Virginia have a number of agricultural engineers occupied with educational and promotional work directed toward their farm customers. These men are particularly adapted to this work because they were reared on farms and understand the farmers' problems. Wherever these men are employed, the public relations of the company, especially with the rural people, have been greatly improved, and substantial results in load building have been produced.

The Virginia Electric and Power Company offers a splendid example of what may be accomplished in rural electrification through a well organized program of rural service work, reasonable rates, and the use of trained agricultural engineers.

In 1929 when this company started its rural service program and employed its first agricultural engineer, it had 860 farm customers, consuming an average of 1,000 kwh per year per customer. At the end of 1935 the farm customers had increased to 1,837, with an average annual consumption of 2,518 kwh. The total miles of rural line increased from 709 to 1,658 and the total number of rural customers, including farmers, from 6,162 to 12,887. This accomplishment is shown in detail in the accompanying tabulation.

(Continued on page 48)

Rural Electrification in Virginia . . .

(Continued from page 23)

The reasonable rural rate which this company has in effect is recognized as one of the principal factors responsible for this achievement. However, the agricultural engineers have also played an important part in this development. The winning of the Martin Award by this company in 1933, for outstanding progress in rural electrification, is largely attributed by the officials of the company to the splendid work of the agricultural engineers.

Yet I feel that the surface has scarcely been "scratched," so to speak, in the field of rural electrification. Never was there a more attractive market for the sale of electrical equipment of all kinds, as even the farmers now having electric service are using only a small fraction of the available service. Intensive educational work is necessary to develop this use to a maximum.

The agricultural engineering department of Virginia Polytechnic Institute will render all possible service to all agencies in this educational work. A new rural electrification laboratory, now under construction at the college, will be completed in July, 1936. It is expected that this laboratory will be equipped with electrical farm equipment of all kinds; research studies will be conducted on new uses of electricity in agriculture; and, in addition, it will serve as a laboratory for class work and short courses in rural electrification.

F. C. Taylor Heads El Paso Production Department . .

F. C. Taylor has been promoted to superintendent of production in charge of operation, maintenance and inspection of power stations. Diesel stations and substations of El Paso Electric Company, according to an announcement from E. H. Wills, general superintendent. Supervision of substations will include all customer, distribution and transmission substations, except pole top transformer installations and underground transformer vaults.



Meter pole and distribution center on a dairy barn in Virginia. There are many advantages and economies in this type of meter installation.

Mr. Taylor has been connected with the Stone and Webster organization for many years, and has had a wide experience both with operating companies and on construction work. He was transferred to El Paso last year, from Scottsbluff, Neb.

SEMR Club Plans to Hold an Entertainment . . .

The regular "first Friday in the month" meeting of the Southeastern Electrical Manufacturers' Representatives Club, held on April 5, drew the largest attendance of any meeting held by the organization. The membership committee has been active, and several new members were enrolled.

Guest speaker at the luncheon was Jimmie Burns, sports writer for the Atlanta Georgian. Mr. Burns had been in training camp with the Atlanta "Crackers," and made a most interesting talk on the outlook for the Southern League this year and on the prospects for the Crackers, giving a brief outline of each member of the team and what he may be expected to accomplish this season.

Following the award of attendance prizes, a committee was appointed to arrange for an entertainment. Carl Hausman was appointed permanent chairman of the entertainment committee. Opinions varied as to what form of entertainment would be most suitable, and it may be that the committee will arrange a combi-

nation of outing and barbecue, with golf and dancing in the evening. It is expected the entertainment will be held early in May.

G. A. Jernigan Transferred to El Paso

G. A. Jernigan, formerly superintendent of Gulf States Utilities Company, at Lake Charles, La., has been transferred to El Paso as superintendent of distribution of El Paso Electric Company. Mr. Jernigan has been with Stone and Webster since 1913, starting in with the organization at Port Arthur, Texas, and, in 1915, becoming superintendent of distribution. In 1927 he was transferred to Lake Charles as superintendent of transmission and distribution.

J. A. Reich, formerly connected with Virginia Electric and Power Company, has been appointed assistant chief engineer of the El Paso Electric Company. Mr. Reich was connected with the company eleven years ago, and during the past seven years has been with the Virginia company.

Harville Named District Manager for Louisiana Power and Light . .

N. A. Harville, for several years assistant manager and in charge of the Delhi district office of the Louisiana Power and Light Company, has been promoted to manager. L. C. Preston, former manager of the Delhi and Lake Providence districts, will remain in charge of the Lake Providence section.

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
June 19, 1936

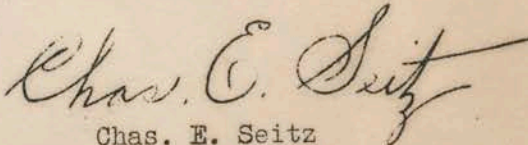
Dear Agent:

I am enclosing for your information a copy of the report on the study of electric dairy sterilizers which we have conducted. The work was done by the V. P. I. agricultural engineering department and the Tennessee Valley Authority.

The attached sketch illustrates the laboratory built sterilizer described in the report. Working drawings with bill of materials may be obtained from the V. P. I. agricultural engineering department. Performance curves and current consumption data under various operating conditions will be gladly furnished on request to this office. These were omitted from the report for the sake of economy.

With best wishes, I am

Very truly yours,


Chas. E. Seitz
Extension Agr'l. Engineer

ETS:R
Enc.

A STUDY OF

•ELECTRIC•DAIRY•STERILIZERS•

TESTS AND STUDY
BY

S.M. BEANE

TENNESSEE VALLEY AUTHORITY



DATA COMPILED AND REPORTED
BY

E.T. SWINK

AGRICULTURAL ENGINEERING DEPARTMENT
VIRGINIA POLYTECHNIC INSTITUTE

JUNE, 1936

#19,147

COOPERATIVE EXTENSION WORK

IN

Va. Agr. & Mech.
Col. & Poly. Inst.
& U.S.D.A.,
Cooperating

AGRICULTURE AND HOME ECONOMICS
State of Virginia
- - - - -

EXTENSION SERVICE

ELECTRIC DAIRY EQUIPMENT STERILIZERS

Tennessee Valley Authority
And

Virginia Polytechnic Institute, Cooperating

INTRODUCTION:

The importance of dairy sterilizing equipment has increased tremendously during the last few years with the ever increasing rigidness of sanitary and health laws. This condition applies not only to distributors of milk and other dairy products, but to the producer also, regardless of the extent of his activity in the production of dairy products. With this requirement facing the dairy farmer, it is timely and necessary that proper information on all types of sterilizing equipment be made available to him, in order that he may select wisely the most practical and economical method of sterilization.

There are many methods of sterilization practiced at the present time, including live steam from boilers heated by coal, oil, wood and electricity; chemical treatments; combination water heaters and sterilizers; and cabinet types in which the amount of steam is controlled, finally leaving the utensils dry. Practically all of these methods are familiar to the average dairyman with the exception of those types of sterilizers which use electric energy for supplying heat. The purpose of the study described in this report was to ascertain facts regarding the practicability, adaptability, operating economy and desirability of electricity as an energy source for operating dairy sterilizing equipment. After a general study of all types of electrically operated dairy sterilizers, one particular type of sterilizer was to have been selected for complete investigation, this investigation to result in definite recommendations for an electric dairy sterilizer most adaptable on dairy farms in the states of the T. V. A. area.

JUSTIFICATION OF THE STUDY:

The dairy industry may be considered one of the basic rural industries in the states of the T. V. A. area. According to the 1930 census there were 24,968 dairy farms in these states, and this number has undoubtedly increased since 1930. A large per cent of these dairy farms are comparatively small, having dairy herds of 50 cows or less. Practically all types of electric sterilizers are especially adaptable to small dairies and, therefore, would find many applications in the T. V. A. area.

The rapid extension of rural electric lines making electric service available on many more dairy farms, and the continually lower trend of rates for electric energy, are the two most conspicuous factors paving the way for

a more generous and economical use of electricity on dairy farms. No one denies the fact that electric energy as a heat source for dairy sterilizers offers every advantage over all other fuels. There are then three things that must be proven feasible relative to the equipment before its use can be generally recommended and adopted: First, the cost of the equipment; second, the cost of operation; third, the efficiency of operation or effectiveness of sterilization.

A large number of state health departments have already approved the use of certain types of electric sterilizers and the use of the equipment has become general in these areas, where rates for electric energy have been such that the equipment could be operated economically. State health departments in Virginia, Tennessee and other states of the T. V. A. area, do not list any type of electric sterilizer as approved equipment in their regulation standards.

OBJECTIVES OF THE STUDY:

The objectives of this study may be listed thus:

1. To determine the most practical type of electric dairy sterilizer for dairy farms of the T. V. A. area.
2. To test the type selected for operating cost, effectiveness of sterilization, and adaptability.
3. To determine the possibility of dairy farmers constructing or having constructed locally electric sterilizers, reducing first cost of the equipment.
4. To obtain definite results on the operation of the sterilizer selected, both from laboratory and field operation; this information to be submitted to the proper state authorities so that the equipment can be either disapproved or recommended as to conform with equipment regulation requirements.

COOPERATING AGENCIES:

Tennessee Valley Authority: The T. V. A. assigned S. M. Beane, Agricultural Engineer, to conduct the study on dairy sterilizers.

University of Tennessee: The Department of Bacteriology assisted Mr. Beane in testing sterilizers in operation at the University by conducting the laboratory bacteria counts.

Virginia Polytechnic Institute: The Agricultural Engineering Department of V. P. I. furnished the technical direction, consulting advice, laboratory facilities and necessary equipment for the study. The Bacteriology Department at V. P. I. made official bacteria counts during the tests of the laboratory sterilizer.

PROCEDURE:

The first step taken in beginning the study of electric dairy sterilizers was that of assembling all available information. The result of this investigation was a varied assortment of experimentation bulletins, manufacturers literature and experiences of various electric utilities with electric sterilizers. The fact was disclosed that the following types of electric dairy sterilizers are being used in various sections of the United States:

1. Electric controlled humidity type cabinet sterilizers.

This type of sterilizer is more generally used than any other one type of electric sterilizer. It consists of a well insulated cabinet, heated with electric strip heaters with a capacity of 1500 watts up depending on the size of cabinet. The desired temperature in the cabinet is automatically controlled by an adjustable thermostat. This sterilizer is simple in design and operation. The method of operation is such that the human element is practically removed from the sterilizing process. As the dairy utensils are washed, they are packed into the sterilizer while wet. When the cabinet has been filled or all utensils placed inside it, the door is closed and the current turned on manually. The particles of water which cling to the utensils go into steam as the temperature rises in the sterilizer and when the desired temperature is reached, the thermostat cuts off the current. The insulated cabinet holds the heat, completing the sterilization of the utensils. The cabinet then provides a clean, dry place for storing the utensils until they are to be used again.

Comments:

(a) The sterilizer is simple in construction and fool-proof in operation, assuring a positive job of sterilization.

(b) Commercially manufactured models are comparatively high priced, ranging from \$175 for the four can size upward.

(c) The simplicity of design and construction make it possible for any carpenter or tinsmith to build a sterilizer of this type at the place where it is to be operated.

(d) Efficient in operation.

(e) Provides ideal storage space for utensils.

(f) Does not provide means of heating water.

(g) Flexible in size so that the sterilizer can be built to suit the needs of any size dairy.

(h) If homemade, the cost is comparatively low.

2. Combination electric dairy water heater and sterilizer.

This type of sterilizer has not been used to any great extent, however, it does have a number of desirable features. It consists of an insulated tank so designed that a trough about six inches wide and six inches deep extends across the bottom. An immersion type electric heating element of 3 to 5 kw is screwed into the side of the tank and into the trough. The drain from the tank is located just above the heating element. Water is run into the tank and heated for washing purposes. The water, when drained from the tank to be used for washing, leaves the tank warm and ready for the washed utensils. The current is again turned on and the small amount of water remaining in the trough gives off sufficient steam for sterilizing the equipment.

The first electric sterilizer of this type was designed and built by the agricultural engineering department in 1930.* This sterilizer has been in continuous operation at a wholesale dairy near Roanoke, Virginia, for over five years. It heats wash water and sterilizes all the equipment for this 20-cow dairy, using an average of 185 kwh of current per month. The owner is well pleased with its operation and values it second only to his refrigeration equipment.

Comments:

(a) Takes care of two separate and necessary jobs at the dairy: heating water and sterilizing equipment.

(b) Comparatively low in first cost. (Can be built for \$60.00 locally or \$125.00 commercially.)

(c) The size of the equipment limits its use to retail dairies of not over 12 cows, and wholesale dairies of not over 20 cows.

(d) Not so efficient in operation.

(e) Can be automatically operated by a thermostat to assure proper sterilization temperature but the utensils must be removed while hot for drying.

3. Electric heated steam boiler.

The electric steam boiler has been developed on the west coast recently. It consists of a well insulated boiler tank with pressure accessories and an immersion heating element of low wattage (1500 or 2000 w.). The principle of operation is that of a low wattage element heating over a long period of time, the heat being conserved in the heavily insulated tank.

* Thesis problem of a graduate student, Agricultural Engineering Department, Virginia Polytechnic Institute.

Comments:

- (a) Provides hot water for washing and steam for sterilizing.
- (b) First cost \$175.00 and up, depending on size.
- (c) Not manufactured in the east at present.
- (d) Cannot be built at the dairy advisedly because of dangers involved in high steam pressures.
- (e) Requires long period of time for making steam, therefore, would not provide for emergency demand.

4. The ^{Small} ~~Small~~ steam generator.

This sterilizer is another recent development. Complete tests were made to determine its place in the dairy. The generator consists of a copper boiler holding one pint of water. A 1,000 watt Cromolux immersion heating element is built inside the boiler. Water is stored in a one gallon jug and runs by gravity into the generator. The test results will be found elsewhere in this report.

Comments:

- (a) The sterilizer, as it is, can be used only for single utensils such as buckets, cans, etc.
- (b) Its use must be limited to small wholesale dairies, or as an auxiliary sterilizer in larger dairies.
- (c) Purchase cost is low, cost is \$18.50, complete.
- (d) Efficient in operation and cheap to operate.
- (e) Requires no special wiring.
- (f) Can be used for heating small quantities of water.

In view of the objectives set forth in beginning this study, a number of sterilizer installations of various types were visited and checked from every standpoint. It was decided that the controlled humidity type sterilizer most nearly met the requirements desired for dairies in the T.V.A. area. The Herrick steam generator appeared to have possibilities as the answer to the needs of the small producer whose business is of sufficient volume to justify a larger expenditure for equipment. As a result of this decision, further study was devoted to these two types of sterilizers and the results of the study are as outlined in the remainder of this report.

Small
The Electric Steam Sterilizer

The principle of operation of this sterilizer is that of providing intense heat in a small area so that, as water enters the heated chamber, it goes into steam almost immediately. A small hole in the top of the copper boiler serves as the jet through which the live steam escapes. Utensils are sterilized by inverting them, one at a time, over the jet.

Tests were made on the sterilizer by the departments of Bacteriology and Agricultural Engineering in the laboratories at V. P. I. Fifteen different utensils were used under various conditions, the time and bacteria counts checked for each test. The utensils used in the tests consisted of 10 gallon milk cans, three gallon closed top pails, and three gallon open top pails.

Preparation of Utensils for Sterilization:

Ten gallon milk cans and 3 gallon pails were picked at random from the V. P. I. creamery. Various methods of cleaning the utensils were used before steaming them for sterilization. The method of cleaning the utensil is indicated on the data sheet in each case. In some cases the utensils were not cleaned at all, but were rinsed with the sterile water after the milk was emptied from them and the bacteria count made from this sample. The methods of cleaning the utensils before taking the first sample for bacteria count were; rinsing with hot water, rinsing with cold water, scrubbing with hot water, scrubbing with cold water, scrubbing with hot water and soap powder and scrubbing with cold water and soap powder.

Collecting Samples:

After cleaning the utensils by one of the methods listed, a definite quantity of sterile water was poured into the utensil and used as a rinse for the utensil. The ten gallon utensils were always rinsed with 1000 c. c. of sterile water and the 3 gallon utensils with 200 c. c. of sterile water. The utensil was always thoroughly shaken, then a portion of the rinse water was poured into a sterile sample bottle and analyzed for the number of bacteria as given by the A. P. H. A. for milk analysis.

When the remaining rinse water had been emptied, the utensil was then placed over the steam jet and exposed to the live steam for a recorded number of minutes. As soon as the utensil had been steamed, it was again rinsed with the standard quantity of sterile water, the sample was taken and the bacteria count was again made as with the first sample.

The dilutions made on each sample for bacterial analysis were always plated out in duplicate and incubated at a temperature of 37 degrees C. for 48 hours. The average count of the two samples was accepted as the number of bacteria contained in each c. c. of the rinse water.

19,147

Sterilizer Operation:

When cold water was used in the storage jar on the sterilizer, it required about $3\frac{1}{2}$ minutes for the boiler to heat up and start giving off steam. A thermometer was held immediately over the steam jet and the mercury rose to a temperature of 95 degrees C (203° F.). Hot water drawn from the faucet on the sterilizer had a temperature of 96° C (205° F.). The three gallon pails were heated to 90° C. when held over the steam jet for three minutes.

The tabulation below shows the results of tests made under various conditions to determine the effectiveness of the steaming for destroying bacteria.

Small
~~Small~~ STEAM STERILIZER
 Test Data Sheet

Sample No.	Size of Container	Amount : Sterile Water	Condition of : can before : first rinse	No. of bac- : teria per cc : of first rinse : water	: No. of bac- : Time : teria per cc : of rinse water : after steaming
1	10-gal. can	1000 cc	:After pour- : ing milk	: 420,000	: 4 min.: 206,000
2	10-gal. can	1000 cc	:After rins- : ing with : hot water	: 60,000	: 4 min.: 1,500
3	10-gal. can	1000 cc	:After pour- : ing milk	: 96,670	: 5 min.: 750
4	10-gal. can	1000 cc	:After wash- : ing with : hot water	: 2,500	: 5 min.: 200
5	10-gal. can	1000 cc	:After wash- : ing with : hot water	: 1,000	: 4 min.: 00
6	10-gal. can	1000 cc	:Washed with : cold water	: 76,500	: 4 min.: 3,050
7	10-gal. can	1000 cc	:Washed with : soap and : warm water	: 165,000	: 4 min.: 11,300
8	$2\frac{1}{2}$ gal. pail	200 cc	:Washed with : cold water	: 8,500	: 2 min.: 90
9	$2\frac{1}{2}$ gal. open top pail	200 cc	:Washed with : warm water : and soap	: 6,850	: 2 min.: 80
10	$2\frac{1}{2}$ gal. open top pail	200 cc	:Washed with : cold : water	: 23,000	: 2 min.: 1,205
11	10-gal. can	1000 cc	:Washed with : cold water : and soap	: 65,000	: 4 min.: 980

(Over)

12	: 10-gal.:	:	: After pour-:	:	:	:
	: can :	1000 cc :	ing milk :	10,800,000 :	4 min.:	195,000
13	: 3-gal.:	:	: Washed with:	:	:	:
	: closed :	:	: cold water:	2,100,000 :	2 min.:	7,200
	: pail :	200 cc :	:	:	:	:
14	: 3-gal.:	:	: Washed with:	:	:	:
	: closed :	:	: hot water:	332,100 :	2 min.:	6,790
	: pail :	200 cc :	:	:	:	:
	: 10-gal.:	:	: Washed with:	:	:	:
15	: can :	200 cc :	: cold water:	106,000 :	4 min.:	43,700

Conclusion:

A comprehensive study of the sterilizers operation, and the results of the tests made, indicate:

1. The time required for sterilizing any utensil effectively varies according to the size of the utensil.

2. Small utensils can be sterilized more effectively. A three gallon pail should be steamed at least 2 minutes, and a 10 gallon can at least 5 minutes, to attain a temperature of 90 degrees C. and sterilization.

3. The simplicity and low cost (\$18.50) of the sterilizer make it desirable for the use of the small wholesale producer.

4. The sterilizer is very economical in operation, compared with the cost of other methods.

5. Will provide sufficient hot water for washing the utensils.

6. From a cold start, the sterilizer requires $3\frac{1}{2}$ minutes to develop steam for sterilization.

CONTROLLED HUMIDITY TYPE CABINET STERILIZER

Two installations of this type sterilizer were observed near Bluefield, West Virginia, both of which were constructed locally with the aid of a tinsmith. The first is located on a dairy farm at Mullens, West Virginia, and has been in constant service for two years. This sterilizer consists of an insulated cabinet 42" x 37" x 31" and is heated by ten 500 watt electric strip heaters. An adjustable thermostat controls the operating temperature of the sterilizer and no attention is required after the utensils have been placed in the cabinet and the current turned on. Sterilization is accomplished by maintaining a

temperature of 120 degrees F. for a minimum period of 20 minutes. The average current consumption is 2.5 kWh per sterilization.

Prior to the installation of this sterilizer, chemicals had been used for sterilizing. The electric sterilizer reduced the bacteria count from over 500,000 to less than 5,000. The actual construction cost was approximately \$60.00 exclusive of labor.

The owner of this dairy states. " I do not think there is any better sterilizer to be had than the electric one we use. Our bottles are always dry, there is no odor from chemicals and we know that the bacteria is killed." A storage type water heater is used for supplying hot water.

The other sterilizer near Bluefield was similar to the one just described, and the opinion of the owner was that the equipment was both economical and satisfactory.

The controlled humidity type sterilizer seemed to be the most generally practical one for dairies in the T. V. A. area for reasons already stated in this report. It was, therefore, decided to make tests on at least two commercially made units of this type, and to build a laboratory model for similar tests. This procedure seemed desirable because one of the main objectives of this study was to determine the possibilities of developing an efficient home-made model, flexible in size and desirable for dairies in the T. V. A. area. The remainder of this report will describe the construction of the laboratory sterilizer and the tests conducted on it and two commercially manufactured sterilizers.

1. Sterilizer: No 1.

This sterilizer is located at the University of Tennessee dairy farm, Knoxville. The cabinet holds two ten gallon cans and other small utensils. The connected load is 1500 watts, and the temperature is automatically controlled by a thermostat. The cost of this sterilizer is approximately \$175.00.

Several tests were made to determine the effectiveness of sterilization, current consumption and time required for sterilization. Each of these tests are illustrated on the following charts. The bacteria counts were made by the department of bacteriology at the University of Tennessee.

2. Sterilizer; No 2

This unit is also located on the University of Tennessee Dairy Farm. It consists of an insulated cabinet with a capacity of 3 ten gallon cans and small utensils. The connected load is 2500 watts and the temperature is controlled by an adjustable thermostat. The cost of the unit is approximately \$225.00.

Operating tests were made under normal operating conditions, the results and descriptions of which are shown on the following graphs. All bacteria tests were made by the department of bacteriology at the University of Tennessee.

3. Laboratory Sterilizer;

The working drawing included in this report is that of the electric sterilizer which was constructed for this study. The cabinet was constructed, using 2" x 4" wood framing, which was covered on both the inside and outside with copper bearing steel. This design provides a two inch spacing between the metal in walls, top and bottom, which was packed with mineral wool insulation. All corners and seams on the inside were soldered with high temperature solder to prevent moisture from entering the insulation. The hinged door was designed to be held tightly shut by two self tightening clamp latches, and the facing was lined with a composition rubber gasket to insure an air tight fit. The inside dimensions of the cabinet were $34\frac{1}{2}$ " deep, $42\frac{1}{4}$ " wide and 50" high with a volume of approximately 45 cu. ft.

A steel rack was constructed to support the electric strip heaters and the electric wiring. To assure a definite circulation of air within the sterilizer and to aid in dissipating the heat uniformly, a perforated sheet metal baffle plate was constructed and installed over the heaters. Utensil racks were constructed of 1/2" steel rods welded together. A 1/2 inch air vent was built into the bottom of the cabinet to allow excess water to drain out, and to prevent an excessive pressure from building up at sterilizing temperature. An automatic adjustable thermostat was used to cut off the current when the desired temperature was attained in the cabinet.

In testing the sterilizer to determine the most efficient wattage of heating elements, and its effectiveness for sterilizing utensils, temperature measurements were taken with a self compensating indicating performeter and thermocouple. The thermocouples were first checked against a structural thermocouple. In all tests the temperature was taken at various points in the cabinet simultaneously to determine the maximum temperature differential.

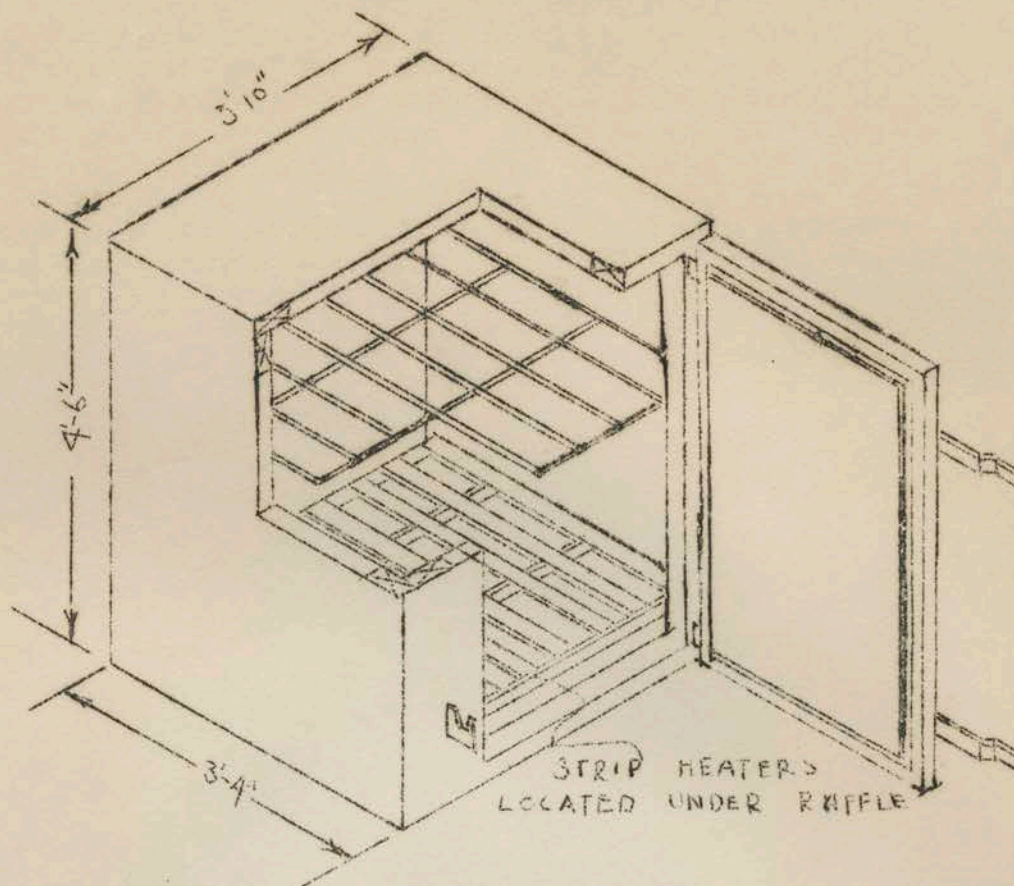
Tests were made to determine the radiation loss through the two inch mineral wool insulation. This was done by varying the total wattage to determine the number of watts required to maintain a constant sterilizing temperature. It was found that 500 watts would maintain a constant temperature of 184 degrees F. when the room temperature was 70 degrees F. The heat loss through the walls of the cabinet with a temperature differential of 114 degrees was 0.35 b.t.u. per sq. ft. per minute. Tests were continued with various wattages to determine the best operating wattage for the sterilizer. It was found that the temperature differential inside the cabinet was less, or that a more uniform temperature was obtained, with a total wattage of 3000. Using 3000 watts with the cabinet loaded with utensils, approximately one hour's operation was required to attain a sterilizing temperature. Wattages of 1500, 2000, 2500, 3000, 4000, and 5,000 were tried. Six 500 watt strip heaters were, therefore, permanently installed in the sterilizer, and all the operating tests covered in this report were made with this wattage.

Numerous tests were made in an effort to determine the most economical sterilizing temperatures. It was found that when the utensils were heated to 180 degrees F. and held at this temperature for 30 minutes, sterilization was as complete as was attained with a temperature of 212 degrees F. maintained for 30 minutes. By using an operating temperature of 180 degrees F. then, the current consumption difference was .8 kwh per sterilization and the time of sterilizing was 14 minutes less than was required when a temperature of 212 degrees F. was used.

The attached curves with the bacteria count shown on the same sheet illustrate the sterilizing results and time involved in each test.

CONCLUSIONS:

1. The controlled humidity type sterilizer does a positive job of sterilizing utensils.
2. The size of the sterilizer can be varied and designed to meet the needs of any size dairy.
3. The cost of materials for constructing the sterilizer built for this study was approximately \$58.00.
4. The laboratory sterilizer proved more efficient than either of the two commercial units tested. This may have been due to a better fitting door, better insulation or a more efficient operating temperature.
5. This type sterilizer can be constructed by any one with the aid of a tinsmith, saving considerable on the first cost, and at the same time be "tailored to the needs" of the dairy where it is to be operated.
6. An operating temperature of 180 degrees maintained for 30 minutes is the most practical and economical and will insure thorough sterilization.
7. In designing sterilizers of this type, the necessary wattage can be determined by allowing 65 watts per cu. ft. cabinet volume where 2 inches of mineral wool or its equivalent is used for insulation and the approximate room temperature is 70 degrees. Where the room temperature will be below 70° F., 5 watts should be added per cu. ft. cabinet volume for each 10° F. that the room temperature might be under the standard of 70° F.
7. This type of sterilizer does not provide means of heating water, however, it has been found that the most satisfactory and economical method of heating water with electricity in dairies is by the use of a storage type hot water heater. Although this involves the purchase of an additional piece of equipment, the total cost of the sterilizer and water heater would not exceed that of a single unit to do both jobs for the same dairy. On practically all localities special "off peak" rates are available for water heaters, thereby reducing costs for current.



ISOMETRIC VIEW OF LABORATORY STERILIZER

BILL OF MATERIAL

6 - 500 Watt Strip Heaters @ 2.25	\$ 13.50
100-lbs. mineral wool	4.50
1 - Thermostat	12.00
100-ft 2" x 4"	2.00
7-Sheets 20 gauge copper bearing	18.00
Metal 45" x 96"	1.00
Metal for racks	7.20
Hinges, pipe, wire, etc	\$58.00

RURAL ELECTRIFICATION CONFERENCE
Department of Agricultural Engineering, V.P.I.
Blacksburg, Virginia
November 13 and 14, 1936

Purpose of Conference

The purpose of this conference is to bring together people interested in the advancement of the use of electricity on farms for the discussion of common problems and to learn recent facts ascertained by investigation.

Friday, November 13

- 10:00 - 10:30 - Problems Involved in Extending Rural Service
By R. R. Choate, Agr'l. Engr., Appalachian Electric Power Co.
Roanoke, Va.
- 10:30 - 10:45 - Discussion
- 10:45 - 11:15 - Load Building - New Uses and Customer Contacts
By G. A. Rietz, In charge of Rural Electric Section,
General Electric Co., Schenectady, N. Y.
- 11:15 - 11:30 - Discussion
- 11:30 - 12:00 - Results of Chick Brooder Studies
By E. T. Swink, Agr'l. Engineering Dept., V. P. I.
- 12:00 - 12:15 - Discussion
- 12:15 - 1:30 - Lunch

- - - - -

- 1:30 - 2:00 - Promoting Uses of Electric Service on the Farm
By B. P. Hess, Rural Electric Division,
Westinghouse Electric & Mfg. Co., Pittsburgh, Pa.
- 2:00 - 2:15 - Discussion
- 2:15 - 2:30 - State Corporation Commission and Rural Electrification
By F. S. Givens, Agr'l. Engineer, State Corporation Com.
Richmond, Va.
- 2:30 - 5:00 - Rural Service Programs and Progress
Statements from representatives of each utility and cooperative
- 7:00 - 10:00 - General Round Table Discussion
(Night session to be held if desired by those in attendance)

Saturday, November 14

- 9:00 - 9:30 - Farm Income and Rural Electrification
By Dr. H. N. Young, Head, Agr'l. Economics Dept., V. P. I.
- 9:30 - 9:45 - Discussion
- 9:45 - 10:15 - Plans and Policies of the Rural Electrification Administration
By a representative of R. E. A.
- 10:15 - 10:30 - Discussion
- 10:30 - 11:00 - Plans and Policies of the Virginia Farm Power Board
By J. H. Rogers, Chief of Development Section, Virginia Farm
Power Board
- 11:00 - 11:15 - Discussion
- 11:15 - 11:45 - Progress of Farmers Rural Utilities
By R. R. Dennison, Farmers Rural Utilities, Bowling Green, Va.
- 11:45 - 12:00 - Discussion
- 12:00 - 12:30 - The Private Utilities and Rural Electrification
By J. G. Holtzclaw, President, Virginia Electric & Power Co.
Richmond, Va.
- 12:30 - 12:45 - Discussion
- 12:45 - - Adjournment
- 2:30 - University of Virginia--V.P.I. Football Game, Miles Stadium, V.P.I.
Admission - \$2.00

Meeting Place - V.P.I. Dairy Building Auditorium, 3rd Floor

DELEGATES ATTENDING THE RURAL ELECTRIFICATION CONFERENCE
AT V. P. I.
November 13 and 14th, 1936

L. L. Koontz, Junior Power Engineer, A. E. P. Company, Pulaski, Va.
E. W. Hogg, Engineer, A. E. P. Co., Pulaski, Va.
C. Nelson Beck, Rural Electrification Committee, Charlottesville, Va.
O. M. Meier, Ag. Advisor - Utilization, R. E. A., Washington, D. C.
R. R. Dennison, Representative, Farmers Rural Utilities, Bowling Green, Va.
A. R. Hines, General Electric Co., Roanoke, Va.
G. A. Rietz, In charge of Rural Electric Section, General Electric Co.,
Schenectady, N. Y.
Geo. N. Harper, Agr'l. Engineer, V. E. & P. Company, Norfolk, Va.
John P. Mange, Asst. So. Dir. Mgr., Virginia Public Service Co., South Boston, Va.
Cecil W. Sanders, Asst. Division Engr., Virginia Public Service Co., " " "
Jas. B. Hawkins, Division Engineer, Virginia Public Service Co., Clifton Forge, Va.
Thos. Richardson, Asst. Div. Manager, Virginia Public Service Co.,
Charlottesville, Va.
W. J. Blake, Jr., Division Engr., Virginia Public Service Co., Alexandria, Va.
W. M. Krise, Manager, Northern Virginia Power Co., Winchester, Va.
— J. Roche, Northern Virginia Power Co., Hagerstown, Md.
— B. Bell, Rural Supervisor, A. E. P. Co., Roanoke, Va.
F. S. Givens, Jr., Asst. Utility Engr., State Corp. Commission, Richmond, Va.
R. R. Choate, Rural Service Engr., A. E. P. Co., Roanoke, Va.
John F. Nash, Dist. Engr., A. E. P. Co., Bluefield, W. Va.
R. W. Smith, Supv. Meters, A. E. P. Co., " " "
Forrest L. Bocock, Agr'l. Engineer, A. E. P. Co., Bluefield, W. Va.
L. M. McGhee, Rural Service Engr., A. E. P. Co., Lynchburg, Va.
C. C. O'Brien, Rural Supervisor, A. E. P. Co., " "
J. H. Rogers, Virginia Farm Power Board, Big Island, Va.
Clarke Spellman, Supervisor, Rural Service, V. E. & P. Co., Richmond, Va.
J. S. Hamilton, Agr'l. Engineer, V. E. & P. Co., " "
Don P. Tillar, Rural Service Engr., V. E. P. Co., Fredericksburg, Va.
W. E. Smith, Sales Dept., Westinghouse Company, Bluefield, W. Va.
J. S. Dodd, Rural Salesman, A. E. P. Co., " " "
Julius Hall, Jr., Power Engineer, A. E. P. Co., " " "
G. L. Furr, Asst. Div. Mgr., A. E. P. Co., " " "
C. C. Sowards, Sales Dept., Copperweld Steel Co., New York, N. Y.
Cecil Gray, Manager, Westinghouse Electric & Mfg. Co., Richmond, Va.
B. P. Hess, Rural Electric Division, Westinghouse Elec. & Mfg. Co., Pittsburg, Pa.
J. W. Hancock, Vice-Pres., A. E. P. Co., Roanoke, Va.
J. G. Holtzclaw, Pres., V. E. & P. Co., Richmond, Va.
A. L. Wellford, Div. Mgr., A. E. P. Co., Pulaski, Va.
Herbert Markle, Mgr., A. E. P. Co., Bluefield, W. Va.
J. E. Jackson, Dist. Mgr., A. E. P. Co., Lynchburg, Va.
G. R. Neubauer, A. E. P. Co., " "
F. D. Peebles, Rural Service Supervisor, Virginia Public Service Co.,
Alexandria, Va.
Chas. E. Seitz, Agr'l. Engr., V. P. I. Extension Div., Blacksburg, Va.
E. T. Swink, Asst. Agr'l. Engineer, V. P. I. Ext. Div., " "

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 2, 1936

Dear County Agents:

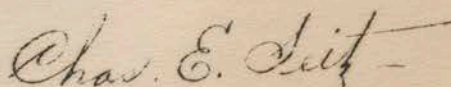
The State Corporation Commission has employed an agricultural engineer to check the costs of rural electric lines. This engineer has had several years experience in figuring rural line costs and is especially well qualified for this type of work with the Commission.

I have been convinced for some time that there should be an unbiased state agency that could investigate the costs of rural electric lines in order to protect the people against unreasonable costs. There are a few instances when it appeared that electric companies have made high estimates of line costs because they did not wish to build the line under consideration. There are other instances where the people felt that the actual cost of building lines was too high. We feel that the expert service now available through the Commission will enable the people to determine for themselves if rural line costs are justified.

Since in most cases rural customers are required to guarantee $1\frac{1}{2}$ per cent monthly of the construction cost of each mile of line, it is essential that the line costs be kept to an absolute minimum. I feel, therefore, that it is good policy to have the Commission check all rural line estimates. If there are any contemplated rural extensions in your county, I suggest that you write the Commission direct requesting such service for your people.

With best wishes, I am

Very truly yours,



Chas. E. Seitz
Extension Agr'l. Engineer

CES:R

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
November 18, 1936

Dear Home Demonstration Agents:

In recent weeks a number of requests have come in for sewing machine schools to be held in various counties. We are glad to be of service to the farm women of our state in this connection.

The Agricultural Engineering Department can hold a number of sewing machine schools during January, February and March, 1937. Plans should be made now if you expect to make these schools a success. Please refer to the enclosed circular "Organizing Sewing Machine Schools" for data on this subject. Only about twelve machines should be planned for each school, and only one school per day.

If you are interested in this phase of work for your county, please let J. J. Bass, Jr., Assistant Extension Agricultural Engineer, know at once the number of schools you would like to hold, and the preferred date for them. A tentative schedule will be arranged after we hear from all agents who want such schools.

With best wishes, I am

Very truly yours,

Chas. E. Seitz

Chas. E. Seitz
Extension Agr'l. Engineer

CES:R
Enc.

AGRICULTURAL ENGINEERING INFORMATION SERIES

Circular No. 11

ORGANIZING SEWING MACHINE SCHOOLS

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

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

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

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

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

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

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

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

Clipping from Newspaper

Regarding Sewing Machine School

WIDE INTEREST IN SEWING MACHINE CLINICS

Sewing Machine Clinics in Louisa County have the record of being the best attended in the state. Mr. M. M. Johns, Assistant Agricultural Engineer, Blacksburg, held two sewing machine clinics in this county, one at Buckner on Tuesday and at Bibb's Store on Wednesday. These clinics aroused a great deal of interest among the women of the county—proof for this statement being that twenty-seven women with eighteen machines attended the Buckner clinic and sixteen women and two men with thirteen machines attended the Bibb's Store clinic. These people came in trucks, automobiles, buggies and wagons and some brought machines on their backs—each determined to have perfect stitching machines before the day was over. These machines were all models and all kinds, some were so rusty, from having been stored in outhouses for eight or ten years, that they would not move at all much less sew, others were so gummed from using oils that were too heavy, that the wheels could not be moved, while others were in very good condition.

The clinic began with an explanation of the purpose and history of sewing machine clinics by Mr. Johns. Following this, instructions were given as to how each woman was to begin cleaning her machine and actual work began. Each woman took her machine apart under the direction of Mr. Johns and Miss Webb, and began brushing, scrubbing and rubbing with special cleaning gas.

Following a good two and one-half hours of thorough cleaning everyone enjoyed a picnic lunch and jolly social hour.

The afternoon was taken up with first, a discussion on adjustment led by Mr. Johns. He explained how the tension, pressure tension and needle should be adjusted for sewing.

Each woman put her machine together and adjusted it according to instructions given. Before any machine left the clinic, however, Mr. Johns checked each part carefully to see that all parts were adjusted correctly, and that the machine was making a perfect stitch. In some instances a new belt or a new tension spring was needed. These were obtained from Mr. Johns at cost. Other than new parts purchased there was no cost attached to the clinic except for six hours of time. It has been estimated that to have this work done on a machine by a machine representative would cost from three dollars and one-half to five dollars; however when the ladies worked on their own machines this was money saved.

Mr. Johns has conducted thirty-four clinics during the past three months and he remarked that of all these clinics, Louisa county has the record of having the largest number of machines present at the clinics. Louisa is to be congratulated not only for the wide interest shown in these two clinics but also the two clinics conducted at Mineral and Shelfar in February during that deepest snow. Thirteen women with machines attended the February clinics in spite of unbroken snow paths and severe cold weather.

LINE KILN CONSTRUCTION

The burning of limestone for agricultural purposes has become a common practice in many of the limestone sections of Virginia. In sections where coal is available at a low cost it is used for fuel, while in wooded areas logs are used as the main source of fuel. The type of kiln to construct depends upon the fuel that is to be used. Plans and directions for building a lime kiln where wood is available as fuel is given herein.

Location:

The first step in building a lime kiln is to choose a proper location. The most desirable location is a side hill where ample supplies of soil or clay and limestone are available. A large amount of soil is required to fill in on three sides of the kiln to keep in the heat. A sufficient amount of limestone that can be quarried as building rock with which to construct the sides and the front should be available. A side hill with ample soil and limestone available will make an ideal location because very little scaffolding need be erected in building the walls and in filling the kiln with broken limestone.

Construction:

After a suitable location has been chosen an excavation should be made extending into the side hill twenty or more feet and of sufficient width to give the proper area for the base. The back and sides should be made perpendicular to the level bottom. The back wall from the bottom of the pit to the top of the bank should be as high as possible as the higher the wall the less work will be required in constructing and filling the kiln.

After the excavation is completed the foundation for the eyes or fire-boxes is constructed by laying large flat limestone rock in the bottom of the pit. The sides of the eyes are then constructed by laying up rock similar to a retaining wall. After the proper height is reached the grates are laid across

the walls which consist of flat limestone rock about 6 inches in thickness and at least 3 feet long. These rocks are placed across the walls at an angle indicated in the plan. After the eyes or fire boxes are built the pit should be filled up to the top of the ground with broken stone. The heavier rocks should be placed directly over the eyes and the smaller ones should be placed at the top.

The front and side walls are built up as a retaining wall by placing the rock in definite order and breaking joints. The front wall should be plastered with wet clay or dirt. This plastering can be done after the kiln has been fired for 8 or 9 hours. The side walls are protected by a fill of dirt or clay well tamped about 2½ or 3 feet wide. The fill is kept in place by walls built of logs and properly braced.

Firing:

Well seasoned cord wood is very desirable for firing the kiln. The rock should be seasoned 8 to 12 hours with a slow fire when the firing is first started. The slow heating will prevent excessive cracking of the rock especially above the fire boxes. After burning slowly for eight to twelve hours the fires should be kept as hot as possible and a continuous fire should be kept until the burning process is completed. Usually 8 days of continuous burning (day and night) is sufficient to completely burn the limestone. It is well to have a sufficient amount of cord wood on hand before starting the firing process. Lack of sufficient fuel may mean a complete failure of the kiln. The wood is cut in 4 to 5 foot lengths and added to the fire as needed. The amount of wood needed will depend upon the kind available but for average conditions from 7 to 8 cords of wood per 24 hour day is needed for the size kiln shown in the plan.

After burning is completed the kiln should be allowed to cool. Ordinarily the burnt lime will take up enough water in the cooling process to properly slake it for agricultural use. The slaking process may be speeded up by adding water gradually to make it crumble. If too much water is added the lime will become pasty and thus make it difficult to apply to the land.

Richmond, Virginia
October 26, 1936

Judge Joseph L. Dailey, Asst. Admr.
For the Administrator
Resettlement Administration
Washington, D. C.

Dear Judge Dailey:

Complying with your request made in RR. Field Letter 32, I am making report on conditions and needs in the twenty-five officially designated drought counties of Virginia. These counties are as follows:

Lee, Scott, Wise, Russell, Dickenson, Buchanan,
Washington, Smyth, Wythe, Greyson, Carroll,
Pulaski, Bland, Montgomery, Giles, Roanoke,
Botetourt, Rockbridge, Coochland, Powhatan,
Chesterfield, Hanover, Henrico, King William
and New Kent.

While Tazewell was designated, it developed that there was no need for drought relief.

When it became apparent around July 1 that we were facing a serious drought situation in Virginia Governor Peery was asked by Director Hutcheson of the Extension Service and a group of prominent farmers to appoint a State Drought Committee. This he did on July 1 with membership as follows:

Mr. Sidney T. Adair, Asst. Admr. WPA., Chairman
Mr. H. H. Gordon, State Dir. RR., Secretary
Mr. John R. Hutcheson, Dir. of Extension
Mr. Henry M. Taylor, Agricultural Statistician,
State Department of Agriculture
Mr. Lyman Carrier, State Coordinator, Soil
Conservation Service
Mr. Arthur W. James, State Commissioner,
Public Welfare
Mr. Walter P. Stewart, Farmer

It will be noted that this Committee was composed of the Heads of various Federal and State Agencies who could possibly contribute to a drought relief program. This State Committee was set up as a coordinating Committee to negotiate with the National Drought Committee and Federal Agencies in position to give drought aid.

The State Committee recommended to the Governor that County Drought Committees be appointed in each of the drought Counties composed of the County Agricultural Agent as Chairman, the RR Supervisor as Secretary, and a member of the County Board of Supervisors and three representative farmers. The County Committees were appointed by the Governor, set up and organized by the State Committee to determine drought policies within the County, select appropriate methods of relief, determine eligibility for relief and to determine beneficiaries of the program. These Committees were aided by the County Welfare Department and by special investigators attached to the Welfare Offices and paid from ERA funds.

The State Committee determined to approach the drought problem from the following angles:

- 1 - Work relief opportunities through W.P.A.
- 2 - Emergency Feed and Seed Loans through the RA.
- 3 - Reduced freight rates.
- 4 - A work relief and Soil Conservation Program through the Soil Conservation Service.

In view of the fact that the Soil Conservation Service had the right to work on private property, and in view of the fact that the drought program was a purely agricultural program, it was decided by the Committee to place major emphasis on a Soil Conservation program, the reasons being that agricultural labor should be employed on agricultural projects as close home as possible to prevent their being drawn away from their normal agricultural pursuits. It was also felt that Soil Conservation work would be of a permanent benefit to the communities involved and serve as lasting demonstrations of good soil conserving practices.

The State Committee approached the Soil Conservation Service in Washington and was successful in securing from them an initial allotment of \$100,000.00 for a Soil Conservation program in the first thirteen Counties officially designated. The Soil Conservation Service agreed to furnish technical supervision, small tools, dynamite and the labor with which to carry on the program. All other expenses to be borne by County Associations formed by beneficiaries of the program. Since the original thirteen Counties were located in the lime stone belt, the major project undertaken was the burning of lime kilns and the application of agricultural lime. In five Counties lime stone was not available, and gully and erosion control was used instead. County Committees were set up to determine eligibility of work relief clients, select sites for soil conservation demonstrations and determine recipients of the benefits to be derived from the program. This project was continued in the thirteen originally designated Counties through October, at the end of which time over 3000 drought sufferers had been provided with employment, 20,000 tons of lime burned and applied and a proportionate amount of erosion and con-

trol work done. Since the work was limited to actual agricultural workers, whether farm laborers, share croppers, tenants or small land owners, an unusual volume of work was accomplished and the original allotment of 118 man years was stretched into 275.

In addition to soil conservation work an additional quota of 2000 was secured by WPA for drought sufferers. This quota was made available to all Counties in the State and was not restricted to officially designated Counties. The Resettlement Administration in turn made emergency seed and feed loans available to all Counties in the State without restricting such loans to officially designated Counties. This was necessary because the drought situation was extremely spotted with portions of the majority of the Counties of the State in serious condition although it was not possible to designate the entire County as a drought County. Negotiations with the Railroad Companies for reduced freight rates were carried on through every available source but reduced freight rates were not secured.

In August twelve additional counties were designated as official drought Counties, however, it was not thought best at that time to set up the County Committees. As of October 1 an additional allotment of funds was made available through the Soil Conservation Service for use in these twelve Counties. The first allotment being \$35,000.00 with indications that additional allotments would be made monthly, certainly up to the first of the year. County Committees are being set up at present in these twelve Counties and a soil conservation program of either lime production, marl or erosion control undertaken in the Counties. Personnel and equipment from the original thirteen Counties are being moved into the new Counties and the soil conservation project will be actively pushed.

The full effects of the drought will not be felt in Virginia until the winter months. As indicated on the attached maps, food and feed crops were not a total failure. However, it is well known that supplies of both food and feed crops will in most instances be exhausted by December or January, and the need particularly for livestock feed will be most acute from that time on. Every effort is being made to anticipate this need and provide relief in time in order to prevent that measure of destitution which will qualify sufferers for relief according to the standards set up by Social Service and WPA. The program is being restricted to genuine agricultural workers who as a result of the drought and lack of an income, whether from agricultural employment or the production and sale of crops, will be in desperate need of food for the family and feed for livestock during the winter months.

Negotiations have also been undertaken with WPA whereby the RA in lieu of a grant program, can certify its clients to WPA for work to the extent that would ordinarily be supplied through a grant; WPA to

work and pay the client according to their security wage and regulations and WPA. to be reimbursed by the RA to the extent previously agreed upon. This will relieve the RA of necessity for carrying compensation insurance and the clerical work in connection with work relief, also the necessity for negotiations with local agencies on voluntary work agreements. Best of all, it will remove the stigma of direct relief from the grant program.

It has been interesting to observe that the universal reaction of the County Committees toward present relief methods was about as follows:

- 1 - Emphatic condemnation of direct relief and grants except to unemployables for whom provision has already been made by State and County Governments.
- 2 - Failure of WPA to secure an adequate amount of work from WPA clients
- 3 - Interference with farm labor and failure of WPA to encourage WPA workers to accept seasonal farm employment.

Under the Soil Conservation program, workers are allowed to miss such time as may be necessary to care for their crops or to help farmers in need of employment; their status on the Soil Conservation project is not endangered by such absence and they are encouraged to take care of such necessary farming operations. A full day's work is also required of them. As a result of these policies the Soil Conservation project has received more favorable comment than almost any Federal undertaking in recent years. Rehabilitation clients are certified for work on this project on the same basis as any other needy farmer and can profit to the same extent.

The special quota made available by WPA is being used largely for those laborers who received occasional and seasonal agricultural employment of which they were deprived by the drought. However, it is anticipated that WPA will take up the load after the first of the year when the Soil Conservation Service has to drop out of the picture. The RA will cooperate with them during this period through certification of needy clients in lieu of grants as discussed above.

The attached maps were prepared by Mr. Henry M. Taylor, Agricultural Statistician, and they indicate the percentage of normal of pasture hay and corn which are our principal livestock feed crops. No data is available on subsistence gardens, but it is known that aside from late gardens and some very early crops, very little was available for preservation for winter use.

As already indicated, \$100,000.00 has been used by the Soil Conservation Service to provide employment to slightly more than 3,000 drought sufferers during a period of three months. It is felt that the money earned during this period will equal approximately the amount they would ordinarily have earned from agricultural employment and that this income should prevent necessity for further relief. Present allocations of funds should make possible the employment of 1500 to 2000 drought sufferers in the remaining twelve counties during the months of November, December, and perhaps, January. It is expected that WPA will take up this load in January and February and continue that portion of the drought sufferers who require continued aid with subsistence and livestock feed. Work relief clients are paid at the rate of 15¢ per hour, or \$21.00 per month, which is the security wage in the majority of Counties in Virginia.

The following figures have been secured from County Drought Committees, Soil Conservation, WPA, Welfare, Extension and other Agencies:

- 1 - Work through Soil Conservation and WPA in November and April - 133,333 man hours; December, January, February and March - 266,666 hours; May 66,666 hours.
- 2 - Total subsistence earned November and April - \$20,000.00 monthly; December, January, February and March \$40,000.00 monthly; May - \$10,000.00. Equipment and supplies will not be charged to these projects.
- 3 - The Resettlement Administration, through a work program in lieu of grants, will provide relief to the extent of \$1,000.00 per month in November and December; January and April - \$3,000.00; February and March \$5,000.00; May - \$2,000.00.

(These three items will take care of needed subsistence)

- 4 - Livestock feed will be required as follows:

January - \$45,000.00
February - 100,000.00
March - 100,000.00
April - 45,000.00

One-half of this amount to be made available through RA loans, the remaining one-half through Farm Credit Administration emergency loans; one-fourth of the total amount could perhaps be made available through standard or supplemental RR loans. This estimate applies to both subsistence and foundation livestock, divided perhaps equally between the two.

- 5 - Emergency seed loans will be required as follows:
January, March and April - \$50,000 each month;
February - \$100,000.00.

One-half of this amount to be provided through RA emergency loans. One-fourth of the total amount could probably be furnished through RR standard and supplemental loans.

I feel that I have touched on the principal points called for in your outline and that I have given the information desired. While in most instances the figures given are estimates, they are estimates made by our best sources of information, namely - County Advisory Committees, Extension and Rehabilitation workers, WPA and Soil Conservation.

In conclusion I would like to say that I sincerely feel that the approach made to the drought problem by Virginia is the ideal approach, namely - through a State coordinating Committee and County Drought Committees and that this provides for the utmost cooperation between all Agencies in position to provide relief without duplication. Our experience has indicated that most harmonious relations will result from this plan and I can heartily commend it to other States. As you will note, it is an agricultural program for agricultural sufferers designed to give not only relief but constructive and permanent results.

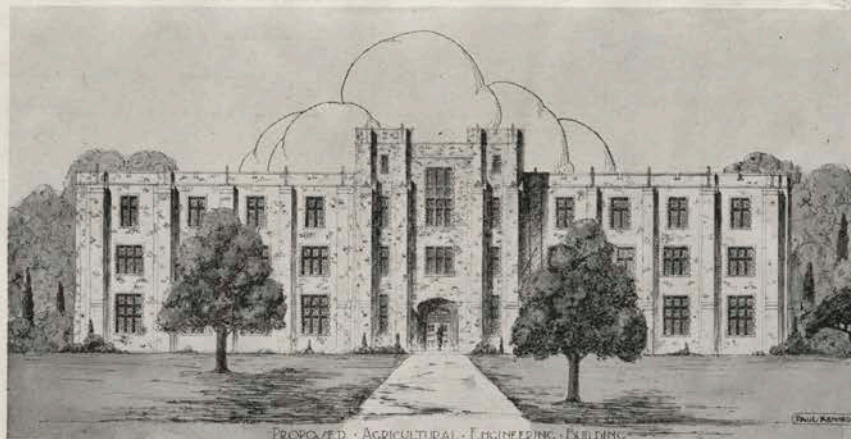
Sincerely yours,

(Signed) H. H. Gordon
Director Rural Rehabilitation

DESCRIPTIVE STORY OF

W.P.A. PROJECT 62-51-1200

Agricultural Engineering Laboratory
Virginia Polytechnic Institute
Blacksburg, Virginia



Prepared by
Agricultural Engineering Department

July 1936

W.P.A. PROJECT 62-31-1200

Agricultural Engineering Laboratory, V.P.I.

This is a brief description of the high points involved in the construction of a stone and concrete laboratory for the Agricultural Engineering Department at Virginia Polytechnic Institute at Blacksburg under an allotment of funds through the Works Progress Administration and under the supervision of the engineering staff of the Department.

Plans were completed and application for the project was first made in August 1935. Approval was finally given in January 1936 and actual work begun on January 15, 1936. This beginning of work consisted of excavation mostly, together with other preliminaries like form building, setting up shop, assigning men to the various jobs and arranging a steam heated wooden laboratory for headquarters during cold weather.

The work has continued to date with scarcely an interruption except for cold weather and during the last three months not a full day has been lost on account of the weather. During the winter and spring the cold weather interfered considerably but concrete in the footings was actually laid in February.

General progress, the quality of construction obtained, and the skill and efficiency of the men has exceeded the fondest hopes of those in charge of the project until it has become to be recognized as one of the best W.P.A. projects in the State.

THE BUILDING

The original project covered only one laboratory wing or unit of a completely planned Agricultural Engineering Building laid out in strict adherence to planning schemes in the College Architect's office for the Agricultural Quadrangle.

This first unit of the building was a one-story laboratory wing 133 feet long and 45 feet wide with a total height of 17 feet, the ceiling height being 14 feet. A concrete floor covered the entire area but no partitions were included. Off one corner was a tool room and storage addition 13 x 25 feet.

Construction was entirely fireproof, the walls being laid up with stone and concrete and the roof being steel truss and steel deck construction. The three outside walls were laid up with native dolomitic limestone in random ashlar fashion after most of the buildings on the campus. These walls were backed up with rough stones laid in concrete mortar with a plaster finish on the inside. One side wall, together with the walls of the tool room were laid up between forms with rough stones in concrete mortar. Window and door openings were trimmed with "cast stone" made on the job and the windows were large steel sash with 14 x 20" glass panes.

Excavation for this wing was rather difficult, the front part being located in a low water course and the rear portion being in a hillside where excavation went down 9 feet into rock. The front half required a fill of 5 feet up to floor level and it was necessary to construct first a concrete storm sewer 3 x 2 feet under the building to take care of surface water that collected on the site.

THE WORKING FORCE

In the beginning a camp force of about 65 men was assigned to the project, there being about 52 men actually working on the construction. Others operated the camp, drove the trucks, kept records, etc. This force dwindled during the spring months until now there are about 38 to 42 men actually working.

These men all came from a camp about 4 miles from the site of the building, said camp being one of several WPA camps in the State and which was originally a transient camp. The men were hauled to the building each day and hot lunch was brought to them at noon. Rough dining tables with benches were made in the steam heated wooden laboratory for the men to eat on.

This arrangement was continued until April when the camp was moved to a corner of the College Farm about one mile from the building and said facilities are still being used. The housing of the men is in tents and these are not so satisfactory and will have to be changed before cold weather sets in.

The camp and this project were administered direct out of Richmond without the local county administration having any authority over it. This was a most efficient arrangement until all camps were dropped in the State and the project came under the authority of the County Administration. The camp is now being sponsored by the College, with WPA loaned equipment and run under private management. The men now have a higher wage rate and pay the camp \$15 per month for board and lodging. Thus WPA has no responsibility for maintenance of the men.

The food in the camp has always been of the best, well cooked and plentiful. There has been very little complaint and this has been one factor in keeping the men satisfied on the job.

THE MEN

At the beginning of the project we were advised by "experts" that a construction job of this kind could not be done with this type of labor. We, ourselves, were somewhat skeptical but willing to try it since we had an experienced architectural and engineering staff in the Department for supervision.

The men at first seemed to be mostly laborers but by inquiring among them and by trying different men at different tasks we soon found out their respective abilities. They were carefully and patiently instructed in their work and were soon found to be very dependable for the most part. They were all very willing and soon became interested in the job and wanted to stay with it until completion. Now they are asking what other units we are going to build and expressing hopes that the work will continue for another year or more.

We soon had a sorted and trained gang that could be set to the various tasks without so much supervision and certainly with dependable results. Slowly that gang has been sifted down and the men have become more proficient in their tasks until now we freely say that the men are twice as good as we expected and we have shown everybody that we can build a structure of this kind fully as well as any contractor would do it.

The College Architect and the Business Manager have both been on the job recently and say that it is as well constructed as any building on the campus and they both said in the beginning they didn't think we could do it with this type of labor.

It is truly remarkable how willing the men are to do any task asked of them. I can go to any man on the job and ask him to come along with me to do any dirty or difficult job there is to be done and he is right with me. In addition they seem to have a personal interest in getting the job completed in good shape. They seem to feel that they belong to an organization that is going somewhere and they want to stock and help.

We have had very little trouble among the men and no tendency to strike or complain. To be sure there have been a few individuals who get mad at each other and there have been some chronic complainers but these are pretty well sorted out by now and our present gang of 40 men is doing better and faster work than the original gang of 30

or more. It is very noticeable in the reduced amount of detailed supervision required. A great amount of loyalty, willingness and interest exists in the gang we now have.

These men cannot be said to be as highly skilled as a contractor would usually have and they are not driven as hard but their willingness to work hard together with experienced supervision makes a combination that can turn out work equal to that of most contractors prompted by the desire to make big profits on a piece of work.

SUPERVISION

The working organization of the men has been constantly under a WPA camp supervisor who has directed the men for two years. The engineering and construction supervision has been under the constant direction of the staff of the Agricultural Engineering Department. This staff is experienced in architecture and construction and promotion to a greater degree than is usually found in a College.

It should be noted here that the College has employed and furnished to the job the services of two expert stonemasons and one stone cutter who have worked on all of the later buildings on the campus. This accounts for the perfection of the outside appearance of the present job.

Along with the supervision furnished in the Department are the very complete plans for the whole building previously worked out in the office of the College Architect. This unit of the building did not just happen. It was planned in strict detail more than five years ago and a WPA project became the first opportunity to get construction work started.

The Department was able to furnish equipment in the form of tools, wheelbarrows, concrete mixer, electric motors, tractor, saws, trucks, air compressor, shop facilities, etc., which have greatly aided the construction.

COSTS

The original cost of this first wing or unit was estimated at \$20,000 to \$21,000 under the idea that the labor furnished would not be very efficient. The approval of the project by WPA carried an allotment of \$12,711 most of which was for labor. The College, as sponsor, has furnished about \$9,000 in stone, sand, cement, lumber, hardware, roofing, equipment rents, wages and supervision.

As the construction of the first wing was nearing completion it was seen that only about half of the WPA allotment for labor had been used up. The Administration therefore granted permission to extend the project and we began work on the second wing which is a duplicate of the first wing. This wing is now about three-fourths completed and

I believe it is correct that the original labor allotment has not been used up. The College has added additional funds for the materials on this second wing, so that the cost of the two wings is perhaps around \$25,000.

It is to be noted that the second wing has gone up about twice as fast as the first one due to the increased skill of the men and development of methods and equipment. This second wing has been most convenient for efficient use of labor since work could be shifted to the new unit as jobs became finished on the first unit.

JOBS DONE

It might be interesting to mention the different kinds of work done by the men on the job. They are listed roughly as follows: laying stone in walls, cutting face stone, making cast stone trim, concreting, laying concrete floors, plastering and finishing walls, setting steel sash, glazing, painting, setting steel trusses and steel roof deck, applying roofing, pointing walls, making forms for concrete and stone, making scaffolds, blacksmithing and making tools, driving tractor, drilling rock, blasting rock, crushing rock, making heavy wood doors, casting reinforced concrete beams, mixing mortar, grading grounds, and all kinds of labor connected with the job.

REMARKS

The results on the construction have exceeded our expectations and the experts say that the construction obtained is equal to any contract job that has been done on the campus.

The men are twice as good as we expected and are interested, loyal, and willing and skillful. They want to stay on the job. Some few that have drifted away have come back satisfied that this is a good place for them to work and hoping that the work will last.

No trouble has been had with the men. There has been no tendency to strike or complain. The rather low wages has had nothing to do with how hard they will work.

We have developed a remarkable combination of working men, proper direction and engineering supervision that cannot often be gotten together under similar circumstances.

It should be worth while for WPA to approve further units on this building so that this organization can be kept working indefinitely, or as long as WPA functions.

This setup worked best when under the independent administration out of Richmond without the necessary red tape of local authority.

Written by
P. B. Potter, Construction Engineer
Agricultural Engineering Dept.

A Supplement To Farm Unit and Area Test Demonstration Projects

In Cooperation With The Virginia Polytechnic Institute

AUTHORIZATION: Contract for Joint Program of Agricultural Development and Watershed Protection through improved Fertilization, dated July 1, 1935, Article 2, Sections 3 and 4, as applied by the projects for farm unit and area test demonstrations in Virginia.

PURPOSE: To establish a systematic procedure for the measurement of the progressive reduction in soil and water losses from watershed areas, farms and plots, resulting from the use of Tennessee Valley Authority phosphates and indicated in the contract and project indicated above.

LOCATION: Initially, Wythe County Virginia and the Glade Spring Experiment Station. The procedure may be established in other counties by mutual agreement.

METHOD OF PROCEDURE: Structures for the measurement of soil and water losses will be established on two or more farms located in that part of Wythe County which is included in the area demonstration and several structures will be established at the Glade Spring Experiment Station. In all cases, excepting check plots, the areas and farms will have been treated with Tennessee Valley Authority phosphates according to the procedure prescribed by the projects named above. It is anticipated that this procedure will be extended to include representative soil types and farming conditions encountered in the Tennessee Valley Area of Virginia and that measurements obtained - taken under practical farming conditions - will be representative of the soil types investigated. The construction of the run-off plots and the method of measuring the run-off shall be in accordance with the methods and procedures established by the Virginia Polytechnic Institute.

APPROXIMATE DURATION: The terms of this supplement shall extend to June 30, 1937 and thereafter until terminated in writing by either party upon thirty days' notice. It shall be subject to legal and budgetary limitations of either party.

PERSONNEL: The project shall be under the supervision of Mr. G. D. Kite, Assistant County Agent, Wythe County, Virginia. It is understood that cooperating farmers will furnish such equipment as they may be able and also the labor necessary for the construction of run-off plots.

BUDGET: Materials for the construction of dams, weirs, etc. and also instruments for recording the run-off will be provided by the Virginia Polytechnic Institute for which the Institute shall be reimbursed by Authority in accordance with provisions of the above-mentioned contract.

Mr. Kite, when working outside of Wythe County, will be reimbursed for travel and subsistence incurred in carrying out the provisions of this supplementary project. Travel shall not exceed 5¢ a mile for the use of his personally owned car. The budget below shall be strictly adhered to.

Instruments	\$500
Stationary installation for plots	500
Travel for Mr. Kite	500

RECORDS AND REPORTS: Complete records of soil and water run-off shall be obtained by the Institution. Such records shall also include complete information on the types of land upon which and the farming conditions and practices under which the losses occurred. Full reports on the progress of this project shall be submitted upon the request of the Director of the Agricultural Division, Tennessee Valley Authority.

November 1, 1936

VIRGINIA POLYTECHNIC INSTITUTE

By Director

TENNESSEE VALLEY AUTHORITY

By Director, Agricultural Division

