PROJECT - 10

VIRGINIA POLYTECHNIC INSTITUTE,

Division of Extension,

DEPARTMENT OF AGRICULTURAL ENGINEERING,

Annual Report,

December 1, 1922 - November 30, 1923.
Mr. J.R. Hutcherson,
Director of Extension,
Virginia Polytechnic Institute,
Blacksburg, Va.,

My Dear Mr. Hutcherson:—

I am submitting herewith annual report of the department of
Agricultural engineering, in accordance with Project 10, Co-operative Extension
work with the United States Department of Agriculture and Home Economics, for the
period beginning December 1, 1922, and ending November 30, 1923.

I. INTRODUCTION.

There have been a few changes in the regular personnel of the
department during the period covered by this report. Chas. E. Seitz, one-half time
Extension engineer, continued in charge of the department. John S. Glenn, full
time Extension engineer, resigned June 30th, to accept a position with the Brandt
Motor Corporation, of Norfolk, in charge of the Tractor Department. Henry S.
Boynton, one-half time Extension Engineer, resigned August 30th, to study architectural
engineering at the University of Illinois. Helen P. Hughes, Secretary,
resigned June 1st, to be married.

J.A. Walker, Jr., instructor in agricultural engineering in the
college, was put on as full time Assistant Extension Engineer, September 1st., in Mr.
Glenn's place. E.O. Mankson, a graduate in architecture of the University of
Minnesota, started work August 11th, in Mr. Boynton's place, as one-half time
Extension Architect. Several students have worked part time doing tracing and
blue printing. The changes in personnel have resulted in considerable time being
lost in the field work, as it has been necessary to train the new men in the
problems, conditions, methods, etc. of the work in Virginia.
II. OUTLINE OF WORK.

Project 10, Agricultural Engineering, is divided into 3 general classes of work:

A. Short Courses and meetings.

B. Publicity and Propaganda.

C. Field Projects and Demonstrations.

The short courses, or extension schools and meetings, are handled during 4 months only - January, February, July and August.

The publicity and propaganda is handled during the entire year.

The field projects are further divided into sub-projects, and the demonstrations are conducted during the actual work on the sub-project, or as follow-up work upon the completion of the projects.

SUB-PROJECT 10-A, LAND RECLAMATION, is handled by Chas. B. Seitz, Extension Engineer, and is further divided as follows:


SUB-PROJECT 10-B, FARM WATER SUPPLY AND SANITATION, is handled by J. A. Waller, Jr., Assistant Extension Engineer, and is further divided as follows:

10-B-1. Farm Water Supply.
10-B-2. Farm Sanitation.
10-B-3. Farm Lighting, Heating and Ventilation.

SUB-PROJECT 10-C, FARM ARCHITECTURE, is handled by R. J. Markson, Extension Architect, and is further divided as follows:

10-C-1. Farm and Community Building Plans.
10-C-2. Farmstead Planning.

SUB-PROJECT 10-D, FARM POWER AND OPERATING EQUIPMENT, is handled by J. A. Waller, Jr., and is further divided as follows:

10-D-1. Gas Engines and Tractors.
10-D-2. Farm Implements.
10-D-3. Farm Water Power Development.

SUB-PROJECT 10-E, MISCELLANEOUS PROBLEMS IN AGRICULTURAL ENGINEERING, is handled by any member of the department, and consists of answering inquiries and supplying information on all phases of farm engineering problems not included under sub-projects A, B, C, or D.
III. METHOD OF PROCEDURE.

A. Short Courses or Extension Schools and meetings are given when scheduled and consist of chalk talks and illustrated lectures, moving pictures and laboratory work.

B. Publicity and Propaganda is handled through correspondence, bulletins, circular letters, newspaper and farm journal articles, agricultural engineering section in the Extension Division News, and exhibits at fairs.

C. Field Projects and Demonstrations consist of technical information and services offered to individuals, communities and organizations in the State in matters relating to agricultural engineering.

Demonstrations consist of visits and meetings at projects under construction, and at finished projects, in order to instruct on methods or to show results obtained.

Individuals, county agents or community organizations make application to the department for the services of the specialists. The individual project is visited, in company with the county agent, if possible. Surveys and other notes are made, and a detailed report and suggestions furnished.

Demonstrations usually follow the completion of the project, and in many cases, is arranged for by the county agent. Many of the sub-projects are self-advertising, such as improved farmsteads, new buildings, new operating equipment, water systems and reclamation projects.

IV. RESULTS OBTAINED.

A. Short Courses and Meetings.

<table>
<thead>
<tr>
<th>Short Courses</th>
<th>No. Courses</th>
<th>Place</th>
<th>No. Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmers Tractor Short Courses</td>
<td>1</td>
<td>V.P.I.</td>
<td>65</td>
</tr>
<tr>
<td>Boys' Farm Mechanics</td>
<td>1</td>
<td>V.P.I.</td>
<td>127</td>
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<tr>
<td>Farm Power Demonstrations</td>
<td>1</td>
<td>V.P.I.</td>
<td>400</td>
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<tr>
<td>Tractor Farming (Movie)</td>
<td>3</td>
<td>V.P.I.</td>
<td>500</td>
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<td></td>
<td></td>
<td></td>
<td>1092</td>
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<td></td>
<td><strong>Totals</strong></td>
<td><strong>6</strong></td>
<td></td>
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<table>
<thead>
<tr>
<th>No. Meetings</th>
<th>No. Attendance</th>
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</thead>
<tbody>
<tr>
<td>Meetings attended</td>
<td>30</td>
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<tr>
<td>Meetings addressed</td>
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<tr>
<td></td>
<td><strong>Totals</strong></td>
</tr>
<tr>
<td></td>
<td></td>
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</tbody>
</table>
IV. RESULTS OBTAINED (Continued)

B. Publicity and Propaganda:

Articles written for newspapers, etc. 22
Letters written in answer to inquiries, etc. 4372
Bulletins on Agricultural Engineering sent out by request, 2626
Farm Building plans sent out by request, 2087
Total 9119

Counties visited 61
County Farm Agents assisted, 40
County Home Demonstration Agents assisted, 16
County Negro agents assisted, 3
Farmers met or visited, 2662

C. Field Projects and Demonstrations:

<table>
<thead>
<tr>
<th>Name of Project</th>
<th>Number of Demonstrations</th>
<th>Acres</th>
<th>Attendance</th>
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<tbody>
<tr>
<td>Land Drainage</td>
<td>42</td>
<td>2,025</td>
<td>210</td>
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<tr>
<td>District Drainage Organization</td>
<td>1</td>
<td>2,700</td>
<td>230</td>
</tr>
<tr>
<td>Terracing,</td>
<td>42</td>
<td>662</td>
<td>230</td>
</tr>
<tr>
<td>Farm Water Supply</td>
<td>237</td>
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<tr>
<td>Farm Sewage Disposal,</td>
<td>75</td>
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<tr>
<td>Farm Lighting and Heating,</td>
<td>10</td>
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<tr>
<td>Farm Building Plans,</td>
<td>2165</td>
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<td>Farmstead Planning,</td>
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<td>Community Building Plans,</td>
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<td>Farm Water Power Development</td>
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<tr>
<td>Miscellaneous Farm Engineering Problems</td>
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</table>

Co-operative work was done with the Chatham and Staunton Experiment Stations, Boys' Club Department, Horticulture Department, Dairy Department, Animal Husbandry Department and Home Economics Department of V. P. I., County Agents, Home Demonstration Agents, Smith-Hughes Agents, High School Teachers, Agricultural Department of H. & W. L. R., the Virginia Truck Experiment Station and the Division of Agricultural Engineering, U.S.D.A.

V. DISCUSSION OF SUB-PROJECTS:

SUB-PROJECT 10-A, LAND RECLAMATION.

10-A-1, Land Drainage:

Unfavorable economic conditions and high freight rates on drain tile have resulted in fewer requests than last year for assistance on drainage. During the
year, 42 field demonstrations were conducted on 2,025 acres of cultivated land. On 26 of these farms, consisting of 1,701 acres, only preliminary surveys were necessary, as the drainage problem was comparatively simple. On 16 farms, consisting of 293 acres, complete drainage surveys were necessary; maps and reports were furnished for these 16 surveys. In addition to these demonstrations, a preliminary survey was made of 2700 acres in Norfolk County for the purpose of organizing a drainage district.

For a comparatively small cost per acre for drainage on the 1732 acres, on which only preliminary surveys were necessary, the productive value can be increased at least $10.00 per acre, or $17,332.00 for the 1732 acres. On the other 16 farms for which complete drainage systems were planned for 293 acres, the increased productive value will amount to at least $20.00 per acre, or $5,860.00 for the 293 acres. On the 2700 acres in the drainage district, the increase can be figured at least $10.00 per acre. The value of the actual demonstrations carried on by the department can, therefore, be conservatively estimated at $55,160.00.

The most important piece of extension work accomplished under this project was the organization of the 2700 acre drainage district, known as Norfolk County Drainage District No. 3. A preliminary survey was made of about 2700 acres of land belonging to a colony of Polish truck farmers. Advice and instructions were given these farmers on the methods to pursue in organizing a drainage district under the Virginia laws. These farmers have secured the signature of the majority of land owners and have petitioned the court for the formation of a drainage district. Their petition will be heard in January.

The farmers are badly in need of drainage and cannot hope to make a success on the land until it is drained. A number of the land owners have become discouraged and left the colony as a result of inadequate drainage. If the district is allowed by the courts, long time bonds can be issued to finance the undertaking and the objecting minority must pay their share for the benefits received.

This project will be written up in full in next year's report, upon the completion of the drainage for this district. The project is being handled in co-operation with the Division of Agricultural Engineering, United States Department of Agriculture.

(The next page shows views taken on the )

( drainage project )
SUB-PROJECT 10-A

PHOTOGRAPH SHOWING TILE DRAINAGE MAP

LAND RECLAMATION
10-A-2 Terracing:

Terracing to prevent erosion continues to be a very important project. Ten county agents requested assistance on this work. Several of the agents asked for more time than the department could give them, but an average of 5 days was spent in each county on this work.

The county agent arranged for and advertised the demonstrations in his county and an engineer from this office laid out the terraces and constructed at least one complete terrace on each demonstration farm.

The terracing demonstrations were conducted in the following counties: Charlotte, Amelia, Hertford, Mecklenburg, Greenville, Dinwiddie, Halifax, and Pittsylvania. Forty-two (42) terracing demonstrations were conducted in these counties and 122,000 feet of terraces were laid out on 662 acres of land. 250 farmers attended these demonstrations. In several of the counties, the Agricultural High School teachers attended these demonstrations with his agricultural classes. In three counties, the Negro county agent attended the demonstrations.

The terracing work as conducted during the last few years has had very gratifying results. The spread of influence has been very satisfactory. The agents that have been instructed in terracing have been doing a lot of this work themselves and the boys in the Agricultural High Schools are beginning to do terracing. A conservative estimate of the cash value of the work actually laid out by the department is $10.00 per acre, or $6,620.00 for the 662 acres terraced.

Probably one of the most important pieces of extension work accomplished on this project was the terracing campaign put on from October 15 to November 24th. With the exception of one week spent on water supply work, this period was spent on terracing demonstrations. The campaign was conducted in eight counties and 116 terraces, having a total length of 72,850 feet, were laid out and 16 terraces, having a total length of 7,660 feet were constructed at the demonstrations.

In general, the specialist received excellent co-operation in these counties. Mecklenburg should be put at the top of the list, not only from the standpoint of amount of work actually done, but because of the efficient and systematic manner in which the county agent handled the work. He remained with the specialist at all times, giving much assistance and made a special point of properly introducing the specialist to all spectators, so that they would know where he was from. Previous to the arrival of the specialist, notice of the demonstrations was put in the county paper with a complete schedule of the work to be done. This publicity resulted in the agent having more spectators out than any other county. Charlotte County should be placed second and Pittsylvania County third, in order of amount of work done, co-operation received from county agent and number of persons reached and visited.

10-A-3; Land Clearing:

No work has been done on this project during the year.

(The next page shows views taken on the terracing project.)
SUB-PROJECT 10-A

NEWLY CONSTRUCTED TERRACE
ROTTAWAY CO

TEERRACED FIELD — AMELIA CO

LAND RECLAMATION
SUB-PROJECT 10-8 - FARM WATER SUPPLY AND SANITATION.

10-8-1 Farm Water Supply.

The farm water supply project has become one of the most important projects of the department. It has grown from a few scattered calls to the demand for extensive campaigns in many counties over the state.

Practically all of the water supply work has been carried on in co-operation with the Home Economics Department and Home Demonstration Agents. This method allows closer contact with the farm home and makes possible more work done in less time. The Home Demonstration agents lined up all the water works prospects in their respective counties and arranged a schedule for the visits. An engineer from this department visited all the prospects with the Home Demonstration Agent and made a survey of the possibilities for water supply. Suggestions were given on the most practical systems to install, estimate of costs and instructions for installation. It was possible to visit several farms each day. The different systems installed were wind mills, engine driven outfits, gravity systems, suction pump and cisterns, air pressure systems, barrel systems and hydraulic rams.

Many farm homes are without water systems because they do not have any idea what kind of system to install, how to install it or what it will cost. When shown that they can secure running water in the home at a reasonable cost, the owners are usually enthusiastic and anxious to go ahead with the work. After they get the running water in the home, they take pride in showing their systems to neighbors, many of whom immediately install similar systems. In addition to the above, 7 farm lighting & heating demonstrations were conducted.

Very gratifying progress has been made on this project. Results have shown that in most cases the installation of a water system leads to the desire for other improvements and conveniences, such as lights, heat and sewage disposal systems. During the year, 259 water supply demonstrations were carried on and 13 Home Demonstration Agents were assisted in this work. The results have been so gratifying in all water supply work demonstrations that it is difficult to select the most important piece of extension work accomplished under this project. However, the Jones demonstration in Wythe County can be taken as one of the typical installations.

A visit was made to the Jones home, in company with the Home Demonstration Agent. Mr. Jones stated that he did not have the time nor money to install a water system. However, permission to make a survey was given and it was found that Mr. Jones had been walking a minimum of 115 miles per year and had carried 72,000 lbs. of water in this time, lifting approximately 200 pounds each day a height of 60 ft. This work required about 360 hours per year.

When presented with the facts and given an estimate of the cost, Mr. Jones decided to put in a system as recommended. A later trip revealed that he had followed instructions and had constructed a 7,500 gallon concrete cistern and pitcher pump for furnishing running water to the kitchen. Other home conveniences, such as lighting and heating plants, have since been installed.

10-8-2 Farm Sanitation

Demonstrations on this project are usually conducted in connection with the water supply demonstrations. This service consists mainly in the disposal of kitchen wastes, protection of water supply to prevent pollution and the installation of sewage disposal systems. Plans for septic tanks have been furnished, showing details of construction and instructions for building. 75 field demonstrations were conducted on sanitation; several hundred plans and bulletins on sewage disposal were sent to farmers requesting this information.

(The next page shows views taken on the Water Supply & Sanitation Project)
WATER AND LIGHT SYSTEMS
IN LABORATORY

BOYS' CLASS IN FARM SANITATION

FARM SANITATION
10-3-1 Farm and Community Building Plans:

This project has been conducted by field assistance on the construction work and by the furnishing of plans, bills of material and specifications. This is one of the most important projects of the department and the demand for building plans is constantly increasing.

The building plan service has been developed along sound and conservative lines to insure the greatest amount of good to the farmers with the least possible expenditure in the preparation of plans. Our files contain plans of every type of farm building, drawn to fit Virginia conditions. The department has recently received a classified list of farm building and equipment plans prepared by the Agricultural Engineering Departments of other states and the Division of Agricultural Engineering of the U.S. Department of Agriculture. By making use of this list and the plans prepared by other states, duplication of work can be prevented. A mimeographed list of our farm building plans has been sent to all county and home demonstration agents.

Requests for special plans have received our earnest consideration and when these plans could be used generally, we prepared complete drawings. Seventeen (17) of these plans have been drawn during the year. A number of poultry house and poultry equipment plans have been prepared for a poultry house bulletin that is being prepared in co-operation with the Poultry Department. Requests have been received from farmers for plans to the number of 2,067, of which 1,600 were for poultry houses. Over 500 poultry house bulletin have been sent to farmers as well as several hundred bulletins on other farm structures.

10-3-2 Farmstead Planning Project:

On this project, field assistance was given to several farmers on the arrangement of their buildings, fences, roads, silo construction, etc. This project takes considerable time and, due to limited assistance, it is not possible to spend very much time on this one project. It often happens, however, that this project can be conducted with some other project, such as drainage. Twenty farmers have been given field assistance with the location of their barns and the staking out of their barn foundations, etc.

Probably one of the most important pieces of extension work accomplished under the farm architecture project was the design of the beef barn for the Animal Husbandry Department, V.E.I. Plans were drawn and bill of material and specifications prepared. The department received bids for the construction of this barn and had charge of the erection of same. This barn will house the new beef herd that has been purchased by the funds set aside by a special act of the Legislature.

(The next two pages show views taken on the farm building and farmstead planning projects.)
SUB-PROJECT 10-C

DAIRY BARN
AMELIA CO

CONSTRUCTING BEACED RAFTER BARN

FARM ARCHITECTURE
SUB-PROJECT 10-D, FARM POWER AND OPERATING EQUIPMENT.

10-D-1, Gas Engines and Tractors.

This project has been handled through short courses at V.F.I., as time and available assistance did not allow any work on the project away from headquarters. One Farmers' Tractor Short Course was held during the Farmers' Institute. Sixty-five farmers were enrolled for this four day course. A Junior Farm Mechanics Course was also held during the State Club enrollment. This course lasted four days and was attended by 127 boys. Instruction at the Junior Farm Mechanics Course was given on gas engines, tractors, lighting plants, water systems, rope tying and splicing and concrete construction. Three tractor-farming movies have been held during the year at which films showing the mechanical features of the tractor and tractor operations were shown. These shows were attended by approximately 500 people.

One of the most important pieces of extension work accomplished under this project was the Farmers' Tractor Course, held during the Farmers' Institute. The Advance-Rumley, International and Fordson tractor companies co-operated with us in handling this course. These companies sent tractors, equipment and instructors to assist with the work. The Advance Rumley Company had two instructors; the International Harvester Company one, and the Fordson Company one. These men, who are considered the leading authorities in the country along their respective lines, gave the farmers some very valuable lectures on the tractor. The Vacuum Oil Company had one of their research engineers at the course. He gave a very instructive illustrated lecture on lubrication. The farmers attending the course expressed themselves as being highly pleased and wanted to come back to the next course held.

10-D-2, Farm Implements.

The only work done on this project was a demonstration held during the Farmers' Institute. Practically all the implements in the department laboratory were put on display and demonstrated to the farmers attending the institute. The farmers showed considerable interest and asked many questions about various implements. Approximately 400 farmers attended these demonstrations.

10-D-3, Farm Water Power Development.

Very satisfactory progress has been made on this project. A great many more calls for assistance were received than it was possible to handle. Some time was spent on the preparation of a bulletin on farm water power development and this bulletin is being published by the Division of Agricultural Engineering, of the U.S. Department. Thirty-two (32) field demonstrations were conducted on this project and 59 farmers were given advice on the subject. During the month of June, the installation of three water power plants were started.

One of the most important pieces of extension work accomplished under this project was the demonstration in Brunswick County. While making a survey for a water system in Brunswick County, it was learned that Dr. R. B. Bragg, Alberta, was interested in a hydro-electric plant. In company with County Agent J. B. Lewis, a visit was made to Dr. Bragg. During the visit, it developed that Dr. Bragg wished to develop a stream flowing near his residence, from which he expected to furnish power to Alberta, one and one-half miles away. A survey was made and Dr. Bragg was advised against trying to develop a commercial power plant, but it was found that he had an excellent proposition for home use.

An estimate was furnished and plans made for the repair and raising of the old stone dam. A later visit was made, in company with a representative of the Fitz Water
Wheel Company, at which time the order for equipment was placed. A 5-KW generator was recommended, not because there was sufficient water to run it continuously, but because of the excellent storage facilities, allowing the plant to be shut down when power was not needed and it is necessary to conserve water. Dr. Bragg decided to try water power because two different makes of gas engine plants had failed to give sufficient power. The latest information is that the installation of this plant is progressing satisfactorily.

SUB-PROJECT 10-5,

MISCELLANEOUS PROBLEMS IN AGRICULTURAL ENGINEERING.

During the year, a large number of requests were received for information and assistance on miscellaneous problems. These requests were received from farmers, county agents, agricultural high school teachers, communities, farm organizations, various departments of the College and Extension Division, and other State agencies. All requests were given careful consideration and assistance was given in all cases where such assistance did not interfere with the regular extension projects.

A few of the more important of the miscellaneous problems on which assistance was given were as follows: A small town water supply; location and plans for community apple packing plant; inspection of ash deposit for brick and tile plant; manufacturing drain tile; concrete products manufacturing plant; community meat packing plant; survey for experimental plats on Staunton and Chatham Experiment stations; refrigeration systems; home labor-saving devices; and plans of book cases for college library.

The department had charge of the farm machinery exhibit at the State fair again this year and also had a department exhibit at the fair. Considerable time has been given to the working out of a five-year agricultural engineering program for the State. A report was prepared, covering the scope, field and progress of agricultural engineering since this work was begun in this State. The head of the department attended the annual meeting of the American Society of Agricultural Engineers, at Chicago.

(The next two pages show views taken on the Farm Power and) Operating Equipment Projects.
SUB-PROJECT 10-D

Boys' Club Tractor Class

Boys' Club Tractor Class

FARM POWER AND EQUIPMENT
SUB-PROJECT 10-D

STUDYING CORN PLANTER

STUDYING BINDING

STUDYING MOWER

FARM POWER AND EQUIPMENT
SUB-PROJECT 10-D-3

Water Wheel
Wythe Co

Surveying Water Power Site
Montgomery Co

Farm Water Development
V. OUTLOOK.

The general low-selling price of farm products and the high cost of production have caused a slackening of the activities of the farmers. This has been shown in the smaller number of requests for assistance on projects such as drainage, which require considerable cash outlay. Requests for assistance on other projects, however, have increased. With the general stabilizing of prices on equipment and the improvement in the financial conditions of the farmers, all lines of agricultural engineering will naturally become more active. It is impossible, however, to meet all the demands made upon the department. As these demands increase, it will necessitate organizing the work in such a way that the most effective progress can be made with the limited force available.

Farmers are beginning to realize that they will have to adopt labor-saving farm machinery and equipment and organize their farming processes on a more business like basis if they expect to lower the cost of production on the farm.

The appended map shows the counties in which agricultural engineering projects have been conducted during the year.

Respectfully submitted,

Chas. E. Seitz,
Extension Engineer in Charge of Department.