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PENDLETON FARMERS SOCIETY HALL

DECEMBER 1938

COLUMBIA S. C.
Acknowledgment

We wish to acknowledge the unselfishness of the agricultural engineering students for discontinuing their Agricultural Engineer and joining with the other agricultural departments to make this magazine possible. In order not to have several departmental publications, the agricultural engineers heartily endorsed the idea of one general agricultural magazine. With this acknowledgment, we are very happy to present The Agrarian, official student publication of Clemson Agricultural College.

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FOREWORD

For many years Clemson's school of Agriculture and department of Agricultural Education have been without an official publication through which agricultural articles of widespread interest could be published and made available to interested readers throughout the state. The need of an agricultural magazine has been manifested by both the faculty and student body. Through this publication students of agriculture will have a channel for their writing. Faculty members will also have an opportunity to make known their recent findings and accomplishments. At the same time students with business ability may receive valuable training in actual business methods which will be of great value in future years.

It is our earnest desire to give our readers a cross-section of agriculture. In order to do this we have given each department their pro-rata share of the magazine and the departmental editor is responsible for that section. In this way no one department will dominate the magazine.

As the magazine is more or less a technical publication, we are striving to get it into the hands of our agricultural leaders. We believe through our county agents, specialists, agricultural teachers, instructors and leading farmers we will accomplish our goal. With this selected type of readers our circulation will be even larger than the actual number of copies mailed because these readers will undoubtedly take articles of special interest and further circulate them.

We wish to extend our sincere thanks to all who have been instrumental in making this publication possible. Without the valuable aid and assistance from our professors and extension workers, and the financial aid of our advertisers, this magazine would have been impossible.

In order to make our publication perpetual, we have selected a junior staff to work under our supervision; we are receiving valuable assistance from them; and they, at the same time are getting experience to carry on next year. It is our earnest desire to make this publication a permanent part of the school of Agriculture and Agricultural Education.

HARRIS L. BEACH
Editor-in-chief.
A LEADER HAS PASSED

The Agrarian Staff together with the whole State of South Carolina laments the passing of one of the South's greatest agricultural leaders, Dr. David R. Coker, who passed away recently at his home in Hartsville. Dr. Coker was a man who will ever be remembered as a great credit to the state of South Carolina and to agriculture in the South. His experiments with cotton breeding brought increased yields and returns to a great many farmers. The high character and influence for good which was ever-prevalent in Dr. Coker's life will stand as a goal toward which the young manhood of South Carolina may strive.

selves and our government to this change. The first period of our history granted "relief" by giving up the public domain. Every depression was met by granting public lands to those in need. The Civil War was followed by the Homestead Act; the unemployed could go West and secure land on which to make a fresh start. That era has passed. Harry Hopkins has no outlet like that, hence "relief projects" and "pump-priming" have become the vogue.

Jefferson advocated and wanted a democracy based on agriculture. It was a dream which could not become true. Hamilton was more realistic and saw that industry and manufacturing would come. The American task from the beginning has been to harmonize these two theories. Much that we think is new today is old in principle but new only in method.

Neither the agricultural nor the industrial problems can be settled separately. They are bound together like the Siamese twins. Industries more and more will come South, but the southern part of

(Continued on page 30)
Our School of Agriculture

The Clemson Agricultural College, which is the A. & M. College of South Carolina, is situated in the red foothills of the Blue Ridge Mountains in northwestern South Carolina. Founded in 1889 by Thomas G. Clemson who donated the land formerly belonging to his father-in-law, John C. Calhoun, it began as an agricultural college but today has five schools other than the "ag" school. Clemson began educating the agricultural youth of South Carolina in 1889 with a small endowment from Mr. Clemson together with some state support but today it is a state and Federal supported school as are the other land grant colleges.

Since the founding of the institution, the agricultural courses have been popular and a large number of "ag" graduates have gone out to take high positions in agricultural pursuits throughout the country. There are 300 students enrolled in the school of agriculture instructed by thirty faculty members. Clemson’s enrollment this year is over 2,100.

For a long time Clemson was an agricultural school without an agricultural building but within the last two years it has occupied a new $400,000 building which houses most of the school of agriculture, experiment station, and extension service. This building is equipped with the most modern classroom and laboratory equipment.

The school of agriculture offers B. S. degrees in Agricultural Economics, Agronomy, Animal Husbandry, Dairying, Entomology, Horticulture, and Agricultural Engineering. The Agricultural Economics department is well known for its research in tax and sociological studies. Dr. H. P. Cooper, Dean of the School of Agriculture, is head of the Agronomy department. Through his influence agriculture in South Carolina is being revolutionized. He has been responsible for soil surveys throughout the state which proved that the majority of soils were acid and this is being corrected by liming. He has also focused the attention of the farmers on the nutrient deficiencies in the soil and the remedies for this. Dr. Cooper is a national authority on soils. Professor G. H. Collings of the Agronomy department has written two nationally known books, Fertilizers and Cotton.

The Animal Husbandry department has developed the most outstanding herd of Berkshire hogs in the country, having won more prizes for these hogs at the national swine show than any other herd. The Dairy department has one of the most modern plants in the country including the latest milk handling equipment and a herd of cows second to none in the South. The Entomology department administers the crop pest law of South Carolina and also supervises the inspection of nursery stock and the certification of plants and seed. The Horticulture

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AGRICULTURE AND THE ENGINEER

By H. K. HERLONG, '39

AGRICULTURAL Engineering is a young and growing profession which developed in response to an urgent need. It was not recognized as being apart from Agriculture until farm machinery developed so rapidly and became so complicated as to force the average farmer to call for help when his equipment needed servicing. But farm machinery is not the only service the engineer renders to the farmer. His service is divided into four fields of activity, namely: farm power and machinery, soil conservation, rural electrification, and farm buildings.

Farm power and machinery deals with the converting of mechanical energy into farm use. The engineer makes use of every mechanical advantage that will replace manual labor. The large farm machinery companies are always searching for information that will aid the farmer in doing his daily work, and are always open for suggestions to improve their products. The problem confronting the engineer is to develop an efficient machine that will yield a profit. The rapidly increasing use of machinery makes this essential for further progress.

Rural electrification involves the converting of electrical energy into agricultural uses. This field is developing even more rapidly than the mechanical field, due to the recent rural electrification program. Here the engineer is confronted with the task of constructing rural lines as well as finding a use for the power after it reaches the farm.

Soil and Water Conservation is receiving particular attention at present by the U. S. Department of Agriculture. Millions of dollars have been spent solely for experimental purposes to find a better means of protecting what little soil we have left and to try to build more through the use of cover crops, legumes and crop rotation. The farmer is dependent on the engineer to furnish him with information relative to terracing, strip cropping and other forms of soil preservation.

The study of Farm Buildings may easily be called "The Architecture of American Agriculture" in that it deals with the planning of all farm storage and curing buildings as well as dwelling and tenant houses. It is one of the most important phases of the engineer's work in that it lays the foundation for better planned farm homesteads which make for greater convenience and more sanitary conditions throughout.

Big Task

Generally speaking the farmer looks to the engineer for information relative to the discoveries of our scientists, the inventions of our mechanics, and all day-to-day agricultural advances. We have but a few well trained "Ag-Engineers" and it is quite evident that these are faced with a tremendous task. They may be compared with a regiment of men faced with the job of rebuilding an empire. What we need is an engineer in every county seat to play the role of a country agricultural doctor. County agents are doing a very commendable job, but however active and well trained they may be, they cannot more than begin the work alone.

It has been the custom in the past for students to specialize in certain phases of farm operation. Specialists are still needed but the individual farmer cannot afford to call in one every time a small problem arises. What he needs is an Ag-Engineer whose knowledge of farming in general will help him to solve his common problems; however, more complicated situations will arise, in which case the engineer may consult a specialist for the solution.

Scientific Data Available

What is most puzzling is the sad state of affairs the farming industry is in at present, with all of the scientific data, which has been tried and proven, available to the farmer free. Still he goes on in the same proverbial "rut", and is seemingly content to do so. It is not so baffling either when we stop to consider that some people have to be blasted into taking action for their own good. Maybe it is just human nature, but it is surely a terrible handicap in the battle for agricultural security.
The Pendleton Farmers Society

By J. L. SHEALY, '39

ONE hundred and twenty three years ago a group of farmer’s organized a society in the Pendleton district of South Carolina which is today the oldest farmer’s society in America. The great object of this society was the agricultural improvement of the district, by directing the attention of their brother farmers to the various branches of rural economy, and the introduction of the most modern and approved system of husbandry. As an organization, the society has always been an adult school for farmers and a pioneer ever opening new and true methods in the first and greatest vocation of man.

Prominent in History

The Pendleton Farmer’s Society holds an important position in the history of the state and the United States. The membership of this society through its one hundred and twenty three years of existence has been large, and descendants from the members are scattered from S. C. to the Pacific coast. On its membership rolls, preserved in the old hall owned by the society are to be found the names of John C. Calhoun and Thomas G. Clemson, both of whom took an active interest and participated in the work of the society. In a paper read by Mr. Clemson in 1867 the advantages of the establishment of the college such as Clemson were strongly set forth and from this germ of thought was developed the Clemson idea that finally culminated after Mr. Clemson’s death through the execution of his will, in the location and establishment of the college which bears his name. One of the oldest members of the society was not far wrong when he remarked that “the Pendleton Farmer’s Society is the mother of Clemson Agricultural College.”

An act of the legislature in 1826 divided Pendleton district into Anderson and Pickens Districts and also suspended work on the new court house. The Pendleton Farmer’s society came into possession of its present building prior to 1829. According to some of the older citizens, the walls were built up to the window sills by Pendleton District and the balance of the wall was built by the Pendleton Farmer’s society before 1829. Citizens say that in 1843 Calvin Hall built the four tall, brick columns at the ends of Farmers’ Hall, extending the roof over them as it now stands, and making other changes inside the hall. This hall as it stands today looks very much like the description given in 1843.

Centennial Celebration

In 1915 the society held its centennial celebration in Pendleton on October 12-13 and at Clemson College on October 14. Clarence Poe, editor of the Progressive Farmer, of Raleigh, N. C., was the speaker at this occasion. He spoke on “Cooperation as the Basis of Rural Community Spirit.” Col. J. C. Stribling, President of the Pendleton Farmer’s Society reminded the members that the first cooperation in Agriculture was in 1815 and 1816 when the Pendleton Farmer’s Society built its first hall. On October 13th addresses were made by Hon. David F. Houston on “Problems of Agriculture in the South,” Gov. R. I. Manning on “The Benefits to be Derived from the Farm Demonstration Work,” Pres. Fairfax Harrison of the Southern Railway on “The Crooked Plow” and Rev. W. H. Mills on “The Contributions of the Pendleton Farmer’s Society to the Agriculture of South Carolina and the South.” On October 14, the society closed its great celebration at Clemson College with Hon. A. F. Lever, representative and chairman of the congressional committee on agriculture, delivering the principle address of the day with advice to the men of tomorrow.

Today’s Activities

Although the greatest period in the life of the society was from 1815 until the Civil War, it has by no means ceased its activities today. From the first President, Thomas Pinckney, Jr., to the present one, Mr. J. B. Douthit, Jr., the society has always been under the leadership of men prominent in both State and National affairs. Mr. Douthit is the breeder of Douthit’s Prolific corn, one of the leading varieties in the South, and manufacturer of Douthit’s sausage.

The present day activities of the society are as follows:

The society appropriates $50 annually for prizes to students in vocational agriculture at Pendleton school. This has been done for the past two years and is expected to be continued indefinitely.

The society makes a small contribution each year to the Red Cross and other activities of that nature.

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Spiders

By E. C. STURGIS, '39

Most people are afraid of spiders. Nevertheless, to lovers of nature, spiders are among the most interesting of all animals. They are found all over the world and are very numerous both in species and number of individuals. About fifteen thousand species have been identified and separated into sixty different families; representatives of about thirty families and fifteen hundred species are found in the United States. Spiders are provided with poison claws which are used to kill their prey, but with the exception of the Black Widow Spider of the South and the Tarantula of the Southwest, are no more harmful to human beings than are beetles and ants.

Spiders Not Insects

Spiders are not classed as insects; They can be distinguished from them very easily because spiders have eight legs whereas insects have only six. Usually spiders have eight eyes but some species have a lesser number. Spiders have a unique digestive system which acts as a reservoir. Large quantities of blood can be stored in the abdomen, being used up as needed. In this manner spiders may live for a period of a year or more without taking in food.

The eggs of spiders are laid inside of small egg-sacs which are made of silk. These sacs are attached to some object or carried about by the mother. The young are cannibalistic in nature and the most vigorous ones will eat the weaker ones before emerging from the egg-sac. This cannibalistic nature is prevalent in spiders in general; often the adult female will devour her weaker mate.

Sting Victims to Death

Spiders differ in their ways of capturing insects. The most common method is to rest quietly at the side of the web until an insect is caught in the web. Then they rush out and wrap threads of silk around the body of the insect, and sting their victim to death. After all struggling has ceased, its juices are sucked out by the spider.

Probably the most interesting habit of most spiders is web-building. The webs are woven of a fluid secreted by glands located in the abdomen and forced out by means of organs called spinnerets. This fluid hardens when exposed to air.

The Black Widow

The Black Widow Spider is a shiny, jet black spider having a body about one half inch long. A characteristic mark by which it may be identified

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Production Control and Tariff

By R. L. ARIAIL, '40

The Southern Economics Association, the foremost of its kind in the South, held its annual meeting in Birmingham on the twenty-eighth and twenty-ninth of the past October. Practically all of the leading institutions in the South were represented, including Clemson College, Furman University, The Citadel, and the University of South Carolina of this state. Many distinguished men were present. Among them were Drs. G. H. Aull, J. E. Gates, W. T. Ferrier, and J. E. Ward, who represented Clemson.

Among the many interesting events of the meeting were the addresses by Drs. W. E. Ayers, the retiring president of the association, and L. H. Bean, economic advisor to Secretary of Agriculture, Henry A. Wallace. An interesting sidelight of the meeting was furnished by two visiting economists from Sweden. At an informal gathering these gentlemen discussed the contrasts in American and Swedish economic and educational systems.

It seemed extremely difficult for these visitors from abroad to visualize the relatively large number of economists in America, for Sweden has only six. Neither could they understand how these American economists could carry on under the added strain of teaching classes. In contrasting the American and Swedish Systems of higher education, they pointed out that in Sweden the primary group concerned is the faculty, but over here it is the students that are concerned. Incidentally only a small percentage of the Swedish youth have access to colleges.

Discuss Pertinent Topics

The principal topics of discussion were the production control program, the Social Security Act, monetary policies, factors influencing the location of industries, and the possibilities of the expansion of foreign trade of southern commodities.

Dr. G. H. Aull, head of the Department of Agricultural Economics and Rural Sociology at Clemson, discussed the problem of production control, from the standpoint of its advantages and disadvantages. He defended this program as a means of enabling the farmers to adjust production to current demands, and of putting agriculture in a better position to cope with the national and international situation.

Tariffs Reduce Our Trade

There are some who think that the foremost factor contributing to our loss of foreign markets is the curtailing of production. But, as investigation will reveal, the principal cause is not due, nearly so much, to the over production of agricultural products as it is to the high industrial tariff that we have imposed on our foreign neighbors. For example, we formerly sold enormous quantities of raw cotton to Germany, but instead of cooperating with her as one of our largest customers, we imposed an extremely high tariff on her finished products that were imported to America. Furthermore, if we consult statistics, the records will show that foreign competition of cotton production increased long before President Roosevelt's inauguration, under whose administration the production control program was introduced.

According to Dr. Aull most economists agree that the Hawley-Smoot Tariff Act has done more to aggravate the farm problem than any other single contributing factor. It became effective at the particular time that we should have been helping a depressed world to recover, but, as afore mentioned, we imposed, instead, an exceedingly heavy duty on nearly all imported goods. As a result of these duties exports of cotton to Germany, for example, have declined from approximately three fourths of her total supply of raw cotton from the United States to only about one fifth from us, while at the same time she is constantly building up an effective bartering system with other cotton producing countries. As suggested by Dr. Aull, it is entirely possible, moreover, that America had much to do with making the time ripe and setting the stage for Hitler, for we all know that men like Hitler are direct results of an impoverished and handicapped nation.

The world at present is consuming an ever increasing amount of cotton, in fact, more than was ever consumed before. But what adds to our already entangled perplexity is the fact that the United States is not benefiting from this expansion of world cotton consumption. We find ourselves, however, in a much more embarrassed position, for where we formerly shipped approximately sixty to seventy per cent of our cotton abroad we now export only about forty per cent.

Farmers Are The Sufferers

It is readily seen that the direct sufferers of this economic unbalance are the farmers of our

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BETWEEN THE

ALPHA ZETA

Alpha Zeta, the national honorary and service fraternity for agricultural students, first came to Clemson in the spring of 1930 when the South Carolina Chapter was organized. Since its beginning at Clemson it has been one of the outstanding fraternities on the campus, having pledged to its membership the agricultural students having the highest records of scholarship, service, and character. Clemson's chapter of Alpha Zeta was organized through the dissolution of Alpha Sigma, a local agricultural fraternity, through the efforts of faculty members.

The purpose of this great national fraternity, having chapters in 42 out of the 48 state agricultural colleges in the U. S., is to promote higher ideals among agricultural students, to encourage scholastic achievement, and to establish a feeling of brotherhood among its members. At Clemson juniors and seniors are taken in twice a year, in the fall and in the spring. Usually the honor sophomore from the school of agriculture is also invited to join the fraternity when invitations are issued in the spring.

Among the outstanding projects promoted or assisted by Alpha Zeta at Clemson have been the Ag Fair which is held semi-annually to display to the public of the state some of the material progress which is being made at Clemson in agriculture; also the Ag Mixer, held annually to welcome the freshman students into the school of agriculture; and a third, the presentation of medals to the honor

ALPHA TAU ALPHA

Alpha Tau Alpha, the national honorary and professional Agricultural Education fraternity was started at Clemson in 1930. Since then it has become one of the leading honorary fraternities at Clemson, its members coming from the Junior and Senior classes in Vocational Agricultural Education. Since its organization at Clemson, 103 members have been pledged.

There are fifteen chapters of the Alpha Tau Alpha in the United States. The purposes of this fraternity are given in the preamble of the Constitution which reads "In order to develop a true professional spirit in the teaching of agriculture, to help train teachers of agriculture, who shall be rural leaders in their communities, and to foster a fraternal spirit among students in teacher training for Vocational Agriculture, we band together in this professional fraternity.” The program of activity for the Kappa Chapter includes:

Acting as advisors or counselors for freshmen,
Sponsoring an Agricultural Education department in the school journal,
Sending representative to the National Conclave,
Printing a directory of agricultural teachers,
Giving an annual banquet,
Contacting Honorary members,
Giving a smoker for professors.

sophomore and the two highest freshmen in the school of agriculture.
FURROWS

STAFF MEMBER

A new member of the staff of the Dairy Department of the South Carolina Agricultural Experiment Station is Dr. P. G. Miller, who assumed his duties at Clemson on August 1st.

Dr. Miller entered college at West Virginia University. While he was there he held a creamery job, which developed in him an interest in the dairy industry. He was graduated in dairying there in 1934, and went to the University of Minnesota the following session to study for his Master’s Degree. He held a teaching assistantship there, where he worked under Dr. W. B. Combs. His thesis topic was “Accounting for the Fat Placed in the Churn.”

In 1936, after having received his Master’s Degree, Dr. Miller went to the University of Wisconsin on a University Fellowship. The following year he held a research assistantship. He worked under Dr. H. H. Sommer there on the “Heat Stability of Milk,” and received his Ph. D. last spring.

Dr. Miller is now working on the “Effect of Feeding Cottonseed Meal on the Physical, Chemical, and Manufacturing Properties of Milk.”

Mr. G. H. Dunkleburg, Iowa State College, has been added to the Agricultural Engineering staff to do Research work.

Mr. G. H. Stewart, Clemson grad of ’35 has been added to the South Carolina Extension Service staff as Assistant Agricultural Engineer.

Prof. G. B. Nutt of the Agricultural Engineering Department attended the fertilizer convention held in Washington in November.

FUTURE FARMER ACTIVITIES

The Future Farmer program is a part of the program of Vocational Agriculture in this country and its purpose is to teach group activities to young farmers through active participation.

Many of these activities are stimulated by contests, the money for these contests being provided by commercial organizations that are interested in the welfare of the farmers of the State, their business being with the farmers. Most of the Future Farmer chapters in this state hold Father and Son banquets during the year, often cooperating with the girls enrolled in the home economics classes. Camping is one of the activities carried on by Future Farmers and is becoming more and more important each year, providing the boys with an opportunity to cooperate in something in which they are intensely interested.

The Future Farmer organization provides a stimulus for action through its different degrees provided for in the organization. A beginner is a “Greenhand”. The second degree is “Future Farmer”. The third step is the “State Farmer” and the fourth degree, the highest stage of advancement is “American Farmer”. By the time a boy has reached this stage of the work, he has become equipped for establishing himself as a real farmer. As soon as he is out of the high school, he is ready to enter a part-time class or group, much better equipped to carry on his farming because of his Future Farmer activities.
RURAL YOUTH-TODAY AND TOMORROW

By Harris L. Beach '39

A S THE barefoot boy plods slowly homeward from a day’s toil in a distant field, little do the captains of industry realize the realm of activity for future achievement that is going on in the brain of this younster.

He realizes the significance of his work and knows that the sacredness of the good earth is intrinsic and inherent. His calloused hands brought about by the tasks equal to his powers show that he does not live an easy life. His poorly clad body gives us a vivid picture of his meager earnings; his stately form and brawny-ness picture health in the first degree; the expression on his face dispels gloom and pessimism and displays courage and perseverance along with a world of satisfaction and contentment, and yet these are just a few cardinal points of our rural youth, the backbone of the nation.

Lured by City

Is this boy at the cross-roads of the nation or has he an equal chance with his city “cousins” to make good? Is the city luring him away from the farm, or is the farm voluntarily relinquishing its claim on him by not offering attractive rewards through the main channels of modern comforts, a chance for wealth, and recreational activities? Will the farm let him go or will the farm fight for its chosen son, thereby yielding permanent benefits to agriculture, ourselves, and our posterity?

Do the youth of America regard the old Homestead Place as the German youth regards his ancestral home? In Germany, as in the United States, the farm may be divided among the sons or one may purchase the shares of the others. When the German youth sells out and goes to the city to make his fortune he still has a claim on the farm, because if for any reason he fails in his endeavor he may return to the farm and seek shelter and sustenance. In other words, the German farm is considered a hereditary home. Even if Germany is not at peace with the world, we will have to admit that she has some good rural tradition and this hereditary home idea is something that we could practice here in America.

Cooperation A Key Note

The future of rural youth is closely correlated with two colonial traditions—individualism and cooperation. In the past we have practiced and been proud of our rugged individualistic ideas, but on account of our modern-day trend of living it is necessary for us to lean toward the tradition of cooperation. The agricultural youth of today may adhere to an ancient adage, “Together we stand and divided we fall” and very probably will be able to compete with youth in industry and other fields. Rural youth has got to fall in line and fight the same battles that other youth are fighting and this writer thinks that cooperation is a good weapon to use.

Many folks are saying that rural youth is at the cross-roads of the nation and agriculture is in a devastating condition. Farmers have exploited their natural resources and their greatest asset, land, is the most neglected one, so it is necessary for our sturdy rural youth to come into the picture and do something about this grave agricultural condition.

Need More Leaders

Our rural areas should have more leaders, for without leaders no nation can survive, no business can prosper and no enterprise will grow—thus leadership is regarded as the keynote to success in any line of endeavor. In the past the more wealthy planters have sent their sons to college to be educated, but instead of coming back to the soil to make a livelihood, unfortunately for agriculture, these farm boys have gone into various fields and have left the farm permanently. Will they continue to leave agriculture or will they come back to the soil and elevate farming to a new high level? This is a question which can only be answered by time but one upon which depends in a large degree the future of American agriculture.

The farm boys of today must be the leaders of tomorrow if the farming industry is going to fall in line with other large industries. Never before in the history of America has agriculture experienced a greater transitional period than it is experiencing today and the needs for leadership are greater than ever before.

(Continued on page 32)
Agronomy Seniors Study Soils in the Field

P. S. LAWTON '39

On Saturday, October 8th, Dr. H. P. Cooper, Dean of the School of Agriculture and Director of the Experiment Station, and Dr. G. H. Collings, Professor of Agronomy, took their Senior Agronomy class of thirteen students into the mountains of South Carolina, North Carolina, and Georgia to study the various mountain soils. Accompanying the party were Dr. G. B. Killinger and Dr. H. T. Folk of the Experiment Station, and Professor J. W. Jones of the Agronomy Department. This trip was made as a supplement to the studies made in class of the various soil types and series. Dr. Cooper and Dr. Collings felt that a thorough observation and study of the soils discussed in class would be of more value than many indoor classroom recitations. After studying the various soil types they found this to be true. As a result the students began to grasp and understand more readily their theory assignments.

Leaving Clemson at 8 o'clock Saturday morning the group visited localities along a route to Seneca, Walhalla, Highlands and Franklin returning in the later afternoon by Toccoa, visiting Toccoa Falls. The group made stops at the near-by fields between each of the above named towns, as well as along the road side, examining and studying the various soil series in each field. A sample of soil from each of the three soil horizons was taken from the more important soils observed. The group stopped at Franklin to have lunch that was graciously furnished by Captain J. D. Harcombe, the College Mess Officer.

The soil series observed, as pointed out by Dr. Cooper and Dr. Collings, may be listed here. First, the soils located in the mountain foot hills of South Carolina were studied. Those soils observed in the field were of the Cecil, Iredell, and Davidson series. These soils in the order named, grade from a grayish-brown sandy loam through a dark gray loam to a dark brown clay loam. These soils are among the most productive of the Piedmont Section of South Carolina. At the next stop the group observed the mountain soils composed of the Talladega, Chandler, and Ranger Series. These upland soils are characterized by their reddish-brown to yellowish brown B horizons. The rocks from which they were formed are granite and a light colored gneiss. Near Highlands the soil series commonly found above 3000 feet elevation were studied. These soils observed were the Porter, Ash, and Burton Series. This particular group of soils, too, is characterized by its reddish-brown to yellowish brown B horizons, and were formed from schists and granite bases. Beginning near Franklin and extending to Toccoa, the class studied the soils of Sandstone origin. This group is composed largely of Habersham and Hartsell soils. These soils were derived from sandstone, shale, and quartzite. This series is also characterized by its reddish-brown to yellowish brown B horizons.

Aside from the knowledge gained from the study of the various Piedmont and Mountain soils the class thoroughly enjoyed all of the sights seen. Only a few of the many sights observed may be listed here. The Bridal Veil Falls and the Gorges seen near Highlands were thrilling sights to most of the class, especially to the boys from the down state section. The Toccoa Falls, several miles from Toccoa, were especially pretty in the late afternoon as the sun was sinking in the west. These Falls are ten feet higher than Niagara Falls. It is reported that they were formed by a very small stream. The Tallulah Gorge, near Tallulah, surrounded by trees with their leaves of various autumn colors was a beautiful sight. This is a sight which few people see. It is a place where large numbers of tourists stop for souveniers and to observe the beautiful landscape.

Dean Cooper has said that he expects to make similar trips with the Agronomy seniors to the Coastal Plains and possibly other sections of South Carolina during this school year. The Agronomy Seniors agree with Dean Cooper in his belief that actual observations in studying soils is an excellent method of learning to distinguish the various series. Since everyone concerned is convinced that this method is better than merely studying in a class room, the Agronomy Seniors are looking forward to similar trips in the future.
Lighting the Milky Way

By G. H. Wise

What is the darkest place in the world? If Jonah had voiced his opinion, he probably would have said the inside of a whale. From a different viewpoint the late Governor W. C. Hoard, a pioneer in dairying, ventured an answer. He stated, "The darkest place in the world is the inside of a cow." This statement has stimulated research and challenged the ingenuity of workers in the fields of anatomy, physiology, and nutrition for many years.

Physical means of exposing a part of the interior of a living bovine to the light of investigation have been developed. The complex conformation of the ox stomach, being divided into four distinct sections, and the great resistance of this species to infection render it possible, by surgical technique, to make a permanent opening through the side into the first compartment of the stomach. This opening, commonly known as a "window", permits the inspection of the first two stomach compartments. Only in recent years has this method been used to study the physiology of digestion.

Seven dairy calves having permanent openings into the first section of the stomach, or the rumen, were used by the Dairy Department of the South Carolina Agricultural Experiment Station to study the factors affecting paths followed by the milk in its journey to the pail from the fourth compartment or true stomach. Nature apparently designed the first two sections to handle the rough work, the preliminary break-down in digesting coarse feeds. Observation through the private windows has revealed that under certain conditions nature's most refined food product, milk, is accidentally detoured into the "crude" sections. Milk, being unable to find its way out, becomes contaminated by association with the residents of the roadside inns. The ultimate result is a disturbance, digestive of course. No calf sanctions such behavior. Hence, the ultimate object of the investigation is to learn to help maintain the health of the calf by keeping the milk in the proper channels as it is swallowed.

Though thus far a beam of light, illuminating several recesses of the stomach of the calf, has revealed some of nature's secrets about what takes place, much remains to be discovered. It is proposed to pursue the work further in order to discover some of the more fundamental causes of the physiological functions observed.

Since the normal suckling period of a calf is restricted to the first several months of its life, the experimental stages are confined to these earlier months. During this period the calves apparently

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Some Trends in Vocational Agricultural Education

By W. H. WASHINGTON,
Dean, School of Vocational Education, Clemson
Agricultural College

There are a few significant changes in vocational agriculture that may be considered as outstanding. Many people think of the high school of today as being the same thing it was when they attended ten, twenty, or thirty years ago; and they think of the subjects as being the same as they studied. Some admit that insignificant changes have been made, but that most of these have been of an unfavorable nature.

The progressive public school of today is as different from the school of thirty years ago as the "V-8" is from the "Model-T". There are changes in practically every single department of the public school. The content of many of the subjects has undergone a revolutionary change. The method of teaching has changed and the number of subjects has been tremendously increased. Even with that there is a lag between scientific advancement and certain social changes and the school.

Public school agriculture, which had its beginning before the passage of national legislation giving aid for this work, has changed as much as many of the other subjects. I will mention a few of these changes as indicating the general trend which is still underway.

1. Vocational agriculture in the high school is no longer limited to the forty-five or ninety minute period and to the boys of fourteen years of age or older regularly enrolled in four high school subjects! It is literally open to anyone who is engaged in, or preparing to engage in farming. In this State last year, there were 8077 regularly enrolled high school boys, 2719 part-time students—that is, young men who are not in attendance at the public school as they are ordinarily considered—and there were 15,145 farmers enrolled in evening classes. All of this work is a part of the public school. It is authorized by the State and County School Boards of Education and approved by the local Trustees and under the general supervision of these authorities and the local Superintendents of Schools. This trend is a tendency to extend the opportunity of studying vocational agriculture to all who desire it. The whole South is making rapid advances in this direction.

2. Vocational Agriculture is developing a content of its own. In the early days, the teachers of agriculture were without appropriate vocational content of an authoritative nature. The subject consisted largely of isolated bits of other subjects. For instance, the teacher was required to have in his school a certain number of beakers, test tubes and other chemical apparatus. Naturally, he thought he was expected to use this equipment in teaching; and he became, in part, a teacher of chemistry. He seldom tied the chemical subject matter up with the farming operations of the students and of the community. Now the supervised practice, or the home farming programs of the students, whether they be all-day high school students, part-time youths, or adult farmers, is the core of the agricultural curriculum and agriculture is developing a content of its own. It must depend upon many of the sciences for technical details; but the big problem is the integration and application of these sciences to the individual farm represented in the class, rather than the mastery of the scientific skills and details of so many sciences that contribute to agriculture.

3. There has been a general change within the scope of agriculture as it is outlined in the teaching programs. For example, a few years ago, the program might be first year Field Crops, second year Animal Husbandry, third year Horticulture, and fourth year Farm Management. In applying this kind of program to the solution of problems as they arise in the supervised practice or home farming carried on by the students difficulty was experienced. Few farmers operate single enterprises. A scheme like that described above gave little or no place for Farm Shop and other Agricultural Engineering needed on the farm. Today, an analysis of the farming operations includes credit, cooperation, etc., for

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FOR the past two years, the growing of plants in water instead of in soil has been given an immense amount of publicity. This process has been described under various names as “tank farming”, “tray agriculture”, “bathtub farming”, and “hydroponics”, a term meaning to work with water. The water culture method consists of growing plants with their roots in a water solution which contains the minerals necessary for plant growth.

The growing of plants in water is nothing new. It all started when scientists turned to chemistry for the answer to the age old question, what is a plant? Nearly a century ago, scientists discovered that certain chemicals in the soil are plant nutrients. In trying to find out what these chemicals were scientist began to analyze soil and water along with determining the composition of plants. Many investigators have used the water culture method to study the influence of factors of environment on plant growth. A large amount of valuable information has been thus obtained.

**Remarkable Experimental Results**

Until recently this method of growing plants in water was merely a tried and true method of scientific observation. About 1929, Dr. W. F. Gericke, plant physiologist at the University of California, suggested that plants might be grown on a large scale by the water culture method. Dr. Gericke conducted a number of experiments outdoors and within the greenhouse to determine the technique which might be used. He constructed shallow tanks and lined them with asphalt. Across the tanks he stretched chicken wire and on top of the wire placed a layer of peat. He filled the tanks with moderately acid water containing the minerals necessary for plant growth—relatively large quantities of phosphorous, nitrogen, and potassium, and relatively small quantities of sulphur, iron, boron, manganese, magnesium, zinc, and copper. Dr. Gericke set young tomato plants in the peat with the roots reaching through the wire into the solution. The plants grew vigorously and rapidly. When mature, Dr. Gericke had to pick the fruits with a step-ladder. At the conclusion of the experiment the yield of fruit per tank was computed as yield per acre. Dr. Gericke’s tanks were exactly one-two-hundredths of an acre in size. By weighing the fruit produced in one tank and multiplying that by 200, he was able to find the yield per acre. On an acre basis the yield averaged about 80 tons per acre. Similar results were secured with Irish potatoes. The yields averaged about 2500 bushels on an acre basis. These enormous yields appealed particularly to writers of popular literature. These writers compared yields with those of crops grown in the field. For tomatoes, 80 tons by the water culture method in the greenhouse, against an average of 10 to 15 tons in the field. For Irish potatoes, a yield of 2500 bushels by the water culture method against a yield of 100 to 125 bushels in the field. This comparison looked good in print and consequently the water culture method received much publicity. Those accounts undoubtedly left the reader with the impression that a new discovery had been made which might revolutionize our present system of agriculture. These writers failed to make proper comparison. The yields in the greenhouse for a whole year were being compared with yields in the field for a relatively short time. Furthermore, the plants grown in water in the greenhouse were

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The Clemson Berkshire herd has made so much history in recent years that people are inclined to think that they have always had good hogs at Clemson—such is not the case. Up until 1920 there were no definite plans concerning the development of the Clemson herd of swine for showing at the State Fairs. Neither were there any suitable swine at the college for the students to judge.

About the time the men at Clemson were considering improvement of their herd, there was a change taking place in the Berkshire type. The most progressive breeders were turning to the larger type with the straight nose. The first breeders to produce this type were the Parker Brothers, of Niles, Michigan. The Parker brothers are college men, students of genetics, and they have also had valuable practical experience. They have a splendid reputation as breeders of swine. In 1921 a boar and two gilts were selected from Parker Brothers herd and brought to Clemson College.

The mating of one gilt that was brought from Parker Brothers did not make any distinct contribution to the future of the herd. Fortunately, however, the mating of the other gilt proved to be a great success, and it was from these two hogs—Clemson Baron and Clemson Baroness—that the whole Clemson show herd has been built.

There were many reasons for building a good show herd at Clemson. The Animal Husbandry professors wanted animals as near ideal as possible for the students to judge, so they could have a good idea of what a well-bred animal is like. In improving the herd at Clemson, good hogs were brought into the sections surrounding Clemson, thus we have a great contribution to the improvement of local hogs. A good show herd furnishes excellent advertisement for the Animal Husbandry Department, as well as Clemson as a whole. Also, in an indirect way, it stimulates the interest of various alumni in the work done at Clemson. One of the greatest reasons for wanting a good show herd at Clemson is to prove to the skeptical public that Colleges are not all theory and that their work has a very practical application.

The Berkshire herd at Clemson has been hailed by many of the leading judges of swine as the greatest show herd in the United States. It has a record that has not been surpassed by any herd of Berkshires in this country. For instance, out of a possible 600 first places, the Clemson herd received 450, or 75 per cent of all first places competed for; out of a possible 254 championships the Clemson herd has received 158, or approximately 62 per cent of all championships competed for, besides a large number of second and third places. The percentage wins in a case like this is not nearly so important as the fact that these hogs have been consistent in taking honors in competition with the best herds shown by Indiana, Illinois, Iowa, and other States that are the leaders in the production of swine.

Since people have recognized the quality of the swine at Clemson the herd has furnished hogs for many judging contests for club boys and girls and college students. This is an excellent method of instilling in the mind of the student the type, quality, and conformation to be expected in well-bred animals.

Clemson’s hogs have done a great deal to popularize the Berkshire breed. Breeding stock from this herd has been shipped to every State east of the Mississippi with the exception of Maine, New Hampshire, and Vermont, and to eleven States west of the Mississippi. This is proof of the quality that

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THE FIVE ACRE COTTON CONTEST

By L. S. BOSARD, J. C. HARDEE, '40

A SURVEY of the cotton mills of South Carolina made in 1926 showed that the mills were using one inch staple cotton. At this time the cotton farmers of South Carolina were producing cotton with a staple less than one inch. This meant that we were selling our cotton to other states and importing cotton from western states to be used in our own mills.

At the same time a survey was made to determine the average yield in pounds of lint cotton per acre for South Carolina. Our yield was only 152 pounds per acre. This survey indicated that the average South Carolina farmer was producing cotton unprofitably. He was neither meeting the demands of the cotton mills nor growing cotton on a profitable basis.

In 1926 the Clemson College Extension Service began the Five Acre Cotton Contest. The Extension Service with the cooperation of the cotton mills provided $2,000 in annual premiums to be given to those South Carolina farmers making the highest yield on five acres of cotton. The main object of the contest was to encourage farmers to produce more pounds of better quality, and longer staple cotton per acre.

Heretofore many farmers had the opinion that they could make a greater yield per acre with 7/8 inch staple cotton than with one inch staple cotton. The results of the contest as given in the following table should convince the farmer that greater yields and profits were made with the longer staple cotton.

Because of the lack of funds there was no cotton contest held in the years 1932 and 1933. The contest was again started in 1934 and has been sponsored yearly since that time. There were 1122 contestants entered in the 1937 cotton contest and 73.8 per cent of those who entered carried out the instructions and demonstrations and turned in complete records of their practices and yields. This is clear evidence of the interest which farmers have taken in the contest. Some farmers who have always grown cotton say that the value of things which they have learned about the production of cotton is far greater than any prize which they can expect to win in the contest.

In past years some farmers considered fertilizing and seedling practices the most important factors determining crop yields. At present it is definitely

Treating Green Wood With Copper Sulphate

A GENERAL report on the treatment of green woods with a solution of copper sulphate was recently compiled by Professor A. R. Reed of Clemson's physics department. It consisted of observations made on fence posts and telephone poles for a period of January to October, 1938. A great deal of interest has been aroused concerning this treatment, and several experiment stations are investigating its value.

Dr. Wilford and Mr. Kohl of the Appalachian Forestry Experiment Station, Asheville, N. C., are given credit for the discovery of the fact that green wood will absorb and distribute water soluble poisons which due to their toxic effect on fungi and insects, increase the serviceable life of treated wood several fold.

Mr. Turner and Mr. Nettles of the S. C. Extension Service have been cooperating with Mr. Reed in experimental work designed to produce a serviceable fence post at low cost and small labor. They have tried several methods of treatment on pine, black-gum, white heart cypress, and oak, several of which proved very promising. The chief obstacle now is to find a general method which will be suitable for commercial use. The U. S. Department of Agriculture is promoting further research

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“Super-Perfect Milk”

By L. M. RHODES, ’39

Here is no better milk produced than that which comes from the Clemson College Dairy.

Having heard this bandied about by a number of tongues on the campus and elsewhere, it seemed that a little investigating would be in order. Consequently, access to the records on bacterial counts was gained. By comparisons with the score card for milk recommended by the Bureau of Dairy Industry, some truly remarkable facts were revealed.

“Better Than Perfect”

Forty-one weekly reports of bacterial examinations made this year have been sent to Professor J. P. LaMaster, Head of the Dairy Department, by Professor W. B. Aull, Professor of Bacteriology. Twenty-two samples (53.6 per cent) have had less than 100 bacteria per cubic centimeter. The score card mentioned above, which allows 45 points to milk perfect on bacteria, allows this score on milk having less than 500 bacteria per cubic centimeter. Thus, bacteriologically speaking, it may be said that over half of this year’s milk has been more than five times better than some milks which are judged to be perfect.

Only six times in 1938 has a bacterial count cut the perfect score, 45 points, and only once has the count risen sufficiently high to cause a drop of two-fifths of a point in its score on bacteria.

Mechanical Milking

This superb quality milk is produced from a herd comprised of registered Holsteins, Jerseys, and Guernseys. These high producing cattle are mechanically milked three times a day in tandem stalls. When the milk is drawn, it flows into a glass container suspended on a pair of scales. After the weight of each cow’s contribution is recorded, it flows through a pipe to a pre-cooler and then into a 320-gallon pasteurizing vat. Incidentally, this was the first vat of its size and kind in the world and was built especially for the college dairy. It is in the room next to the milking parlor.

Milk from noon and night milkings is held in this vat until the next morning’s milk is added. Then the milk is pasteurized at 142°-145° Fahrenheit for 30 minutes. After pasteurization the milk is cooled to 50°. The only contact made with the atmosphere comes when the milk is drawn from this vat into ten-gallon cans to be sent to the mess hall for cadet consumption. This contact lasts only a few seconds.

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Beautifying Our Highways

By B. A. PEELING, '39

Within the past eight years large-scale highway beautification projects have been progressing rapidly. This is the first time in the history of man that highway beautification has been done on public roads by public agencies. Highway departments have realized that this work makes for more enjoyable driving and increases the number of tourists visiting their states. In some states there are laws against placing billboards within certain distances from the highways. Our national government has also realized the need of road-side beautification, and of the money it appropriates to the states for highway work, at least one per cent must go to highway beautification.

In most states native trees and plants are used in these projects. Men are sent out into the woodlands to obtain good specimen trees and plants that are suited for transplanting. After a tree or plant has been selected it is dug with care during the fall and planted in its designated place. The selection of these trees must be done by persons skilled in year-round identification, in order that the correct kind of tree will be obtained. The other plants are secured from nurseries which submit sealed bids. The lowest bidder does not always receive the contract because all plants must meet the standards set by the American Nurserymen's Association.

Projects Successful

One of the first highway beautification projects started in the South is located between Greenville and Leland, Mississippi, a distance of about ten miles. This project has been such a success that similar projects are now under way, or have been completed, all over the country. Some state highway departments have a Forester or Horticulturist in charge of this work. In other states the work is carried on under the supervision of the maintenance bureau of the highway department. Most states have a Landscape Engineer and one or more Assistant Landscape Engineers to plan these beautification projects.

Most of these projects have been demonstrational in nature in order to interest people in the (Continued on page 37)
MODERN COTTON PICKING

By A. F. BURGESS & FRANK E. ROGERS, Jr., '40

As we find ourselves in the midst of the Machine Age, there seems to be a commendable trend toward mechanical farming. Today, practically everything that has been done by hand or by old-fashioned methods of farmings, can be done, and is being done, by machinery. One big draw-back to mechanical farming, however, is that labor-saving devices must be adapted to suit certain farming areas. For instance, very valuable, fertile, farming areas are occasionally found to be too steep or hilly to make farm machinery operate profitably. But excluding this and other very few exceptions, farm work may be carried out mechanically.

What once seemed almost impossible on the farm was to pick cotton with machinery. But now it appears that even this dream has been realized, and already cotton has been satisfactorily picked with mechanical harvesters; however, more improvements are still necessary on this kind of machine.

Many Difficulties

There are a number of difficulties which immediately present themselves in opposition to the manufacturer of a practical cotton picker. To begin with, the cotton does not all mature at one time. In addition to this, there are variations in types of cotton plants, and also variations in habits of growth of the same type of plant from season to season and in different kinds of soil. Furthermore, the height of the plants, and their spread of branches, vary greatly. Another handicap in the development of a mechanical cotton picker is the fact that the time for testing such a machine during each harvest is limited, and, therefore, a year must pass before alterations and improvements may be experimented with.

Aside from field problems which must be solved, the following basic requisites must be achieved:

1. It must harvest a high percentage of the mature cotton, with a minimum dropped on the ground.
2. It must not seriously damage the cotton, so that the highest possible grade of ginned cotton may be obtained.
3. It must not seriously damage the plants or the immature cotton bolls.
4. It must have sufficient capacity to make its operation profitable, as compared with hand picking.
5. It must gather as clean a sample as possible, with a minimum amount of leaves, stems, hulls, weeds, etc., entrained in the lint.
6. It must be mechanically sound in design so that it will provide satisfactory, consistent, and dependable operation, and must be simple enough that both the operation and the ordinary servicing of the picker can be done by farm labor.
7. In order to afford most profitable utilization, the mechanical harvester preferably should be an attachment for farm tractors rather than a selfpropelled machine, so that the tractor may be available for other purposes.

These reasons partially explain why the early (Continued on page 37)

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We sell 115 varieties of peaches, 75 varieties of apples, and many varieties of grapes, plums, cherries, raspberries, dewberries, pecans, etc. Many of these varieties have better appearance and quality than the varieties usually grown in home or commercial orchards. Try some of these delicious fruits next season.

The Horticultural Department, C. A. C.
A successful type of inexpensive silo was the college Dairy Department's answer to an urgent need for additional ensilage space last fall.

Designed by J. P. LaMaster, Head of the Dairy Department, the silo was built to contain about 175 tons of sorghum and soybean silage to meet both the emergency and the need of farmers for an inexpensive silo. Entirely above-ground, it consists mainly of 6" x 6" posts, 2" x 4" stringers (horizontal bands about the box), and the walls of the box, made of vertical 1" x 10" planks covered on the inside with a layer of tar paper to exclude air.

The Clemson box silo measures 12' x 12' in cross-section dimensions and is 60 feet long. The wall planks were dressed, a detail which might be dispensed with on the farm. After cutting, the silage was blown into the silo with an ordinary blower type silo filler. When it had packed, it was covered with wet oat straw in which oats was later sown. Feeding the silage was made easy by knocking out one end of the silo and carting the silage to the feeding troughs. About 8 inches of spoilage occurred at the top. The only difficulty encountered was a decrease in palatability, probably due to leaching from the decayed straw on the surface. The total cost of the silo, including labor, was about $150.00. This cost does not include a roof, added later. Figuring the cost of storage, we arrive at less than one dollar per ton capacity! Furthermore, the silo's use is not limited to one year.

Construction Cheap

Farm labor can be used in constructing the box silo, and the lumber can be obtained largely on the farm. Dr. George H. Wise, Associate Dairymen with the Dairy Department of the South Carolina Agricultural Experiment Station, says, "I think the farmer can construct a silo of this type that would take care of more than one ton of silage per dollar cost of construction, even with the roof."
CAMP LONG

About ten years ago, C. Lee Gowan, County Agent of Aiken County, with the support of local people, succeeded in arousing a great interest, in establishing a permanent camp for Aiken County 4-H Club boys and girls. In 1930, Mr. Gowan and Dr. W. W. Long, the late director of the Extension Service, and others interested, visited a number of prospective spots in Aiken County and selected the beautiful spot, which was to become the site for the present Camp Long.

As a result of the intensive interest of Mr. and Mrs. Monson Morris of New York and Aiken, $500 was donated by the latter in 1930, which was put in the hands of a board of trustees and deeded to Aiken County, for the purchase of the original tract of 50 acres of land. This land, which later became the state 4-H Club Camp, was deeded to Clemson College to be developed and operated under the supervision of the Extension Service. Many interested Aiken winter residents also made donations, which were used for the clearing the grounds and constructing the first buildings. The dam, however, was built with the funds appropriated by the Aiken County legislative delegation.

Since 1932, by receiving federal funds through relief projects, the buildings have been completed, the lake enlarged, grounds beautified, water and sewage systems installed and new tracts of land purchased, increasing the camp's area to 288 acres. The camp was very appropriately named "Camp Long" in honor of Dr. W. W. Long, whose effort made it possible to develop these opportunities for the rural boys and girls of South Carolina.

Camp Long entertained its first group of campers in 1933. Since that time the camp has been steadily growing, and at the present time it entertains from 2000 to 2500 4-H Club boys and girls who attend every summer for the training, recreation and inspiration received at the camp.

Camp Director Romaine Smith and his staff plan to improve Camp Long by further landscaping the grounds, improving the nature trail, building a handicraft room and workshop, constructing a nature museum, making collections of handicraft exhibits and developing a rock garden and water plant.

The camp is equipped to take care of two hundred and forty campers during each camping period. Seventeen log buildings, including three sleeping cabins and one large bath house for boys and similar quarters for girls, dot the hillside about the lake. The permanent camp staff has a large counselor's lodge which serves as their home during the summer camping season. Among the other camp constructions are a large recreational hall, provided for assembly programs, a spacious dining hall and kitchen, and a lodge for county agents and their families.

Among the many interesting features enjoyed by the campers are the evening vespers services and campfire programs held at the beautifully constructed stone circle, the most outstanding spot of the camp, which is located in a grove of trees overlooking the lake. The lake is equally as important in offering recreational advantages. During the last season 262 boys and girls learned to swim;

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World Famous Bull at Sand Hill Station

Saugerties Royal Sequel, sire of the world’s record Guernsey cow and the greatest production-transmitting bull of the Guernsey breed, is now being used at the Sandhill branch of the South Carolina Agricultural Experiment Station. This is made possible through a cooperative project between the Experiment Station and the Bureau of Dairying Industry, United States Department of Agriculture.

Ten years old, Saugerties Royal Sequel has sired nineteen tested daughters who produced an average of 13,344 pounds of 5.2 per cent milk in the equivalent of one year. The average amount of butterfat produced was 694.3 pounds, equivalent to 868 pounds of 80 per cent butter. The average production factor was 142.1. This means that the average amount of butterfat produced was 42.1 per cent higher than the average amount produced by Guernsey cows in general, the amount called breed average. It might be added, however, that “breed average” must be computed on the basis of production of tested cows only, and that not all registered cows are tested. Thus it is evident that “breed average” in the common sense is much higher than true breed average.

Daughter’s Record

Cathedral Rosalie, one of the daughters of this great animal, was included in the summary above. Her record was 23,714.5 pounds of 5.1 per cent milk, or 1213.1 pounds of butterfat. Her production factor was 213. In the year in which this record was made, the butterfat she produced, if churned, would have made an average of more than 4.15 pounds of 80 per cent butter a day.

The wonderful records of the daughters of this bull are by no means freakish, because his pedigree indicates that he inherited potential producing capacity from both his sire and his dam.

From Famous Dam

The dam of “Sequel” was Shagbark’s Dorothy, with a record of 823.4 pounds of fat in class D, former holder of seventh place. Her sire, Florham

(Continued on page 39)
Better Farm Buildings for South Carolina

By W. J. OATES, '40

ONE of the greatest needs for improvement on the average South Carolina farm lies in the problem of farm buildings. Almost every farmer has a space of shelter of some kind for his animals; however few have adequate space for the storing of feed and tools.

The maintenance cost for animals is directly dependent upon the type of housing which they are given. Even though almost every farmer has some type of shelter for his animals, very few have buildings suitable to withstand any severe change in climatic conditions. Any farm building, when built for good appearance and greatest service at the most reasonable cost is one of the most valuable assets to a modern farm. Such a building will more than pay for itself in the amount of labor and feed that is saved. Since the animal body requires a certain amount of food to give it heat and energy, it is easy to see that if farmers will furnish warm, comfortable quarters for their animals, these animals can use most of the maintenance food to help the farmer realize a greater profit. Comfortable quarters will also bring about a reduction in the amount of food required for the stock. This reduction in feed required will also help the farmer to realize a greater profit from this investment.

There are many factors to consider when planning farm buildings. Some of these factors are: size, convenient location, safety, neat appearance, construction material, and constructing cost. Size is a very important factor. The farmer must anticipate the amount of feed and storage space that he will need. All farm buildings should be conveniently located with respect to the farm home. Fire proof materials such as stone, brick, concrete, or tile should

Japanese Beetles in South Carolina

By L. G. HANNA, '40

Yes, there are Japanese Beetles in South Carolina. We commonly associate the Japanese Beetle with fruit growing states such as Florida and California, because of the much publicized quarantines to which likely infested produce from these States have been subjected. Nevertheless in this little pest, we have a potential enemy of South Carolina farmers.

In 1937 positive results were shown by trapping in two sections. Greenville and Charleston districts were the ones slightly infested. Due to the comparatively small number of these insects in South Carolina, we can, by constantly keeping on the alert for their appearance, keep them under control. The adult beetle is one half inch long with a green head and thorax and possibly a bronze tinge, brownish wings and with two white spots at tip of abdomen.

Reproduction consists of only one generation a year. They appear in June, and become most abundant in July and August. They decrease in activity, finally going into the ground as cold weather approaches, where they stay until April when the life cycle is completed.

Control methods vary with plant affected. For ornamental plants and non-bearing trees, a combination of arsenate of lead paste with two per cent of lead olate will furnish adequate protection. As is the case with all insects and diseases, prevention is the best remedy; Therefore let’s cooperate in preventing this insect from becoming economically important in our state.

be used wherever practical; however the choice of material depends largely upon the owners’ preference.
FROM THE DEANS

In his will providing for the founding of this institution, Mr. Clemson stated that his purpose was to "establish an agricultural college which will offer useful information to farmers and mechanics." The first board of trustees, following this suggestion, decided to call the institution "The Clemson Agricultural College" thus indicating by its very name the important place which agriculture was expected to have in its operation.

Although engineering has from the beginning been elected by a large share of the students, and although textiles, chemistry, general science and vocational education which developed later, have also attracted their share of students, Clemson is still regarded primarily as an agricultural college. The total number of agricultural graduates who have gone out exceeds the number of those who have graduated from any other school of the college.

It is fitting therefore that a journal be established which will provide a medium of expression for agricultural students and those responsible for its coming into being deserve to be congratulated for their vision and perseverance.

In addition to furnishing a means by which students may give expression to their ideas about things agricultural, this journal should be of value to them for several other reasons. First, there is the training in the art of writing which a larger number of students will receive than has been the case heretofore. Since the ability to write has been said to be the greatest shortcoming which handicaps college students of all kinds, and students of agriculture particularly, the larger the number of the latter who avail themselves of this training the better it will be for them.—and for agriculture. In this connection it might be pointed out that there is a considerable field of agricultural journalism which does not seem to be particularly crowded and for which work on a publication like this is good training.

Then there are the managerial aspects of such an enterprise which furnish excellent experience to those who secure the necessary advertising and

(Continued on page 39)

As this Journal makes its appearance, I wish to extend to it as a publication and to its staff my heartiest congratulations and best wishes.

In attempting to produce a publication of this character, the students of Agriculture and of Vocational Agricultural Education deserve a great deal of credit. The venture, in my opinion, is a far-sighted educational plan. Even though the radio and the cinema are taking an ever-increasing part in the dissemination of information, and we think that practical television is just around the corner, journalism has not lost its place; but it seems to me that it will have an ever-increasingly important function to perform for society.

Students in a technical field and students in a professional field will have in the publication an opportunity for preparing and editing material of a technical and professional nature. This type of publication will require a degree of accuracy and completeness that may be disregarded, more or less, in a publication which deals with general short stories or non-technical subject matter. Agricultural workers are called upon to prepare technical papers, both for delivery and for publication, which are means not only of extending their ideas to others, but also serve as a challenge to other workers in the field to check and double check, if you please, their efforts.

Likewise, the vocational teacher must prepare technical subject matter or subject matter that has been developed through a scientific laboratory for consumption by students of Vocational Agriculture who are, in many cases, not trained in scientific technique. This means that he must be able to read and understand the scientific phases of agricultural readings and that he, in turn, must be able to interpret the findings of these scientific workers in terms so clear, so simple, and yet so accurate that they may be understood by persons whose general educational level is often below that of the seventh grade.

It is hoped that this Journal will provide a "writing laboratory" for students of Agriculture

(Continued on page 39)
Green Manure Crops
By J. M. BAKER, '40

Although the practise of turning green-manuring crops into the soil for the purpose of increasing crop yields dates back to 300 B. C., when the Greeks turned under broadbeans (Vicia faba L.) for this purpose, today the average farmer in South Carolina does not realize the importance of this practice. Because of this fact, many dollars are lost each year by the farmer who could save this if he would systematize his farming practices so as to include a green-manuring crop in his rotation. For many years the Agronomist of the United States Department of Agriculture have been recommending the use of green-manuring crops, and today they are emphasizing this practice more than ever before.

The primary reason for turning under green-manuring crops is to keep the organic matter of the soil at a constant level. It is very important that we do this because there is a direct relation between the organic content and the productivity of the soil.

Green-manuring crops also improve the physical condition of the soil which is of great importance in the control of erosion. Green-manuring crops tend to prevent soil erosion in two ways. While the crop is growing, the plant canopy acts to protect the soil from the impact of rain, and to retard the run-off; and after the crop is turned under, it increases the permeability of the soil, thus enabling the water to soak in more rapidly, with a resultant decrease in run-off and erosion.

Both legumes and non-legumes are used as green-manuring crops. The chief difference between them is that legumes add organic matter and nitrogen to the soil, whereas the non-legumes add only organic matter. Sometimes in maintaining the soil organic matter, a bulky crop is preferred and often times a non-legume such as sorghum or rye may serve this purpose best, but there are certain limitations in using non-legumes as green-manuring crops. If a non-legume is turned under directly before another crop is planted on the soil, the micro-organisms that break down the organic matter is liable to use all the nitrogen in this process and thus cause a nitrogen deficiency in the latter crop. If a non-legume is turned into the soil preceding the planting of another crop, it is advisable to add some nitrogenous commercial fertilizer to the soil to prevent a nitrogen deficiency. Legumes do not draw upon the soil nitrogen when turned under as green-manuring crops, and for this reason, they are often preferred.

Many Dairy Alumni Take Graduate Work

CLEMSON alumni from the Dairy Department have distinguished themselves by the high percentage of their number who have continued their study at other institutions.

Out of 120 graduates who have finished during the past seventeen years, sixteen have taken graduate work elsewhere, according to departmental records. This is 13.33 per cent of the total, or two out of fifteen. The average number of dairy graduates during this period is slightly more than seven per year. At one time the percentage of graduate students among the alumni was twenty.

To Many Schools

Alumni have gone to many schools. The University of Maryland attracted three, who were among the first five. Other institutions attended include the University of Missouri, three alumni; and Cornell University, two. Also each of the following institutions has been attended by one alumni: Iowa State, Michigan State, Pennsylvania State, University of California, Virginia Polytechnic Institute, the Universities of Wisconsin and Minnesota, and the South Carolina Medical College.

Studies Valuable

A consideration of the present occupations of these men shows the value of their continued study. They are engaged in part as dairy farmers and plant operators. The rest are distributed, one each, in the fields of farm demonstration, farm superintending, agricultural teaching, county agent work, assistant school superintending, dairy extension work, medicine, and dairy research. Dr. George H. Wise, who received his Ph. D. at Minnesota, is the one research worker. He is Associate Dairyman with the Dairy Department of the South Carolina Agricultural Experiment Station, and is located at Clemson.

The others mentioned are scattered south to Georgia, north to Pennsylvania, and west to California.

The development in the United States of the largest superphosphate industry in the world was the result of the discovery in 1867 of the superior South Carolina rock phosphate.

Some of the common green-manuring crops in the South are:

**LEGUMES**—Cowpea, Soybean, Peanut, Alfalfa, Winter Vetch and Velvet Beans.

**NON-LEGUMES**—Rye, Oats, Mustard, Buckwheat, Rape, and Turnips.
THE CLEMSON POULTRY PLANT

Did you know that there have been many 300 egg hens, among the elite of the poultry world, raised by the Clemson Poultry Department. To get accurate records on the 2000 hens kept at the plant, that have reached a maximum production of 100 dozen eggs a day, one man spends his entire time operating the trapnest and recording the eggs that each hen lays. The eggs are carefully marked and the chicks identified as to parentage so that pedigrees can be kept. By intelligently studying these records, it has been possible to select breeders with the ability to transmit high egg producing qualities to the offspring.

On the thirty-five acres of land situated three-quarters of a mile from the college on the Pendleton road, are forty-two structures consisting of laying houses, brooder houses, range shelters, and the accessory feed houses and management buildings. 4,000 to 5,000 chicks are hatched and raised each year. Of the many breeds of chickens in the world, only the three leading breeds of South Carolina; namely, White Leghorn, Rhode Island Red, and Barred Plymouth Rock, are kept as Clemson. The limited number of breeds makes it easier to keep pedigrees and conduct breeding experiments.

Sanitary Program Enforced

A complete sanitary program is enforced to maintain health. To eliminate flies, a vigorous campaign is waged since flies carry worms as well as microorganisms and viruses. Annually the breeders are tested for pullorum disease, a disease transmitted from the hen through the egg to the chick. Last year less than one-half of one per cent reacted to this test. The hens and growing stock have access to ranges on which Bermuda grass and lespedeza form the sod. Rye grass is added to the sod in the winter. Sanitation is maintained by rotating the ranges.

Feed Studies Made

Although considerable work is being done on range paralysis, the experimental program deals primarily with feeding rations for growing chicks and laying hens. It has been found that high quality cottonseed meal is an efficient protein for growing chicks as part of the protein in the ration. However, cottonseed meal is not desirable in a laying mash because it discolors the eggs. Studies are being made on the effect of feed on quality of eggs, mineral metabolism, and the use of oats, soybean oil meal...

Horse Shows in Oconee and Pickens Counties

By JOHN M. LYNES, '39

Do you know that there are more than 500 brood mares in Pickens and Oconee Counties?

About two years ago the farmers in these two counties became conscious of the enormous annual cash outlay for the purchase of workstock. At this time cotton acreage was reduced and more land was available for growing feed crops and pastures.

The farmers, county agents, Smith-Hughes High School teachers and bankers all got together with the idea of solving this economic problem. The farmers wanted to know why these mules could not be grown in South Carolina just as well as in Missouri, Kentucky, Tennessee, and Texas. The answer to this question was simple. If they could grow their feed crops and pastures economically they could most surely raise mules. Moreover, the mares could be used in making the crop while raising these mule colts.

During the past two years there have been more than 200 brood mares purchased in Oconee County and more than 200 in Pickens County. Each county has also purchased two jacks and two stallions.

Largest Show Ever Held

On October 14th there was a horse and mule show at Westminster, Oconee County. This was probably the largest draft horse show ever to be held in South Carolina. Hundreds of farmers were present and they were all intensely interested. Traffic was stopped and the streets were roped off for the horse show. Imagine 70 mares being shown in one class; that is what happened. The judges had quite a task in selecting the four top mares in the ring. There were also 35 home-raised mule colts competing for honors.

Family Class Interesting

Probably the most interesting class shown was the family show. There were seven mares with their families at side. This family class demonstrated that there were a few farmers who had for several years been raising their own work stock.

On October 12th there was a Pickens County Horse Show at which there were about 40 mares and colts exhibited. The show was quite similar to the Oconee County Show. An interesting feature was the stallion show, there being two outstanding Percheron stallions exhibited. The stallions, mares, and colts were all paraded through the streets of Pickens.

(Continued on page 39)
POLLED HEREFORDS BECOME POPULAR

CLEMSON COLLEGE has been breeding Hereford cattle for more than a quarter of a century, but no Polled Hereford blood was used in the herd until 1926. The first polled bull used was Charming Stanway. He was purchased as a calf from C. B. Woolsey, of Aiken, South Carolina. In 1929 a polled bull, Beau Blanchard 62nd, was purchased from Iowa.

The present herd sire is Mossy Plato 26th. He and seven of his daughters were purchased in 1935 from Leslie Brannan, at Timken, Kansas.

Famous Sire

Mossy Plato 26th is without doubt one of the most outstanding bulls of the breed. Last year Mr. Neil Trask, of Beaufort, South Carolina, traveled 6000 miles searching for the best Polled Hereford bull in the country. After looking them all over he finally purchased a son and two grandsons of Mossy Plato 26th. Mr. John M. Lewis, of Larned, Kansas, who is one of the oldest and one of the best breeders of Polled Hereford cattle, is using a sire which is a son of Mossey Plato 26th.

At the present time Clemson has 30 females, all sired by this great bull. The present plan is to increase the breeding herd to 100 breeding cows.

Breed Becoming Popular

Polled Herefords are becoming a very popular breed of beef animal in South Carolina. The absence of horns, and consequent elimination of the task of dehorning, plus the absence of any danger of infection by screw worms is a big factor in their favor, according to many South Carolinians.

The beef cattle industry in South Carolina is steadily on the increase. The average farmer who once depended on cotton for an income is now seeking other sources of revenue. A point in favor of this statement is the fact that all of the bull calves sold by Clemson College this past year were sold to buyers within this State. This trend cannot be over-emphasized.

LET US HELP
YOU GET THE MOST OUT OF YOUR SOIL

Are you as a farmer satisfied with the yields and quality of the crops you are getting? If not—and for that matter, who is?—why not give us a chance to help? It's a practical service we offer you, based on 75 years' experience in the manufacture of quality plant foods and constant contact with the problems of the soil.

First, let us send you a copy of a new 92-page book; it is full of interesting facts about good farming practice here in the South. Second, let our Service Division analyze your soil and give you a report on soil reaction, fertility and suggested cultural practice.

Through this and related services, we are endeavoring to do our part in the work of building an even sounder agriculture here in the South, by helping to widen the influence of the sound basic principles which have been established through the leadership of Agricultural College and Experiment Station authorities.

A postcard will bring a copy of the book and arrange for a soil test. There is of course no charge; we'd appreciate the opportunity to cooperate with you.

The American Agricultural Chemical Co.
Charleston, S. C. — Columbia, S. C.

Anderson Service Station
Sinclair Products
Lewis Anderson, Owner — Phone 149W
the United States will remain agricultural. Nature has settled that. Climate and soil fit it for agriculture—more so than any other part of the country. The people must be fed and clothed and the South can do both.

However, the new problems in the South are keenly felt. There are problems not only of production but of distribution. Our problem is how to build and maintain a wholesome economic and social life. We must know the facts and use them as a guide to this solution. We must eschew the Utopias which are coming full-fledged from visionaries. The cultivation of the good earth in an antidote to such fancies. Close contact with the soil, both literally and figuratively, helps a man keep his feet on the earth. South Carolina is the land of opportunity but we must know how to use it.

Our School of Agriculture
(Continued from page 5)

department maintains one of the most extensive variety plantings of peaches, apples, and grapes in the South. It is doing important work in the breeding of certain vegetable crops. Agricultural Engineering is one of the most rapidly growing departments in the school, teaching farm machinery, soil conservation, farm buildings, water and sanitation.

Associated with the work of the School of Agriculture is that of the extension service and the experiment stations. There is a county agent and home demonstration agent in every county and often two or more assistant agents making it possible to cover the state efficiently and contact most of the farmers getting to them the agricultural information developed by the experiment stations and other sources.

The Experiment Station itself consists of the main station at Clemson with five branch stations located in the various types of farming areas of the state. The research work of the experiment station has always been regarded as outstanding among Southern experiment stations.

Some of the men who have gone out from Clemson's School of Agriculture to distinguish themselves in agricultural pursuits include the directors of the Georgia, Alabama, and South Carolina experiment stations; the chief of the cotton division of the U. S. D. A., the regional conservator of the Soil Conservation Service for the Southeastern states, the director of the Southern division of the AAA, one regional director of the Farm Security Administration, the principal cotton technologist of the U. S. D. A., the head of the rural social economics department at the University of Virginia, the chairman of the graduate committee for N. C. State College and many others.

In addition to the School of Agriculture Clemson has the Schools of Engineering, Textiles, Chemistry, Vocational Education and General Science. Each has its honor scholastic fraternity, as Alpha Zeta is in the School of Agriculture. Clemson's petition for a chapter of Phi Kappa Phi has just been accepted and this will set a higher goal for men in the honorary scholastic fraternities of the various schools to try to attain.

The Pendleton Farmers Society
(Continued from page 7)

While the society does not now meet regularly for the discussion of agricultural topics, it holds meetings two or three times during the year at which dinner is served by one of the ladies' clubs of Pendleton in the Society's hall. These dinners are sometimes held jointly with the Lion's Club of Pendleton and sometimes by the society alone. At the last one of these meetings, the society heard a discussion of farm management as illustrated on her own farm.
by one of the leading women farmers of the community.

From the foregoing paragraphs, one can clearly see that the Pendleton Farmer's Society has been in the past and is continuing at present to be one of the leading societies for the advancement of Agriculture in the South.

**Spiders**

(Continued from page 8)

from all other spiders is the dark-red hour-glass on the under side of the abdomen. Because of this peculiar mark the name "hour-glass spider" is often applied to it. It is also known as the "shoe button spider" because of its globular, shining, black abdomen. Very rarely specimens are found without any red markings on them. Very uncommon are specimens bearing a pattern of white lines on the back of the abdomen.

The male is very much smaller than the female (one seventh to one sixth of an inch in length). On the lower side of the abdomen it has the red hour-glass design; on the top of the abdomen it has a series of red dots with white lines on each side of the red markings. The male bite is not poisonous to humans. Immature spiders of both sexes also show these markings.

The black widow is found in all sections of the United States, although it is essentially a Southern species. For a number of years the black widow are so scarce that they are rarely noticed. Then for a few years they abound in such large numbers that, due to some alarming publicity, they tend to raise widespread fear. Even in the years of black widow abundance when many farms contain several hundred spiders, authentic spider bite cases in the Southern states are still uncommon. The black widow therefore cannot be regarded as a very serious menace.

**Bite Rarely Fatal**

Spider bite cases are rarely fatal, and then under very unusual circumstances. The effects, although very painful, seldom lasts more than three days and in no recorded case has the bite resulted in lasting after effects. Like most spiders the black widow is very shy. If one chances to turn over a log or stone and disturb the spider, it will make every effort to escape and hide. Even handling black widows, gathering specimens by hand and holding them is not hazardous.

However the several hundred cases, apparently authentic, now on record prove that the black widow does bite on some occasions. Such cases as where the spider is hiding is a shoe and bites when the shoe is put on, or where the spider is caught in a bed sheet and bites when the victim-to-be goes to bed, are easily explained. The spider is equipped with small fangs and will not use these fangs unless it is mashed or unless a person touches the spiders web with his hand or finger. If the spider is so disturbed it will not hesitate to bite with its very efficient poison fangs.

Death may, in some cases, result from black widow poisoning. Much will depend on the physical condition of the individual and where, on the body, the bite takes place. There are persons who are very sensitive to animal poisons. Some persons become very seriously ill following a bee sting or a wasp sting, and now and then one dies from one of these stings. Owing to the seriousness of the bite, it is highly advisable to consult a physician as soon as possible after being bitten. If the doctor is not available tincture of iodine may be applied to the wound; a sedative may well be tried, and a stimulant such as strychnine is desirable. Probably the most effective among simple remedies is hot baths. These should be given as hot as possible at frequent intervals.

From 1868 to 1888, South Carolina produced 90 per cent of the world's supply of phosphate rock.
Production Control and Tariff
(Continued from page 9)

Country. The element of our population typified as the rural farm class embraces roughly one third of the total population. We have been hearing much lately about the poor destitute farmer, and have been inclined to think of him as an honest man not receiving all that he deserves. But in reality his position is far more astounding, for this one third of the population that he constitutes receives less than one tenth of the total national income. This disparity is even wider in the South.

It has been stated that no nation is richer than its land. This statement is very true and can be extended to mean that no nation prospers unless her farmers prosper, for the farmers are the backbone of any nation, since agriculture is the basic industry around which all others are built. Now, since the nation is directly or indirectly dependent upon the prosperity of the farmers, we see that the farmers are not alone affected, but the farmers, the industrialists, merchants, lawyers, and all others alike. Dr. Aull has placed agriculture as the nation's economic problem number one.

The above interesting facts, many of which were pointed out by Dr. Aull in support of the production control program, are mutually the problems of everyone who considers himself a citizen of the United States. Agriculture is the nation's problem, not merely the farmer's.

Rural Youth — Today and Tomorrow
(Continued from page 12)

Many Problems

The farm boy in the past has had to do without many of the luxuries of life on account of general farm conditions. Today, the farmer is confronted with overproduction, underconsumption, high tariffs and low prices. Will our modern rural youth continue in the footsteps of our forefathers or will they cooperate with governmental agencies in control programs, so that agriculture may be established on a firmer basis? The writer believes that our youth will fall in line and conduct farming in a business-like manner. A more diversified type of farming will be established and eventually farm incomes will be increased, thereby holding our farm youth to the rural areas.

Overpopulation

Has the farm boy still an opportunity to make good on the farm? Let’s look at our rural migration for just a moment. Annually, during the past decade there has been born on the farms approximately 700,000 babies and during the same span of time, the death rate has been slightly over 300,000. By these figures we have an annual excess of practically 400,000. This is higher than the city rate. So it is necessary in order to balance our farm and urban population for some of these farm children to migrate from the farms. Another factor is the expectancy of life, which runs 5-7 years higher in rural areas than in urban areas. So by these figures we need not get alarmed about some of our rural population being lured to the cities, because we have a surplus already. We need more real farmers on the farms and fewer soil robbers and destroyers.

Organizations for Rural Youth

Some agricultural organizations which are doing a great deal for our rural youth are first, the 4-H clubs.

In 1914 a new day dawned in agriculture for the American farmer and formerly underprivileged farm youth. For in this year 4-H club work had its beginning. 4-H club work has many objectives and high ideals. Some of them are to help rural boys and girls, develop desirable ideals and standards in farming and homemaking; to afford technical instruction in farming and homemaking; to provide an opportunity for "learning to do by doing"; to instill in rural youths' minds an intelligent understand-
ing, and an appreciation of nature and environmental influences; to teach and encourage thrift and cooperative movements; to use leisure time to an advantage; to produce products at a profit; and to appreciate the great out-of-doors.

Today, 4-H club work is making great headway, but there are approximately 12,000,000 farm boys and girls, and club work is only reaching around 1,000,000 annually. Since the work was begun 25 years ago around 7,000,000 have been reached. What will the figures be in the future? Judging the accomplishments of the future by the ones of the past and present—it would probably be safe to say that within the next decade more than twice the original number will be associated together annually as 4-H Club members.

The Grange

Another great organization which is helping to conserve our rural heritage is the Grange, America’s oldest and largest farm organization and the only rural fraternity in the world. For nearly seventy years of vigorous life the Grange has endeavored to serve the farmer. The Grange was the first great youth movement in America and is still fighting for the conservation of our farm youth. The Grange conducts a five point program, namely: (1) Fraternal—It has the tie that binds and works behind closed doors. (2) Legislative—Every year the National Grange writes a legislative program and their main objective is to pass legislation to help elevate the position of the American farmer. (3) Educational—All meetings are educational as well as inspirational. (4) Cooperative—Cooperation is the selling point of the Grange; millions of dollars are saved annually for Grange members by buying seeds, fertilizer, insurance, etc., cooperatively. (5) Social—After the meeting is over the social hour follows. When one joins the Grange he is a member of an army of approximately 1,000,000 farm people striving at the same goal—Agricultural Equality. A few of the accomplishments of the Grange are listed here: Rural free delivery, parcel post, better roads, protection of pure food, stringent dairy laws, marketing facilities and cooperative buying. From Maine to California and from Minnesota to Texas, the Grange is conserving our rural heritage and fighting the farmers’ battles. “Join the Grange, the gateway to agricultural opportunity.”

F. F. A.

Another organization which is doing a great deal to help our rural youth is the Future Farmers of America under the direct supervision of vocational agricultural teachers. All “Future Farmers” are members of a national organization in which democratic control is exercised. Voting delegates attend state and national conventions and receive valuable training as to parliamentary procedure and business methods.

Aside from the many advantages mentioned in the preceding paragraph, these Future Farmers have an opportunity to conduct livestock and crop projects, thereby learning the methods of modern-day farming and at the same time receiving handsome profits from the sales of their projects. Many boys become partners with their parents in this organization.

It is this writer’s belief that our rural youth of today have a bright future if they will adhere to the principles outlined by the 4-H clubs, The Grange and the Future Farmers of America.

Lighting the Milky Way

(Continued from page 14)

suffered no discomfort. Much body heat is lost through the window, and the investigation was necessarily conducted during the summer months only. The general treatment and behavior of the calves was the same as for normal individuals.

Since they undergo no suffering, the calves are happy to contribute to the health and well-being of other calves.

TOWNE SHIRTS

NUCKASEE MANUFACTURING CO.
GREENVILLE, S. C.
Some Trends in Vocational Agricultural Education

(Continued from page 15)

the basis of each year’s program as well as for the long time program. This does not mean that the student can know less of the so-called fundamentals; but he must know more. There are more fundamentals today. The mathematics needed in solving mechanical problems on the farm is as fundamental as any. The electricity used in the operation of so many farm machines and home appliances is just as important, proportionally, as the power generated at the Keokuk Dam in Iowa to operate the street cars in St. Louis a few years ago. They are now even building electric fences and the rural electrification service is extending its activities, so that farmers must know something of electricity, even if it is largely for the protection of their bodies from electrical accidents. Vocational Agriculture cannot be stored in air-tight compartments of single sciences. It draws on many of them.

4. Another trend is from the production goal to the economic goal and social goal. A generation ago, we felt that to produce two bales of cotton per acre or one hundred bushels of corn or more per acre was in itself evidence of successfully solving the agricultural problems involved in these enterprises. We know now that production alone does not prepare a farmer to successfully cope with farming problems. Economic production was a second step, then marketing and distribution; and now farm boys and farmers are studying some of the more complicated problems of our social and economic order.

During the past few years much fun has been poked at the policy of “paying the farmer not to produce pigs”, but poking fun does not solve the complicated problems that face the farmers and affect the nation. The place that cotton holds in national and world trade; the relationship of consumption to production; the increasing of the ability to consume; the efforts to put every occupational group on “parity” with every other occupational group for the benefit of the whole; the maintaining of sufficient individuality to stimulate and maintain initiative; and at the same time produce well-rounded citizens might be thought of as some of the unsolved problems in and related to agriculture. These problems call for educational and agricultural statesmanship.

Then, the place that the State (the Nation) holds in the program is of great concern to all. High school boys, farm youths, and adult farmers realize as never before what the government means to business. Doubtless, those who strove for protective tariffs in other sections generations ago realized this; but we of the South kept our interest in individual initiative. We did not look to the government to protect a cotton farmer as the farm machinery builders of the North looked to the government to protect their business. It will probably take a long time to correct the great economic inequality that has developed. Unless farmers study this problem as carefully as industrialists, bankers, and others, we may not expect that action will be taken in our behalf.

The Future

What is the future of Vocational Agriculture? One guess is as good, perhaps, as another. It might seem safe to predict that these problems will not become less but more complex and complicated every year and that the demand for legislation will become greater rather than less; that more schools and more communities will be calling upon the public school system to help the citizens of the communities to cope with these problems. This does not mean that less attention will be given to Agricultural Engineering, Agronomy, Animal Husbandry, Dairy, Entomology, and Horticulture, but more. This does not mean that less attention will be given to the mental development and the learning aptitudes of students, but more. This does not mean that less attention will be given to the educational program and to the coordination of vocational agriculture with all the other subjects of the school, but more.

In the field of education someone has estimated that its building and plants represent an investment of ten billion dollars, its annual expenditure two billion five hundred million, and the number of persons involved more than thirty million. The payroll is larger than that of any industry. If all of this is to mean the most, its leadership must be aggressive and progressive.
GROWING GARDEN CROPS IN WATER
(Continued from page 16)

grown under the most favorable conditions, while in the field plants are subjected to varied conditions of soil and climate. This sort of comparison is entirely unsound. If a true comparison is to be made, all factors influencing plant growth, except the one under consideration, must be kept at the same magnitude.

Water Yields Slightly Higher

Plant physiologist at the University of California have tested the growing of plants in water along with plants in soil. In this test the plants grown in water and those grown in soil in a greenhouse were given the same spacing and cultural treatment. Results for one year indicate that the yield of fruit of plants grown in water will not be much greater than that of plants grown in soil. Data on the yield of tomatoes grown in soil in a commercial California greenhouse show that the yields were practically the same as the yields secured by the water culture method in another successful California commercial greenhouse. In other words, if plants grown in soil are subjected to the same conditions of light, temperature, water, air and nutrient supply as those grown by the water culture method, the yields will be practically the same. The growing of plants in water is essentially the same as the growing of plants in soil. The roots of plants grown in soil are bathed in solution just as are the roots of plants grown in water. We all know that the minerals necessary for plant growth must be in solution with water before they can be absorbed by plants.

Put on Commercial Scale

Soon after Dr. Gericke’s results became known, the water culture method began to be tested on a commercial scale in other places. On Wake Island in the Pacific Ocean many garden crops are being produced successfully. These tank gardens produce enough vegetables to supply the staff of the Pan American Airways base situated there. In Montebello, California a certain firm is raising tomatoes in water culture in a greenhouse during the winter when prices are high. In Illinois a company has been growing roses, carnations, lilies, and sweet peas in water successfully for two years. A professor of dentistry at Northwestern University has made a hobby of growing plants without soil and is getting good results.

The usual equipment for the commercial grower consists of narrow shallow tanks made of wood, concrete, or iron coated with some cheap material which will hold water and which will not give off poisonous substances. Coarse wire screen is placed on top of the tanks above the nutrient solution. On the screens is placed a layer of bedding material such as pine shaving or rice hulls. Some material such as sawdust or red wood shavings may give off certain poisonous substances and should not be used. Young plants are set in the bedding material with their roots reaching through the wire into the nutrient solution. The porous nature of the bedding material and the shallowness of the solution in the tanks makes it possible for the roots to obtain the necessary supplies of oxygen. The amateur gardener or small scale grower may use glass jars, earthenware, crocks, or glazed vessels instead of tanks.

Various Formulae Used

Various formulae have been developed to supply the necessary nutrients. The California Experiment Station offers two, a PN formula and a TC formula. The PN formula consists of potassium nitrate, potassium phosphate, calcium nitrate, and magnesium sulphate. In addition small amounts of iron tartrate, zinc sulphate, copper sulphate, manganese sulphate, and boric acid are necessary. Each chemical is applied in a definite quantity for any definite amount of solution. Other intitutions have developed slightly
different formulae. These fertilizer salts can be obtained from chemical supply companies or drug stores. There is no one formula that is suitable to all kinds of plants grown under all kinds of conditions. For example, there is a very close relation between the light supply, the nitrogen supply, and the type of growth a plant is making. With favorable temperature, the intensity and duration of light largely determines the rate of sugar manufacture within the plant, while the supply of available nitrogen determines the degree of vegetative growth. If the plant absorbs a large amount of nitrogen in relation to the amount of sugars being manufactured, then the plant will become extremely vegetative and non-fruitful. On the other hand, a lowering of the nitrogen supply, combined with the rapid manufacture of sugars will make the plant more fruitful and less vegetative. Since the light supply varies with the season, the rate of sugar manufacture will also vary, and the nitrogen supply must be varied in order to obtain maximum yields. The nitrogen supply should also be varied with the stage of growth of any particular plant. In general young plants developing their stems and leaves use more nitrogen than plants developing flowers and fruits.

Before extensive trials with growing plants in water are made, the water should be tested for the salt content and degree of acidity. Plants cannot grow satisfactorily in water which contains a large amount of salts or which is extremely acid or alkaline. In general, water that is suitable for drinking or irrigating will be suitable for the growing of plants.

Clemson's Berkshire Herd  
(Continued from page 17)

is recognized in the herd at Clemson.

During the past few years the leading show herds of Berkshire hogs in this country carry considerable blood from the Clemson herd. As a matter of fact the stiffest competition which the College herd has had has come directly or indirectly from hogs which were sold by Clemson College. This is evidence of the tremendous influence which the Clemson herd has had on the improvement of the Berkshire breed.

The Five Acre Cotton Contest  
(Continued from page 18)

known that climatic conditions, fertility of the soil, number of plants per acre, and insect and disease infestations are factors of even greater importance in the production of a high yield than the amount of fertilizer applied.

The following is a list of farmers who have won first prize in the ten South Carolina Five Acre Cotton Contest.

In 1936 another survey was made of the cotton mills to determine the effectiveness of the cotton contest in producing a longer staple cotton crop. The results were very satisfactory. It was found that 74.4% of the cotton consumed and reported was one inch or longer.

It has been clearly shown that the Five Acre Cotton Contest has done much for South Carolina in helping to solve the cotton problem. We feel greatly indebted to the Clemson College Extension Service and to the South Carolina Cotton Manufacturer's Association for putting the contest across in such a great way.

TREATING GREEN WOOD WITH COPPER SULPHATE  
(Continued from page 18)

for such a method and as soon as one is found, the data will be arranged for publication.

The general conclusion is that wood preservation with a poisonous salt is possible on a simple, economical scale and soon a suitable method of treatment will be published which will bring the practice into use resulting in huge savings in labor, money and timber.

"SUPER-PERFECT MILK"  
(Continued from page 19)

Cadets Like It

The fat content of the college milk is always above four per cent, and its nutritive value is enhanced by the scientific care and feeding of the cattle. As for its flavor, no comment is needed, as far as those who drink it are concerned. Seldom does a day pass when cadets in the mess hall are not seen foraging (usually in vain) for partly-filled milk pitchers left by other diners.

The Gas Engine & Electric Company, Inc.
Charleston, S. C.
Beautifying Our Highways
(Continued from page 20)
work. Later it is hoped that this work will be continued on other roads.
Highway beautification in South Carolina has been under way for four and one-half years. These projects are among the best in the South. There are several under construction at the present time. The oldest one is a four-mile stretch of highway between Pendleton and Clemson. For a general view of part of this four-mile stretch see Figure 1. The shoulders of this section, as well as those of other projects in the state, are covered with a thick mat of rye grass sod. Ditches are graded and sodded to form valley ditches.

Increase Land Value

Beautification increases the value of the land alongside the highway. Land along the Pendleton project sold for as low as thirty-five to forty dollars per acre for building purposes. Since finishing the work some desirable one-half acre building lots are now sold for from three hundred to seven hundred dollars depending upon the location. Similar rises in building lot prices have occurred along all beautification projects in the state.

The four-lane highway projects which have been completed recently in South Carolina include two three-mile sections. One runs north of Charleston, the other out of Columbia toward the Veteran’s Hospital. There are two six-mile sections with a twenty-foot grass plot between the two two-lane roads. One is out of Spartanburg toward Greenville, the other is out of Greenville toward Spartanburg. There is a four-mile, two-lane section of improved highway from Greenville toward Traveler’s Rest. Contracts have been let to complete the super highway between Greenville and Spartanburg, a total distance of thirty miles. This will be one of the finest stretches of road in the entire country, according to highway engineers working on the project. There will be valley ditches on each side and a twenty-foot grass plot between the opposing traffic lanes. Another contract has been let to improve fifteen more miles of the four-lane highway out of Charleston. All of these projects are planted in such a way as to simulate natural growth. Any local, native trees that are in suitable positions are left in place. Figure 2 shows a grove of trees near Charleston. Spanish moss is characteristic of this area.

Plants that are usually used in these projects include holly, bee, sycamore, red or swamp maple, and yellow poplar or tulip trees are planted. Evergreens that are used include American holly, spruce, slash pine, and red cedar. Flowering plants include dogwood, black hawthorn, and mimosa.

Modern Cotton Picking
(Continued from page 21)

attempts to make a mechanical harvester failed. Early machines with spiked drums, not only injured the plants by their raking motion, but also failed to
gather and retain the small amount of cotton which was clawed out. Machines having rotary brushes, as well as those which dragged chains bearing hooks through the plants, were failures. Pneumatic pickers were not successful because of the excessive power required for their operation, and also because they required manually controlled suction tubes which proved to be too slow. Of course, as cotton has a high affinity for nearly everything with which it comes in contact, it is not logical or reasonable to expect any mechanical device to pick the cotton entirely free from foreign matter.

**New Rust Machine**

At present, there are several new cotton picking machines practically ready for the market. Nation-wide comment has been inspired by a new cotton picker developed, after several years of experimentation, by John D. and Mack Rust of Memphis, Tennessee. Of simple and clean design, this machine employs as its working principle the affinity of cotton fibers for wet surfaces; therefore, it has no hooks or teeth on its collecting spindles. As the inventor says of his machine, “it consists primarily of an endless belt carrying several hundred smooth wire spindles. As it passes over the row of cotton, the rotating wire spindles enter the plants. The speed of travel of the carrier (and the consequent movement of the spindles in a backward direction during contact with the plants) is approximately equal to the speed of the forward travel of the machine. The spindles, therefore, while in the plants, rotate in a position approximately stationary with relation to the stalks. This avoids endangering the plants.”

The spindles of the Rust machine are automatically moistened before they enter the plants. Cotton fibers adhere, are wrapped about the spindles as they rotate, and in another part of the machine are stripped of the spindles and delivered by a suction fan to a container. It is claimed that the spindles probe every part of the plant, that only mature cotton is gathered while immature and faulty cotton is left behind.

**Will Lower Production Cost**

Although the harvesters now are showing fairly satisfactory performances under reasonable good conditions, necessary refinements must be made. Cotton picking is and always has been, the costliest operation of cotton growers, and much thought has been given to the job of lowering that cost. Too much remains to be done in solving the picking problem for anyone to say that present mechanical pickers will cause a social upheaval or an economic revolution in the South. Though it may be assumed that the demand for mechanical cotton harvesters will be stimulated by the increasing scarcity of hand pickers, there is no probability of their being produced in quantities sufficient to revolutionize agriculture, or to seriously affect the labor situation in cotton-growing areas.

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**Camp Long**

(Continued from page 23)

Moreover, 250 passed the beginners test, 92 the swimmers test, 11 the junior life saving test, and 5 the senior life saving course.

In addition to this training in recreation, many courses of technical value are offered, including hygienics, crafts, entomology, forestry and soils. The camp offers cultural and spiritual benefits and helps the boys and girls to develop such qualities as resourcefulness, helpfulness, neatness, courtesy, and a democratic spirit.

Mr. Shelton in an official report, following a weeks stay at the camp, during the Rural Life Conference last August, stated, “Camp Long is really a model camp.” This will certainly be the opinion
of anyone who visits the camp, for its ideal location, recreational and educational opportunities make it an unexcelled summer retreat for the rural boys and girls of South Carolina.

**World Famous Bull at Sand Hill Station**

(Continued from page 24)

Laddie, had seventy-three Advanced Registry daughters, three having records of 800 pounds of butterfat or better, and eleven ranging from 700 to 797 pounds. Dorothy's dam was Imported Wyebrook Rose with a record of 710 pounds of butterfat in class BB, a class leader record when made.

*Sire Was Great*

"Sequel’s" sire was Langwater Holliston of Rockingham, with twenty-two Advanced Registry daughters, including two with approximately 750 pounds of butterfat each. His paternal grandsire, Langwater Holliston, sired the famous cow, Langwater Levity, whose sale price was $15,000, and who was former world’s champion in class EE. The dam of Langwater Holliston was Imported Belle of Rockingham with a record of 622.2 pounds of butterfat, former New Hampshire champion in class AA. She also had five Advanced Registry daughters, all with remarkable records.

"Sequel’s" sale price was $1250, paid to H. H. Buckley, former owner of Cathedral Farms, Oneonta, N. Y. On the day following the transaction, an offer of $2500 was made for him, followed (according to an unconfirmed rumor) within a week by another offer, of $5000.

**From the Deans**

(Continued from page 26)

*Dean Cooper*

arrange the details of publication, distribution, etc.

Those students who write for the journal and those who are responsible for the subject matter of each issue and for editing the material submitted will necessarily broaden their fields of knowledge and thus profit from their connection with the enterprise.

The publication should be of much interest and value to its readers. It will keep them informed not only of the activities of agricultural students and organizations at Clemson but will no doubt also bring interesting news of the latest developments in agricultural science and practice, both in South Carolina and elsewhere.

The experiment station and the extension service will cooperate in furnishing much live agricultural news for this state.

The agricultural graduates who have gone out from Clemson during its almost half a century of service have established a tradition of success which has been a subject for unsolicited comment by many who are not Clemson men. Recently Dr. E. C. Auchtet, Chief of the Bureau of Plant Industry, United States Department of Agriculture, told a group here that he had been greatly impressed with the large number of Clemson men in important agricultural positions throughout the country. Our students who go to other institutions to pursue graduate studies not only make excellent records in their work but, equally important, get along unusually well with those whom they come in contact.

The editors will keep in mind this reputation possessed by those who have trod the agricultural highway ahead of them and will issue a publication which will be not only a credit to themselves but in complete keeping with our fine agricultural traditions.

*Dean Washington*

and Agricultural Education which will help them in rendering a worth-while service back to the society that has made possible their educational opportunities. We believe that, in turn, these students will be setting examples which will stimulate other students in other fields to broaden their vision and deepen their educational experience in college.

Again our best wishes go to the staff in its efforts to render this service.

**The Clemson Poultry Plant**

(Continued from page 28)

and peanut meal in the ration.

The experiments are designed to apply directly to South Carolina conditions. Range paralysis is one of the scourges of some South Carolina flocks. Cottonseed meal is one of the cheapest sources of protein available in the state. Oats and soybeans can be grown cheaply on the farm. The poultry department is showing the farmer how to produce poultry and eggs economically and thereby increase the farm income.

**Horse Shows in Oconee and Pickens Counties**

(Continued from page 28)

The judges in the Oconee County Show were: L. V. Starkey, Clemson College, W. J. Sheely, Extension Animal Husbandman, Florida, T. A. Bowen, County Agent, Pickens. The Pickens County judges were: L. V. Starkey, Clemson College and G. H. Griffin, County Agent, Oconee County.

*Sponsored by Clemson Men*

Both of these shows were sponsored by County
Agents and Smith-Hughes teachers who got their training from Clemson. Both shows were attended by several of the Clemson cadets who are majoring in Animal Husbandry. The people who attended these shows seemed to enjoy them very much and they are looking forward to more and larger horse shows.

Is there money to be made in the production of such livestock? Be your own judge. This is not official, but the writer personally saw one of these farmers sell a three months old mule colt for $75.00. Why don’t you accept this challenge, Mr. Farmer? Turn your depleted lands into suitable pasturage by planting Bermuda and Dallis grasses thereon. Besides pasturage there are innumerable feeds which you can produce at home at a low cost.

Agriculture, the basic industry, is also the oldest industry. Man probably began cultivating crops, as shown by archeological research, as early as 10,000 B.C.

The oldest farmer’s society hall in the United States is in Pendleton, South Carolina. The Pendleton Farmer’s Society was organized in 1815.

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**Notice to Advertisers**

When we were soliciting advertisements this publication was called “The Clemson Agricultural Journal.” This name was very similar to other student agricultural publications so we thought it would be better to change the name. After much thought, we decided upon The Agrarian as the name for the official student publication of Clemson Agricultural College. This is the only change in the magazine. It still has the same number of pages, the same size, and circulation. We sincerely hope that this small change will not confuse our advertisers.

THE EDITORS

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