College men know that a thin mantle of manure on several acres brings about twice the gain in total crop yield, as compared with the same amount of manure in a heavy coat on a single acre. Few farmers take full advantage of this fact because it takes too long to cover the acreage with slow-moving equipment.

Now, with either of the machines shown here, that waste of crop-producing power gives way to creation of new wealth. Motorized spreading makes thin applications practical because it multiplies the acreage covered in a day. Rubber tires permit spreading at tractor speeds even on rough, frozen ground. Transport from farmstead to field is speeded up still more, even on stony roads.

Hitching is faster because there is no heavy lifting, no jacking up; self-hoisting hitch simply slides to level of tractor drawbar. Maneuvering is faster because the spreader is built and balanced, steers and backs like a 2-wheel cart. Loading is faster because the front end lowers for loading, because the low wheels are not in the way. Every detail reduces drudgery, increases daily capacity, encourages better manure management and soil building.

The new low-priced model below has a 70-bushel steel-sided box. Its tires and wheels fit other farm machines, get double or treble service from a single investment in rubber. Both it and the 90-bushel size shown above are built with an apron drive which moves manure more steadily to the beaters ... and uniformity of spreading is required to make manure do double duty through thin application.

There is also a Case horse-drawn spreader, long famous for its light draft, its double steel backbone, its long life. See any or all models at our factory show rooms or branch houses. J. I. Case Co., Racine, Wis.

New Low Price Tractor Spreader Meets Challenge of Soil Conservation
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Ask for Literature, Name of Nearest Dealer, and Prices on
TENNESSEE BASIC SLAG, Carlots or Trucklots.
The Soil Defends America

By EARLE C. TRUETT, Jr., '41

Research shows there is very definite relationship between the soil, the produce of the soil and every form of life drawing sustenance from the soil. It is very true that if the soil is healthy its vegetation will be healthy; and if the vegetation be healthy so also will be the life reared on it. Animals reared on poorly mineralized soils will most likely suffer from demineralization and their susceptibility to certain diseases is greatly increased. Minerals are the basic of the chemical changes that comprise life and they enter into the structure of every cell in the body.

Human bodies contain many elements in addition to nitrogen, phosphorous and potash and calcium. Such elements as copper, iron and many other so-called minor elements play important roles in the proper functioning of the human body. The elements should be in your soil solution on which the plant feeds, to enable the plant to extract them in proper combination from the soil, to store them in the food which you eat, so as to produce in your body, good rich blood, strong firm flesh and bones to prevent disease, tooth decay, the decline of eyesight, and to keep the brain clear, so that it may function properly.

We must ration our soils for better crops. A healthy horse, cow, or human being, can live for weeks without food and still survive. But all the system's stored up reserve of food, fats, muscle, minerals, will be used up in the fight for life, to evade starvation and death. That is what starvation is—a slow, but steady depletion of reserve elements of food and life, which nature stores in our systems. And it is by this same slow but steady method of farming without replacing such foods as crops that finally deplete the soil of all the elements of plant life, and leave us a starved soil. It is only recently that we have learned how to ration out livestock with great success. Today we measure out proteins, minerals and vitamins to our hogs, cattle, and poultry, making certain they receive the correct elements in the correct proportion. We also know what elements are required to produce dark colored, tender steaks, solid pork, the heaviest egg production and the richest milk. We also know how to put our land on a scientific "diet". This comparison between the feeding of ourselves, our animals, and our soils is a stepping stone toward providing for a better defended America.

Those diseases of humans such as pellagra, rickets, scurvy, and anemia, etc. are much the same sickness that plants have. Corn and many other crops, for example, show us as best they continued on page 39
Giving the Farmer A Start

By R. L. STODDARD, '41

The Farm Security Administration is solving this problem by providing a new start for these families. The F. S. A. program may aid in many ways such as readjustments of debts and community loans, but the main activity is that of rehabilitation and individual loans. First, let us see how the over-burdened debtor is aided. This is done by furnishing services or efforts to all who are so heavily in debt that they are handicapped in making a new start. These debt adjustment committee (available to any farmer or creditor) enable the debtor and creditor to reach a mutual satisfactory agreement. Up to July 1, 1939 South Carolina creditors had reached voluntary agreements with 1,336 families living on farms totalling 113,613 acres. Their debts were reduced from $1,516,122 to $1,090,064. Foreclosures were saved in many cases and substantial payments were paid to creditors which might otherwise have been bad debts.

In the community or group loans made by this service a total of 2,107 farmers have been aided. Two hundred and twenty three loans amounting to $158,021.64 were made to cooperative groups to obtain services that they otherwise were unable to get. Some of these loans were used to pay for purebred sires in communities where needed, some for heavy farm machinery, and others for community canneries.

The basic work of the F. S. A. is that of working out a balanced program for each worthy family receiving aid from it. A trained Farm Security Administration supervisor, or an assistant, who is familiar with modern farm management visits each family and works out a program according to their needs and conditions. He also keeps in touch with them by visiting through out the year, making suggestions when necessary and seeing that the requirements are fulfilled. In this way the farmer "earns as he learns." As soon as he pays off his loan he is free and prepared to carry on in a self-supporting and independent way.

Over 14,000 low-income farmers have been aided in South Carolina by the F. S. A. Some borrowed to buy farms, some to buy equipment and livestock, and others for both. The continued on page 40
Why Keep Bees?

BY F. K. HINNANT, '41

Why keep bees? In this modern age of fast living, and synthetic products, it seems rather odd that such a question as this should be asked. However it is easily answered in several ways.

There are several commercial phases of beekeeping of which honey production is the most widely known. Honey is a natural, unrefined, nutritionally valuable food. It is unique in that it is the only unmanufactured sweet available in commercial quantities. People have known and realized this since beekeeping was first inaugurated, but only today are they appreciating this fact and using it to advantage. Honey is now being used in large quantities as a bay food and in many other foods. It, like ice cream, has become a necessary food instead of a luxury.

Many farmers in South Carolina have become aware of this and of the possibilities of commercialized beekeeping and honey production and have turned it into an industry. The average farmer reaps only about $50 to cover the initial expense of buying hives and bees, a little time to take care of the bees and a little irrigation on bee culture and honey plants and has a hobby that will pay him dividends.

Honey production, however, is only of minor importance to the farmer as compared with another service rendered by the bees. Cross pollination which is so necessary in the development of many of our crops, fruits, and berries is by far the most important service rendered by bees. Its value is from ten to fifty times that of all honey. About twelve to fifteen thousand hives may be used in a state for this purpose. A farmer with bees can kill two birds with one stone. He can get his crops cross pollinated and a crop of honey produced at the same time.

If he is real industrious he may kill another "bird" by renting a few of his colonies to a neighbor who needs and does not have bees.

Up until a few years ago, honey production and cross pollination were the only two reasons why bees were kept except possibly for the beeswax which plays such an essential part in the cosmetic industry. Now, however, the package bee business has arisen and is taking its place among the commercial phases of beekeeping. This business arose when northern honey producers found that they could buy bees produced in the South cheaper than they could raise them and take care of them through the northern winters. So now the beekeepers in the North buy bees by the pound, produce a honey crop with them, kill the bees, sell the honey and still clear a profit.

This business has grown to enormous proportions, considering the type it is, and how long it has been started. These bees usually sell for a dollar a pound. One year's production of 151 tons in some several Southern States gives some idea of the size of the package bee business. The production of 12 tons by one man is the high for South Carolina.

Another phase of beekeeping which has been commercialized to some extent is queen rearing. Some of this is being done in South

Continued on page 36
Good Land Means Prosperous Farming

GUEST EDITORIAL

Gilbeart H. Collings, Professor of Soils

Farm prosperity is more easily attained where soils are fertile. This was again brought forcibly to the author's attention last summer when he had the privilege of visiting for two weeks one of the most prosperous farming communities in the American Corn Belt.

This community is located in the northern part of the State of Illinois. It is largely a prairie country composed of such soil series as the Tama, Marshall, Clarion, Webster, Carrington, and Maume. These soil series are probably unsurpassed in the world for corn and oat production. Having visited this community about a decade and two decades ago, respectively, I was much impressed with the changes that had taken place during the last twenty years and I was especially struck with the fact that the pattern of thinking and action of the American farmer is fast becoming standardized over the country. This means that the time has arrived when the soil and climatic factors of most areas in the United States are now the principal determiners of the pattern of farming followed in those areas. The idea so often expressed to the effect that a given section of our national farming community has a corner on intelligence or on laziness is untenable.

The farmers in the Corn Belt community visited were, according to South Carolina standards, extremely well-off. Most of the land in the area is now under cultivation, and a woodlot is something of an exception although formerly a small area of woodland was present on many farms. Because of this the old wood pile and the chopping block often seen 20 years ago have gone out of existence. Today most farmers in the community use coal for fuel, the order for the coal being phoned to town and the delivery being made to the farm. Windmills which 20 years ago dotted the landscape have almost entirely disappeared.

Most of the farmers in the community appeared to be farming 160 to 220 acres of which nearly all is under cultivation. Pastures are seldom larger than 30 acres. There were a few farms of 300 acres or more and a few of a 100 acres or less. One farmer expressed the belief that a man couldn't make a decent living in that community on less than 125 acres.

Good farm land brings $125 to $150 an acre. Practically no commercial fertilizer is used. I saw farms that have been in the same family for three or four generations which have never been limed and which have never received commercial fertilizer, and yet these farms are still making better than 50 bushels of oats to the acre. Many farmers of the community told me, however, that due to continual cropping crop yields have been on a decline for some years. The agricultural leaders in the community advise the use of lime and phosphate, the phosphate to be applied as rock or superphosphate, but the results secured from the application of these materials did not appear very impressive.

Like most farmers the country over, the farmers in this Illinois community were largely interested in cash crops. Their cash crops are corn, oats and soybeans. Little wheat is grown because the farmers fear an outbreak of chinch bugs which usually follow the harvesting of the wheat crop. Only occasionally does one see a field of Timothy, red clover, or alfalfa, and when these crops are grown they are usually grown to be combined for seed. Soybeans at present prices are not as popular as formerly when they

Continued on page 36
Agricultural Engineering and National Defense

By A. F. Burgess, '41

On every hand we are confronted with different aspects of the National Defense. Agricultural Engineering is playing a big part in proving the relationship between engineering and leadership. However, these are two different things, since many engineers are not leaders, but it is easily seen why it would be very desirable if the two were combined in more of the same individuals.

The affairs of men need more leadership and a higher character of leadership. Leadership is said to be the result of a combination of personal qualifications as inherited by most people to a greater or less degree, subject to development, but which few individuals develop in themselves to their fullest capacity. Most men who become engineers, as a result of the discipline of engineering training and work, develop the qualities of intellectual honesty and personal integrity which guide leaders in the direction they are to follow. All of the leadership which will develop in this country can never be furnished by engineers, but a greater attempt should be made by engineers as individuals and as a profession to develop and exercise their capacities for leadership of high quality.

The relation of agricultural engineering to agricultural production phases of a defense program is obvious. Increased economic and mechanical aspects of modern defense further suggest that training and experience has qualified many agricultural engineers for important work in military phases of the defense program, and in non-agricultural as well as agricultural phases of the national economic foundation for defense. Engineering ability and accomplishment in effective use of men, materials, energy, and mechanical equipment are of greatest importance to the defense program.

Some of the agricultural problems of national defense are: the continued production of staple commodities and increased domestic production of important commodities or of substitutes for commodities previously imported.

Plans need to be made and ready to put into effect when the occasion arises, to adapt production to new requirements and conditions which might be needed in greater and some in smaller amounts.

Since defense with a large army and navy is considered, plans must be made for continued farm production with reduced manpower. Plans must also be considered for maintaining farm production without benefit of some areas now in production. Plans for further decentralization of farm product storage are suggested as defense against "fifth column" activities.

Almost every substantial defense considers the possibility that certain very important materials now used in making farm equipment may be exhausted or hard to get for such use. Planning for redesign and use of substitute materials is essential.

Other problems that seem to be more evident now are involved in maintaining supplies of organic materials. Some of these have been imported in large quantities. It is possible that the production in this country might be started or increased in the case of sugars, starches, proteins, vegetable oils, fibers, and other organic compounds of importance.

Defense considerations suggest that the whole subject of organic material requirements, present sources, and possibilities, means, and economy of domestic production be looked into and studied for opportunities to improve our position by agricultural engineering attention to nature, variety, methods, and economy of American farm production.

The immediate urgency of defense measures is very great, but there is also occasion to look and plan ahead for a sound agriculture when the immediate defense emergency has passed.

The nation realizes the freedom and opportunity that our present defense program seeks to preserve.

The proper measure of a man is the size of the achievement or office required to make him feel important.

More than a billion dollars can be furnished home seekers through the facilities of the Federal Home Loan Bank System.

Texas highway sign: "This is God's country. Don't drive like hell."
Blue Mold of Tobacco

BY W. H. McNAIR, '41

... An obstacle in the path of tobacco profit, blue mold can be controlled...

Blue mold is a disease that is very much feared by the growers of tobacco in South Carolina and adjoining states. In the years 1932 and 1937 severe damage was done to tobacco plant beds in many regions and growers had to secure plants from other communities with which to set out their crops. The damage during other years was not as severe.

This disease may attack the young plants on the bed or those that have been transplanted to the field, but it is most frequently seen on the plant beds. The date of appearance seems to be about the same time that the flowering dogwood begins to bloom. The first symptoms of the disease on a bed are the turning downward of the tips of the leaves. Shortly afterwards a bluish, downy coating appears on the underside of the attacked leaves; hence, the name blue mold. If the weather is cool and damp the upper surface may take on a yellow color that looks as if the leaves had been scalded, and a characteristic odor develops. During dry, warm periods the leaves may show dark brown specks within yellow spots with little or no downy coating on the underside of the leaves. Small plants seem to have more difficulty recovering than older ones and may be entirely killed by the attack. Growth is retarded and if the plants do recover the farmer is late in getting his plants in the field. If infection takes place in the field shortly after transplanting, the leaves may develop symptoms similiar to those seen on the beds during warm, dry periods.

For the past few years methods of control haven't been very definite, but several promising treatments are now being tried and thought to give control. Among them are benzol fumigation, copper oxide spray and paradichlorobenzene. Paradichlorobenzene seems to be the best one found so far.

The benzol gases are very poisonous to the blue mold fungus, but the tobacco seedlings can withstand greater concentrations than can the disease. Best results are secured by the use of narrow beds because a more thorough fumigation may be had and the technique of application is simplified. Small pans around the edge of closely constructed beds hold the liquid until it evaporates sending the fumes down over the plants. A heavier cover than is ordinarily used is needed to retain the vapors. This treatment seems to give fair control.

Farmers haven't taken to the copper oxide spray method very rapidly because the spray is very difficult to prepare and keep emulsified. Most farmers don't have the proper materials with which to apply this material either. This spray will not prevent infection under extremely suitable conditions for infection or during an epidemic. It is of practically no value as a cure after the plants are already infected. It may decrease the damage done by the disease though.

The easiest treatment to apply and the one that seems to be the most "sure shot" method of control is paradichlorobenzene, commercially known as "P. D. B." It is applied in crystalline form and the size six crystal seems to be the best to use. Fairly tight beds should be constructed and the crystals can be sprinkled on top of the regular tobacco cloth used as a cover, about three pounds per one hundred square yards of bed area. Another cover with threads close together (50 to 60 per square inch) should be drawn over the original cover so as to hold the fumes under and prevent air currents from carrying them away. These fumes are heavier than air and will naturally settle down over the plants. Application should be made about sundown and the heavy cover taken off the following morning before the sun gets hot. This treatment does continued on page 33
Electric Hot Beds

BY J. E. COTTINGHAM, Jr., '41

A Norwegian engineer accidentally hit upon the idea of growing plants with electricity in 1922 when he noticed grass growing greener and more advanced over a network of overloaded electric cables. He conducted extensive experiments along this line, and, as a result of these experiments, within five years 12 percent of all cold frames in Norway were electrically heated. Electric hotbeds were first used in the United States in the state of Washington in 1925. However, they were not very satisfactory at first, and for several years they were not widely used.

The development of a satisfactory heating cable that could be buried in the soil gave a great impetus to the trend toward electric hotbeds. Today, the standard heating cable consists of high resistance wire electrically, mechanically, and chemically protected by suitable wrappings. The standard cable is lead covered to protect it from water and comes in sixty and one hundred and twenty foot lengths. The sixty foot cable requires 110 volts current and the one hundred and twenty foot cable requires 220 volts.

The kind of plants to be grown determine the depth that the heating cable should be placed in the sub-stratum. The latest Extension Service bulletins recommended that the cable should be placed near the surface for germinating seed, at the bulb for bulb plants, and in the center of the root system for all others.

Dr. J. B. Edmonds and Mr. G. H. Dunkelburg of Clemson College have done some very interesting work on the propogation of sweet potatoes in electric hotbeds to determine the best horizontal spacing of the cable and the best temperature to use. They recommend a ten inch horizontal spacing and a temperature of from 83 degrees to 85 degrees Fahrenheit. However, a six to seven inch spacing is considered standard for all electric hotbeds.

A simple thermostat is used to control the heat in electric hotbeds. These thermostats are accurate within about one degree and are absolutely dependable. Since different plants require different temperatures, it is very important that the operator know the correct temperature to use. Below is a table taken from The Farm Electric Handbook, R. E. A., Washington, D. C., giving the correct germinating and growing temperature for several plants.

<table>
<thead>
<tr>
<th>Crop</th>
<th>Germinating Temperature F.</th>
<th>Clear</th>
<th>Cloudy</th>
<th>Night</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cabbage</td>
<td>60</td>
<td>65</td>
<td>55</td>
<td>50</td>
</tr>
<tr>
<td>Lettuce</td>
<td>65</td>
<td>65</td>
<td>55</td>
<td>50</td>
</tr>
<tr>
<td>Pepper</td>
<td>80</td>
<td>75</td>
<td>65</td>
<td>60</td>
</tr>
<tr>
<td>Sweet Potato</td>
<td>75</td>
<td>75</td>
<td>70</td>
<td>65</td>
</tr>
<tr>
<td>Tomato</td>
<td>80</td>
<td>70</td>
<td>65</td>
<td>60</td>
</tr>
</tbody>
</table>

The first question that comes to the farmer's mind when you mention electric hotbed is "How much will it cost?" The answer to this question is very reasonable. Soil heating cable costs approximately six cents per foot resulting in an investment of from $1.00 to $2.00 per sash depending upon the horizontal spacing of the cable. Thermostats range in price from $6.00 to $9.00.

The design of the hotbed frame is as important as the electric heating unit itself. Since standard hotbed sash is 3' by 6', hot bed frames are usually built in 6' widths and any multiple of 3' in length. Ordinary 1'' rough lumber has been used very satisfactorily for constructing hotbed frames. If a permanent bed is desired, concrete or 2'' dressed lumber (painted) may be used. Creosoted lumber should not be used since creosote frames are apt to injure the young plants.

Particular attention should be given to the location of electric hotbeds in order to in-continued on page 33.
The Havoc of the Hurricane

BY H. C. ZERBST, '41

During the month of August 1940 the soils of Coastal Carolina were swept and partially covered by a hurricane. This hurricane caused the rising of the creeks and rivers, covering the soil in varying depths with salt water. In most cases only a small portion of any one grower's field was covered.

At this time of the year the only truck crops in the fields were newly seeded cabbage, radishes, turnips, and broccoli. All of these crops were destroyed by the wind and the rain regardless of whether or not salt water had covered them. Cover crops vary in their susceptibility to salt water injury. The majority of the grasses are tolerant, Bermuda even thriving on salty soil. Legumes, however, are very susceptible to salt water injury.

The amount of salt remaining in the soil depends on several factors such as: length of time that salt water covered the soil, physical condition of the soil, topography, and subsoil drainage.

Freshly plowed land absorbed more salt than those soils which were planted and had not been cultivated for a rather long time.

At varying intervals since the hurricane samples have been taken from the profiles at definite locations.

The samples have been studied and attempts made to determine the response of crops grown on these soils. Some of the conclusions drawn from these recent experiments are as follows: the most susceptible crops to salt are beans, peas, and lettuce; turnips, beets, cabbage, potatoes, and small grain are more tolerant of salt.

Salt concentration varies with the rainfall. During the period from August to January sufficient rain fell for crop growth but not enough for leaching to occur. As the soil dried out the concentration of salt in the surface soil increased, and as the subsoil moisture began to rise to the surface more salt appeared in the top soil. During such periods plants that had commenced to grow died from salt toxicity. When a rain did occur some of the salt was leached downward, and a noticeable increase in plant growth was evident for the next few days, but with all of these barriers and difficulties these plants struggled through the season, but no marketable crop was made.

The last samplings made were just before Christmas, and they showed a greater salt content than the sample taken immediately after the hurricane. Between Christmas and January 15th a very heavy rainfall leached much of the salt from the surface. Subsequently there was found to be an increase in the salt content of the subsoil at a depth of approximately fifteen inches. If rains continue until this salt is leached to a depth where it will not return to the surface by capillary movement of soil moisture, crops on this salty soil will grow all right. If the rains do not leach this salt away, it will return to the surface of the soil when the dry weather of spring arrives. If this condition occurs, there will be a marked damage to the crops growing on such soils.

This common salt, or sodium chloride as it is chemically known, replaces many of the minerals from the soil. When this situation arises an increased acidity is noticeable, and a deficiency of many minerals occurs. Liberal liming and fertilization must be practiced on these soils if good crops are to be obtained in the year immediately ahead.

Compliments of

Clemson College Laundry
Bird Banding At Clemson

BY ORDWAY STARNES, '42

Bird banding in the United States dates from the time of Audublon, who, about 1803, used silver wire to mark a breed of phoebe. The following season two of the banded birds came back to the same vicinity. Since that time several banding or marking schemes have been tried, one of which was the American Bird Banding Association, organized December 1903. The work of this group was so successful that it demonstrated the possibilities of extensive banding operations. In 1920 the Biological Survey took over the work of the American Association and activities have progressed until there are now more than 2,000 cooperators banding birds in the United States and Canada. The cooperators contribute their work entirely without pay, their remuneration being the pleasure they derive from the association with the birds, recreation or the following of some special problem of their own.

The first step in operating a station is, of course, the catching of the birds. A large variety of trap designs are furnished by the Biological Survey and each operator modifies them to suit his own particular needs. The types used at Clemson are all modifications of the drop system; i.e., the birds are enticed into the box shaped wire covered trap and in feeding spring a trigger that releases a door. The usual number of traps used on the campus is 12 to 15, depending on the season. During the winter the traps are visited three to four times a day, but during the spring season they must be visited every hour or two as the birds are nesting and must be freed to care for their young. The captive bird is marked by placing on the leg a small metal band. The band in no way inconveniences the animal, and will last longer than the expected life span of the bird. These numbers are recorded on regular forms and forwarded to Washington every six months. If the operator catches a bird already wearing a band placed there by himself this is known as a repeat, or return, if six months have elapsed from banding date. If the band was placed by another station, it is then referred to as a foreign return. This is a highly desirable occasion at any station, as the number of foreign returns is quite small as compared to the total number of return of all kinds. We explain these terms as we shall refer to them later. If a bird banded at Clemson is taken, say in Tennessee, by another operator, the Biological Survey upon receiving his reports will notify us as to the place and date it was retaken. The same transference of information takes place if a bird is killed or found dead and reported, by others. So at this time, may we ask, if you hear of any one finding a banded bird, please make some effort to see that it is reported to Washington.

The total number of birds banded at Clemson during the last 6 years ending February 18, 1941 is 6,468, while the number caught was approximately 15,000. The total number of species is 58.

Below is a Statistical Representation of Birds Banded at Clemson and Returns Sent to Washington

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Nos. Banded at Clemson</th>
<th>Nos. of returns sent to Washington</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. White Throated Sparrow</td>
<td>2024</td>
<td>101</td>
</tr>
<tr>
<td>2. Chimney Swift</td>
<td>1908</td>
<td>5</td>
</tr>
<tr>
<td>3. Cardinal</td>
<td>488</td>
<td>20</td>
</tr>
<tr>
<td>4. Blue Jay</td>
<td>472</td>
<td>14</td>
</tr>
<tr>
<td>5. Tufted Titmouse</td>
<td>412</td>
<td>7</td>
</tr>
<tr>
<td>6. Brown Thrasher</td>
<td>401</td>
<td>11</td>
</tr>
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<td>7. Catbird</td>
<td>91</td>
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<td>8. Carolina Wren</td>
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<td>10. Robin</td>
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<td>11. Wood Thrush</td>
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<td>12. Mocking Bird</td>
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<td>13. Hermit Thrush</td>
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<td>14. Ring Neck Duck</td>
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<td>15. Little Blue Heron</td>
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<td>3</td>
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<td>16. Myrtle Warbleu</td>
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<td>17. Breech Owl</td>
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<td>18. Dove</td>
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Many of these birds have been caught one, two, three, four, and in the case of one Chimney Swift, five years after date of banding. This proves not only that birds live a number of years, but also that they return to the same places.

Other species of which there have been no returns sent to Washington as yet are, Field Sparrow,—5, Chipping Sparrow—43, Blue Bird—33, Flicker—23, Quail—13, Song Sparrow—12, Slate Colored Junco—11, Red Eyed Vireo—9, Summer Tanager—6, Crested Flycatcher—5, Red tailed—2, Fox Sparrow—2, Yellow breasted Chat—2, Phoebe—3, Orchard Oriole—2, California Quail—2. And one each of the following species. Snowy Egret, Louisiana Heron, House Wren, Oven bird, Little Green Heron, Mary—continued on page 32
Choosing A Farm

BY L. C. HAMMOND, '42

Choosing a farm is the first and most important task confronting the prospective farmer. It often means choosing a place to live and work for a lifetime. Too many farmers fail to give the task a thorough thinking-through with the result that the many factors which will determine success or failure are not adequately considered. A book could be written on "Choosing a Farm", but it is desired that this article may show the prospective farmer the necessity of much thought and use of common sense on his part before he can choose a farm on which success can be realized.

First, one must decide the type of farming which he prefers. This will affect the general location of the farm. Cotton farming will be done in the South, and tobacco farming in certain areas of the Southern States. A dairy farmer must choose a location where markets are available, and a soil type to which grasses and other forages are well adapted. The farm should not be chosen in a locality which is adapted only to the desired type of farming, but in a locality where other factors are good, such as, desirable social conditions, good markets and good water supply.

Everyone desires to live where good health, happiness, home comforts, and social activities can be enjoyed. To realize this a farm should be in a thriving community, near schools, churches and neighbors. The climate may be ideal, the soil may be productive, and all the essentials for making money may be present on a farm, but if the farm family cannot mingle with people who have high ideals and a desire for better living, this poor community hinders the most desirable living, just as such other factors may hinder the most profitable production. Desirable living conditions can be found in a peaceful, law-abiding, hard-working community where it is the desire of each farmer that his children shall have a place as worthy citizens in the world of tomorrow. Bringing up a good family should be the greatest desire of every farmer, and every plan, whether for a larger farm, an increase in the number of livestock, or for a combination of factors for increased profits, should have this aim as its goal.

Climate is one of the fixed factors over which man has no control. In many areas other factors may be ideal for profitable farming, but because of temperature or rainfall no farming can be done. Because of climate we find some areas more thickly populated than others, for most farmers locate where the growing season is sufficient for crop production and where temperature and moisture are such as to permit relatively high yields per acre. In choosing a farm many pitfalls may be avoided if the time and amount of rainfall, the length of growing season, and the frequency of early frosts, storms or other unfavorable weather conditions are known.

The earning capacity, affected by the climate topographic features and soil conditions, may determine whether or not the cost of the farm is ever repaid. Some farmers today are puzzled about the success of their fathers and grandfathers many years ago on the same land. They fail to realize that they are actually not farming the same land, but are in many cases using the subsoil whereas their ancestors used the rich topsoil. Erosion has caused complete abandonment of many once highly productive farms, and sent the farmers who kept trying to eke out a living

continued on page 32
A Preview of the Clemson Ag. Fair

As Clemson is one of the highest rating Agriculture Schools in the South, we, the Agricultural students, have decided to put on a two-day exhibition of the work we are doing at this institution. This exposition, which is to be called the Clemson Ag Fair, is put on entirely by the Ag students; although helpful suggestions and one hundred percent cooperation is being given by the faculty members.

Every major department is to have an exhibit, and in addition the Bacteriology, Poultry, and 4-H Club will also give exhibits.

The projects of different departments will be held in Long Hall (Clemson's new agricultural building), the dairy building, dairy barn, and the library. There will be plenty of free entertainment that can not be surpassed by any group of entertainers in South Carolina. There will also be reels on vitamin deficiencies of animals, rural South Carolina problems, and nutritional deficiencies of plants running continuously.

In the dairy exhibit there are a few things that you don't want to miss: (1) The churning and printing of butter, (2) The making and freezing of ice cream as only "Big Ben" Goodale and his seniors can, (3) The pasteurization of milk, and the showing of how to determine the amount of butterfat in "Ole Bossie's" milk.

At the barn you will be able to see the most up-to-date milking parlor in the United States. There will also be a calf feeding demonstration by the "Nipple Pail Method". Different feed mixes will also be shown.

The Agricultural Engineers will have an outstanding exhibit as usual. In a classroom they are going to show you how they plan to run their farms. They will present a miniature electrified farm with running water (using glass tubing as pipes). Colored water will be used to show all the graduates of the Ag Engineering department and where they are located. A metal electric hot bed with a glass cross-section showing actual growing plants will be on display with a student in charge to explain the details of its construction and operation. A newly designed method by a Clemson student for keeping baby piggies warm on frosty nights will be on display also.

The Agricultural Economics boys are going to show you something that you have wondered about: Where the tax money of South Carolina goes, and how it is collected. Good farm management will be demonstrated on a small model farm. The value of education in regard to labor income will be shown as will a very interesting demonstration of calculating machinery (addition, subtraction, and multiplication). An exhibit of marketing showing how South Carolina products are distributed will also be of interest to all of you who are concerned with Agricultural South Carolina.

The 4-H Club will have a booth that will open the eyes of all observers and make other 4-H members proud that they belong to the organization.

The Horticulture Department is putting on an exhibit that will seem impossible to you. A sweet potato weighing one hundred pounds that has never been in the soil. (Don't take our word—come and see it.) You will see cuttings of all kinds, treated and untreated seeds, types of greenhouse plants, landscape design, and vegetable exhibits.

The Agronomy Department will give plenty of competition for the best exhibit. Here you will see plants of all kinds in all stages of growth; clovers, grasses, wheat, corn, oats, and cotton varieties will be shown. The effects of inoculation will also be demonstrated. They will show where your fertilizer comes from, how it is mixed and the value of a high analysis fertilizer. Quick test showing acidity and the amount of phosphorus and potassium in the South Carolina soils will show you amazing things about the soils of your community.

The Bacteriology Department will show germs that cause different diseases.

The Poultry Department will have biddies hatching under glass.

The Animal Husbandry Department plans to have the best exposition in the entire Fair. Exhibits of all types of college livestock will be shown. These animals will be fitted for showing according to the practices followed by leading showmen throughout the nation.

Saturday night at eight o'clock the big horse show gets under way on the football field (also continued on page 28)
Farm Mechanization

M. O. BERRY, '43

The successful farm of today is, of necessity, mechanized. For example, when wheat was grown entirely by hand labor, approximately 56 hours was required to plant, cultivate, and harvest an average acre yield of 20 bushels: whereas with the present farm set-up of today only 3.3 hours is required to accomplish the same amount of work. True it is that the present initial cost is greater, but this cost is more than offset by the saving in time and labor, greater efficiency of production, superior product and greater total production.

There are two general classes of machines used today by the farmer. First is the special crop machine such as the potato planter and digger, corn picker, cotton harvester, and cotton gin. The most advantageous use of these machines would be to operate them cooperatively. The second class of farm machinery is the adjustable machine such as the grain drill, row-crop cultivator, binder, reaper, and tractor. Each of these machines can be adapted to several uses. For example, the tractor may be used for cultivation, or as a stationary power plant for jobs such as threshing, and as cutting wood.

One common fault among present day farmers is the lack of care for farm equipment and costly machinery. Proper oiling is essential to the long life of frictional surfaces; and a grade of lubricant should be used that is the thinnest oil that will stay in place and do the work. Exposure to weather conditions is the main cause for rusting and rotting of parts on machinery; so exposed surfaces should be kept free from dirt and dust which would hold moisture, and cause deterioration.

Much improvement can yet be made in developing farm machines. Instances that are most noticeable are a need for:

1. A cotton picker that will not damage the stalk.
3. A sorghum header to cut stems of uniform length.
4. An automatic puller and topper for beets.
5. Devices for the comfort of the operator.

Research has played a major role in modern machinery. The development of new type roller bearings, new alloys of steel and cast iron, and the V-belts and pulleys have improved the efficiency and lasting quality of farm machines so as to greatly reduce repair costs. Also, research in size, type, and requirements for different sections of the country has done much to foster the best machines for certain areas. For instance, the typical Southern farm is fairly small. Manufacturers had formerly produced huge tractors and implements for consumption and use on the large Western farm. These were too large and cumbersome for the average Southern farmer; therefore research men secured data for the specifications of smaller equipment to suit the requirements of the small farmer. The research also helped the manufacturer to realize that most farm machinery must withstand considerable exposure to weather; so wood parts were either wholly or partially replaced with alloys of certain metals to prolong the services of the machinery. Notable examples are the replacement of wooden pulleys with cast iron pulleys and the manufacture of all-steel farm trucks and wagons.

One of the newest phases of farm mechanization is taking place now in the farm home and farm buildings. Utilization of electricity is this new phase. Farmers are now becoming wise to the fact that electricity can have other uses than just for lights and radios. Installation of electric pumps, electric motors, refrigerators, and

continued on page 28
Mr. Shands, originally from Florence County, S. C., was prominent in his class as a student and a singer in the Glee Club. After completing his work in Entomology at Clemson in June, 1926, he attended the University of Minnesota for three years, obtaining his Master of Science degree in June 1928 and continuing his studies for one additional year. While there he held the position of teaching assistant for courses in Zoology and Insect Ecology. This was very helpful to him as the major emphasis in his studies was placed in insect ecology and experimental zoology.

Since July 1, 1929, Mr. Shands has been with the Bureau of Entomology and Plant Quarantine of the U. S. Department of Agriculture. His first assignment (as Assistant Entomologist), which continued until July, 1935 was for the investigation of insects affecting sugar beets; the research performed being with the beet leaf hopper which transmits a virus disease known as curly top of beets. Most of this work was done at Grand Junction, Colorado. The work, however, took him all over Colorado, Utah, New Mexico, and Arizona where intensive studies were carried out.

At about this time he was transferred to Oxford, N. C. to serve as a leader (Associate Entomologist) of the newly-initiated research on insects affecting flue-cured tobacco growing in the field. Although headquarters were at Oxford, investigations of this nature were also be-

gun soon afterward by the Bureau of Entomology and Plant Quarantine in cooperation with the South Carolina Experiment Station at its Pee Dee branch near Florence.

The investigations at both places were both ecological and toxicological in nature, involving essentially the tobacco flea beetle, horn worms, and bud worms.

In June, 1940, Mr. Shands was transferred to the Washington office. He now holds the title of Senior Entomologist, serving in the capacity of Assistant Chief of the Division of Truck Crop and Garden Insect Investigations, Bureau of Entomology and Plant Quarantine. His work in this division includes also that relating to insects affecting tobacco, sugar beets, berries, and greenhouses and ornamental plants.

Mr. Shands was well thought of as a student at Clemson, and he stood well in his classes in Entomology.

We are glad to see him, as an alumnus doing such fine work and forging ahead in his chosen field. It gives undergraduates an incentive to do better work and furnish them a goal toward which to strive.

As the first in a series of features on alumni, we are proud to present Mr. Shands as a brilliant alumnus who has gone far in his chosen field of Entomology.

THE AGRARIAN PRESENTS—

Beginning with this issue, THE AGRARIAN is establishing a new policy and a new method of recognizing graduates of Clemson College. In introducing distinguished alumni, the selections are made at random, and no department or branch of the School of Agriculture will be represented more than another.

It is the purpose of this page to publicize the work of the man or men chosen, to call attention to their achievements, and to bestow the well-deserved praise and commendation which they certainly merit.

We take great pleasure in introducing to its readers, the first in a series of outstanding Clemson graduates who has contributed to progress in the field of Agriculture. THE AGRARIAN PRESENTS—Mr. W. A. Shands.
Limiting Factors In Dairying

BY G. W. BALLEN'TINE, '42

Success in dairying like many other industries, depends upon the farmer’s ability to raise the limiting factors of production and marketing to the highest possible level. Without raising the low factors in dairying the farmer is almost certain to be a failure.

Some farmers who are hard workers and know many of the requirements for successful dairying fail because they do not map out a definite plan of breeding for their herd. As a result of the farmer’s failure to map out a breeding program he will have a herd of low producing cows which eat almost as much feed as a herd of highly productive cows. It takes just as much time, labor, feed, and capital to maintain and operate this herd as it would a high producing herd.

One farmer’s herd of 30 cows produced a yearly average of 4,910 pounds of milk and 340 pounds of fat. He joined a Dairy Herd Improvement Association, which kept records on his cows. The records enable the dairyman to cull out the low producers, and to breed his high producing cows to a proved sire for high milk and butterfat production. In a few years the cows gave a yearly average of 8,265 pounds of milk and 388 pounds of fat. This increased his profit per cow to $96 or $2,880 for the herd per year.

There are many limiting factors in production on the dairy farm. Some ambitious hard working farmers find one or more limiting factors in their farming system and at once set about to raise these factors. In raising one or two low factors of production they overlook other factors; therefore, his effort to increase production is lost because it is not the raising of one limiting factor but, the raising of all the limiting factors in the correct proportion, so that the most desirable interaction between factors in production will give the highest possible profit.

In many instances a young man will inherit a farm which is valueless in so far as profitable production is concerned. The land is poor, the fields are small and rough and it will be almost impossible to get the farm into a highly productive state of cultivation. After working hard for the better part of his life he loses the farm and has nothing to show for his life’s work.

The successful dairyman chooses a farm which is the correct size for his type of dairy farming and which has the essentials for high production. The buyer should investigate all the facts and be certain that there are no limiting factors which can not be economically improved. It often happens that the buyer will overlook one unalterable low factor because of a large number of desirable factors.

To be a success in dairying the farmer must be constantly on the lookout for all the undesirable factors with which he is confronted in his enterprise. When the limiting factors are determined they must be economically raised so that they will give the greatest returns over a long period. When the dairyman is able to determine and eliminate the limiting factors of production, his dairy will be productive and profitable.
March of the Nitrogen Industry

BY S. K. ABLE, '42

"By 1930 the Chilean nitrate beds will be exhausted and the world will face a shortage of fertilizer nitrogen and, consequently, a food shortage that might have disastrous results." So said Sir William Crookes, appearing before the British Association for the Advancement of Science at Dublin in 1898. Sir William literally set the scientific world on its ear when he made that gross misstatement of fact. Not only was he completely wrong, but scientists today say that at the present rate of consumption, the Chilean supply of nitrates will be sufficient for another 250 years. This estimate does not take into consideration the thousands of square miles of undeveloped fields in that country.

It is an ill wind that blows nobody good, and so it was with Sir William's prediction. It served as a stimulus to chemists in developing a practical method of obtaining nitrogen from another source. The very thought of losing 70 percent of the world's supply of nitrogen caused scientist and statesman alike to shudder, for not only are nitrates used in agriculture, but they are essential in the manufacture of munitions.

Chemists had known for many years that nitrogen in the atmosphere could be "fixed", but whether it could be done economically enough to warrant commercial production was the question. Engineers were called in to collaborate with the chemists in changing from laboratory methods to factory methods. Costs of machinery had to be developed, and capital was necessary to bring about the atmospheric nitrogen industry.

In 1902 the first attempt at commercially "fixing" nitrogen was made at Niagara Falls, but it lasted only two years because of the high cost of production. Several other processes were subsequently proposed, tried and discarded, but a few, such as the cyanamid process, were successful enough to warrant continued operation. During this time, two Germans, Haber, a chemist, and Bosch, an engineer, developed a process under the auspices of a large German chemical company that far overshadowed the attempts made by other men. In 1912 an experimental plant was producing 10,000 tons per year. With the shadows of war growing, the German government smiled upon this new industry which would have to produce nitrogen for her war machinery when the time came. Germany succeeded in putting her enemies in a hole when the war did develop, and her commerce raiders began to harass Allied shipping lanes and the loss of nitrogen put munitions production behind schedule.

At the close of the World War every nation became aware of the necessity of producing its own nitrogen. With this in mind, many nitrogen-fixing plants sprang up throughout the world as each country entered the race. Because of this race the atmospheric nitrogen capacity of the world is at present almost twice the annual consumption. This enormous capacity of 3,600,000 tons has been achieved in the last twenty-five years!

During the World War the United States was made a victim of the Chilean nitrate monopoly. Prices soared, doubled, trebled and quadrupled. In our two years of war we paid Chile $328,000,000. Even the $127,000,000 invested in the Muscle Shoals Plant failed to produce one ton of synthetic nitrogen. These enormous losses evidently awoke America. By 1928 this country had become independent of Chile. The capacity of American plants now in operation is estimated to be in excess of 540,000 tons annually. This is 165,000 tons more than the peacetime requirement and 15,000 tons more than the estimated wartime requirement.

Due to the fact that the Southern tobacco and cotton farmers are the greatest users of nitrogen, ninety percent of the industry is located south of the Mason-Dixon line, but for a long while after the introduction of this form of nitrates to agriculture, many farmers were dubious and continued to use the old form. Industrial organizations using nitrogen, however, were not so wary and the old form of nitrogen has practically disappeared from the market.

The march of the chemical industries southward, continues. The rayon industry, the soda ash industry, the paper industry, and their smaller, but no less important, brethren led the way, and now the atmospheric nitrogen industry is also on the bandwagon. The modern industrial south is also the modern chemical south.
Designs In Pig Brooders

BY E. L. McKESSON, '41

The United States leads in pork production by producing twenty percent of the world’s supply. Since electricity has been made available to nearly all farms by the power companies and the R. E. A. high lines, the farmers are turning to the use of electricity. Everyone knows that electricity makes work easier, cleaner, safer, and cheaper, and now the rates are within reason; therefore, the farmers are letting electric current help in every way possible.

Farmers have found that the only way to make money with hogs is to see that they farrow twice a year. The way to get the hogs on market when the prices are at the peak is to have the sows farrow in February or early March. The optimum temperature for pigs is 50 degrees F. to 60 degrees F. but in many states the temperature is far below this; therefore some type of artificial heat has to be supplied.

The first type of artificial heat was supplied by lanterns and small stoves. The most efficient fuel which was uniform continuous and gave less danger of fire than wood was oil.

Next an electric lamp was hung in a corner so the young pigs could gather beneath. This idea developed into our lamp type brooder. The two most used types of brooders today are the lamp brooder and underheated brooder.

There are a number of advantages of these brooders. Some of these are:

1. Distinct saving of labor
2. Reliable automatic heat control regardless of changes in the weather.
3. Electric heat does not use up oxygen of the air or give off fumes.
4. Reduces mashing of young pigs by their mother.

5. It will save a larger number of pigs and in this way the farmer will be able to get more hogs on markets when the price is high.
6. More economical, as it reduces the number of sows to feed if sows can farrow twice a year.
7. There are no fire hazards.

There are two types of brooders in use now. The lamp brooder is nothing more than a triangular box well insulated and equipped with a 150 watt to a 200 watt bulb with a reflector of a diameter of eighteen inches. It has a definite advantage as this type gives off Ultra-violet rays. This ray is necessary as it helps to ward off colds. Many days are dark and dreary, and this helps as a substitute for the sunshine when it is not available.

The other type of brooder is the underheated type. It is a thermostatically controlled heating element housed in a galvanized pan which is placed on the floor of the brooder. The heat is distributed over the floor.

An experiment was run by T. E. Hinton and J. M. Fore, of Purdue University, on these two types. The underheated consumed nine kilowatt hours for four days and twenty-five kilowatt hours for fifteen days. The lamp reflector used 22 kilowatt hours for a seven day period.

An experiment run by Oregon State Agricultural College found a real significance with pigs farrowed in March. Twelve sows and their litters were raised in eight weeks when using an electric pig brooder. Those pigs weighed an average of 29.5 pounds each at 56 days of age and those not so raised (without a brooder) weighed 25.2 pounds each. Another experiment run by the University of California in 1935-36-37 showed that pigs lost for the first ten days averaged 29 per cent in regular farrowing pens when no heat was supplied. North Dakota reports a loss of 30 percent and Nebraska reports on 159 litters showed that mature sows raised only 60 percent of the pigs farrowed. For the same years underheated brooders were used on nineteen litters in California with a loss of only 15 percent, and a lamp type, where heat and light were both supplied, lost only 13 percent.

A report received from Purdue University by T. E. Hinton showed that 41 pigs in houses with heaters gained 0.318 pounds per pig per day while 20 in unheated houses gained only 0.259 pounds per pig per day. This shows 8.1 percent more gain per day per pig over those of unheated houses. At weaning time (57 to 70 days) 39 pigs farrowed in the heated house gained .420 pounds per day per pig while pigs farrowed in unheated houses gained .345 pounds per day per pig. This shows 8.5 percent more gained per day over the ones farrowed in an unheated pen.

Therefore, pig brooders not only help to get hogs on market when the prices are high, but they lessen the losses of pigs for the first ten days by 50 percent.
Alpha Zeta Holds National Meeting

BY W. M. Hobson, '42

Two agricultural students while attending Ohio State University realized the need of a more friendly relationship in the promotion of the agricultural profession. These two students, C. W. Burkett and J. F. Cunningham, conceived the idea of a fraternity composed of outstanding students in agriculture. It was to be neither a social fraternity nor primarily an honorary fraternity, but it was to be a service fraternity designed to promote the advancement of the science of agriculture. The outgrowth of these ideas by Mr. Burkett and Mr. Cunningham was the founding of the first chapter of the Fraternity of Alpha Zeta on November 4, 1897. From this meager beginning, the Fraternity rapidly grew into an outstanding national organization.

There are now 16,000 members from 44 chapters located in 42 different states. The South Carolina Chapter of Alpha Zeta installed on April 19, 1930, was the 38th organization chartered.

To solve problems which naturally arise in this large organization, and to insure a closer and more friendly relationship among the chapters, a convention, The Conclave of Alpha Zeta, is held every other year. These conventions are attended by the members of the High Council, the two co-founders, and one official delegate from each chapter. The active Alpha Zeta member representing each chapter is selected from the Junior Class.

The writer of this article was the delegate from the South Carolina Chapter to the 19th Conclave which convened in Chicago from December 30, 1940 through January 2, 1941. This delegate arrived in the Chicago bus station well preserved—in a refrigerated state. From the bus station, he found his way to the Stevens Hotel, headquarters for the Convention. There south met south, yet one south was north. Yours truly was assigned to share a room with the delegate from South Dakota.

Before launching into the business part of the meeting, the first afternoon and evening were devoted to the pleasant task of becoming acquainted. East met west, north met south and soon all were the best of friends.

In every phase of the program, social or business, promptness was one of the noticeable characteristics. At thirty seconds before each time of convening, the High Chancellor would be seen with a watch in his left hand and the gavel raised in his right. Promptly on the hour, the gavel met the table and the Conclave was again in session.

The business was conducted in a very democratic manner similar to that of a well organized legislative body. Any one of the forty official delegates had the right to the floor to either present or discuss a proposal. All proposals were referred to various committees who studied them and submitted a written report. The future activities of the fraternity are determined by these committees.

As 12:00 midnight December 31, 1940 approached, business of any description was the least of the delegates concern. Most of the delegates left the hotel en masse to inspect the downtown area of Chicago. Soon the boys were so hopelessly lost in the rush of the crowd that no two returned to the hotel together. Chicago certainly royally introduces in the New Year!

Among other recreational and social activities, the delegates were treated to a banquet, a luncheon, and an ice hockey game. At the ice hockey game, they witnessed a free-for-all involving the players of both teams, the referee, and several spectators and cops.

The Conclave was deemed a success and all the delegates were complimented for their splendid work.

It is the duty of each delegate to return to his chapter and to interpret all actions of the Conclave to the chapter and see that these actions are abided by. The South Carolina Chapter, since hearing the report from the delegates, has launched an even more active program than it has previously followed in promoting the science of agriculture in South Carolina and in obtaining a more friendly relationship among students and faculty members at Clemson.

The AGRARIAN

Soil tillage is vital if maximum economic yield is to be derived from the land.

The AGRARIAN

"The farm must be made a place of beauty so attractive that every passing stranger inquires, 'Who lives in that lovely home?'"—Dr. Seaman A. Knapp.
4-H Delegates to Raleigh

The executive committee of the Clemson 4-H Club represented the local chapter at the Tri-State Intercollegiate 4-H Club meeting held in Raleigh, February 15. Members making the trip were Bill Derrick, G. W. Jones, K. J. Bodie, and Ben Leonard. Plans were made for the outing to be held at Camp Long the week-end of May 17.

The 4-H Club is taking steps to be actively represented in the Agriculture Fair to be held in March. Pruitt Agnew has been made chairman of the committee to exhibit the purposes and the activities of the 4-H club.

Ag Engineers Get Work

Since its foundation in 1934, the Agricultural Engineering Department has had sixty men to obtain their B. S. degrees in that field. Only one man of this number is not employed at present. Graduates have followed various lines of work, the majority being engaged in sales, service and advertisement of farm machinery. Others have gone into private business, extension work, conservation work, teaching, selling fertilizer and a number of other lines of endeavor. Eighteen students will be awarded degrees in agricultural engineering in June.

Dairy Club

Guest speaker at a recent meeting of the Dairy Club was Hugh Roberts, regional agricultural engineer for the Portland Cement Association. Mr. Roberts’ subject was the history, uses and general properties of cement. After the talk, he held an open forum discussion in which he answered questions from the audience. Agricultural engineers were guests at the meeting.

Judging Team

About eleven boys are trying out for the judging team. Those selected will go to VPI in April. This will be the first trip of the new team. The boys trying out are being given instruction daily by the team’s coach, Prof. Ed Hauser.

Ag. Men to Meeting

A group of men from the Clemson Agriculture Department attended the Southern Agriculture Meeting in Atlanta, February 5, 6, and 7. A large number of agriculture teachers, experiment station and extension department men presented papers.

Kappa Alpha Sigma

Professor Robert E. Gee, of the Chemistry Department, and Dr. Gilbeart H. Collings, of the Agronomy Department, have been speakers at recent meetings of Kappa Alpha Sigma, agronomy society. Besides presenting speakers on technical subjects, Kappa Alpha Sigma each year gives a social for its members. The club is also taking steps to assist in the Ag. Fair.

Alpha Tau Alpha Taps Seniors

Five vocational agricultural education seniors were recently accepted for membership in Alpha Tau Alpha, national honorary fraternity for agricultural education students, announced C. C. Jackson, president of the fraternity.

Those seniors being initiated were: E. C. Jackson, Starr; E. F. Bennett, Vance; D. E. Brazell, Blaney; L. C. Hicks, York, and R. M. Hendrix, of Greer.

Two vice-presidents of the fraternity graduated at the end of first semester and at the last meeting C. K. Hollingsworth, of Greenwood, and C. M. Eaddy, of Hemingway, were elected to fill out their unexpired terms.

Civil Service

Agronomy seniors are making preparations for the Civil Service Examination to be held March 8. The position offered is that of Assistant Agronomist. The junior agronomy students also stood a Civil Service examination recently.

Two mid-year graduates in Agricultural Education have secured positions nearby. R. F. Wheeler, of Saluda, is teaching vocational agriculture at Central, and W. C. Stroud, of Richburg, is doing DHIA work for the Dairy department.
FURROWS

Ag Fair Plans

Fair Chairman Marshall E. Walker recently announced that the Agricultural Fair will be held here March 22 and 23. The fair is being sponsored and presented by students in all departments of the School of Agriculture. All buildings of the School of Agriculture will be turned over to the fair and many interesting and educational exhibits will be presented.

Other members of the executive committee are: T. E. Garrison, assistant manager; J. J. Lever, H. W. Hollis and Ben Leonard, promotion; L. C. Martin, E. P. Huguenin and W. M. Hobson, finance; F. M. Kearse, H. G. Way and R. C. Wiggins, exhibits, and P. D. Seabrook, secretary treasurer.

Future Farmers Elect Officers

Members of the Clemson College chapter of the FFA recently elected the following new officers: C. M. Eaddy, President, D. C. Herlong, vice-president and W. L. Brunson, treasurer. Other officers elected were T. H. Caldwell, treasurer, C. K. Hollingsworth, reporter, and O. H. McKagen, parliamentarian.

The program at the last meeting featured Dr. D. W. Daniel, Clemson’s ambassador of good will, who was at his entertaining and informative best. During the business period, plans were made for a social which will be held in March.

Horticulture Club Sees Films

At a recent meeting, members of the Horticulture Club and the professor of the entomology and horticulture departments were entertained by colored films showing the habits of the codling moth and the Japanese beetle. Mr. Joe Webb, a Clemson graduate now with the Georgia Department of Entomology, explained the pictures. The second portion of the program was conducted by Dr. D. R. Jenkins. Dr. Jenkins’ subject was New Zealand and Australia. He is a native of Australia and presented some interesting facts about the continent “down under.”

ANNOUNCEMENT OF FIRST ANNUAL CLEMSON HORSE SHOW

The first annual Clemson Horse Show will be held at Clemson College, Saturday night, March 22 at 7:30 P. M. This show is being put on in connection with the Clemson Ag Fair which is to be held Saturday and Sunday afternoon March 22 and 23. A well rounded program has been planned including ten horse classes and several novelty acts. The exhibitors will compete for trophies and ribbons, and James V. Robinson of Greenville will be the judge. The Clemson Horse Show is planned as an annual event and is being sponsored by the Clemson Animal Husbandry Club. Entry blanks are being prepared and will be sent out to all horsemen in a few days.

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Manufacturers

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Forage For Poultry

By E. R. Huguenin Jr., '42

One of the biggest and more obvious mistakes made by South Carolina farmers in poultry management is not providing sufficient space for the growing of grazing crops. Green forage is one of the most economical of all feeds, whether for hogs, hens, or cattle. Very often the laying and brooder house are squeezed in between other buildings without proper consideration being given to spacing of buildings or room to plant a green forage crop. Another very common mistake is locating the house and yards on land that is too wet for the best sanitary practices and unsuitable for a growing crop.

Chickens, turkeys, ducks and geese are natural consumers of a large amount of roughage, and the cheapest and easiest way to provide this is to allow them to have free range over a growing, green crop, grass or legume. For this reason poultry yards should be located on well drained fertile soils which is suitable both for the chickens and their grazing. The yards should be large enough to furnish a reasonable amount of roughage over a considerable period. This would require about one acre for every five hundred pullets during the growing season and one acre for one hundred hens that are laying. Turkeys and geese require more green feeds than chickens and so require a wider range and a greater variety of grazing material.

Modern poultry husbandry men recognize the high nutritive value and sanitation benefits to be derived from a satisfactory green range. Succulent green feed from grasses and legumes is one of the best natural feeds and if it is lacking in the poultry ration it has to be made up by expensive feed supplements.

The green fast growing range is an economical source of proteins, minerals, and vitamins, particularly vitamins A and G which are especially necessary in a poultry ration.

Green feeds also have advantages other than nutritional in that it tends to keep the birds busy and content. It may help to prevent feather pulling and cannibalism in growing chickens and laying hens. For these reasons it is vitally essential that poultry should have access to green forage at all times. To supply this for baby chicks, the yards and houses should be arranged so that both can be moved each year so as to minimize the dangers of infectious diseases. This range should supply shade as well as food for baby chicks and pullets.

Among the many grasses and legumes that can be grown in South Carolina a few possess qualities that make them especially desirable for poultry. Permanent sod-forming grasses and legumes together with quick growing plants, both grasses and legumes may be used to provide a suitable pasture through the entire year.

The most important factor in providing a good grazing crop is to have a rich soil well balanced in soil nutrients. Generally this can be obtained by applying one-half to one ton of superphosphate to every acre. Under ordinary conditions this should give excellent results. When crops are closely grazed, application of fertilizer containing readily available nitrogen will be beneficial. If a top dressing is used the poultry should be excluded until a rain has cleaned the forage of the fertilizing material.

Congratulations

The field house is finally nearing completion and The Agrarian extends its heartiest congratulations to Coach Frank Howard and his staff for their fine work and the new acquisition. Members of the fairer sex who come to Clemson dances will be more than glad to know that rooms are provided for them. These rooms will be used for members of visiting teams also. Lounges, dressing rooms and a canteen go to make this a complete unit.
Low-State Erosion

BY CAROL M. EADDY, '41

The need for Soil Conservation in lower South Carolina has, until recently, been more of a paradox than a reality. Farmers have not been made to realize the paramount importance of conserving their soil, their most prized and irreplaceable possession. So far they've failed to attach the proper significance to an old but true statement, that an ounce of prevention is worth a pound of cure especially when applied to soil erosion. When applied to the irreparable effects of soil erosion, the value and benefit of purposely waiting to learn through inference and observations of one's own soil may be said to be comparable to the value of a farmer engaging a veterinarian after his horse has died.

It therefore seems needless to say that when applied to the farm, especially the soil, the cost of learning by allowing the destructive forces of soil erosion to work freely far exceeds the benefit received therefrom. Knowledge is costly, but experience is priceless. The fallacy of the farmer to gain knowledge of soil erosion through the teachings of his experience is as foolish as the idea of a swimmer diving into a pool that contains no water. Why have not the farmers been made to realize, as they have in the Piedmont, the necessity and importance of avoiding such useless experience, and the need for protecting this land against these merciless forces of erosion?

A suggestive reason is that it may be attributed to the lack of emphasizing the total annihilation of the soil resulting from free soil erosion, especially sheet erosion, which is the predominant type in the lower part of the State. Paradoxical as it may seem, it is a mystery to many farmers why their soil becomes poorer from year to year. And although other attributes must be recognized at this point in claiming a share of the causes of this approaching annihilated condition, sheet erosion may justly be credited as being responsible to a notable extent.

Another reason why Low-State farmers fail to realize, before it is too late, the desperate condition of their soil so cunningly produced by sheet erosion, is the subtle way in which this type of erosion works. It carries in its subversive wake, deception and concealment. As long as it remains as sheet erosion it ingeniously precludes all reason for the farmer to be alarmed. At the same time the most widespread and worst type of erosion in existence is gradually but surely and most effectively removing from the land its precious and priceless top-soil.

This useless devastation of farm land must be reckoned with immediately. Little do we realize that the soil, "Our Heritage," cannot be replaced. There is no substitute for it. Once lost, it is definitely and forever irreplaceable. Yet, those of us in the lower part of the State seem to be too busy gaining a livelihood from our soil to concern ourselves with such an insignificant matter as erosion control. That is a comparatively new term to us. We have not needed it before, why should we need it now? We just have the advantage over those who choose to live where erosion is more serious. What reason have we to regard it as being serious when we are unable to observe any apparent effects of deterioration. If it is easier and more convenient for us to run our rows straight and on a down-grade, we'll do so. A little sand or silt may wash down some rows, but what does that matter, it's not enough to make a big difference.

To the farmer who believes there can be logic for such disdainful and preposterous reasoning, may his crude, ignorant, and pathetic way of thinking be somehow influenced to the contrary; perhaps by some free but competent advice or by merely observing soil that has been destroyed by erosion. If this does not convince him and cause him to change his way of thinking, he will be left in the hands of fate, and fate, itself, will take the critical step towards proving to him how exceptionally wrong he was.

It has often been said that experience given away is seldom appreciated, and so it is with advice. Therefore, when a farmer completely ignores the free and authoritative advice concerning soil erosion, regardless of what happens to his soil, he alone is responsible.

It has been sedately said that the largest room in existence is the room for improvement. Could any statement be more applicable to the present prevailing condition of our soil from an erosion standpoint?
Green Manure Crops

By R. N. Gleason, '42

A green-manure crop is any crop grown and plowed under while green for the purpose of improving the soil, especially by the addition of organic matter. These crops affect the supply of plant nutrients, and improve the physical condition of the soil, which is important in erosion control.

Nearly all the organic matter in the soil has as its source decayed plant material. The roots of plants is the greatest source; however, stable manure and green manures have been used to supplement this source. Many conditions affect the amount of organic matter that actually accumulates from the decay of these materials.

A large part of the plant material disappears during decay as carbon dioxide. It has been found that on sandy soil in a hot climate, the conditions are unfavorable to the extent that the loss may be so excessive that no permanent addition to the soil organic matter is made even by turning under a heavy green-manure crop.

When a single green-manure crop is turned under, no very large addition to the soil organic matter can be expected. If a crop that will yield a ton of dry matter per acre is turned under, only about one-half will become a part of the humus because the other half is quickly lost as carbon dioxide or in other ways. If 1000 pounds were added a year, 40 years would be required to double the organic matter in a soil that contains 2 percent of organic matter (40,000 pounds per acre) in the surface soil. This illustration points out that the main object of green manuring must be to maintain rather than to increase the quantity of organic matter in soils.

Both legumes and non-legumes are used as green-manure crops. Legumes add both organic matter and nitrogen, whereas non-legumes add organic matter only. Such a crop as rye or sorghum will supply more bulk than a legume. This fact is one to be considered, because from the standpoint of maintaining organic matter of the soil, bulk is of first importance. Non-legumes contain a lower percent of protein and a higher percent of carbohydrates than legumes. When non-legumes decay, a large amount of energy is formed. However, the bacteria responsible for decay requires an excess of nitrogen. Non-legumes often fail to supply this nitrogen, and the bacteria use the available soil nitrogen, which causes failure of the following crop. It is not uncommon for this to happen when a nearly ripe crop of rye is turned under. A legume crop, on the other hand, containing a higher percent of protein and a lower percent of carbohydrates carries with it more than enough nitrogen for its decay, and this excess becomes available to the following crop.

The amount of nitrogen added when a legume is turned under depends on the kind of legume, the thickness of the stand, and the stage of growth at which the legume is turned under. The top part of a legume plant has about twice as much nitrogen in it as does the underground portion. When turned under as green manure, a legume adds to the soil only the amount of nitrogen it has taken from the air.

There are other factors determining the crop to be used for green manuring besides the amount of organic matter and nitrogen. One of these is the time when they least interfere with the regular cash crops. In the South, winter cover crops are used and turned under in the spring as green manure.

Each user of green manure crops should bear in mind the fact that when large quantities of green organic matter are turned under the soil, some time must be allowed to elapse before planting a succeeding crop. This lapse of time avoids injury by decomposition products to the seedling of the crop to be planted.
Beyond the Horizon...

Each new year brings a new horizon, beyond which are concealed the realities that materialize or shatter our hopes, our dreams, our visions. It is this mystery of the future that adds zest to living and spurs man to new achievement.

In 1837, John Deere caught a vision of a better plow to turn the stubborn soils of the new west. He dreamed, he hoped, as his anvil rang day after day, night after night. Success greater than his fondest hopes lay beyond the horizon for John Deere, the blacksmith of Grand Detour.

Today, the great organization that bears his name looks forward to new horizons, to new achievements in the creation and perfection of equipment that makes life easier and more profitable for the man who tills the soil. Its twelve great factories with thousands of men, and its sales organization that spreads around the world are a living tribute to the man who saw beyond the horizon of 1837.
Oddities of Agriculture

BY EARLE C. TRUETT, JR., '41

Did you ever stop to think that a one-cent postal card may bring to you from your agricultural college publications worth hundreds of dollars toward better farming?

Over 4,000,000,000 feet of lumber and timber products will be necessary to fill the requirements of the National Defense program during the next 17 months.

We should also say, blessed are the terrace makers because they shall be called the saviors of the soil.

Did you ever see a field walking? Well, you’ve seen it running down muddy streams, and that’s more frightful.

Wise land use has a moral and spiritual value. Soil conservation gives new life to rural communities and their churches.

Did you know a cow requires about an hour to eat enough grass, and regrind it suitably for assimilation to produce one quart of milk?

It is estimated that if a laying flock is to make a reasonable labor income for its owner, the hens should lay an average of at least 150 eggs each year.

It is true that good farm buildings are another thing that don’t grow well on poor land.

Damage to cotton bales, unprotected from the weather this winter, estimated at $5.00 per bale, will cost the Southern farmers a lot of money, practically all of which could be saved.

In the book of successful farming, there will be many legume leaves.

When the farmer’s dollar goes to town, businesses pick up, wages rise, jobs are created, and dollars multiply.

Just a little traveling on the Great Plains of the west makes you realize how blessed is a land like the Southeast with ample rainfall.

Because hogs do not perspire, they suffer from heat more than other domesticated farm animals and therefore need plenty of shelter and fresh water.

Two good reasons for painting are: It adds beauty to the building, and also paint gives protection from weathering and this adds permanency to a structure.

Rotten manure, entirely decomposed, makes a swell mulch for the bed of perennial flowers after the stalks have been cut and removed.

The strangest experiment directed toward the alleviation of the boll weevil menace is to be seen at the Delta Experiment Station at Stoneville, Mississippi. Weevils take to their heels in consternation as a gadget with bells on it is started to jingling. The affair is built so that when a small motor is turned on, a bell is hit swiftly by rotating clappers, making a long jingling noise.

There are more students in the colleges and universities of the United States than in those of all the rest of the world put together. Americans are by far the best educated, best housed, best clothed, best fed people in all the world. May it ever remain the home of the free and brave.

High quality and low prices are never found together in the same bag.

A new vaccine for hog cholera contains no disease producing virus and does not require the costly serum dose.

Farm population has increased two million in the last decade.

Germany has grabbed Jersey, Guernsey, and Holland the home of the Holstein. After the war Europe may have to come to the U. S. to replenish its stock of purebreds.

In the first draft of Stephen Foster’s immortal “Old Folks at Home” he used the name “Pee Dee River”; therefore the Pee Dee almost became world-famous.

Cotton farmers of S. C. should be congratulated on producing a 372 pound average on 1,235,000 acres. It took not only ideal weather but mighty good farming for the South Carolina cotton growers to make this amazing record.

Pruning can be done any time from Nov. to April. Tools ready?

Oyster shells supply chickens with calcium—but they’re not a substitute for grit. They quickly dissolve in digestive juices, and have little, if any, grinding value.

M. L. Wilson, a director of Extension work says, “Food and nutrition are very vital things in defense and war activities.”

I’m just beginning to learn that I can use my land for profitable production and conserve it, too.
We all should agree that whoever saves a field from erosion’s frightful waste is doing a service to posterity.

There are millions of acres of idle land in the Southern States that should be producing at least 250 board feet of pine timber a year.

Sad but true—the only running water in many farm tenant houses is that which runs through the roof when they leak.

A pathetic little feature of the coming winter rains is the huge amount of soil that will go down the creek from fields not protected by terracing and other soil-conservation practices.

Americans eat an average of about 1440 lbs. of food per person annually, or nearly 4 lbs. a day.

A woodland pasture is a rather poor woodland and a mighty poor pasture.

Many farmers could send their boys and girls to college on dairy cows, if you get what I mean.

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Slogan for 1941 farming: Make the farm feed the family.
AG. FAIR PREVIEW
continued from page 13

novelty events). There will be ten horse classes and six novelty events.

The horse classes will be as follows: (1) Amateur Three Gaited Horse Class, (2) Horsemanship Class, (3) Five Gaited Class, (4) Road Hack Class, (5) Walking Horse Class, (6) Young Ladies Horsemanship Class, (7) Gentleman Amateur Riding Class.

The Entomology Department will have a most educational exhibit. All of the insect pest and wild life of South Carolina will be shown. Different means to combat pests will also be demonstrated.

Dr. Lease will have a complete array of crystal vitamins and their functions in the human and animal body.

Due to incomplete plans the Agricultural Education Department has not announced the nature of their exhibit.

We, the Agricultural and Educational students of Clemson College, present this Ag Fair to show you the progress we are making. Come out, have a big time and see what young South Carolinians are doing.

FARM MECHANIZATION
continued from page 13
electrically wired fences has, to a large degree, taken drudgery and labor out of farm tasks. New 1/4 to 1/2 horsepower electric motors are being used on the farm for grinding small grains, with power lathes and saws, and for operation of ventilators in barns for curing hay.

Farm mechanization has come a long way; but it still has far to go. The Southeast is the least mechanized section of the country as to farm machinery; but it, too, is rapidly advancing in all phases of power farming, because it has learned that cheaper and greater production per acre means greater net returns.

Many of our farm people will sleep much better because of the cooperative mattress making program throughout the South.

Limestone and phosphate is a powerful grass growing team, according to agronomists.

A million matches may be made from one tree but one match may destroy a million trees.
Soil Acidity and the Southern Farmer

BY L. C. HAMMOND, '42

The southern states make up one of the poor sections of the United States. Why is this statement true? There are many and varied factors which contribute to the general poverty conditions found to exist among a large percentage of the farmers of this section. Erosion, promoted by the climatic and topographic features plus the general ignorance and careless of the farmers, has removed the soil upon which our grandfathers made an abundant living. The one crop system of farming has depleted the soil of its fertility and organic matter and has promoted an acid condition. Because of the poor soil, physically, biologically, and in quantity of available nutrients farmers have been forced to use some commercial fertilizers. Without their use in some areas the farmer would hardly be able to obtain a bare living.

In the South the soil acidity problem is receiving much attention. A test of over two and one-quarter million soil samples taken from all over South Carolina revealed that seventy-five percent of the cropland is too acid for a farmer to obtain an adequate profit from his occupation. Only about twenty-five percent of the farmers in this state are making a fair profit and, generally speaking, these live on the twenty-five percent of soils which are not extremely acid. In recent years, pioneers in this field have labored to promote the use of lime to partially correct this acid condition of the soil. The farmers, however, and even a few agricultural leaders have been slow to recognize the profit to be reaped from its use. In many other states more lime is used than in South Carolina, even where their soils are derived from limestone and other basic rocks. Most South Carolina soils being derived from acid rocks need relatively more lime.

The southeastern states are highest in the total consumption of commercial fertilizers. Superphosphate is used in great quantities either alone or in mixed goods, yet there is commonly a comparatively unequal crop return. The crop apparently does not obtain a sufficient amount of this fertilizer element even though large quantities are applied to the soil. Plants must have phosphorous. Animals must obtain phosphorus from the plants which in turn must get their phosphorus from the soil. A deficiency of phosphorus is shown by the plants becoming very dark green in color, and their failure to make necessary root growth.

The reason for plants not showing a corresponding response for the amount of superphosphate used, can be attributed to the presence of soluble iron and aluminum in the acid soils. These compounds cause the superphosphate to revert into a form which is unavailable to the plants. For many years farmers have been spending money on a costly product used to precipitate the iron and aluminum when a cheaper product, limestone, should have been used. This does not mean that no phosphate should be used. Probably more should be used, but to supply a sufficient quantity to be absorbed by the plant, lime must be used to precipitate these toxic elements. The pH of the soil should be maintained between six and seven for the plants to be able to absorb the maximum amount of phosphorus. The lime, besides precipitating the iron and aluminum by raising the soil pH, has another function furnishing calcium, which reverts the superphosphate to the form more readily available to plants than if the iron and aluminum were allowed to revert to superphosphate as is the case in acid soils.

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National Defense and Vocational Education

BY S. K. ABLE, '42

To many residents of agricultural districts, as in rural South Carolina, the defense program of the United States is an abstract quantity which affects them remotely. They are anxious to serve their country, but feel that their capacity is limited because of lack of training and the absence of defense industries in their district. However, in the vast program now underway in America there is a place for everyone. Each citizen has allotted to him a place for service. His duty is to find that place.

To assist the citizen in finding his niche, the government has set up an organization whereby every citizen in the community may have a part in the preparedness program.

One of the most serious bottlenecks that has occurred in building up this nation’s defense is the shortage of skilled labor. To overcome this shortage, “Pre-employment Courses for Defense Training” have been set up under the direction of the State Board of Education. Under this department, the local teacher of vocational agriculture has been made the organizer and supervisor in his community. His job is to prepare a course of study, secure competent instructors and maintain high standards of learning. He also has the responsibility of obtaining the approval of the local school authorities, securing classrooms and checking the available tools.

A number of courses of instruction are offered. Among them are the operating, servicing and repairing of motor vehicles, metal work, woodworking, elementary electricity and related subjects. These subjects are the ones in which a shortage has occurred or will occur in an emergency. The organizers do not attempt to make artisans in the short time given to these courses, but do try to present a thorough, basic knowledge of the subject from which foundation the trainee may advance to the more complicated vocation. In other words, these courses of study are introductions to advanced work.

When the teacher of vocational agriculture completes his outline of the course and gets it approved, he looks about for a competent instructor. This instructor is a specialist in his field and the training he gives is practical in its application. He is employed in the field in which he expects to teach and obtains a leave of absence from his employer. The government pays him a salary during the period of instruction.

Who is eligible for participation in the pre-employment courses for defense training? The application must be an “out-of-school” boy, of high mental caliber and good moral character. He must be industrious, because the greater portion of instruction is actual work on the subject being studied. For example, in the course on motor vehicles, the class will take the vehicles apart and rebuild them. Repairs must be made on the various machines. So we see that to take advantage of this program, the participant must be willing to toil and sweat, but he will gain practical knowledge and experience which will prove invaluable to him in later life.

This great program that has been so recently inaugurated is a character building program as well as a defense program. It was conceived by and is being carried on by patriotic men who deserve great credit for their untiring efforts in its behalf. These men are serving without pay, shouldering their increased burden without flinching. Their efforts will be rewarded not only by a better defended America, but by an America better prepared to weather future storms because of stronger characters and citizens better prepared to take their useful place in the community.

“The soil is good to be born on, good to live on, good to die for, and good to be buried in.” James Russell Lowell.


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SOIL ACIDITY AND THE SOUTHERN FARMERS
continued from page 29

The farmer must face the problem. Many are working and studying to help him, but he must do his part. Crop yields are decreasing and yet a great percentage of the farmers day-dream and slip further and further into utter poverty and ignorance. Living standards are already low as costs to grow crops frequently exceed returns. Poverty results in crime, disease, and poor health.

What should be done? The cropping system must be changed to control erosion, soil must be properly cared for by the addition of organic matter and lime, and fertilizers must be used as needed. The use of lime will solve many problems which have resulted from soil acidity. Dr. G. H. Collings, Professor of Soils at Clemson College, says, "For the Land's Sake, lime!"

Of course the farmer cannot expect all his problems to fade with the use of lime. This is only one of the controllable factors which the farmer can take in hand and by so doing make his profession more successful. Some farmers have chosen their farms unwisely and are now tied to a farm on which no one can make a profit, and on which he is doomed to slave his entire life for a bare living. Many farmers in the southeastern states live on such farms, however, the majority live on farms which can be greatly improved through the proper use of lime and fertilizer.

The Greek gift-horse idea still works. The budding dictator always seems a deliverer if he offers something for nothing.

People may be grateful; but if you aren't the kind of person they naturally like gratitude can't make them like you.
BIRD BANDING AT CLEMSON COLLEGE
continued from page 11

land Yellow Throat, Meadow Lark, White Eyed Vireo, White Breasted Nuthatch, Coot Baltimore Oriole, and Ruby Crowned Knight.

Larger birds of which no repeats have been sent to Washington are Mallard—9, Black Duck—3, Great Horned Owl—1, Black Vulture—2, Copper Hawk—1, and Red Tailed Hawk—1, Making a grand total of 6,468 birds of 58 species. Returns sent to Washington total 374 and are of 18 species.

This list of species leaves a lot of gaps to be filled to make any approach to the list of birds that have been observed. The land birds, not Passerine, seen at Clemson number 37. The Passerine group observed total 108. Of this latter number 33 are Warblers. They are not attracted to the ordinary baits of bread crumbs and corn used in catching those birds listed, but are drawn by rippling water. This calls for quite a setup and we have not made any special effort to catch them as yet.

The usual bait is bread crumbs and scratch feed, as most of the common birds will come to this bait. The cardinals, however like cracked corn and the sparrows, chicken mixtures. Most of the birds, especially the wrens and the sparrows come again and again and do not seem to mind being caught. The presence of the traps seem to encourage the numbers of birds in their immediate vicinity, drawn of course, by the supply of food. We have not been banding long enough to present any conclusions derived from the date obtained, but hope to do so at some later date.

CHOOSING A FARM
continued from page 12

on such land into conditions of poverty. Poor, eroded and steep land cannot be combined with good factors to obtain the most desirable living. If the soil is lacking in any essential of fertility, physical properties, or biologically, the returns will not be as good as they would otherwise be. The farmer should observe the growing crop, which will help to determine the productive capacity of the soil. No farm should be purchased until the farmer, through a thorough study of the soil depth, drainage, susceptibility to erosion, and its content of lime, phosphorus and other fertility elements, is sure that with good soil management and good farm practice he will be able to bring the producing capacity of the soil high enough to combine with other good factors to make a desirable farm on which to live.

Poverty conditions and failure are sometimes the result of an insufficient amount of acreage in the farm. A farm which is too small for the introduction of labor-saving tools causes the farm laborers to compete vainly with the more productive labor of farmers who are better equipped. The farm should be large enough to keep the farmer occupied throughout the year. Where specialized crops are grown such as cotton the farmer is idle throughout the winter months. The managing ability of the farmer, is also very important in considering the size of the farm.

The prospective buyer will receive his first impression when he sees the farm house and the surrounding buildings. Usually these will serve as an index to the success of the previous farmers. This is not always true, however, because some farmers are better managers than others and may have a greater appreciation for a beautiful house and for good barns and other buildings. Other farmers have spent a fortune at the outset on a good house and barns, but have treated the farm in such a way that the productive capacity is no longer high. The increased outlay of cash necessary to bring a dilapidated house, surrounding buildings and landscape into desirable living conditions must be considered by the prospective buyer. If a good home is found in a community where all homes are painted, up-to-date, and well kept, this is a good indication that the community is a thriving one.

Prices on farms are sometimes not the real value, but are speculative. A farm bought at a speculated price may be in such an area where the real value is low and the farm cannot be sold again thus forcing the farmer to live on the farm for the rest of his life. Many farmers have been tied to an unproductive farm where they have slaved their entire life and yet have been unable to approach a desirable living.

Experience and some knowledge of farm management, an understanding of the principles of plant growth, feeding and care of animals and the maintenance of soil fertility are valuable assets to the person selecting a farm. The farmer should consider all these factors and be absolutely sure that he is not buying a place on which there is some hidden factor which will cause other favorable features to be of no value in producing a desirable living for the farm family.
AIM OF VOCATIONAL AGRICULTURAL EDUCATION

By TAFT SHERMAN

The main aim in Vocational Agriculture is to teach or train present and prospective farmers for proficiency in farming. We should not only be interested in one farmer, but the community as a whole. The development of the individual is another important objective. Each individual should be interested in his practice program, and he should make it his point to learn something. He should also set a high ideal or goal and strive to reach it to the best of his acquired and growing ability. The student should learn to appreciate his home conditions and farm life in every way possible. He should realize the importance of his work; therefore, his attitude should be good. Vocational Education can also help a lot in cooperative aims of the community. This aim helps in the process of bringing the farmers together for social life and better understanding of each other. When the farmers understand each other they can cooperate better to carry out business deals that will save them hundreds of dollars in the long run. The aim of Vocational Agricultural Education is not merely of business concern, because it helps in every way possible for the farmers and farm boys to have some recreation and have better and more understanding love of farm life conditions.

ELECTRIC HOTBEDS
continued from page 9

duce the amount of electric current used for heating the beds. The five conditions listed below represent ideal conditions for the location of the beds. The first two are the most important.

1. South slope protected from winds as much as possible or south side of building. (This affords maximum sunshine and heat.)

2. Well under drained soil. (Effective control of soil moisture. Wet soil requires more heat.)

3. Bed should extend East and West and tops or covers should slope to the south in order to get a maximum amount of sunlight.

4. Easily accessible to farm house and buildings.

5. Nearness to good water supply.

The use of the electric hotbed on the South Carolina farm is still in the experimental stages, although great progress has been made. The tobacco belt offers a great field for the use of electric hotbeds and in some cases they are being used now. Mr. S. W. Epps, County Agent of Dillon County was very well pleased with the results he got from his electric tobacco bed last season. The rapid extension of the R. E. A. lines together with the advent of cheaper heating cable, should cause a very marked increase in the use of electricity in the propagation of plants.

BLUE MOLD OF TOBACCO AND METHODS FOR ITS CONTROL
continued from page 8

not have to be repeated every night, and it seems to cure the disease after the plants are attacked. Therefore, application does not have to be made until the disease is seen on the bed.

A more thorough knowledge of this disease and its control may be worked out in the near future as it can cause serious loss to the tobacco grower.

J. G. Lewis, who is now the Superintendent of Education in Aiken, graduated from Clemson College in the class of '23, receiving his B. S. degree in Agronomy.

Palestine, which has the only commercially developed source of potash in the British Empire, is rapidly increasing its exports of potash and bromide.
Farm Buildings in South Carolina

BY F. M. JOHNSON, '42

The need for improvement of farm structures in this State is prevalent. In the past decade farmers have concentrated all their efforts toward maximum crop production. In so doing they have neglected the upkeep of storage space for feed and animals and their homes. Grain losses in South Carolina in one year are five to ten times the cost of adequate storage buildings. Is that good policy? Any work to improve the soil and increase crop production is futile if the crop is lost after it is produced.

The average value of all buildings per farm in South Carolina is $754.00. This compares with the United States average of $2059.00 per farm. Yet South Carolina has 3,600,000 acres of woodland. This is far more than enough to repair and rebuild all farms in the State.

However, the average farmer does not have the income or ability to design, build or repair his buildings. The income of a farmer averages about fifteen cents per hour and carpenters demand from fifty cents to one dollar, and the farmer cannot afford to pay this difference. The greatest need today is for rural education. The man of today living on a farm does not realize the need or value of paint. Nor does he know when or how to apply it. He also needs complete designs showing all details for each type of farm building and training in the construction of simple buildings.

The Agricultural Engineering Department of the Clemson Extension service in the past years has been rendering commendable service in this field. Models and exhibits of all buildings have been demonstrated in all parts of the State and have proved to be the most successful way of promoting this program. Below is a table taken from the Extension Report of 1939 showing the number of each type of building built through the aid and advice of the extension service in that year.

<table>
<thead>
<tr>
<th>Type of Building</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General Purpose Barns</td>
<td>53</td>
</tr>
<tr>
<td>2. Dairy Barns</td>
<td>44</td>
</tr>
<tr>
<td>3. Hog Houses</td>
<td>160</td>
</tr>
<tr>
<td>4. Hog Self-feeders</td>
<td>322</td>
</tr>
<tr>
<td>5. Poultry Houses</td>
<td>347</td>
</tr>
<tr>
<td>6. Brick Brooders</td>
<td>307</td>
</tr>
<tr>
<td>7. Tobacco Barns</td>
<td>94</td>
</tr>
<tr>
<td>8. Trench Silos</td>
<td>51</td>
</tr>
<tr>
<td>9. Box Silos</td>
<td>10</td>
</tr>
<tr>
<td>10. Potato Houses</td>
<td>159</td>
</tr>
</tbody>
</table>

The United States Department of Agriculture through the Federal Housing Administration has also helped to promote this program. Through this association many farmers have built comfortable, but inexpensive homes. The Administration visualized the effect of economy and designed small, roomy, useful, and economic buildings for rural use in this section of the country. The average cost of a home built through the Federal Housing Administration last year was about $1400.00.

The work that has been started has only benefitted a small number of the farmers in this State. However, through the cooperation of the Extension Service and the Federal Housing Administration South Carolina can again have adequate farm building.

Cornell University has just sold an All-American world's record cow, which is the daughter of another All-American former world's record cow.

No hope of profit, no investment; no investment, no employers; no employers, no employment.

Erosion removes more than 20 times as much plant food as is removed by crops.

If you think politics is easy, try standing on a fence while keeping one ear to the ground.
Remarkable Improvement in growth of SUMMER LEGUMES

...with the use of TENNESSEE BASIC SLAG

LOOK at the picture above. Notice the rich and full-grown foliage on the cow peas at the right. And notice the poor growth at the left. One thousand pounds of Tennessee Basic Slag per acre made this vast difference in cow pea growth on the farm of D. W. Alderman & Sons, at Alcolu, South Carolina.

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Basic Slag has proved a valuable soil builder. It improves pastures and provides minerals that help produce beef faster and increase milk production. And it increases yields of grains, cotton, sugar cane, truck crops, peanuts and fruits.

Get the facts about Basic Slag. Ask us for a free copy of our booklet that tells when, where and how to use Basic Slag.
WHY KEEP BEES?

continued from page 5

Carolina, there being five queen breeders in the state. These raise from a few hundred to eight thousand queens each per year. In 1936 this business produced and sold 104,600 queens for $59,000. This business is for raising queens for honey producers only; the package bee men raise their own queens.

Another phase of beekeeping which is more or less a part of the honey producing phase is migratory beekeeping. Beekeepers take their bees around to the best surroundings for producing a good honey crop. One beekeeper for example raises his bees here in this state and transports his bees to catch the honey flow in Ohio.

Due to South Carolina’s being so fortunate in having such a few bee diseases, the beekeeping industry is getting a foothold faster than it ordinarily would. Numbers of farmers have become acquainted with the commercial phases of beekeeping and the opportunity it provides of making some ready cash.

THE AGRARIAN

GOOD LAND MEANS PROSPEROUS FARMING

By GILBEART H. COLLINGS, Professor of Soils

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brought about twice as much per bushel. Most farmers plant 20 to 30 acres of soybeans. The soybeans are usually combined and in many cases the straw is left on the ground.

Poultry flocks on the average farm are small and in some cases non-existent and the same thing is true of gardens and orchards. Most farmers keep from three to six head of dairy cattle and the milk that is not consumed by the farmer’s family is sold to a creamery. Regular milk routes are maintained by local creameries through the community. On many farms no attempt is made to manufacture butter.

The horse is fast disappearing in this community and mules are seldom seen. Twice during my stay I was on farms on which threshing operations were in progress and a horse was not in sight. The racks of grain were brought in from the fields by tractors. While this was no doubt an exception to the general rule, it does emphasize the extent to which some of our American farms have become mechanized.

Most of the breaking of land is done in the spring rather than in the fall. Oats are planted about the first of April, the planting being done with an end-gate seeder, at the rate of three bushels per acre. The oats are then cut in. The crop is harvested about the first of August and this year most farmers were making between 58 to 68 bushels per acre. One farmer told me he made only about 48 bushels but another said his yield was 84 bushels. Most farms appeared to have about 60 to 90 acres in oats. Many farmers combined their oats, but this is not a popular practice among those farmers who desire to use their straw for bedding. Oats were threshed last August for 2.5 cents a bushel and what wage-hands were available were being paid $3.00 a day.

Corn, in most cases, is planted in check rows, although a few farmers have begun the practice of planting on the contour. Many farmers are planting corn with four-row planters and most farmers “go through” their crop four times. Although most of the corn harvested will be picked this year by hand, two-row tractor-drawn pickers are rather common. These pickers will pick from 15 to 18 acres a day. Most farmers were expecting a yield of around 75 bushels of corn per acre and most farms had around 100 to 130 acres in corn. At present prices the gross income from corn on one of these farms is, according to our South Carolina way of thinking, extremely good. It should not be overlooked also that these farmers do not have a fertilizer bill to pay.

Throughout the area are many small towns that are made up almost entirely of retired farmers. This is a breed of farmers almost unknown in South Carolina, although we have, no doubt, many tired farmers. In many cases the older couples have moved to town and have turned over the operation of their farms to their grown children.

From what has been said it can readily be seen that these people are not interested to any great extent in a “live-at-home” movement. However, it is not to be expected that a farming people of their income level would take any other attitude. These farming people have a great deal of leisure time, for the mechanization of their farms has reduced by more than a half, the time and effort formerly demanded for the production of their cash crops. The income from these cash crops allow a standard of living not seen in many farming communities of America.

Such a standard of living could only have been made possible in an area of fertile soil, and had we, in South Carolina, been so bountifully endowed with a rich soil, we too, no doubt, would have a like economic background and a like standard of living.
About This and That...

BY THE EDITORS

AN AG FAIR AT LAST

Again the students and faculty of the Clemson Ag School have taken a forward step. This time, it is the presentation of an agricultural fair, long advocated and much talked of, never actually carried out before.

The fair will serve one of the crying needs of the schools—specifically, that of showing the people of South Carolina, and those who are interested in Clemson, exactly what is going on and what is new in the business of making progress toward a more profitable agriculture. It will prove that we aren't loafing on the job here, and that we are working for a GREATER CLEMSON and a FINER SOUTH CAROLINA.

The exhibits sponsored by the various departments are indicative of the traits of initiative and independence which a show of this type develops, and we of the staff feel sure that the positions of responsibility will be amply filled by those in charge of the fair development.

As the date for the exposition approaches, THE AGRARIAN wishes to express its sincere best wishes for the success and permanent continuation of the project, and once again to heartily endorse the first Clemson Agricultural Fair.

THE COVER

The pictorial map of South Carolina as shown on the cover of THE AGRARIAN this month, effectively illustrates the distribution of the types of farming as carried on in this State. Diversification is not evident to a noticeable extent.

Several of the counties, in spite of adverse weather conditions and undesirable soil types, could certainly make a better showing in comparison with others if a genuine effort were made. So it is up to the individuals themselves to take advantage of the facilities at their command—the help and advice of the Extension Service and the Experiment Stations, the aid of their County Agents, the recommendations of the state college—to bring the agricultural standards of their respective counties on a par with the rest of the State. There's a challenge—and THE AGRARIAN believes that because it MUST BE MET, IT WILL BE MET.

WHAT ABOUT JOBS?

Because of the rapidly expanding defense program of the U. S., there is a great need for skilled workers in practically every field, particularly in defense industries. Therefore, now is the time for students to apply for jobs if they have not already done so. The demand is far exceeding the supply, and on the basis of hiring because of necessity it's going to be "first come, first served."

With conditions as critical as they are now, THE AGRARIAN sees no reason why every Agricultural student who will graduate in June should not be placed before he receives that diploma. Of course, a certain percentage will be called into the army immediately upon graduation, but for the remainder opportunity is knocking louder than it has in many years and we should certainly "grab while the grabbin' is good."

FARMS DEFEND AMERICA

Our farms must be kept up. In this critical period of political and economic unrest, with the world at war with itself, there still remains one country as yet untouched by the hand of Wars—America. And the only way to keep it that way is by an active defense here at home.

Even as we fight "fifth-columnists," and combat sabotage and espionage, so must we fight the tendency to allow the farms—the backbone of a home-loving people—to deteriorate. Production must be kept up, and if armies travel on "their stomachs," then our army will have to be the best-fed in the world.

The draft is taking our young farmers, others volunteer; we must guard against the desire to leave the farm, for some of us must stay at home. We must not allow our country to fall under dictatorship, and the farms are our first line of defense in our fight to preserve Democracy and the rights of man.
Nitrogen Factories on the Farm

By J. H. GRAHAM, '42

Two general procedures have been followed in making the soil transfer. Four or five hundred pounds of soil taken from an old field is scattered and harrowed into the soil. The second method is to mix several quarts of composite soil in a paste with water. The legume seed are then well coated with the muddy water. The principle disadvantages of the soil transfer method are: uncertain that there are sufficient nodule bacteria in the soil to give good inoculation and that the ones which are there are of the desirable type. Furthermore, very often insect pests, weed seeds, or plant diseases are transferred with the soil.

Due to the many disadvantages of the soil transfer method, bacteriologists soon began to cultivate the nodule bacteria in the laboratory and to use these cultures for legume inoculation. Lacking knowledge of the growth and properties of such cultures, the success obtained was very variable during the first few years. Great progress has been made along these lines, and at the present time very efficient cultures are on the market which are moderate in price.

Inoculation not only increases the crop growth and yield, but the quality of the crop is improved. The plant contains an increased amount of protein and nitrogen.

It has long been recognized that legumes in crop rotation make the soil more fertile for the following crop. A good growth of legumes adequately inoculated will fix approximately ninety to ninety-five pounds of nitrogen per acre a year for the subsequent crop.

The use of legumes for green manure in the cotton belt has greatly increased in recent years. Erosion and leaching of the plant food are decreased. The physical conditions of the soil is not only retained but improved.

The farmer who has an efficient nitrogen factory on his farm thus has access to an unlimited supply of nitrogen for the production of superior crops and the building up of the fertility of his soil.

Nitrogen is the most expensive element required for plant growth when secured commercially. Consequently most farmers have been waiting for the nitrate manufacturer's to reduce the prices. Other farmers have located nitrogen factories on their own farms in the nodules on the roots of legumes. The microscopic bacteria, the factory workmen, have the job of converting the raw nitrogen of the air into a simple form which the plant can use, and they do this work without any charge. As one writer said, "They not only work for nothing and board themselves, but they pay for the privilege."

To have an efficient factory the host plant must be inoculated. It has been found that not all legumes are inoculated with the same species of legume bacteria. All of the different species of legumes which are inoculated by a single species of legume bacteria form what is called a cross inoculation group. There are eight such groups.

Soil may be inoculated by two methods: By the transfer of soil from a field where the same legume or a legume of the same species has previously been successfully grown or by the use of pure culture preparations which are on the market.
A WELL NOURISHED SOIL PAVES THE WAY FOR A WELL DEFENDED AMERICA  
continued from page 3

can when starvation for certain plant foods are creating diseases in them. One of the best ways to provide for a well defended America is to have a healthy people; we must provide for them a healthy food and to make this possible and easy—we must first feed our soil.

The armed forces of the United States—admittedly better fed than any in the world—consume vast quantities of food. A well nourished body and an alert mind are of first importance for the soldiers, whether he is drilling or working over blueprints and maps. The army, as a result of years of study, recognizes that in addition to providing calories adequate for his many activities, the soldier's diet must contain minerals, vitamins and proteins necessary for physical well being and maintenance of robust health. The Napoleonic adage that an army travels on its stomach is just as true to-day.

The most vital problem before all nations is not defense armament, but the mineral exhaustion of their soils, and they are faced with the alarming fact that the food being raised on millions of acres no longer contains enough of certain minerals absolutely essential for the best of health of the people. The process of curing sick soils is easier than is the curing of sick people or animals. Calcium, phosphorous, and iron are perhaps, the most important of the major salts regarded as indispensable to the living body; and yet calcium deficiency is almost world wide. Four thousand patients were examined in New York Hospitals and it was found that only two had sufficient calcium. We provide special schools for children who are thought to be backward and stupid; whereas science is proving that many of them are simply suffering from magnesium deficiency. Again we find the underlying cause to be a starved soil.

It is true that we carry tuberculosis and pneumonia germs in our systems, but most of us are strong enough to resist them. However, if something breaks down resistance, the disease germs have their way. So it is with sheep and cattle and hogs. If they were only given their mineral requirements in proper balance, diseases now taking heavy annual tolls will be resisted, because the animals' constitution will be fortified against them. The value of mineral licks is widely known, but licks are not the same as minerals gained from vegetables in organic form. The producer should regard the licks as but a stepping stone to better processes and prepare his land for growing properly balanced food, working up by gradual stages till he can say all his land is approaching a state of mineral restoration, then will his wool, fat lambs, mutton, beef and milk products, and etc, flourish in high quality and he will find his profits increase year by year.

Another thing that is very important in making possible a well defended America is the maintaining of income. Saving and preservation of soil and maintaining of income run hand in hand. Our farmers lose much money every year because of nutritional deficiencies of their crops, their animals and even of themselves. Therefore we vertebrates, human and animals, are just what we eat.

Richard Weindling, Ph.D.

Dr. Richard Weindling is a native of Germany. There he received his undergraduate work. He came to the United States in 1929 and entered graduate work at the University of California where he received his Master's degree and Doctor's degree in 1933. He pursued two additional years of post-graduate work at Cornell University.

Since 1938 Dr. Weindling succeeding A. J. Ullstrup, who began the work, has been working at Clemson with the South Carolina Experiment Station cooperating with the Division of Mycology and Disease Survey of the United States Department of Agriculture. His work has been in the laboratory growing cultures of and identifying cotton seedling and boll diseases collected over the entire cotton belt by a co-worker. The main objective of the work has been to determine just what cotton seedling diseases are most frequently found in the cotton belt. Through careful and concentrated effort Dr. Weindling has been able to bring new things to light and to settle many questions. The Anthracnose fungus has been found to be present over all the cotton states east of Texas and Oklahoma. Dr. Weindling says that moisture conditions in parts of Texas and Oklahoma are unfavorable for the complete life cycle of the fungus, therefore accounting for its absence in this area. He has found that the fungus which causes both seedling blight and boll rot of cotton is spread from leaves, trash, and parts of bolls to the seed in the ginning process. Very few of the disease-causing spores were found to be necessary on each seed to cause the seedling blight.
GIVING THE FARMER A START
continued from page 4

net worth average has been raised (of these families) from $33.63 in 1935 to a financial level of $524.98 at the end of 1938. There is an average of six persons in each family. By July 1, 1939 a total of 79.5 percent of all matured payments from the beginning of the program in 1935 had been met by the borrowers. $40,000,000 was appropriated for the nation for the fiscal year ending June 30, 1940. The farmers pay an interest rate of five percent. Only a small percentage of farmers making application receive loans each year. The average tenant purchase loan of South Carolina was $3,392 for the first two years, and the average farm size was 120 acres. Each loan provides for improvements; including new houses, barns, terracing, fencing, or other facilities necessary for a well balanced farm unit. The second year of the loans went for improvements, compared with only 18 percent for them the first year. This was due to a scarcity of suitable farms with adequate housing facilities.

These families not only have year round gardens, but also can their surpluses. Many families canning as many as 142 to 159 quarts of fruits and vegetables per season. This being brought about by helping them to get sufficient jars and pressure cookers. In 1935 only 55 percent of them had any cows, only 49 percent had any hogs, and 75 percent had chickens. These subsistence needs are being adequately met under this program. The farmer plants more feed and less cash crop acreage, which enables him to produce more of these needed products.

One of the main features of the F. S. A. is that it is improving the tenure in more than one way. Written leases are being used satisfactorily. Children are attending school more, which is a step toward decreasing our large illiterate ranks. Housing conditions have been bettered by building better ones, through the use of loan funds. At this point it is worthy to note that the Bureau of Home Economics made a survey in 1934 pointing out that it would cost about $8,000,000 to put all of the farm homes in the U. S. in repair provided all materials and labor costs were secured and hired at prevailing wage rates. The 1930 census showed that all farm houses in the nation were valued at only $7,083,000,000. This indicates that it would cost nearly as much to put them in good condition as they were worth. In many cases this problem faced the F. S. A.

By screening houses, providing sanitary toilets, building necessary out-buildings, and obtaining an adequate water supply for each farm unit the thing which is so dear to all humans was reached—better health. Also by cooperating with county medical societies medical service associations have been set up in 16 of our 46 counties. The cost ranging from $12 to $16 per year for each family.

Besides all of these monetary gains that the F. S. A. has helped bring about there are an abundance of other improvements which have been listed above which are just as important. In short they are: adequate gardens, more meat, milk and eggs per capita; better workstock with an increase in feed acreage; improved tenure and housing; better school attendance, better health and sanitation. All of these go together to help the tenant to become a progressive self-supporting owner. These factors strengthen the morale of the people and undoubtedly have raised the standards of living throughout the nation and has helped to establish the "live at home program" in South Carolina. This sound program is another step toward national security and defense.

G. O. Hill, an Agronomy graduate of the class of '18, is now engaged in work with tobacco in Durham, N. C.

H. G. G. Hoffmeyer, a graduate of the Agronomy class of '18, is now farming at his home near Florence, S. C.

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28%

than the average of the 4 other of the largest-selling cigarettes tested—less than any of them—according to independent scientific tests of the smoke itself.

WHEN you get right down to it, a cigarette is only as flavorful—only as cool—only as mild—as it smokes. The smoke's the thing!

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