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HOW NEW IH PARTS DEPOTS SERVE FARMERS — BETTER

A report to you about men and machines that help maintain International Harvester Leadership

Speedy parts service cuts costly field delays—often saves crops for farmers! That's the big reason why International Harvester is establishing a nation-wide network of parts depots.

Several of these new depots are already in operation; others are on the way. They all are designed to keep IH equipment in the field when days mean dollars.

Depot stocks include every type of casting, stamping, forging, and standard hardware used in current machines—even to the cotter pins. Parts for machines no longer in current production are on call. Deliveries from depots are fast. Seasonal stock items are shipped ahead of the "using season." All stock orders are shipped exactly in accordance with established schedules. Emergency parts orders are filled the same day.

These new parts depots are another example of the "do it better" creed at International Harvester. This refusal to let well enough alone brings constant improvements in the design, manufacture, and distribution of IH farm equipment.
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Clemson House 
Fact or Fantasy

By The Editor

No one is more proud of our new Clemson House than I am. It is indeed a credit to Clemson, and would be a credit to any campus. Nevertheless, it was my understanding that the new hotel would house single faculty members, as well as have apartments and rooms for transients, yet the meals are so high that it would take a month's pay check to pay for a month's board. Then too, the food is nothing to brag about. Very few of the faculty members that live at the Clemson House take their meals there. I've eaten there several times, but I'll take the college dining hall anytime now.

Some of our student organizations have held banquets and suppers there, and I hear it took two hours to get them completely served. I don't blame some of the other fraternities and clubs for cancelling plans to entertain at the Clemson House.

If the powers that be want to make a real success of the hotel, they will cut down a little on the ritziness and try to improve a little on the meals. If the Clemson House would establish a reputation of having excellent, moderate priced meals, with good service, it could easily become a mecca for all Clemson alumni as well as Clemson friends on and off the campus.

Some people might say we should give the Clemson House a chance before we start criticizing it. Granted—it is a bit early for criticism, but it seems to me that they would do well to get started off on the right foot in the beginning, before a general negative opinion of the hotel is established.

COVER

This month's cover pictures Dean H. P. Cooper, newly elected President of the American Society of Agronomy, sitting at his desk. See page four for story. Cover picture by staff photographer Henry Chaplin. The new title plate was designed by Warren R. Brenner, an Architectural senior.
ARMSTRONGS ADDRESS BOTANICAL CONGRESS IN SWEDEN

This summer, Dr. G. M. Armstrong, head of Clemson’s Department of Botany, and his wife Dr. J. K. Armstrong presented an invitational paper on Cotton Wilt Fusaria of the American, Egyptian, and Indian varieties at the International Botanical Congress in Stockholm, Sweden. Although the meeting lasted only for one week in July, Dr. Armstrong and his wife, spent two months in Europe. Dr. Armstrong’s wife also holds a doctors degree in plant pathology.

Dr. and Mrs. Armstrong left New York by plane and, after a short and pleasant trip, arrived in London thirteen hours later. This was the first plane journey for both and they found it highly interesting. Shortly after his arrival in England, Dr. Armstrong visited the Rothamstead Experiment Station at Harpenden, Hertfordshire, England.

From England, Dr. and Mrs. Armstrong passed through Scotland to Denmark, where they spent two days.

The Armstrongs travelled through Sweden on train. While in Sweden, the Doctor and his wife visited the old and famous university at Upsalla where Linneaus, world famous botanist, lived and taught. After their stay in Sweden, the Armstrongs travelled to Kufstein in the Swiss Alps.

Dr. and Mrs. Armstrong then journeyed to Holland. Here the large number of canals and dairy cows impressed them most. From Holland, the Armstrongs travelled through Italy and France. In France they visited a winery which had ten miles of underground tunnels that were used for the ageing of wines. While in France, Dr. Armstrong encountered an old friend and classmate, Dr. Harry Parker, who is with the U. S. Department of Agriculture in that country.

After a delightful fifty days in Europe, the Armstrongs returned to this country by plane.
COMPLIMENTS OF

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Dean Cooper Heads Agronomists

Dr. H. P. Cooper Elected President of the American Society of Agronomy

At the annual meeting of the American Society of Agronomy in Cincinnati earlier this month, Dr. Herbert Cooper, Dean of the School of Agriculture, was elected President for the coming year. Dr. Cooper, whose advanced work in the field of soil science is known throughout the world, had been chosen vice-president of this body at its annual meeting last year. These high honors which have come to Dr. Cooper are certainly richly deserved by a man who has contributed so much to modern agriculture in the field of plant nutrition.

Dr. H. P. Cooper was born on a farm near Ridge-way, South Carolina, on February 18, 1887. This was the time in the South when, according to Dr. Cooper, “a man either planted cotton or he didn’t plant.” Perhaps it was the poor soils of this area that fastened Dr. Cooper’s interest in soils and soil minerals.

Dean Cooper received his Bachelor of Science degree in Agronomy at Clemson in 1911. From Clemson, Dr. Cooper went to Wisconsin, where he received his Masters degree in 1915. After receiving this degree, Dr. Cooper moved to Pennsylvania State College, where he instructed in agronomy from 1915 to 1917. From Pennsylvania State, he
went to Massachusetts College where he served as an assistant professor from 1917 to 1920. From 1920 to 1922, Dr. Cooper served as an instructor in field crops at Cornell, and it was at Cornell in 1922 that he received his Ph.D. Following the receiving of this degree, Dr. Cooper became an assistant professor of agronomy and served at Cornell in this capacity until 1930. In 1930, he was recalled to his alma mater where he became a professor of agriculture. In 1936, Dr. H. P. Cooper was appointed Dean of the Clemson School of Agriculture and Director of the South Carolina Experiment Station.

RETURNS TO CLEMSON
Following his appointment as Dean of the Clemson School of Agriculture and Director of the South Carolina Experiment Station, Dr. Cooper began concentrated work in three important agricultural fields. These were (1) the study of the relations between applied fertilizers, soil characteristics and liming requirements; (2) the correlation of theories regarding necessary soil minerals and the manner, method and order in which these soil minerals are absorbed; and (3) the correlation of theories regarding the effects of energy properties of some plant nutrients on availability, on rate of absorption, and on the intensity of certain oxidation-reduction reactions.

FIRST RESEARCH
The first work that Dr. Cooper undertook after 1936 was concerned with soil liming practices in South Carolina. After intensified research that included the testing of over two million, one hundred and fifty thousand soil samples from areas throughout the state, the South Carolina Experiment Station published Circular 60, written by Dr. Cooper, entitled “Fertilizer and Liming Practices Recommended for South Carolina.” This circular was published in October, 1939, and it was from it that Dr. Cooper received his first honors as an outstanding soil scientist. In this circular, Dr. Cooper brought out three important facts: (1) That “approximately forty per cent of the soil samples had a pH value of 5.5 or less and were classified as strongly to extremely acid.” (2) “Another forty per cent of these samples of cultivated soil had a pH value ranging from 5.5 to 6.0, which would be classified as moderately acid.” (3) “The remaining twenty per cent of the soil samples were classified as slightly acid to alkaline, and like the better portion of the moderately acid group, is capable of supporting a profitable diversified system of agriculture.”

Following the publication of this circular, Dr. Cooper turned his attention to his second research project. During the years of the war, the experiment station, under the guidance of Dr. Cooper, worked hand in hand with the war effort and were rewarded for their troubles by seeing the farmers produce record crops. Shortly after the war, Dr. Cooper and his associates published several papers emphasizing the relation between the energy properties of nutrients and the intensity of absorption by plants of the different nutrients. Many soil scientists hailed this theory as being ten years ahead of its time and as representing a much needed field of study. The article itself aroused controversy throughout agronomists' ranks and the pros and cons of the subject were discussed heatedly. In the March, 1948, issue of the “Journal of the Australian Institute of Agricultural Research,” one author drew special attention to Dr. Cooper's concepts by stating that “the whole of this theory is plain rubbish.”

Shortly following this criticism, Dr. Cooper released another paper entitled “The Effects of Energy Properties of some Plant Nutrients on Availability, on Rate of Absorption, and on Intensity of Certain Oxidation-Reduction Reactions”. This paper, also, aroused much argument. It is probably the very advanced nature of the text of these papers that renders them so vulnerable to criticism.

PRESENTS PAPER
This summer Dr. Cooper attended the fourth International Congress of Soil Science in Amsterdam, Holland. Prior to the meeting of this body, Dr. Cooper had attended the seventh International Botanical Congress in Stockholm. This is one of the most important meetings of the botanists and it links together all phases of botanical research and instruction. While at the meeting of the International Congress of Soil Science, Dr. Cooper presented a paper on “Differential in the Nutrient Content of Calcium Accumulating and Silicon Accumulating Plants”.

During his professional career, Dr. Cooper has joined and is active in several of the foremost national and international agronomic groups. Among these are the American Society of Agronomy, American Chemical Society, American Society of Plant Physiologists, American Soil Science Society, The International Soil Science Society, and many others. Dr. Cooper's outstanding contributions to soil science have been in the fields of mineral nutrition of plants, energy properties of nutrient salts, soil science, and plant physiology.

Shown from left to right is the Cooper family; Herbert, Mary, Mrs. Cooper, Dr. Cooper, Tommy and Louise
Did you ever think of the honey bee as a special friend of yours? Well she is, and unlike most friends she puts dollars and cents in the pocket of almost every agriculturist. If farmers could only see the reaching benefits bestowed upon them by this friend, I'm sure more interest would be taken in the care and management of honey bee colonies. If all the honey bees could be removed from the states of this nation for a period of one year, I would venture to say that there would be such a prodigious depletion of many self reseeding annuals and such a shortage of many fruit crops that the economy of the nation would suffer serious consequences.

How is the honey bee such a help? How can she govern the production of fruits and seed? The answers to all of these questions hinge on one word—pollination. The value of the honey crop. However, this service is such an intangible factor that it is impossible to even estimate its true value. It is even harder to convince a fruit or seed grower that this small insect is so indispensable to maximum efficiency in production. True, some fruit is set and some seed are produced when honey bees are not present in quantity; and it is also true that some plants produce when self-pollinated. Nevertheless, the plants which necessarily are insect pollinated benefit materially from bees, and even the plants which will produce from self pollination often will produce more fruit or seed of higher quality when cross pollinated by bees.

When it is brought to mind that the honey bee is not a native of this country, I often wonder in what state the agriculture of the United States would be, had the honey bee not been introduced into and thrived so well on the North American Continent. True, there are several families of wild bees which are pollinators, but these are all solitary bees, except the Bumble Bee, and do not exist in sufficient numbers to be effective in an extensive pollination program. Also the present day agricultural practices have so reduced the weedy fence rows and untilled grassland, in which these families reproduced, that the population of these insects has been reduced to an extent that now their pollination work is believed to be an almost negligible factor in most extensive agricultural areas. A half century ago it was not uncommon for Alfalfa, under favorable conditions, to make eight to ten bushels of seed per acre, but today such a heavy yield is seldom seen. James I. Hambleton in charge of the bee-keeping work for the U.S.D.A. summarizes it this way, "The plow and the cultivator will continue in use. The development of more efficient farm machinery will encourage planting large acreages to single crops. Rail fences will never come back; clean fence rows will remain in vogue. Injurious insects will continue their struggle to outwit man. More and better insecticides will be used to save our crops. What chances do the wild bees have? The only ray of hope is that conservation practices may encourage re-establishing some of the native pollinating insects. As of the moment, and certainly for many years to come, pollination will depend almost exclusively upon the honey bee. The conclusion is an irrefutable one. This country must have a thriving beekeeping industry. Every encouragement to the keeping of honey bees and wise and careful planning will be necessary to provide insect pollination." (The Hive and the Honey Bee—R.A. Grout.)

With the population of native pollinators so low in many areas that they are hardly a factor in pollination, and with the honey bee assuming the whole load, it naturally follows that almost every agriculturist from the dairyman to the seed grower is benefited by the honey bee. The apple growers of New York were among the first to realize the economic benefits of hiring honey bees as pollinators. Many apple varieties are self-sterile. These must be cross pollinated in order to set fruit, and due to the nature of apple pollen, which is sticky and heavy, the job must be done by insects. An example reiter-
A Man
A Dare
and A Fellowship

By WINSTON H. SIBLEY
Animal Husbandry '51

"H. R." and I were boun cing along a road through the mountains of Tennessee in a milk truck. The vehicle was a big, cumbersome affair that we were driving to North Carolina for "H. R.'s" tent leader; but we were glad to have it, because it afforded us a cheap means of transportation from Camp Miniwanca. We also slept in it.

I was thinking about how much fun it was to be out on our own like this, stopping in cities like Detroit, Cincinnati, and Lexington, when "H. R." interrupted my thoughts by saying, "You know, Sib, Mr. Danforth really gave us a great opportunity and some valuable experience in this Fellowship trip. We had a good time, too, meeting all those swell guys from each state college—and then there was little Tom Ajamina from Hawaii and Jim Biggar from Canada."

"Yeah," I agreed; and it had been a swell trip—one that I would never forget. "But, you know, Mr. Sindecuse was wrong when he said that it will be Christmas before we really appreciate our trip. I do already."

"H. R." Caldwell, an an ag. senior from N. C. State, was driving; so I settled back on a blanket atop a milk rack to reminisce a little. I remembered way back last spring, when Mr. Goodale called me into his office and explained to me the purpose of the Danforth Fellowship: to choose a man from each state college and develop him fourfoldly—physically, mentally, socially, and religiously. How lucky I was to have been chosen, and it was with anticipation that I arrived at Lee Hall, Washington University, in St. Louis, Missouri, on July 30th.

Although the milk truck was bouncing violently, I took out my scrapbook that we had been required to keep during our two week tour of St. Louis. The scrapbook, or notebook, was red and white checkered, because it had been covered with an old paper Purina Checkboard feed bag. The Ralston-Purina Company, of which Mr. Danforth is founder, had sponsored our two-week stay in St. Louis, while the American Youth Foundation, also founded by Mr. Danforth made possible our two week stay at Camp Miniwanca.

I opened up the notebook, and there on the first page was the signature of Mr. Earl A. Sindecuse, our guide, tutor, and friend during the trip. I smiled when I saw the "very excellent" grade that he had put on my notebook, for he had put "very excellent" on practically everyone's notebook.

The second page displayed a picture of Mr. William H. Danforth, himself, in which he was pointing to a plaque reading:

I DARE YOU
TO STAND TALL
THINK TALL
LIVE TALL

THE FOREFOLD WAY OF LIVING

These words illustrate what he is trying to accomplish with youth:

TO BE YOUR OWN SELF
AT YOUR VERY BEST
AT ALL TIMES

Getting into the body of the notebook, I found I had utilized the first pages of it in telling of the Purina Research Farm. A chartered Greyhound bus had taken us out there from St. Louis for a three day stay. All of us boys had been living together in the lodge, and we had found the farm a good place to get acquainted.

My notes reminded me of how we had gotten off to a bang with classes and tour. Mr. Elmer W. Powell, the farm's director of research, had spoken to us first, orienting us and explaining to us the purpose of the farm, which is to solve practical problems of not only feeding, but also sound management, careful sanitation, and good breeding, and to bridge the gap between research and the farm.

I turned a few more pages describing interesting lectures and tours to the beef, dairy, turkey, duck, fox, dog, minx, martin, chinchilla, dairy goat, pheasant, pigeon, chicken, and rabbit units. I saw on one page the placing 2-1-3-4, which brought back to my mind the ring of fat cattle that we had judged. In between times we had found recreation in softball and swimming.

The next thing I came to in my book was a brief summary of the farm, acknowledging the fun we had had, the experience we had gained, and the excellent food we had eaten. Too, there was the description of the Greyhound trip back to St. Louis, for my book had served as a diary as well as a notebook.

In St. Louis our time had been spent almost entirely at the St. Louis office of the Ralston Purina Company. Thumbimg through the pages, I saw an account of our first lectures, which had dealt with all phases of nutrition—a regular Feeds and Feeding course. Then on over were ac—

(continued on page 22)
Imagine smoking a cigarette of sweet mellowed aromatic tobaccos, commonly referred to as Turkish tobaccos, and enjoying the smoke in the cool of the foothills of the Blue Ridge Mountains from Virginia to Georgia. You can imagine this now, and you can imagine still further that this aromatic tobacco is grown right here in the Piedmont and mountain areas of Virginia, North Carolina, South Carolina, Georgia, and eastern Tennessee. It's being done on a commercial scale!

During normal times 50 to 75 million pounds of aromatic tobaccos are imported, mainly from Turkey, Bulgaria, Greece, and Soviet Russia, for the manufacture of various blends of cigarettes. During the war these imports decreased greatly, and the interest of our agricultural workers was aroused with respect to growing in this country all the aromatic tobacco needed.

In 1939, Duke University pioneered in aromatic tobacco research in order to determine whether satisfactory tobaccos of this type could be produced in the southeastern part of the United States. Following the first tests, Duke University, with the cooperation of the Agricultural Experiment Stations and Extension Services of Virginia, North Carolina, and South Carolina, has carried out experiments in the Piedmont and Mountain areas of these states involving cultivation, fertilization, harvesting, curing, storage, and fermentation of several varieties of aromatic tobaccos.

The results of these preliminary experiments have shown that aromatic tobaccos, of equal value to those which have been imported, can be grown on many of our Piedmont and mountain soils; and the crop fits in well with rotations and farming practices common in this area. Because of its high labor and small acreage requirements, it is best adapted to small farms with large families. Since the results of experiments mentioned above prove that aromatic tobacco can be grown profitably in the Piedmont areas, and since the market outlook is strong, a project was initiated at Clemson in 1947, to develop labor-saving methods in stringing the leaves and more efficient curing methods.

Until recently, the big drawback in growing aromatic tobacco was the high amount of labor and handling required at harvest time. Because of these factors, it was recommended that only those farmers who had large families attempt to grow the weed. Children as well as older persons could do the tedious job of stringing and hanging the tobacco leaves. Few able bodied adult farmers had the time or the inclination to personally tackle this phase of the job.

A galvanized rod has been devised on which to impail the tobacco leaves. The rod is 27 inches long and 1/8 inch in diameter. This is only onehalf the length of the standard tobacco stick, but it holds almost as much tobacco. Furthermore, the tobacco can be impailed on the rod in a fraction of the time it takes to string it on a stick. This solves one phase of the problem.

The other phase, curing, has also been solved by the construction of a "pilot model" tobacco curing barn measuring 17 feet x 12 feet at the base and 10 feet high. A thermostatically controlled oil furnace with forced air circulation supplies the hot air (100°F) from underneath the roof down through the tobacco leaves. After the air passes through the tobacco, it may be re-circulated or discharged through bottom ventilators, depending upon the relative humidity. If the humidity is above 75 percent, the air is discharged; if below 75 percent, it is re-circulated through the heater and used again.

This type of barn makes it possible to go right on curing tobacco at night and on rainy days. In the past, curing has been done entirely by sunlight. When the sun didn't shine, no curing was done; and, during pro-
longed rainy and cloudy periods, the tobacco was damaged by molds. Under the new arrangements, the tobacco is rolled out of the tobacco barn on portable racks, as usual, and cured by the sun on sunny days; but rolled inside the barn at night, or on rainy days, and cured by the use of heat. Twelve to fifteen days are required to cure tobacco in the sun, — six to eight by the combination sun and heat method. The sun-heat cured tobacco has been judged to be of excellent quality by tobacco experts who have examined the product.

A barn of this size is designed to take care of one-half to one acre of tobacco. The Peirson-Moore Company, Lexington, Kentucky, and the Armco Metal and Drainage Company, Atlanta, Georgia, have cooperated with the writer in developing the complete unit for average size farms.

Aromatic tobacco differs from the other types of tobacco by the small glandular hairs which contain aromatic substances. It is from these small hairs that an oily secretion is produced which gives the aroma to the tobacco. The density of these hairs per leaf is influenced by heredity and environmental conditions. Any environmental factor which encourages vigorous vegetative growth of the plants also causes the density of the hairs to be less and results in a poor quality tobacco. In growing aromatic tobacco the growth of the plant should be controlled in order to obtain small leaves which possess as many glandular hairs as possible per leaf. In this way, quality can be raised to a higher level.

Cultural Methods

In locating a seedbed, a soil should be chosen which is relatively high in organic matter, contains few weed seeds and disease organisms, is well drained, and is near a source of water. The beds should be located on a south or southwestern slope in order to get the benefits of natural heat.

After clearing the plant bed area, the top soil should be pulverized, smoothed, and leveled. The seed bed should be sterilized in September or October so as to eliminate weeds, diseases, and insects. This may be done with steam, by burning, or chemical treatment. AERO Cyanamid, Granular applied at the rate of one to one and a half pounds per square yard of plant bed has proved to be highly satisfactory for weed control. After sterilization of the seed bed, the fertilizer should be applied at least two weeks before seeding at the rate of two pounds of a complete tobacco plant bed fertilizer per yard.

The beds should be seeded between February 1 and March 1, using 3 to 6 teaspoonsfuls of seed per 100 square yards. The seed should be mixed with cottonseed meal, fine sand, or sifted wood ashes, using one quart of such material to each teaspoonful of seed for uniform sowing of the seed.

Tobacco cloth covers are used on the seed beds to increase the temperature and protect plants from unfavorable weather conditions. After a stand of plants has become established in the field, the remaining plants in the beds should be destroyed, and the bed planted with nematode resistant varieties of cowpeas or soybeans.

A heavy and relatively poor soil containing mixtures of sand, gravel, or small rocks is desired for the best growth of aromatic tobacco. The field should have some slope which will give protection against wind damage and provide drainage.

To fertilize aromatic tobacco, 4 to 8 tons per acre of well-rotted stable manure is used as a source of nitrogen. Superphosphate and potassium sulphate are used at the rate of 200 and 160 pounds per acre, respectively. Research is now in progress using various sources of fertilizer material to ascertain their effects on yield and quality.

Rows should be laid off 20 inches apart and the plants spaced four and one-half to five and one-half inches apart in the row. According to these specifications, it will require approximately 60,000 to 70,000 plants per acre. The close spacing has a dwarfing effect upon the leaves of the plants which is favorable for quality.

The seedlings should be hardened five to seven days before transplanting by removing the tobacco cloth covers in order to withstand transplanting. Transplanting is done with a hand transplanter which releases plant and water simultaneously. Plants are placed midway on the side of ridges, approximately half the distance from the bottom of the ridge to the top.

The first cultivation is usually 10 to 15 days after transplanting. During this cultivation the tops of the ridges are raked down away from

(continued on page 30)
On Saturday and Sunday, November 4 and 5 of this fall the agricultural buildings and surrounding campus evidenced a noticeable change. Decorations, signs and streamers adorned both the inside and outside of the buildings which added to the various displays and activities that were taking place. The students in the School of Agriculture had prepared the campus in preparation for the 3,000 visitors, including many Clemson alumni who attended the fair. Lights burned long into the night the week before the fair while the students put the finishing touches on their projects.

Plans for the fair had begun last spring at which time its general organization was decided upon. The Council of Agricultural Club Presidents met to organize the agricultural clubs for the undertaking. It was decided that each of the professional clubs was to be responsible for a program depicting the work and progress made by the department of agriculture each represented. To the Fraternity of Alpha Zeta, National Agricultural Honor Society, was left the job of overall planning and organization. Among its jobs were the printing and posting of signs, general publicity, makeup and printing of programs and establishing an information booth during the fair. Alan B. Sibley, Jr., Chancellor of Alpha Zeta, became then, Chairman of the fair. Prof. B. E. Goodale, faculty member of Alpha Zeta, was chosen by the fraternity to serve as Adviser. By Nov. 4, the students were ready to receive their visitors. Unfavorable weather conditions resulted in an unfortunate drop in expected attendance on Saturday, but those visitors present indicated a keen interest in observing these activities.

The Dairy Department, represented by the Dairy Club, held its exhibits in the Dairy Building. Oscar F. Lovelace served as Chairman and Prof. J. T. Lazar as Adviser of this program. A model dairy plant on exhibit was explained thoroughly to all visitors as were the other dairy displays. The Dairy Research Laboratories and Dairy Barns remained open for inspection.

Most of the exhibits were contained in Long Hall, the main agricultural building.

In the basement were the poultry exhibits which were adequately explained to the visitors. Egg grading, chicks hatching, de-beaking, chemical caponizing, refrigeration of poultry products—all of these went into the making up of the poultry program headed by Robert T. Miller as Chairman and Prof. C. L. Morgan, Adviser, both representing the Poultry Department and Poultry Club.

The Agricultural Engineering Department, represented by the American Society of Agricultural Engineering, also offered an extensive show, including farm machinery, drainage and irrigation, rural electrification and a large sand table exhibit clearly contrasting good and bad soil conservation. Hal E. Bland and Prof. A. W. Snell were Chairman and Adviser respectively.

On the second floor were found the Botany and Bacteriology exhibits. Hans F. Paul, Botany major, was Chairman, and Dr. G. M. Armstrong was Adviser. Microscopes were set up in order that visitors
HIGHLIGHTS HOMECOMING

could view our infinitesimal plant world.

Robert E. Farmer, Chairman, and Dr. Kaloman Lehotsky, Adviser, guided the forestry program to a successful presentation by providing a variety of exhibits. Forest protection, care and management were stressed.

The Entomology and Zoology exhibits with Albert C. White as Chairman and Dr. Farrar as Adviser proved to be quite unusual. Exhibits on agriculture, bee-keeping, and aquarium shows were before the public. Visitors were able to witness the heartbeat of a turtle several hours after the turtle had been dissected and apparently killed. These indicate the nature of the show.

On the wall leading up to the third floor was a graph which extended right up the stairs, depicting the rise of the cost of living. At the top of the stairs were the agricultural economics and rural sociology exhibits. Signs, graphs, balances, peep shows and other clever ways of presenting basic economic principals were displayed. Theiron D. Wilson, Chairman, and Mr. J. F. Miles, Adviser, teamed up to present this unusual program.

Fred D. Sease, Chairman, and Dr. G. H. Collings, Adviser, directed the Agronomy Club in putting on its show, which covered a wide range of subjects. Soil, plant and fertilizer exhibits and demonstrations by agronomy seniors aided visitors in understanding the program.

The Animal Husbandry Department headed by Winston H. Sibley, Chairman, and Prof. R. R. Ritchie, Adviser, organized the Block and Bridle Club to present features of Animal Husbandry. Movies were shown on the meat packing industry and exhibits were demonstrated on slaughtering, processing, and packing of meat.

The dairy and animal husbandry students collaborated to present a cattle show Sunday afternoon of the fair. The Dairy Department presented the various breeds of cattle, and prizes were given for judging, showmanship and fitting of animals. The A.H. Program featured cattle, hog and sheep shows. These animal shows drew wide attention from the visitors.

The Future Farmers of America Club, representing the School of Vocational Agricultural Education, presented its exhibits in the Education Building. Raymond L. Boozer, Chairman, and Prof. J. B. Monroe, Adviser, directed the program, which included slides, charts and demonstrations to show the scope of the agricultural teaching profession.

Last, but by no means least, the Horticulture Department, represented by the Horticulture Club, also provided entertainment. The exhibits ranged from landscape design to plant breeding work. The entire greenhouse was open for inspection, and the program included vegetables, fruits, nuts and small fruits. Food preservation was also presented.

As can be readily seen from the few exhibits listed above, the Agricultural Fair was quite extensive. Now that the fair is over the students can again return to regular schedules which the fair interrupted. Two years will elapse before the School of Agriculture sponsors another fair. The students and faculty will again make every effort to fulfill their opening invitation presented on the program, and it is hoped that all visitors will return in the future years.

Bill Allen demonstrates Kyeldahl method for nitrogen determination.
Ag School Gridiron Stars

FRED CONE, Fullback
V. A. E. '51  Elmore, Ala.

BILL GRIGSBY, Tackle
V. A. E. '51  Saluda, S. C.

JACK BRUNSON, Center
A. H. '51  Sumter, S. C.
Pave Way To Orange Bowl

RAY MATHEWS, Halfback
Dairy '51   McKeesport, Pa.

BOB PATTON, Tackle
V. A. E. '52   Gray Court, S. C.

WYNDIE WYNDHAM, Q. B.
A. H. '51   Moncks Corner, S. C.
Grain Sorghams -- Dry Weather Insurance

By ALAN B. SIBLEY
Agronomy '51

All agriculturists realize that the business of farming is different from other businesses in one respect. Most efficient business managers, such as industry possesses, can foretell to an accurate degree what the output for the year will be. They can accomplish this because they have almost complete control over all of the factors relating to production. The farmer, however, does not possess this almost unlimited control, for who can say what the weather will do, and what farm output will be? No one can control weather, but an efficient farmer will look for crops which make a good showing against adverse weather conditions, crops which give yields the minimum of which, at least, can be estimated in advance. Thus, he can then make his plans accordingly.

Looking at crops from this requirement, we recognize one that can be counted on never to fail entirely. This crop is grain sorghum, a crop almost comparable to corn in yield during normal seasons and which outyields corn during dry seasons.

Grain sorghums are not by any means new, but their importance as grain and forage crops in the south is new, and they are becoming more important. They have served as an important source of feed for livestock in the southwestern states for many years, and their dry-weather insurance is beginning to be appreciated here.

Corn is still rated as the greatest livestock feed; therefore, why should anyone contemplate using grain sorghums as a substitute for it? Farmers in South Carolina are turning to grain sorghums because low average yields and increasing demand for livestock feed do not go hand in hand, and grain sorghums are very profitably grown on good cotton and corn land.

Corn under very favorable conditions will outyield and be more profitable than grain sorghums. A farmer would do well to plant corn if he could predict a favorable season. Surprisingly enough, however, the yield of grain sorghums is not affected very greatly by rainfall; thus, it is a consistent yielder. It can be counted on ahead of season to produce grain which may be the necessary part of a livestock program.

Anyone who possesses an ordinary grain combine should at least consider planting sorghums for livestock feed. The dwarf varieties, such as Caprock and Plainsman, although lower yielders than the taller varieties, are becoming increasingly popular due to the fact that their size allows them to be combined. Combining saves labor which compensates for the slight advantage in yield of the taller varieties. Combining sorghum has definite advantage over cutting the taller varieties by hand and pulling corn.

Sorghum grain is estimated to be worth about 90% of the relative feeding value of corn. It is slightly higher than corn in digestible protein and slightly lower in fat. Corn is more palatable than grain sorghum, but this does not mean that grain sorghum is unpalatable.

Sorghum makes a palatable forage crop especially when planted with velvet beans. The combination provides excellent grazing in November and December.

The Clemson Extension workers recommend the following program for raising grain sorghums: Plant sorghums in late June or early July, in order that the heads will be ripe for harvesting during October, a month of light rainfall. Plant the grain in 36 to 42 inch rows spaced 6 to 10 inches in the row—all of which adds up to 6 pounds per acre of planting seed. Treat the seeds with Ceresan. Two or three cultivations are necessary and should follow the procedure for cultivating corn. Harvesting of the dwarf varieties should be done when the heads are fully mature. Too much moisture during storage will make for heating and spoilage.

As stated before, the larger varieties may be harvested by hand, cutting off the heads and separating in a threshing machine. Grain threshers are sometimes used, and oftentimes the sorghum is cut and shocked in the field and later stored for

(continue on page 32)
HORMONIZED CHICKENS

Chemical Synthetics Offer Hope For Practical Caponization

By BOB MILLER '51
Poultry '51

Hormones have created considerable interest among poultry men. Some reports have indicated that these compounds will increase the growth rate of chicks, maintain higher egg production in old hens, hasten maturity in turkeys and improve the appearance and market grade of broilers. Experimental evidence is available to justify some of these claims, but for others, contradictory results have been reported.

Hormones are chemical regulators produced by the ductless or endocrine glands and are distributed to various organs by the blood. The different hormones serve as a check on one another and may perform more than one function. Due to these processes, the body is kept in balance and the behavior is normal to the species and sex.

The pituitary gland, master gland so to speak, is located at the base of the brain. It regulates many other hormones in various other parts of the body. For example, laying hens need a 12-14 hour day for top egg production. The spring flush in egg production is due in part to increased length of day. The active light rays penetrate the eye and stimulate the pituitary gland which influences the ovary to increase egg production. In the same manner, artificial lights during the short days of the fall and winter have been used to increase egg production in hens and to start egg production in turkey breeders.

EDITOR'S NOTE: Care must be taken when consuming birds which have been fed, or have been injected with diethylstilbestrol. Some reports indicate human sterility may occur if humans eat a bird that has undissolved diethylstilbestrol in its tissues.

The naturally occurring estrogenic (female) hormones produce the physiological change associated with maturity in pullets. These hormones cause the oviduct to develop rapidly and to increase the deposition of fat under the skin, in the abdomen and within the muscle fibers as the hen nears sexual maturity. This layer of fat under the skin greatly improves the appearance and market grade of pullets. However, the estrogens produced by the ovary are too expensive to use for improving market grades of poultry.

Organic chemists found a compound whose derivatives produce effects similar to the natural estrogens when injected. One of these compounds was diethylstilbestrol, and, when injected into cockerels and old birds, was found to feminize them. The roosters stopped crowing, began to "sing" and took on female characteristics. The pelvic bones of the male birds began to spread, the vent became moist and enlarged, the skin became soft and pliable and the feather pattern changed to that of the female.

The estrogenic hormones should be of greatest use in fattening and finishing male fowls. The treatment should be useful for broilers of both sexes since they ordinarily grow too quickly to accumulate much fat.

Diethylstilbestrol, however, is far more effective when injected than when given in the feed. Since the beneficial effects of this compound depends upon its concentration in the blood stream, the best way of applying it is to make the compound into pellets which delay its immediate absorption.

The use of pellets of diethylstilbestrol for fattening poultry is permitted by the Food and Drug Administration and several commercial companies have made these pellets available with an implanter or metal band for implanting them under the skin of broiler and old males. A single pellet weighing 15 milligrams is sufficient to produce the maximum feminization in a broiler within a four-week fattening period.

An experiment using thiouracil, a synthetic substance to reduce the effectiveness of the thyroid gland, along with stilbestrol gave the following data:

Thiouracil or stilbestrol alone consistently improved carcass quality, but the combination of these two substances was superior to either administered separately.

Fat deposition and dressing percentage were increased by all experimental treatments and protein and moisture were decreased.

Comb area and testis weight were reduced by all treatments. Stilbestrol alone or in combination with thiouracil produced maximum testis inhibition. Thyroid weight was not affected by stilbestrol alone but was increased by thiouracil; maximum thyroid size was produced by the combination treatment.

In these experiments it appears that maximum gain, efficiency of feed utilization and market quality are obtained when a 6 mg. pellet of stilbestrol is administered in combination with 0.15 per cent thiouracil in the ration from the ninth to twelfth weeks of age.
ALPHA ZETA TAPS THIRTEEN


Officers of the fraternity include: Alan B. Sibley, Chancellor; Robert M. Prince, Scribe; Winston H. Sibley, Treasurer; and Wyndham Manning, Chronicle.

DR. COLLINGS HONOURED
Dr. Gilbeart H. Collings, Professor of Soils and Agronomy, was elected a Fellow of The American Society of Agronomy during its convention earlier this month. This honor is based on outstanding contributions in the field of crop and soil science, and service to the Society. Dr. Collings, who has been at Clemson since 1918, was recognized for his ability as an educator and author in the field of soil fertility, plant nutrition, and the use of commercial fertilizers. For the past several years he has also been consulting editor for a series of college text books.

NEW MEMBERS ADDED TO AG. FACULTY
Six new instructors and three laboratory assistants have been added to the faculty of the School of Agriculture. They include: J. O. Hammons, Assistant Professor of Agronomy; Dr. R. I. Jackson, Associate Professor of Agronomy; E. M. Rallings, Assistant Professor of Agronomy; and C. H. Strickland. The Entomology Department has added Miss Eugenia Inez McDaniel, and Harvey H. Wheless. The three newly added lab assistants are: Miss Betty Bagwell, General Botany lab; Miss Marian Graham, Bacteriology lab; and J. D. Boykin, General Zoology and Entomology lab.

AG. ENGINEERING BUILDING SHAPES UP
The modern Ag. Engineering building complete with radiant heat, glass doors, and farm machinery display room is nearing completion to help give Clemson its “new look”. The quarter-of-a-million dollar structure will also have an auditorium with a seating capacity of two hundred, fluorescent lighting, and a tractor lab with a round turntable. The Department plans to move to its new location in February.

AG. ‘PROFS’ LEAVE FOR GRAD SCHOOL
Professor C. M. (Champ) Jones and Professor J. M. (Jeep) Jones have both been granted leave of absence to complete work on their Doctorates at Cornell University.
FURROWS

AGRARIAN MAKES STAFF CHANGES
Hans F. Paul, Botany senior of Charleston has been named Assistant Editor of the Agrarian, replacing James E. Cushman, resigned. Harry M. Lightsey, agronomy junior of Columbia has been named Managing Editor. New additions to the staff include: Robert T. Ward, Ag. Economics junior of Clemson; Raymond E. Cox, A.H. junior of North Carolina State; E. C. White, Entomology senior of Alabama; Jack L. Sims, Horticulture senior of Georgia; Robt. E. Farmer, Pre-Forestry sophomore of Kentucky; Jack Trimier, Jr., A.H. sophomore of Bedford, Pennsylvania; J. W. O’Cain, Horticulture freshman of Orangeburg; H. H. Flowers, Pre-Vet. freshman of Lancaster and Robert Miller, Poultry senior of Atlanta, Georgia.

JUDGING TEAM WINS HONORS
The Clemson Block and Bridle Livestock Judging Team has recently completed trips to the Southern Livestock Judging contest in Memphis, Tennessee, the Southeastern Livestock Judging contest in Atlanta, Ga., and the Eastern National Livestock show in Baltimore, Maryland.

In Memphis the Clemson team came in fifth following Mississippi, Tennessee, Louisiana, and Kentucky.

In Atlanta, the team placed third with Florida and Louisiana placing first and second respectively. Several men did exceptionally well in the individual classes. George H. Liebenrood placed second in hog judging. Bob Johnson placed second on Hereford cattle and Winston Sibley was second on Angus cattle and third on Hereford cattle. Frank Flowers was fifth highest man in the entire contest.

At Baltimore, Flowers was high man in the hog judging contest. Clemson placed fifth in the entire contest of fourteen teams.

Members of the Clemson team are: Frank Flowers, Winston Sibley, Bob Johnson, Billy Patton, George Liebenrood and Bill Schwiers.

FRESHMAN RECEPTION
On September 8, during freshman orientation week, the Ag. Council of Club Presidents entertained the new freshman entering the School of Agriculture with an orientation and reception.

The President or his representative for each departmental professional organization made a short talk telling the new men what his respective department had to offer in the field of agriculture. After the talks by the student leaders, Mr. R. A. McGinty made a short welcoming address and introduced the faculty members present.

Following the orientation program, refreshments were served and a fellowship hour was enjoyed.

Alan B. Sibley, Chancellor of Alpha Zeta presided at the orientation.

AGRONOMY CLUB ELECTS OFFICERS
During a September meeting of Kappa Alpha Sigma, the Clemson chapter of the American Society of Agronomy, officers for the year were elected. The newly named officers are: Bill Brabham, President; Rupert Kinard, Vice President; A. B. Sibley, Secretary; J. S. Ulmer, Treasurer and C. P. Hamer, Parliamentarian.
TOMATOES FIGHT BACK

Resistant Varieties and Good Management Lessens Parasite Damage

By H. F. Paul
Botany '51

In 1781, when tomatoes were first introduced to this country, tomato diseases were no problem. The few varieties planted then had been brought from England and France, and were grown only in home gardens. Now tomatoes are grown on more than 800,000 acres in the United States and the crop is valued at about 170 million dollars.

At the turn of the century, the commercial tomato industry was concentrated in definite regions. The severity of tomato diseases was continually increasing, until they became as serious as they are today. As far back as 1915, the Department of Agriculture recognized the fact that the control of tomato diseases had become a serious and national problem. A project for breeding disease-resistant varieties was begun, and the first consequential disease encountered was Fusarium wilt. This disease, one of the most prevalent and dangerous diseases of tomatoes, is caused by a soil-infecting fungus which can live for long periods of time in the soil. During the next ten years, a series of wilt-tolerant varieties enabled growers to produce profitable crops on soils slightly infested with the fungus. The control of fusarium wilt is somewhat effective with rotation. Yet, in warm soils and temperatures, the disease remains active; and, due to the expansion of the crop, the gradual infestation of more soil areas and the natural development of more virulent races of fusarium wilt, the disease has become more difficult to control. Field sanitation is a recommended control, but is not very successful because often the measures are not properly applied. The use of resistant varieties such as Marglobe, Pritchard, and Rutgers is urged. The Marglobe is the main tomato used for canning. Presently, the planting of resistant varieties is the best preventative for fusarium wilt; however, there are many other diseases to consider.

Another of the most serious tomato diseases is Early blight, also caused by a fungus. This disease occurs in most tomato-growing regions and is one of the most common and serious diseases of the crop. This disease first affects the young seedling, defoliating the leaves and ruining the fruit. This organism causes the same disease on egg-plants and Irish potatoes. The organism ideally survives on, or in, soil that contains decayed plant tissue, on which it is parasitic. The favorable climatic conditions are high humidity and a temperature of around 75 degrees Fahrenheit. Since the disease is soil-borne, a great many planters make their mistake by crowding plants into the seed bed. Poorly nourished plants seem to be more susceptible to diseases.

A large scale breeding program was started in order to get some variety that is resistant to early blight. One variety, Southland, developed by Mr. C. F. Andrus of The Regional Vegetable Breeding Laboratory, Charleston, S. C., is now used as the resistant variety.

Tomatoes, one of the Nation's most valuable vegetable crops, is highly nutritional because of its vitamin contribution. Diseases of this crop deprive the nation of large quantities of food, but also waste many man-hours of labor.

Loss and waste in the tomato industry can be avoided only when the diseases that cause them are understood and effectively combated. The Department of Agriculture has published a bulletin entirely on tomato diseases.

Tomato diseases are caused by fungi, bacteria, viruses and unfavorable soil conditions. Diseased plants cannot be cured, but it is often possible to prevent infection. The most effective and economical method of growing healthy tomatoes is to use resistant varieties; but, as varieties resistant to most diseases are not available at present, growers must depend upon other methods of reducing losses.

Prevention of disease in the seedbed is particularly important, since the losses from diseases are likely to be less severe if disease-free tomato plants can be set in the field. When chemical treatment is used and the seed is planted in healthy soil, a crop of healthy seedlings usually results. These practices, combined with crop rotation, clean culture and the proper use of fungicides, are the best safeguards against loss from disease.

THE AGRARIAN
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Clemson South Carolina
Agrarian Philosophy
By
The Editors

Bells and Clocks

We all want our money’s worth, but when it comes to being kept in class five minutes overtime, we usually don’t want any more than what we bargained for. With our campus growing by leaps and bounds in all directions, it gets to be quite a hike between classes sometimes. When you are held five minutes overtime in class, it frequently makes you late for your next class. The professor doesn’t keep us in class after the hour on purpose; it’s just that he doesn’t have any signal to end the class, since you can’t hear the guard room bell in most of the buildings.

Why couldn’t we have a synchronous buzzer system connected to all the buildings on the campus? We could have a bell or buzzer on each hall of every building which would be automatically controlled. The cost for such a project would be minor, and it would greatly increase class attendance efficiency.

Another thing, why doesn’t someone either fix or wind up the clocks in Long Hall? For the past four years it has been twenty past two by the clock on the third floor.

We and The Atom

Today, standing at the brink of another world war, we at Clemson are certainly aware of the fact that we may soon be swapping our cadet blues for army O.D.’s.

Since the news that our leaders may decide to use the atomic bomb in Korea, many of us have pondered the big question, “Should we use the A-bomb?” You might wonder, “who are we to be deciding such a question?” Well, we are just part of the people, but the people should have a say in matters such as this.

Our answer is NO! let’s not use the A-bomb in Korea or elsewhere. War can’t be polite, but there must be a mutual understanding between warring nations of just how humane the conflict will be. The way we see it, is that if we use the atomic bomb in Korea, it would be an open invitation for war with Russia. If Russia has the A-bomb, which is highly possible, she could paralyze American industry by wiping out six of our major industrial cities within twenty-four hours after we bomb Korea. Russia has a tremendous stockpile of arms, yet a comparatively small industrial potential, while we have a small stockpile, but a vast industrial potential. A quick war would be the only way for Russia to win; that is attack us before we build up our arms and manpower, and before their stockpile is exhausted.

In these critical times we must reconvert America into another arsenal of democracy. We must hold our American industrial potential at all costs, so let’s forget the A-bomb for awhile.
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A MAN; A DARE; A FELLOWSHIP
(continued from page 7)

counts of tours to the Merchant's Exchange Building, to an egg marketing company, and to an advertising agency. There were a few pages of notes on the day we spent at the Swift & Company packing plant, describing the meat packing industry from actual transactions between commission men and buyers to the shining carcasses and cellophane-wrapped meats that eventually find their way into the butcher's windows and onto the housewife's table. I licked my thumb and flipped right through a tour of the Ralston Purina plant, the St. Louis Zoo, and the research laboratories of the company, and several excellent lectures on Purina organization, job getting, personnel training, and Ralston Purina Cereals.

On the last page of my notes was a brief account of our banquet, held at Garavelli's Italian Restaurant on August 11th, the day ending our two week stay in St. Louis. In the back of my book was a scrapbook affair filled with pictures and souvenirs. I took special notice of the group picture taken of us all, and the faces were those of the finest group of boys I had ever met.

I closed the book and held the checkered thing out—it must have weighed four pounds and was an inch and a half thick. How we could have done so much in two weeks was hard to understand; and also, we had published a 65 page Danforth Grist Mill, telling about the Fellowship and the boys who comprised it.

All this thought on the first half of my fellowship made me remember how I had looked forward to the second two weeks at camp. "Miniwanca is enchanting in summer,—" the folder had said—and it had been, with the sunset-red waves of Lake Michigan dashing to meet the gigantic white dunes.

The milk truck ran into some rough pavement and jarred me from Michigan back into the Tennessee hills, but a road junction, smooth pavement, and the drone of the engine soon lulled me back to Miniwanca. Yeah, Miniwanca had been great, first to last. There had been Mr. Danforth, standing in front of the lodge to greet us in a green checkeredboard shirt and a red checkeredboard tie; and I remembered how I had enjoyed the Life's Essentials class that he led, inviting big men like Mr. Joseph B. Hall, President of Kroger Stores, Mr. Orman Hunt, a director of General Motors, and Mr. Dan F. Gerber, founder of Gerber Baby Products Co., to speak to us.

During my stay at Camp Miniwanca, I had heard lectures on religion, philosophy, and ethics, taught by American, Chinese, and Indian philosophers — big men, and leaders throughout the world.

The open-air tent life, the intramural sports, and the track meet had rounded out the physical part of the program. In fact, the whole theme of the camp had been to balance the physical, mental, social, and religious parts of our times.

The big milk truck swung around a curve, almost throwing me off the milk rack. Turning around in the swivel driver's seat, "H. R." said, "Hey, wake up! we're almost in North Carolina, and it's your turn to drive this thing awhile.

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NOVEMBER 1950
ESTONIAN TAKES A.H. AT CLEMSON

Quite a few students from other countries have studied at Clemson in the past few years. In this column I would like to introduce to you a student who comes from Estonia. He is 19 year old Jaan Kurgvel. Jaan arrived in the United States on the 19th of September of this year. He is attending Clemson on an Alpha Phi Omega scholarship.

Jaan's native country, Estonia, is situated at the outfall of the Finnish Gulf in the northern part of the continent of Europe. Estonia is bordered by Russia on the east and south. The area of the country is 29,546 square miles with a population of 1,126,413, averaging a density of 23.7 inhabitants per square mile. Among the natural resources of Estonia are oil, shale, dolomite, limestone, phosphorite, and gypsum. Climatically Estonia belongs to the moderately cool belt, summers being cooler and winters warmer than in the corresponding latitudes of Eastern Europe. Agriculture is by far the chief means of securing a livelihood in Estonia.

Jaan came to the United States from Germany, where he lived as a refugee or displaced person for almost six years. He left Estonia in September 1944 as the communist troops of USSR were to occupy his native country for the second time. Remembering the first occupation in 1940 to 1942 when the communists deported six percent of the total population of the country to Siberia in two days and nights, Jaan's family thought it better to flee. As there was only one country where they could go at this time, they had to accept this chance — although this country was Germany.

Jaan Kurgvel graduated from the Estonian Secondary School in Lubbeck, British Zone of Germany, in December of 1949. Later he studied at the German University in Bonn for one semester, and then immigrated to the United States, having received the offer for a scholarship in Agriculture from the Clemson Alpha Phi Omega fraternity. Jaan is planning to major in Animal Husbandry and possibly return to Estonia, which has made great advances in cattle production in the past few years. His future plans depend a great deal upon the world situation.

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NOVEMBER 1950

TWENTY-FIVE
TIMBER CRUISING

A Necessity for Good Forestry Management

By R. M. FARMER
Pre-Forestry

In any type of business in which goods are bought or sold, it is extremely important to know the quantity, quality, and variety of merchandise on hand at all times. This also holds true in the proper management of a forest. In order to make his forest profitable, the owner must know not only the identity and distribution of his trees, but also their size and quality. This enables the forester to harvest at the right time the trees demanded on the market.

One can readily see taking inventory in a forest is a tremendous undertaking when compared with the counting of goods in a store or other business. This process of taking stock, commonly called "timber cruising," requires much time and patience on the part of the forester;—but it pays off profitably in the end, for then he has the potential products of a forest at his fingertips.

Now, one might ask, just how is this "timber cruising" done. Are the trees simply counted and classified according to size and location, or does it involve more complicated work? To illustrate the process let us imagine that we have a large tract of timber which has never been managed. The first step in "cruising" this land consists of obtaining a map of the region. After this lines are drawn on it—usually north and south or east and west—along which sample plots and trees will be taken in the field. At the present, aerial photographs, which present a reliable picture of the area, and even enable one to tell where one type of timber ends and another begins, are used. A forested area that has uniformity of species, age, density, and rate of growth is called a stand. These stands are segregated and delineated on the aerial photograph with the aid of a stereoscope. These stands must be located and sampled in the field. After the streams are located and drawn on, the map becomes ready for field work.

Then out to the woods we go to begin our work. We set up our compass at one end of our first line, which we shall say runs north and south. Then we stretch out our chain and start chaining along the line being careful to keep on the north-south meridian. After progressing four chains we stop to take the first sample plot. Taking a plot consists of tabulating the name and D.B.H. (dia. breast high) of every tree within one tenth of an acre. The chief of the crew stands in the center of the plot and the other members of the party circle around him calling out the information which he records on a special field sheet. Then the age, height, and merchantable height of a sample tree, usually one of the predominating species, is recorded. The crown density, ground cover, and regeneration are then noted as we prepare to chain on to the next plot.

Pulling the chain on a cruising can be a trying and sometimes amusing experience. The bearing, which creates the direction of the line to be chained, invariably goes through the thickest, most impenetrable part of the forest. If there is one small formidable patch of briars in twenty acres of woods, the line will always, without exception, run exactly through the center of it. Therefore the head chainman must either be a little fellow who can wiggle through without a scratch, or a big bruiser who can stamp out a superhighway for himself and the rest of the crew without getting tangled up.

Often before we have chained another four chains, we must move off to the left or right of the line in order to take a plot in a stand which is indicated on the aerial map, but is not crossed by the line of our bearing. This is called an off-set.

After the stands, intersected by or adjacent to the first line, are inventoried, we repeat the same operations on subsequent lines until the whole forest is cruised. Now the data assembled in the field must be evaluated and compiled in the office. First of all we calculate volume, using the basic data collected in the field. The volume of timber in each stand is determined in board feet, cubic feet, and cords while the volume of each species of tree and each forest type (hardwood, coniferous, etc.) is also calculated. Then height-age relationships are worked out by means of graphs. From this data we determine the rate of growth of each stand. Then the cutting budget or annual cut, which is based on the several types of maps must be constructed, for without them the management of the forest would be impossible. The two indispensable ones consist of a map showing each stand, idle fields, cultivated fields, etc., and another one showing important physical features, e.g., contours, roads, trails, streams, and boundaries.

Having finished the maps, the calculations, and the tabulations, it can now be said that the area has been cruised. We know the location, quantity, quality, rate of growth, and type of the timber to be handled. The problem of how, when, and where to cut is partially solved, and the first step toward proper management is taken.
He's one of the Experts

behind this soil conservation picture

The farmer and his son did the work. The soil conservation service helped them make the plan. The farm equipment dealer made this new kind of farming convenient as well as practical.

Without home-owned power farm equipment, perhaps none of it could have happened. Today we switch to conservation farming because it means a bigger income, and experience has proved that farmers will stay switched only if conservation farming is made convenient as well as profitable.

The farmer doesn't need to wait for or hire heavy earth-moving equipment for much of his soil conservation work. With his own tractor he can build terraces and grassed waterways, farm on the contour and carry out other recommended practices. When he needs advice on how to operate or adjust his equipment, the farm equipment dealer is the best source of information. The dealer is one of the experts, too.

That's why Allis-Chalmers dealers have been supplied with a new soil conservation handbook, "Making Paydirt Last." It looks at soil conservation from the farmer's side of the fence — detailing practices for cropland, grassland and woodlot.

In company with the county agent, college soils man, vocational agriculture instructor and soil conservation service, the A-C dealer is becoming a recognized partner in the teaching of better farming.
OPERATION POLLINATION
(continued from page 6)
ated by George Rea, a former Extension Professor of Beekeeping at Cornell University, will serve as a good illustration of the value of bees in apple pollination. One orchard owner on Lake Ontario had 50 acres of apple trees well interplanted with pollinating varieties but very little fruit was set each year. Two men investigating the problem found only eight individual insects in eleven days of collecting, indicating the lack of pollinators. The following year sixty colonies of bees were introduced into the orchard and the yield jumped from seven hundred and fifty bushels to thirty five thousand bushels. This is an increase of thirty-four thousand, two hundred and fifty bushels, or more than forty-five times the production before the bees were brought in. The case is the same for many other fruit crops.

The clovers, alfalfas, vetches, and many other hay and pasture crops are also dependant upon the honey bee for pollination. An experiment conducted this past summer by Professor David Dunavan, Clemson Entomology Department, on the seed production of ladino clover in South Carolina yields some interesting and valuable information. The experiment was carried out in a Clemson pasture planted in ladino clover and fescue. Screened cages were used in the experiment. One was set up to give the enclosed clover a high proportion of bees working the blossoms, and to assure good pollination. This was arranged by removing the end piece from the bottom board of the hive thus allowing a similar opening at the front and back of the hive. This was then placed against the cage, thus allowing the bees free access to the clover in the cage and also allowing normal flight of the other field bees. (See Photo) Another cage was set up designed to keep out all insects, pollinators and otherwise. This prevented any insect activity on the blossoms, and any pollination which took place had to be either natural self pollination by the blossom or wind pollination. A third plot of the same size was set up, but there was no cage over this area.

When the experiment was started all flower and seed heads were picked from the plots, so that all heads involved in the experiment were fresh, and had not been previously visited by some other insect. At the end of the experiment 50 seed heads were gathered from each plot and were carefully threshed out to obtain all seed from each fifty heads. The following figures are in the average of the plot and its replication. The heads from the plot in which insects were excluded yielded one hundred and thirty-six seed for fifty seed heads, the open pollinated plot yielded three thousand, six hundred and thirty-two seed per fifty heads, and the plots with bees only gave a yield of four thousand, four hundred and ninety-three seed from fifty heads. The results of this experiment are very satisfying and prove that the honey bee is necessary for ladino clover seed production.

LIKE TO STUDY ABROAD NEXT SUMMER?
You can earn full credits on an all-expense, university-sponsored study tour via TWA

Now’s the time to start planning for one of the most interesting and profitable summers you’ve ever spent... sightseeing and studying in Europe while you earn full university credits. Again in 1951, TWA will participate in the tours that proved so popular for the past two years... in cooperation with the “Institute of University Studies Abroad.” And you’ll have a chance to learn at first-hand the new concept of air-age geography... traveling by luxurious TWA Skyliner. Remember, half your time will be devoted to touring Europe and the other half in residence study as indicated below.

Look at this list of study-tours being planned for next summer (from four to nine weeks abroad), and check the ones that interest you:

□ SWITZERLAND □ University of Geneva
□ University of Zurich, School for European Studies
□ University of Lausanne
□ Fribourg Catholic University
□ FRANCE Sorbonne (Paris) □ Lille (at Boulogne-sur-Mer) or
□ Toulouse (at Nice)
□ AUSTRIA University of Salzburg
□ BRITISH ISLES AND IRELAND Study at various universities
□ SPAIN Madrid and Barcelona
□ ITALY Florence and Siena
□ GENERAL EUROPEAN Study and Travel Tours
□ INDIA “India and Problems of the Orient,” including Cairo visit, a 6-week tour leaving in January, 1951,

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Please put me on your list to receive detailed information about study tours via TWA indicated above, to be sent as soon as available.

Name
Position
Address
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THE AGRARIAN
Yes, modern conservation practices soon begin to repay their cost—enable farmers to eat their cake and have it, too. Controlling erosion helps to hold precious top-soil on the land and, at the same time, hoists farming profits.

Contouring, terracing, strip-cropping, and other soil-saving operations, which can be practiced with regular John Deere farm equipment, mend mismanaged or erosion-scarred land. Grasses and legumes, together with agricultural limestone and commercial fertilizers, rebuild soil productivity in a hurry. This double-barreled program, recommended by agricultural authorities, enables soil conservation farmers to improve their places and, at the same time, raise bigger yields and enjoy better incomes than ever before.

Soil conservation, however, is more than a remedy for ailing acres or a recipe for bigger profits. It's a gilt-edged investment in America. By making our agriculture more stable and productive, modern soil conservation practices help to maintain our economic well-being and safeguard our national security.
He only needs one drink to calm himself.
His steadiness to improve.
(Last night he got so steady, He couldn't even move)

He: We sure had a good time last night for only fifteen cents.

Girl: Yes, and I wonder how my little brother spent it.

AROMATIC TOBACCO.
(continued from page 9)
The rows of plants and followed by one furrow with a small subsoil plow in the middle of the row. The second cultivation is carried on mainly to control weeds and to loosen the soil in order to get better aeration. In general, very little cultivation is required during most seasons.

The first priming begins 40 to 45 days after transplanting. For maximum yield and quality, leaves are harvested when they are quite green. Leaves showing yellow or any burning will be of light weight and poor quality. Priming should be done early in the morning before the dew on the leaves has dried.

Leaves are then strung on a string by the use of a 14-inch needle and then tied on a wood or bamboo stick. As soon as the leaves are properly arranged on the string, they are placed in a cool and shady place on racks so that the tobacco can yellow and wilt, which will take from 36 to 72 hours. After wilting, the tobacco is placed on portable racks on casters and placed in the barn for curing by the sun-heat method.

Approximately 700 square feet of white sand or concrete should be close to the opening of the shed for use as a runway for curing in the sun. This place should be dry and free of grass and weeds, as vegetation causes a higher humidity and, consequently, delays curing of the tobacco.

As soon as the tobacco crop is properly cured, it is baled for delivery to the Southeastern Aromatic Tobacco Company in Anderson, South Carolina. This company is the sole buyer of all aromatic tobacco produced in five states. Each bale offered for sale is graded individually, and the price is determined according to the grade. All growers of aromatic tobacco are guaranteed a minimum average price of 85 cents per pound for all usable tobacco. Most growers average 85 cents per pound, and the highest price is $1.25 per pound.
Yields range from 600 to 2000 pounds per acre, the average being 1000 to 1200 pounds.

Aromatic tobacco is susceptible to disease and insects, such as blue mold, flea beetle, budworm, hornworm, and nematodes. These diseases and insects are controlled in the same manner as in raising flue-cured tobacco.

THIRTY

IF EVERY FARMER KNEW
The Full Value of Inoculated Legumes

*ABOVE: Comparative yield from two 250-foot rows—nubbins on left did not have benefit of inoculated cover crop.

The bigger yields of clovers, alfalfa, soybeans and lespedea you get from inoculation is not your only benefit. Inoculation with NITRAGIN helps these and other legumes but it helps boost yields of other cash crops, too. The Georgia farmer pictured above reaped 56.3 extra bushels of higher quality corn from a test acre that followed an inoculated legume cover crop. The pile on the right easily shows the extra benefits of inoculating all legume crops, whether they are used for hay, seed, or soil building. For best results with legumes, always use NITRAGIN... the inoculant in the orange-colored can.

*Name of farmer on request

THE NITRAGIN COMPANY, INC.
3929 NORTH BOOTH STREET • MILWAUKEE, WIS.
This little fellow says emphatically . . . "These are My Toys" . . .
It's natural for him to say this, and he's the capitalist of tomorrow . . .

He may decide to be tomorrow's farmer or clerk or business executive or mechanic or scientist or almost anything he wants to be. But that's not the most important thought right now . . .

This is . . .

He can be the capitalist of tomorrow because our competitive enterprise system says he will be free to work where and when he will, to save, to invest, to spend. He will choose his work for his own particular kind of satisfaction. He will save for his own self-interest, but that helps everybody. He may invest in his own advantage and that makes work for others. For there is now, and must continue to be, incentive! An incentive that is realistic . . . that creates . . . that helps produce more.

We at Minneapolis-Moline hope to do business with this young American. We hope to help him grow . . . and in turn his growth will help our growth . . . and our growth will again create more and better opportunities for more people.

This is the chain reaction of good living that the competitive incentive system brings out . . . And our competitive enterprise system is the incentive system . . . the American way . . . WHERE ability and the willingness to work and to produce, still earn a deserved dividend . . . WHERE competition stirs everyone to do his level best.

The world has never known a better system or plan of progress for all mankind . . .

Let's guard this way of life . . . our American Heritage. It's been mighty good to a lot of people—and if we take care of it, the best is yet to come. The most important thing about America is that it is the land of hope, of promise, and of progress for our children.

Our part in the American parade of progress is the manufacture of a complete line of Modern Farm Machines, Visionlined Tractors and Power Units for modern farming and industry.

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MINNEAPOLIS - Moline
MINNEAPOLIS 1, MINNESOTA
Grain sorghum is certainly a worthy competitor of corn. It has a promising future in the South and should help farmers to adequately plan their livestock feeding program.

A college student is one who enters his alma mater as a Freshman dressed in green, and emerges as a senior dressed in black. The intermediate process of decay is known as a college education.

"They say that there's alcohol in bread."

"Good, then we'll drink a little toast."

A small boy was seated on the curb with a pint of whiskey in his hand, reading ESQUIRE and smoking a big cigar. An old lady passed and asked: "Little boy, why aren't you in school?"

The child replied: "Damn it lady, I ain't but four."

The young Cadet attending a community dance tried to make conversation with his attractive companion, a symphony in sepia.

Smiling he said, "You look like Helen Brown."

She nodded her head. "Yes, I know," was her coy reply, "I don't look so good in yellow either."

Two Scots were playing golf under the broiling sun. One of them had a stroke — and the other one made him count it.

"Hey look at that bunch of cows."

"Not bunch, herd."

"Heard of what?"

"Herd of cows."

"Sure, I've heard of cows."

"I meant a cow herd."

"What do I care if a cow heard? I haven't said anything I'm ashamed of!"

A Hollywood actress who had been married to a director for three years without a blessed event, got a divorce and married a producer.
quick and lasting

rust protection

for that big farm investment

Farm machinery is important—it represents a large investment that will give years of extra wear if you give it proper care. FALL is the time to protect valuable machinery from becoming winter feed for rust!

Constant research by ESSO helps develop better products for better farming

**ESSO RUST-BAN 347**—forms a protective coating that helps prevent rust on plows, cultivators, discs and other implements... provides money-saving, all-winter protection. Esso Rust-Ban 347 can help add years of usefulness to farm machinery! EASILY applied, with a rag or old brush!

**ESSO RUST-BAN 603**—to help prevent rust attack on the inside of idle engines. Ideal for your tractor engine... forms a protective film on inside surfaces, gives a lasting coating to inner precision parts, provides dependable "lay-up" protection! Obtain directions before using.

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High-quality products for modern farming
- Esso Extra Motor Oil
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- Esso Tractor Fuel
- Esso Weed Killer 35
and many other Esso Farm Products

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