MEMORANDUM

Subject: Use of potassium nitrate in tobacco fertilizer.

Observation: It appears that the use of potassium nitrate increases the potassium content of the tobacco leaf, increases yield, and improves the smoking quality of the tobacco.

Comments: Potassium nitrate is highly soluble and readily absorbed by the plant. The nitrate ion is readily assimilated and the potassium ion would probably combine with an organic anion. The potassium organic compound would be less soluble in the plant sap than the potassium nitrate. The lower solubility and the lowered potassium ion concentration in the plant would result in the absorption of a relatively large quantity of potassium.

Where relatively large quantities of chlorine are present in the plant, the potassium chloride would tend to maintain a relatively high potassium ion concentration in the plant sap. The high potassium ion concentration in the plant would tend to lower the intensity of absorption of additional potassium. Increasing the potassium content of the plant without increasing the chlorine should significantly increase the intensity of the absorption of carbon dioxide by the plant.

The increase in the availability of carbon dioxide for photosynthesis could result in higher yields and higher content of sugars and other carbohydrates, which improve the smoking quality of the tobacco leaf.

In wet seasons, and in some poorly drained soils, excess water may exclude soil air, which will result in inadequate soil aeration and a deficiency of available oxygen in the root system of plants. The oxygen in nitrate ions, liberated by reduction reactions within plants, may significantly increase the supply of available atomic oxygen for crop plants, particularly in the root system. A deficiency of oxygen in the root system is often a critical factor in crop production. However, this problem may be corrected by the application of adequate quantities of nitrate nitrogen.

H. P. Cooper

(Dr. H. P. Cooper is retired and was formerly Director of The Clemson (S. C.) Agricultural Experiment Station.)

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This magazine is published twice yearly by the undergraduate agriculture students, and coordinated by The Agrarian Staff and the Student Agricultural Council. Opinions expressed in the magazine reflect solely the opinion of the author and do not necessarily reflect the policy of the School of Agriculture or Clemson College.

THE COVER "Three Phases of Agriculture" by Bob Upson. Clemson's Tillman Hall is depicted with lines radiating to these different phases of agriculture.

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AGRARIAN PHILOSOPHY

By The Editor

Agriculture And You

American agriculture has not experienced very many lean years—thanks be to God for this fact! But the blessing of abundance has created what some American taxpayers consider a burden in the form of surpluses. Agreed, the United States Government spends much money for the storage of what is considered excess agricultural products, but other commodities such as medical supplies and war materials are also stored. The foremost question is not the cost of storing such items but whether a reserve of the materials is necessary to the national security.

There is no doubt that in the case of war a reserve of both war materials and medical supplies would be very much appreciated. Another instance in which reserve medical supplies would come in handy would be a widespread epidemic. How about agricultural products? A reserve of agricultural products would also prove beneficial and maybe even necessary for our survival in case of war or epidemic, either of which would take people out of production of food and fiber. Another thing we cannot overlook is the possibility of famine. It seems to me, then, that a reserve of food, fiber, medical and war supplies is a necessity, although a costly one—but could it be that the absence of such a reserve might prove more costly, maybe in terms of human lives rather than dollars?

Perhaps you are interested in some phase of agriculture as a career but are concerned over the fact that American agriculture is producing over and above our present needs and figure that you may be better off in some other field of endeavor. But if your interest lies in agriculture, please keep in mind that today's level of production will be insufficient rather than too great a few years hence if the present rate of population increase continues. I am not saying we are doomed. The point is that increase in agricultural technology must keep pace with the increase in population if we are to remain well-fed and well-clothed.

The purpose of the foregoing discussion is to say that people are still very definitely needed in agriculture. The staff of The Agrarian is of this opinion and is attempting, in this the Fall-Winter '63-'64 issue of The Agrarian, to show prospective future agriculturists something about the broad field of agriculture, and to tell those who have come to the conclusion that agriculture is something of the past that there is a place for interested individuals in agriculture.

So if you're interested in agriculture, wade right in and I'm sure you'll find, in either the production, business or scientific phase of agriculture, a place of service which will give you the satisfaction of a job well done and a life usefully lived.

Yesterday, Today And Tomorrow

The Agrarian was born in 1938 and grew through much sweat and toil into a B.P.O.C. (big publication on campus). As with many quality publications, however, The Agrarian spent, in the quest of a bigger and better magazine, more money than was economically wise. Thus it was that in 1958 The Agrarian ceased publication because of financial difficulties.

In the fall of 1960, however, under the leadership of the vitalistic Jere A. Brittain, The Agrarian again appeared on the Clemson campus. Jere and his staff and the staffs following are to be commended for the valuable service which they have rendered. Last year Jerry Moore campaigned for a return to a slick type publication, but, much to his disappointment, the money was just not to be had. Jerry's effort proved far from being a failure, however, as he instilled into the present staff his ideas and opinions, and as a result the present issue of The Agrarian marks the first slick issue since the 1958 difficulties.

Recognition should be given to Jimmy Williams, Charles Josey, Jimmy Palmer and Dr. J. T. Lazar for their hours of concentrated effort in securing funds through sale of advertisements, and for the management of business affairs in making possible this issue of The Agrarian. Other students worked willingly in trying to secure funds but were unsuccessful in their attempts. To them we also express our appreciation for their effort. Various departmental student clubs contributed funds from their already deficient supplies, and to these we express our gratitude.

If you have an occasion to do so, please patronize our advertisers as they paid dearly for the ads you see in this magazine in order to help us get into a more sound financial condition. Good news! The financial picture is looking bright; there is even talk among the staff of lowering advertisement rates next year!

The Agrarian has a hard working crew on the staff this year which has kept things running smoothly. Clubs have also been cooperative in getting articles in (some even on time). All in all, participation has been very good with this issue. But how about next year? In order that The Agrarian may continue on the incline, all interested students are invited to attend our meetings and observe our operation as we in turn observe you. Then sometime during second semester, next year's staff will be chosen. Do you think you can benefit The Agrarian? I think it has something to contribute to you if you are willing to work with it.
WHAT IS AGRICULTURE?
By Dr. J. W. Jones
Director of Agricultural Teaching

Is agriculture a science? Yes, it is a broad and complex science, primarily an applied one involving food, clothing, and shelter—the necessities of life.

Is agriculture a business? Yes, the nation's biggest.

Is agriculture an art? Yes, many skills are required in the production and marketing of farm products.

Modern agriculture is, therefore, the science, business, and art of producing, processing, distributing, and utilizing plant and animal products, including those aspects of economic and human relations related to these activities.

About 21 million people in this country are in jobs related to agriculture—one-third of the nation's total employment.

Five million people are engaged in farming—the production of food and fiber. This is equal to the combined employment in transportation, public utilities, the steel industry, and the automobile industry. The efficiency of the American farmer has increased tremendously. In 1940 one farm worker produced enough for himself and 10 others. Today he produces enough for himself and 26 others. One hour's work will purchase more food today than it did 30 years ago.

Six million people provide supplies and services for the farmer. Each year farmers spend about 27 billion dollars for goods and services to produce their products. These expenditures include 3.5 billion dollars for fuel, lubricants, and machinery maintenance. Farming requires more petroleum than any other single industry.

Ten million people are employed in the storing, transporting, processing, and merchandising of agricultural products. The meat and poultry industry, for instance, employs 300,000 people and has an annual payroll of approximately 1.5 billion dollars.

Since all segments of agriculture, including farming, are rapidly becoming more complex, they require employees with higher levels of education. This means that a greater proportion of workers in this industry need a college education. The demand for college agricultural graduates is increasing. According to a recent national study, about 15,000 agricultural graduates are needed each year. Our land-grant colleges, such as Clemson, are now graduating about one-half this number.

What subject matter makes agriculture a unique area in education? There must be some good solid reason for the long-time existence of schools and colleges of agriculture. Otherwise, the responsibility for educating future workers for this basic industry could be assigned to other segments of the institution. Agriculture is a unique area in education because it applies the basic and organizational sciences to biological material for economic implications. This is the irreducible core of subject matter that is agriculture.

Because of the increasing complexity and diversity of agriculture, it has become impossible to cover adequately all of its important facets in a four-year undergraduate curriculum. As a result, the Clemson School of Agriculture has established options in science, business, and production technology in several of its curricula. These options make it possible for the student to emphasize the facet of subject matter that will best prepare him for his chosen career.

The undergraduate curricula available in the School of Agriculture include agricultural economics, agricultural education, agricultural engineering (jointly administered by the Schools of Agriculture and Engineering), agronomy, animal science, dairy science, entomology, food technology, forestry, horticulture (fruit and vegetable, and ornamental), poultry science, and pre-veterinary medicine. The biology curriculum with options in botany and zoology is also administered by the School of Agriculture.

Senior (at a football game)—“See that big substitute down there playing quarterback? I think he's going to be our best man next year.”

Coed: “Oh, darling, this is so sudden.”

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Surpluses—A Blessing In Disguise

By Gene W. Dukes, Ag. Ec.

Americans today are faced with a very unique problem—the problem of farm surpluses. A large percentage of the world population today lives in the constant fear of hunger, while we in America are constantly seeking methods to solve a problem created by overabundance. The fact that our government had 5.3 billion dollars (as of December 31, 1961) tied up in what many regard as unneeded stocks of storable farm products is frustrating to taxpayers, worrisome to officials, and puzzling to the general public.

The so called problem of farm surpluses is given much coverage by newspaper editorials, legislative reports, and almost every type of news media in the United States. Many people seem to think that this problem, if not liquidated, could prove detrimental to our economy as a whole.

Our economy, however, hasn’t always been faced with such a unique problem; instead, during the earlier periods of our economy the reverse of this situation occurred. General Washington had no farm surpluses to draw upon when his army faced hunger during the bitter winter of 1776. During this period, most farmers had to devote all of their time to the feeding of their own families, while today one farmer can feed 26 other people and still find ample time for relaxation.

How has agriculture become so dynamic? Is it because a larger percentage of people now farm? No—the farm population has dwindled from almost 100% of the total population during the period before and after the Revolutionary War to only about 7.7% of the total today. Is it because more resources are being utilized? No, the acreage of land in production has stood fairly stable over the past years. Certainly the amount of labor put into agriculture has nothing to do with this great increase in production, because man hours devoted to agriculture have actually been decreasing with time.

What has caused the boom in production? There is no one sentence answer to this question. There have been many contributions to agriculture from within the agricultural population and from outsiders. Farm machinery companies have developed machines which enable the farmer to plant and harvest efficiently. Agricultural scientists have developed new varieties and improved old varieties of different crops to increase output. The increase in knowledge of the different nutrients that plants need to grow and the proper adjustments in the fertilizer industry have had beneficial results. If I had to designate one phase which has contributed most to this tremendous increase in output capacity of the American farmer I would place emphasis on the increase in the managerial ability of the farmer.

The American farmer today is a businessman in all respects. He is motivated by profits, and spends many hours reviewing his facilities at hand in an effort to increase his profits. He considers the returns from which he could get from allocating his resources among different crops and means, and chooses the one he considers the most beneficial to his entire farming program. The American farmer has learned to use credit in the planning and expanding of his farm program. In the past the farmer was dreadfully afraid of debts and foreclosures, but through the example set by industry, and the improvements in the lending programs to farmers, he has changed his attitude and now seems to regard credit as an essential means of increasing production.

The American farmer has learned to incorporate new techniques of production into his farming program, he has pushed specialization to a peak, and has built up stores of capital equipment which are necessary for an efficient operation.

Surpluses are the result of the ability of the American farmer to adapt to the most improved methods of increasing output. Our population has increased from just a few million during the early days of our country to about 183 million today, but instead of the farmer keeping in step with the population growth he has stridden ahead of it.

Experts say our population should reach 200 million by 1975, and even with the great advances of knowledge, scientists probably will never find anything to really take the place of food. So our population will keep on buying bread, milk, meats of all sorts, vegetables, and all varieties of our present food supply in greater quantities than ever before. The resources of the American farmer are not unlimited. There is just so much more land that can be put into agriculture, so this increase in demand is going to have to be met by still further improvements in the operation of the farm. Whether the farmer meets this increased demand is going to depend upon whether or not he can sort out the new techniques and plug them into his operation in such a way that he will profit by them.

Surpluses, then, should give the people of America a feeling of security. Even though they do represent a touchy problem, they also represent the advances of agricultural production. Surpluses show that the farmer is progressive, that if it is possible he will increase production with time, so that future generations of Americans will have a bountiful quantity and quality of all sorts of agricultural products.
Science Assures Quality Milk

By Spann Brabham and James McMillan, Dy. Sci.

Much time, labor, and money is spent by federal, state and local governments for scientific research and development dealing with methods and processes for assuring the consumer a wholesome and plentiful supply of milk and dairy products. Science plays an important role in making and keeping milk the purest food in the American diet.

Methods for the determination of the freezing point of milk have been developed to prevent the adulteration of milk by "added" water at production and processing levels. Accurate butterfat and total solids methods are constantly employed to assure that milk and other dairy products meet quality established by state and federal authorities. Bacteriological assays are made to determine the milk's sanitary quality. Methods based on the presence or absence of enzymes are used to insure that all milk is properly pasteurized.

Most of these methods and processes have been developed in colleges of agriculture and state experiment stations located throughout the United States. With the passage of the Morrill Act which initiated the establishment of the land-grant colleges, a place was provided for the research and development needed to make the United States dairy industry second to none in the world. In these colleges reside departments of dairy science in which scientists, specializing in biochemistry, bacteriology and other related subjects, strive to improve the quality and consumer acceptability of milk and other dairy products.

Serious flavor defects may be found in milk. Most of these flavors originate during processing or distribution, but there are a few that develop at the production level. Research has shown that consumers prefer the same flavor in milk from day to day although it is seldom produced with uniform flavor by the cow. Flavor defects have been studied, in many dairy science research laboratories and methods have been devised to eliminate them. The vacuum pasteurizer was developed to remove most fat-soluble off-flavors from milk and to "standardize" milk flavor from day to day. Rancidity is the only off-flavor that gives the milk industry a great deal of trouble today, and through scientific research, its occurrence is being rapidly eliminated.

The dairy industry is the only industry that has "zero" tolerance for drugs. Absolutely no drug residues can be present in milk. Penicillin is the drug that is of primary interest to the dairy industry, because a few people have allergic reactions to it. Penicillin is used in the treatment of bovine mastitis—an irritation of the mammary system in dairy cattle, as in humans. The treated animal's milk must be disposed of for a certain length of time after treatment. Milk found to contain drugs of any kind is prohibited from entering distribution channels.

The freezing point determination has given the milk plant a very efficient method of checking for adulteration of milk by "added" water. The addition of water to milk at either the production or processing level is not permitted by either state or federal authorities. This is one of the measures in quality control of milk. The freezing point value of milk has been found to be affected by vacuum pasteurization in much the same way as by the addition of water. This presented a major problem between the milk plant and the producer until science revealed the answer. It was found that vacuum pasteurization raises the freezing point of milk 0.0055°C., equivalent to one percent "added" water. No water has been added but soluble gases have been removed making it appear that water was added.

Milk, like other food products, is a good medium for the growth and multiplication of patho-

(Continued On Page Seven)
Is vocational agriculture in the high schools important?

Approximately 3-10 per cent of the total population of the United States today is engaged in agricultural production and the present trend is for the percentage to keep decreasing. This gives each farmer the responsibility of feeding more people than ever before. In addition to these engaged directly in agriculture, approximately another 20 per cent of the U. S. population is engaged in the total industry of agriculture. This total industry includes, in addition to production, marketing, processing, and services to the farmer. At least 2 workers in off-farm agriculture will be needed to supply and service each farmer and process and market his products. All these are jobs in which a knowledge of basic agricultural principles is essential or highly desirable.

Although the number of farm operators is decreasing, the number of workers per farm is steadily increasing. In South Carolina the total number of farm workers has increased from 12,790 in 1954 to 17,142 in 1959. This is an increase of 34% for the five year period. This represents additional regular employment opportunities for nearly a thousand agriculturally trained persons per year plus replacements for these workers.

Not only the number of workers is increasing but the quality of workers desired is going up. The hired workers must, in addition to being able to operate and maintain modern farm machinery, have a basic knowledge of scientific farming methods. Today many states are faced with the problem of a surplus of farm laborers and a shortage of the type of skilled, well-trained farm workers needed on modern farms.

The fact that the majority of farm workers today are relatively untrained and unskilled in good measure explains the difference in average wages between farm workers and workers in other industries.

The average age of farmers in South Carolina is about 50 years. It is estimated that 2,400 persons will be needed annually to replace the farmers who retire, die, or quit. At present about 4,800 farm boys reach maturity in South Carolina each year, meaning there are farm operators' jobs for about half of the boys who grow up on South Carolina farms.

So, again the question, is vocational agriculture important? Today's farmer must keep abreast of new technology and production methods to perform his job efficiently. Since the majority of the young men going into farming today do not attend college, where will they get the training necessary to become successful farmers? Training high school students in basic agriculture is more important now than ever before. What of the non-farm agricultural worker? Again vocational agriculture is one of the answers to providing the necessary training or providing the background for training many of these workers.

The Block and Bridle Club News

By Jim Heselbarth

This fall the Clemson College Livestock Judging team, coached by Professor Dale L. Handlin and sponsored by the Block and Bridle Club, has participated in two intercollegiate judging contests.

On September 21, the team competed in the Mid-South Fair in Memphis, Tennessee. After the contest the team was treated to a rodeo and a banquet. Wayne Long placed fourth individual in the contest.

On October 2, the Judging team participated in the Southeastern Fair Judging Contest in Atlanta, Georgia. Clemson placed third out of eleven with Tillman Mathias third high individual and Wayne Long tenth high individual. The team was the number one team judging hogs.

Members of the team who took the trips are: Tillman Mathias, Wayne Long, Clyde WhENUH, Bill Howell, Jim Heselbarth, and Hubie Waldrop. In November, the Meats Judging team took part in judging contests in Baltimore, Maryland, and Madison, Wisconsin.

The Block and Bridle Club held its annual fall bar-b-que at the Clemson - Georgia football game on October 12. Each year the club sponsors a fall and a spring bar-b-que to finance the activities of the club. Primary activities of the club include sponsoring trips for the livestock and meats judging teams and sponsoring the Clemson College Little International Livestock Showmanship and Judging Contest.

To study the migratory habits of birds, a government agent released thousands banded with metal strips, reading, "Notify Fish and Wildlife Division, Wash, Biol, Serv." They soon heard from a North Georgia farmer. "Gents, I shot one of your crows last week and followed the instruction attached to it. I washed it, biled it, and served it and it shaw was awful."

SIX
Food Supply—Imperial Style

By Jeff Denit and Jake Joye
(Student Branch—A.S.A.E.)

Imperial Valley, California is now famous. What was once called the Colorado Desert, a dry, parched region of famine, is presently a half-million acre, "open-air" greenhouse. How this came about is a wonder to agricultural scientists the world over.

At the turn of the century the old Colorado Desert was, at best, bone dry. A paltry three inches of rain fell annually and this evaporated almost as it fell. But a group of speculative promoters organized a company and built a canal to irrigate the valley with water from the great Colorado River. Hundreds of settlers, sensing the potential of the area, flowed into the valley. In 1901 the canal was opened. But, even though the land was now productive, the greatest enemy of all desert irrigation, salt poisoning, waited for the conditions wherein ruin and waste would once again cover the newly-formed farmsteads.

To explain this problem: In areas with high annual rainfall leaching actually benefits the land by carrying the salt compounds to rivers which, in turn, deposit the salt in the ocean. In arid areas the high temperatures cause rapid evaporation and upward movement of the water through the topsoil. The net result is that the salt compounds, normally leached away, are pulled to the plant root zone and cause ultimate death. Many millions of acres of the fine land in the Middle East have been abandoned for this very reason.

By 1920 the Imperial Valley was also being abandoned—the ravages of salt poisoning were prevalent.

This devastation led to the initiation of one of the most expensive and thorough research projects ever launched. Federal and state agencies and universities in this arid region united to find a solution.

After many years of arduous research they found the answer. A 32 million dollar drainage system was installed six feet below the soil surface. With 9,500 miles of tile drains, the valley literally flushes itself as you would an automobile radiator after the winter season. Irrigation water comes in on the surface and the drains remove it along with the salt well below the tender root zones of the plants. Two 100-car freight trains of salt are dumped into a basin at the northern end of the valley each day!

Now, some forty years after the valley seemed doomed, it is one of the richest, most productive areas in the world. Its growth media is topsoil which was deposited by the Colorado River over millions of years. In some places this topsoil reaches a depth of two miles! This valley has an almost ideal climate with 365 days of sunshine and only an occasional light frost. Each year the valley produces 549,000 head of cattle from 172 feedlots; 28 million dollars worth of lettuce, one-third of the nation’s carrots and cabbage in January and February, along with a 3.6 bale-per-acre cotton crop.

From land which was worthless, the Valley is now valued at $1,000 to $1,500 per acre. The Imperial Valley with its rich soil and miles of green vegetation is truly a monument to engineering in agriculture.

Science Assures Quality Milk
(Continued From Page Five)

Genic bacteria. There are many precautions taken today to assure the public that milk is one of the safest foods in the national diet. The development and use of the pasteurization process makes certain, if present, that all pathogenic bacteria will be destroyed before the milk is marketed although the development and maintenance of disease-free herds, with annual or biannual checks for diseases such as tuberculosis and brucellosis, makes their presence extremely unlikely. At regular intervals a check is made for efficient pasteurization by testing for the enzyme phosphatase. Research has revealed that both this enzyme and pathogenic bacteria are destroyed by efficient pasteurization, so a test for phosphatase will determine whether or not pasteurization is complete and milk is "super-safe."

The dairy industry is the most regulated and inspected food industry in the world because of the importance of dairy products in the diet of all age groups. Milk is the only beverage that is classed as a food. Because of scientific research and development, consumers receive the purest, most wholesome, and finest quality foods in their diet from milk and milk products. These safe, pure, and wholesome foods represent to the consumer a return for the time, labor and money invested which is unequalled in any other segment of the food industry.

"Mother, are there any sky scrapers in Heaven?"

"No, son, engineers build sky scrapers."

A patient at a mental hospital who had been certified cured was saying good-bye to the head psychiatrist.

"And what are you going to do when you get out in the world?" asked the doctor.

"Well, I may go back to A&M and finish my chemical engineering course. Then, I liked the Army, so I may enlist again."

He paused a moment and thought. "Then, again, I may be a teakettle."
The number of coeds at Clemson has been increasing in recent years. Presently, there are 150 coeds enrolled in various curriculums at Clemson. Due to the recent construction of housing for women students, the number of coeds at Clemson is expected to increase at a much greater rate in the future.

There are eleven coeds in the School of Agriculture, with academic endeavors in the major fields of Dairy Science, Horticulture, Food-Technology, and Pre-Veterinary Medicine.

Dairy Science is composed of selected studies of fundamental and technical nature superimposed upon required basic science core of the Dairy Science curriculum. It enables students to acquire the perspective, understanding and proficiency necessary to enter a demanding, rewarding and respected industry. Occupational opportunities for Dairy Science graduates include management of production and processing facilities, teaching, research, extension work, quality control work for processing units and production organizations, public health services, industrial promotion and public relations work in both production and processing fields, dairy and food products engineering, and special services and educational work in non-institutional fields.

Dixie Marion from Cedartown, Georgia chose the Dairy Science curriculum, while Elizabeth Hamlin from Charleston, South Carolina chose Ornamental Horticulture as her major. Elizabeth plans to pursue the field of landscape design after graduation.

The Ornamental Horticulture curriculum is designed to give students a scientific background and technical facilities in the field of ornamental horticulture. Graduates find careers in nursery work, floriculture, landscape contracting, turf management, and park supervision.

Dona Hallum from Liberty, South Carolina is in the field of Food Technology. Dona plans after graduation to do graduate work in either Food Technology or English. Susan Boulware from Arlington, Virginia is also a Food Technology major.

The food processing industry is the nation's largest industry. The curriculum in Food Technology provides an excellent education designed to prepare graduates for occupations in the food industry, research positions in government organizations and state experiment stations, food inspection, grading work with state and federal agencies, teaching, extension, and consulting opportunities.

The curriculum in Pre-Veterinary Medicine is designed to meet general requirements of certain schools of veterinary medicine. The Pre-Veterinary curriculum at Clemson specifically meets the entrance requirements of the School of Veterinary Medicine at the University of Georgia. This curriculum is based on a four semester program at Clemson. There are seven coeds at Clemson in this curriculum. These include Martha Jacks from Simpsonville; Joan Le Mire from Greenville; Barbara Atkins from Greenville; Romana Biejenski from Jackson Heights, New York; Mary Williams from Monks Corner; Cheryl Truesdale from Camden; and Susan Jumper from Hampton.

The eleven girls mentioned above chose the field of Agriculture because of their desire to be of service to mankind and to be a part of this ever growing and much essential industry in the United States. Coeds have a place at Clemson. The field of agriculture offers good educational and occupational opportunities. Regardless of your interest, Agriculture has a place for you! Think it over before you make your choice. If you have an agricultural background and an interest in one of the three areas of Agriculture—science, business, and production—you should seriously consider making Agriculture a part of your life.

The Last Straw. A fortunate young man in New Hampshire proudly showed friends this glowing love letter from his old girl, Susan: "Dear John: I have been unable to sleep ever since I broke our engagement. Won't you forget and forgive? Your absence leaves a void nobody else can ever fill. I love you, I love you, I love you. Your adoring Susan."

"P.S. Congratulations on winning the Irish Sweepstakes."

"Oh! dear, I've missed you so much"—then she raised the revolver and tried again.

"Is your girl spoiled?"

"No, it's just the perfume she's wearing."
AGRONOMY?
By Jimmy Carter, Agron.

The science which deals with crop production—this is a general definition of agronomy. Agronomists are responsible for the production of good, healthy crops.

Soil scientists and plant physiologists determine the needs of the plant and the ability of the soil to fulfill these needs. They tell the farmer how much he must feed his crop, whether or not he must “sweeten” his soil and the amount of extra water the plant will need on this soil.

Geneticists are busy developing new varieties of crop plants which will produce more “fruit” with a given amount of labor and fertilizer. Research has also given rise to plants which can withstand extremely dry conditions and diseases.

So we see, the agronomist is necessary for our food, and fiber needs. However, agronomists have also made more direct contributions to mankind. Waksman, who came to this country from Russia in 1910 at the age of 22, is a soil scientist well known for his work with microorganisms and their therapeutic value. In 1952, he and two of his coworkers received the Nobel Prize in medicine for the discovery of streptomycin. They isolated a streptomycin-producing strain of microorganism. This strain was obtained from the throat of a chicken and also from a heavily manured field soil. Many infections which did not previously lend themselves to any form of therapy were controlled by this new “wonder drug.” Tuberculosis in animals, for instance, was controlled in early experiments with streptomycin. This suggested that an agent had finally been found which could be used effectively against this dread disease in man!

Dr. Waksman’s contributions represent only one of the many things which scientists in the field of agronomy have done. Today, with modern research tools, great advancements are being made in pure science and in the application of new principles to agriculture which will increase the efficiency of farming. As more land is used for highways, industry and cities, the ability of the farmer to produce enough to supply a bulging population will represent a major factor in the struggle of the United States for survival—and the agronomist must be beside the farmer, still lending a helpful hand.

The Clemson College Forestry Club
By Danny Lamb

Every second and fourth Tuesday night, members of the Clemson College Forestry Club converge in our elaborate clubroom (complete with bar “Pepsi Cola”) to be entertained by interesting speakers and films dealing with all phases of forestry.

The forestry club, always guided by spirited leadership, keeps on the move with its activities and projects throughout the school year. Last year, our club was the host for the regional conclave of southern forestry schools. Three hundred forestry students from eleven forestry schools in the southeast were on our campus for a weekend of activities in which the students displayed their skills and knowledge of forestry. This year our club travels to Oklahoma A. & M. for the regional conclave.

The most recent project of the club is “Operation Firewood.” In order to raise the necessary funds to send our club to Oklahoma, we have been cutting firewood on weekends and selling it to the local people. After several weeks now, we are again operating in the black. The forestry club always has an interesting and winning homecoming display and this year we are planning a “drop in” for members and their dates.

The highlight of each semester is the club’s “cook-out” at Lake Issaqueena. More than one tired but smiling face is seen at the annual barbecue, climaxxed by the initiation of new members, draws to a close. But once it’s over, all initiates become members in one of Clemson’s most active clubs—THE CLEMSON COLLEGE FORESTRY CLUB.

Words to the Wise
A young man was graduated from college, ran out shouting to the world: “I’ve got an A.B.! I’ve got an A.B.!”

“Sit down,” said the world, “and we’ll teach you the rest of the alphabet.”

NINE
MEAT FOR THE FUTURE

By Kenneth K. McDaniel, Animal Science

In the year 2000, the population of the United States will have doubled the 1960 population. As students of today and businessmen of tomorrow, we will be responsible for feeding this multitude of humanity. This will be possible through ever-growing scientific research and development, improved practical application, and more effective administration.

Livestock farming is a large and expanding industry. The livestock farmer must produce the type of meat suitable to each and every consumer. As animal scientists we must meet the ever-changing needs of the future. We must produce an animal which supplies higher quality meat with less fat and more lean. This animal must make faster, more efficient gains and have the ability to pass these traits onto its offspring. Our goal is to produce more meat of a higher quality for a growing population. We can help accomplish this goal through such animal programs as the use of purebred sires, performance testing, and swine certification. These programs provide important tools for a breeder to use in adapting most quickly his present day animals to the constantly changing performance demands as dictated by consumer demands.

Perhaps you feel you are better adapted to other phases of the agriculture industry. The animal scientist needs assistance from other fields in order to meet the demands of the future. We must work with the geneticist to improve breeding. The assistance of the agronomist is needed to produce improved pastures and crops. The veterinarian is needed for his help in preventing diseases and improving management. The entomologist is a great aid in reducing insect and parasite loss. The extension workers teach the basic principles of management and provide producers with new ideas. The agricultural engineer develops new equipment and better units to fit specific situations. The chemist aids in feeding, digestion, and pharmaceutical problems. With the assistance of all these workers and many more, the animal scientist can produce a better suited animal for the increased needs of the future.

You can fit into this picture. There is a po-

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“MOLECULAR HOE”

By Bill Morrison and Jim Trautner, Biol. Sci.

“Praise the Lord and give us the 2,4-D” might well be the call of the progressive American farmer today. 2,4-D happened to be the first of an ever-increasing number of chemical agents used in selective weed control. Dr. Willard B. Albert, who has been with the Department of Botany and Bacteriology at Clemson College since 1926, can vividly recall his father using salt in eliminating weeds from his fields nearly a half century ago. Crude methods such as using salt were an expression of man’s desire to find more efficient means to control weeds.

According to Dr. Albert, the break-through in chemical weed control came right after World War II. Following the introduction of 2,4-D in 1944, there was a phenomenal growth in production of selective herbicides by the chemical industry of the United States. Dr. Albert’s own work with selective herbicides has been carried on extensively for the past 18 years with remarkable results. Dr. Albert, a plant physiologist-agronomist, evaluates promising chemicals for weed control in such field crops as corn, cotton, soybeans, sweet potatoes, alfalfa, and pastures in South Carolina.

What are some of the problems facing scientists such as Dr. Albert in selecting chemicals as useful herbicides? Most important of all, the chemical must not leave residues on the crop or in the soil that might be harmful to succeeding crops, or to man and animals that utilize these crops for food. Crop tolerance is another problem taken into consideration—the chemical must destroy weeds but not harm the crop. Also, effectiveness of herbicides has been found to vary with such conditions as temperature, soil types, and rainfall. For example, the chemical CIPC works well in relatively large quantities in the Spring, whereas in the Winter when soils are cooler smaller quantities of the chemical are used to reduce toxicity to the crop. Dr. Albert carries on his research at three experiment stations with varying soil types: Clemson (sandy clay), Edisto at Blackville (sandy loam), and Pee Dee at Florence (fine sandy loam). As a result, it has been found that perhaps only one out of ten prospective chemicals tested is of any significant value for practical use in weed control.

What is the real significance of this research? Weeds cause losses of millions of dollars to agriculture in the United States because they reduce yields, lower the quality of the crops grown, and prevent the efficient use of land. The “hoe-bill” (i.e., the cost of cleaning by hand weeding) for an acre of cotton may range from ten to sixty dollars. When chemicals are not utilized for weed control, cotton must be hoed three or four times in one growing season. Chemical weeding can be done for three dollars per acre and will eliminate 80 to 90 per cent of this hoeing.

The significance of chemical weed control is also felt outside of agricultural areas. Weeds must be controlled on railroad and power line right-of-ways. The homeowner is constantly at war with them in his lawn, shrubbery, and play areas. Aquatic weeds clog up drainage ditches and interfere with swimming, boating, and fishing in our rivers and lakes.

Weed control is indeed big business. Plant researchers such as Dr. Willard B. Albert of Clemson College Department of Botany and Bacteriology are really the backbone of this great industry which is now having, and will continue to have, profound effects on our economy. It is they who seek out the values of new chemicals and recommend their application as weed controlling agents. Man has at his disposal a new and increasingly important tool, the “molecular hoe.”

Meat For The Future

(Continued From Page Ten)

sition waiting for you either in the field of animal science or some other phase of agriculture. There are job positions open to both men and women in the production, business, and science phases of agriculture. The choice is wide and the opportunity is great.

Animal science is a wide field awaiting you. Livestock production coupled with our entire agriculture industry is the key to a successful nation’s economy. Meat is a miracle. Today meat offers more quality, and more taste-tempting variety; yet it is taking a smaller part of our income. It takes fewer people to produce more meat today than ever before. The future of any industry grows out of the present, just as the present has grown out of the past. You can be a part of this great future in the livestock industry. You can help us feed the multitude of humanity in the years to come. If you understand our objective and can work hard to achieve that goal, then choose the livestock and agriculture industry. You will be richly rewarded.

“What’s the matter?” asked the girl.

“We’re out of gas,” replied the boy. “We may be here quite a while.”

The girl smiled shyly as she took a bottle from her bag and said softly, “We can make good use of this, then.”

“Great,” said the boy with a pleased grin. “Is it gin or whiskey?”

“Neither,” she smiled, “it’s Ethyl. I’ve been out with you Clemson men before.”

Who was the smartest inventor? Edison. He invented the phonograph so people would stay up at night and use his electric lights.
Three Phases Of Agriculture
By John D. Ridley, Feature Staff

Agriculture today is different from the agriculture of yesterday. The word agriculture in the past seems to have meant working in the field and actually getting down to the hard, straining labor to produce some agricultural product. Today the word agriculture has taken on a new meaning, and we have a new look toward the field.

The School of Agriculture at Clemson has taken a look toward the future in breaking the field down into three branches. Clemson stresses the science, business, and production-technology options in agriculture. The School administrators recognize that modern agriculture is a complex industry. We have a half million scientists directly or indirectly concerned with agriculture today. The "new" agriculture includes more than scientists, however. About six million people produce items that are utilized by the farmer, and ten million people process and distribute farm products. All totaled, approximately one third of all jobs are related to agriculture. This shows us the importance of workers in agriculture to the survival of man.

The choice of option is left to the student, but if he chooses the science field, he will place emphases on the basic sciences that prepare students to contribute to the advancement of knowledge in their respective fields. This course of study is designed for students whose future work requires considerable scientific training and usually graduate studies. Employment opportunities include research with State Agricultural Experiment Stations, the United States Department of Agriculture, and industrial and commercial organizations; and teaching in colleges of agriculture, and other educational work with Federal, State and industrial organizations.

The student who makes the choice of the business option has the responsibility of working

ASAE NEWS
By Jeff Denit

The first meeting of ASAE was devoted to planning the groundwork for this year's program. Financial projects, Homecoming participation, and administrative details were handled. Also, during this meeting, recognition for Clemson's activity in the Farm Equipment Institute competition was noted. This competition consists of presenting a review of club activities to a judging board which selects the top clubs in the nation. Clemson won third place in the Class B, or smaller club membership, competition.

This semester's initiation program was carried out during the week of October 16. Four new members were inducted bringing club membership to eighteen.

ASAE is looking forward to a fine year. Banquets and guest speakers are planned to provide enjoyment and education to all faculty staff and student members.

with one of the many businesses and industries that provide supplies and services for the farmer, and process and distribute farm products. There are many opportunities in employment. They include work related to meat and poultry processing, sales and service of farm machinery, manufacturing and sales of fertilizers and pesticides, dairy and food processing, grain and seed processing, feed manufacturing, banking and credit, insurance, farm management, land appraising, and the marketing of agricultural commodities.

The production technology field emphasizes the application of scientific principles to agricultural production. A student in this field must have a broad general knowledge and training in scientific and practical agriculture. Some of the employment opportunities include general and specialized farming; agricultural extension services; teaching vocational agriculture, conservation of natural resources; agricultural communications; and agricultural services of the United States Department of Agriculture, State Departments of Agriculture, and private enterprises.

Into which of the three phases of agriculture do you best fit—science, business or production technology?
CANC DIETING AFFECT AGING

By Dona E. Hallum, Food Tech.

Six years ago, the Department of Food Technology and Human Nutrition was inaugurated at Clemson. The purpose was primarily to conduct research leading to improved food products and better public nutrition. More recently, an undergraduate teaching curriculum has been adopted in the department and is in its second year of operation. The department now has twelve major research projects in progress. Intensive investigations are proceeding in such areas as: the nutritional aspects of sesame meal; the development and improvement of poultry products; the function of vitamin E in lipid metabolism; the causes of nutritional muscular dystrophy; improvement in the amino acid composition of corn protein; the biochemical factors affecting peach texture; and the nutritional quality of vended foods in industrial plants. Thus the research is concerned largely with obtaining basic information leading to increased utilization of South Carolina agricultural products for food purposes and the improvement of the basic nutrition of people generally. In the latter field especially, where research is in the realm of animal and human nutrition, the results come slowly but are far-reaching.

One of the department projects concerns the influence of amino acid supplementation on growth rate. It has been noted by adjusting the proportions of certain amino acids in the diet that the growth of rats was partially suspended for a period of six weeks. How is the phenomenon of partial growth suspension brought about? A basic protein source is supplemented with prescribed levels of crystalline amino acids. High levels of supplementation gave rise to suspension of growth. Animals fed the supplemented protein were visibly smaller than the control animals fed the normal protein. At the end of a six-week period the experimental animals had gained an average of 20 grams in weight whereas the control animals had gained an average of 120 grams. When the experimental animals were returned to the normal protein diet, weight gains were resumed.

Although both the experimental and control animals, apart from the size difference, appeared normal, exhaustive steps are required to trace and evaluate the metabolic differences. To accomplish this phase, the animals are sacrificed at the end of the six-week experimental feeding period. The liver is extracted, its enzyme system studied, and the changes in protein metabolism recorded. This entails isolating the enzyme systems from the liver and observing abnormal changes in oxygen uptake as measured by a Warburg respirometer. Studies are made of the cholesterol level in the blood system, and the fatty acid composition of the liver. The electrophoretic pattern is noted to evaluate changes in blood protein.

Results thus far suggest that further intensive work is required to understand clearly the various factors affecting growth suspension. The supplementation of proteins with crystalline amino acids appears to have an influence on the liver enzyme systems. The relative influence on the amino oxidase system and the deaminase system is to be investigated further.

This research is providing a better understanding of protein metabolism which could have important significance in human nutrition. Growth suspension has an apparent link with delay in aging. A well-known U. S. chemical company has used similar supplementation practices to maintain chickens at a relatively static physiological age for one year. In the future, life may well be prolonged and aging retarded through dietary influence on metabolic pathways.

Dairy Club News

The Clemson Dairy Club started its year with a student-faculty picnic. About fifty students, faculty members and wives gathered at the YMCA cabin for a chicken barbecue. The chicken, prepared by our president and chief cook, Larry Gause, was very good. Naturally we had milk to drink and ice cream for dessert.

The Clemson Dairy Cattle Judging Team arrived in Clemson on October 10, after a two week judging trip. The team judged at Memphis, Tenness, and Waterloo, Iowa. The members of the team are Ronald Gaston, Jimmy Moeller, and John Skinner. The team is coached by Mr. C. C. Brannon.

Clemson's other Dairy Judging Team, the Dairy Products Judging Team, participated in contests at Norman, Oklahoma, and Dallas, Texas, during the first week in November. The team judged in both the southern and national contests and were away from Clemson eight days. The team is composed of Spann Brabham, Shuler Houck, Lloyd Kapp, and Jimmy Williams. The coach is Dr. J. J. Janzen.
The National Forests...Benefiting Every American

By Danny Lamb, For.

"Operation Multiple Use" is the key word in the Forest Service today. But what does it mean and how does it affect every American?

The policies of the National Forests were outlined in a letter written in 1905 by Secretary James Wilson to Gifford Pinchot, then chief of the Forest Service. In this letter, Mr. Wilson demanded that the National Forest land be devoted to the most productive use for the permanent good of the whole people; that the wood, water, and forage of the forests be conserved and wisely used and that the "greatest good for the greatest number in the long run" should always be foremost in the minds of the administration.

The Multiple Use program now applied to the National Forest is providing greater use, fuller enjoyment, more jobs and expanding wealth from our forested area. You as an American, are part owner of some 181 million acres of valuable forest land. This land is being properly managed to provide the greatest possible continuing use by the American people. "Operation Multiple Use" is indeed benefiting every American.

More and more people are using and depending on the National Forests each year. There is a growing need for greater supplies of clean, clear water, for more trees that will yield good wood, for more grass to feed livestock, and for more food and homes for wildlife. The growing interest in outdoor recreation in America is amazing.

Unlike many of our natural resources, the forests are renewable. Nevertheless, new forests are not "just over the hill" and the acres we now have must be literally stretched to produce the extra goods and services required of them. Multiple Use is the best form of forest land management yet devised in terms of producing the overall benefits demanded from the National Forests.

In brief, the story of "Operation Multiple Use" is to provide for this and future generations, more and better wood and wood products, a more abundant supply of water, adequate facilities for recreational use, a better grazing range, and improved hunting and fishing. In addition, Multiple Use helps to create better jobs and payrolls for a more stabilized economy.

Multiple Use is only one way in which the Forest Service is attempting to improve our forest land for the greatest service to the Nation.

The work of forest conservation has grown rapidly, extending its benefits in all directions. Not until 1902 was "forestry" listed as a subject in the Encyclopedia Britannica. Today it is a living movement toward more and better things from our forest. Let us keep it growing healthily.

Scene: Driveway beside suburban home.
Time: Just before Father arrives from work.
Action: Housewife placing child's bicycle in driveway where husband can't miss it.

Sound (From yard where child is playing): "Mother-r-r. I'd rather do it myself."
PEAR PERSONALITIES
By Loren Brogden, Hort.

Dependence on one or a few agricultural commodities is not a sound economic practice; economists tell us that by broadening the scope of our production we gain stability in our economic system. The production of crops is a highly perfected science.

Geographic regions produce those products in which there is the greatest return; the adaptability and consequent yield potential of any one crop determines its incorporation in the economic program. Occasionally there is a crop whose potential is vast, but which has certain limiting factors which render it useless. Pears are one such crop in the southeastern United States. Horticulture research activities begin here where there is a potential gain for society.

The development of a variety of a crop for a particular region requires research. Research, whether it is limited to a definite problem or concerned with a general topic, calls for men of many skills. When the horticulturist begins his work he may find that he will need to be a geneticist, bacteriologist, physiologist and fertilizer specialist—the list is endless. A current project conducted by Clemson College in cooperation with a nationally known baby food company is an example of the challenging aspects of horticultural research.

The project under consideration concerns the production of desirable pears. This seems simple enough; there are certainly a number of acceptable pear varieties on the market. It should be simple to buy some trees and plant an orchard, but progress doesn’t come that easily. Pears are easily infected with fire blight, caused by the bacterium Erwinia amylovora. Once the fruit is produced it may contain a large percentage of stone cells whose grittiness may render the fruit unmarketable.

The pear producing regions of the United States are the Pacific Coast States (California, Oregon and Washington) and to a lesser extent the eastern states of New York and Michigan. Commercial production is limited to these locations because of numerous problems, fire blight a major one.

Fire blight causes great losses when it strikes commercial orchards. An outbreak is largely unpredictable; radical changes in temperature and moisture conditions encourage its growth. The southeastern United States’ climatic conditions of high temperature, abundant rainfall, and high humidity are conducive to blight growth.

Fire blight attacks trees in one of three ways: 1) attack centered on blossoms, 2) attack mainly on new shoot growth, and 3) concentration on the main trunk. The severity of each form varies with the tree, and any combination may be seen on a particular tree. Previous study has shown that tree form, cultural practices, and the variety of the tree affect the severity of the blight. The Clemson project has been designed to afford the researchers as much freedom as possible in their investigation of these and other problems.

A principal concern is that of developing a desirable rootstock, one which will have good growth characteristics and be resistant to fire blight. At the present time Domestic French rootstocks are used in the major pear producing regions; however, these are susceptible to fire blight. Southern nurseries have had difficulty in budding this stock because leaf diseases cause premature defoliation and early hardening of the wood. Southern nurseries have been using Pyrus calleryana as rootstock. This stock is a vigorous grower, is resistant to fire blight, and is budded easily. Certain Oriental rootstocks have been found to be associated with pear decline and have recently been rejected by growers in major producing regions. However, it is felt that one of these two stocks will be the best for South Carolina. Blight resistant pear varieties have been selected for grafting on the rootstock; the selected varieties are Starking Delicious (Maxine), Magnness, and Moonglow. Besides their relative freedom from fire blight, these varieties are fairly free from large stone cells, which makes their marketability much greater.

After establishing the particular type of tree to be used, the next concern will be cultural practices. Earlier research has suggested that the growth status of the trees, which is affected by pruning and fertilization and other cultural practices, is related to fire blight resistance of the tree. It is quite obvious that the more severe the fire blight the less productive the tree. These practices will be considered by the project also.

Pruning will consist of four types: 1) no pruning, 2) modified central leader, 3) modified central leader plus heading back and thinning out, 4) modified central leader plus thinning out.

The shape of the tree will be investigated by various shaping procedures using Starking Delicious trees. These procedures will include hanging weights on the limbs, wiring the tree, and the use of notched sticks to achieve a wide-angled.

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FIGURE 1: The effects of fire blight can be seen on this heavily diseased tree.
HIGH SCHOOL SENIORS VISIT CLEMSON
By Kenneth K. McDaniel

On November 2, 1963, we of Clemson College and the School of Agriculture were host to a number of high school students and parents participating in Clemson College's annual high school visitation day. These visitors were met at 9:00 a.m. in the college auditorium by College President Robert C. Edwards and Dean of Student Affairs Walter T. Cox for a brief introduction and welcome to our campus. They were shown the film "This is Clemson," a pictorial presentation of the Clemson story narrated by Bob Cummings. A tour of the various schools was then conducted by the faculty of the host schools. The visitors were exposed to requirements for entrance, degrees and curricula offered and other information regarding college life and the choosing of a major field of study. At the conclusion of the tours the visitors were invited to have lunch with the students in the College Dining Hall and to attend the Clemson-Wake Forest football game as guests of the college.

PEAR PERSONALITIES
(Continued From Page Fifteen)

pattern of branching.
The application of various levels of nutrients will also be included in the project. Results will be checked for: amount of fire blight under each treatment of fertilizer; tree growth (measured in trunk diameter and linear growth), and, eventually, fruit yield and quality.

Effective use of chemicals such as weak Bordeaux and antibiotic sprays applied during the period of blooming will be considered. Zinc chloride has also been used quite effectively. This area of study is open for thorough investigation and could possibly lead to important advances.

All of the activities of the project are directed toward fruit production, for this is the economic objective of growing pears. The production of fruit from the various test sections will be checked for optimal harvest time. Fruit will be examined for stone cell content. Determinations of soluble solids and acidity of fresh fruit and the color and flavor of the processed pears will also be made.

Fruit from the developed stock will be subjected to thorough tests and evaluation. The presence of stone cells makes an otherwise desirable fruit valueless.

The use of fruit for baby food necessitates reducing the whole pear to a puree (a paste-like suspension of the fruit). The presence of stone cells makes the puree gritty and is extremely objectional. Stone cells are sclerenchymatous cells which, because of their cellular structure, are extremely hard and in an aggregation result in the grittiness mentioned.

The determination of the size of the cells and their distribution is extremely difficult. Stone cells are held together by connective fibers which must be broken down before accurate measurements can be made. Work carried on under the direction of Mr. L. O. Van Blaricom of Clemson College resulted in a fourteen step procedure for the separation and weighing of the individual stone cells. Results from this work show that it is primarily the larger stone cell particles which affect the grittiness of the puree. These then are the ones which need to be eliminated from the pear through breaking or processing methods. Screening has been suggested as a possible method for eliminating the undesirable cells.

The Clemson pear project is an example of the work done by the horticulturist. The work varies from spreading fertilizer to taking readings under a microscope. The limitation of the work is the imagination of the scientifically trained mind.
High Value—Low Cost Broilers For The Consuming Public

By Billy L. Amick, Poultry Sci.

The increasing rate of consumption of poultry meat since 1940 has been phenomenal! The public consumed an average of only 2 pounds of broiler meat per person in 1940. Today, the average individual consumes over 25 pounds of broiler meat per year! Annually, almost 2 billion broilers are produced in the United States.

The gigantic increase in broiler production since 1940 has been due to a complex of factors that have affected both the supply and demand of this product. In recent years, despite declining prices, producers have been willing to offer increasing supplies of poultry because the cost of production and marketing of poultry has been greatly reduced. Reduction in cost of producing broilers has been largely due to sensational advances in nutrition, genetics, disease control, and management of broilers on the farm. Other factors have also been important, including the change in organization structure, financing of the broiler and retail food industries, and the downward trend in broiler prices. The reduction in cost of production has been passed on to the consumer, as evidenced by the low price of broilers in retail stores.

Fortunately, during this growth period the consumer has gone along with this increase in production and decrease in consumer price. He ate 1 two-pound broiler in 1940, and he ate the equivalent of 12 3/4 two-pound broilers in 1962. This demand for more poultry has been enhanced by its increased availability, convenience in packaging, and quality of the product. All of this was assisted by the facts of population increase and growth in per capita income.

The consumption of broiler meat has become a firmly entrenched habit in the American way of life. The product has adapted itself daily to the dinner table, to the picnic table, and to the back yard cookout craze. It can be reasonably purchased and prepared successfully by the new bride or the professional chef.

Broiler production has restored the economy to many marginal farm operations, allowing many to expand their holding and increase their buying power. Others benefiting from the poultry industry include equipment manufacturers, drug houses, the automotive industry, the shipping industry, and a number of other allied industries.

Undoubtedly more research work has been conducted on this broiler type chicken than on all other farm animals. For example, in 1948, 3.95 pounds of feed were required to produce 1 pound of broiler meat. In 1962, however, only 2.25 pounds of feed were required per pound of meat—exactly 1.7 pounds of feed less to do the same job. The broiler chicken lends itself to experimentation. Quick results because of short life cycle and the availability of large numbers of subjects are helpful to the researcher.

Contributing to the strong consumer demand for the ready-to-cook broiler, much to the chagrin of the industry, are the merchandising methods being used by some large chain stores. These chain stores feature the ready-to-cook broiler as so called "leaders." They under-price broilers to entice the consumer into their place of business. In spite of such practices as these, (Continued On Page Nineteen)

Kappa Alpha Sigma

By Hugh Gray

The Kappa Alpha Sigma, Clemson Agronomy Club, started off this year with a cookout on September 23, for all members and freshmen majoring in Agronomy.

The Agronomy Club formed a soil judging team in early October under the direction of Dr. G. R. Craddock. This team, composed of Tom Boyce, Joe Weeks, Tommy Coward, Budgy Wilhelms and Jimmy Palmer, participated in the Regional Contest on November 8, 9 at the University of Georgia.

The club has obtained permission to install a candy machine in addition to the club's Pepsi machine on the second floor of the P & A building. These will be the two major fund raising projects.

Several distinguished speakers will be guests at the meetings this semester.
WHOSE MIND TOMORROW?

Dr. W. H. Wiley, Dean of Agriculture

People in educational circles throughout the country are mulling over various thoughts in their minds about curriculum development, trying to look ahead at what our students will be needing 25 - 50 - 100 years from now; developments that must be started at this time in order to make some of those things possible in the future. Many of these thoughts and mental gymnastics are reported as facts in much of the literature one reads today. Unfortunately, a great deal of this is opinion and speculation. Unfortunately, that is oftentimes all that we can use in predicting future activities in the academic world. Much of this writing has caused some unrest among students.

Some students have found it impossible to settle down solidly and approach their program of study in a positive manner. All too often they have been made to feel inadequate, and have been led to believe that they fall short of the mark of an educated man when they have completed their undergraduate training. I am one of those peculiar people who do not feel that this is the case.

I feel that our students can stand up and do battle toe to toe with the classicist of the 19th century and earlier, but his approach to things may seem a little different to the person who has been in the educational field for a long time. The student today, it seems to me, has a quicker grasp of situations around him than the student who thumbed through his moldy book in the dimly lit and completely silent library hall, or who worked at his unruled tablet with his quill pen in hand and a flickering candle in front of him. On occasion I have felt, and I am sure others have, too, that if I were subjected to some of the psychometric testing that students must take who are preparing for college today, surely I would fail to make the grade. I am sure that many of today's young potential students have the same fear, and yet our total mind has been developing during all the span of time in which knowledge has been accumulating, without our really realizing what has been happening to us. I am sure that, if put to the test, we would be more capable of handling the materials than we think.

If a hundred years from now, we could look back on today, I am sure that we would see a tremendous change in the fund of knowledge to which a student is subjected. I am sure we would find that the student's preparation through the elementary school system, and through the secondary school system, was equally as different from today's preparation so that the student might be prepared to handle the more voluminous program and the more advanced program that will surely be demanded of him tomorrow. The one thing which we must keep in mind is that the mental capacity of the mass of students doesn't undergo an overnight evolution which puts them in a more highly graduated scale of mental capability.

I would say today's human being is, basically, much the same as the student of a hundred years ago; and this is true regardless of race, color or creed. The agility of the brain has undergone some changes through the adoption of new teaching methods and new living habits. I am sure that newer methods and different living habits will continue to change and shape the mind of the average and above-average student from now on. What I am trying to say is that you who are students in agriculture at Clemson today, will be fully as capable of meeting challenges which face you tomorrow as were the students in agriculture 50 years ago, and as will be the students in agriculture at Clemson 100 years from now.

I wouldn't have you become complacent, for you still have a lot of work ahead of you, but I feel that the student who is passing his work adequately is trained today better than he thinks. I would use this opportunity to encourage you to stick to your guns and dig just as deeply as you can, for it will fall your lot, some years from now, to be the one responsible for what happens to the students who follow you. It must always be uppermost in our minds that if this country is to remain the leader in the agricultural sciences, we must maintain a strong mental inventory.

Uninformed people will continue to ask "Why study agriculture?" In fact, the question may be asked more often as time goes along; but unless we have people who are quite capable, and who are well trained, we will find that our agricultural proficiency will slip backward. The present trend in the educational world is in the direction of the liberal, general type of study, or into the astro-physical sciences. In other words, everybody wants to study how to get to the moon. My precaution to us is that we continue to study on how to have the food there for them when they get there.
Gamma Sigma Delta is a faculty controlled society that selects its members from graduating seniors, graduate students, faculty and alumni in agriculture. The Honor Society of Agriculture—bringing honor and agriculture together—gives a feeling of having done something great. That is exactly what Gamma Sigma Delta attempts to do for the individual member.

The initials of the name were selected in 1917 from the Greek words Gaea, Syndemos and Deimeter, whose meaning is: “The binding together of earth, the mother of all, and the practice of agriculture and the arts relating thereto for the welfare of mankind.”

Chapters are now scattered halfway around the globe. The Clemson Agricultural College Chapter was established in 1957. The Clemson chapter has 90 active members and 17 alumni members.

The basic objective of Gamma Sigma Delta is to recognize and stimulate excellence in agriculture. No other general professional area has exceeded the excellence exhibited by agriculture over the past several generations. This excellence has been dependent upon outstanding leadership as well as upon high quality students and scientists solving many problems that have been confronted.

The chapter each year presents a certificate of recognition to an outstanding sophomore and to a senior student in recognition of scholastic achievement, and as a stimulus to achieve higher levels of attainment.

Membership is conferred as an honor on those students in agriculture who have shown exceptional ability. These awards are made at an annual banquet.

Senior agricultural students, not to exceed 15 per cent of their number in agriculture, may be elected to membership. These students must rank scholastically in the upper 25 per cent of the class, and they must show promise of future leadership in some phase of agriculture in its broadest meaning.

Graduate students of outstanding ability in the various fields of agriculture or closely related sciences, and alumni and faculty who have, by virtue of outstanding achievement in agricultural pursuits, demonstrated their worthiness of the honor, are also eligible for election. The eligibility requirement for faculty members is at least three years experience in agriculture or science related to agriculture with demonstrated exceptional teaching or investigational ability. Alumni are eligible for election not sooner than five years after graduation by virtue of signal service to agriculture.

Luncheons are held each semester along with various types of informative programs of interest to students and faculty.

Agriculture must keep pace with industry in the United States in all respects to provide for the nation’s welfare and to meet the increasing food and textile requirements of an expanding population. No group of scientists, students or technicians has a more important task than those in agriculture. Gamma Sigma Delta has a place in keeping the nation conscious of the importance of agriculture. As this group grows in strength its beneficial influence increases accordingly. Those honored by Gamma Sigma Delta by election to membership are destined to lead in this advance on some front. Their election is more than an honor: it is a challenge that they do so.

High Value—Low Cost Broilers

(Continued From Page Seventeen) and many other problems facing the industry, we have a big winner nutritionally over the chief competition from beef and pork. Both competitive products contain over three times the number of calories in equal portions of meat. Chicken, pork and beef contain about the same percentage of protein; however, similar portions of beef and pork contain up to ten times the amount of fat found in poultry meat. These nutritional facts further indicate the high value of the reasonably priced ready-to-cook broiler for the consuming public.

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WHERE WILL YOU GO FROM HERE?

By Basil Acock

What made you decide to study agriculture? Was it because you like the open air and the smell of the soil; or was it because you thought that agriculture courses would be the easiest for you? Did you think first about the financial reward attendant upon your graduation; or did you just want to learn more about living things? If your interest was in the plants and animals themselves, maybe this article is for you.

When I started my studies in agriculture, I had visions of turning my knowledge into profit by having my own farm. Then the research bug hit me; and my ideal changed to one of finding out new facts about agriculture for the betterment of mankind in general. Now, I suppose a man can reach this sort of decision by reason of his religious convictions, his patriotism, or plain old scientific curiosity; but it has been my experience that a good many students of agriculture, like myself, have a genuine humanitarian desire to make two blades of grass grow where only one grew before. This is not an ignoble desire even in this land of surplus, because, with the present population explosion, it will not be so very long before we will need to bring the margin lands back into production. Also, the way in which we have been able to help famine-stricken nations, and more recently the countries of the Soviet Union, is probably one of our better pieces of propaganda against the spread of Communism.

Very soon, however, I began to wonder whether I would be realizing my full potential if I stayed “at home” in the civilized world. There are distinct arguments for and against working at home as opposed to working in underdeveloped countries. On the one hand, here in the civilized world I could work in a good academic environment with the latest instruments and the best scientific literature. Perhaps I could make some major break-through during my life; but then again, perhaps I would just become another in the growing ranks of the mediocre fact-finders. On the other hand, I read that 60% of the world’s population is undernourished and that, to give but one example, the introduction of the hand hoe to Afghanistan boosted production by some 30%. This makes me wonder whether the little knowledge that I possess might not be better used in these underdeveloped countries.

Naturally, the picture is not quite as simple as I have painted it. The first requirement for working with the people of backward nations is that you be acceptable to them as a man. One definite prerequisite, then, is adaptability, including a willingness to learn from these people before rushing in to change their way of life. It is also necessary to accept the fact that only the most basic concepts of agriculture will apply in these tropical environments; and these must be introduced to the people little by little. Many a scheme for developing tropical areas has failed because it attempted to transpose temperate region farming practices into a completely different environment.

Despite these difficulties, it seems worth the extra effort to teach primitive farming communities how to increase their food production, because this is the only permanent solution to the world food shortage. Increased production leads to a higher standard of living and this, in turn, is usually accompanied by a decrease in the birth rate. It’s a rather long-term project; but if you want a world for your children and grandchildren to live in, then you had better start doing something about it now.

Of course, it has not been my purpose just to tell you about my own thoughts and decisions on this subject. Rather, I want you to awaken to the problems and possibilities of service abroad. If you are interested and would like to read further on the subject, try to get hold of “Food for Peace,” the American Society of Agronomy Special Publication No. 1, April 1963. It is an up-to-the-minute account of what is being done and what still needs to be done. If you are moved to serve abroad, you will find that it is almost impossible to get permanent employment in an underdeveloped country unless you are prepared to free lance. However, the Peace Corps provides opportunities for short tours of duty and this is one way in which you can play your part without becoming too deeply or permanently involved. We have knowledge that can help the poorer nations. It is an honorable occupation to stay at home and add to that reservoir of knowledge, but it is also an honorable occupation to disseminate that knowledge. It is the age old question: “Who will go?” being asked over again; and its more personal equivalent is, “Where will you go from here?”

Poultry Science Club News

By Billy Amick

The Poultry Science Club held its first regular meeting on September 24. At this meeting, Club President Dean Pruitt introduced the following new officers: Vice-President, Johnny Dehart; Sec.-Treasurer, Wayne Long; and advisor, J. F. Stephens. Several speakers were suggested for future meetings.

On October 8, the members voted to process and sell turkeys as a fund-raising project. The turkeys will be sold through the Agricultural Products Sales Room in the Food Industries Building. Dr. Douglas Hamm, Poultry Extension leader, was the guest speaker at this meeting. His topic was “The Future of South Carolina Eggs.”

Mr. Furber Whitmire, a representative of the Quaker Oats Company, is scheduled as guest speaker for our next meeting. All interested individuals are invited to attend these meetings held in room A-104, P & A.S. Building.

“Did you know that Bill doesn’t have a last name?” “Bill Who?”
By John D. Ridley

This year, without an exception, the horticulture club’s activities seem greater than ever. We have made two types of jelly this season, grape and peach. The club is also in the process of propagating plants for sale to make money to aid the students in attending the Regional and National meetings of the American Society for Horticultural Science. There will also be a project in growing container stock for sale by the club.

Last February we had a large number of representatives to attend the Memphis, Tennessee, meeting of the Southern Region ASHS. At present, the Hort Club is looking forward to the February meeting in Atlanta, Georgia of the Southern Region ASHS. At the National ASHS meeting at Amherst, Massachusetts, Gordon Halfacre, Butch Ferree, and Ronnie Robbins represented the Clemson club. We are also planning a field trip to Charlotte, North Carolina for the annual Southeastern Flower and Garden Show in March.

Bruce Tyson is planning to present a paper in Atlanta, Georgia in competition for the Joseph B. Edmond Award, which was won last year by Clemson Hort. student Ronnie Robbins. We are happy to know that Ronnie, in giving his fine paper at the national meeting in Amherst, Massachusetts in August, won the first place L. M. Ware Award along with his election to the National presidency.

John D. Ridley received a part time scholarship from the Garden Club of South Carolina. This illustrates the fact that the Garden Club of South Carolina is backing the Department of Horticulture at Clemson.

Pre-Veterinary Club

The Pre-Veterinary Club at Clemson held its first meeting September 25, 1962. It began, at this time, with a charter membership of thirty, consisting almost entirely of students in the Pre-Veterinary curriculum.

The club is primarily for Pre-Veterinary students, but the club welcomes any student interested in Veterinary Medicine.

The meetings are held on the first Tuesday of each month in Room 123, Long Hall. The club plans to make trips to the University of Georgia’s School of Veterinary Medicine Open House and also to visit the Livestock-Poultry Health Laboratory near Columbia. The highlight of the year is the annual dinner meeting in the spring of the year to which an outstanding speaker is invited.

Each year the Pre-Vet Club, as it is known by the members, is striving to do bigger and better things. This year the membership has almost doubled, and many new and interested programs are planned.

Hotel Page: “Telegram for Mr. Neidspindiavanci, Mr. Neidspindiavanci.

Mr. Neidspindiavanci: “What initials, please?”

By Joe Barnette

Alpha Zeta held its first meeting of the year on October 14th in the P & A auditorium. The meeting was an informal smoker with the “Profs” from the Ag School, who were former AZ members in the college days, invited. Plans for the new year were presented by the chancellor and AZ's advisor, Dr. Shain. Committee assignments were issued and each point discussed. The following are projects which Alpha Zeta at Clemson hopes to accomplish during '63-'64: a) Operation contact—Jake Joyce, Larry Stroman b) P & A study rooms open at night for study—Tom Garrett, Joe Shealy c) AZ paper weights—Jim Potts d) Teacher evaluation—Jimmy Howard, Richard Cooper e) AZ banquet and programs—Butch Ferree, Lloyd Kapp f) Student initiation—Loren Brogdon, Doug Heath g) Book sale—Joel Hanks, Shuler Houck h) Outstanding teachers—Ernest Sheeley, Jim Troutner i) Projection—Jimmy Williams

“Waiter,” said the diner, who had just sampled his dinner, “these real chops don’t seem very tender to me.”

“Sir,” said the waiter, “I used to be a butcher and I can tell you that less than a month ago those chops were chasing after a cow.”

“That may be,” replied the man, “but not for milk.”

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