

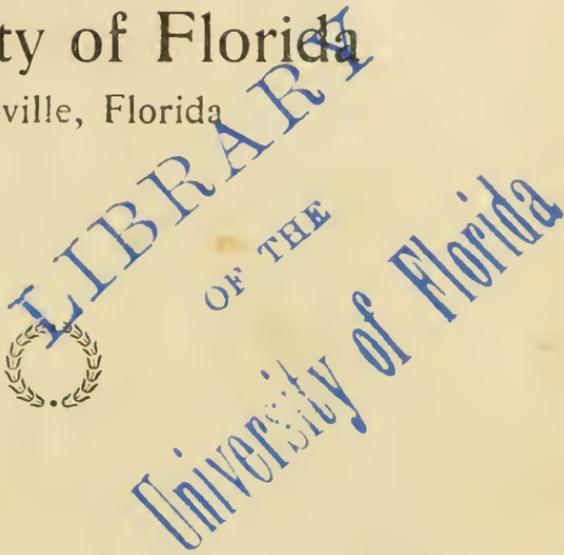
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Gainesville, Florida



Co-operative Demonstration Work

Agents' Meeting
February 24-27, 1914

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FARMERS' CO-OPERATIVE DEMONSTRATION
WORK.

STAFF

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COUNTY DEMONSTRATION AGENTS.

	<i>Postoffice</i>	<i>County</i>
Stafford Burgis	-----Gainesville	-----Alachua
E. W. Turner	-----Macclenny	-----Baker
B. V. Mathis	-----Panama City	-----Bay
O. L. Mizell	-----Dukes	-----Bradford
J. D. Brown	-----Lake City	-----Columbia
W. L. Watson	-----Jacksonville	-----Duval
S. W. Hiatt	-----Gonzalez	-----Escambia
Joseph Crews	-----Wauchula	-----De Soto
M. C. Gardner	-----Greensboro	-----Gadsden
R. T. Kelly	-----Plant City	-----Hillsboro
C. A. Fulford	-----Bonifay	-----Holmes
G. W. Belser	-----Marianna	-----Jackson
D. C. Geiger	-----Mayo	-----Lafayette
W. E. Brown	-----Williston	-----Levy
Frank Robinson (col.)	-----Tallahassee	-----Leon
A. W. Turner	-----Bristol	-----Liberty
D. R. McQuarrie	-----Madison	-----Madison
S. J. McCully	-----Berlin	-----Marion
C. H. Baker	-----Orlando	-----Orange
I. E. Soar	-----Dade City	-----Pasco
A. A. Lewis	-----Kathleen	-----Polk
O. O. Simmons	-----Botts	-----Santa Rosa
T. Z. Atkeson	-----Live Oak	-----Suwannee
J. C. Smith	-----DeFuniak Springs	-----Walton
D. G. McQuagge	-----Chipley	-----Washington

EACH MAN GIVEN CREDIT FOR HIS PART.

The following pages were prepared from stenographic notes taken at the time of the Co-operative Demonstration Meeting. Some of the papers were prepared beforehand and filed with the Secretary at the time they were delivered.

So far as possible every man's name was taken in connection with the discussion during the meeting. The views there expressed are the views of the parties whose names are mentioned, in connection with the discussion or the paper.

Every effort has been made to present the discussions and lectures as nearly in the form in which they were delivered as possible. In some cases the discussion was too rapid to allow it to be taken fully. In other cases the discussions carried on were identical with the material treated in the papers. Such discussions have not been dropped from the proceedings.

P. H. ROLFS.

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FARMERS' CO-OPERATIVE DEMONSTRATION WORK.

The Farmers' Co-operative Demonstration work of the United States Department of Agriculture in charge of Dr. Bradford Knapp, Special Agent, has formed a co-operative agreement with the University of Florida and with the Commissioner of Agriculture of the State of Florida, whereby the Demonstration and Extension work of the State is centralized into one co-ordinated management. The University of Florida provides suitable office rooms and facilities on the University Campus for headquarters for handling the clerical work. It also pays one-half the salaries of the State and District Agents. When the State and District Agents are travelling exclusively for Farmers' Institute work all of the expenses are borne from the State funds.

The central management of the Farmers' Co-operative Demonstration Work, the Boys' Corn Clubs, and the Girls' Canning Clubs, is under the direction of Prof. C. K. McQuarrie, who is State Agent for carrying on this work. The salaries of the County Agents and other local employees are met in part by funds appropriated for this purpose by the U. S. Department of Agriculture, amounting to about \$22,000. These funds are further augmented by the appropriation by the legislature of Florida of \$5,000 annually. The Farmers' Institute work is provided for by annual legislative appropriation of \$10,000.

The District Agents work under the direction and advice of the State Agent. The State Agent and District Agents visit the County Agents as frequently as possible, and with the County Agents make visits to the various Farm Demonstrators, the Boys' Corn Clubs, and the Girls' Canning Clubs. The State Agent and each of the District Agents are members of the faculty of the University.

The State is divided into two sections. All of the Counties organized east and south of and including Duval, Bradford, Alachua and Levy, are considered as Central and South Florida. This district is in charge of Prof. A. P. Spencer. The Counties to the northward and westward from those named, and already organized, are placed in the North Florida District, in charge of Prof. E. S. Pace.

The value of this co-operative arrangement cannot be easily over-estimated. The State and District agents being located at the seat of the University are constantly in close contact with the staff of the Experiment Station and the

professors of the Agricultural College. The County Demonstration Agents having their sessions at the University are thus enabled to come in contact with the most recent and fundamental progress that has been made in agricultural education.

The County Agents visit as many farms as possible. Where the farmer agrees to set aside a portion of a field to carry out the instructions of the County Agents fully, he is called a *demonstrator*. Where the instructions are carried out on the whole field or where the instructions are carried out only in part, the farmers are known as *co-operators*.

Every County that has entered the co-operative arrangement has been aided at the rate of \$675 annually. The amount needed above this has been supplied either by the Counties as a whole, or by private or community aid. The salaries paid to County Agents vary from \$800 for the lowest to \$2,400 for the highest. The Counties in which the higher salaries are paid also make provision for traveling expenses.

ADDRESS OF WELCOME TO THE AGENTS.

DR. A. A. MURPHREE

Under the co-operative plan entered into by Dr. Bradford Knapp (Special Agent in charge of the Farmers' Co-operative Demonstration Work, Bureau of Plant Industry, United States Department of Agriculture) and the University of Florida, you gentlemen, State Agent, District Agents and County Agents, become a part of the State University, and a very important part. It seems, therefore, that I am extending a formal welcome to a part of the family here this morning. Be that as it may, I want to assure you that everyone here on the campus is glad to welcome you as co-laborers and fellow servants in the common cause of Agricultural Extension and rural uplift.

It has been stated that sixty-four different people are required to manufacture a pair of shoes, and that it takes the commerce and co-operation of the world to produce a breakfast. For the solution of our country-life problems and the improvement of the agricultural condition of the country, we need the whole-hearted co-operation of the farmers, bankers, transporters, merchants, churches, schools, and State.

This is a land of opportunity; but in order to realize its greatest value, co-operative effort in the application of intelligence and scientific knowledge to the common farm problems is demanded.

You, gentlemen, you county Agents, are preaching diversified agriculture, crop rotation, increase and improvement of live stock, and the intelligent use of concentrated fertilizers; you are encouraging saving and co-operative marketing, and the increase of per capita income; and you are expected to disseminate valuable scientific information. It is of the utmost importance, therefore, that you should come here at intervals to touch elbows with the investigators of the Experiment Station, and familiarize yourself with their projects. It is important that you meet these teachers, these experts in the College of Agriculture, who have endeavored to master the best methods of presenting the subjects in their respective fields of knowledge. These teachers and investigators are keeping abreast of the times, and have valuable information that perhaps will be useful to you in your activities among the farmers. In the present



Fig. 1.—County Demonstration Agents and Staff

arrangement for the integration and co-operation of the various agricultural extension activities of the State University, particularly those of its Experiment Station and Agricultural College, it is desired that there should be co-operative effort all along the line.

The University expects to derive great benefit from you through this co-operative scheme. First of all, you will present at first hand the difficult problems which you meet in the field, so that the investigators and experts can adapt their investigations to the more pressing and immediate needs of the various sections of the State.

Realizing, as you do, the great need of scientific agriculturists, you will, I am sure, endeavor to encourage every boy in your county to look forward to a course in the Agricultural College of his State University. Why not bring the farmers with you when you come up to the two-weeks course in the summer? I am sure they would reap much benefit from conference with you men, and from the lectures and instructions to be given at this conference.

Now, finally, I must urge you to command any or all of us here on this campus during the next four days, or at any time from the field when our men can be of service to you; and may the new relations into which we have entered, by virtue of the authority of the Federal Bureau and the University of Florida, be happy and joyful, mutually helpful, and abiding.

ADDRESS TO COUNTY AGENTS

H. E. SAVELY

You understand the arrangements here by which you are members of the faculty of the University just as much as you are Federal Demonstration Agents. We feel that it is a step in the right direction, this gathering together here to build up stronger work in the State, and to this end all of the trained men of the College are placed at your service. While the University was at your service before, you have now become a part of it, and are in a position where you can better use it than in the past.

We hope that a larger fund will be available for this work in the future, so that we can justly compensate every man for the good work that he does. My vision is that in the future we will have in every County a corps of men none of whom shall receive less than \$1,200 per year, and the best \$2,000 and over. I expect to see you men riding in automobiles from farm to farm, with a complete equipment

of all those things that make for better work, riding plows, spraying machines, and a lot of other things that need not be mentioned here; all of which will be supplied for your work, as a part of your equipment.

JUST A BEGINNING

This is new work. The amount of money put into it in the past is insignificant in comparison with the amount that will be put into it in a few years. The time is coming in the State of Florida when we will spend one hundred thousand dollars in this work. We must go right ahead and use every means possible towards being the most thoroughly equipped men. In these four days, filled with discussions by agents and members of the faculty, we will all become much better informed. We are planning to hold a school of instruction for two weeks next summer, when the best instructors along various lines will be brought to your service. This will give you a chance to become thoroughly equipped. It is not so much what you have learned, as whether or not you are students and investigators who will not stop until you get all the information that can be obtained. If you have the investigator's turn of mind that will not stop until you have solved your problem, there is no doubt but that you will be well equipped. If, on the other hand, you strike a problem but do not investigate it—are content to pass it by without investigation—you will soon find farmers in your County that know more about the subject than you do. You must lead. That is why we have called this meeting, and why, from time to time, we are going to call other meetings. Keep note-books, and when a point is made, jot it down, think it over; and when you get back home sit down and write on a piece of paper all the points you have gathered at these meetings. It will help to fix them in your mind. We want you to be the best trained men in the County. We realize that many of you have not had the best opportunity for study. You are good farmers, and some of you have done a good deal of studying; but we want you all to become great students of agriculture that you may be of the greatest help to your people.

ADDRESS TO COUNTY AGENTS

P. H. ROLFS

I would like to emphasize the point Mr. Savely has made. Every Agricultural Agent should be the best informed man in his County. Now the difference between

Counties is so great that the best informed man in one of our cotton-growing counties, for instance, would find his knowledge of little or no value in a citrus-growing county; and conversely, the best informed man in a citrus-growing county would find his knowledge of small value to a cotton-growing community.

NEED OF SPECIALIZATION.

We need specialization, so that our men in the different Counties shall be specialists in what each County needs. Every County differs from every other County in a greater or less degree. The lands, climate and crops are all points to be borne in mind. Then there is another feature that we also have to bear in mind; that is the social surroundings in the County. You will find perhaps two Counties in Florida, almost or quite bordering one another, and in one the agriculture is far in advance of the agriculture in the adjoining County, so we must specialize and adapt ourselves to the particular County in which we are working. In one of the well-developed Counties where agriculture has been accentuated, where agriculture has been taught for a number of years, as in Washington County for example, where better corn production has been so ably taught by the West Florida Agricultural Society for twenty years, we find some of the best corn grown.

The demonstrator in any particular district has to keep a step in advance of the best farmers in his County.

LEADERS NEEDED

There are stages in the development of agriculture; and what is the best now, in ten years more would be so hopelessly behind as to be absolutely worthless. So the isolated farmer needs your best information. The work is progressing very rapidly; if you go to sleep for one year you will fall behind, but if you go to sleep for the next ten years you will be so far behind you would never catch up again. You must be at the head of the procession, but only just so far ahead as the conditions of your County will permit. Nearly every community has some one, two, or three individuals who have led the progress, who have done the whole work; and oftentimes the progress comes from a single person. Let us see if we cannot be prophets, leaders, inciting people in our own sections to excel in crop production. We can if we will. I know personally some who are doing just that thing; and while many of the County Agents are working under very serious handicaps, you should remember that

we are pioneers in this work, and the pioneers are the men who have to blaze the way. For that reason the work is made still harder when handicapped by small salary and various hindrances of that kind. We must have the vision of what the work is leading to if conducted along right lines, to keep our spirits up. Personally we may not suffer seriously by failing to correctly understand our true mission; but it is a terrible mistake for the County. So we need to keep in mind the vision of what we are doing, how we are doing it, and what the end will be.

ONE LEADING CROP HELPS ALL CROPS

I may use the same illustration that I have used so many times, that of better corn production in Florida. You will remember it has been said from time to time that the South was no place to produce corn. Statistics formerly showed the low average of 8 or 9 bushels to the acre. Yet when you come to look the country over for the largest number of bushels produced per acre, you find it in the South. In spite of that, most of the people of the United States have gotten the idea that the South is not adapted to corn-growing. The trouble is we have not put our brains into the growing of corn as we ought to have done. I know we are going to have trouble in applying brain power to corn production. We have a large number of negro farmers, and quite a number of indifferent white farmers who are content to produce less than 10 bushels per acre. But I expect to see conditions in Florida changed, so that everyone will see that the South has an advantage over the West in the production of corn.

The value of the corn crop in Florida has risen from something less than \$4,000,000 in 1908, to \$10,125,000 this year, being now second only to the citrus crop. I do not know but what the corn crop is worth more to the State of Florida than the citrus crop; the citrus crop is shipped out of the State, and the money comes back, some of it going into circulation locally, but much of it is lost to us. The corn crop, however, does not enter into commercial channels; it goes on to our tables, and the money enters our local circulation; it makes for better farm homes, better homes, better roads, and everything for local convenience. That is why I like to use it as an illustration. When we started the Farmer's Institute work, almost everybody said we ought to use the insignificant sum of \$2,500 per year for the entire State, in teaching people how to grow all sorts of crops. But we held firmly to the idea of concentrating our

efforts on better corn production, and you know that when a farmer can produce 20 to 40 bushels of corn per acre, he has no trouble in producing a big crop of cotton. In talking with Mr. Meharg, we agreed that was the one thing to hammer on, the one point to keep our eyes on—a big corn crop. Now it has worked out to the point where it shows that our combined judgment was extremely well taken, that corn was the important thing and cotton would follow rapidly in its wake. We were not altogether determined by the relative value of the corn and cotton crops. We had before us the experience of Texas, where they were losing their cotton crop through the ravages of the boll weevil. We knew that we must prepare for this, and we were so well prepared that when the trouble struck the western part of the State there was no panic among the growers. They knew how to grow other crops. There was no panic among the bankers, because the banker had confidence in other crops. But I will not dwell further on this. I want later to dwell specifically on some of the problems that we need to study in detail.

In furtherance of what Dr. Murphree and Mr. Savely have said, we do not look upon you as visitors here, we want you to see the buildings, get all the information that you can and make use of it to the best advantage.

EDUCATING BOYS AND GIRLS FOR FARM LIFE

J. J. VERNON

(Corrected copy of this paper had not been received up to the time of going to press, May 10.)

DISCUSSION

C. H. BAKER. I just want to say that I don't know when I have listened to anything more inspiring than Dean Vernon's talk. It had never occurred to me that this matter might be treated as a part of our school course of literary work which would appeal directly to the child and interest him in his own line of life; but I can see it now.

Another thing I have thought of a great deal, and that is when it comes to be a question of studies in school, we are often under misapprehension. I do not know of anything more misapprehended than mathematics. We are born, live and die by mathematics. That is too long a name and I hope it will be shortened some day. It is the same way in all the world, it takes the scientific worker years of effort to evolve a formula for something he has been working on; but the formula is simplicity itself, it is often only one or two words. (Illustration of a child in India performing quite complicated mathematical operations with the abacus.)

I want to take this opportunity to express my thanks to Prof. Vernon for what he has said here with regard to work in schools, I am inclined to take it up, and introduce it into my own County.

S. J. McCULLY. I heartily endorse all that Prof. Vernon has said toward the betterment of agricultural life. I feel that we will not be doing our whole duty as demonstrators of agricultural work if we do not go into the schools and get up and talk to the boys and girls about the organizing of Boys' Corn Clubs and Girls' Tomato Clubs. We must bring out the views of the teacher who teaches these things all the time. * * * I believe we have not done our full duty as Prof. Vernon says until we can go through the rural districts and find some very inviting homes. They would certainly appreciate it if all the Demonstration Agents would take a more active part in the work, as they are supposed to do later. We can set an example, and teach by example how they are to train the child to beautify the home and everything of that kind. It all has a tendency to aid agricultural work.

O. L. MIZELL. I appreciate very much the remarks Prof. Vernon made. I have heard him make similar remarks many times before, but they are always better and better. I believe in these things, and I believe it is our duty to carry the inspiration we get here to the homes of the people we visit. In my traveling around I try to follow up all the cow trails and byways, and see the people in their homes, and see their conditions and their disadvantages. When we do that, we can place ourselves somewhat in their position, imagine ourselves in their situation, and approach them in a different way than if we casually met them at home or on the highway. In that way we can gather the children with the father and mother and gradually broach all these ideas, bring them to believe in our ideas, and under it all is the idea of better conditions for the boys and girls. We must not neglect the education of the boys and girls. The parents are doing all they can, and if we can point the way to higher ideals the boys and girls will catch the spirit and their ideals will be greater. I appreciate the ideals given here. Let us carry them home and let us talk plainly to the teachers about them. I am persuaded that they do not know very much about it.

E. W. TURNER. I cannot say much more than has been said along this line; but it is my idea to take up all parts of the home, get the mothers interested, instruct the farmers how to take care of their machinery and keep it oiled, and in the future generation the farmers will be what they should be. We want to get the schools to teach agriculture. There are many little things you must take up within the home, and show them why they should do this, show them by the different surroundings where they can be benefited by confining their hogs and cattle.

T. Z. ATKESON. This problem is one that when you get to studying from the practical standpoint of the demonstration work, has many things connected with it. To my mind perhaps the thing that has done most is the Girls' Canning Clubs' work. As Dean Vernon so well phrased it, it is necessary to get in touch with the homes and understand their conditions. I do not know why it is, for my girls are all boys, but I think the girls especially appeal to parents. If we can put something like the tomato-club work before them that touches the daughter, we may get the attention of both parents. The tomato club work has the advantage of showing the people on the plantations where they have been losing money all these years in not utilizing the by-products of the farm. The canning-club work in Suwannee County

last year was a great success. The lady in charge has done a great work in that County. I think her work has done more toward the upbuilding of the rural conditions in Suwannee County than any other thing that could be done. This problem has to be approached with quite a good deal of caution by the average Demonstration Agent. My own experiences have been rather amusing in some cases, and rather unique in others. To give you one case in particular. I remember last summer a farmer in the County, who is fairly well educated as farmers go. He has a good common school education, owns his place, and has a very nice house. It is a log house, to be sure, but has a big porch and is fitted up well. I was taken with it, for it was an attractive place. I stayed there one day to dinner, and I certainly was sorry for his wife; all of the time we were at the table she was so embarrassed. Her husband and I sat at the table, and she had a big limb of a peach tree with which she was doing the best she could to keep the flies off. I told him he ought to have the house screened. He said it cost too much. But after dinner we figured over the cost carefully and found he could buy all the materials necessary to screen the house entirely for \$12. He said: "You know I would like to do it, and my wife she has been after me about it for a long time, but I haven't the money." So I said, "Well, I'll tell you what I'll do, if you say the word when I get back to Live Oak I will send you down all this stuff and you can pay me back next fall when you get your money." But he wouldn't do it. That man had a riding cultivator, but his wife had to cook on a \$7.50 cook stove. This is a rather difficult matter to meet, and I think those are the things that will have to be evolved rather slowly in the majority of instances.

P. H. ROLFS. At first sight it seems as if the position taken by Prof. Vernon was rather far-fetched, but we are closer to it than we realize. People are ready for this. I remember our first Institute held at Greensboro. We talked to the children, and Mr. McQuarrie asked how many of the boys and girls wanted to be farmers. There were four little hands that went up, and they were feeble expressions at that. Two years later we asked the same question, and there were a great many hands that went up in the air. There were only a few who did not hold their hands up. That was the result of a small stimulus toward better farming. Dean Vernon has told us how great the advantage would be if only the problems in arithmetic were agricultural problems and if the reading lessons were agricultural subjects. We will find here and there (only a few it is true) some of the finest homes in the country for which I would trade in a minute some of the best in town. It is not an easy matter, but it is possible to have those fine homes. The moment we have one country house with a bathtub, it is only a year until we have a half dozen others. It is not because people do not want them. They may talk against it, and want to defend their old way; but when the way is shown we will find that improvement goes rapidly. The first step, we know, is that of getting more crops on the farm, so we can pay for these homes. We must have the money to begin with. The 1900 census showed the average farmer was making but \$129 per year; and out of that he had to pay for schools, for ministers, etc. It is no wonder the farmers are living under the hard conditions. These conditions have shown great improvement during the decade ending 1910. Our work primarily and immediately concerns us with the parents, so we can get these ideals. Let us keep these ideals. If we have a low ideal we will never attain anything better. Put your mark

high. Formerly we were satisfied with nine bushels of corn. If we keep our ideal on nine bushels of corn, we will never get above it. We have already reached the fifteen bushel crop. If we keep our ideal on the little log school-house we will never get above that. If we have an ideal of a perfectly trained teacher, it makes no difference how great the obstacles, we will overcome them, and have a good school. Dr. Murphree referred to the school with the teacher on one end of the log and the child on the other. Some of the best lessons are taught by the teachers in this way.

I tell you, you have a great opportunity, greater than any of the rest of us, of bettering these interests in the country, and I think Dean Vernon has given us a great ideal.

H. E. SAVELY. I don't know how many of you men can make a public talk, but you are going to miss some wonderful opportunities of doing good if you don't make it a practice to speak in the little schoolhouse every time you go by and say something to the children. The best Demonstration Agents everywhere are the men who appreciate this fact, who make it a rule to stop at the schoolhouse and say a few words to the children and pass on. You have no idea the amount of good you can do if you will think out little lessons on corn or something else, and make it your rule never to pass the schoolhouse when it is in session without stopping and saying something. And when you get the sympathy of the children you will get the older folks too. As an illustration of what may come out of a chance conversation which is at the time seemingly unimportant, I want to tell you a little story about the late Dr. Seeman A. Knapp and a farmer he met one day. About fifteen years ago, Mr. Green, of _____ Miss., came to Dr. Knapp to buy some hogs. Dr. Knapp had some stock to sell. While they were talking over the trade on stock, Dr. Knapp got to talking to Mr. Green and telling him how to prepare a better seed bed and grow better corn and garden crops. Mr. Green had not seen Dr. Knapp since, but one day I saw Mr. Green, and he said he was making two bales of cotton where he used to make only one. I asked him how he came to do it, and he said that 15 years before he met Dr. Knapp who was so enthusiastic, and talked to him about making a better seed bed, etc., and Mr. Green said "All these years I have been trying to do what he told me." So I said "I will write to you the next time Dr. Knapp comes to the State." I wrote to him and he came 150 miles to meet Dr. Knapp again. Now that man was a sort of leader in his community, and all that influence for betterment came out of a little conversation he had with Dr. Knapp fifteen years before. Don't lose an opportunity of going into the schools.

SUGGESTIONS TO AGENTS FOR THE PRACTICAL HANDLING OF THE BOYS' CORN CLUB WORK

C. K. MCQUARRIE

This movement carries one of the most useful lessons ever given to crop growers. Some critics have declared that the phenomenal yields secured by some of these boys were owing to their having picked the best soils available for their work, and that they devoted more time to their

crop than it is possible for the farmer to do under usual conditions; that they nominally lived in their patches; that they used excessive amounts of fertilizer. To all of which the reply can be given—What about it if they did? But on analysis we find, that in almost every case the soils were not picked; that the amounts of fertilizer used were not more than the average farmer could profitably use; and that if the boys devoted more time to their patches than in the orthodox way, it paid them to do so. Where the corn-club boy excels the ordinary father is in that he sets out to make a maximum yield; he sets a figure to be attained; he plants his seed thick enough to ensure that yield providing his soil is capable of producing it; and he stays with his crop, cultivating it and working it to the utmost, so as to attain the end in view. And it seems to me our agricultural education has all along been remiss in this line of teaching agriculture, in that they never set a maximum yield as being possible under certain soil conditions and certain closeness in planting the crop. They have been content to stick to the oft-repeated phrase of increasing the crop production. They did not have the nerve to set a figure and live up to it. It has been left to a few little boys to give an object lesson of what can be done when you start out to do it. The boys' work emphasizes the first and most essential aim of everyone who puts a seed into the ground—to give this seed every possible favorable soil condition, to make a maximum yield at harvest time. Over and above this, these boys have demonstrated to their fathers and all others concerned, that the increased yields have been made at reduced cost per bushel.

In the past history of the Corn-Club Work in the State, the most part of the work has been done through the County Superintendent of Schools, and by visits to schools where talks were made on the subject and the boys enrolled in number at one time. There was not much actual field work done among the boys by any of the Agents. This method has not proved very satisfactory, and has not resulted as well as was expected at its inception. The weak point has been that the personal touch, so requisite, was not continued; and the boy was left very much to his own initiative and resources. He was not accorded the influence of periodical visits and instruction, so necessary to his success. The boy on the farm is sometimes a difficult problem to handle, even to his parents; and where the Demonstration Agent pays his periodical visit, he has to use discretion as to how to get the boy to do as he wants. If he gets his name for enrollment right at home, he can do all the necessary initiat-

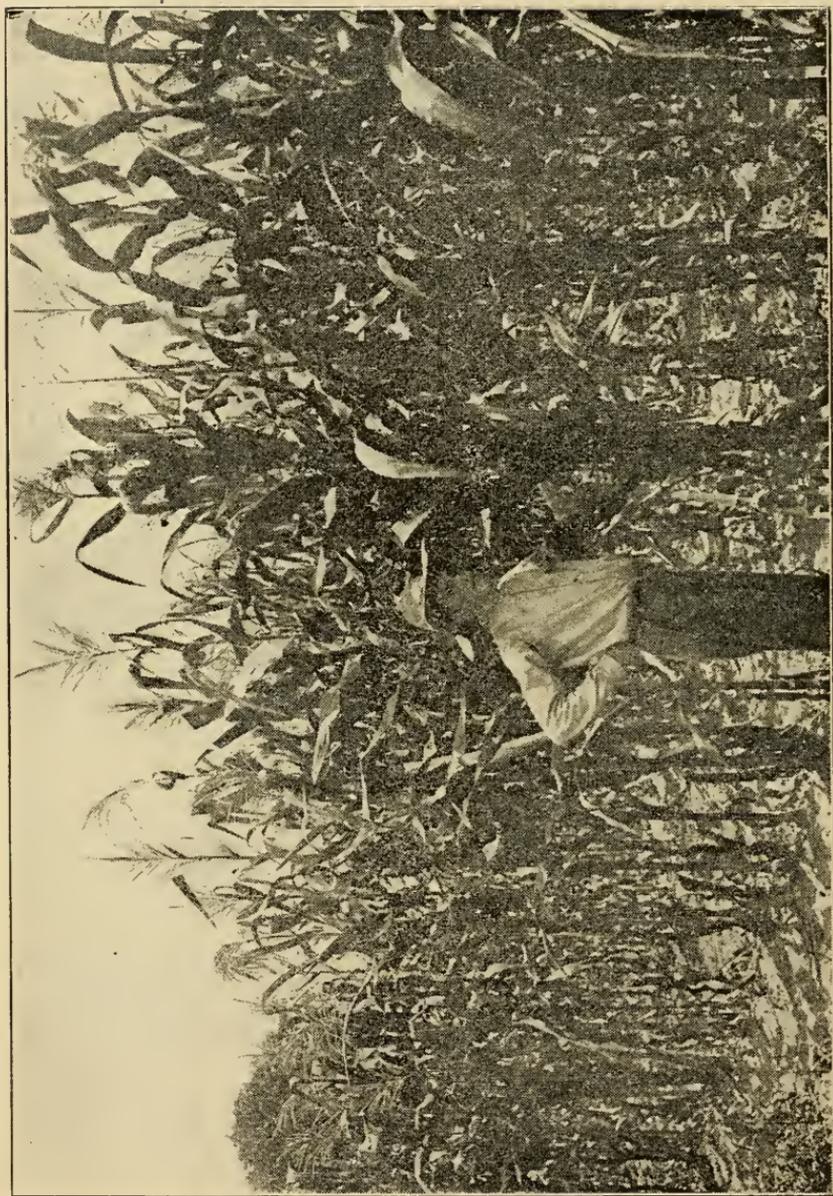


Fig. 2.—Boys' corn club member.

ing right there and then. If his name is enrolled with several others at a school or other meeting, the enthusiasm that generally occurs at meetings where a number join at one time, has waned by the time the Agent gets around, and he has to sometimes use diplomacy to get the boy started right. Sometimes the Agent will find names on the lists made at such meetings that are not desirable, that have no land suitable for the work, or not enough of it; and the Agent may have to do some weeding out. In this he must use some diplomacy so as not to cause any hard feelings that would hurt the work at some future time.

The land should be measured, to see that it is not too small or too large a patch. Seventy yards square is an acre, or 43500 square feet, and any multiple of this may be used. In planting a crop, the measurement should be from the outside water furrows. In the past some have measured the land from row to row, which is really more than an acre and was not a proper record.

In all the work with boys and girls, the personal touch is really what counts for success. The enthusiasm that the Agent shows in his periodic visits is reflected manyfold in the boys' successes, or otherwise. The necessity of a good seed-bed should be strongly emphasized, and also that the drainage is ample to prevent water standing on the surface during a rainy time. The proper fertilizer should be used and applied in the proper way; the quantity to be used should be determined by the mechanical condition of the soil and the depth of plowing when it was broken. A good rule to observe here would be 100 pounds per acre for every inch the land was broken. Where six hundred pounds per acre and upwards is used, it is recommended to broadcast it, and work it into the soil a few days before planting. In all these operations the Agent should be very explicit in his directions so as to ensure success. The personal touch is what counts, right at the time. Good seed should be procured that is suitable for the kind of soil in use.

PRIZES

The Agent should familiarize himself as early as possible with the number of prizes that will be available in his County. This will be an incentive to the boys to do their best. There is a difference of opinion as to whether these prizes should be in cash, live stock, implements, clothing, shoes, etc. We generally favor live stock, poultry or cash. The implements given generally do not appeal to the boys as much as a pig, a calf, or a chicken. If the prize is in cash,

send a check with the recommendation that he open a bank account with it, if he has not one already, which more boys have than some people have any idea of.

The Department at Washington is not in favor of the yearly trip to Washington given the boys that have the largest yields in the States, but recommend that it be used for a scholarship of a year's course in the Agricultural College. Giving short courses for the winners in the Counties is also a good way to reward the boys, and the Agent should at an early date get everything in line, so that he will be able to encourage the boys as much as possible.

THE GIRLS' CANNING CLUB

While the Agent has no direct charge of the girls' work as he has of the boys, still he is to help in any way he can by his personal attention as far as possible in the matter of soil treatment, spraying the plants, pruning, staking, and the other operations that belong to the work. He can, by cheerful encouragement, do wonders towards making the girls' work a success. The girls have just one-tenth of an acre, but on that they should grow a variety of crops, and practice a system of crop rotation for the season, because their crops are all short period crops; so that they should be encouraged to grow tomatoes, beans, okra, egg-plant, and peppers.

DISCUSSION

H. E. SAVELY suggested that two boys from each County should come to the Short Courses at the University. He also suggested that there should be uniformity in the different Counties in regard to the prize money. Big cash prizes are not desirable, as they are so discouraging to all but the prize winner.

PROF. VERNON recommended a large number of small prizes, making the first large enough to be attractive; \$25 as a rule, is high enough. Scholarships are excellent prizes, but the money value of the scholarship should be made considerably higher than the cash prize. Then if the winner does not want the scholarship, he can of course have the smaller cash prize.

D. C. GEIGER. In our County the County School Board have offered to duplicate any amount the Demonstration Agent can get up. I have a guarantee of about \$100, and they will add as much more.

Some boys are handicapped in advance, from the fact that their land is not as good as that of some others. It is a good idea to give first, second, third, and fourth prizes so that all would be encouraged to try.

S. J. McCULLY spoke of lack of perseverance, citing the fact that of 141 boys enrolled in the corn clubs 100 dropped out; but in spite of that they had a good exhibition and had money enough to give each boy a little prize. * * * He said that the Painter Fertilizer Co. offered \$25 and a gold watch for the largest yield of corn per

acre, but unfortunately the offer came rather late, as most of the corn was planted. He recommended that every boy should get something, if it was only \$1. His method was to go from house to house and talk it over with the parents and the boy. The results were more certain, as the enthusiasm that could be gotten up by talking to the boys at the schoolhouse does not amount to very much. He makes it a rule never to let any one boy know what another is doing. The Demonstration Agent's boy must not be one of the contestants. It is an absolute rule that no relative should have anything to do with the measuring or weighing of the corn.

O. L. MIZELL. I thought after trying it one year that I could advise anyone, but now I am not so sure. There is just one point that I want to mention, and that is about raising the corn. I think the proper thing to do is to stress the fact that it is the raising of the corn, and not the winning of the prize that is the most important. If we stimulate every boy with the idea that there is nothing to it but the winning of the prize, there will be a great deal of disappointment. So let us keep the idea that the real thing is the raising of the corn, not the winning of the prize. Incidentally, let the boys know there is a prize coming, but do not make the prize the main idea.

G. W. BELSER had about 50 new names this year. He was in favor of giving every boy some kind of a prize if he grows his corn and reports to the County Fair. He did not think it a good idea to encourage the boy to grow the corn simply for the prize, but to work for good corn. Possibly some boy works as hard as the others but does not get anything because he did not make as much as the other fellow. He did not favor money prizes much, but rather something that the boy could appreciate. The outlook was encouraging. The chances this year were for better results.

I. E. SOAR. It is rather difficult at times to get everybody in good humor. It would be better to distribute prizes largely through the list of boys who complete the work and turn in results, but a large proportion of the prize money should go to the boys who make a good showing. I have made it a rule that every boy that completed the work and turned in the records should get at least one of the Boys' Corn Club Badges. Sometimes boys are very much interested, but in starting into the work do not seem to have suitable ground; and it seems to me that such boys ought to have something to encourage them. The having a badge seems to be a stimulation. I am particularly in favor of going to the homes and talking with the parents as well as the boys; boys whose parents have been interested are the ones who make the best showing in producing corn.

A. P. SPENCER. Referring to the scholarships, it has come to our attention that sometimes the scholarships come to rather small boys. Would it not be well to award the scholarships for work extending over one or two years? Of course the small boy is welcome, but the older one gets more out of it.

PROF. VERNON. It would be better for the individual boy; but on the other hand, I think we would reach a smaller number, unless we could work out a plan to get a large number up here on the basis of three or five years work. There is no question but what the boys (as many as we could get together of that kind) would do better, or that they would get more out of the short course. The great idea with the scholarships is to get as large a number of boys from as broad a field as possible. The boys come here, and when they go home they will talk about it, and possibly the boy or his father will write it up for the local paper, and everybody reads it and talks about it,

and pretty soon you have some boys coming on their own account. Dr. Murphree has ruled that no boy under 16 shall remain at night on the campus; but we have made arrangements through the different ministers to have them taken care of in town, and I believe in catching them just as young as you can. Of course, there is a limit. If we could have a bunch of eight-year-old boys I would just as soon have them; but the younger boys may not get as much as the older boys; though I know cases where a boy of 13 got more than a boy of 17. I have asked questions that a gray-haired man and others in the class could not answer, but this little fellow could answer. I think the boy I have in mind got more out of it than anyone else. I would not rule out a boy because he was young.

I think a longer course for two or three years work is a good idea.

H. E. SAVELY. Aside from the prizes, there are a lot of things you can do to create interest. One thing is an entertainment by some of the leading citizens of the County. This wakes the business men up. I know of one such an affair in Texas that was very successful. There the boys marched in procession with the Governor at the head, and afterwards had a banquet and some entertainment. It made the boys feel a sense of pride to belong to such an organization. It is up to you Agents to see in how many ways you can bring the boys in touch with the business people.

BREEDS AND MANAGEMENT OF SWINE

C. L. WILLOUGHBY

(Corrected address not received at time of going to press, May 10, 1914.)

DISCUSSION

D. R. MCQUARRIE. Peanuts for young pigs when fed alone have detrimental effect, do they not?

PROF. WILLOUGHBY. Yes, they are probably too highly nitrogenous in that stage of the pig's growth. It is best to feed them to larger animals. Do not feed any to young ones; bad effects may follow.

E. W. TURNER. My experience has been that young pigs do not do so well when fed on peanuts. I turned some animals weighing seventy-five pounds on this crop and they were reduced to forty pounds or so. Say five or six months old is about the age they should be before being turned on peanuts. Hogs need certain things for their development. Wheat shorts and skim milk are good.

R. T. KELLEY. What is the best breed of hogs?

PROF. WILLOUGHBY. There is more in the individual than in the breed. Berkshires are probably best. Duroc Jerseys second.

C. H. BAKER. Is there any breed better adapted to sections of Florida?

PROF. WILLOUGHBY. Tamworths for South Florida and the Everglades seem to do best.

D. G. MCQUAGGE. We lost some of the animals, and dissected them and found worms. We gave others potash and it helped them.

PROF. WILLOUGHBY. I would suggest turpentine for worms, $\frac{1}{2}$ teaspoonful to a hog.

PRACTICAL METHODS OF HOG RAISING

W. E. BROWN

One thing about the selection of breeds is that of the individual hog, and farmers will often buy blooded stock without knowing anything as to the history of their stock and their breeding qualities. It is important that they should know something about the history of the hogs they buy.

One of the best crops I know of for hogs, especially stock hogs, is velvet beans. We look upon beans as being great feed for cattle, beef cattle and such things, but few farmers realize the value for hogs, especially stock hogs. I have never seen the hogs injured from running on the bean fields, or sick from it, except from cholera or something of that kind. Supplement the beans in the winter with such crops as rye, oats, rape. By planting Yokohama, Chinese, and the old-fashioned velvet beans, the farmers can have nine months of pasture. I know of no cheaper thing to raise than the bean crop. It is a soil builder and a hog grower. In the spring we have cowpeas, peanuts, cassava, chufas, sweet potatoes, beggarweed, sorghum, Japanese cane, and, of course, corn. All these crops can be grown through the summer for the fall and winter pasture.

Of course these crops should be grown to furnish a rotation. That is one thing farmers should learn something about. These crops will then mature in such a way as to have a succession in feeding, one following another.

THE HOG LOT

The hog lot is another important adjunct to hog raising. This lot should be kept in a sanitary condition, with a dipping vat. The wallow should not be a mud hole, but should be of concrete with a good drain, so it may be thoroughly cleaned. Then it can be used as a dipping vat, and should be kept clean and free from vermin.

I might say four gallons of crude oil, one gallon of water, and one pound of hard soap will make a stock solution, with twenty gallons of water added for dipping hogs for vermin. The vat should be filled with water, and this oil poured on top. You can use kerosene in place of the crude oil if you desire.

I think hogs should have some shelter, especially brood sows with young pigs. More pigs die, I believe from exposure, than from any other cause. We think that because it

is warm, they do not need shelter; but they want good bedding and shelter from cold weather. This applies especially to young pigs.

DISCUSSION

E. W. TURNER. At what stage would you say to turn them on to Japanese cane?

J. D. BROWN. They get best results from Japanese cane chopped up, and it is a very good soiling crop.

C. H. BAKER. Which variety of bean would you begin with, as a rotation?

W. E. BROWN. The Yokohama will mature first.

R. T. KELLEY. Is it best to turn hogs into the velvet bean fields before the beans are ripe?

W. E. BROWN. If you feed velvet beans, peanuts and sweet potatoes, the hogs will not bother the beans much; but if you have a bean field with a pasture or something to run on they will eat the beans in a young stage. They do not eat so many beans, but if nothing else is given they will get fat and make a splendid growth.

D. C. GEIGER. Is the velvet bean a finishing crop?

W. E. BROWN. No, it is more a pasturing and growing crop, although you can fatten hogs for pork for the market or for home use; but there is nothing like peanuts for this.

H. E. SAVELY. How about the meat produced with peanuts?

W. E. BROWN. It is best to use some corn with the peanuts as a finishing crop.

I. E. SOAR. Use Japanese cane and such things and the quality is fine.

D. G. MCQUAGGE. How about turning under the peanuts and letting the hogs root for them?

W. E. BROWN. This is good, and they will go down after them; but many of the beans are lost in this way.

W. L. WATSON. What is your opinion of the Chinese as compared with the velvet and Yokohama beans?

W. E. BROWN. My observations are that the Chinese makes more grain than either of the others. They rot easily and shell out badly. But if you have hogs to eat them as they shatter, you do not lose so many as with cattle.

W. L. WATSON. How much earlier will they mature than the Florida velvet beans?

W. E. BROWN. Three weeks. I assumed as a basis in my talk that the Yokohamas be picked dry in September, being planted in May. The other beans matured almost at the same time, but put on more crops the first picking. I have picked the Chinese Velvet Beans three times, first in September, then in October when most of them were mature, and again later. They are fine feed for horses, mares, and colts. Nothing will keep the colt in better condition than velvet beans. When a mare gets fat from velvet beans, she is shaped like Santa Claus.

A. P. SPENCER. Did you pasture the Yokohamas?

W. E. BROWN. Yes, but there was some loss on account of their shattering in October, as they will soon rot on the ground.

Q. What do you consider the best way to plant beans in corn?

W. E. BROWN. That depends on whether you want to plant them for soil building or for pasture, and on the kind of land. On

ordinary upland pine soil you will probably need to plant the corn six or seven feet apart and the beans in the middle. That will be sufficient to cover the corn stalks and everything completely, on good land. You want to give more distance on very rich land. Plant the corn in five foot rows and then down in the middle plant the beans. If your ground is very rich so you cover too much of the corn with the beans, plant the corn in five foot rows, and for every six hills drop a hill of velvet beans. You can make twenty-five bushels of corn that will be covered up almost completely.

D. C. GEIGER. My Chinese beans do not shatter as do the Yokohamas.

W. E. BROWN. I did not get any Yokohamas, but the Chinese certainly did shatter. Some of the pods were very long and shattered a great deal. You could hear the pods all over the field cracking like guns. They made a very heavy crop of vegetation.

J. C. SMITH. Which is better, the Yokohama or the Florida Velvet Bean?

W. E. BROWN. I cannot tell. There are several things to be considered. One point is that the more roots in the ground, the more nitrogen you would suppose the roots could store up. On the other hand, the velvet bean covers the ground more completely and makes a better growth. Personally, I know little about the Yokohama bean except what I have said.

HOG CHOLERA SERUM

W. L. WATSON. What percentage of your hogs did you save in inoculation with serum?

W. E. BROWN. About 90 per cent. In some herds I would lose a good many, and in some cases it seemed they died more quickly from being inoculated. That probably was due to their already having the cholera, and being caught and worked with made the fever rise and caused them to die more quickly. Another important thing is to inoculate them when it should be done. The farmer who has the good results is the farmer who does it at the proper time. Then the next time there is cholera about fifteen miles or so off, the hogs should again be inoculated before the disease slips up on them. Another thing is that they try potash, Sloan's Liniment, and as a last resort they try inoculation too late, and blame the loss of their hogs to that. In talking to a man the other day from Floral Home, he stated that the hogs around Williston were dying off because they had been inoculated. That they never died before. He had a short memory. They did not believe in inoculation, and it was a hard matter to get them to do anything.

There is only one way to accomplish anything in this hog cholera matter, and that is to push it. I got a syringe, ordered the serum, and told the farmer to hold the animal firm and I did the work. They got started and I could not keep up with the work, there was so much of it. They wanted me to work on Sunday—could not wait until Monday for fear the hogs would die in the meantime. I got a syringe, and do not charge them anything and drive to their place with the serum, and tell them there is nothing for them to do but hold the hogs and I will do the work.

J. D. BROWN. Is it true that four weeks after inoculation the effect is gone; that three weeks is as long as it lasts? My understanding was that it was necessary only once. I think they become

immune after once having cholera, but it is only for twelve months, according to Dr. Dawson.

W. E. BROWN. I would say, inoculate your hogs, and if they are sick inoculate them again, and keep inoculating them as long as they keep getting sick, for you cannot afford to have the hogs die after inoculating them. Your reputation is at stake.

EXPERIENCE IN PORK PRODUCTION

S. J. McCULLY

The production of pork and the cheapness of it depends largely on what kind of hog you propose to make pork of. If you are going to make pork out of the common piney-woods rooster, and let him get his living in the woods as best he can, your pork will be very expensive, for, Mr. Chairman, it will take more food stuff to make pork out of a poor, measly, knotty pig than out of a good healthy hog. Now, to have your hogs healthy, you must care for them. Inasmuch as a hog must have some care and attention, I would advise to get a large, thrifty variety, such as the Hampshire, Poland China, Berkshire or the Duroc. Either of these varieties will give good results in pork production; and to make the results at the least expense, you must devise some way to keep the hogs healthy and growing. To keep them healthy you must rid them of all diseases, such as fleas, lice, and scale. This can be done by building a hog vat, and dipping the hogs in either Cresol or Bee Dee dip. When once you get your hogs in a healthy condition you can easily make them grow.

My experience in the production of pork is to have a variety of pastures as follows. In the winter and early spring let your hogs run on rye and rape. This is fine feed for hogs, and very cheap. In the latter part of the spring or early summer have a plot of Spanish peanuts and sorghum; hogs do exceedingly well on this kind of feed. The latter part of August put them on peanuts, velvet beans and cassava. This mixture will cause them to thrive and make better and firmer pork than if you feed only one thing. Again, it gives the farmer a good opportunity to dispose of his surplus at any time he wants to.

DISCUSSION

S. J. McCULLY. You can have your pork in market condition at any time. The trouble about the Marion County people (and other counties, for that matter) is that the majority of the farmers want to market their pork at the same time. Their feed is exhausted in the latter part of the fall, and they want to get rid of the animals. In September there is a good demand; but take it in November or Decem-

ber, you will find all our markets overstocked, and consequently, pork runs at about six or seven cents. But if you plant cassava and hold it until spring, and keep the hogs to the middle of March or in April, you can get ten cents. Mr. S. R. Pyle got ten cents f. o. b. for his pork last spring from the Tampa market. They are not so particular about the size. There was a time when a farmer could market only a certain sized hog. This condition has passed, and you can get rid of any sized hog at the proper season.

H. E. SAVELY. Do you advise keeping cassava over until the spring?

S. J. McCULLY. Yes. Before I kill the hogs I run them on cassava alone. This hardens the meat and lard, and it is firm and hard. After smoking the meat I always dip it in hot water for fear of insects or something, then get a new box and salt the meat thoroughly, and put a layer of salt, and layer the meat on it, and barely cover it with salt. Then being weighed after four or five months, it will be about the same. This is not so after feeding peanuts. The meat drips and drips and almost drips itself away if it hangs up. The lard is oily, and some people even put it up in jugs. The same is true if hogs are put on chufas. The lard is almost as thin as water.

D. R. McQUARRIE. How do you plant Cassava?

S. J. McCULLY. Cut the stalks to about eight or ten inches long. Plant three feet in the drill. I plant in February and March.

Q. Will the roots keep through the winter, and how best?

S. J. McCULLY. Let them stay in the ground, the hogs will dig them up themselves.

I. E. SOAR. Will Cassava keep if the ground is wet?

S. J. McCULLY. We have had lots of rain and we have wet ground, but the cassava is keeping well. It is best, though, to plant it on a bed.

R. T. KELLEY. Will it keep better in the ground than out?

S. J. McCULLY. Yes, it dries and rots out of the ground. Cassava is a cheap crop and a good crop.

J. C. SMITH. Do cattle eat it?

S. J. McCULLY. Yes, and seem to like it well, although I do not know what its feeding value is.

W. L. WATSON. What is the average yield per acre?

S. J. McCULLY. I do not know. I have about 25 or 30 hogs on a half acre of cassava, and it lasted for two or three months. I have had other cassava fields that did not last that long. I used a formula of 3-8-8 fertilizer on it. It will make good cassava.

O. O. SIMMONS. Where it is planted on level lands, do you want beds?

S. J. McCULLY. Yes, it is good to make a bed and cover it only barely. Cassava is a peculiar thing. If it has grown a crop only three or four feet high, it may have a great many roots, and some land that produces good top crops does not produce good roots.

W. L. WATSON. What do you think of Bermuda grass pasture for hogs?

S. J. McCULLY. It makes a good pasture, although some people are prejudiced against it. It all depends on the locality. I would have experimented with burr clover if I could have gotten the seed.

CUTTING AND CURING MEATS

T. Z. ATKESON

In growing hogs it is very necessary to have the proper hog to cure. It must be a good individual and the right shape; for the reason that a properly built hog cuts to better advantage for the higher priced and better cuts of meat than the ordinary razor-back hog. It is also necessary that the hog be in the proper condition to butcher. We all know the exclusively fed peanut hog will not make a good quality of pork; but so far as flavor is concerned, it is good. It has a flavor that I rather prefer; but the fact that it cannot be kept without considerable loss in weight and without losing its high qualities rapidly, is a detriment that cannot be overcome. My method over in Southern Alabama has been always to corn-feed hogs for three weeks, and for the last few days I have used some corn along with peanuts in the pasture. Our Dan Gray, (we still call him ours although he is now in North Carolina) has said that when hogs are fed at the rate of one pound of corn per day for each one hundred pounds of live weight, they will bring in about \$3.75 for every 100 pounds of corn fed. You see there is no loss of money on this proposition.

BUTCHERING

You will have to have everything sharp when you butcher an animal. Have the knives sharp and ready before you begin to kill. I do not know your experience or method of killing. I have tried everything in this line from knocking the hog on the head to turning it on its back and sticking it with a knife till it bleeds to death (the method is recommended by the Department of Agriculture). I suppose you are all situated as I have been, on farms, and have to use negro labor for the most part, or incompetent white help. After seeing the negro turn a hog loose and let it run around over the pen until it finally drops dead, one never wants to kill another in that way. So I take a 22 caliber rifle and shoot the hog, then stick him with a knife, and he never gets up. Hogs should be killed in Florida in the afternoon. The one absolutely necessary thing in saving meat is to get the animal heat out as soon as possible. With as much hot weather as we have there is much danger of losing the meat. Kill the hog in the afternoon, split it apart and hang each part by itself; and then the next morning, if it is reasonably cool cut the carcass to pieces. The carcass can be put in the

smoke-house and allowed to stay over night, and by next morning it will be ready to cut up.

THE MAIN PARTS

There is some difficulty in cutting it up just right. It is absolutely necessary to have the knives sharp, as I have said before, but I repeat it for emphasis. All of them must be sharp. To do a nice piece of work with a smooth finish, everything must be in the best condition. Of course, we presuppose the head was cut off the night before and the carcass split. Now, where do you cut the head off? As close behind the ears as possible. Why? Because the shoulder is worth more than the head and we want as much shoulder as possible. The shoulder is not as choice a piece of meat as the side; so when you cut the shoulder out, cut as closely as possible so as to leave as much side as possible. Then when you get to the ham this is more valuable still, so you want to cut as much ham as possible. That is Scotch philosophy, is it not?

CUTTING THE SHOULDER

Now, take up the different cuts. The packers' cut is the best. The farmers' cut is much lower. This piece of bone is practically worthless and the best place to cut is above this. It is the place where maggots have the best chance to get in and ruin the meat, so I advise you to cut it high and throw the other part away. The only use you can make of this is to cook it with collards, and it always ruins the pot of collards. Going back to the sharp knife. This meat has another bone that was not shown in the drawing. Take your knife and cut around it smoothly, then turn your knife, making a smooth cut. Make the meat perfectly smooth, not only from the fact that it looks better, but it removes the danger of flies and insects getting a chance to work on that particular piece of meat.

There is another unique idea in cutting the shoulder. As I stated, the shoulder is one of the poorest cuts (next to the head, it is the poorest), and is really one of the hardest pieces to cure that I know of. It is of such shape that it is exceedingly hard to cure. The packing-house man is able to cut it much better than the farmer. He has the right tools and can do it in the right manner. Most of the hams, that is the picnic hams and lunch hams, are made of the shoulder. The shoulder blade stands up, and, in curing, the bone and meat draw apart; which is a bad proposition. In order to relieve that trouble I drop back a distance, and make a cut

through the whole, and cut the bone nice and smooth all the way through. This is all flabby meat, and you want to take a knife, and cut to where there is no flabbiness. Then cure this along with the hams and it is as good a ham and as good meat, if cut from a good large hog, and only in shape is there any difference. I put the lean loin part in with the sausage meat, and put the fat in the lard tub where it belongs.

THE BACON

In Live Oak the other day my wife bought breakfast bacon all fixed up in a box and very attractive, and she paid 40 cents a pound for it. That brings me to the point that every farmer can have his own breakfast bacon as good if care is used. The side is divided into three distinct strips by the farmer, but the packing house man makes about six cuts. With us it is more economical to make only three, the fat back, the bacon strip, and the belly. This fat back is pure lard. Then the loin is stripped out, and a cut made through to the lard, which is used for lard. The belly part is least desirable of all, and I have always dry-salted it and sold it to the negroes on the farm.

THE SUGAR-CURING PROCESS

Now, the sugar-curing process. It is strange how easy it is to put up something better than we have been doing, and do it cheaper. Farmers in Suwannee County, when I first began to talk of it, argued that it would be good for Alabama and Georgia, but not for Florida. There are many who have done as I have been describing it, with perfect success; and in order to test it out, I persuaded one particular farmer, who had gumption enough to do just as I told him, and he did it without any cold storage. One day he did get a scare, and asked me if he should use ice and how to do it. I did not think so, and told him if he wanted to do it to go ahead. We put a dry goods box on a table and bored holes, and put in a layer of meat and a layer of ice, and then in forty-eight hours we took it out, and the meat and ice were frozen together and only half the ice melted, which shows that there was no animal heat at all in the meat. The farmers used to take it for granted that brine-cured meat meant pickled meat. Meat cured in a brine solution will not lose the weight in curing in the briny solution that it will in dry salt. And we can add other things to the brine and make a better quality of meat. I suppose this formula that I will give you has been used for 200 years or more in the United

States. My great grandfather brought it from Virginia where it was used commonly in putting up the old Virginia hams. It has also been recommended in the Department Bulletins (Farmers' Bulletin 83 gives it), and it has certainly been used long enough to prove there is absolutely no doubt about its efficiency.

Get barrels or build vats (I prefer barrels, for they can be changed if necessary), pack the meat down after it has been spread out and allow to become thoroughly chilled. Pack it down as closely as possible, but don't jam it down, and put pieces in different positions. By rolling up the bacon strips, they can be wedged in so that the barrel will hold as much as possible. There is always room for plenty of the brine to cure the meat. Another thing is that the more meat there is, the less brine it takes to cover it. Use the following:

- 3 pints of syrup.
- 2 ounces of saltpeter.
- 8 pounds of salt.
- 4 gallons of water.

The saltpeter can be left out if you want to. It keeps the red in the lean portion of the meat, and improves its appearance, but not the quality. Nitrate of soda will work just as well. It is said this will cover about 100 pounds of meat but that depends to a large extent on the packing of meat in the barrel. The important thing is to put enough there to thoroughly cover the meat.

After the barrel is packed, you want to lay a weight on top to keep it from rising out of the brine. Leave it from five to eight weeks, according to difference in size of the pieces. It is better to separate if you have different sizes and lots of them to cure, and put the small pieces in one and large in another. For the smaller ones, leave the meat about five weeks; but for the hog weighing about 250 pounds leave it for ten weeks. At the end of this time, take the meat up and wash it well in slightly warm water, luke warm; and then hang it up and drain it, and then it is ready to smoke. This is not *pickling* meat. It is simply a process of *curing* it. The long time necessary is due to the fact that the solution will not be as strong as pure salt.

SMOKING MEAT.

Now use your imagination in looking at this chart. Here is the smoke house, and just outside is an old heater. Cut a hole through a sheet of tin and run the pipe through it and into the smoke house. Have the pipe long so it will

cool the smoke before it enters the house. In entering the house, let the pipe come in near the bottom. The reason for cooling the smoke is that there is not so much loss from dripping caused by heat.

DISCUSSION

Q. Do you use hot water in making your brine?

T. Z. ATKESON. No. I used to do so; but after trying it both ways I found the cold water served just as good as the hot water, so I stopped heating it.

I. E. SOAR. Do you change the brine?

T. Z. ATKESON. Not unless it happens to sour. I have never found it necessary to change it in my experience. You can, however, taste it several times, and you can tell if it is right. If the brine is coated with mold it does not mean that it is sour, but simply that particles of the meat and fat have come loose and to the top and have spoiled. You should skim this mold off whenever it appears. Before curing, I often sprinkle the floor with pine tops, and lay the meat on top, and sprinkle with salt. This draws a portion of the water out. Be sure that all the animal heat is out, for this is absolutely necessary; and then forty-eight hours or so after it has cooled pack it down.

H. E. SAVELY. Do you need to use ice in August?

T. Z. ATKESON. Yes, it would probably be necessary.

H. E. SAVELY. What steps would you take in killing a hog in August.

T. Z. ATKESON. I say, if possible put it in cold storage by all means. If this cannot be done, I would say to kill it and dress it late in the afternoon and then put it into the box of ice after about two hours, and after thoroughly chilling it put it immediately into this brine solution.

S. J. McCULLY. In putting this up in this way does it go through the same process, and have the same flavor that ice would give it?

T. Z. ATKESON. If it does not have a much better flavor, send it to me and I will eat it. One thing that is especially attractive about this is that the process will make it better than anything else you could do. If you will just remember that you are putting it down in the salt and not in brine it will not worry you any longer. The ordinary way is to put it in salt, but the brine is much better.

Q. After killing the hog, how would it do to put it in cold water?

T. Z. ATKESON. Ice would be better, but it might be safe to use water.

W. L. WATSON. After cooling it some, put it in boiling water and cook it for an hour or so, and then put it in that solution and it is fine.

M. C. GARDNER. Did you ever try using liquid smoke?

T. Z. ATKESON. Yes, and it is fine. My reason is the climate. If I were back in Virginia (my birthplace) I would not use it; for conditions are ideal there in the fall and winter for curing meat. But here, with the unfavorable conditions, and the fact that our meat is peanut fed, or partly so, and pretty soft often, and when you take these things into consideration, and take into consideration that the average farmer simply hangs his meat about five feet or so high and then puts the smoking fire under it, I would then advise liquid smoke. This is supposed to be made of the active principle in the

hardwood smoke, so I do not see how there could be any bad effects from its use. Of course, it is a preservative, and a good one, but it will make a little extra skin on the meat.

S. J. McCULLY. How do you treat the hams after they have been smoked?

T. Z. ATKESON. This may sound curious to you, but I simply hang them up in the smoke house and let them stay there. I killed 52 head of hogs at one time here in Florida. The liquid smoke is an insecticide in a way, and protects the meat from bugs. My experience in putting meat away, that is in putting it down in anything or covering it with canvas, has been that the moisture in the atmosphere is almost sure to get in and cause the meat to spoil. In the smoke house, if there is any mold on the meat, I take a coarse sack and rub all the mold off and then use some liquid smoke, just a little, and hang the meat up again. Then the next time there is any necessity for this treatment, I repeat it.

B. F. WILLIAMSON. What is the loss in weight?

T. Z. ATKESON. It is estimated that under ordinary conditions it would be 15 to 25 per cent. in all, from beginning to end.

Q. Would it keep better if put in a barrel and lard poured over it?

T. Z. ATKESON. Yes, but it takes too much lard. Another way used in Alabama is to cover it with cotton-seed oil, which is cheap.

BACKBONE AND SPARE RIBS

That brings me to another problem, that is, the backbone and spare ribs. The first meal or so, you are just delighted with them; but when thirty or forty hogs are killed and a fellow tries to eat all the backbones and spare ribs, he has a big job and a tiresome one. This condition can be relieved. The backbones and spare ribs should not be salted, for there is so little meat that the chances are of their being over-salted. So you should have a tub, or keg, or barrel, and make a brine of ten pounds of salt and four gallons of water, and put them into this; and in ten months, if you wish to leave them this long, you can take a piece and soak it in boiling water and you will find the flavor is very little impaired, if at all. This will relieve the congested period, and at the same time you do not have to spend all your time trying to eat the backbones and spare ribs, but can eat the livers and such parts.

Q. Do chufas or peanuts make the hardest meats?

T. Z. ATKESON. I have not had experience with chufas. I do not know when they could be used except after December, during January or February. When it is taken into consideration that they should be planted early and grow all the year, I prefer not to use chufas. The chufas mature earlier than that, but during the fall and winter there are so many other things that can be grown cheaper and more rapidly, that I do not care to grow this crop, for it occupies the land too long.

HOG CHOLERA IN FLORIDA

DR. C. F. DAWSON

I believe this audience more truly represents the general agricultural interests of the States than any we often have the pleasure of meeting. This hog cholera is the most important disease that attacks hogs. I estimate that Florida

loses anywhere from \$300,000 to \$500,000 a year from hog cholera. This is only a fraction of the loss in other States, for our hogs are not worth so much as those in other States and our feeds are cheaper.

One year Kansas, alone, estimated her loss at \$2,000,000. We lose about 20 per cent. of the hogs, and if worth



Fig. 3.—Demonstrating the use of hog cholera serum.

about \$4.00 a head, our loss is between \$300,000 and \$500,000 from hog cholera. The disease has been in this State since 1840. Records in the Department of Agriculture (or what represented the Department at that time) prove that the disease was reported from Florida in 1840. This disease has been worked at from a scientific standpoint for many years.

SEARCH FOR THE CHOLERA GERM.

The most important work done in hog cholera in the whole world is being done by the Department of Agriculture. The work was done by Dr. Simons and his assistant, Dr. Smith, who reported in 1891 that they had discovered the cause, and described the germs which caused cholera, and this was thought true not only in America but in Europe, but there was always some doubt about it. They could grow cultures, and were able to kill hogs from it; but never were they able to have other well hogs catch the disease from the ones which they treated. Thus, it was never quite sure in their minds that Smith had discovered the hog cholera germ. They tried to produce the germ. That is, they tried giving the so-called vaccine to an animal and causing that animal to get a mild attack and in that way bring about immunity, but they were never able to produce this immunity, for they were never able to make a hog really immune. They also noticed that they could always produce the disease, although they were never able to produce a typical case by this injection. They could also produce it by feeding the hogs with the entrails of a dead hog, or by injecting the blood of a sick hog into a well one. It was also noticed that a hog that had had hog cholera by natural means and had recovered was immune. We know all hogs that have cholera do not die, and if they get well they are immune to the disease. In 1903 the real cause of cholera was discovered, and while we do not know much about it, it is a germ too small to be seen with the microscope, no matter how strong, and one that will pass through the finest clay filters we can make. This proves that it is a filterable virus. Yet the filtered part was capable of producing the disease. They then tried to produce a vaccine by attenuating blood either by heat or by subjecting the blood to the action of chemicals, with failures in every case. That brought them up to the position of using blood of hogs immune from cholera.

THE SERUM.

It was found that after a hog had recovered from an attack, its blood would protect others from the disease. That was the beginning of the serum treatment. It was found also that the blood should come from a hog with an extra degree of immunity. It is hard to get blood, for a 100 pound hog only gives one quart of blood. Horses, cattle, and other animals have been used, but it has been found that no animal will produce this serum but the hog. So the method is to

take a hog which has had hog cholera and recovered (but it must be one that has had the disease naturally) and inject into that hog large quantities of blood from a hog that is dying from hog cholera (and such an immune hog can stand quite a large injection). Then this blood is taken from the hog in quite a peculiar way; the blood vessels are so deeply seated that it is found the best way is to cut off pieces of the tail. This tail is chopped off and allowed to drip the blood into a basin and then the blood is beaten until there is no pulp left, and the blood does not clot, that is, it is blood from which the fibrin-forming elements have been taken. This bleeding is done three times, or as long as the hog has any tail left to cut. These three parts of blood are then mixed together as one bleeding and tested out on a hog.

In working with this disease you must use as virulent blood as you can find in order to produce the effect. The Government has ruled that all manufacturers of serum must be certified; so the hog cholera serum must be produced from places that have been inspected and that have a certain degree of cleanliness and paraphernalia so as to be able to produce the serum. They give some hogs, say 10 cubic centimeters, others 15 cc., and others 20 cc. This is given to two more hogs in order to test it.

The dosage of the hog cholera serum is generally 30 cubic centimeters. Some claim their serum is better than others; but the Government requires 20 cc. to a 100 pound hog, and 5 cc. for every fifty pounds additional weight.

REPORTS ON THE USE OF SERUM.

We have reports that the serum has done no good, but this is when being used under adverse circumstances. It is put in the hands of men who have no conception of what they are doing, and under those conditions they do not get as good results as are gotten in a laboratory. Still our reports have been very gratifying. We sent out blanks to 500 persons to get reports. It is necessary that we find if it is any good, for it is very expensive. About 95 per cent. of our reports were favorable to the use of serum. I was surprised, for I expected that probably 50 per cent. would say that it was no good. The cause of the failure may be that the fellow using it does not use it in the right way. The manufacturers now find that with the Government after them, they must send out properly manufactured serum. There is nothing being made that gives better chances for fraud than does hog cholera serum. Men have gone to the slaughter house and collected blood and bottled it and sold

it for serum, for it looks like serum. But now the Government rules that the blood shall be tested and the place all right before it can be used.

DISEASES SOMETIMES MISTAKEN FOR HOG CHOLERA.

The disease may not be hog cholera. We have other diseases. One of them is a very serious one. The other day a man from Indianapolis told me that they had spent \$60,000 in treating hogs and then found on opening them that they had intestinal worms. This does not cause the disease, but it bores a hole through the bowels of the animal and causes peritonitis and death. Such a hog shows inflammation and redness of the bowels on the outside. Another disease which occurs in young animals, is lung-worm disease. It is often lung worm in a hog and not cholera. If you will cut open the hog, you will find these worms. Then cholera may have run too long. The serum, to be of benefit to the hog, must be used early; so if a hog has been running sick for three or four days or a week, with back arched up, giving evidence of the disease, the chances are that the serum will not do any good. Tuberculosis is another disease, and one that hogs take readily, more quickly than people. They are especially liable to take it when they run with cattle. It does not spread in cattle and does not trouble them much. Swill containing soap, from hotels, will, when given to hogs, cause death that is often supposed to be cholera.

The life of a hog is short, so it does not catch diseases which it might if its life were longer.

SYMPTOMS OF CHOLERA.

There is a loss of appetite, which is a symptom. The hog will begin to get into corners, matter will form in the eyes, and there will be diarrhoea and constipation. Constipation will cause death quicker than diarrhoea. You will no doubt have noticed these symptoms. In the acute form, the hogs die quickly, only living a day or two; and often you will think they must have been poisoned. They have, of course; had fever for a week or two. In the chronic form these symptoms are drawn out longer. In post-mortem examinations, ulcers on the bowels and kidneys are found. Those ulcers will break and cause blood spots. Some cases will show the kidney looking like a turkey egg. With the heart this is the same. In these cases we call it the acute form. Death is rapid, and you will hardly believe these hogs have cholera. In the chronic form, you have pneumonia accompanying the disease. This used to be called swine

plague. They have lung pressure, and on opening the valves, you will find a lacerated condition. In chronic cases the serum does not do any good. It does best when used early; when the animals in a herd first begin to die. The prevention of the disease, outside of the use of serum, is sanitation.

CARRIERS OF CHOLERA.

It is not right to allow the dead body to lie around. Buzzards carry the disease from place to place. We made an experiment feeding a buzzard on a hog that had died. We collected the feces and mixed that with condensed milk and fed to young pigs. That same food was sent to H. K. Mulford, a Philadelphia Company, and it killed every pig they used it on, and it proved we were working on virulent stock. That, of course, has nothing to do with the carrying of the hog choiera on the feet. I think the buzzard is one of the great ways the disease is carried. That explains why it is on one farm, skips another, and appears on a third.

It is now believed that the man treating hog cholera carries it on his feet, and the same is true of dogs carrying virus on the feet. Lice, no doubt, carry the disease by inoculation. I believe lice probably inoculate a hog. All show hogs can carry it; and while inoculation will not prevent them from carrying it, it will prevent the disease from developing while they are being exhibited.

IMMUNIZING HOGS

The injection with serum and a certain amount of virus is known as the simultaneous method. The serum is the only one we are sending out. This consists in putting the serum into the blood. We always recommend that the serum be injected under the skin. This is the safest way. If you have an abscess produced in the meat, you will have a bad rotten spot in the ham. The serum simultaneous method is the right one, I think; for the serum treatment is simply a kind of makeshift from a scientific standpoint, because it has so many drawbacks. You cannot cure a hog with it. You cannot entirely prevent the disease, and you simply have to wait for the disease to appear among the hogs to use the serum, and three weeks is as long as the treatment will hold; from a scientific standpoint, this is a makeshift.

The true thing is to have the virus injected at the same time with the serum. That has its drawbacks. It is all right and good for the man who double treats his animals; but for the other man who does not, it is one of the worst things,

for these treated animals become carriers of the disease, and the hog that has not been double treated is almost sure to develop the cholera. I do not think the disease has become less prevalent since we have been inoculating with serum, and I think the spread has been due largely to the double vaccination. This is, however, the only true scientific way of treating. As long as everyone does not use it, it will spread hog cholera; but if everyone would use this treatment we would have no hog cholera at all. If every hog were double vaccinated a few days after being born, hog cholera would soon cease to exist.

Now, something as to the duration of immunity. It is supposed that this immunity lasts for about the life of a hog, but I would say use it about once a year on the brooders. One of the important things connected with the work is the injection of the serum.

We have had a hard time to get the druggists in Jacksonville (and I suppose it is the same elsewhere) to carry the right kind of syringe in stock. This syringe must have rubber fittings so it can be put away in good order. The syringe we are now sending out is such a one, and the reason we want an expanding and contracting plunger, is that when you put the syringe away you do not want the plunger to get smaller and harden. The cost of this instrument is \$4.50. Now this syringe should be disinfected each time it is used with as much as 50 per cent. carbolic acid, alcohol made rather weak, or whiskey. Weak alcohol is probably better. The needle should be kept as sharp as possible.

Of course, the animal should be disinfected at the place of injection; for the abscess that is often caused is not caused by the serum, but by germs carried in on the point of the needle. I have sometimes, when working single-handed, dipped the point of the needle into carbolic acid when applying the serum.

The serum is distributed by the State Board of Health under certain rulings. It is one of the most expensive things the Board has undertaken—it is the most expensive in the way of distributing a remedy or medicine. We always put literature in with the package. One is a report blank to be used at the end of a month. This we made out wrong at first, but now we hope that we are sending out intelligent reports. The application blank is simply a statement of what you want, telling us the weight of your hogs and how many head you wish to treat. We often get telegrams like this: "Send us hog cholera vaccine." We do not know how much and we cannot send it. Now, if a man gets in a hurry

and telephones us or even sends a telegram, stating what we need to know, we can then send it to him without delay. We sometimes have trouble in knowing how to send it, if a man lives in a little town and does not tell us his express office. We have agents in the different Counties who are authorized to do this work of injecting.

Let me emphasize the point that hogs given the double treatment must be kept away from hogs that have not been given the double treatment, or you will spread the trouble. For instance, if you double vaccinate your animals, do not let them run with your neighbors' hogs for at least thirty days. By that time the germs will no longer be passing from the animals.

DISCUSSION.

Q. How long is a territory dangerous? Does immunity last any longer in double treatment?

DR. DAWSON. Yes, it lasts possibly a year. You know that you have gotten the virus in him. Personally, I think that every hog in an outbreak of hog cholera, gets the disease. Otherwise, we would not get such good results from the use of the serum. Of course the virus dies out after a time. If vaccination could go on, it would be only a short time until the disease would be eliminated.

Q. Does the double vaccination produce the same results, practically, as the natural disease in the animal?

DR. DAWSON. Yes. But it is, of course, supposed that a natural thing will do the best work. Now, an instance of this three weeks business—one of our agents treated a man's hogs near Starke and advised him to put a sick hog with them. Of course, the Agent meant to do it at once when the serum was injected; but, instead, the man waited for three weeks and he lost many of his hogs.

A. W. TURNER. When the hogs have chills, what does it indicate?

DR. DAWSON. It is probably cholera. To prevent lung worms change the pasture and burn the bodies of hogs that have died with it. A single infection does little harm, but continued reinfection does the work. One worm in the throat of a chicken does little harm, but if there are many, the chicken does not have time to eat, it is so busy breathing, and it dies of starvation. The thorn-headed worm bores a hole in the bowels and brings about a fatal disease, peritonitis. Lung worms cause fits and convulsions.

B. F. WILLIAMSON. Are there any statistics that hogs given the double treatment for cholera have contracted cholera at a later time and have died?

DR. DAWSON. I do not know exactly. The hog is a peculiar animal and lives only about a year. I do not know of any available statistics along this line. Re-vaccination of brooders is advised each year. The reason is that there seems to be a difference of opinion. In South Carolina they claim a hog is immune for life.

I. E. SOAR. Do you advise re-vaccination each year?

DR. DAWSON. Yes, if the animals are very valuable. The suckling pigs are more or less immune if their mother has been vaccinated. There are some principles given off, apparently, in the mother's milk that keeps the pigs immune while suckling, but after that they become

susceptible. The more serum you can use, the greater the degree of immunizing you do. We give five additional cubic centimeters for each additional fifty pounds live weight in order to produce immunity. Another way would be to inject the blood into the abdominal cavity. This is rather dangerous, as it may produce peritonitis. It takes a 100 pound hog to produce enough blood to immunize 100 pounds of blood. It costs us anywhere from \$15 to \$20 a quart, according to the manufacturer. When we see one firm building a hospital at a cost of \$50,000, this hospital to be used for hogs, we realize the importance of the work that is being done. They keep three men doing nothing else but continually bleeding tails. These hospitals are built, so far as cleanliness and equipment are concerned, as human hospitals.

TICK ERADICATION IN FLORIDA

DR. C. F. DAWSON

I always object to the title usually given to my subject—"Tick Eradication," because, as you all know, we are not yet eradicating the tick in Florida. What we are doing here is simply working toward it, and man being the kind of animal he is, we have to carry on educational work to educate him to the idea of how important it is to get rid of the tick. The tick probably came to Florida the first of the United States, because Florida was first settled at St. Augustine in 1565, and it is entirely probable that the ticks came here on the first cattle shipped in by the Spaniards, and since then we have always had more or less trouble with them.

DISTRIBUTION AND NAME.

The infested area is limited only by the amount of cold; its northern limit is placed by cold entirely. Wherever the cattle go, they carry the tick; and if it drops to the ground where it is cold enough to kill it before it lays its eggs the infestation is checked. The disease caused by ticks is known as Texas Fever or tick fever. The name Texas fever does not mean anything, except that it conveys to our minds the diseased condition which was first noticed in cattle driven north from Texas; it might as well have been called Mexican fever, or Florida fever. Tick fever is much the better term, because it means something. It is also called bloody murrain, old town pasture fever, etc.

There are eight species of tick, but only one that causes fever. The tick is sometimes found on horses and mules, but when raised on horses or mules it loses its power of causing fever. However, it is most frequently found on cattle, and it is this common cow tick that has the power of producing fever.

CAUSE AND SYMPTOMS.

The fever is not caused by the tick itself, but by a germ which the tick harbors. This germ gets into the blood, and destroy the red corpuscles about as malaria does in man, and produces anaemia. The amount of infestation by this parasite determines the severity of the fever. There are two forms, the acute and the chronic. The acute is that form which attacks cattle brought to the country for the first time and from that originated the idea of acclimation fever. But there is nothing in that theory. When you ship an animal from above the quarantine line, it becomes sick in its acute form after its arrival here, and may even die, with a high fever and all its accompanying symptoms. One of the principal symptoms is bloody urine, from which we get the name that is sometimes used. The chronic form is what we see mostly. Every cow in Florida has chronic tick fever all the time. It is not a question of getting rid of the tick. There is not an animal in Florida that is not suffering from the fever. After several infections they acquire tolerance of it, so that they look in a fair state of health; but when they get into a poor condition from short pasture, then you see the scrawny cattle.

The man who discovered the tick germ is Theobald Smith, the same man who discovered hog cholera, but his work on Texas Fever has not been doubted. Every one who has studied it has come to the same conclusion. If you examine a tick under a microscope, the germ appears of pin point size. Smith made his announcement of this discovery in 1892.

THE TICK CRUSADE.

(Attention was here called to the chart showing the tick infested States and the area which has been freed from the tick, North Carolina being the pioneer in the crusade which started in 1906.) The work was begun by Cooper Curtice, who started with \$700 from the State and began by rubbing an animal with oil. He was considered a crank, but he finally demonstrated that one farm could be rid of ticks, and if one farm, why not the whole county, and if a county, why not the whole State. The money of the National Government is not spent on building vats, but in inspecting lands and cattle. When a County applies for removal of quarantine restrictions, it must be inspected by a Government Inspector, and that costs a good deal of money.

(Dr. Dawson then called attention to the shaded area

below the black line representing the States that have been cleaned up.)

HOW TO RID CATTLE OF TICKS

Now we have several methods of ridding cattle. You do not have to build dipping vats, but that of course, is very much to be advised in Florida and in certain parts of Georgia. Where a farmer has only one or two head of cattle, he can use a spray; we have one authorized by the Government. Where you have only one cow, you can hand-pick the ticks, and you will find that it is only a short time until that cow is entirely free from ticks. Chickens are sometimes a great help in that line, as they will pick ticks off from the animal and also from the ground where they have dropped; and every time a large female tick is killed, it is not only that one, but stands for hundreds of thousands of others.

THE DIPPING VAT.

The best method for Florida is the dipping vat. There are 33 in the State. They are generally made of cement, though they may be made of wood; but it is an awful job to keep the wooden ones from leaking.

There is also a steel tank on the market. It costs about \$100, but the firm that is putting them out requires the people to use their dipping solution. No matter how you do it, what you want is to get the ticks killed. I have not seen these vats, but the man who told me said they would be here soon. They are to be handled by the Painter Co. They weigh 800 pounds each, and they are easy to set up. In many places it is almost impossible to build a concrete vat because the water table is so high.

DIPPING VATS IN FLORIDA (1913)

<i>Alachua</i>	Bock & McDonald, Daysville, Feb. A. L. Jackson, Gainesville, Mch. P. G. Ramsey, Wacahoota, Apr. John R. Zetrouer, Rochelle, May. A. B. Zetrouer, Rochelle, May. W. B. Phifer, Rochelle, June. C. F. Harrison, Clyatt's Station, July. College of Agriculture, Gainesville, Dec.
<i>Baker</i>	C. F. Barber, Macclenny, Feb. R. Rooney, Baxter, Oct.
<i>Duval</i>	Riverside Dairy Co. (J. C. B. DeBevoise) Mch.
<i>Eseambia</i>	So. States Lumber Co. (P. K. Yonge, Mgr) Muscogee, Nov.
<i>Gadsden</i>	State Insane Asylum (W. W. Trammel, Supt.) Chattahoochee, Nov.

<i>Holmes</i>	W. A. Sessoms, Bonifay, Nov.
<i>Hillsboro</i>	Aug. Van Epoel, Tampa, Aug.
<i>Hamilton</i>	H. S. McCallum, Winn, Oct.
<i>Jackson</i>	J. W. Hinson, Cottondale, June.
<i>Lake</i>	W. R. Matthews, Leesburg, Oct.
	Wm. Edwards (Mgr. Wenalden Co.) Zellwood.
<i>Leon</i>	Leon Co. Live Stock Club.
	A. P. McCaskill, Tallahassee, April.
<i>Marion</i>	S. H. Gaitskill, McIntosh, Apr.
	J. R. Williams, Citra, May.
	Jack Camp, Ocala, July.
<i>Osceola</i>	E. L. Lesley, Kissimmee, May.
	H. T. Bass, Southport, Oct.
<i>Putnam</i>	C. L. Whitehead, Hollister, Sept.
<i>Pasco</i>	Kirby Williams, Dade City, Nov.
	C. A. Croft, Trilby, July.
<i>Seminole</i>	J. C. Cameron, Geneva, Nov.
<i>Suwannee</i>	Frank Drew, Wilmarth, June.
<i>St. Johns</i>	F. E. Bugbee, Hastings, Aug.
	Total 33.

Now, some time ago I sent a lot of circular letters to the vat owners of the State, as we wanted to publish the result of a year's use and their ideas as to the value of the vat. It is only a year on the 22nd of February since the opening of the first vat. All have been built by private enterprise. We may pay for the vat at the University, but that is the only one, as this is against the principles of the State Board of Health.

(Dr. Dawson read extracts from numerous letters that he had received.)

Of course the question of vat construction in Florida is not the same as in other States, as conditions are different here, and probably the vats will cost more here than they do in some States. Some States do not have to haul the stones; and here, too, we have water to contend with. Mr. Barber's vat cost about \$75, and that was about the cheapest one in the State. The one at Hastings did not cost much more, and I think none of the others cost more than \$300; but it is mainly a question of the supply of material. \$100 is very reasonable.

DIPPING MAKES IT POSSIBLE TO SHIP CATTLE.

There are about 31,000 less cattle at the end of 1913 than at the beginning of the year; but on the other hand, they have greatly increased in money value; so, while we have lost in numbers of cattle, we have gained in worth. This agitation of the tick question may have been one of the things which directed the attention of cattle buyers to the fact that we had cattle in Florida. We have about 1,000,000

head; and while some people think we have sold too many, I do not think we have. If we had a million, we could spare one in every hundred. That is what we raise them for, and if people will come down here and pay us twice as much as they ever paid before, I do not think we have much to say about the question of selling. Of course you do not want to sell off your best breeding stock, and the buyer wants to get the best he can for his money; but this is a question between the buyer and the seller. The dipping vat has made it possible for us to ship out cattle at any season of the year. One great reason for the demand for Florida cattle is the scarcity of feeding cattle, and as soon as the stock farmers in the Middle West get re-stocked, they are not going to buy our piney woods cows in the shape they are now. But the piney woods cows well fed on the western pasture and bred to a good thoroughbred bull, would give a remarkable cross at once.

At present you can ship out of Florida under certain conditions, without dipping; but not out of the quarantined region without being dipped twice. So it is advisable for a man who is going to ship a carload to dip his cattle once here, and then they will be dipped again at Atlanta, practically on arrival, under Government inspection. So the owner will have no big board bill to pay, for the board bill for a carload of cattle for a few days is quite an expense. It has been recommended that all shipments of cattle be stopped unless they have been dipped. This will stimulate the building of vats. My plan is to get every vat built that we possibly can without reference to tick eradication; and then when people are educated to the point where they see the value of the dipping, there will not be any difficulty in getting the few remaining people to take up the work. When a man sees he is being benefited, he becomes most enthusiastic about tick eradication.

(Here Dr. Dawson called attention to a diagram of a dipping vat, explaining its construction fully.)

DIPPING SOLUTION.

Five or six dollars worth of material will make 1,500 gallons of the dipping solution, and it will last a long time, according to the number of times it is used. The amount of rain water that may get in, or the evaporation that takes place, are conditions that can all be determined by the man who owns the vat, and we have rules to help him to determine how much water should be added for the evaporation. It is against the law to pour any poisonous substance on to

land where it may find its way into a stream, but the poison can be neutralized by the addition of lime and arsenite of lime will fall to the bottom as a magma, and can then be shovelled out. Do not pour the poison on the land, as it may find its way into some stream.

The State Board of Health has a chemical method for determining how strong the solution should be. The ideal way would be to try it on one animal and then wait a few days and see if the ticks are dead. The tick does not die just at first; but the arsenic will give the little pests a death blow, and even if the eggs hatch out, they are weak and do not reproduce themselves.

The dipping vat pays its cost even if you do not improve the cattle, because it causes the animal to take on more flesh. Of course it does not remove the disease parasites from the blood; but it removes the cause, and the animal begins to recover. All this depends upon the continuation of the introduction of the parasite. As in the case of the hook worm, if you get one on you it does not harm you materially; but if you keep on introducing the parasites, it gets the person or the animal into a diseased condition.

ADVANTAGE OF DIPPING.

This parasite can live in the blood of an animal for fourteen years. We had an animal at Washington for thirteen years, which died finally of tuberculosis, whose blood, when injected into any other animal would give it tick fever. So by dipping the cattle they begin to improve immediately. They take on one or two hundred pounds of flesh, according to the condition of the animal. I have a photograph of an animal in Mississippi that took on 450 pounds weight in four months, or over four pounds a day. This shows the vast improvement that took place in this Mississippi steer, fed under the same conditions and living in the same place.

The small cost of dipping will pay for itself in the increase of meat alone, and the increased cost of hides alone would pay for all the money spent in the United States for tick eradication. I heard a man say he never paid half as much for southern hides as he did for northern hides because they were eaten up by ticks. Another man said he preferred the southern to the northern or western hides because of their better texture, but could not use them for they were so scarred by ticks. Of course those hides that had been bitten up by ticks, even though they were eradicated afterward, would not be very valuable. There could be no great improvement in that generation. It

would come in the young cattle that had never been attacked by the ticks.

Another thing will be the desire on the part of the farmer to improve his herd. The first thing he will think about, naturally, is the acquirement of a thoroughbred bull. I think it pays to sell off a half dozen cows to get a good bull, and you cannot get better cattle without tick eradication and a good purebred bull.

I know a man within nine miles of here who has as good a herd as any in the State. Another method of eradication of ticks is by pasture rotation. This man does that. In his case, of course, if he had a very ticky place, his idea would have to be to control the ticks, not eradicate them.

Four and a half million dollars worth of milk is annually lost on account of ticks, in the loss of animals brought here, by the abortion of animals, and the death of infested cattle. But the loss of milk alone is what the figures refer to.

Another thing is the increased desire on the part of boys and girls to remain on the farm. At present there is very little in the farm home to attract young people, but I think tick eradication would be one of the things to increase the desire of the young people to remain on the farm. They will take pride in raising good cattle as they do now in raising corn and hogs. I hope Prof. Willoughby will start a calf club before long. The first public movement was started here at the University when we formed the Live Stock Association in December, 1912. So the whole subject is only about one year old here in Florida; but I think now there are very few people in the State who do not know something about tick eradication. We have gone at it through the newspapers and lecturers. The Farmers' Institutes have had something to say about it as they have gone about the State.

STATE LAW.

We have a law on the Statute Book, "The Tick Eradication Law," which allows the State Board of Health to spend such money as they deem advisable from the half mill tax on every dollar in the State. There have also been donations made by individuals to carry on the work * * * * * How this law is going to be carried out, I am unable to say at present. The State Board of Health will meet again in a few days, and we expect the matter will be taken up; but just how much more money they will be willing to spend I do not know.

In the past we have furnished speakers to meetings. The Government had a man who knew how to construct the vats, and he has gone about giving instructions free. We have not only to teach the cow man what he ought to do, but some other people. * * * * *

I can hardly see how any man could say anything against tick eradication after he sees the benefits to be gotten out of that work. I am most interested in the disease side of it, and others deal with the financial side; but the main purpose of the whole question of tick eradication is teaching the people the important fact that they must eradicate the tick.

DISCUSSION.

H. E. SAVELY. Dr. Dawson has pointed out that this is a campaign against the tick. You will have an opportunity to talk with hundreds of men in your Counties during the next twelve months, and if you understand it, you can do a great campaign work in educating the people up to this thing; and by and by, if they do in Florida as in other States, they will appropriate the money and compel those other fellows to take the proper steps. But if you have not done the work beforehand, you will find it hard. In Mississippi last year they had a lot of fellows who made it their business to dynamite the vats and hinder the work all they could, until a Government officer had to be sent there to clean them out. It is a whole lot better for you to educate your people and make them see the value of this work so that they will do it willingly. You can do another thing, you can find the men who have the money and the interest to be willing and able to build a vat. I think it will look bad for the county for you to come here next time without being able to report at least one vat in the County. If you can get more, so much better. Now when you go home, set about finding some one man who is willing to build a vat.

I knew of an agent in Mississippi who was convinced of the benefit of the dipping vat, but could not get any of his neighbors to have much faith in it. So he set to work to construct one himself on his own place. He built it off in the bushes and so no one knew he had one there till it was ready for use. Then he had a big barbecue and invited every one to come, telling them he had a surprise there to show them. And the surprise was the demonstration of the dipping vat. Some of the old farmers were very much opposed to the idea, and declared loudly that they would never allow any such thing to be done to their cattle. But he persisted and dipped what he could; and as a result there are now 21 vats in that County, and some of the very men who were loudest in their statements that they would not allow their cattle to be dipped, are now driving their cattle 8 miles to have them dipped in his vat.

PROF. WILLOUGHBY. Did he charge anything for it?

H. E. SAVELY. Just enough to cover the actual cost, perhaps a nickel or 10c a head. This man was J. G. Harrold, of Clark County, if any of you want to correspond with him.

A. W. TURNER. In case we wanted to build a community vat, how should we go to work?

A. We have one in this community. Each one signed up for

what he would give, and any information can be gotten from the State Board of Health.

C. H. BAKER. We had a very successful demonstration in our County. The vat belonged to Mr. Wm. Edwards of Zellwood, but the cattle came from Orange County. We had a Farmers' Institute there, and Mr. Spencer was present. Mr. Edwards, who is a very enterprising man, persuaded the people he represents to build the vat at their own expense for the purpose of demonstrating to the people in the County who had large numbers of cattle. They sent and got the solution, and we had a very interesting demonstration. One of the oldest men there said he knew the ticks came out from the inside of the cattle. This shows how necessary it is to go at it diplomatically.

DR. DAWSON. The 1st of April we shall have somebody to send around who knows just how to build the vats. Now if anyone wants to build a vat about the 1st of April we shall have a man who can superintend it free of charge.

CROP ROTATION

H. E. SAVELY

THE VALUE OF A SYSTEMATIC CROP ROTATION TO THE COTTON FARMER

The value and necessity of following a systematic crop rotation in order to maintain soil fertility and ensure the largest yield of crops per acre, has long been known in the older agricultural regions of the world. Land leases in European countries usually specify what the crop rotation is to be. In some sections of the United States, farmers fully appreciate and have adopted systematic crop rotations.

Only a very small percentage of the farmers in the cotton States have adopted any system of crop rotation up to this time. Interest, however, is growing rapidly among the cotton farmers in favor of adopting crop rotation. The rapid depletion of the soil under the one crop system has emphasized the necessity of this.

SOME ADVANTAGES OF A CROP ROTATION.

1. It provides for the growing of legumes (nitrogen-gathering crops), which furnish an economic supply of nitrogen, and it reduces to the minimum the necessity of purchasing commercial forms of nitrogen.

2. It keeps a growing crop on the land most of the time, which checks leaching and the erosion of the soil.

3. Shallow rooting crops are alternated with deep rooting crops, and the plant food is taken from different portions and layers of the soil.

4. It reduces to the minimum the possibility of damage from insect pests and crop diseases.

5. It supplies the soil with humus (decayed vegetable matter) which increases the water-holding power of the soil and helps to ensure against the damage of the crop by drouth.

6. It enables the farmer to systematize his plans and economize in labor.

IMPORTANT POINTS TO CONSIDER WHEN PLANTING A CROP ROTATION

1. The first thing of importance in the rotation is to provide for growing and turning under enough legume crops to keep the soil well equipped with nitrogen.

2. Plan to grow, as nearly as possible, all supplies necessary for the farm.

3. Keep a crop growing on the land all of the time to prevent the leaching and washing away of the soil.

4. Put a hog-proof fence around the entire farm, so that it can be utilized for a pasture for your own stock, and so that your neighbors' stock can be kept off.

5. Keep enough stock on the farm to consume all forage and grain produced. Carefully save the manure and return it to the land.

HOW SOILS CAN BE MADE RICH BY A CROP ROTATION.

We will use for illustration the most common crop rotation practiced by cotton farmers, which is as follows: Cotton one year, corn the next, and oats the next. It is possible to grow four soil-improving crops in this rotation. First; crimson clover can be sown in the cotton middles in October, and plowed under the following April as a fertilizer for the corn. Second; cowpeas can be sown broadcast in the corn at the last cultivation. Third; cowpeas can be sown for a hay crop after the oats are harvested. Fourth; after taking off the cowpea hay crop, the land can be seeded to crimson clover to be turned under the first of April as a fertilizer for the cotton crop.

If the oat crop is to be used for hay, hairy vetch can be seeded with the oats, which would give five soil-improving crops in three years.

DIAGRAM OF THREE YEAR ROTATION

FIELD No. 1	FIELD No. 2	FIELD No. 3
1914. Cotton, crimson clover as winter cover crop.	1914. Corn and peas.	1914. Oats and peas. Crimson clover as winter cover crop.
1915. Corn and peas.	1915. Oats and peas. Crimson clover as winter cover crop.	1915. Cotton. Crimson clover as winter cover crop.
1916. Oats and peas. Crimson clover as a winter cover crop.	1916. Cotton. Crimson clover as winter cover crop.	1916. Cotton. Crimson clover as winter cover crop. Corn and peas.

TABLE I

PLANT FOOD REMOVED FROM THE SOIL BY STAPLE CROPS ON RICH LAND

Pounds per Acre of Plant Food Removed by Crops.

Crops.	Gross Weight Air-Dry Matter.	Nitrogen	Phosphoric Acid.	Potash
Cotton—1 bale				
Lint	500	1.50	0.65	2.12
Seed	1000	31.50	12.17	11.62
Corn—50 Bushels.				
Grain, cob and shuck	3650	54.60	21.00	12.00
Stover	4000	41.60	11.60	56.00
Oats—50 Bushels.				
Grain	1600	35.00	12.00	10.00
Straw	3000	15.00	6.00	35.00
Cowpea Hay	4000		22.00	70.00
TOTAL		179.20	85.42	196.74

TABLE II

NITROGEN ADDED IN LEGUME CROPS.

Crops.	Air-dry matter. Tops and Roots	Nitrogen
Cowpeas in Corn	4000	100.00
Crimson clover (preceding corn)	5785	134.40
Crimson clover (preceding cotton)	2892	67.20
Total Nitrogen		301.60

When cowpeas, crimson clover, vetch, and other annual legumes are cut for hay, about one-third of the total nitrogen is left in the roots and stubble, and the remainder, or two-thirds of the total nitrogen, is removed with the hay.

On medium fertile soils, legume plants draw about two-thirds of their nitrogen from the air and one-third from the soil.

When cowpeas are grown on soils that will produce one bale of cotton per acre and the hay removed, the soil will be neither richer or poorer in nitrogen, as the nitrogen left in the roots and stubble is about equal to the amount of nitrogen the plant has drawn from the soil.

Two-thirds of 301.6 pounds, the total amount of nitrogen contained in the legume crops that are turned under in three years, equal 201.06 pounds, the amount of nitrogen added to the soil by crops turned under.

If all the grain and hay produced on the farm was fed to live stock, and the manure carefully saved, at least one fourth of the plant food in these crops could be returned to the land in the manure produced.

It is estimated that from eighty to ninety per cent. of the fertilizing elements in feeds is returned in the manure. In actual practice few farmers will save more than one-third of the manure produced by stock. From table 1, it will be seen that 177.7 pounds of nitrogen, 84.77 pounds of phosphoric acid and 194.62 pounds of potash were removed from each acre of soil in three years in grain and hay products. To this, one hundred pounds of nitrogen contained in four thousand pounds of cowpea hay should be added. The total plant food in feed produced is as follows:

277.7 pounds nitrogen, 84.77 pounds phosphoric acid, and 194.62 pounds potash. Estimating one-fourth of this saved in manure, we have the following amount of fertilizer in the manure produced: 69.42 pounds nitrogen, 21.19 phosphoric acid, and 48.65 potash. Add to this the 201.06 pounds of nitrogen returned to the soil in legumes, and we have: 270.48 pounds nitrogen, 21.19 pounds phosphoric acid, and 48.65 pounds of potash; which is the total amount of plant food returned to the soil in legumes and barnyard manure. Balance this against the amount of plant food removed in crops, and we have a gain to the soil of 91.28 pounds of nitrogen per acre, and a loss to the soil of 64.23 pounds of phosphoric acid and 148.09 pounds of potash per acre in three years.

The above calculation plainly shows that soils cannot be made rich by depending on live stock alone. It also shows

that by growing and turning under legumes and keeping live stock enough to consume all grain and hay produced, the soil can be kept rich in nitrogen. It also shows that phosphorus and potassium must be bought and put on the land year after year for all time to come if the fertility of the land is to be maintained.

An application of 200 pounds of sixteen per cent. acid phosphate and 100 pounds of muriate of potash per acre each year would more than supply the mineral plant food removed.

We should all unite our efforts to see that these two indispensable plant food elements, phosphorus and potassium, are brought to the farms of the South at the cheapest possible price.

The leguminous crops, such as cowpeas, soy beans, velvet beans, beggarweed and the clovers, gather nitrogen from the air and store it in the soil. If live stock are kept to consume the hay and grain produced on the farm and the barnyard manure is applied to the soil, the fertility and productivity of the soil can be maintained at very little expense for commercial fertilizers. The only elements of fertility that will be reduced will be a small amount of phosphorus and potassium each year, and these can be returned at small expense in commercial forms.

The above rotation was used only as an illustration. Each farmer can, with a little study, plan a system best suited to his own conditions, and one that will maintain the fertility of his farm.

With a well-planned system of crop rotation, any farm can, at the end of five years, be made to increase its yield of all crops from 50 to 100 per cent; fertilizer bills can be reduced one half; and the washing away of the soil, to a large extent, can be stopped.

Why not begin a crop rotation?

DISCUSSION.

J. F. DUGGAR. What do you think of the exportation of phosphate?

H. E. SAVELY. I think it ought to be allowed, the purchaser paying an export duty (which is now prohibited) just as much as Germany does for potash. I would vote for a change in the Constitution that would allow us to charge an export duty. I would suggest that the formulæ of different fertilizers be published. That each formula give the amount of each element needed per acre. Every farmer would then know exactly what he is putting on his soil.

C. H. BAKER. I would like to know about the probability of getting those formulas. The sooner we begin to introduce these

things, the better. I should like to have all the formulas Mr. Savely spoke of.

P. H. ROLFS. I should like to say one word about the formulae. They have sprung up under necessity, and under difficult conditions. It would be a great step in advance to get a more thorough knowledge of the fertilizer constituents that go into making the formula. I do not want to take the time to go into the history of fertilizer formulas; the original work, of course, was done with the separate elements. Then sprang up the small fertilizer houses, handling the different elements, fish scraps, cotton-seed meal, etc. Then we found that one element used alone was not sufficient, so a second was introduced, and then a third. It has been a struggle in our education to get to the point where we are at present. We know our school system is a splendid system, but barbarously short of what it ought to be. So with the fertilizer formulae; they are immensely better than nothing, but far short of what they ought to be. It will take some time to accustom ourselves to the use of the fertilizer elements rather than to the complete fertilizer. It is a slow process of education; so I would say to our County Demonstration Agents, "Do not become discouraged if you do not see any revolution in five years." I have been in the work for over twenty years, and in that time the change has been marvelous, while from year to year I could hardly see it grow. The work we are doing in our laboratories shows us more clearly than anything we have had heretofore just what the relationship is of the particular form of fertilizer constituent to the particular piece of land or particular crop. Some very interesting things come up, and I should like time to discuss them, but I will merely mention in a general way that sulphate of ammonia is a splendid thing for such a crop as radishes, but a pretty poor thing for some other farm and garden truck. I think it would not be a very difficult thing to get out suggestive formulae, such as Mr. Savely spoke of.

I. E. SOAR. Now sometimes a man can make these things weigh up to a ton after putting a filler in, but the point is, why do you need to make a ton?

H. E. SAVELY. I picked up a bulletin of another State that had a lot of formulas that were very confusing to me. It would have been much easier if it had said, "Use so many pounds of ammonia, so many pounds of acid phosphate, and so many of potash." I like the simpler form.

A. That is much better, but we have gotten so used to reading it in percentages that we get the chemical carrying that amount.

P. H. ROLFS. It is a matter that will require time, but not so long as you might imagine. Fifteen years ago, the farmers were very ignorant on the reading of the formula on the tag; but now it will average at least one man in every community who understands them; but they are a block and a hindrance, and we shall probably have to unlearn them.

C. K. MCQUARRIE. One great step in advance that Florida has taken is that any farmer or anybody can buy any quantity of these elements that are commonly used. There are some States where it is almost impossible to do this.

P. H. ROLFS. As to the matter of publishing these formulae, we will have to start in somewhat slowly I think, so as not to plunge ourselves into greater confusion than we are in at the present time. We will have to take it up somewhat tentatively because of our lack of information on these points. Take the citrus fertilizers which are the most studied of any in the world, we still have a great deal to

learn, as I took the precaution to say this morning, and what I said referred to a particular type of soil. Now if we were working on flatwoods soil we would have a different condition from the rolling pine.

IRISH POTATOES

A. P. SPENCER

The Irish potato in Florida may be classed either as a truck or farm crop, in view of the fact that quite a large area is grown each year in certain sections of the State. Its adaptability is more general than was once thought, and it is now found growing in every County of the State with more or less success. The largest acreage is found in the flatwoods sections where artesian irrigation is possible. Many of these soils were considered quite worthless for almost any crop until they were brought into a high state of cultivation by systematic crop rotation, co-operative methods in marketing, and the proper cultural methods well understood. A much larger area of Florida can be used for Irish potatoes, and these lands are found in almost every County in Florida. The flatwoods soils, when they contain small amounts of humus, must have more humus added. High pine lands always need an addition of humus. Scrub oak lands are not suitable for the growing of Irish potatoes, although it is possible to bring these to a state of high productivity, provided there could be sufficient vegetation turned under, which in most cases would not be a profitable undertaking. It is important to understand that a large amount of vegetable matter in the soil will go a long way toward assuring a good crop in almost any section or with any type of soil in Florida.

DRAINAGE.

Inasmuch as the flatwoods sections of the State have been selected for growing Irish potatoes, the matter of drainage has presented itself in such a way that the farmers have necessarily made provision for drainage; but even with the drainage provided, there are seasons when the rainfall is above the average, and the Irish potato growers find some difficulty in taking care of the water in flatwoods lands. So that before the crop is planted, ditches should be cut to carry the water off in case of excessive rains.

It is a general practice to make the beds from 12 to 16 inches high on flatwoods lands. This, with the ditches at the ends of the rows, will give a sufficient drainage for ordinary seasons. While the Irish potato needs a moist soil, the

crop will not make a satisfactory growth if the ground is water soaked.

FERTILIZATION.

The Irish potato requires a complete fertilizer on most Florida soils. If the land has been in cultivation and has a liberal amount of humus, as much as one ton of fertilizer might be applied. A formula analyzing approximately 4 per cent. ammonia, 7 per cent. phosphoric acid and 8 per cent. potash would be recommended. The material necessary for a ton may be made as follows: 1055 pounds cotton-seed meal, 655 pounds of acid phosphate, and 290 pounds of sulphate of potash. The following formula is also used extensively: 800 pounds blood and bone, 900 pounds of 16 per cent. acid phosphate, and 300 pounds of sulphate of potash.

In the event that the land is new, it would not be advisable to apply more than 1500 pounds per acre, and in the proportions of the above stated mixtures. Where the soil is deficient of humus, an additional 100 pounds of cotton-seed meal or blood and bone may be added to advantage, as the ammonia encourages an early growth of the plants.

Stable manure is not generally used as the fertilizer for Irish potatoes, as it seems to have a tendency to increase the amount of scab. Commercial fertilizers may be applied either under the seed or above the seed in the beds. Both methods are practiced with good results.

DATES FOR PLANTING.

Florida has two seasons for planting Irish potatoes. From a commercial standpoint, the winter-grown potato gives the best results. These should be planted as early as possible, but late enough to avoid a freeze that may occur even up to March 1. In South Florida, January, or even December plantings are to be recommended; but in Central and North Florida, because of the danger of freezes, it would be better to defer planting until from January 25 to February 20. Irish potatoes can withstand a light frost. If the leaves are just through the ground, the injury will be very slight if they are frozen off, but if the top has made considerable growth the crop would be considerably damaged if frozen down. It requires from 80 to 95 days from planting to mature the crop to a marketable size.

FALL PLANTING.

For the present we may expect the fall-planted crop to be consumed locally. We can hardly expect to ship to

Northern markets and compete with northern-grown potatoes when the northern crop is moving; so that the fall-grown Irish potato crop is not so important from a commercial standpoint.

Attention has been directed to local markets that are quite frequently neglected. A few farmers in Alachua County, who had made provision for marketing their Irish potatoes, sold quite a large quantity at from \$1.60 to \$2.00 per barrel in Gainesville and neighboring towns during December and January. The distribution of these potatoes was more or less uneven, consequently a good many who might have used larger quantities did not do so. In order to secure a market for fall-grown potatoes, it is advisable to look well in advance, when quite a large acreage in each community might be placed on the market at a good price during the early winter.

As to methods of planting, cultivation, fertilization, etc., of the fall crop, it does not differ much from the winter planting.

SEED POTATOES

Because of the high price paid for northern-grown potatoes, it is advisable for farmers to grow their own seed wherever possible. It has never been found a good practice to plant the fall-grown seed for the winter crop. The potatoes do not have sufficient time for maturing, which results in an uneven stand; so it is best to import seed for winter planting, unless they may be carried over from the previous spring. In that case it is recommended that potatoes to be carried over should be spread out on the floor where they will mature and begin to sprout before being planted. The spring-grown crop may be kept over with but little trouble for fall planting.

VARIETIES

The varieties that have given the best success are Spaulding's Rose 4, Bliss Triumph, Look-out Mountain, and Irish Cobbler. The two first-named varieties are favorites on flatwoods land, as they grow rapidly, are good shippers, and are quite well established in the markets; and there is little difficulty in securing seed of either of these varieties just previous to planting time.

IRISH POTATOES IN ROTATION.

Irish potatoes can be used in a rotation with other crops, and with good results. In the potato-growing sec-

tions, it is a common practice to plant during January, when the potatoes will be ready to dig in April. Immediately after the last cultivation, corn is planted; and the digging of the potatoes is the first cultivation the corn gets. In some cases corn is planted immediately after the potatoes are dug. It matures about July 20, when cowpeas are planted between the rows, giving a third crop off the land. Or the land may be allowed to grow up in crab-grass, which can be cut for hay or turned under to form humus. Such a rotation gives a variety of crops, and keeps the land in good physical condition. Similar rotations may be obtained with other crops, leaving Irish potatoes for the cash crop. Such rotations improve the soil and make it more productive for the following year.

COST OF TRANSPORTATION

The cost of transportation in carload lots from Hastings, Florida, to the following points, for the year 1913, was as follows:

To Baltimore, 83c per barrel.

To Chicago, \$1.01 per barrel.

To Cincinnati, 73.2c per barrel.

To Columbus, Ohio, 90.7c per barrel.

To Cleveland, Ohio, 88.9c per barrel.

Express shipments, of course, would be much higher.

DISCUSSION.

S. J. MCCULLY. Do you know of any shipments being made in the fall to eastern markets?

A. P. SPENCER. I do not.

S. J. MCCULLY. I should think there ought to be good prices.

A. P. SPENCER. From what I gathered from Mr. Robert Taylor, A. C. L. Freight Solicitor, it would not pay to do it, though a few shipments had gone out. Last fall they were getting northern-grown potatoes at the White House, Gainesville, at \$1.00 per bushel. It is a matter of competition and transportation.

A. W. TURNER. What would be the proper time to plant potatoes in our section for a fall crop in Liberty County?

A. P. SPENCER. From the 20th of August to the 15th of September. I would say the 15th of September at latest, and as much earlier as you think advisable.

M. C. GARDNER. I want to know about the fall crop of potatoes for seed purposes.

A. P. SPENCER. I think experience has proved that the Maine seed potatoes were best. It is probable that our fall potatoes have not reached a stage of sufficient maturity for sprouting.

P. H. ROLFS confirmed this opinion, adding that they could be put in cold storage and kept until planting time, but that makes them more expensive than to get them from the north. We have sometimes spread the spring-grown seed potatoes under a building where

the wind could blow across them until they were sufficiently mature for germination. It has not paid to grow potatoes for seed in Florida. The northern-grown seed makes a more uniform stand.

S. J. McCULLY. Have you ever tried holding the spring crop of potatoes for the following spring?

P. H. ROLFS. It has been tried with very good success so far as germination is concerned.

S. J. McCULLY. I have tried it this spring, and they are growing off nicely.

M. C. GARDNER. Are spring-grown potatoes all right to plant in the fall?

A. P. SPENCER. Yes, that is all right. Plant only the tubers that show sprouts.

FERTILIZERS

P. H. ROLFS

Generally speaking, it has been assumed that the ammonia derived from chemical sources, such as nitrate of soda or sulphate of ammonia, leaches out of the soil much more quickly than the organic ammonias which are derived from cottonseed meal, dried blood, or similar materials. These statements, however, are based rather on a priori grounds than on direct tests. There is still so much to learn about the availability of the different elements, and the possibility of the different elements leaching out of the soil, and the inter-relations that these different elements have one with another, that we may well pause and not be too positive in our assertions in regard to the matter.

If we could just eliminate from our minds those facts that we believe to be so but are not so, we would make more progress in the next ten years than we have in the past fifty of this fertilizer question. I might broaden this assertion out to say that this would be the case in all of our agricultural work. I do not mean to include in this statement those fictitious stories that are told purely for the sake of "boosting" some particular material, the sale of which will prove of advantage to some commercial concern, but I am referring to the statements that pass current in unbiased literature. With this introduction to our discussion this morning, I want to take up immediately the formulae that we use in our Farmers' Institute Work, and discuss these somewhat in detail.

FERTILIZER TABLE

Giving the number of pounds of materials needed to furnish the equivalent amount of plant food contained in a ton of a ready-mixed formula.

Percentages or Units Desired	Ammonia from Sulphate of Ammonia 25%	Ammonia from Nitrate of Soda 18%	Ammonia from Blood 16%	Ammonia from Cotton Seed Meal 7½%	Ammonia from Tankage 6½%	Phosphoric Acid from Tankage 7%	Available Phosphoric Acid		Potash from Muriate of Potash 48%	Potash from Sulphate of Potash 48%	Potash from Kainit 12%	Phosphoric Acid from Bone 12%	Ammonia from Dried Fish Scrap and 10% Tankage
							From 14% Acid Phosphate	From 16% Acid Phosphate					
							Phosphate	Phosphate					
1.	80	110	125	267	308	285	143	125	42	166	166	200	
2.	160	220	250	533	615	570	286	250	84	333	333	400	
3.	240	330	375	800	923	860	430	375	126	500	500	600	
4.	320	440	500	1067	1231	1140	570	500	168	667	667	800	
5.	400	550	625	1333	1538	1430	715	625	210	833	833	1000	
6.	480	660	750	1600	1846	1715	860	750	252	1000	1000	1200	
7.	560	770	875	1867		2000	1000	875	294	1167	1167	1400	
8.	640	880	1000				1143	1000	336	1333	1333	1600	
9.	720	990	1125				1286	1125	378	1500	1500	1800	
10.	800	1100	1250				1430	1250	420	1667	1667	2000	
11.	880	1210	1375				1570	1375	462	1833	1833	2200	
12.	960	1320	1500				1715	1500	505	2000	2000		

HOW TO USE THE TABLE

To make a fertilizer containing 4% Ammonia, 6% available Phosphoric Acid, 10% Potash from Nitrate of Soda, 16% Acid Phosphate, and Muriate of Potash. By looking in the percentage column for 4%, and in the Nitrate of Soda column we find 440 lbs., in the 16% Acid Phosphate column opposite 6% we find 750 lbs., and in the Muriate of Potash column opposite 10% we find 420 lbs., the sum of the 440 lbs., 750 lbs., and 420 lbs., is 1610 lbs., which is equivalent to and contains the same amount of Plant Food as 2000 lbs. of the 4-6-10 manufactured fertilizer.

In case it is desired to make a formula 4% Ammonia, 6% available Phosphoric Acid, 10% Potash and derive 2% Ammonia from Nitrate of Soda, 1% of Ammonia from Cotton Seed Meal, 1% of Ammonia from Blood, use 220 lbs. Nitrate of Soda, 267 lbs. Cotton Seed Meal, 125 lbs. Blood, 750 of 16% Acid Phosphate, and 420 lbs. Muriate of Potash. Any combination can be figured in the same way.

(b) If your fertilizer house handles only mixed goods write to the larger fertilizer houses in Jacksonville or Tampa for prices.

	FERTILIZER FORMULAS.		
	Ammonia	Phosphoric Acid	Potash
Corn -----	3	5	4
Cotton, Clay -----	4	10	4
Cotton, Sand -----	3	7	7
Sugar Cane -----	3	5	8
Sweet Potatoes -----	3	7	8
Irish Potatoes -----	4	6	8
Peanuts -----	3	6	9
Oats -----	4	5	4
Georgia Salad -----	5	6	5

The foregoing formulae have been compiled. We have practically a complete set of these. It must be borne in mind, however, that different soils will behave differently toward the same fertilizers, and that a fertilizer formula may be all right for one year and quite useless another year.

FERTILIZER LOST IN DRAINAGE

	July 1910 to June 1911.			
	Tank 1	Tank 2	Tank 3	Tank 4
Gallons of Water -----	239	252	266	245
	<i>Pounds Per Acre Lost</i>			
Nitrate of Soda -----	775	764	820	1112
Acid Phosphate -----	2.9	2.6	2.7	3.8
Sulphate of Potash -----	21	19	22	46
Limestone -----	249	291	239	265
	June 1911 to May 1912			
	Tank 1	Tank 2	Tank 3	Tank 4
Gallons of Water -----	213	191	234	220
	<i>Pounds Per Acre Lost</i>			
Nitrate of Soda -----	960	1130	2205	1351
Acid Phosphate -----	2.1	1.7	1.8	2.1
Sulphate of Potash -----	99	107	105	70
Limestone -----	563	633	514	694
	May 1912 to April 1913			
	Tank 1	Tank 2	Tank 3	Tank 4
Gallons of Water -----	181	167	131	116
	<i>Pounds Per Acre Lost</i>			
Nitrate of Soda -----	876	714	795	188
Acid Phosphate -----	2.3	1.8	1.4	2.2
Sulphate of Potash -----	454	447	286	190
Limestone -----	1062	1039	258	519

WHAT THE CHARTS TEACH.

These charts I have presented are developed from the exact work done by the chemists of the Experiment Station. The number of gallons of water referred to are the gallons of water which ran through the particular tanks. These would have to be multiplied by 3000 to get the number of gallons of water lost per acre.

The amount referred to under the heading nitrate of soda represents the amount of ammonia that is lost from leaching and by calculating this amount of ammonia into the form of nitrate of soda we have the amount given on the chart. This is done for convenience sake so that every man may know just how much material is lost. If it were stated in terms of ammonia it would not carry such definite information with it, but when the ammonia is stated in terms of nitrate of soda anyone can readily picture 100 pounds of it or any other quantity in his mind.

In the case of potash it should not be assumed that the potash leached out of the soil is in the form of high-grade sulphate of potash, but no matter in what form it was when it was leached out, the amount was calculated to sulphate of potash as a standard.

In the case of acid phosphate the explanation is similar. The phosphoric acid leached out was obtained and then we calculated back to the amount of 16 per cent. acid phosphate that it would make.

In the case of limestone it is quite probable that a little was lost in the way of sulphate of lime or land plaster as well as in the form of carbonate of lime. However, the whole was taken and calculated back to the amount of pure ground limestone it would have taken to have replaced the lime (calcium) lost.

In observing the different tanks you will notice that there was a very considerable variation as to the amount of ammonia lost; however, do not let this confuse you, as that question is an entirely different one and one that would require a two hours lecture by itself. What we want to observe here is the main fact of the large amount of ammonia lost under all the varying conditions. The variations noted in the different tanks form an extremely interesting problem, and one of great importance to the user of fertilizers in Florida. I hope some day to have an opportunity of discussing this rather fully and technically with you.

The figures placed before you in the tables show you that the ammonia is the one element in our fertilizers that you must keep your eye on. You will notice that it keeps running up and down, at one time a large amount is lost, at another time a smaller amount is lost. It is the one element that is likely to be deficient in our soils at one time and too abundant at another time.

The potash you will notice does not vary greatly nor

does so large an amount leach out as to cause us any particular uneasiness.

The phosphoric acid, you will notice from the tables, sticks well in the soil; therefore, we will not need to anticipate danger from plant hunger in that direction. The last line of figures shows the loss of lime in the soil. It was quite a great surprise to us to find so much lime was being leached out; but it explains why good crops so frequently have followed an application of lime.

AMMONIA

From the foregoing charts and the foregoing discussion you will see that the ammonia content of the soil is the one we need to pay the greatest attention to here in Florida. It is the one element that keeps fluctuating most rapidly, and one that is causing us more trouble than all the others combined.

While we pay for ammonia at the highest rate of any of the fertilizer elements, it is the one element that we can get nearly for nothing. All of our legume crops supply a large amount to the soil without charging us anything for it. In my lecture last night I showed you the tubercles that form on the different leguminous crops. By the aid of these, the legumes are enabled to transform a large amount of atmospheric nitrogen into ammonia, so it can be used by the plants. Professor Scott, or for that matter everyone who talked on forage and hay, has emphasized the importance of growing legumes. These plants are the ones that return to the soil more fertilizer than they have taken from it. In addition to returning fertilizer, they return another element which is called humus. This humus enables the soil to hold in its make up more of the soluble ammonia than it would be able to hold without the humus.

DRY SOIL

The conditions of the soil vary greatly, from being too dry for plant growth, to being too wet for plant growth. So far as the ammonia condition of the soil is concerned, it is as bad for the plant to have the soil too dry as it is to have it too wet. Fortunately a great many years the condition of the soil is neither too dry nor too wet, and then we have the maximum crop production. However, it frequently happens that our soils become too dry for the soil organisms to convert the organic ammonia into the form that can be taken up by the plants. Hence we have years

development into Modern English. The texts in Bright's Anglo-Saxon Reader are studied and Cook's edition of Judith is read. (3 hours.)

ENGLISH VIII.—*Chaucer and the Middle English Grammar*.—During the first semester the works of Chaucer are read in and out of class. The pronunciation, grammatical forms, scansion, condition of text, analogues and sources are closely examined. During the second semester, Morris and Skeats' Specimens, Part II, is studied in connection with informal lectures on Middle English viewed as developing from Anglo-Saxon into Modern English. (*Prerequisite, English VII; 3 hours.*)

ENGLISH IX.—*Engineering Exposition*.—This course will attempt to give special training to the Engineering student in the preparation of the various kinds of writing that he will be called upon to do in the pursuit of his profession. It will consist largely of the writing of papers (upon subjects assigned by the departments in the College of Engineering), which will be criticised and revised. (*Engineering Seniors; 1 hour.*)

HISTORY AND THE SOCIAL SCIENCES

Professor Bernard

Students entering the University for the first time who have not had satisfactory courses in European or American history are advised to include these subjects in their courses of study as a general cultural foundation for their other work. It is also recommended to those who expect to elect more than one course in the social sciences that they begin with the first course in sociology, this being the most general course in the social sciences.

HISTORY I.—*European History*.—The growth of civilization in Europe in its various aspects from the earliest historical times to the present. (3 hours)

HISTORY II.—*American History*.—The growth of nationalism, democracy, and industrialism in the United States, with particular reference to the origins of the problems of to-day. (3 hours.)

HISTORY III.—*History of Democracy*.—Not offered in 1914-1915. (3 hours.)

HISTORY IV.—*Industrial History of England and the United States*.—Not offered in 1914-1915. (3 hours.)

ECONOMICS

ECONOMICS I.—*Principles of Economics*.—The leading facts regarding business, money, banking, industrial organization, labor, taxation, tariffs, governmental regulation. (3 hours.)

ECONOMICS II.—*Selected Problems*.—Not offered in 1914-1915. (3 hours.)

ECONOMICS IIIb.—*Agricultural Economics*.—Business methods on the farm, markets, rural credits, and cooperation. (Second semester; 3 hours.)

POLITICAL SCIENCE

POLITICAL SCIENCE I.—*American Government*.—Federal, State, and local governments, with particular reference to the actual practice of legislation, administration, and the courts. Current political problems. (3 hours.)

POLITICAL SCIENCE IIa.—*Principles of Political Science*.—Not offered in 1914-1915. Offered in 1915-1916. (First semester; 3 hours.)

POLITICAL SCIENCE IIb.—*European Governments*.—Not offered in 1914-1915. Offered in 1915-1916. (Second semester; 3 hours.)

SOCIOLOGY

SOCIOLOGY I.—*Principles of Sociology*.—The evolution of social institutions, with particular reference to the family; selected social problems, such as population, race, immigration, poverty, crime, the church, education, and social reform. (3 hours.)

SOCIOLOGY IIa.—*Modern Philanthropy*.—Causes and conditions of poverty and pauperism, preventive measures, relief, administration. (First semester; 3 hours.)

SOCIOLOGY IIb.—*Criminology*.—Causes, prevention and treatment of crime and criminals, with particular reference to Southern conditions. (Second semester; 3 hours.)

SOCIOLOGY IIIa.—*Rural Sociology*.—Rural life in relation to sanitation, the school, the church, and various other cooperative enterprises. (First semester; 3 hours.)

SOCIOLOGY IIIb.—*Southern Race Problems*.—A study of the Negro Problem in its anthropological, social, political, and economic aspects. (Second semester; 3 hours.)

SOCIOLOGY IV.—Seminar.

SOCIOLOGY Va or b.—*Current Public Problems*.—(Either semester; 1 hour.)

CONCLUSION

In conclusion I will say that I cannot emphasize too strongly that if anyone adopts a hard and fast rule in regard to fertilizing crops, he will either frequently be disappointed in the results, or he will be using a great deal more fertilizer than his crops actually need.

From the discussion today, and from the charts presented to you, I have emphasized very strongly the point that the ammonia is the fickle element in our fertilizer formulas. It is the element we have to keep our eye on. It is the costly element if we have to buy it. We can produce it on the farm without its costing us anything and we then have it on the farm distributed through the soil in such a way that the plants can use it to the best advantage. As long as it is necessary for us to buy this costly element let us keep our eye clearly upon it. If a dry year occurs, we need to reinforce our formula with chemical nitrogen; when a wet year occurs, during which much water leaches from the soil, we need to apply a considerable quantity of nitrogen.

The potash leaches out of the soil to an inconsiderable extent, as you have seen. It needs only minor attention, and one or two good applications a year to ordinary farm crops is sufficient.

Phosphoric acid, as you have seen, sticks in the soil very tenaciously, and it is quite probable that one application of a large amount of phosphoric acid will supply a sufficient amount of this element to last the plants for several years.

Finally, no formula of fertilizers will prove to be the best under all varying weather conditions, nor will any particular fertilizer formula prove to be the best for all varying soil conditions. We must vary our formulas for different weather conditions and different soil conditions.

DISCUSSION.

D. R. MCQUARRIE. In place of nitrate of soda, if you had used cotton-seed meal and tankage, what would have been the result?

P. H. ROLFS. It was not nitrate of soda. As a matter of fact these tanks have had three forms of ammonia.

D. R. MCQUARRIE. Which form leached out least?

P. H. ROLFS. That is a point on which we shall have to suspend judgment for some time. We have had these experiments going only three years, and that is not a sufficient length of time to be sure of the result. It is frequently said that sulphate of ammonia washes out more quickly than organic ammonia, but the data at hand seem to call the statement into question.

Q. Is there any particular relation between the amount of nitrate that washed out and the amount supplied?

P. H. ROLFS. Yes, there is a relationship. The amount washed out varies under different conditions, and is not always proportional to the amount of ammonia applied. A part of the ammonia leached out was elaborated in the soil by organisms.

I. E. SOAR. Which washed out more, sulphate of potash or muriate?

P. H. ROLFS. We don't know.

W. L. WATSON. Was it necessary to reinforce the ammonia in a dry season?

P. H. ROLFS. Yes, it would be necessary. It became very apparent last year. We had an extremely dry season. The ammonia was placed in the soil, but did not become available to the plant. The amount of ammonia applied to the soil would have given good results in a normal season. We must look out for both dry and wet season, but the dry season is the one we have overlooked in the past. In dry seasons the bacteria and other organisms are unable to vegetate in a normal way, consequently, very little nitrogen is being fixed in the soil. Therefore the land is poor in assimilable nitrogen, not because it has been leached out, but because the bacteria cannot convert nitrogen into an available form for the use of the plants. Then we should add a form that can be quickly taken up by the plants.

R. T. KELLEY. In a case of that kind the crop would not use all of it?

P. H. ROLFS. No. The moment you have good cropping weather you will have an over-supply of nitrogen, and a rank growth results with a small crop of fruit or grain. If a dry period follows a wet one the plants are likely to suffer from ammonia hunger, because the available ammonia was washed out by the rains, and in the dry period the organisms cannot elaborate enough to satisfy the plants,—shedding of bloom of flowers. An application of nitrate at the right time will prevent this trouble.

In conclusion I want to add, if we could only by some magic get rid of the things that are not so that we believe to be so, we would make more progress in the next 10 years than we have in the last 50. As Josh Billings puts it, "I would rather not know so much than to know so many things that are not so." You will find it stated repeatedly that to get a high per cent. of sugar in the cane juice you must add potash. Yet right in the face of that are the long continued experiments made in the West Indies and here at the Experiment Station which do not show that you can change the percentage of sugar in the juice one iota by adding potash.

CO-OPERATIVE BUYING OF FERTILIZERS AMONG FARMERS

S. J. McCULLY.

In beginning I will read a Circular sent out by the Department, that has caused more criticism than anything that has been sent out in the State of Florida.

(At this point Mr. McCully read a circular distributed by the U. S. Department of Agriculture,

which gives directions for home mixing of fertilizers.)

Gentlemen, I contend just as the Department does in this circular, that we can save from 25 to 50 per cent. on our fertilizer bills. First, the fertilizer agents have a price practically for every land. Now that is a broad assertion. I will take one particular fertilizer, Lettuce Special. I am not going to call any names unless it is necessary. In our County last fall there were quite a lot of demonstrators there and I had occasion to follow right behind a man who was around selling Lettuce Special. I do not remember its analysis, but that does not make any difference. I have in mind the names of three men to whom he sold it—one at \$36, one at \$38 and one at \$42. It is a fact that it was the same fertilizer, and they all bought on 120 days time. This is why I contend that the farmers should co-operate and buy the chemicals and do their own mixing.

Now we find the greatest trouble in getting the farmers to co-operate and buy the chemicals. One reason is because the fertilizer man comes along and says, "It's no use for you to listen to the Demonstration Agent, he will give you a formula that is worthless. What does he know about it?" He says that if you buy the chemicals you do not save anything. But he will mix them for you, sell you on time and take your note.

I had the circular I have read you published and distributed, 75 or 100 over the County. Shortly afterward I met a gentleman going along the road; he said, "By the way, I read your circular in the Banner the other day. I showed it to a fertilizer man and he looked at it and said, 'You can't do anything like that. You don't know anything about the chemicals.'" Honestly, he made that man believe the chemicals came in liquid form, and he wanted to know of me how in the world he would apply it.

In November I was in Dunnellon and I spoke to a man who as I knew was going to buy 50 or 75 tons of fertilizer. I suggested that he buy his chemicals and do his own mixing. He said he had a price from a house in Jacksonville, and showed it to me. As I remember, they had cut the price some; but when we figured it out he said he would keep the figures and show the fertilizer man, and the result was he got his fertilizer at \$26 a ton delivered at Dunnellon. You see the point?

There is another thing I want to ask, and anyone can answer. Why have mixed fertilizers advanced \$2 a ton since last year. The phosphate mines have shut down on account

of over-production. Where does this advance come in? I know where it goes—it goes into their pockets. (Information by Mrs. Prange that there had been an advance in price of tankage and of organic ammonia in the packing houses).

(Suggestion by MR. SOAR: People working in the phosphate mines say it cost \$1.25 a ton to load phosphate on the cars.)

Now we want to see some figures gotten out by the nitrate people; and I believe they are right, and I want to compare their figures with the prices the fertilizer people have sent out. Take this one, Ammonia 4, phosphoric acid 5, potash 6. Listed price to-day is \$32 per ton. Content, 450 lbs. nitrate of soda, 125 lbs. dried blood, 875 lbs. acid phosphate, 300 lbs. sulphate of potash. That same company has listed prices probably sent to every agent in the State; but the quantities at those prices would actually cost you \$20.85. Take another, 4-7-6. This is about the usual thing for cantaloupes; nitrate of soda, dried blood, acid phosphate and sulphate of potash. Now we can buy these materials and have them laid down at any station in Florida for \$27. Now until we can get the farmers to open their eyes to these things, we are up against a hard proposition. I find another thing in my work in trying to get men to co-operate and buy chemicals, they do not understand anything about the formulas, they just take another man's word for it. Now my plan is, just to try out the different chemicals, take a little plot of ground and plant a few rows of one kind of plant and use different chemicals on it. I do this for the benefit of my Demonstrators and Co-operators.

FERTILIZERS AND MARKETING

N. M. G. PRANGE

I wish to express the great pleasure I have had in attending your meeting. It would take too much time and be entirely unnecessary to endorse the able work on the many subjects covered. I will, however, call attention to a most important point, which, it seems to me, has not been given the emphasis it needs. As perhaps most of you know, for about six years I have been connected with the largest fertilizer concern in the South, not to sell fertilizer, but to advise the grower as to his best interests. In this six year's work I have found that fully ninety per cent. of the failures were based on improper handling of the soil. Now I know that most, if not all of you, have been selected

for your positions because you are good farmers, so you appreciate the full importance of proper drainage, plowing and cultivation, and the great necessity of keeping up the humus content of the soil, but the general Florida grower depends too much on the fertilizer sack.

It is easier to sell him 600 pounds of fertilizer to go on a three-inch plowing, than to convince him of the value of plowing six inches deep. I suppose you all accept the general rule that on field crops the amount of fertilizer profitably used is 100 pounds per acre to each inch depth of plowing, this up to ten-inch depth. While it is better to plow even deeper than ten inches, it has not been found profitable to use over 1,000 pounds per acre on the common field crops. But you will find this, so simple to you, is little understood by a large number of men in your care. Generally they do not appreciate the value of deep plowing; and when they do, they are likely to plow new land deep, which, as you know, is not advisable, or to do their deep plowing at the wrong season; for instance, just before planting the corn, thus drying out the soil, and being a detriment instead of an advantage. Then too, shallow cultivation should be equally emphasized. Many a crop has been ruined, or at least seriously injured, by too deep cultivation, and the people must be taught to do this plowing and cultivating when the soil is in the right condition.

The matter of humus in the soil has been most carefully covered, but it cannot be too greatly emphasized. No plant can live on chemicals alone, and in order to get the greatest benefit from chemicals, there must be plenty of humus in the soil. It is here that the citrus growers have so much trouble. The trees must have humus, and the grower has trouble to get this humus in the right form, and great trouble if he gets it in the wrong form.

MARKETING TRUCK AND FRUIT

I would also speak of marketing. To be sure, most of your work is with the field crops, but some of you are in the trucking districts and others will find your men growing small areas of truck crops at certain seasons for a little extra money. Now, the f. o. b. buyer with cash in hand is the best market; the shipping by car lots is next advised; but we must meet conditions as we find them, and in many cases you will have to depend upon the much abused commission man. (You know when the grower has given seemingly all the compliments (?) at his command to the fertilizer man and the transportation com-

panies, he can generally find a few more for the commission man.)

I believe I hold the record for money-making by growing ordinary truck crops on small acreage. I raised fine crops, to be sure, and packed them well, but I consider the greatest factor in my success was my method of marketing, so perhaps a few words as to this may be of value.

The first precaution is, of course, to select an honest man. In this you are aided by the National League of Commission Merchants; but this not enough. Get a man who handles the kind and grade of products you have to market. A commission man may have an excellent trade in fruit, but give little attention to garden products; again, if he is able to get fancy prices for fancy goods, you will find that he can do very little for your inferior goods. The best of fields will have some seconds worth sending to market; but the grower's name never should appear on such packages if he wishes to build a reputation for quality.

After selecting men in different cities, stick to them; never divide your shipments to a city, as you are thus making the shipments compete against each other. Keep your house informed as to the crops being raised in your section and as to their general conditions. Just your crop may have no particular influence on the market, but its condition is an indication of what may be expected from that section of the State. The commission man appreciates such information. Co-operate with him and he will work for your interests. For instance, he will not only keep you carefully advised as to market conditions; but on a rising market he will hold your goods as long as he can, while in a falling market he will put them to the front and sell them as soon as he can, in each instance getting for you the maximum amount possible to obtain. Every twenty-five cents to seventy-five cents per crate to be gained in this way helps to swell the season's profits; but there are times in every city when good prices cannot be obtained because of heavy shipments. These times almost invariably follow a scarcity, during which high prices have prevailed. The lesson from this is never to ship to the city sending out fancy quotations; instead, allow time for the glut which is bound to follow, to have been cleared up, so that when your products arrive there will be a scarcity, which insures remunerative returns. It can be depended upon that as soon as the news of the glut has been received, the crowd has

turned to other channels. By keeping his eye on markets from Chicago to the East, and taking advantage of the natural rise and fall, the attentive grower can always find some place in which there is good demand for his products.

SWEET POTATOES

T. K. GODBEY.

I plant something like 100 acres a year now. Most important in farming in the South is clean land, free of stumps, and labor-saving machinery. The machinery that you call new and modern here was used in the West when I was a boy, more than forty years ago; and to tell you the plain straight truth the South is fully forty years behind in farming advantages. They are behind; behind in the use of something that will take off the hard work in farming. Farming is the easiest position to fill, and I have done everything that a farmer could do, and have done things with my own hands. I do not farm by proxy. I am a Westerner and the Western man does not ask anyone else to do his work. They do hire labor and pay more than the South for it, but they get twice as much from their laborers as we do in the South, and still they sell their crop for less than the Southern man does. It is because they have men there who can turn out the work. When I tell you a man should cultivate 100 acres it sounds fishy, but I can raise 100 acres of corn by myself and I can raise 100 acres of sweet potatoes myself. I can cultivate 100 acres.

PREPARATION OF THE LAND AND PLANTING

The way I prepare is this: I believe in deep plowing usually, but you should not plow for sweet potatoes. I usually follow oats or velvet beans with sweet potatoes. I have had velvet beans in the field the year before, and it makes a good place for sweet potatoes; or else I plant them on oat stubble, and plant them the first of July. If you want potatoes that will keep over winter you do not want to plant them early. I take a "middle-buster" and run off my land with that in four foot rows, then I take a disc cultivator with a fertilizer distributor. This fertilizer distributor is my own invention. I had that put on the cultivator and it took me about four years to do it, but they finally came around after I had made one myself and showed them how. I make a bed and straddle it with the middle-buster

and put in the fertilizer at the same time. One man can make six acres per day and put in the fertilizer. Two hands, one to stake and one to drop, ought to plant about two acres a day or one acre a man. After the beds are planted and the potatoes begin to grow, I take that same cultivator and set it to throw the dirt to the bed and work it with the disk cultivator. When the vines begin to run and get in the way, I put the vine lifter on the cultivator. This is made out of spring fingers that run along, and the first are wide apart. These strike the vines and lift them. The next two are closer together, and they strike them farther up and pull them more. The third are still closer together, and they draw the vines up so they go between the fingers, and the disks do not throw any dirt on the vines at all, and you can work them with this until the vines begin to lap across the rows. If you handle that machinery properly you can work 6, 7 or 8 acres a day, according to the speed of your team. I work my potatoes myself. You can figure out how many acres you can work. You do not have to work them oftener than every two weeks, and a lazy man will be able to work six or seven acres a day and a smarter man can get over 100 acres in two weeks. This is all there is to working potatoes.

HOW TO PRODUCE SHORT TUBERS

Now, as to plowing, and why you should not plow deep. The sweet potato belongs to the morning-glory family, and the tubers are not really tubers but simply roots that have stored up a lot of starch, and when conditions are favorable they make nice smooth potatoes, and when conditions are not favorable they make strings. If you plow deep the potatoes will try to run as deep as you plow, and that would make long ones. There is also a difference in variety. There are some varieties that have a tendency to go down, and there are others that seem to scatter potatoes all over the ground and run along near the surface. Such potatoes usually make stringy potatoes. The reason that potatoes that grow straight down make good plump potatoes is that where they hit hard ground it causes a plumpness, and though the roots may go farther down and draw up the moisture there is a swelling in the soft ground. There should be a hard bottom to the bed; but the more trash, straw and litter of all kinds you can incorporate in the soil the better. It often happens that the man who has to go out in the woods and rake up straw to make his bed makes a much better crop of potatoes than does the man

with the commercial fertilizer. Then, almost every farmer knows that cow-penning is good for sweet potatoes. The cattle tramp the land and make it hard, but the top is worked up and still the bottom is left hard. As I said before, some potatoes will run along the land and not go down. The Triumph, which I originated, is prone to go that way, and it is inclined to make a stringy potato. (Demonstration of different varieties.)

ORIGINATING NEW VARIETIES

As I said, the sweet potato plants and the morning glory belong to the same family and the potatoes are simply roots. The Porto Rico yams grow downward and make a nice smooth potato with hardly any strings. Florida is the only State in the Union that I know of (and I have made diligent search along this line) where the sweet potato blooms and matures seed on the vine; and that is not often done even in Florida. I have watched for sweet potato seed each year and gathered them all. About twelve years ago I secured seed and planted them, and out of the lot I got the Triumph, which I decided was worth keeping. It was early and had good keeping qualities. It has been ten years before I could find seed. Last year I got 100 seed off forty acres, and it took me two or three days to find these. After planting these I have only 15, and I now have 15 new seedling potatoes. I hope in the lot I will find something better than we have had before, and I feel pretty sure I will succeed. Some of them are very promising.

HOW TO KEEP SWEET POTATOES

One of the main things is to keep the potato after you grow it. I have found this extremely easy, that is, after I learned how. Most farmers have their own way of doing this. One fall it was very wet and warm, and we took our potatoes and covered them with pine bark. The warm wet weather continued and the potatoes had begun to rot. Some of the neighbors were tearing down their banks and trying to dry them out and then bank them up again; but that did not do well, for it rained all the time. So I went to the banks and made a hole at the bottom to let the air in and one in the top to let the air out, (this top hole is usually made in the bank). My potatoes were then covered with a white mold and looked like they were on fire. I let the air in at the bottom and left them. In a few days the white mold had dried out, the rotting had

stopped, and they kept the rest of the year. I then knew that the secret of keeping potatoes was ventilation, and I have never lost potatoes since that after they are put in the banks. Some of them have been water-soaked, some have become frost-bitten and partially rotted; but I did not separate them but hauled them all together, and the rotting never increased. Last year I banked over 12,000 bushels, and I know there were not twelve bushels of rotten potatoes in all. I kept a carload of Triumphs last year until July, and shipped them to Atlanta, and they were sold on the Atlanta market in August. I have no fear of keeping sweet potatoes at all, and I keep them easily. I have never put more than 200 bushels in one bank. I bank them in long banks. Now I think I have told you all I can but I will be glad to answer any questions on points that I have skipped over.

DISCUSSION

Q. How wide apart do you plant them?

T. K. GODBEY. If for market or for table use I make them four feet apart and 18 inches apart in the row. It has been tried out at nearly every Experiment Station in the South, and 18 inches has proven to be about the right distance.

Q. What kind of fertilizer do you use?

T. K. GODBEY. I have used Sweet Potato Special, so-called, although you know the fertilizer house will put up two sacks of fertilizer and name one Sweet Potato Special and the other * * * * * Special, but it all amounts to the same thing. The fertilizer I used last year was 4-8-8 goods. I used about 700 lbs. to the acre.

Q. What is the average yield?

T. K. GODBEY. My yield was about 100 bushels to the acre, and I call this a fair yield. I have raised 300 bushels to the acre, but an all round average I would say to be 100.

S. J. McCULLY. Do you use draws or vines?

T. K. GODBEY. Draws, altogether. I grow sweet potato plants for market, and do not have time to grow early potatoes. My shipping season usually closes out (that is the rush end of it) the first or middle of June. After that I have a surplus of plants, and I let these grow until a foot long, then pull them up.

S. J. McCULLY. Do you drop the potato vines across the row or lengthwise?

T. K. GODBEY. In planting sweet potatoes I hire almost anybody I can get. I put a dropper ahead, and a man behind to stick, and some of the negroes like them one way and some the other and it does not make any difference.

A. W. TURNER. Do you plant the roots in the ground?

T. K. GODBEY. No. I stick the vine in the middle.

R. T. KELLEY. Do you select the potatoes?

T. K. GODBEY. No. I plant all I come to, because selection amounts to nothing. The sweet potato is only a root, and not a seed, and makes the same kind of tuber.

C. K. McQUARRIE. Do you pack the ground?

T. K. GODBEY. No. Probably you think you should plant the vines as soon as you get them from the ground. This is a mistake. Pull them up, pile them in stacks, and let them lay with the roots together 3 or 4 days, and then plant them and they will live twice as well, sometimes 10 times as well. The same is true of the vines, only they can lay longer and the leaves shed off and this is best for them.

G. W. BELSER. Should you plant them in wet ground?

T. K. GODBEY. I planted in July, and it usually is wet then * *

M. C. GARDNER. Do you mean you have a different potato from each seed?

T. K. GODBEY. Every seed you plant will make a new kind. They always come different and never true to the parent plant.

R. T. KELLEY. Is there any difference in planting, if you put several joints in a bed?

T. K. GODBEY. No, except possibly a little larger yield.

I. E. SOAR. Is there any difference in the yield from the draws or vines?

T. K. GODBEY. I could never tell any difference at digging time if planted at the same time. I find a good strong plant or vine will grow off good and ensure a good yield. If they stand a month and do not get a good hold the yield will be poor.

J. D. BROWN. Is this true: Potato growers contend that seed from a plant that produces large potatoes will produce likewise?

T. K. GODBEY. No, it is not so. Irish potatoes are true tubers, they start out with a stem and have no roots at this end (holding one up), and the sweet potato is different the other way and most of the eyes will be at the back. It is simply a root, and if you get plants from the old vines, if they live over, as they often do, the plants from those old vines are as good as if you put out the tubers.

S. J. MCCULLY. Have you ever tried selecting large potatoes?

T. K. GODBEY. Yes, there is no difference. I have had men write me that they had a new potato, something wonderfully fine, and it was gotten by planting two vines in the same row and in some way it grew a different potato. It is not so. This is not true. The man who sends out such news either takes you for suckers or does not know what he is talking about.

S. W. HIATT. Last year I planted Dooley's and long red negro yams. How do you account for part being red and part yellow?

T. K. GODBEY. I have had potatoes myself when there was only one kind in the field come this way, some would be red, some yellow and some white.

S. W. HIATT. They were found only in that one row.

T. K. GODBEY. I have had the same experience. Potatoes make long vines, and the potatoes will put down roots, and if the vines and roots lap over the vines will make potatoes in the other row.

S. W. HIATT. I had two kinds on one vine.

T. K. GODBEY. The old bunch yam was the worst, I think, and the Dooley was that way. The bunch yams I got had forked leaves and after planting them a while some of the leaves were smooth.

A. W. TURNER. What is a good early potato?

T. K. GODBEY. The Triumph is the earliest; the Nancy Hall has been a leading market potato on account of the nice shape, earliness, fine quality and color. The Triumph is a good potato, but its long habit of growth and white flesh make it unpopular in the market. It is one of the best for canning and is used extensively. The Porto Rico is as early as the Nancy Hall. So far as I can see it is a fine

one. The Nancy Hall is being driven out of the market on account of its being subject to blight.

S. J. MCCULLY. Do the Nancy Halls have a tendency to crack?

T. K. GODBEY. Not very much. Sometimes they do. This cracking is due to the condition of the soil and fertilizer. I have low, flat woods land and plant in July. If planted early they crack, but later they do not do so.

Q. Which variety yields best.

T. K. GODBEY. The Triumph.

R. T. KELLEY. In planting Nancy Halls, do they make very small potatoes?

T. K. GODBEY. Yes, this is a small variety. The market wants a small potato, so this has been a favorite.

Q. Do you get better yields by planting early?

T. K. GODBEY. Not too early, say the middle of June would give the best yield. I plant especially for seed, and I do not want my potatoes to grow large. I plant them in hills and close together for seed, but 18 inches apart for the market.

S. J. MCCULLY. How often do you plant potatoes on the same land?

T. K. GODBEY. I always skip one year at least, and I like to skip two, for I get better results.

Q. What do you plant in the meantime?

T. K. GODBEY. Corn.

Q. Is there a good yield following sweet potatoes?

T. K. GODBEY. Yes, I get thirty to forty bushels of corn per acre. I usually do not give my corn land any other preparation except to turn the hogs in, and they root out the potatoes, and then I disk the land smooth.

J. D. BROWN. How many acres do you plant from a bushel of potatoes?

T. K. GODBEY. My experience has been that there are about a thousand plants to the bushel; sometimes 1,500, sometimes 2,000. The Triumph will make twice as many to the bushel as the Nancy Hall.

Q. Do you bed your potatoes?

T. K. GODBEY. Yes, on land that is tile drained and irrigated.

B. F. WILLIAMSON. How many acres do you get from 1,000 draws of potatoes?

T. K. GODBEY. These ought to furnish you 4,000 or 5,000 vines. It depends on the potato and the variety. The Triumph potato makes a little longer vine than the Nancy Hall, and you get a few more cuttings.

Q. What do you think of cutting vines off? Does it ruin the crop?

T. K. GODBEY. Yes, undoubtedly.

C. H. BAKER. How long do you cut the vines?

T. K. GODBEY. About a foot long.

D. C. GEIGER. Would it be better to bed the land or plant level?

T. K. GODBEY. That depends on conditions of soil. Now in Kansas they plant corn in a trench because it is dry there. In most places where they grow Irish potatoes they grow them on a level, but at Hastings it is necessary to bed them high. That is a necessity here in Florida. It is the same way with sweet potatoes. If you have high, dry land that is drained, you do not need to make the bed at all. I could not plant this way on my land, for it is flat-woods land underlaid with clay, and I have to make the beds as high as I can, and the higher the better. My idea is that the land should all be laid off and

drained. I suppose you Agents all know how to plow. I could tell you that most people in the South do not know how to plow. Always commence in the middle of the field and plow out to the fence. This is the best way, and you can turn the dirt away from the fence. You will have a deep furrow next to the fence and the rows will begin to slope down towards the fence from the middle, even if the land was originally level, and when it rains, the water will run out into the ditch around the outside and run away. Now, if the people at Hastings did not do that way they could not raise Irish potatoes. They have a furrow on the outside. The land is practically level. They tell me there is not a difference of four inches to the mile. They accomplish the good things because they know how to farm.

Q. Do you run a plow through to mix the fertilizer.

T. K. GODBEY. No. There is the distributor on the cultivator and the fertilizer is put down ahead, and then the disks come along and stir it together.

I. E. SOAR. Why do some hills produce so much more than others?

T. K. GODBEY. You will find there is a little more favorable condition in those hills than others; that is why those hills do the best.

Q. Do you use stable fertilizer in draw beds?

T. K. GODBEY. Yes, also commercial fertilizer. I like raw cottonseed to bed on. The sprouting of the seed in the raw cottonseed will make the germinating seed produce heat, and that little bit of heat warms the ground and makes the plants come on earlier. For early plants use stable manure. It should be wet. An inch or two is all you can stand, and it will not hurt your potatoes. I would say to put down a layer of earth first before you put in the potatoes. In making a draw bed it is best to scatter some kind of straw, pine straw or wire grass, or other stuff of that sort with a body to it. This straw keeps you from pulling up the potatoes when you pull the plants. Broom sedge straw is not good, for it keeps the land too dry, but it will do. I have used it myself and it is good to hold the potatoes down.

I. E. SOAR. Would oak leaves do?

T. K. GODBEY. They are not very good for this.

Q. Do you think that the thoroughness with which you mix your fertilizer and the control of moisture have more to do with the cracking than the early planting?

T. K. GODBEY. No, I do not think so. I have a firm belief that it is due a great deal to the variety of potato. There are some that I have never seen crack under any conditions.

Q. Do you think the amount of potash used has anything to do with the cracking of the potatoes?

T. K. GODBEY. No. Too much nitrogen may do it, but this does not always work. However, I have seen land extremely rich in nitrogen make an enormous crop of potatoes. The yield of potatoes is due more or less to the mechanical condition of the soil. There is no crop that I know of so particular about the mechanical condition as the sweet potato. It does not matter how much or how little fertilizer, it all depends on the mechanical condition. The best crop I ever made was on barnyard manure and a little phosphate.

I. E. SOAR. On land that has been cow-penned does it crack more?

T. K. GODBEY. Yes, on old land it occurs more.

C. K. MCQUARRIE. Do you claim that sweet potatoes from the vine are the same as the draw, and as early?

T. K. GODBEY. Yes, there is no difference.

W. L. WATSON. Then why is it considered that there is a difference?

T. K. GODBEY. Well, people plant draws early and later on they cut the vines and set them out and they usually make a better crop from the vines and they keep better, and a great many are positive that the draws are no good if planted late. They have never tried them. I have done so from the beginning to end, and I find that it is the lateness of the potato that makes a good keeping potato and makes a better crop. I have never made good keeping potatoes early. The only advantage of earliness is the market, and if I wanted potatoes for the early market I would simply keep over my crop and sell them early the next year.

I. E. SOAR. Do you advise earlier planting on dry land than on wet?

T. K. GODBEY. No, I have both kinds of land and plant them at the same time.

Q. What is your experience in planting them as you would Irish potatoes?

T. K. GODBEY. This is not a custom among farmers in Florida, but it is a pretty fair way to get early vines. They make a few early potatoes, and the pieces you plant will grow and make a good potato; but you can see the pieces sticking on to the new part. The potatoes are poor and always inferior and cannot be sold late after better ones become plentiful. Last September I sold over 100,000 sweet potato plants in South Florida, and I have sold them in December around Miami. I plow new land, after taking out all the stumps, for I never plow stumps; then I take a turning plow with a rolling cutter on it and turn the land as shallow as I can because the vegetation rots quicker, and I always plant sweet potatoes on that land, because it is not fit for anything else. In plowing land we often come across stump holes, and of course this land is worked deep. I have found that potatoes planted over stump holes send the roots down ever so far, and after harvesting a top crop I often find that if I go down farther I will find a nice lot of potatoes. They always go as deep as the land is soft.

W. L. WATSON. What would you say about breaking?

T. K. GODBEY. I do not know. Run over the land with a middle-buster and that is all.

Q. What about putting a crop of sweet potatoes on oat stubble that has been plowed eight or ten inches?

T. K. GODBEY. The land used has become compact during the winter and if not freshly plowed you will find that the bottom soil is harder and the potatoes form in the loose part.

C. K. MCQUARRIE. It seems, then, that hardpan land would make good sweet potatoes.

T. K. GODBEY. No, it is too sour. The sweet potato does well on new land that is not too sour, but hardpan contains too much acidity. I have seen land, very loose hammock land, planted in sweet potatoes that have become very stringy. Bedding would not have helped in this case, for they would have been worse.

O. L. MIZELL. Is there any particular time for digging?

T. K. GODBEY. No, I take them just whenever I want to. I have piled them, mud, water and potatoes in the bank at once, and in a few days they would be dry, and the mud would be dust. After the vines have been frost-killed, the potatoes should be dug up, or they may sprout again.

G. W. BELSER. There is an idea that if you dig potatoes you should not let the moon shine on them. What do you say about this?

T. K. GODBEY. There is absolutely no truth in this. The moon has nothing to do with it, unless possibly you want to dig them at night, when the moon would be of aid then.

T. Z. ATKESON. Gentlemen, this has been a most interesting and instructive discussion to us all. We have all heard Mr. Godbey with much interest and appreciation. I feel like one fellow who went to Mr. Barnum's Winter Garden in New York, paid his price of admission, and on getting in, he asked some one to show him Mr. Barnum. "There he stands over there." The man looked at him and then turned and walked away. He had gotten his money's worth. And I feel that same way. Mr. Godbey has been exceedingly kind in coming up here today in the disagreeable weather we have had, and I feel that we owe him a rising vote of thanks for coming and speaking to us today.

(This was unanimously given.)

THE STATE NURSERY INSPECTION LAW

DR. E. W. BERGER

I will not detain you long except to tell you that there is a State Nursery Inspection Law, and that something is being done along that line. It will interest you; for, in meeting up with the farmers, some of them will be planting fruit trees, and this inspection work applies principally to fruit trees. I have a few circulars here that I will have passed around to you. I wrote a little paragraph sometime ago that I will read you:

What does it profit a man if the world be made to bloom and two blades of grass be made to grow where only one grew before, if, when the insects come and the diseases begin to ravage, he stands idly by unable to stem the tide of destruction? It is not enough to be able to grow a crop, but the grower must be prepared to protect the crop during an emergency, whether the same be frost or fire, or insects and diseases.

Each man has his troubles, and the more successful a man is in getting something to grow, the more rascally bugs there seem to be to take it from him. There are the cucumber growers. They are getting desperate. They grow the cucumbers and the diseases come along and get them. Of course the best way to protect your crop is to avoid introducing new insects and pests. That is the form of prevention that I mean; the keeping out of these diseases and pests by means of inspection. We have State Boards of Health and City Boards of Health, and they are trying to prevent the spread of diseases by isolation and education. The object of the law is, then, to check the spreading of any insects and diseases of plants that may already be in the

State, and to prohibit the introduction of any new pests, and something is being accomplished along this line.

In bringing this message before you, I regret that our inspection does not apply to vegetable plants; but, practically altogether to trees. The law, I presume, is broad enough so it could apply to vegetables; but with only one Inspector, and a few deputies, and only \$1,000 to run the office with, outside of my salary, we cannot appoint many deputies, and it has been our policy to put only those things on paper that we could undertake to handle, and as it is impossible for us to undertake the inspection of vegetable plants, bulbs, roots, etc., we have limited our work to the inspection of trees.

My message to you should, therefore, really be of more importance, as it is evident that the matter of protecting, perhaps one part of the County against another, or one part of the State against another part, will be more or less in your hands, and you can warn the farmers and advise them. In the case of the Irish potato and the cotton boll weevil, a great deal can be done. I believe the public is informed as to the boll weevil. Of course there would be many difficulties in the way of inspecting food crops, here in the State, that are shipped from one part to another. Take, for instance, the Irish potato. Being a food crop it would be a difficult matter to devise a satisfactory rule, when potatoes are permitted to be shipped as food. There are a great many difficulties. As I stated, I just want to bring the subject before you, and will not detain you longer.

In your work, if you come to things that you think should be brought to our attention, send them in to us, and we will try to help you.

LEGUMES

E. S. PACE

The legumes form a lot of plants that are peculiar in that they have formed a partnership with a group of bacteria. In this partnership the legumes are host plants: the bacteria gain entrance to the roots of the plants, live on the sap found there and cause swelling or nodules to form on the roots. In return for the sap taken from the plant, the bacteria gather nitrogen from the air contained in the spaces of the soil. This nitrogen is taken into the nodules, part of it goes to the plant, and part of it, when the root decays, goes into the soil and is used by the following crops.

Nitrogen makes up about four-fifths of the air we breathe. This nitrogen is the same element for which we pay twenty cents a pound in commercial fertilizer. Over each acre of ground, it has been calculated, there are about seventy million pounds of nitrogen. This, at twenty cents a pound, amounts to fourteen million dollars. When a farmer buys an acre of ground all of this is his and it only remains for him to grow the legumes and get it as it is needed by the crops grown on the land. Through the nodules on the roots of the legumes it is possible for each farmer to locate on his farm millions of fertilizer factories to run as long as the host plant lives, and which have no operating expenses. A good crop of velvet beans, cowpeas, crimson clover, or beggarweed, plowed under, adds as much nitrogen per acre as would be obtained from one-half to one ton of cotton-seed meal. When these crops are plowed under, the soil is not only benefited by the nitrogen thus obtained, but also by the vegetable matter so badly needed.

While there are numbers of legumes which can and should be grown in this State, I will confine myself to three with which I think we should become better acquainted. These three are lespedeza, burr clover, and crimson clover.

LESPEDEZA

Lespedeza has been in the United States for something over sixty years, and is now found throughout a large part of the country. While it has been recognized from the start as a good pasture and hay crop, it has been only a few years since its use in regular farm practice began. It has proven to be a very valuable crop to follow oats. The cowpea has been the crop most generally used to follow oats, but there are several reasons why lespedeza is better. One advantage lespedeza has, is that it is sown at a time when other farm work is not very pressing, as it usually is in the summer when cowpeas must be gotten in. The cost per acre of the lespedeza seed is less than of cowpeas, and cost of seeding is very much less. The lespedeza is free from disease. When used for hay, the quality is much better than that made of cowpeas and it is very much easier to cure.

The time for sowing lespedeza is in February or early in March. Sow the seed at the rate of a bushel to an acre on the growing oats. Scratch in with a weeder, or use a drag harrow with the teeth set back at an angle of about forty-five degrees. This will not only get the seed in, but will also give the oats a good cultivation. If nitrate of soda is to be applied to the oats, it can be put in at the same time. The

oats are cut off at the regular time, and the lespedeza used as is seen fit. Very frequently an early cutting of hay is gotten, and the lespedeza allowed to reseed the ground for a second year's crop.

BURR CLOVER

Burr clover is a winter and spring growing annual. It belongs to the same family as alfalfa. Being a legume and growing at the time of year it does, burr clover is a very valuable crop. It gives a large amount of good grazing, and makes a good combination with Bermuda grass. Until the seed is more plentiful it will hardly be used very extensively in regular crop rotations. The seeds are sown in the burr during August or September, and where it is intended to get a stand the first year four bushels to the acre should be used. Where it is only intended to get a start in pastures, a bushel to the acre or less can be grown. It is advisable for each farmer to select a piece of rich land, sow the burrs thick, and fence off for a seed patch. Very frequently from 150 to 200 bushels of seed are produced to the acre. The seed should be bought only in the burrs, as the cleaned burr clover seed on the market is a variety not so well suited to our conditions. Care should be used in sowing the seed not to get them covered too deeply. If they are to be sown on ground that has been freshly plowed, a roller or some implement to pack the surface should be used before the seed is sown. When they are sown early good results may be obtained by sowing on Bermuda sod, and giving no other treatment.

CRIMSON CLOVER

Crimson clover is one of the best winter cover crops and soil builders that we have. It should prove a success on all soil types when the drainage is good. However, unless the proper nitrogen-gathering bacteria are present, the cover will be a failure. The bacteria that live on the roots of crimson clover are the same that are found on white, red, or Carolina clover. So when Crimson clover is sown for the first time, a ton of soil from where one of these clovers has grown should be broadcasted on each acre. If this soil is not available, artificial inoculation can be used. In any case the inoculating material should be harrowed in at once. The best time for seeding is probably during the latter part of October. The better the seed-bed that is prepared, the better the results will be; but good results are had from sowing the seed in clean cotton or corn middles, and harrowing in

with some form of harrow. The seed should be sown at the rate of twenty pounds to the acre. Every farmer should prepare to get in at least an acre of crimson clover this fall, so that from this small plot he can get soil to inoculate a larger area the following season.

DISCUSSION

J. C. SMITH. I ordered a bushel of burr clover seed last winter, and sowed it on Bermuda. I did not get a good stand; possibly my stand was a third or fourth stand, but now it is bunching out. Mr. P. W. Smith has a plot of clover that is doing well. I have seen it.

S. J. MCCULLY. I have tried Crimson Clover and inoculated the seed. It was planted too near the house and the chickens have been on it, but it is still growing nicely. I have a fourth acre, and sowed five pounds of seed. The Department advised me to test it, inoculating some of it, and leaving some. There seems to be no difference in the two plots. I tried last fall to get the burr clover, and ten men had promised to test it, but I cannot get seed at any price. This fall, I guarantee you that we will have a number of demonstrations with it. Mr. Pace, I think, says to run a furrow every four feet. The Government, I think, says to run a cutaway harrow and sow the seed broadcast and leave it alone. A plot was tried at Dunnellon; it was sowed with rye. The man cannot tell the value of it, as his calf has been on it all winter, so of course, he does not know its value.

G. W. BELSER. I had an acre of clover last year that did fine.

M. C. GARDNER. I have two crimson clover demonstrations, one of an acre, the other half an acre, and some seems to be doing fine. I did not inoculate it. I got some inoculating material from a company in New Jersey, and in spots this is looking fine now. I have an acre of vetch that, two or three weeks ago, which was the last time I saw it, was doing fine and spreading out nicely.

A. W. TURNER. I have four demonstrations of hairy vetch, that was inoculated with material from the Department. It does not look good.

I. E. SOAR. I have two demonstrations of crimson clover. A few weeks ago I went over one and noticed that in some places it was doing well, but in others it was not so good. Wherever the inoculation was, it was doing well, but where there was poor inoculation or none at all, it was no good. The inoculation did best where peanuts were grown on the land and pigs put on it, and where other feed had been thrown in to them. In such places the land was rich in humus, and it was four or five times as good as anywhere else. Rabbits had been eating quite a bit of it.

M. C. GARDNER. I had an alfalfa demonstration on land limed with about 1,500 pounds to the acre of ground lime rock, and one acre had 400 pounds additional of the burnt lime. I noticed in that field that there were little low stubbles about a half foot high with very long roots and lots of nodules on them in places, while in other places the roots had gone into the ground but at the surface it seems to be dying away. Some places are still green, but others are dead.

J. D. BROWN. I have an inoculated hairy vetch demonstration planted with oats, and have a good stand. I used the Farmogerm. There were two ten-foot-square plots that grew very nicely with the oats and did fine. The rest died out. I followed directions for inoculation very carefully.

(Here Mr. Savely explained that much care must be taken with the cultures for inoculation or they may not be strong and would not do much good.)

G. W. BELSER. I have two demonstrations with alfalfa, and would like to speak of them. I do not know whether all our agents are pressing this or not, but we are simply carried away with it over in Jackson County. One man had six acres which he cut four times, getting a ton to the acre each time. Last fall he planted four more, making a total of ten acres this year. The soil contained lime and is rich soil. I had another demonstrator to put in two acres last winter. We have a fine stand and it was limed, fertilized, and the seed inoculated, and it is doing well. There are many people in the County who will plant it this year.

P. H. ROLFS. I was glad to hear that, for by the time the report reached Alachua County it was multiplied a great deal and the yield was ten tons per acre. Several years ago it was found that these legumes, such as we have been discussing, were in many cases quite successful and promising, that is, on those lands that were well drained, in a good agricultural condition, and had plenty of lime, and in pursuing the studies farther we found a number of these legumes did much better on a limy soil, the soil that raised the best crop of peanuts. Some of them gave negative results on flat woods lands, while others gave negative results on the higher and dryer land. For instance, take the lespedeza; it liked a flat woods condition, and there are few places on the rolling pine lands where it makes a success. Alfalfa, on the other hand, needs a rolling pine land to approach a success. The burr clover was found near the sea where there was lots of ballast rock and lime, and it was growing nicely; but when tried farther away from the bay on high land there was nothing came of it and the plants died.

Now I think one of the best lines for investigation is these legumes. We want more crops that will give grazing in the winter time. These legumes come in and give feed and nitrogen to the soil that other crops we already have do not, so we want to study their production. We know that formerly red clover would not grow in Dakota, but now large fields of clover grow there and we get large quantities of seed from there, which shows that where formerly it would not grow, it now grows abundantly, and we know this is so with other crops. Soil well supplied with lime is the best because the nodule-forming bacteria prefer such a soil.

M. C. GARDNER. Can we pasture alfalfa in winter?

A. Yes, it does all the better for being pastured.

F. P. HENDERSON. I have just gotten a book that says a great deal about the yellow clover, or what is called "hop clover." They say it makes two tons per acre in Florida.

P. H. ROLFS. *Mellilotus* or sweet clover grows around St. Augustine spontaneously; also in many other places in Florida. It is not generally relished by cattle. It makes a good hay. What we need most is a legume for the winter that will act as a soil builder and a cover crop at the same time.

BEEF CATTLE IN FLORIDA

C. L. WILLOUGHBY

The question of live stock production is commanding very general interest in America, and it is a subject

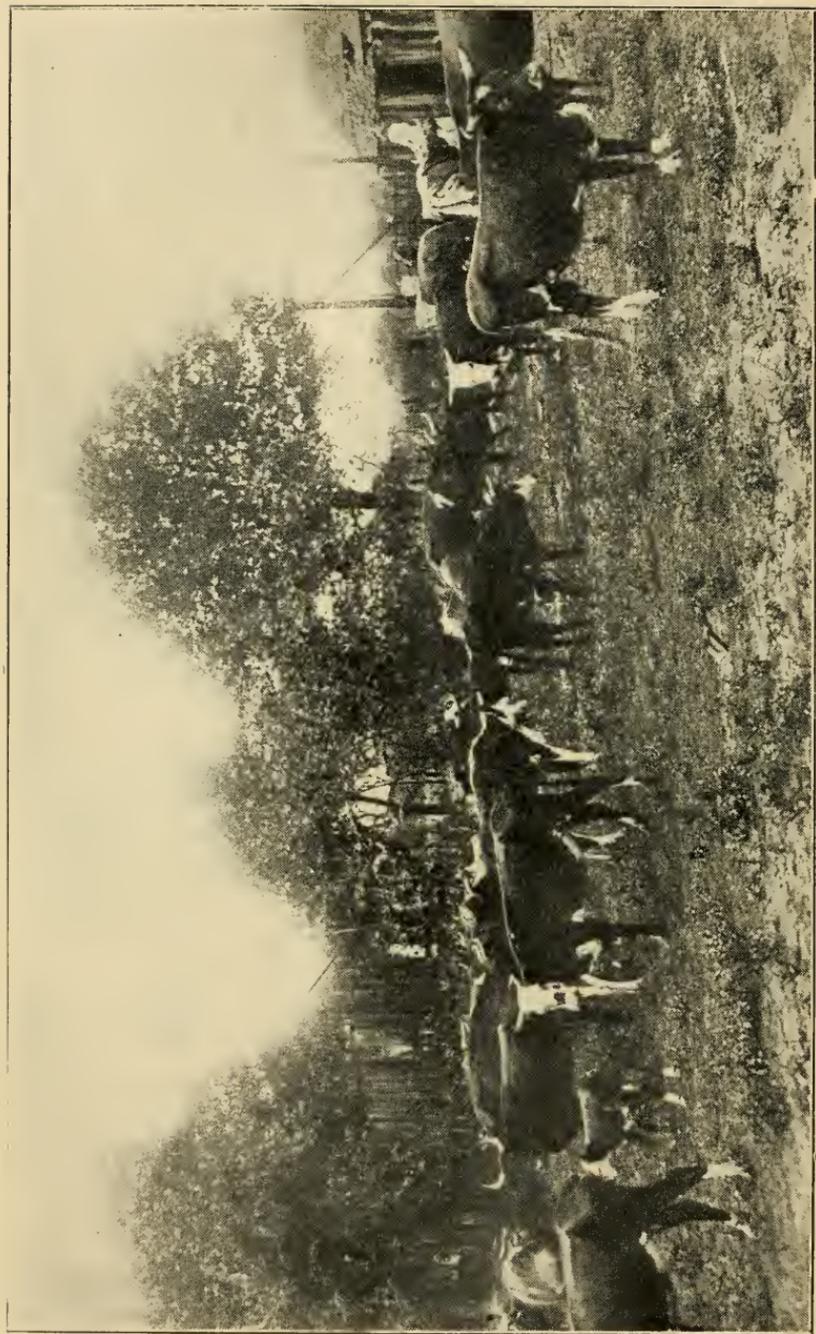


Fig. 4.—Dr. Bystra's herd of grade Herefords.

that will grow upon us every year. The great needs of the South are diversification of crops, live stock and soil fertility, and the more we can learn on these topics and advise the people rightly, the greater will be the prosperity of the entire country and the success of the demonstration work.

There are only a few basic lines of work that have produced wealth in Florida. These are the lumber interests, the phosphate industry, citrus fruits, truck crops, and live stock. The lumber industry is almost extinct, phosphate mining is limited by the deposits in the State, while the prices of fruit and vegetables are rather variable. But we find that demand and prices for live stock are increasing rapidly, and the supply is diminishing almost as fast. It, therefore, seems evident that there is more certain prospect of good profit in live stock work than in many other lines of agriculture. The price of beef is not likely to fall, but on the contrary will probably increase somewhat for the next 20 years.

ADVANTAGES OF LIVE STOCK

In studying the opportunities for live stock in Florida, we find that the State has many natural advantages over other sections of the country for such work, and only one real disadvantage, the cattle tick, which is, after all, an imported trouble.

On the question of lands, there are many thousands of acres in the State that are well suited for range and pastures, which will probably not be needed for more intensive farming operations for scores of years. Most of these lands will produce a number of the best pasture grasses and forage crops, and all of them are capable of improvement with legumes and the manure produced by the animals. These lands can be secured for prices ranging from \$5 to \$50 per acre, or leased for a very small sum.

Statistics of the last census show that there are nearly 1,000,000 cattle in the State of Florida, while the population of the State is only 750,000 people. This gives a ratio of slightly more than one head of cattle for every citizen of the State, which is larger than the proportion for the entire area of the United States, this being only six-tenths of one head on the average for the total population. We are, therefore, leading many other States in beef production at the present time. The great ranges of the West are being rapidly filled with holders of small

farms, and the days of the production of cheap beef in large quantities have evidently passed away.

FLORIDA CATTLE SOLD TO FEEDERS

Beef production on the average sized farm is being revived everywhere east of the Mississippi River. We find that other States are coming to Florida during the past year to secure cattle for feeding purposes, something like forty to fifty thousand head being shipped out to the feeding pens of Oklahoma, Missouri and Kansas during the past twelve months. This trade is likely to increase in numbers every year if we take proper care of it and furnish good stock, but the buyers will not be suited long with the present class of feeders which they have popularly termed "Florida Knot Heads." They will want better cattle, and will get them wherever they can, and will come to Florida for such material only as a last resort.

The question is pertinent if the feeders of Oklahoma can buy our "Knot Heads" and pay freight on them to their feeding yards, fatten them there and then sell them at a profit to the packing houses, how much profit could the Florida farmer make if he would keep these cattle in the State, fatten them on his own farm and sell them when finished to Florida packing houses? There is no question but what we could make more upon them than the Oklahoma feeder if we would adopt the same measures. But at the present time we are selling these cattle on foot at low prices and we are buying them back from the Western packing houses after they are killed and dressed. We pay the freight both ways on them and give the Oklahoma feeder a profit.

The greatest trouble with live stock in Florida, next to the cattle tick, is the poor quality of the animals we now have. The native Florida range cattle or piney woods stock are largely of Spanish descent, being small and poor to begin with, and have had very little improvement during the past century. One of the great reasons why more improved cattle have not been brought in from other sections is the loss from cattle tick and Texas fever, but we now have methods for controlling this trouble, and all who desire may introduce better cattle with comparative safety. There is not much difference in the amount of food consumed or the gains made by the scrubs as compared with the pure bred animal; but the latter will produce a carcass that contains more of the high priced cuts with less waste,

and will bring from 20 to 40 per cent. better prices on a discriminating market.

WHAT BREEDS

When people are ready to buy improved stock, the question of the best breed is always the first thing that occurs to them. This, as a matter of fact, is not so important a question as most people think, as any of the good breeds of beef cattle will do well when properly handled. It is more a question of individual preference of the owner and the conditions of soil, feeds, and markets that he will have.

SHORTHORNS

The Shorthorn cattle, or Durhams, as they are sometimes known, are more numerous than any other leading beef brand. They are large-framed animals with wide hips and good development of loin. The color is red and white or a mixture of these colors, called roan. They were called Shorthorns in England to distinguish them from a breed having much longer horns. They have been the pioneers in the beef breeding work of the world, and have formed the foundation for further improvement. They require rather large quantities of feed for their best growth and are not considered quite so good for grazing on scanty ranges as the Herefords. They are easier to secure than perhaps any other breed, and are held at moderate prices. They are more specially a beef animal, but some families of the breed have become famous as producers of milk and butter. In England they are still a popular breed for the farmer who wants both beef and milk.

One strain of the Shorthorns has been developed in America without any horns and these are called Polled Durhams. They have all the qualities of the Shorthorns and are easier to handle on account of absence of horns.

HEREFORDS

The Hereford cattle are probably the next most important breed. They are distinctly a beef breed and produce comparatively little milk, usually not more than enough to properly raise a calf. Their color is dark red or mahogany body color, with white faces and legs. They are frequently spoken of as the "White-Faced Cattle." They are comparatively large in size, although not quite so heavy as Shorthorns. They produce a very fine quality of beef but are inclined to be narrow in the hips and sometimes

put on fat in lumps. Their greatest quality for the South is their splendid grazing ability, as they can hustle over ranges and make a living on poor pastures where many other breeds would suffer severely. In breeding operations the Hereford bulls are very prepotent in transmitting the red body and white face to their offspring, even from scrub cows of all colors. Herefords are quite popular in the West at present, and a large proportion of the beef cattle marketed from the great feeding grounds show some of this blood. They are a little more difficult to buy, and prices are probably higher than for Shorthorns.

The Aberdeen Angus breed stands first in quality of beef in America. They are a medium-sized animal, being smaller than Herefords and Shorthorns, black in color, with soft fine hair, short legs and round body. They have no horns, and are sometimes called "Polled Angus." The head is very neat and refined. This breed is used more for the production of high class baby beef than any other, and it might be termed the highest stage of beef breeding. The meat from Angus cattle regularly brings the highest prices on the great stock markets of any breed in America. But on the other hand it requires more skill and experience for success with Aberdeen Angus than with other breeds. They are not very good grazers, being better adapted to pen and stall feeding than to grazing on thin pastures. They are also rather scarce and hard to buy, but some progress is being made in this line by the breed association holding occasional sales of these cattle in the South. It would probably be best to advise most of our people to try to work with Shorthorns or Herefords for a while first, and take up the Angus if they desire, after acquiring some experience.

OTHER BREEDS

Red Polled cattle are very good. They are large cattle with color and shape of body a good deal like the Shorthorns, and many of the cows are good milkers. They are rather scarce and difficult to secure.

The Devon is a good breed, with red color, somewhat smaller than any of the others. They are good grazers, and produce a fair quality of both beef and milk, but they are very scarce and are being gradually supplanted by the other breeds.

All the important breeds just mentioned were developed originally in England, but since coming to America have increased in large numbers and are fully equal to the

original stock of the Old Country. All the various breeds are represented in America by their own breeders associations, and the secretaries of these organizations are always willing to furnish information as to cattle, and names and addresses of breeders.

NATIVE CATTLE

Last, but not least, let us consider our native Florida cattle, whatever we may call them, Piney Woods, Scrubs, Knot Heads, etc. Sometimes we hear the Guinea mentioned. These were doubtless brought here by the Spaniards, and are very little better than the average scrub.

It is evident that the native, or scrub cow, is a fine example of "The survival of the fittest" under conditions prevalent on the ranges of Florida. They have been inbred so long, that, looking at it from one standpoint, we might call them a pure breed that has shown its fitness for its environment. Until we change the conditions for such cattle, it would be poor policy to say that we ought to do away with these native cattle and replace them at once with the pure breeds. If we can persuade our people to discriminate among the scrubs, and select those having the best beef form to be retained as breeding animals, we could get considerable improvement among them. If they would select cows with the square beef body, short legs and smooth heads, considerable uniformity and improvement could be secured.

GRADING-UP

Pure bred cattle need pure bred attention, and unless a man is ready with feeds and fences and the knowledge and experience necessary to handle fine animals properly, it would not pay him to go into the work by buying pure bred cattle of both sexes. The best advice for the average beef producer is going to be to urge him to buy a high grade (3-4, 7-8 or 15-16) or a pure-bred beef bull, and use him on the best selected native cows for grading up and improving the offspring. Such a bull can be used for breeding on one or two generations of his own heifer calves without serious injury from inbreeding. In fact, such a practice is the best method of improvement yet known in the history of live stock work, when conducted by a careful and observing man.

As the cattle improve in quality the means of the farmer should also improve. He should grow more feeds for

the cattle on his own farm, provide better pastures and build dipping vats and fences. You have already heard from other speakers how the trouble of cattle ticks and Texas fever can be controlled by the dipping vat. This naturally demands having the cattle within reach, and shows the need of fences.

THE FENCE QUESTION

This question of fences for live stock is bound to come up sooner or later, and it is a very complicated problem; but if we can bring people to see that they can make more money by producing more of their own feeds, using better cattle, and controlling the ticks, then the matter of fences will solve itself, for they will readily see that it will pay them to fence their lands, whether they own or lease from other people.

A great many cattlemen tell us that the only way to make money is to let the cattle roam wild and loose on anybody's land, and get what feed they can from wire grass and swamp. Twice a year they try to collect what animals are left and brand the new ones, and send to the butcher the oldest and fattest. They seem to think that the money secured in this way cost them very little for expenses, and is like so much cash picked up in the road. It is impossible to figure just how much they lose by these methods as compared with taking better care of the stock and securing larger numbers, but a very conservative estimate would be that one-third of the total number born each year are lost from diseases, theft and other causes. In the last three years Texas fever has been getting worse, so that even the range cattlemen are not making much money with such loose methods. In my opinion this disease will likely increase in virulence so that it will actually compel cattlemen to completely revise these antiquated methods. This, of course, will be a blessing in disguise, but it will be hard for some of them.

Fencing should probably be done first with large areas of land and every community, or at least every county should have a cattle dipping vat. It would be well to try to secure a law for Florida that would permit local option on the fence question, so that a County, or even a militia district that has a majority of votes in favor of it, can put the law in operation without having to wait for the legislature to confirm the action.

FLORIDA LIVE STOCK ASSOCIATION

The Florida Live Stock Association is trying to help the industry by promoting the building of dipping vats and establishing live stock clubs or local associations in each County. We do not want this association to conflict with any other county association, and would be entirely willing to merge the live stock work into any general farm improvement club that the County Agents may organize. If we can induce these co-operative clubs to act together and purchase good breeding stock for the use of their members, it will be a fine thing for the State. The time will come when we will have our own packing plants in Florida, and quit shipping our stock away and buying it back from other States.

STUDIES ON LIVE STOCK

For anyone who cares to study the history and characteristics of the different breeds of beef cattle, I would like to recommend a few recent books along this line. One is called "Beginnings in Animal Husbandry" by Prof. C. S. Plumb, published by the Webb Co. of Minneapolis; another is entitled "Animal Husbandry for Schools" by Prof. M. W. Harper, published by the MacMillan Co. These are both excellent books for anyone beginning this study, or for pupils in the high schools in our State. They give a brief study of the important farm animals, and many of the principles of breeding, feeding and management. One of the best works that the County Agents could have in their library as a reference for all topics in animal husbandry would be the "Encyclopedia of Live Stock" by Wilcox Smith, published by the Orange Judd Co., price \$3.50.

CATTLE BREEDERS.

SHORTHORN CATTLE.

Z. C. Chambliss, Ocala	S. H. Gaitskill, McIntosh
J. R. Shuler, Bristol	Marion Farms, Ocala
A. L. Jackson, Gainesville	Carson Bros., Kissimmee

HEREFORD CATTLE.

N. A. Callison, Gainesville	J. R. Shuler, Bristol
Magnolia Farms, Muscogee	W. A. Sessoms, Bonifay

JERSEY CATTLE.

Aug. Van Epoel, Tampa	J. C. Goode, Gainesville
Miles Johnson, Tallahassee	C. H. Simpson, Milton
E. H. Gould, Oneco	Wm. Edwards, Zellwood
Jack Camp, Ocala	R. C. Shaw, Quincy
A. L. Vidal, Gainesville	

GUERNSEY CATTLE.

A. L. Daughtrey, Gainesville
 J. S. Goode, Gainesville
 C. L. Wiloughby, Gainesville

SWINE BREEDERS.

BERKSHIRES.

Wm. Edwards, Zellwood
 Oscar Williams, Muscogee

Richard C. Shaw, Quincy
 W. A. Sessoms, Bonifay

DUROC JERSEY.

W. B. Willett, Maitland
 H. H. Whitworth, Ocala
 J. C. Henry, Live Oak

C. H. Simpson, Milton
 L. B. Thompson, Pensacola
 (R. No. 1)

SHEEP BREEDERS.

Walker Bowers, Freeport	John McSween, DeFuniak Springs
Dan King, Luanna	Dyer & Daniels, Wetappo
W. A. McCollum, Laurel Hill	W. M. Gist, McIntosh
Eugene Miller, Freeport	Ridge & Gale, Belleview
Alex. Steele, Point Washington	B. B. Keep, Boardman
Hutch Cawthon, DeFuniak Springs	Geo. E. Meade, Cantonment
John McCollum, DeFuniak Springs	

POULTRY BREEDERS.

J. D. Archie, Tampa	A. B. Lowe, Zona
F. L. Bills, Crescent City	C. J. Mishler, Anthony
H. P. Bitting, Ocala	R. T. Monroe, Ocala
E. G. Brown, Lakeland	John Parks, Palatka
Mrs. Clarence Camp, Ocala	C. G. Pearce, Arcadia
E. L. Carney, Ocala	Rosamont Poultry Farm, St. Petersburg
Geo. L. Clemons, Ocala	W. M. Shockley, Lowell
W. H. Clifford, Lakeland	A. H. Snyder, St. Petersburg
Mike Coward, Ona	Geo. B. Stearns, Ocala
Wm. Crouch, Punta Gorda	W. D. Wheeler, Griffin
J. M. Douglass, Shady	P. W. Whiteside, Ocala
D. D. Elliott, Lakeland	W. P. Woodworth, St. Petersburg
O. M. Gale, Belleview	C. C. Woodworth, Tampa
— Gary, Ocala	Mrs. Lester Windsor, Winter Haven
Geo. Graves, Pensacola, R. No. 1	Thos J. Rhodes, Hosford
W. R. Hanis, Tampa	Lackawanna Poultry Farm, Jacksonville
C. W. Hinsdale, Lakeland	Chas. H. Simpson, Milton
F. J. Hoffman, Lakeland	
W. T. Johnson, Tampa	
Mrs. N. M. Jones, Bartow	
Lakemont Poultry Farm, Winter Park	

DISCUSSION

C. K. MCQUARRIE. Would you recommend the Polled Angus cattle to Florida breeders?

PROF. WILLOUGHBY. Not until a man has had some experience with other beef breeds, or with good native cattle.

R. T. KELLEY. We all know that fences are obliged to come, but the South Florida people are against them at present. I would like to have your judgment and advice as to how to proceed.

PROF. WILLOUGHBY. It is going to be a matter of patient education and trying to impress upon these people that it would be better for them and their pocket books to keep their own cattle controlled with fences. It will also be a matter of yielding to the rule of the majority when it comes to voting on the subject. Very frequently the people who do not want fences are the men who do not own land. Have they any right to let their cattle trespass on other people's land, without the consent of the owner? Statistics show that nearly 70 per cent. of the people of Florida come here from other States, and most of them are accustomed to fences for cattle, and if they will vote right they can control this subject without any trouble. Many of the native Florida people who are kicking against fences are inviting people from other States to come here and buy land. It would be very inconsistent, to say the least, to invite these people to Florida, sell them land, and then be allowed to continue grazing scrub cattle over these areas. There is no fairness in a scheme of this sort, and it will hurt the reputation of Florida to continue such methods much longer.

S. W. HIATT. I presume Mr. McQuarrie is not surprised to see me speak. He knows I am much enthused over this, for the reason that I had the opportunity to be brought up and raised in what is becoming the live stock section of the United States, and I know that we have a far greater chance here for development than in the North. I believe we need to put our attention into this, and for that reason I want to say something along the line of breeding up. I find in our County over 50 per cent. of the farmers have not been paying much attention to this, but now they are expecting to turn their attention more to the raising and feeding of live stock and the grading up of their cattle.

Now, as to fences. We all know that we, as Demonstration Agents, need to exercise care in going among these people; but I am giving to my people the necessity of grading up. I am trying to work on the people in a way that will make them see the necessity of grading up, and to get around the fence problem by co-operation and succeeding in getting the legislature to pass a law prohibiting inferior males from running at large. I think with this, we would get the fences. I am from near the Canada line, there is nothing allowed there but registered stock. One can keep others on his place, but he cannot allow them to run at large.

A. W. TURNER. I believe the fields should be fenced, and I have my land fenced.

PROF. WILLOUGHBY. The legislature, I think, should pass a law letting the counties have fence laws if the people want them. The question of allowing only pure bred males to run is like a law that some one wanted to pass not to let calves be killed. It would not work.

R. T. KELLEY. It seems to me that pure bred cattle will be protected by such a law.

PROF. WILLOUGHBY. I think as conditions now stand, there is little hope at present for many large breeding establishments for registered cattle to expect to make much money here, because too few farmers will pay a decent price for good stock.

H. E. SAVELY. I know what this fence law business means, because in my home in Mississippi I know what the law was when passed. It is a question the local people have to fight out. Now they have such a thing as a stock law in a beat. The County is divided into five beats and the beats are allowed to decide for themselves whether

they shall have the fence law or not. Well, when one beat got it, the thing naturally grew until now it covers practically the entire State. I believe if the legislature would allow every County or part of a County to tax itself to build a fence around itself, and have a law of this kind in that particular part, it would be one of the greatest things, and it will be bound to spread. This would be a good step in the right direction for the agents to take up. It is good to combine it with the tick eradication law also. This is one of the things that it would be well for you to do, and present it to the legislature. If certain communities want it, why should they be prevented from having it. When one beat got this law it proved a disadvantage to the other beats and in a pretty short time the others will come in. It should not be forced on the entire State at once.

G. W. BELSER. I think that suggestion is right. This thing, if started, is bound to grow. We will never have any good stock until we have laws governing it. The number of cattle in the county I was raised in is four times as large now as when begun. The "beats" usually measure ten miles square. I believe local option should be the thing.

PROF. WILLOUGHBY. That is a matter of education. To eliminate the scrubs, both man and beast, we must keep everlastingly at it. Many people are now fencing large areas with miles of fences, simply to prevent loss in the woods, from Texas fever and other causes. Probably by education, we can get up to it gradually.

E. W. TURNER. Take Mr. _____, for instance, he does not own five acres of land, but he has several hundred head of cattle. In my own County I find the people there are afraid to express themselves, but there are a large majority of the stock owners who do not want the fence law.

M. C. GARDNER. The people are all afraid to say what they think and we agents are all handicapped. We cannot go out and express ourselves. If we do we are likely to make enemies.

H. E. SAVELY. You could do this. If they pass a law allowing certain parts of it, you could say: "I am not saying one way or the other, and if the majority of the people want it they should have it. If they do not want it, I do not think they should be made to have it, but I am with the majority in either view." Personally, however, I would say that I am for it.

GRAZING CROPS FOR FLORIDA

T. Z. ATKESON

We have had so much talk about the different legumes and crops that I do not feel it is necessary for me to go deeply into that subject. I would like to say, however, that the subject of grazing crops, taken in connection with live stock industry, is one of the things that most pleases the northern man who comes here. When a man is figuring on changing his location, particularly southward, he begins to study literature, and often in this literature nothing whatever is said about cattle. He studies the situation over, gets bulletins and reads that where he has possibly been raising red clover and alfalfa, that here it is possible

for him to raise quite a number of legumes. Possibly he might prefer to raise alfalfa, many do, but after he begins to study the subject he becomes more and more firmly convinced that this is a magnificent live stock country, and we know it is, but the only objection is the cattle tick; that he never reads anything about.

Now I think it is a mistake on the part of the land companies, or anyone else, not to take this up with the people. The land companies, of course, put the bright side of the thing to the people and they do not realize the effect of the cattle tick in the South. So far as grazing crops are concerned, in themselves, it is so wide a field that we cannot possibly take all of them up on a short talk of this kind.

BURR CLOVER

In regard to burr clover, I will say last season, or in 1912, I was in Southern Alabama on the Florida line in the Demonstration work, and I will give you some reasons why the supply of seed was so short. I, for one, managed to get about twenty acres planted in my County, and we were instructed by the State Agent to see to it that the plots were all on good land under the best possible condition, and these 22 or 23 acres that we had there, all grew off and simply did fine. This was burr clover. Last season, I understand that in the fall there were over 1,000 acres planted in that County alone, and this was duplicated in nearly every part of the State, at least the statistics show that there were 75,000 acres of it in the State. My experience was like that of nearly all the other Counties, I think. Now, then, the thing that appeals most to the man in the live stock business, is the green crop to pasture on, and he can have it if he will only take a little extra time and trouble.

ROTATION AND SUCCESSION OF CROPS

I plant for hogs, but you will find that with some little change it will be all right for cattle. Now these crops, maturing, say about the first of September, you will plant soy beans and peanuts (the old time Spanish variety, that is, the small one.) The Valencia, the new one introduced by the U. S. Department of Agriculture, is an early maturing peanut that matures in about 120 days, making as many bushels, or more, to the acre than the old one, making a larger nut, and making quite a better crop of hay. Soy beans, two varieties of peanuts, and corn, fill the period from the first of July until the first of October, and we will call this the September period.

Begin the first of October and we have a regular fattening crop for hogs that we consider here as most important, that is the North Carolina peanut. To supplement this we have corn. This will last from the first of October until the 1st or 15th of January. We have corn, rape, vetch, rye, oats and barley. I have skipped some of those that you might think good.

In January when the peanuts are about exhausted, we have one crop that I would say is chufas. Personally, I do not bother with chufas. I think they take too long a time in the ground, but they are a pretty good crop, and one that will suggest itself in rotation. We can have rape, vetch and the two clovers, burr and crimson, oats, rye and barley. This period of time, beginning about the 15th of January, will last until about the 1st of May.

Now there is always just a little bare place in whatever rotation we have that is hard to fill, and this extends from the 1st of May until about the 15th of June. It is a little too late for the winter crops and a little too early for the spring crops to be ready for grazing. I have never found anything like Bermuda grass for pasturing in this bare spot. I do not know how many of you have these Bermuda pastures, but you cannot get away from Bermuda in this country. The very fact that Bermuda is as tenacious as it is and because it is hard to get rid of when once established, in itself presupposes that that grass is bound to be a good pasture grass. Comparative tests have been carried on in several different States regarding the value of Bermuda pastures and blue grass pasture as feeds. It has been found that an acre of Bermuda will carry more animals and keep them in better shape than an acre of blue grass. We have often heard of those wonderful blue grass pastures that have given to those States of Kentucky, Virginia, etc., such wealth; but if we study our possibilities, we will see that we have just as good a chance of wealth from our Bermuda pastures.

Now here is a crop that I want to mention as valuable, and I expect a laugh when I do. It is citrons. They grow wild, and we have never paid this much attention, but in some of the northern and southern States, in Tennessee and Missouri, those fellows have to plant them and fertilize them carefully. They have been worked with by the Experiment Stations there, and have been decided to be one of the best feeds for winter that they can find. Here in Florida it requires no special attention to grow or to keep citrons. They will keep a long time, so that if there is

any feeding value in these citrons it stands to reason that it should be a pretty good crop to grow. The Missouri and Tennessee Stations have classed them about with pumpkins, not so good as corn silage, but about one-half as valuable. In other words, a ton of corn silage is about as good as two tons of citrons, but where a farmer has to figure on building a silo, and buying the machinery that is necessary to prepare the silage and get it into the silo, I think there might be a possibility for the citron on the average farm that would be very promising.

I just wanted to bring this to your attention, for it does look like a joke, but it is not as much of a joke as you might think. One of my demonstrators has had them. I went to his field last spring with him and we were looking along over the corn field and the citrons were about the best I ever saw; they were growing everywhere. He wanted to plow these up and throw them away. I asked him to leave those in the rows and try a little feeding experiment with them. He decided to try them. He asked me if they were really of value, and I told him I did not know but it would be good to try them anyway. So he gathered his corn when the time came, but did not take time to gather the citrons, for he knew they would stay there all right. Then he opened his gate and turned the cattle and hogs in there. He told me, two weeks later when he had a little time he decided to go in and haul the citrons out, and he says that when he got in there, he could not find a wagon load of them on the twenty acres. The cattle and hogs had carried on the experiment by themselves.

Now I have simply indicated these crops that can be grown at different seasons of the year to carry on a crop rotation.

CORN AND PEANUTS

One other thing. I would say during that period from July 15th to October, I mentioned corn in connection with peanuts. I believe it best to plant them together, corn with peanuts down the row. I plant from two to four acres, and plant them in a succession, planting every ten days or two weeks, as many times as I think necessary. I do not gather these, but turn the hogs in on them. You will find after the first day that you are about as blue as a man can be. The first day the hogs will root out every peanut and put every ear of corn to the ground, but there will really be no loss, for they come along and gather them up. There is practically no loss in the end. You must use the

old Spanish peanuts for this, for they mature at the same time as the corn. There is one objection to the Spanish peanuts; that is, they sprout almost immediately after maturing, so you cannot plant more than a little at a time, for they would sprout and you would lose them. It is better to make your patches small, depending on the number of hogs you have; and run your hogs on the different patches as they mature, and in this way save each patch by feeding it when it is ready.

DISCUSSION

A. P. SPENCER. I would like to ask why no one has emphasized sorghum. It seems to me this is one of the important crops and one of the best things we have. Prof. Gray seems to have fed mature sorghum.

T. Z. ATKESON. That is a proposition. All of Dan Gray's experiments have been with mature sorghum. The mature sorghum is not what it ought to be. It would be fine for the hog if he could get all of it. But the hog gets a stalk of the sorghum in his mouth and commences to chew it, and the juice runs out both ends and is lost. So far as sorghum is concerned, it is one crop that I have never had any experience with; and so far as I know Prof. Gray has not experimented with it except in the mature stage. I should judge that where a man did not have Bermuda pasture it would be a good thing to try sorghum, and possibly it might pay him.

H. E. SAVELY. If you plant cowpeas very thick you can kill Bermuda anywhere; and if you plant velvet beans very thick there, you will get a good crop. Shade, if thick enough, will always kill Bermuda. It is bound to do so, and in one year's time.

A. P. SPENCER. Plant cowpeas with sorghum. Mr. Atkeson says mature sorghum is not good for feeding, but here at the Station farm we get over 32 bushels of seed from the sorghum per acre. I would suggest planting sorghum thick, and I have seen some that made the finest kind of hog feed if planted thick and pastured off two feet high. These green feeds are mainly for the succulence that a green crop will supply.

The big trouble in this State is between the middle of March and along into May. We want something for this period. In South Florida last year I saw acres and acres of sweet potatoes in the ground until along in April; and I think this is a good thing for the spring feeding. If the ground is very wet or the potatoes valuable, it is a different proposition entirely.

T. Z. ATKESON. I would like to say that there is a good deal more imagination connected with this Bermuda proposition than anything else. I have been farming on land that has a good deal of Bermuda on it and my experience has been that in plowing with a one-horse plow it is lifted around these patches but with a two horse plow you will have no trouble.

A. P. SPENCER. We have always recommended the use of Japanese cane, and the proper use of it, but I have had it thrown at me time and again that people have turned young pigs into the Japanese cane patch and that they have simply died right off. I have never seen little pigs killed by it and I would like to hear from you gentlemen. Have you seen this happen? I have about come to the conclusion that it is a case of starvation rather than anything else.

S. J. McCULLY. When Japanese cane is in a succulent condition little pigs can grow on it and do well without any loss. I think after it is old they are not able to handle it.

J. M. SCOTT. The pigs too often get only the watery juice, and that will not keep them alive. They should have some other feed along with it.

O. L. MIZELL. Mr. Atkeson spoke of that bare season in the spring. Many are not situated as I am. I think one of the best things for hog feeding after velvet beans is millet. I have tried that, and it does splendid, and withstands pasturing, and is good for all kinds of stock. It should be encouraged to grow more than it is.

M. C. GARDNER. I remember that three or four years ago I had three or four acres of sweet potatoes. My hogs had been killed in the fall with cholera. So the next spring about May, and after I had turned the land in December, there were potatoes all over the ground. The next spring they sprouted. I left them there just for the young pigs, and they did exceptionally well.

FORAGE CROPS

J. M. SCOTT

There is little use talking about forage crops unless there is some need for them. Under the present conditions there is a greater need for the growing of forage crops in Florida than there has been in the past.

There is not much demand for forage crops unless we have live stock to feed them to. During the past there has been an idea, entirely too common with most of our farmers, that here in Florida it was not necessary to go to the expense of providing winter forage for our live stock. This, however, is a false notion that we have gotten from somewhere; and the sooner we forget it, the better it will be for our live stock.

Any country in which an abundance of good, nutritious forage can be grown, ought to be a good live-stock country. It is quite important in a forage-growing region to have an abundance of live stock, for the reason that live stock on the farm furnishes the best market for disposing of our forage crops. Most of these crops are bulky. Hence, shipping to a distant market is not advisable. But by feeding them to live stock of some kind, we convert them into a more marketable product, producing a larger profit, and at the same time leave at home an abundance of material that adds materially to the fertility of our soils. For instance: With every \$100 worth of beggarweed hay sold from the farm, as hay, there goes \$92.38 worth of fertilizer. With every \$100 worth of crab grass hay sold from the farms, as hay, there goes \$40.67 worth of fertility. With every \$100 worth of corn sold from the farm there goes \$31.06 worth of fertility. Is it any wonder then that our farm lands grow poorer and poorer every year?

We hear a good deal about "Crop Rotation," and it is a very important topic, which should be talked in season and out of season. But along with "Crop Rotation" there is another very important topic, and that is how to dispose of these crops to the best advantage. We have called your attention to the fact that if our forage crops are sold from the farm in their raw form, a large amount of fertility



Fig. 5.—Japanese Cane in Shock.

is sold from the farm at food prices, and this fertility must be returned the following year in the form of commercial fertilizer. The most economical way of disposing of forage crops on the farm would be to make them into either beef, pork, or dairy or poultry products on the farm, and then send them to market. The reason for making this suggestion is that with every \$100 worth of beef sold from the farm only \$14.26 worth of fertility is sold; with every \$100 worth of pork sold from the farm only \$6.16 worth of fertility is sold. With every \$100 worth of milk sold only \$2.82 worth of fertility is sold; with every \$100 worth of cream sold only 83c worth of fertility is sold, and with every \$100 worth of butter sold from the farm only 10c worth of fertility is sent away. This, of course, means that the fertilizer produced by the animals that consume the forage crops must be well taken care of and applied to the land in good condition. I refer you to Press Bulletin No.

191, of the Florida Experiment Station, for information how good forage crops will improve our native cattle.

In suggesting crops to grow it is difficult to say just which one should be placed at the head of the list. However, Japanese cane, sorghum and corn are without doubt three of our best forage crops. Just which of these will do best for you will depend on the character of your land and the way in which they are to be used.

JAPANESE CANE

Among the first forage crops that I wish to mention is Japanese cane. Perhaps all in the audience would not agree with me that Japanese cane should have first place, but some one crop must be placed first, and I place Japanese cane first because I believe it will yield more per acre than will any of our other forage crops here in Florida. I do not wish any in the audience to think that my arrangement of the crops is the best for all farmers or all sections of the State, but I would suggest that each man select those crops from this list that he considers best for his particular section of the State.

Japanese cane can be used in a variety of ways; as a pasture crop, as a soiling crop, or for silage, and it can be cut and cured and fed out during the winter and early spring as dry forage.

This crop produces no grain or seed. Hence in feeding it some allowance must be made for this, and a sufficient amount of grain fed in addition to the forage to compensate for any corn or sorghum that might be fed in corn forage or sorghum forage. For instance, it would hardly be fair to compare results of feeding a ton of Japanese cane silage, with a ton of corn silage made from corn that would yield 30 or 40 bushels of grain per acre. To make these feeds comparable, a sufficient amount of corn or other grain should be added to the Japanese cane silage to equal the corn in the corn silage. We have heard a number of complaints from farmers who have been feeding Japanese cane silage, and I believe most of the complaints are because that they made no allowance for the grain that may be in other forms of silage fed.

Perhaps the most economical way to use Japanese cane is as silage. With this method there is less waste of feed. If used as a pasture crop there is considerable waste. Cattle tramp a good deal of it under foot. Then if it is

left standing in the field and is injured by frost a number of times, the feeding value is reduced somewhat, though just how much I cannot tell. If it cannot be made into silage, perhaps the next best method would be to cut it and place it in shocks, and let it cure; and then feed it out during the winter when feed is needed. The shocks should be made of fairly good size, and as soon as they are completed they should be tied with a good heavy cord. We have found lath cord very satisfactory for this purpose, because it contains a good deal of tar and resin, hence the grasshoppers and crickets are not so likely to cut it in two. The shocks should be tied very securely and as near the top as possible, so as to make the top shed water. It might also be of advantage to run the Japanese cane through a cutter just before feeding. Some three or four years ago we cured a considerable quantity of Japanese cane hay, and placed it in the barn in November and December. Some of it was not fed out until the next June and July. When this was run through the cutter, there was still enough moisture in the cane to moisten nearly the entire mass, and only a small amount of it had soured.

Japanese cane does well on nearly all kinds of soil, but like other forage crops it does best on the best grades of soil. The better grade of soil, such as the hammock soil, will no doubt produce the heaviest yield per acre; and perhaps the high pine sandy soil will produce the smallest yield per acre. Japanese cane will also grow on rather wet land, although we would not advocate planting it very extensively on that class of soil.

You will find that Japanese cane, like a good many other crops, likes an abundance of lime in the soil. In our fertilizer experiments conducted some time ago we found that an application of one ton of ground limestone increased the yield per acre by about ten tons of green material. It is rather difficult to say just what is the best formula to use in fertilizing cane, but I believe that the important point in fertilizing is to give an abundance of ammonia, so as to induce a strong rank healthy growth.

SORGHUM

Sorghum is another good forage crop for Florida, and there are quite a number of varieties to choose from. Perhaps the three best varieties for Florida would be the Gooseneck, Sumach and Orange. These three mature about the same time, and the yield per acre of forage is about the

same for the three varieties. For an earlier forage crop, perhaps the Early Amber should be selected. This will mature and ripen seed perhaps two weeks earlier than the other varieties mentioned. The sorghums can be planted almost any time from February or early March until the first of August. If an early soiling crop is desired it would be well to select the Early Amber. Sorghum planted the first of March ought to produce at least two good crops, and under favorable conditions three crops, during the season; that is, as soon as the early crop is ripe it should be cut, the stubble fertilized and given good cultivation, and as soon as the second crop is ripe the stubble should again be fertilized and cultivated. In the northern and western parts of the State it would perhaps be inadvisable to always count on three crops during the year; but in the vicinity of Gainesville and southward, by planting early in the season, that is the latter part of February or early in March, three crops can be obtained. The first crop will be much heavier, and the third crop will be lightest in yield.

Sorghum can be used either as a dry forage crop or as silage. Sorghum will also be found a good crop to grow as a grain crop. The yield per acre of grain on the average sandy pine land will be found to be equal to, or better than, that of corn grown on the same class of land. Some difficulty may be encountered in curing the seed of the first and second crop on account of the excessive moisture at that time of the year; but if the heads are cut when perfectly dry and spread in an open pen or shed they will cure out and dry without becoming moldy. Care should be taken when they are first placed in the barn not to put them in too large piles until they become well dried. If the crop is to be cut for forage, it should be harvested about the time the seed is in the dough stage. Like Japanese cane, sorghum grows on almost any class of land, but it does better and gives better results on the better grade of land. To obtain the most satisfactory yields, sorghum should be well fertilized and given good cultivation.

CORN

Each year corn is becoming of more importance in Florida, until last year the corn crop was second to that of citrus. However, there is not enough attention given to the saving of the forage. The forage is of considerable importance and is a valuable feed. Too many farmers have been wasting their time pulling fodder when it would have

been much better to have saved the entire crop. When the fodder is pulled, there is no doubt of its being a good feed; but it is very expensive. It will cost about \$20 a ton by the time it is ready to feed, while if the entire crop is harvested as a forage crop it can be done much cheaper and more feed can be saved. In ordinary seasons, the corn can be cut and shocked and cured in this way. Of course in real wet rainy seasons there is more or less loss from mildew and mold, but if the shocks are well built and well tied up, the corn will keep quite satisfactorily. Or caps can be made by using ordinary unbleached muslin dipped in raw linseed oil and then wrung out. This will make them more or less waterproof, and they will last for several years, thus making a cheap covering to protect the fodder.

OATS

Perhaps oats should be considered as a hay crop more than as a forage crop, but hay and forage are so closely related to each other that we will at this time speak of oats as a forage crop. Oats should be planted in the latter part of October or early in November in a well-prepared seed-bed. They should also be given a liberal application of fertilizer to produce a strong healthy growth; and if we have favorable weather during the winter they should produce a satisfactory yield of hay. They should be cut for hay when the grain is in the dough stage.

Just what variety of oats should be sown is rather a hard thing to say. Some prefer the Appler Oat, while others think the Burt Turf Oat is best, and still others prefer other varieties. The yield of hay that can be obtained per acre from oats will vary considerably, depending on the character of the soil, how they have been fertilized, and also on climatic conditions.

GERMAN MILLET

German millet is another good hay crop that does well in Florida, and that makes a good quality of hay for the feeding of cattle; but it is not so good for the feeding of horses and mules. It is also a good crop to use in rotation following oats. Land that has grown a crop of oats during the winter can be plowed and sown to German millet as soon as the oats are harvested in the spring. The yield of millet hay per acre would be about the same as that for oats. There is one important point that should be kept in mind in the growing of millet for hay, and this is that it should be harvested just about the time the seed heads be-

gin to show in the field. If allowed to stand until the seed is ripe, it will make a very poor quality of hay.

CRABGRASS

Crabgrass is a volunteer crop in most fields, but it is one of the most important hay crops in the State. It makes a good quality of hay when harvested at the proper time and well cured. It will require no cultivation and no fertilizer, since it comes as a volunteer crop after the spring and summer vegetables, or after any other spring or summer crop has been harvested. The yield per acre of crabgrass hay will depend upon the quality of the soil on which it is grown, and also the amount of fertilizer applied to the previous crop. Where crabgrass is following a vegetable crop it is not uncommon to get as much as two tons of hay to the acre and even more in some cases.

NATAL GRASS

This is a grass that is perhaps not as well known over the entire State as it should be, especially in the central and southern parts. It does better in this part of the State than in the northern and western part. We cannot at this time recommend it as being a satisfactory crop for the northern and western parts; but for central and southern Florida on the dry sandy soils it is one of the best hay crops we have. In fact it is such a persistent grower in Lake County that they claim there that it will kill out Bermuda grass. This is probably true on the very sandy soils, but I do not believe it would be true on the heavier clay soil. Like crabgrass hay, Natal grass comes in as a volunteer crop after the spring and summer crops have been removed. The yield of hay varies all the way from one ton to three or three and a half tons per acre of cured hay. In feeding value it is perhaps a little better than the best timothy. If the ground is not already seeded to Natal grass, the seed should be sown during the months of April and May whenever there is sufficient moisture to ensure germination. Sow the seed at the rate of eight to ten pounds per acre. The seed is very light and fluffy, and it will be found quite difficult to scatter it unless it be mixed with moist sand. When moist sand and the seed are mixed together, the seed can be scattered broadcast quite satisfactorily. Care should be taken not to make it too wet or it will not scatter well. Two or three cuttings can be obtained during the year.

RHODES GRASS

This is one of the most promising hay crops we have at the present time in the State. It is not yet grown on any large area, but it has been tried in nearly all parts of the State and seems to be quite promising. Because the seed must be imported and is therefore rather expensive, it is difficult to get seed. The yield of hay per acre from this grass seems quite satisfactory. In feeding value it compares favorably with our other hay crops.

DISCUSSION

P. H. ROLFS. About Rhodes grass. The Experiment Station has followed this up and has planted some of it since 1909; but we should not get excited about the high yields we hear of. If we can average four or five tons on our best land it will be satisfactory. Those yields that have been spoken of are excessive and very extraordinary yields. If we can get as much as three or four tons per acre on the average flatwoods it ought to be satisfactory. Rhodes grass should be tried out on every farm, but we should not let our hopes run away with us. Let us get some trial plots of it in our own Counties before we advocate it strongly. It is apparently a good thing, but one that we want to go slowly with.

GROWING AND CURING HAY

W. E. BROWN

I will mention only about three crops: the first we might call a forage crop, and now is the proper time to plant it. It is sorghum. There is a man in our County that plant 20 acres of sorghum every year, and while feeding this he says he saves \$100 per month. It is one of the good crops I think that you can feed to good advantage.

The next is the peanut. We plant a great many cucumbers, cantaloupes and watermelons; and after those, we plant peanuts on that land. A great many of those are harvested for seed and thrashed out by peanut thrashers. That crop is sacked in large sacks, and the hay is baled and used on the farm and sold on the market. A better way would be to plant peanuts, and cut the crop with a mowing machine. You can get a better grade of hay than if you have the roots in it.

The next is a crop that is easily handled at the proper time and if planted at the proper time, it will come when it can easily be saved. It is the cowpea. It can be planted after watermelons and cantaloupes, which mature along in June. It should be planted in July. Cowpeas should be planted on well-prepared lands, in rows or else broadcast.

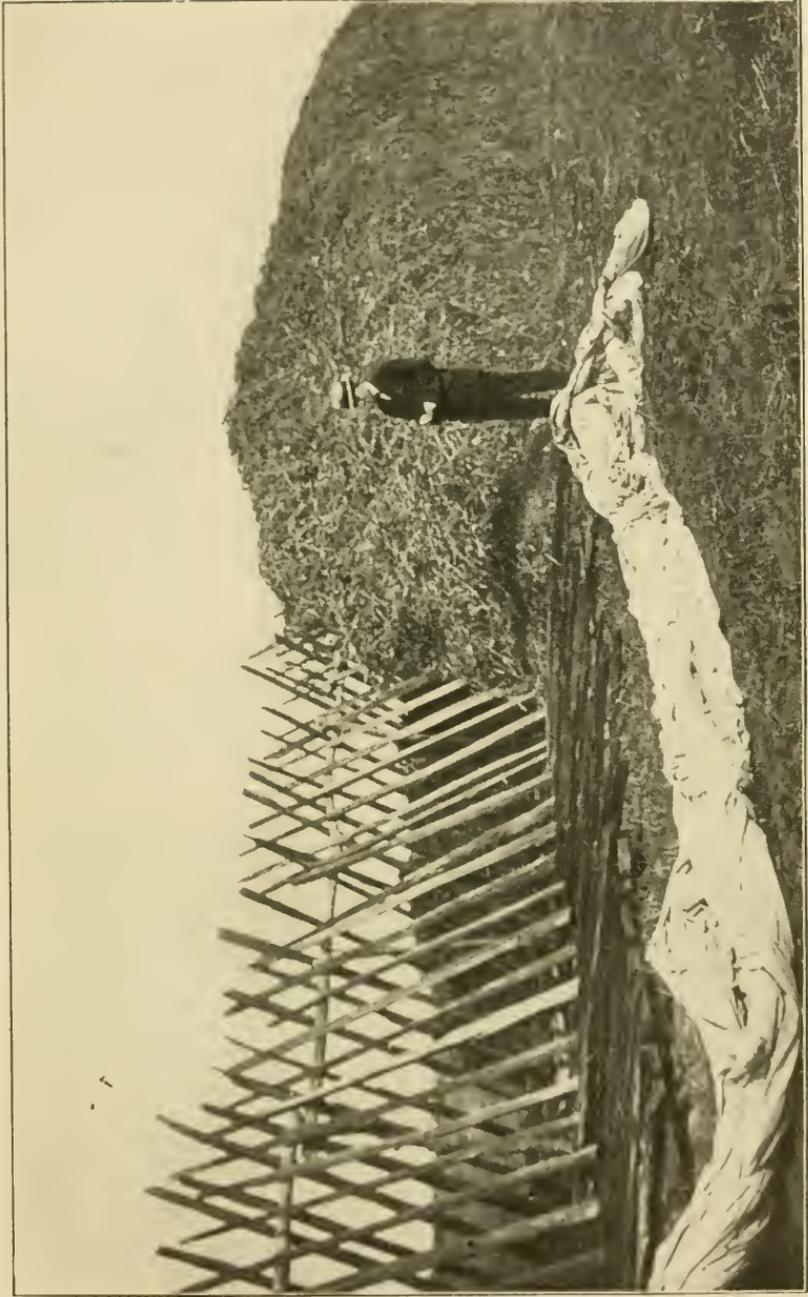


Fig. 6.—Means' method of curing Pea-vine Hay.

It is better to drill the cowpeas, and of course the next best thing would be to plant it in rows, so you can cultivate it. Cowpeas will be ready to cut along in October, at a time when you have good hay weather. The proper way to cut and cure pea vine hay is just after the dew has dried; or wait until noon or a little after and leave those vines until they wilt, and then the next day stir them and turn over, and the next day rake them up and put them in small cocks. I have seen some use different methods with poles. Sometimes they would do all right, and at other times they would not. I think the best way is just to let cowpea vines cure in the stack. When the vines are dry enough so there can be no water wrung from them, haul them into the barn and leave them there for six or eight weeks, when they can be baled. If it should rain, just leave them until they get dry on the top, then turn them over like you do when they are first cut and let them dry on that side. If those cocks get real wet, just leave them until they dry, then turn them over and let them dry again. Do not handle them any more than you have to, as it causes the leaves to fall. Cut for hay when there are many mature pods, as they make the best hay.

DISCUSSION

Q. Have you ever tried sowing cowpeas thick to make them grow tall?

W. E. BROWN. Yes, and you can always get good results. If you plant the Whippoorwill variety you will find they grow best, and are nice to cut. Plant in July.

Q. Will the spring pea make good hay?

W. E. BROWN. Yes, if you plant the bunch kind. If planted in the spring they mature during the wet season when it is difficult to put them up in good condition.

S. J. McCULLY. Have you seen them cut in wet weather?

W. E. BROWN. Yes, I have seen them cut when they stood in water. I have seen peas planted after watermelons and cut at the time I have stated, and put into cocks, when I thought those things were ruined, for it rained every day and I did not see how in the world one could save those peas. He hauled them up, as I thought, too wet to save, but later he had no trouble to dispose of the hay at \$25 a ton, and it could never have been told that it was not cured under the best of conditions. Last fall there was a man came along telling people how to save pea vine hay and beggarweed hay. All you did was to take the vines and put posts up and lay cross poles on these and put litter and trash on the ground, then throw the vines on this and cover them with something like hay or Japanese cane tops, or anything that would prevent the water running through this stack. I guess that will work all right. One fellow, instead of doing that way, thought he would improve on the method, so he laid the poles every which way, cut the vines and put them up, but they were too heavy and fell down, and the weather came in on them and ruined them.

Q. Did you ever plant sorghum and peas together for a hay crop?

W. E. BROWN. Yes, it is good, and makes a good quality of hay. Some beggarweed and crab grass with your pea vines will make a better grade.

Q. Did you say that you put the peas in cocks after you cut them?

W. E. BROWN. No, I leave them on the ground to wilt.

Q. Do you first rake them into windrows?

W. E. BROWN. Yes, do not leave them in the sunshine too long. You want to cure them in as short a time as you can.

Q. What if the cocks are rained on and a mold is formed?

W. E. BROWN. Most people cut their pea vines too green.

C. K. MCQUARRIE. If you cut your vines at the right condition you can do it without any mold at all. Never let the peas get beyond the blooming stage before you cut them. If you wait and cut the hay after the pods are formed, you are going to lose a good many of the leaves after a heavy rain, for it is a law of nature that after performing its function a thing dies. Crab grass should be cut when the first bloom shows.

W. E. BROWN. I can show you, in our County, pea-vine hay that matures pods, and it is just as good as any that is cut first. The variety has a great deal to do with it. Take the Whippoorwill. Now a great many people pick some of these peas for cooking before the vines are cut.

D. C. GEIGER. I agree with Mr. Brown. I wait until the peas start to ripen, and it makes a better quality of hay and takes only half as much time to make the hay that it takes if cut earlier. It is a mistaken idea that we need a great deal of corn in feeding. There are too many people today who are feeding too much corn in this State. They do not need to use so much. I know of a man in our County who hauled turpentine and fed his stock on grain feed for thirty days. He used sorghum.

S. W. HIATT. There is one variety of forage and feed crop we are interested in, in our County, that has not been mentioned. This is Egyptian wheat. I want to hear something about it. Is it better in the line of seed than anything else?

W. E. BROWN. One of the seed houses got hold of that and boosted it because they thought suckers would get and use it simply because it was something new. It is only one of the good varieties of sorghum. The Gooseneck sorghum, I think, is much better.

J. M. SCOTT. You might say about the Egyptian wheat that probably the grain is as good as any other, but the stalk itself has no sugar content. It is one of the non-saccharine sorghums.

O. L. MIZELL. I have been putting up a variety of hay myself. I have used several things in this hay-making, beggarweed, peanuts, etc., and all have been fairly successful and give a splendid quality of hay. But I have found the peanut vine the most profitable of all. I got a splendid lot of hay, and it is as easy to make as any, and when I get through with the hay I have exactly what I want to follow with the hogs. You usually get your peanuts for nothing, or your hay for nothing, and stock will eat the peanut hay with as much relish as the peavine hay, and it is easy to put up.

Now I will tell you how to make peanut hay. First, take the stumps out of the field, prepare it thoroughly. Lay off the rows thirty inches apart, and drop in the North Carolina peanuts. They do best if planted from ten to twelve inches in the drill. Get a little

flat sweep or a weeder, and if your blacksmith cannot make it, show him how. You should all know how to make one.

P. H. ROLFS. Another forage crop and hay crop has not been mentioned. It is Japanese cane cut and shocked. It makes one of the best for forage in the spring, and with us at the Experiment Station, if kept way into the summer and protected from the rain it is excellent feed. It is cut and shocked like the northern man shocks his corn. All who have tried it, though they have been few, have been well pleased with it. Cut and shock it, of course, before frost. It makes splendid forage for the spring months, March and April, when we are short on forage. Florida, you know, does not produce as much hay as she feeds. The Secretary of the Merchants' Association at Tampa wrote me that \$1,700,000 worth of hay is imported into Tampa alone, in a year. This fact insures us a market for all that we can grow.

Q. At what stage in the growth of the Japanese cane do you cut it?

P. H. ROLFS. Leave it stand just as long as you can before frosting. If the upper leaves are nipped a little it does not hurt it much, but do not let it freeze. With us it is kept without any special protection. During the winter and spring we have few rains, but if you should have a rainy season, it would pay to haul it to a shed and protect it. Cut it green and shock it right away. Make your shocks just as big as convenient. You have your sugar content in your cane stalk and the forage in the leaves.

G. W. BELSER. I agree with Prof. Rolfs on the cane proposition. We have tried it in our County and it has proven satisfactory. If you want to you can chop it up before feeding.

H. E. SAVELY. Mr. Mizell suggested using a weeder in cultivating peanuts. It is a good thing to run the weeder over the rows every week and the grass will be kept down all right. It is hard to get a weeder in Florida. Some dealers in the largest towns of the State have never heard of a weeder. It is a very scarce implement, and one that is of great worth.

C. K. MCQUARRIE. I have tried a weeder with peanuts. It is the best thing to use. It will not hurt the plants. Start using it early and run any way that you want to.

J. C. SMITH. Peanuts, I agree with Mr. Mizell, make one of the finest crops to grow. I have my land stumped, and rake it flat, and lay it off in rows eighteen to twenty inches, possibly 24 inches. Then I plant peanuts and cover them with only a little soil. Then I take a board and put on my plow stock and never use a harrow at all. I use the weeder entirely, using it once a week, and then after the crop comes up it can stand any grass that comes in.

SUGAR CANE

C. K. MCQUARRIE

Sugar-cane growing and syrup-making in Florida could be made far more profitable than at present were better methods employed in the production of the crop and the manufacture of the syrup. Sugar-cane can be grown on any of the Florida soils if the proper measures are taken in the preparation of the land and the care of the crop. Land intended for the sugar-cane crop should

be well broken in the fall, and a cover crop grown during the winter to preserve the soil fertility and prevent the leaching which occurs where soils are left bare during the winter. In a general crop rotation, sugar-cane should follow either sweet potatoes, or some crop that left considerable humus in the soil, or a velvet bean crop that had had the vines plowed under when frosted, or grazed off by cattle. These crops furnish humus, which gives the soil the ability to retain the moisture content, which is the most important factor in our crop production.

SEED-CANE SELECTION

Selection of seed-cane is very important. Short-jointed seed canes should never be planted, because they are generally low in vitality, and while the stand may be a little better to begin with, the crop does not ratoon well after it gets to growing. Seed canes should be long-jointed with the buds well developed. It is not advisable to plant any seed-cane if it has not had time to mature the previous fall.

In the preparation of the land for planting seed-cane the furrows should be laid off six feet apart. A good tool to use for this work is the middle-buster. Run it about as deep as the land has been plowed. The cane should be cut in three or four-joint lengths, and laid in these furrows, lapping a little to ensure a good stand. The covering should be light, just enough to ensure good germination of the seed-cane buds. If a heavy rain occurs shortly after planting, a good plan is to run a weeder over the land and break up the crust the rain has formed. This will help to warm up the land and put it in good condition for the germination of the seed-cane. When the first sprouts show through the ground, a sweep or some light tool should be used around the rows, throwing a little soil into the furrows. The middles should be cultivated at the same time, with some tool that does not affect the roots. This cultivation should be kept up until the furrows are level with the surrounding land. In planting deep this way, the crop is anchored in the soil, and is not so liable to be blown over in September and October when high winds prevail.

FERTILIZER

The fertilizer used should analyze about 4 per cent. ammonia, 6 per cent. phosphoric acid, and 8 to 10 per cent. potash. The source of the ammonia should be of an organic nature. Cotton-seed meal is acknowledged to be the most

suitable because of its slow availability and its ability to feed the crop gradually as it is required. To use about 100 pounds of fertilizer per acre for every inch the soil is broken, is a good plan. If the land was broken about six inches deep, 600 pounds could be used profitably; and if plowed ten inches deep use 1,000 pounds of fertilizer.

The sugar-cane crop is peculiar in that it does not begin jointing for the first two or three months after being planted. It seems during that time to be busy preparing and laying the foundation for the crop. It is then that the root system is being multiplied extensively, hence the reason for broadcasting the fertilizer so as to promote a large root system before the crop begins to joint. During the middle of July to the first of August, the stalks begin to make joints, and right at that time a top dressing of nitrate of soda or sulphate of ammonia should be broadcasted at the rate of 150 to 200 pounds per acre. This should be thoroughly mixed with the soil immediately upon application, and cultivation with a shallow tool such as a weeder or a sweep, should be kept up at intervals of every week or ten days until the cool nights set in in September. The crop's growth is increased by these frequent cultivations.

CULTIVATION

The old method of plowing so many times then laying the crop by is not in accordance with modern agriculture. The growing roots in the soil require oxygen and plenty of it, and this can be supplied by cultivation. I find in the weeder of adjustable type one of the best tools the grower can use. In the case of a heavy rain, the weeder should be run between the rows to break the crust left by the rain as soon as possible. If the crust is left, the tendency of the roots is to come to the surface for the supply of air and oxygen, and in the case of deep working tools, the mutilation of the roots is great, so I would recommend the use of a weeder. The sugar-cane crop is peculiar in that it sheds the leaf that protects the bud on every joint as soon as that bud is mature, therefore, along early in October the first stripping should be commenced. All those decayed leaves should be removed to allow fresh air and sunshine to get on to the growing crop. This tends to evaporate moisture leaving only the saccharine portion in the stalk.

In manufacturing the syrup a most important consideration is a mill heavy enough to give a high percentage of extraction. A single farmer under ordinary conditions

cannot afford to buy a mill heavy enough to do effective work; therefore, we recommend every community that grows sugar-cane to unite and form an organization or stock company to erect a central plant to which the cane can be hauled and ground. A plant that will manufacture from 200 to 300 gallons of syrup per day, can be erected for about \$300 to \$400. Every year there is a loss among the cane-growers in that they do not get more than 50 per cent. of their cane juice, because they do not get a mill heavy enough to get a full extraction of juice. This central plant should be put in charge of a man who knows his business. Evaporation by steam is recommended, because one is able to control the boiling a great deal better than he can by the furnace method. There are many evaporators on the market. I do not recommend the Cooper type of evaporator because it has no skimming facilities. The green material and half cooked material mixing together cause a cloudy appearance. To get a high-grade article, the evaporation should be carried on in three distinct compartments, so the juice can be worked through the compartments without mixing the different stages.

STRAINING THE JUICE

Straining the juice is an important factor right here. The juice should be subjected to thorough straining through either fine strainers or cloth strainers and where possible it is advisable to use a filter skimmer. If one can get gravel the right size, it is a first-class filter; and where black moss can be had, it can be used as a filter. Where the moss is used, one will require quite a supply, so that when one batch gets foul, it can be laid aside, washed and dried, and a new batch substituted. One would require at least three batches of black moss to do effective work. As the juice runs from the mill it is advisable to use dessicating tanks for settling purposes. It does not matter how well the juice has been strained, there is always some fine settlement that will escape this filter. If dessicating tanks are used and a little milk of lime used in them, it will cause a settlement to the bottom of the tank, and give an absolutely clear juice. In the small plant, ordinary barrels can be used for this purpose; but in the larger plant, where several thousand gallons of juice are used per day, one will have to erect tanks. At least three tanks should be used, one for each stage. The juice should have at least from one to three hours to settle. It is necessary to use a good skimmer. The skimmer in general use, with perforations at the

bottom, is not a skimmer at all in the real sense, because 90 per cent. of the skimmings that should be removed go back into the boiling syrup, and this forms a cloudy produce with poor flavor.

TESTING THE SYRUP

The thickness is important. The old method of flaking and testing is a poor method. A hydrometer should be used for testing the density. This should be tested when the syrup is hot. Thirty-four degrees Baumé is acknowledged to be the best point at which to stop evaporation. In running off the hot syrup it is advisable to run it through a woolen blanket. Wool has the faculty of removing all impurities. Care should be taken not to use any cloth with cotton in it, because the effect of the hot syrup will be to swell the cotton and the hot syrup will not run through. The syrup should be bottled, or put in tin packages when hot, as this preserves the flavor.

MARKETING

A great problem before syrup-makers in Florida is the marketing of their product. There are at least a million gallons of last year's syrup in the State to-day not marketed. The reason for this is several-fold. One of the main reasons is the inequality of the products, some thick, some thin, some clear, some cloudy, some well strained, some moldy, and some filthy. Most of the syrup is put in barrels, and barreled syrup is not marketable except to the refiners who take this product and work it over, put it in bottles and packages, and sell it as Florida syrup. The producer gets about 25c for it, and it is sold by the retailer for about 80c, so there is a great profit to some middleman between the producer and consumer. To put the Florida product where it belongs with a good price, we must first of all have a product of uniform density. Then put it in attractive packages, and sell it direct to the consumer. Florida syrup is an article of large commercial importance, and must be marketed like any other high-grade commercial product.

In an experience of twenty years, covering the manufacture of syrup in all its phases, I would recommend to put this product in bottles of pint and quart capacity. These bottles should be uniform, and of clear glass, so that when the consumer buys one, he knows what he is getting. If the consumer buys a tin can, he does not know until he opens it what the product looks like; while in bottles, he can tell at a glance what he is getting.

We must put more business into this. If we put Florida syrup on the market of the country in the packages and of the quality I have indicated, there is an unlimited demand for it; and there is no reason why we should fail to do so. So long as a thousand different farmers are each putting up syrup, there will be that many grades of syrup. Until we wake up to the fact that we must have a central factory and cater to the taste of the buyer, we will never get anywhere.

DISCUSSION

S. J. McCULLY. I have gotten a great deal of information from what Mr. McQuarrie has said, but I want to ask a few questions. Do you recommend broadcasting the fertilizer and using a large percentage of potash?

C. K. McQUARRIE. Certainly.

S. J. McCULLY. Do you recommend to grind all the cane, that is, the short immature joints?

C. K. McQUARRIE. I should say something about that right here. I am glad you brought up that point. The cane as it is originally growing forms glucose. As the joint hardens it forms sucrose. There is always some glucose in the green joints. You should grind one immature joint for every eight mature joints, that will give you glucose enough to prevent the syrup from crystallising. The joints nearest the ground are the sweetest. We have tested that out thoroughly at Pensacola. This may be a source of very great waste, for in some fields you will find the stubble left very long. I took the matter up several years ago with Mr. Rose, and he recommended grinding all the little short joints, he said that was where you got the glucose. Now I wanted to make my syrup bright and clear, and he told me to put in the glucose to stop it from sugaring. I use the hydrometer to test it, and I bottle a great deal, and never have any trouble to dispose of it at 75c to 80c a bottle. Of course the law requires a man to label his syrup, and we are following out this plan if we bottle it.

Q. Will that lime you spoke of (milk of lime) prevent the fermentation of the syrup? I ask because we know it is best to put it up in bottles, and after the spring opens up a considerable amount ferments.

C. K. McQUARRIE. No, that occurs from poor straining.

S. J. McCULLY. Have you any experience with corking the bottles, hot or cold.

C. K. McQUARRIE. Seal your package right away.

W. L. WATSON. I find the usual practice here is to dig the seed cane. Now back in Louisiana people never think of doing that, they cut off the stubble and use it for two or three years, and I have never seen the use of digging up the seed-cane, but if there is any benefit in it, I would like to know it.

C. K. McQUARRIE. I cannot answer that question explicitly, for this reason: there have been several attempts made to show that the stubble was as good as the planted cane. If you leave the stubble standing, the juice is apt to sour and kill the germ.

T. Z. ATKESON. In regard to this point Mr. Watson has brought up about growing cane from the same cane already planted, we did

a little work in Southern Alabama. One test I remember was with one acre of cane grown under ordinary conditions, with ordinary cultivation. We got the first season 15 tons, the second season 17 and the third season not quite 15. I have heard quite a little complaint from the farmers about the use of nitrate of soda causing the cane to become salty, and I am not enough of a chemist to know what it is due to. I have always supposed it was some malnutrition of the plant.

P. H. ROLFS. The Demonstration Agents should keep up with the latest scientific discoveries in connection with the use of fertilizers. Just here I want to call attention to the data as published in some of our annual reports. These show results opposite to what is usually supposed to be correct. It is not an unusual thing for speakers on fertilizers to say that you must add potash to increase the sugar content of sugar-juice, and for that matter, of any other crop that grows. In our fertilizer experiments with Japanese cane we have been unable to detect any such change due to the application of potash to the soil. As a matter of fact the plot of Japanese cane which received no potash at all gave juice with as high a sugar content as those plots that were treated with potash. This is quite in accord with experiments that have been conducted over a period of more than 25 years in the Windward Islands. The amount of sucrose present in cane juice proves to be governed by the variety of cane and the maturity of the cane from which the sample was taken. You should not for a moment infer from what I have said that potash will not increase the yield of cane, especially on those lands where there is potash hunger. This is not the way it is usually stated; the usual statement is that the addition of potash to the soil will increase the sugar production on account of giving a juice with a higher percentage of sugar. Apparently from the best authenticated and best conducted experiments it appears that the addition of potash will increase the total juice production per acre, and in this way increases the amount of sugar per acre.

T. Z. ATKESON. What is the cause and remedy for saltiness in cane juice?

(No one being able to give an answer, this question was passed over.)

O. L. MIZELL. In answer to Mr. Watson's point in regard to cutting off seed cane instead of digging it up, I have seen a good deal of this done, and the reason we dig it up is because there are from one to six of those lower joints that die from sourness. I have seen a number of men try to keep over their stubble, but all the efforts that have come under my observation show that it keeps better to let it alone instead of doing anything to it.

COTTON BOLL WEEVIL

E. S. PACE

Farmers living in parts of Florida where no cotton is grown are not much concerned about the boll weevil; but in our fight against the weevil it becomes necessary to put into practice a number of things that are necessary to the best development of agriculture in any section. Raising cotton with the boll weevil means, in the main, better farming.



Fig. 7.—Boll-weevil
(enlarged).



Fig. 8.—Boll-weevil
(enlarged).

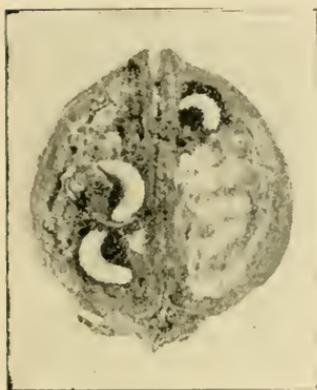


Fig. 9.—Weevil larvae in boll.



Fig. 10.—Weevil larvae in "square" about to drop.



Fig. 11.—Weevils feeding.

(Figs. 7-11, are from photographs by Dr. E. Hinds, Alabama Polytechnic Inst.)

In controlling the weevils one of the first and most important things a farmer should do is to work on the soil, to lay out a systematic campaign of soil improvement. Get out the stumps if they are still in the land. Plow deep, using two or three-horse plows with heavy teams, at the same time getting this deep soil filled with vegetable matter. The farmer should grow crops, especially the legumes, for the sole purpose of furnishing vegetable matter to plow under. Even if he has not the weevil to fight, every farmer should see to it that this humus content is kept up, for if it is allowed to burn out through a system of clean cultivation and lack of attention to the soil, the crop will suffer.

The dark color given the soil by the vegetable matter plowed under will cause the soil to warm up earlier in the spring, which will allow the cotton to be planted earlier and result in earlier fruiting. This is very important, as cotton made with the weevil must be made before the weevils get so numerous, as they always are late in the season. Another benefit derived from the increased humus in the soil is that the fertility it carries keeps the plants growing vigorously. The increased water-holding capacity of the soil will help toward getting an early crop by lessening the shedding of squares and young bolls frequently caused by dry hot weather following more favorable conditions.

DIVERSIFICATION NECESSARY

Another thing the farmer must do, is to become as far as possible independent of cotton. He must be sure in planning his crops for each year, that he has made ample provision for growing all the food he can for both man and beast on the farm. The most successful cotton farmers in the past have been those who not only kept up, but increased the fertility of their soils, and who have not relied on cotton to pay for everything used on the farm. With the weevil to face, it becomes imperative that these better methods be adopted.

DESTROYING THE WEEVILS

The deep plowing, spoken of before, should be done in the fall, and with this must go the fall destruction of stalks. This fall destruction of stalks is a point on which too much stress cannot be laid. The stalks, if possible, should be piled in windrows before frost, allowed to dry out a day or two, and then burned. This will not only kill the mature weevils, taking refuge here, but will destroy the immature stages, which, if allowed to come out just before

frost, stand the best chance of surviving the winter. If the stalks cannot be gotten out of the way before they are killed by frost, the next best thing is to get them out of the way as soon afterward as possible. Either burn them or plow them under deep.

Before the seeds are planted, see to it that a good seed-bed has been prepared. Use pure seed of a good variety, not too late in maturing, and plant when the soil has warmed up sufficiently for the seed to germinate quickly and the plants to grow off well.

The cultivation must be frequent and shallow, the fields should be gone over every week or ten days. The first two or three cultivations can be frequently given to a good advantage with the weeder run across the rows. Cultivation should be continued until the cotton begins to open.

From the time the weevils come out of hibernation until squares begin to form, they live on the young plants and eat the tender leaves in the top or bud. The fields should be gone over carefully every few days, and the weevils picked and destroyed. This picking of the weevils in the spring is next in importance to the fall destruction of stalks. One weevil destroyed at this time, means that hundreds or even thousands have been cut off. After the squares begin to form, the weevils move into these, and for a time the adult weevils are not so easily found. The punctured squares soon begin to fall, and must be picked up weekly or oftener. After this time attach a brush to the plow handles or to the cultivator in such a way that it will hit the plants. This will shake off punctured squares and they can be picked up, or if they fall into a hot dust mulch the immature weevils inside will be killed. The picking up of squares should be continued up until August 1st or 15th, by which time an early crop has set. Picking should be finished as early as possible, so as to allow the stalks to be gotten out of the way in preparation for next year's crop.

DISCUSSION

S. W. HIATT. How much space should be allowed in planting?

E. S. PACE. Give the same distance as before you had the boll weevil. Of course with the ranker cotton you want to have a pretty good width.

C. K. MCQUARRIE. What distance would you plant, 4 by 5 or 5 by 5?

E. S. PACE. That is a question that depends on the growth your plants are going to make. On rich land, of course, you want wider

distances. It all depends on the soil and on the seed. In a great many instances we get better results from early maturing varieties. I had rather have a single stalk to a hill.

W. L. WATSON. My experience is rather different. I space rather wide, enough so the plants will never overlap. The sunshine is our best friend in this fight, so leave the cotton so far apart it will not lap. I would not recommend less than 4½ feet in medium soil, 30 inches in the drill. Stress picking the weevil; that is half of the fight. Every one you kill by hand picking early in the year, destroys the possibility of about four million weevils of the late generation.

Destroying the stalks about the first of October does much towards solving the problem. It is the late hatched weevils that survive the winter. One trouble here is our mild winters, and another is the Spanish moss. A good farmer will destroy all of the stumps, and hibernating places around the farm. We must impress on him that he must keep it cleaned up. The man who will keep his place cleaned up will make a bale, while the man across the road makes very little. So if a man keeps his own place picked up he can do a great deal towards keeping the weevil out of his fields. After the eggs are deposited, it takes 14 to 21 days for them to hatch. As a rule all of the old weevils die out by the first of July. Keep your cotton hand picked closely until the latter part of June. The old weevils will die off and the eggs cannot hatch. Over in West Florida last year I believe the best cotton was King's Toole.

E. S. PACE. It is a mighty hard thing to have these directions followed at first, but after the second year there will not be much trouble.

C. K. MCQUARRIE. I look upon the boll weevil as a blessing in disguise. It has compelled better methods of farming, and set the old farmers to thinking. One of the best methods is to make the rows 5 ft. apart and chop out to every three feet. The cotton branches naturally, and if you don't chop out wide you don't get much cotton. Then, with the wide spaces, the sun will beat down on the soil, and if you miss picking up some of the squares they will die from the baking heat. Now I have had instances last year. A man had 15 acres of cotton which he planted wide and chopped out wide. Then the boll weevil came in, and one morning he and his wife and his boys went out and they collected 6 bushels of squares that day and dug a hole and buried them. He kept up his cultivating until the bolls were open, and he made 17 bales on his 15 acres. Just across the way was another man who planted his rows three or four feet apart and chopped out 15 inches and did not pay much attention to picking up the squares. He made 71 lbs. of lint cotton per acre. Now, if you will use some gray matter and elbow-grease, you can fight the boll weevil successfully, but you must be always on the job.

COST OF DIFFERENT METHODS OF REMOVING STUMPS.

B. F. WILLIAMSON

(Corrected copy of this paper and of the discussion was not received at time of going to print, May 10, 1914.)

DIFFERENT KINDS OF VELVET BEANS

J. M. SCOTT

To begin with, it is hardly worth while to say much about the old Florida Velvet Bean. It is a good deal like an old shoe. It has been used a great deal, but when we want something that we can depend on, we always go back to our old shoes. So with the velvet bean, we always have to fall back on that. It has some faults, but after all, the old Florida velvet bean will probably be a standby for many of us for quite a while. It is spoken of as the old Florida velvet bean, yet it is not so very old. We can all remember when it was more or less of a curiosity, used only for an arbor plant or for shade around a porch. But today it is an important crop for the farmer in nearly all parts of the State. Perhaps its most serious fault is its long season. This is especially true in North and West Florida. In Central and South Florida, we rarely have cold enough to kill it before maturity. But in the north and west parts the yield of seed is often reduced substantially by frost.

(Exhibit of specimens.)

THE LYON VELVET BEAN.

The next is the Lyon velvet bean. This is a Philippine bean, brought in some years ago, and has been pretty thoroughly distributed throughout the State. In some sections it is grown to a considerable extent. This also has its disadvantages. It matures about the same time as the speckled velvet bean, requiring about six months to get an average crop. The pods shatter pretty badly in the field, so that if grown for cattle pasture there is a good deal of waste. If grown for hogs, of course they will gather up the beans more or less from the soil, but cattle will not do that. Probably both beans suffer to about the same extent from caterpillars, and the yield per acre is about the same for the Lyon and the speckled velvet bean. (Exhibit.) We have tried seed of the white velvet bean a number of times, but I have not found any white velvet beans that would come true to color.

D. R. MCQUARRIE. Some people have advertised white velvet bean seed.

J. M. SCOTT. One of the large seed houses advertised white velvet beans and I sent for some, but when it came it was seed of the Lyon velvet bean.

The yield of vine and seed per acre is practically the same in both Velvet and Lyon. Some people think the Lyon

bean matures ten days earlier, but we have found very little difference on the station farm, after five years testing. We generally find more green pods on the Lyon bean at the first frost than we do on the velvet.

THE CHINESE VELVET BEAN.

The next is the Chinese velvet bean, probably known to some of you. In general appearance the pods resemble those of the Lyon velvet bean, excepting they are a little longer and a trifle broader. Both resemble the Florida velvet bean while growing in the field, but if you have the Lyon, the Florida and the Chinese all growing side by side you will be able to distinguish the difference distinctly. It is hard to describe, but quite noticeable if you have the three together. The Chinese makes a larger leaf and vine than the others. The Chinese are a different shade of green, a little darker and ranker looking. The yield per acre is about the same as the others. It has the advantage in that it matures three weeks or a month earlier. There is quite a little difference in the color of the pod. The Chinese is darker in color, and the pods are, as a rule, larger than the Lyon. The Lyon grows into larger bunches, and does not give off the irritating dust given by the Florida (speckled.)

Now about the bad habits of the Chinese. It matures earlier, but it has the same bad habit of the pod shattering in the field soon after it ripens, and unless gathered very shortly after maturity there will be a great deal of waste in the field, unless pastured by hogs. The time of maturity depends upon when they are planted. If planted in April they will mature during September; they make more vine than either the Lyon or Florida. The velvet bean does not seem to know when to quit growing. The Chinese matures early in the fall and quits putting on new growth. We noticed this year and last that the Chinese was not so much affected by the caterpillars as the Florida, probably because the foliage was older and tougher, and the caterpillars take the most tender growth they can find. In the latitude of Gainesville the Chinese should not be planted later than the middle of June. You would not get the yield of seed per acre that you would if planted in March or April, but you would get some seed.

It could be used as a cover crop, to follow oats, if you plant late in May; this would be time enough for a fairly good crop.

YOKOHAMA VELVET BEAN.

Here is the Yokohama bean, which I believe most of you know something about. It is a little different from either the Chinese or Lyon. It is easier to distinguish between the Yokohama and the Lyon than between the Chinese and Lyon. There is quite a difference in the pod. The Yokohama pod is more covered with a hairy growth than either the Chinese or velvet. It matures much earlier than the others, ripening most of the seed in about 120 days. It makes very little growth of vine, about like vining cowpeas. We had it planted in 2 1-2 or 3 ft. rows and it barely covered the ground. Probably it does not yield as much seed per acre as either of the others. There is another difference in that it produces nearly all of the pods near the base of the plant, very few being produced out on the vine away from the main plant. We planted it with corn and it was almost choked out, but sown with sorghum it makes a pretty good hay crop. It would probably be pretty green when the sorghum was ready to cut. The Yokohama also has the bad habit of the pods shattering badly. It matures early and you get a fall crop for feeding much earlier than any of the other varieties mentioned. Planted in March, they would come along in July. You can almost get two crops in one year under favorable conditions. Another point in its favor is that coming in early it gets ahead of the caterpillars, which hardly ever appear until early in September. By that time the Yokohama bean, if planted in the spring, is about mature and out of the way.

Q. How do they compare as soil builders?

J. M. SCOTT. I should say for the same amount of growth, they are about the same. The larger the growth of vine, the greater the amount of nitrogen gathered. I think there is no difference in their ability to gather nitrogen, ton for ton of vine. So far as I know there is practically no difference in feeding value.

D. C. GEIGER. I would like to say one thing about the Yokohama and Chinese velvet beans. The Yokohama has met with some disfavor on account of maturing in the wet season. It will produce a very good crop and very satisfactory if properly managed so it can be harvested before the wet season damages it. But with the Chinese velvet bean, my opinion is that in quite a number of ways it is going to prove more satisfactory. It makes a fine growth and matures in October, our most favorable month. * * * My opinion is that with average weather and circumstances it is going to prove one of the most satisfactory of all of the velvet beans, and I believe it would be advisable for every farmer to plant Chinese velvet beans.

J. M. SCOTT. With regard to the difference in soil building, I suppose the Chinese will make more growth per acre and no doubt gather correspondingly more nitrogen. I think Mr. Geiger quite right in his opinion. The Yokohama probably comes in too early to begin

feeding stock for market, and it is earlier than you want to get hogs ready for market. So the Chinese comes early enough in the fall to supply the feed we want.

R. T. KELLEY. When do you advise planting to get them in the fall?

J. M. SCOTT. I should say the middle of April. You will find as a rule the early plantings will mature more seed per acre than the late plantings. It has been tried on practically all kinds of land. I do not know the results on muck land. So far as I know, most people that I have heard from seem to think more of the Chinese than of the velvet.

S. W. HIATT. What is the average yield?

J. M. SCOTT. Twenty to twenty-five bushels to the acre of cleaned seed.

M. C. GARDNER. I had some planted of it, but I believe the old Florida velvet bean right out on poor land made more than the Chinese bean. Take it in good fertile ground I think the Chinese may be better.

J. M. SCOTT. There is probably no crop but is subject to a certain amount of criticism. * * It has been said against the Chinese velvet bean that it wears out the cow's teeth. I suppose it does, but the same thing is true of hard, flinty corn. Any cow is likely to have her teeth worn off if she chews velvet beans and wire grass.

W. L. WATSON. What is the best method for threshing, without machinery?

J. M. SCOTT. I believe, to use a flail. Then I think you will find it takes some time to thresh them out. But put a few in a bag at a time and you can thresh out a good many in a day. There are a good many machines on the market, varying in price and varying in size. Just which is the best I would not want to say.

(Some discussion of prices.)

W. E. BROWN. You can get a small one for \$25. I don't know the make.

D. R. MCQUARRIE. There is one made by the Red Ripper Hay-press Co. At first he did not get it started up, but when he did get it going it did a good job. It shelled about thirty bushels a day.

T. Z. ATKESON. The Star Pea Huller people have one made in Chattanooga, I think, that will thresh about 100 bushels a day. It costs about \$100. The man who had it tried lots of different kinds. One objection he found to the smaller and cheaper ones was that the lighter machinery could not withstand the strain of the tough velvet beans. Take a light huller, and put on a two or three-horse power gas engine, and you are going to shake something loose. This man tried out half a dozen, and every time he had a new one I went round to see it. I tried most of them, and I think it is practically impossible to get good results from a machine run by hand power. The one he has now is run by electricity. A four-horse power gas engine will run it satisfactorily.

Q. If velvet beans are allowed to run up on corn will the yield be greater?

J. M. SCOTT. If you plant corn in alternate rows the yield will be nearly the same as when beans are planted 4 ft. apart. It is almost impossible to harvest the corn. Of course if the rows are 8 ft. apart you do not expect as much corn as when the rows are 4 ft. apart.

S. W. HIATT. What difference in food value is there between crushed and whole beans?

J. M. SCOTT. As far as I know there are no published data. My observation has been that the velvet bean seed is pretty easily digested by cattle, and whether it would pay to grind it or not I cannot say.

D. R. MCQUARRIE. Some of the farmers are feeding ground corn and are very well satisfied with the results. I have found by actual experience that we could do as much work on 200 bushels ground as on 300 bushels whole.

J. M. SCOTT. With regard to grinding food for stock, I might mention that it depends a great deal upon the value of the product. When corn was cheap it was not profitable to grind it for feed, but as corn got more expensive, grinding became more profitable under certain conditions. No doubt with some classes of live stock it would pay to feed crushed velvet beans; I say crushed rather than ground.

T. Z. ATKESON. I know a man who runs a mill; he buys corn all around. I make this suggestion for what it is worth. Of course buying ordinary corn, he got a lot of nubbin corn, and he ground it with velvet beans, and sold it locally for cow food. It was used by everybody who could get it. He sold it for less than cotton-seed meal.

J. M. SCOTT. Velvet-bean hulls are selling for \$12 a ton; I would rather have them for feed than cotton-seed hulls. Cotton-seed hulls are \$16 to \$18. There is really more food value in velvet-bean hulls than in cotton-seed hulls.

VELVET BEAN HYBRIDS.

We have been doing some breeding with the velvet bean and we have gotten a good many hybrids, and we have three worth bringing before you. This is No. 515 (exhibit). It has a good deal larger seed than either the velvet or Lyon or Chinese. It is from a cross between the Florida velvet bean and the Lyon bean. This particular hybrid matures probably two weeks earlier than the old Florida velvet. We have not grown it enough yet to get much idea as to the yield per acre, but it appears to be as good as the velvet or the Lyon. Like the Lyon and Chinese, it shatters its pods.

Here is another hybrid, No. 297. It resembles the other somewhat, though not quite as dark in color, but the pod is quite different—it is larger and has more velvet on it. It is a great deal more like the ordinary speckled velvet bean. Its pods too shatter. This matures about a month earlier than the Florida velvet bean, about the same as the Chinese.

Here is one more, No. 216 (exhibit). This ripens at the same time as the Yokohama, about 120 days from planting. It is easily distinguished as it is lighter in color, the pod is not quite as large, and it is a little different shape. It is quite different from No. 297. * * * * It does not make as much growth of vine—a little more than the Yokohama, but not nearly as much as the old Florida velvet bean does.

P. H. ROLFS. One important consideration in favor of the velvet beans, is that they are strongly resistant to root knot, which is not the case with cowpeas. So we have the great advantage in using velvet beans, that they eliminate root-knot from the field, while the cowpeas propagate it.

Another point is that we can use arsenate of lead as a spray for killing the velvet bean caterpillar. The formula is published in one of our Press Bulletins. Remember this next summer when the caterpillars come on.

I would advise you to plant the seed you are getting of these hybrids at your home place. This will enable you to report on these from personal experience.

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