

Agriculture Lectures

By Dr. Carey Reams

As we gather here to study more about nature, not how to force nature, but how to co-operate with nature. Try to recall as much as you can from the course fore and apply it and co-ordinate it with this course so it will be easier for you. You know education is two different things. One is to know, the other is to use. A lot of people know, but can't use, they know but can't do it. So what we need to do is learn to use the knowledge that we have and let God supply the wisdom. Wisdom comes from God, not man. Knowledge, learning, education, book reports and ideas came from man, but wisdom comes from God. Wisdom is the way you use knowledge, regardless of how you learn it. So wisdom is the way you tackle a job to get the most done in the shortest length of time. What you do, is to do it permanently. So as we learn to work together and learn to co-operate with nature, it is then that we begin to get results. I do not know of any thing that is more productive over the years than to be farmer. But one of the things we're going to discuss here is to learn to take the "beat" out of farming. Farming can beat you into the ground, it can whip you, knock you out or you can handle it with the greatest of ease.

One of the greatest mistakes that farmers make is this, they try to do everything themselves. You know, as long as you can hire somebody to do your work and you can use your brain, you are far ahead of trying to do everything yourself. Now if a farmer only has 5-10 acres or something like that, that is different. But if you are really in production, then you need a lot of help. But also remember this, you can produce many times more on 5 or 10 acres of certain crops, well taken care of, than you can on 40-50 acres, half done or trying to do it all yourself. The more congested your farming program is, the more labor it is going to take to keep it. The more you spread yourself out, the less labor it's going to take and the less your production is going to be. Supply and demand is what counts. Try to do what you do really well and be prepared. That's a Boy Scout motto, "Be Prepared," be prepared for any situation you might be caught in. Be prepared to handle that situation. It is only those things that confront you that you are not prepared to handle that are the cause of failure. Who is to blame? You. You have nobody to blame, just you, you blame anybody and everybody but yourself and you did not make

preparation for the inevitable, for the things you think haven't happened or won't happen. Now there are certain things you cannot prepare for, that you cannot do, i.e. Earthquakes, acts of war, vandalism. You cannot prepare for those things or floods. I don't count a 12 inch rain a flood, but I'm talking about when you have about 10 times as much rain or an ocean tidal wave or a river changes course or a dam breaks. Those I call a flood. Just an ordinary 12 inch rain is something to be expected. But what I'm trying to say is, prepare for that. And in preparing for that, you are getting mighty close to your Maker and your God. Be prepared to handle the inevitable and as you handle those situations, you are progressing.

You hear a lot about "Progressive Farming" and there is much to be desired in the progressive field. But one of the great mistakes farmers make is this. They make some money on a crop one year; they really do well on it, then you know what they do the next year? They plant twice as much. You know what happens? Everybody else does the same thing. If you really want to make money farming, plant the thing that everybody lost money on this year, because they're not going to plant it next year and you will be in. Get the idea? That is wisdom. I'm not talking about the citrus grower who grows citrus every year, or the peach grower. Naturally he's got to produce peaches. I'm talking about general crop farming, unless you are farming under contract, which is good business too, under certain circumstances. But be prepared to handle any situation. And whenever you do, get your guidance from the Lord Jesus Christ. He will guide you correctly.

When I was a boy of 14, my Father had a packing house. Whenever the Citrus market busted, in other words went to zero, where you couldn't sell fruit, he shipped as much as he could ship on a "busted" market, because when it got to market the bust was all over. He made money when everybody else failed because he shipped when the market was glutted. Remember this, a flooded market only lasts anywhere from 7-14 days. That's the length of a flooded market, 7-14 days and it's all over. I'm talking about perishables now like citrus, apples, and peaches. Peaches not even that long, peaches only 7 days. So you use your head, God gave you a brain, do not be washed by the tide, jumping from point to point. Plan your crops, plan what you do under every circumstance, i.e. when good drivers learned to drive, they planned what to do and go over it and rehearse it and rehearse it, so if that situation ever exists, he'd know exactly

what to do. And that is the same way with pilots. They take them thru the mill, to know any situation that would ever happen, so they'd know exactly what to do. This is self discipline, self training. Also, learning to farm is learning to prepare for the inevitable. Don't plan on everything being rosy all the way. Plan on the worst year you've ever had, while most farmers plan on the best year they've ever had. Plan as if it is going to be the worst year you're ever going to have in your whole life. Make preparation for it, for every terrible thing that can happen to you. Then you know what will happen? You will not be disappointed, because you will have prepared yourself for that situation. Prepare yourself for the inevitable and if we do that then we learn we can handle the situations that are before us. Whenever other farmers are panicky and you see "For Sale" signs on their farm and they mean it is for sale, they are quitting because the farm has licked them. They did not prepare for the inevitable. I also suggest too that the more successful you are, that you have a "For Sale" sign on you farm too. Keep it up there, it's very good bluff for Income Tax purposes. But the thing about that is, when you find some nut that wants to buy it, your wife will refuse to sign the papers. That's something between you and her. She refuses to sign the papers, so consequently you are in and the "For Sale" sign stays up. Very good practice. I'm telling you to use your head. You know, some of the most successful farmers I know have the farms for sale, but they've never sold them. Their wife never signs the papers. Be careful with the Real Estate man, because you have to pay him a commission. Do your own selling. If you really mean business and want to sell, do not put it under a Real Estate man, because if he sells it your wife refuses to sign the papers, he can sue you for his commission in some states and collect it. So just don't get caught in the trap. These are things that you can do and it's not wrong to do them. It is right to do them. It is no harm to spoil the Egyptian, so the Jewish people say. No harm to deceive the enemy. In other words you are supposed to deceive you enemy if you can. Because all is fair, in love and war. And the thing about it is, if you're true to yourself and true to your God and be fair to all men. And if you make an agreement with someone, stick to it, live your part to the Nth degree, regardless of what I cost you. Don't back out, be a man of your word. And God will bless your mistakes. If He didn't bless our mistakes, I don't know what would happen. But be a man of your word, let your word be your contract. And when you do, God will do the rest.

The last thing I have to say is this too. Give a tithe of your profits to the Lord. And He will open the windows of heaven and pour out a blessing so great, that you cannot count it. He says He will even keep the moth and the grasshopper from destroying your crops, if you will do it. Now, I have never known anyone that tithed, that didn't prosper, even the sinners. I've known sinners that absolutely claimed no religion at all, they didn't deny it either. They never went to church or anything else, but they tithed, and they became very wealthy. That is one promise that's made both to sinners and saints alike who give a tithe of their income. I'm not telling you where to give it, ask God where to give your tithe.

I want to tell you one story that happened. I was doing an engineering job. The way we got this job was, this man had a little saloon and bar and lunch counter in a small town and his Uncle had died and left him a fernery. A Coco-Fermosis Asparagus Fernery and he did not know what to do with it. He didn't know a thing in the world about it. So he hired our engineering firm to guide him and teach him how to make this fernery profitable. We were guiding him from month to month, year to year. After I'd been servicing him a few months, I'd always go into his office and place a business, this little saloon and bar where they sold beer and wine and where they drank it at the counter, etc. One time I went in there and I asked, "Is there anything I can do for you?" "Yes," he said, "Tell me how to make a million dollars." And there were half a dozen or so fellows in there, maybe 7 or 8, drinking beer. And I said, there's no use to tell you, you won't do it. He said, "I hired you to teach my Superintendent how to run that fernery, have I done everything you said?" I said, "Yes, you did." He said, "If you tell me how to make a million dollars, I'll do it." I said, "Well, you've asked for it and it was your idea not mine. But, I said, "If you want to make a million dollars, pay your debts." And his face got as red as a beet. He said, "Do I owe you anything?" I said, "No sir." He said, "You tell me one person I owe and I'll pay them." I said you owe the Lord Jesus Christ a tithe of your income and you've never given him a nickel. Consequently you have nothing and you're going to have a hard life." His wife was there and she said, "Richard, I've been telling you we ought to do something." "Well," he says, "Every preacher comes in here, points his finger at my nose and tells me I'm going straight to hell. I know that, but I don't want them telling me and I wouldn't give them a nickel." I said, "I haven't told you

where you were going, because I don't know, but I know one thing, if you want to make a million dollars, you tithe." You know what happened? I looked down there and all those fellows were all gone and the beers were still there, some of them hadn't even touched them. They were all gone, completely gone. So I went out and next month I came in and the moment I walked in his wife said, "My husband wants to see you in the office." So I went upstairs to his office and he met me at the door with a clear box in his hand. And I said, is it a boy or girl? "Neither," he said, "it's my tithe." He said, "Listen, I'm going to tithe just like you said, I'm going to do what you said, I'm going to tithe. I want you to give this money to the Lord, I can't find Him." So I took it and give it to a religious institution and school. And they sent him receipts for months and months and months. But when that money was counted, I was amazed at how much was in there. It was quite a bit. After a few months of tithing, he said to me one day, "You know, I'm sick of seeing these gluttons come in here and sip their beer. What do you suggest that I do?" Well at that time Publix Markets were spreading widely thru the state of Florida. I said this town could use a Publix Market, why don't you put in one and get a Franchise? Sell this business. Well, liquor licenses in town bring \$40,000 and up, just to buy them, because you can only have just so many according to the population in Florida. So he did, and he got the franchise and he has a very highly successful Publix Market in that area. Then after a few more months he said, "I've done what you said and I'll agree that I'm prospering, but we're unhappy because we feel like the Lord wants to use us but we don't know where." I said, go into your churches one by one by one, until you find your niche. Find your quarter where God wants you. And you know, he found it in the Episcopal Church there, a wonderful church there. A wonderful saint, a wonderful leader of God. I'm not preaching any denomination because in other cities it's Baptists, others it's Methodists, in some it's Catholics and some this, that and the other. I'm not talking about denominations. But you know, he's a very, very, wealthy man today because he tithed. What I'm recommending highly is that you give unto God a Tithe and He will open the windows. You can find that in Malachi 3, read it and prosper and may God bless you thru this course, Prayer.

I'm going to enter this class without knowing very much about the first course, so I'm going to ask some questions, about the first course that we took. First question – How many square feet are there in an acre?

A – 43,560 square feet.

Why is that important to know that?

A – How much fertilizer to put on.

Is that all? That's very good, that's true, but is that the only reason?

A – You can't figure your energy without it.

Can't figure energy without it and what else? You want to know what your yield is going to be. This is the purpose of farming. Is the yield – you want to know what the yield is going to be. How many gallons of water does it take to cover an acre one inch deep? Somebody says 100 tons – we'll figure it out. I've never figured it out in tons, but we'll figure it out in a few minutes.

R – A gallon is 8 pounds?

Yes, and how many gallons of water does it take to cover an acre one inch deep? You've forgotten it? It's 27,500 gallons. Multiply that by 8 and see how much you have.

R – 220,000 lbs.

That's right – yes, to cover an acre one inch deep. Now I'm not talking about one inch in the soil, I'm talking about like you had a vat now. Approximately half that number would wet the soil one inch deep. That's probably what he was talking about when he said 100,000 gallons.

R – He said 100 tons.

Well, let's see, you're pretty close to it. I was thinking 100,000 I had in my mind, thank you for helping me. What is it in the soil that causes soil compaction? I'm not asking what breaks it, I'm asking what causes it?

A – Is it nitrogen?

No, something in nitrogen though. Sodium, it's sodium in the soil that causes soil compaction. Now, how do you break this soil compaction? Have you ever seen a field plowed in great big clods? Turned over and it rains and rains and it's still in clods? That's high sodium content. Now how do you break this soil compaction? What breaks it up?

A – Soft rock phosphate

Soft rock phosphate, that is correct. Not baking soda, but baking powder, crude baking powder or calphos. That is your soft rock phosphate. That crumbles it, that is right. What else does the soft rock phosphate do to the soil? I'm not speaking nutrition wise now, but what else does it do?

A – Determines the fruit sizes?

Yes, but I didn't say in the fruit, I said in the soil.

A – Breaks down the organic matter.

Not directly, actually it does one more thing besides causing or keeping the soil from being compacted, pulverizes it. But there's one more thing it does, what is that?

A – Holds moisture.

It holds moisture, but what is it about it that holds moisture?

A – Carbon?

Carbon is the governor for water yes, but what is it about the phosphate? It forms protoplasm that's right. It forms protoplasm in the soil. What is protoplasm?

A – The material in a cell, I always understood.

Well, some of it is in a cell, but what is the meaning? A very fine sticky substance is the meaning of protoplasm, gummy, gluten so to speak. What is the advantage of having the protoplasm in the soil?

A – To hold the nutrients.

Yes, can you think of anything that would take the nutrients out of the soil besides the crop you're growing? Rain is one and what else? Two more, what are they? Right, sun and air take it out. What do we call this air that takes it out? Wind, plain wind.

Haven't you seen the dust blowing off a field? I mean a regular dust storm with just a 15-20 mph wind, not 100 mph like you have on a desert. But I have seen fields where we were engineering, I don't mean small fields, but large fields. In March and April when the wind was just blowing a gale, 25-35 mph. The field that we were servicing, not a bit of dust was on it, except what blew in from other fields. But the rest of them were a regular dust storm. Now why wasn't that dust blowing off that field? Protoplasm in the soil would keep the soil from blowing away. Do you realize that the dust that is blowing away is the nutrients you've applied to that field? It's the very nutrient you've applied to that field. That is why we need to know about the soil

chemistry that we have studied in the last course. That is all in review. If you'll go back and read your notes, you'll find some of, maybe in different words, but it is in there. What is the minimum amount of APA (available phosphate per acre) that soil should contain?

A – 400 lbs. per acre.

Of what?

A – Phosphorus.

Phosphate, not phosphorus, but phosphate. There is a difference in phosphorus and phosphate. 400 lbs. per acre. How much calcium should there be per acre?

A – 1,800 lbs.

About 1,800 to 2,000 is correct. Which should be applied first?

A – Phosphate

Why phosphate first?

A – It helps to hold the rest of the nutrients down.

That's right, it forms a chewing gum in there, a sticky substance, to hold the other nutrients. Then what is the next step? After you have the phosphate and calcium on?

What is the next thing you should try to get on?

A – Potash, then chicken manure.

That's right. Anybody run into any problem in your soil testing or soil problems?

Or into any of the things you need to know about? Yes?

Q – If you want to grow Alfalfa and you have 500 lbs. per acre of potassium, you also need calcium, is it alright to put on gypsum or will the gypsum bring the potassium level lower?

A – Gypsum is calcium.

Q – Right, a source of calcium, but does it bring the potassium?

A – No, it just brings it into ratio. How much calcium do you have per acre?

R – 2,000 lbs. per acre.

And that's your total of TDN of calcium? How much have you got to apply?

R – You recommended 8,000 didn't you?

That's right, but you can't do it all the first year. You have to apply it in degrees. In other words I would get it to 4,000 the first year, 6-7,000 the next and 8-8,500 and even 9,000. If you will evaluate your soil by what you've got left over after the crop, it'll

mean a lot more to you than trying to figure out what you've got before you plant your crop. However, you've got to do both. Are there any other questions now?

Q – What about the 500 lbs. per acre of potassium, is there some way to bring that down?

A – No, just don't bring it down. Just wait, it'll drop in line in time. This is some of the problems that you run into. Sometimes it takes 2-3 years to build it up.

Q – Does a quick change in soil applied nutrients, make a quick change in soil chemistry?

A – Not at all. So it takes sometimes 2-3 years to bring these things into place. Don't try to get rid of it, don't try to bring it down, but just don't apply any more. Just don't be caught applying what you've got too much of.

You know, that is one of the greatest causes of failure. The farmer is buying stuff he's already got too much of and not buying things he doesn't have enough of, because he doesn't know. Do you know the greatest cause of farm failures? Ignorance, Ignorance is the greatest enemy progress ever had, it really is. You know what the Bible says about ignorant people? It says, "Let him who is ignorant, be ignorant still." When a person wants to know they will ask. It is nice to preach, but there's only a very few that listen that really want to change, a very few. So the best way in the world I know to get a point across to the public is to really set yourself up a set of standards to live by. I'm not talking about a set of standards that you are going to run your farm by for a year or two years or five years. It is excellent to work out a 2-3 year goal. You may not reach it, but, it's a goal you work towards, diligently. And slowly, bit by bit you will accomplish it. But the more you accomplish, the bigger hurry you'll get, and the slower it seems. And you know time passes the slowest when you're waiting for a train or plane! Time just drags, and drags. You know why? Because you have nothing to do. You know a busy man is always got something to do. He always has a bunch of problems to work out the next few weeks or months. And you get busy on a problem and the next thing you know you're going to have to catch the next plane because you've missed that one. You're so busy you forgot to get on the plane before it left. That's happened to me 2-3 times. I'd get there just the minute the gate was closing and they wouldn't open it any more and I had to catch the next plane, because I was busy. So this is the way to plan your farming, plan it detail by detail. And always plan for the worst thing in the world to happen to you. And if it does not happen to you, the Lord has blessed you.

Q – If you have an established stand of alfalfa and you need potassium, what form do

do you add?

A – If you followed all the rules, I'd add the sulfate of potash if I had to have it quickly. If not, I'd add sawdust or chicken litter. But you can count 90 days on that.

Remember, Alfalfa has the ability to take practically all its potash from the air. It needs very, very little. This is one time when the ratio of . . . Let me ask you a question, what is the ratio for grasses and alfalfa between the P_2O_5 and K?

R – You want 200 lbs. of potassium and 100 lbs of P_2O_5 ?

No, that's not what we said in the last lecture, first course. What is the ratio for grasses? Sugar cane? 4 to 1, 4 parts phosphate to 1 potash is for grasses. Did you ever take a leaf of alfalfa, sugar cane or corn and examine it closely and see little black dots in it? Have you noticed that or on the stem? Have you seen little black dots appear on the stem of alfalfa? Did you really look that close? That's too much potassium in the soil. How many have seen those little black dots? Have you noticed it on peach leaves, orange leaves, any crop?

We have a beautiful plant in our home, 20 years old now. It's a Defenbachia. But, one day a man came into our home smoking a cigarette and I didn't know he was smoking because he had it down. But the moment he sat down with the plant right beside him, I said, "No smoking is allowed in my home. He stamped it out and stuck it down in this pot of Defenbachia. You know it took 1 ½ years to get that potash out from that one cigarette, because the little tip ends of the leaf died, side of the leaf died. If I could've found where that cigarette was buried in there, I would have dug it out of there. That one cigarette in that plant, defiled that plant for 18 months before we could get it out of the leaves. Just one cigarette did that because that plant cannot stand potassium. It takes it from the air. So whenever you see the tip point of the leaf dead and crisp and dry on the side or little black dots on the leaf, that's too much potassium for the amount of P_2O_5 . Any questions now about your problems that you have? You better ask them now, because when you get home you'll think of them.

Q – Liquid fertilizer for foliar feeding?

A – We'll come to that in the lecture.

Q – If you can't get chicken manure, what do you get in its place?

A – Dr. Allen's' Compost. I just bought \$1,100 worth, 23 ¼ tons delivered yesterday. The freight on it was \$17 a ton and I think it was \$50 some odd a ton. I don't

remember exactly. The bill was somewhere around 11-12 hundred.

Q – Can you point out anything that is particularly wrong with these? I know they're deficient in manganese.

A – It's deficient in everything. It's light as a feather. Calcium – this ear of corn should weigh 1 ¼ lbs. and it weights about 7 oz. Pass it around and feel it.

R – I know my land is very deficient. I'm trying to build it up.

Calcium, manganese, and iron deficiency. There is no mineral in the sweet potato here, it's as light as a cork. Also, there's too much sulfur in this ground and when there's too much sulfur it rots. This is Black Rot and lack of calcium in the soil is what causes it and there's too much sulfur there. So this is an example of what happens to potatoes. Too much calcium on Irish Potatoes will cause them to have scales, look like scales on it. On potatoes you need to do 2 things. You need to have a certain amount of sulfates from super phosphate but you also need certain amount of calcium. What would cause Black Heart in potatoes?

A – Boron deficiency.

Boron deficiency causes Black Heart and it also causes them to split open in there. What causes the cabbage or lettuce when you cut it off at the ground to have a hole in the bottom?

A – Boron deficiency.

What is the best way to get boron onto your fields?

A – Chicken manure.

Chicken manure is very rich in boron – yes. We're going to learn how to put it on in sprays a little later. But these are factors I want you to have just at your fingertips. So ground yourself in them, go over and over and over those first tests, because you've got to learn the theory of it deep within. Drive it in to know it. Farming is much easier than the medical course because in farming you're dealing in hundreds of pounds and tons and acres, where in people you are dealing with parts per billion and parts per million and thousands of parts much more delicate. But you are going to learn as you work with people and so forth, to link the nutritional foods with your diet and this is the purpose of agriculture for human nutrition. Are there any other questions or problems you've run into?

Q – If you find the agricultural lime in the area is up to the dolomite strain, would you

use the dolomite?

A – Don't use it.

Q – Where do you go from there. . what?

A – Well, if you can not get it from you area, you may have to have it shipped in from Florida or somewhere else. Just don't use it.

R – Know the amount of magnesium in the dolomite! Ask them..

There are 2 reasons why they won't tell you. One is that they don't know and second, if they do know they won't tell you. There are lots of places you can get lime from, but I'd suggest whoever you get it from has an analysis on it or I would get a few pounds and have an analysis made. You can have an analysis made for around \$15-25. And if you're going to use very much of it, it is well worth it. They do it with a Spectrometer or a Flame Photometer, either one. It is money well spent. Or if you have an Experiment Station and you take it there and ask them to do it. They're duty bound to do it for you, or they're supposed to. And stand there and watch them, it only takes 15 minutes and costs them 3¢. But it is worthless as far as you TDN, but it will tell you your magnesium. If it has over 2% magnesium in it, don't use it.

Q – Can we run that test on the lime?

A – Yes, you can, but you're going to need about \$60 more equipment. It isn't worth it. Just ask the person who is selling lime, he has an analysis on it. Tell him you want Agricultural lime –calcium carbonate or calcium oxide or basic slag. You who can get basic slag from the iron mills, it is an excellent product, even the before basic slag was. It was magnesium. It's perfectly alright to us it, because the heat of the iron destroyed it and it gets red hot, burns the magnesium out of it. Or burnt lime, anytime you burn lime, you burn the magnesium out of it, so you have nothing to fear in that.

Any other questions now on the first course? This is a review of the first course.

Q – They have a lime plant in our area of Georgia, are you familiar with that?

A – No, I'm not familiar with that one, but ask them for an analysis of it, they have it.

Q – What would be the best way to direct that down to start with, setting out a new orchard?

A – Just like you would for anything else. The greatest thing to do in putting out an orchard is to put your nutrients from tree trunk to tree trunk. Do not try to take the food to the young plants. Put it out there and let them go get it. Remember my telling you the story about the watermelon that went 100 feet in the wrong direction? To get its food?

Q – On the calcium test, the highest number was 2,800 on the chart and on the alfalfa

you recommend 8,000. How do I figure that?

A – Would somebody tell him? By dilution, multiply by 2 or 3 or 4 according to you dilution. How would you dilute? Tell me exactly how would you dilute it, what would you do?

R – You would add more Reagent #2 and put twice as much or 3 times as much.

Add more Reagent #2 and then what? How much more would you add?

R – Well, you can put twice as much in or 4 times as much in whatever you want.

How many drops of the extract solution, that has your soil nutrient in it? How much would you add? Same amount? How much is that?

R – Five drops I think to one drop of the oxalate.

Who will tell me? Who'll tell us how to do it now?

R – Put one drop of soil extract solution to 6 drops of calcium test solution.

That's right, exactly. Now suppose you want to dilute it, it was still more milky than your highest number, the 2,800 that's on your chart. How many would you add? What would you do next?

R – Then you'd add 12 drops to one drop of soil solution.

That's right, and then what would you do?

R – Read it,

No you wouldn't either, there's something else you've got to do first. What would you do next? You take 6 drops out of there and put in another vial. You can only read it 7 drops deep. But suppose it was still too dark, then what would you do?

R – Do it again.

No you wouldn't. What would you do next? You'd have to start all over again or else pour that back into the other one and add 6 more drops to the same thing and then shake it up and then take 6 drops out and then multiply it by what?

R – Multiply by 3 then.

That's right, multiply by 3, but don't just add 6 more drops to that one. If you do you'd have to multiply. Now suppose you did that, you took the 6 drops and add 6 more, then what would you multiply by?

R – Four?

No. Is it 4 or 8? I have to figure that out myself. I believe it's 8. it is 8. Multiply by 8. so the best way is to pour your solution back over and add 6 more, multiply by 3 then you won't get confused. But you'd have to multiply by 8 or you'll really have a problem.

Q – Now you've got me confused, because our original instructions were to put 5 drops of the filtrate, after you filter the soil thru the filter paper. Five drops of that solution in the little calcium tube and one drop of the oxalate. Is that right now?

A – Six I believe.

Q – Well it was 5 when we were taking the course?

A – O.K. use 5 then.

R – Well that's what you've got me confused on.

Use 5 then.

Q – And one drop of oxalate?

A – O.K. 5 then. There is another test we use 6 in but this one is 5. Thank you. I haven't reviewed these thing in 40 years until the last course and I was going by the book that day. Either one would help you but 5 is better. Any other questions?

Q – Change our notes then to 5?

A – Yes. Any other questions?

Q – If you're applying your chicken manure to your soil, would it make any difference in The amounts you put on for corn, peanuts or soybeans?

A – No it doesn't. just put down what you can afford. If you're using the litter, use about 4 tons to the acre, but if it's cage manure, one ton to the acre or ton and a half to the acre. I'm talking about the dry or comparatively dry that stacks up under the cages. That's called dry. It isn't dry, but it's called dry.

Q – And one ton of that per acre?

A – Ton to a ton and a half, that is if you can get it down that thinly. That depends on your distributor.

Q – We have applied some and I think we can adjust it to whatever amount.

A – A ton to a ton and a half to the acre is very, very good, but 2 tons wouldn't hurt you at all.

On all orchards and groves, remember this rule: Never, never, never disc it (chicken manure) in. It must be kept on top of the ground.

Q – You're speaking of actual chicken manure, but when you are getting broiler manure That has the shavings in it you could use more correct?

A – That's right. Broiler manure or floor bird manure is only about 25% manure and 75% shavings. That's a pretty good rule of thumb.

Q – You're caught between a rock and a hard place if you don't disc it in, the sun takes the value out of it?

A – Not the chicken manure it doesn't. Only after it's composted, the sun does not destroy the nutrient of manures, but it does of compost. What is the difference in a compost and a manure?

R – Bacteria.

There's a whole lot more to it than that, give us the whole story.

R – Bacteria breaks the manures down and it would be in comparison between milk to grass and grass to milk

Decompose, that is the word, decomposed manures. Approximately what is the loss between the raw manure and the compost? How much loss is there generally in weight? I'm talking about zero percent moisture both times. How much loss is there between the raw manure and the compost with zero percent moisture? About 50% weight wise. It increases in value.

Q – Do you recommend putting calphos with manures to keep the nitrogen from leaching?

A – Yes.

Q – Like a farmer has manure and he puts calphos with it?

A – Right. Also, what is primary benefit of adding compost over adding raw manures whenever you disc them in?

Q – Would you repeat that again?

What is the primary benefit of adding compost over manures whenever you disc them in or plow them under.

R – It is immediately available.

That's one thing, but what is the something else I'm trying to get across to you? It doesn't burn the plants. The raw manure creates a heat in the soil. If you have a dry year what happens? It releases too much moisture and you're really suffering from a drought. But compost does just the opposite, it draws the moisture from the air and holds it in the ground. How does it do that? The carbon content, it's not going thru a heat, actually it cools the soil. What form is the nitrogen in the compost? Ammoniacal nitrogen and what does it do to the soil? Not only warms, but cools. It controls the temperature. How does it do that?

R – By refrigeration.

Yes, in other words when you heat ammonia it freezes, when you freeze it, it boils, it's a contrary substance. If it wasn't true you couldn't use it for a refrigerant, do you realize that? That alone is worth everything you are paying for all the courses, just to know that one factor if you use it.

We picked beans up to 2 weeks before Thanksgiving right here in the mountains last year because we used that factor. And do you know where I had to go to get ammonium sulfate? Orlando, Florida. They don't even have it up here. Whenever I go into the fertilizer plant or the seed house here, they say, "What is it that you want that we haven't got this time? You're always asking for what we haven't got. So I know what I want and what the soil needs and I'm trying to teach you the same thing. To know what it needs.

Q – What does sawdust do to soil besides supply potassium?

A – Carbon

Carbon and one more thing, what else?

R – Potash

Yes, but what else?

R – If you have plenty of calcium it supplies energy.

It supplies energy, but there's one more factor I want you to get.

R – Sugar?

It's got a little bit of phosphate in it but not much. Just one more thing, what else does it do? It gives off CO₂ gas that helps to pulverize the soil. Now CO₂ gas is deadly to your aerobic bacteria because they are animals. What's going to happen to the aerobic bacteria if you have sawdust in your soil? This is a new question; I haven't discussed this one before. Let's see how well you use your head. What does it do? Have any idea? They're animals and have to breathe oxygen, but the sawdust gives off CO₂ gas, what happens?

R – Kills them

No, it doesn't

R – They multiply on it I would think.

They multiply on it, now why?

R – It's food for them.

No, CO₂ is not food for them.

R – I don't mean the CO₂ is food, the sawdust is food.

Yes, it's food to them, but it's also giving off CO₂ gas. What makes it give off CO₂ gas?

R – The bacteria.

The bacteria, right, now you've got it. But it bubbles, thru the soil. It makes little tiny air holes in there that oxygen goes down thru, because oxygen is heavier than CO₂ gas. Now this aerobic bacteria has something about it similar to what a fish does, it can take oxygen out of the water, out of the soil moisture. How does it do that?

R – Filters it, goes thru a separation in gills.

It's a one celled animal, how does it do it? By ionization, what's the course about? It's so easy and so simple it's difficult isn't it? Trying to make something hard out of it? It's just as easy because it's like a fish, it can take his oxygen out of the water thru his gill system. But this bacteria doesn't have any, so it does it by ionization. Anything hard about it? Now does anyone else have anymore questions about our review, because I'm about to finish it?

Q – What does sawdust give to the soil again? Potassium?

A – That's the main thing you put it down for is to supply the potash, but it's also a nutrient for the bacteria. It also has carbon which causes the soil to hold moisture. It also has many minor trace elements also, since the sawdust is an excellent thing, providing you have enough calcium in your soil, otherwise it will make it to acid.

Q – You're taking land that's 0-0-0 trace 0 and you're putting this on, first phosphate, calcium, potash, chicken manure in that order, then you should plow it in right?

A – Yes. That is for farm crops, but not on orchards or groves. Do not disc in any of the fertilizer. Leave it right on top of the ground.

One of the finest things you can grow in orchards is Bermuda grass. If you can't afford Bermuda grass, you can't afford the orchard. And then in the winter, sow rye in there.

Q – How about Kentucky Fescue?

A – It's very good too, but Bermuda grass is far different, because it is a legume and Kentucky Fescue isn't.

Q – Is it an annual or a perennial? (Bermuda)

A – It's an annual.

Q – You just keep sowing it?

A – Right on and on and on and on.

Q – What can you put in there that you don't have to sow again? Alfalfa? What can you sow in the orchards that you don't have to do anything with it except just mow?

A – In orchards, I wouldn't put alfalfa in there. Well, that all depends on where you are.

If you had an orange grove in south Florida that I used Napier grass on because of the large amount of tonnage that you get off it. You get your mineral high enough for Napier grass and you won't have to buy any fertilizer or sprays for 20 years. All you've got to do is mow, mow, and mow. But I'll tell you something, you'll have to mow every 10 days. Because you mow it off when it's a foot high and in 10 days it's waist deep. If you go 20 days you'll have trouble finding the trees even if they're 20 feet high. I'm telling you, wet, rain or shine, you've got to keep that machine going in there.

Q – What about Pennsylvania, what should you put in an orchard there?

A – Bermuda grass.

Q – Sow it every year?

A – No, you don't have to sow it every year. You just put it in there once and don't plow it up and it will stay. It'll come back the next year by itself.

In the winter, on all of your Bermudas, you should sow rye grass, winter rye grass so it'll get at least a foot and a half deep before the cold comes. Then when the cold comes, it'll lay it down in the snow and it won't kill the nodules. The germ of life in the Bermuda grass. Even if you planted it every year, it's cheap.

Q – Do you consider alfalfa a grass? You said a 4 to 1 P and K for grasses, do you consider alfalfa a grass?

A – Yes, sugar cane too is a grass. Corn is not a grass.

Q – This crop's taking so much material out of the soil. Suppose the crop takes out, say 50 lbs. of phosphorus out and your test showed 100 lbs. of phosphorus when you started. Does that automatically mean your next test would show you needed 50 lbs. of phosphorus?

A – Generally speaking when testing soil, at your very best you'll only pick up 70-72%. That's all you'll be able to pick up.

Because I've seen soil that was 0-0-0-0 and yet I saw grass out there growing. You know what I mean? It wasn't very good grass I'll grant you that, it was pretty poor grass. But it was growing there because it was getting only its moisture from the soil and

the rest of it, it was getting from the air. Also, I've seen soil that had 0-0-0-0 there and guavas growing beautifully by the thousands of bushels per acre. Not thousands, but for forty acres at least. I mean you couldn't put your foot on the ground for those guavas. Yet the soil was 0-0-0-0. Now, the guava tree has the ability to take all its nutrients from the air, just its moisture from the soil. But on average crops. With any soil testing system I know, that is anywhere near effective, if you can pick up 70-72% you'll do real well. You're working in ranges, so what you try to do is to keep it within these ranges. You will be quite deficient if there's no outside supply at all. You will go down, i.e. You remember the example I gave you on the citrus producing or taking off of that acre about 45-46 thousand pounds? What was the amount of solids that I gave you that you actually took off that acre? Do you remember? Or any other crop would be about the same.

R – Five ton?

No, it wasn't 5 ton. It was 5,000 lbs, about 22-25 hundred pounds of actual nutrients you take off the soil.

Q – How can you measure how much nutrient it's going to take out of the soil when it gets some of the nutrients out of the air?

A – You're not interested in how much it takes out of the air, care less about that. All you want to know about is how much you have to put back in the soil.

Q – The question I'm raising is, you say a crop of 100 bushel of corn takes out X amount of nutrients. You can tell by so much in that crop that's harvested. O.K., you say it took that much out of the soil? How can you say it took it all out of the soil when some of the nutrients come out of the air?

A – What you measured that comes out of the soil is what you measured when you put it in there and what you've got left over after the crop. You subtract what you've got left over after the crop and then you also subtract up to 25-33% from that. Because this is for an inaccuracy in your soil test.

This is the reason we actually use about twice as much, in the soil as needed, to keep it twice as high in order to be successful. But you don't try to do that the first year and the second year, but by the third year you should have it up there. And when it does, you're practically farming for no expense per acre in crops. Very, very little. You're not interested in how much it got out of the air. But if you'll dehydrate that down to an ash, in platinum tubes where you'll even have the gas that goes off of it still in the ash, you'll be amazed at where the rest comes from. You just can't imagine it being so much. As I told you about those tomato plants that I grew under a vacuum under glass and I

measured everything I started with and in the final analysis I had 80% more in this plant than I put into it to start with by actual measure. I was using both methods, the method I taught you and also the Flame Photometer method. But the Flame Photometer method was the one that actually showed me what the plant actually used. That's an actual test for measuring volume. But, it's worthless to know what to do, you cannot go by it, because it gives you totals and it doesn't tell you how much is water soluble. I wasn't interested in water soluble, I was interested in total gain.

Q – On our farm we've moved a forest back and we've cleared the land off. I want to put it into pasture, but it's on a hillside and there's no way possible I can plow that or disc it or anything. I was just figuring on sowing Kentucky in there. When do I fertilize it, before I sow?

A – Yes, I would, I'd get the ground ready first.

Q – How long would I have to wait?

A – On your phosphate you'd have to wait 2 weeks, the rest of it doesn't matter.

Q – We were bargaining under contract to buy chicken manure. And the owner of this manure was using it on his farm and he specified corn and he said he doesn't use any fertilizer, period, or additional nitrogen. Is it possible to grow a corn crop without using additional nitrogen?

A – Well I wouldn't know without an analysis, but somewhere he is getting nitrogen somehow. I don't know, I'd have to have an analysis. It is not possible to grow a crop of corn without having nitrogen in you soil. He adds chicken manure to his corn?

R – He owns the chicken farm

I know, but he add chicken manure to it?

R – He's added according to his report, he's added 6-8-10 tons of something per acre.

Then that will get the nitrogen from the air. Get your carbons up in your soil and your plants will take enough nitrogen out of the air. But you also have your carbons.

Name 3 sources of getting carbon into the soil?

R – Sawdust.

Sawdust is one, what's another one?

R – Grass roots.

Grass roots is another, or crop roots. What's the third one?

Q – What about your carbonates? Your lime?

A – Yes, but I was thinking of all of your carbonates, lime. It just goes in with the lime as

carbonates. These are factors that you need to know and use and measure.

How many of you ever heard corn growing?

R – They say you can, but I’ve never seen it.

Whenever that ground is right, you’ll hear corn growing. It’s like thousands of snaps (finger snaps) when you hear that corn growing. Just like snapping your fingers. Corn growing, that expansion is what you hear as it is growing. You should be able to hear corn growing.

Q – When is a good time to listen for that?

A – In an electric storm for instance. Just before the storm is an excellent time to hear it or you can hear it thru the night. I’ve heard it in the day time. Especially when there’s been a few days of no rain and then in comes a shower, couple of hours afterward, you can really hear it popping.

Q – You said that corn is not a grass, is sorghum a grass?

A – Yes.

Q – It is? What differentiates it?

A – Different frequency, yes. Corn is on a different frequency from you grasses. Actually it has a frequency all its own, but you have many, many different kinds of corn.

How many have ever seen some Egyptian corn? I’m going to try to get some seed of Egyptian corn. It doesn’t have an ear like this other corn, it grows on the tassel. On grain out on the end of the tassel. You can get anywhere from 1 lb to 1 ½ lbs. of these grains of corn off of this tassel. And that’s what it means when it says, Jesus plucked the corn and ate it. He plucked it off these tassels. A corn grain that grows on the tassel is called Egyptian Corn and they still grow it to this day in Egypt and Palestine, over there.

R – An Experiment Station is using this to see if it would work producing this type corn in the U.S. on the tassel, instead of the ear.

The only thing about it is that you can produce more on the ear, up to now, because I’ve seen 7 ears of big corn on one stalk. Seven 12-14 inch ears on one stalk on corn growing 12-14 feet high. You get corn that’s really got the nutrients in the soil to supply it and you can get up to 7 big ears off one stalk, but if it isn’t you may not get even one nugget. What determines the amount of yield in your crop?

R – Energy.

Energy is right, but where do you get this energy from?

R – Anions and cations.

Anions and cations is the origin, but where does the anions and cations come from that determines your yield? It comes from the basic 3 substances, NPK. Not NPK, but calcium PK. However, you must have an agent for ionizing the molecules to make it available to the plant. What is the agent that ionizes the molecule? Nitrogen is correct.

We're going to discuss at this time, leaf feeding. Actually we've got such a short length of time and so much to cover that we really can't do justice about the subject. But actually if we spent two days on nothing but the leaf itself, we'd have a chance maybe, to peek into the keyhole a little bit about how a leaf is made. I don't even have a chance at this time to go in to telling you how leaves are made, or how they feed, or how they work, so I'm going to just give you something that you're going to have to swallow, hook, line and sinker until you have time to take some leaves and study them. I'm going to use a term, stomata, a biological term which was used when I was studying Biology many, many years ago. I don't know whether it is still used today or not. Do they still use that today? It's still the term we use today. Stomata is the cellular structure of the lower part of the leaf. Out of this stomata there are very, very fine hairs. Some of them are so fine that if you actually touch the leaf it will feel smooth to you. There's also little antennas, so to speak, that come out of this stomata. It's the rough edges of the electrons in orbit, but they stack up in little stacks and become little antennas. Something like the taste buds on your tongue. Did you ever feel your tongue and then put your finger on a cats tongue and feel how hairy it feels? A cow too, Well, it's those rough little hairs like that I'm talking about that are on the bottom of this leaf called Stomata. Now all leaves have them and if you put them under a microscope you can see them Whenever you use nutritional sprays, it's only the sprays that you get on these little hairs under there that forms the outer lining of the stomata that really counts. What you put on the top of the leaf cannot get into the leaf. It's only what is on the bottom of the leaf. This nutritional spray must be able to stick onto the leaf and if the droplets are too large, they cannot stick to the leaf. They must be very, very fine mists and the finer the mist, actually the particles should be homogenized. What's the difference in a homogenized spray or homogenized substance and one that is not homogenized?

R – It's broken down. Homogenized material won't separate.

In other words, each molecule is somewhat equal. The substances are not separate. They are together. In other words, each little molecule becomes a little solar system within itself. Do you know, can anyone tell me how homogenization is done? How do you homogenize anything?

R – Pass it thru a very fine orifice?

Yes, then what? It isn't the passing thru the orifice that makes it to be homogenized. What actually causes it to homogenize? Do you have any idea how homogenization is done? You pass a very, very fine stream thru a nozzle or nozzles. It can be hundreds of them. But then it strikes this cold plate. I don't mean a hot plate, but one you've got to keep at about, depending on what you're using, the temperature of the atmosphere around you, temporarily. What happens when this force strikes this plate then it mixes all the substances in that solution into one molecule and that's homogenized substances. Now, this is what should be done when you spray onto the leaf. Homogenize this spray.

If you will homogenize this spray material or the nutritional sprays at least, you'll get a lot more effectiveness out of it. Now, let me tell you something about sprays and insecticides that I want you to remember. Things that are often poisons to people are not poison to plants. Some things that poison people are nutritious for plants. Keep this in mind, because nicotine sulfate is an excellent nutritional spray, excellent bug killer. But to people the amounts you could lift on a pin point would practically kill a person if it went into their mouth and got into their blood stream. So what you do with it in this respect, is to get this nicotine sulfate or Black Leaf 40 homogenized into a molecule with your other nutrients. Nicotine sulfate is not a real good nutritional spray by itself, it needs other things added. Nicotine sulfate needs a wetting agent in it. The finest wetting agent that you can get and the most economical is ordinary calphos. Two lbs. per hundred gallons. It forms a wonderful nutritional spray. Now if you put more than that in there, the plant will pick out the ionized particles and leave a crust of this phosphate on the bottom of that leaf which will bring about an oxidation process and retard the growth. So don't use over 2 lbs. for 100 gal. of water, because then every molecule of water in that whole thing will have a particle of that calphos in it. In fact calphos is so fine, that 1 cubic inch will cover 7 ½ acres in a solid sheet. So you see how fine it is.

I just told you before that phosphates in this form, each molecule is a complete little solar system within itself, containing some 60 different elements in each molecule. Therefore, this is 100% available to the plants along with the other nutrients. Being that it is so very fine and also a solar system within itself, actually if it were a person going to church it'd be a "holier than thou" person or particle. In other words it refuses to have anything to do with any other particles around it because it is a complete solar system within itself. It's so full of self-righteousness so to speak, until it is rather hard to harness. But in this drop of water, it is caught in there and it can't help it, it is caught in it. So the calphos then is a wetting agent because of its fineness. It sticks to anything it can stick to in order to free itself from the substance that finds itself in. It's not thinking, it is just a chemical reaction.

I'm trying to tell it in words simple enough for you to understand. But what you do to this spray is you don't stop with your wetting agent, you don't stop with just the calphos and its value, but when you use your wetting agent, try to use one that is 100% available to the plant.

The next thing you want to add to your spray and I'm telling you in hundred gallon lots. Assuming you are going to mix them in hundred lots. I'll also give you formulas for those who have a 2 gallon spray can so you can use both. But let's take the hundred gallons first. You may have a 400-500 gallon spray tank or what not, but whatever you do, try to get a homogenizer spraying machine that will homogenize the spray and don't use the big droplets, they're too expensive, too hard to get on. The finer the mist the better. If you must use a big machine, use high pressure and do not put too much force on your plant because the very force that blows it on also blows it off. If you use high pressure and fine nozzle, stay at least 20-30-40 feet away from the crop that you're spraying. Well, you say, "How do we do that?" Spray it behind your machine. In other words, have your machine moving, but don't have it hitting your plants right up to you. Give it a chance to form a mist at a distance. Now there's also another advantage of having the calphos in the spray as a wetting agent. It increases the specific gravity of the droplets of the molecules, therefore causing it to drop quicker to the earth's surface or some surface that it's going to land on than it would otherwise. In other words, supposing

you're spraying in air that we'll say is 40% humidity. Do you realize that you're losing 80% of your spray material to the air? You can't afford it.

Q – Do you wait until the humidity is down then?

A – No, you don't wait until it is down. You weight down your molecule with your wetting agent – calphos. I'm speaking (of the loss) if you don't have your calphos on it. If you don't have something to weight it down.

This is only one way we're going to weight it down. This is not the only thing we need to weight it down. We're really going to anchor it in a few minutes. We're really going to tie a weight onto it and anchor it.

Q – If you spray it in a fog, then what happens?

A – Well, if you get an anchor, we're coming up to it. We're going to anchor it and put it where we want it, without letting it get into the air. In other words, if it gets into your air, it's got to be in a fine form, lighter than air, is that correct? The fineness of it makes it lighter than a molecule of air, so therefore it rises.

The pressure, atmospheric pressure, of the air makes a difference. Also, you must consider the altitude that you are using the spray at. If you are using a spray at sea level it is different from applying your spray at 5,000 feet, an entirely different thing altogether. So you must consider the difference in altitude.

Now, I would consider, if I were doing it on a commercial scale, I would consider every thousand feet in altitude in my spray applications for economy's sake, that is in commercial fields. But in a backyard garden you don't pay any attention to it. Another, did you pick up a gallon of the liquid phosphate, the P_2O_5 say 78-85% and notice how heavy it is? It's kind of heavy. So I would add at least 1 pint of liquid P_2O_5 per 100 gallons of water. Now I've got 2 anchors in that molecule now. The first one is my wetting agent – calphos. My next wetting agent is phosphate, liquid P_2O_5 , 78-85%, one pint per hundred gallons.

Now, the next thing I would add into that spray, in most areas of the U.S. would be some iron chelate. Let me give you some warning about the use chelated materials. There's times when you do not use them in the ratios that I give you, i.e. you would not ever want to use a chelate on alfalfa. Why?

R – Anionic instead of cationic.

That's not the reason, but it's a true statement. Why? If, say you were growing out in Colorado, California, Arizona, Idaho, Nevada, you would not use chelates there. Why?

R – Well, the calcium is high out there.

The calcium is high. That's exactly the right answer. Calcium is high. So what happens when you use a chelate in a high calcium soil? It loses its leaves, all the leaves fall off. Why? Because it thins the protoplasm that holds the leaf onto the stalk. Nothing to hold it on. The leaf is held onto the stalk by protoplasm. did you ever break a leaf off and look at it about 3 minutes later under a glass and you saw a little jelly-like substance form in there? It's that little jelly-like substance that holds that leaf on the plant. And what happens when you use a chelate on a carbonate soil, high calcium soil? It sheds the leaf off. Many times this happens naturally in your soil and you don't want it to. Therefore the alfalfa leaf sheds off, you start to mow and the leaves all fall off. This material has been chelated and you don't want this to happen in a high carbonate soil. We're going to learn more about that later when we study soils and how to prevent it. But do not use a chelate in a high carbonate soil.

You need iron, very badly. What form would you use if you could not use a chelate? Iron sulfate. I don't know whether or not you've ever tried to dissolve it in just plain water or not, but it is a tough job. It's kind of hard to dissolve in just plain water. But warm water and a lot of concentration and grinding it to a powder, ground real fine, something like a very, very light colored brown sugar. The iron chelate dissolved in water first before you put it in the tank. I would add as much as 8 oz. per hundred gallons of water. 8 oz. of iron sulfate, or 1-2 oz of iron chelate per hundred gallons of water. Providing that I was not in a carbonate soil.

Now, you've got your phosphate in it, your wetting agent, and your iron. There's another substance you're going to need in this spray solution and what would you think you'd need next? What product would you need next in it? I would suggest something with oil in it.

R – Alaska Fish Fertilizer. (AFF)

Alaska Fish Fertilizer is excellent, also Sea Kelp is excellent. I would add at least 2 quarts of FF per 100 gallons of water, or 1 ½ gallons to 500 gallons. They deodorize the AFF by boiling it. In other words, it's cooked and the other isn't. so you need to add this AFF and also Sea Kelp solution. The last price I heard of on the Sea Kelp is that comes in little 8 oz. bottles in powder form. I believe it was \$36 a case of 24-30 packages to a case.

I would use one of those 8 oz packages, would be sufficient for 200 gallons of water. if you added more it wouldn't hurt anything, but it just gets a little expensive. What I'm trying to do is economize. This Sea Kelp will do something that the AFF or other materials will not do. It ionizes the substance altogether and if your spraying machine will homogenize these materials when you spray them onto the plants and get them under the leaf. Two hours later you can know exactly where you have sprayed and where you haven't. you can tell the difference in the looks and the color. If you really want to be a successful farmer and really do it well, it is a good idea on young plants like cotton or on corn, etc., to spray when they are about a foot high the first time. And then as it begins to get nearer the ear, half grown, you spray it another time. And as it begins to form the ear, spray it from the time the ear gets on, even before the tassel. I would spray once a week with this spray. Ordinary corn, already 6 feet high, and spray once a week, it would approximately cost you \$2 an acre to spray, including the spray materials, and your tractor and amortization and everything else. Because if you own a sprayer that can really put it out, you can spray an acre about every 3-4 minutes with your tractor. Because this spray is going out each side of the tractor about 60 feet and that's 120 feet and you can cover an acre in no time flat and the tank should hold about 60 gallons of spray, working on the power take off of your machine. This 60 gallons should spray 8-10 acres of corn that size and really wet it. If it is during the moth season and it's your first year, you haven't got your minerals and nutrients up high enough, then it's a very good idea to use a small amount of Cystox or some other spray, but use it about 1/10 will do the job just as well. It's also perfectly safe to use a few drops of liquid Chlordane per hundred gallons of water. I would say 20 drops of liquid Chlordane per hundred gallons of water. Also, it will form enough fume in that entire corn field to keep the moths out that lays the egg in the silk. So these are things you can do and that silk will contain a high amount of oil in it and it is also excellent.

Suppose you run a test for some unknown reason you find your potash isn't high enough. Then I would use 12 oz of potassium hydroxide per 200 gallons of water or 4 oz per hundred gallons of water. the reason I said, it generally comes in ½ lb. packages. It is kind of hard to separate it. Be awful careful about your sodium hydroxides, because sometimes you ask for potassium hydroxide and they'll give you sodium hydroxide.

Please read the label. There's a lot of difference. You can generally get this at the drug store. They might have to order it for you but they can get it. It's an excellent thing to do. You can also get the P_2O_5 liquid at the drug store or your favorite chemical company that handles reagents for cleaning purposes and so forth. It's used a lot in making reagents. Also, there's something else you can do that makes a wonderful wetting agent and that's to use Octagon Soap. Do not use the soap powder. The old fashioned Octagon Soap you can buy it still by the case by ordering it. It makes a wonderful sticking agent and it's an excellent thing for your plants and crops and it contains a nutrient. Be sure to read the label though to see if they have any sodium hydroxide in it. The last I used it, it did not, it had potassium hydroxide in it. But they might have changed it and used sodium hydroxide which will still make a good soap, but it sure doesn't make a good pray. Don't use it. Are there any questions now about this nutritional? This is just one formula I'm going to give you a number of them.

Q – You didn't state the amount of Octagon Soap.

A – I'd use about 5 lbs. per hundred gallons.

It's a good idea to chip up your soap, then put it in your tank and your motor will dissolve it. Also, another thing I would suggest too that you do is to get sea water from the ocean. Get a couple 55 gallon drums of salt water from the ocean or bay, either one. Use 10% of that salt water, don't exceed 10%. But it gives a color out of this world, a wonderful color. In fact, it's got the same as Sea Kelp.

Many years ago, back in the depression, many farmers didn't have enough money to buy the ingredients, so I took Octagon Soap and we made an old tank that would turn round and round you know? We put in about a case of Octagon Soap, added 2 gallons of kerosene to it, then we beat that kerosene up. We didn't have washing machines in those days to do it, so we just made an old tank with blades in , to turn around and round with an old gasoline motor. We chopped it up into like a slurry and then we took a gallon of that slurry and poured it into the tank of water. One gallon per hundred gallons of water into that tank and then we'd also go to the coast and get 50 gallons of salty water and put that into the 500 gallon tank and finished filling it with water. But we were filling it with water at the same time we were pouring in the substance. We had the prettiest crops of fruit you ever saw in your life. Made out of Octagon Soap, kerosene and sea water and

just plain water. We had no bug problem at all. But whenever you grow your crops correctly you won't need any of it hardly, but that is what we did back in the Great Depression to fertilize and spray, use for our crops. It really worked and I have never seen prettier fruit and trees than those were. But it got to be too much trouble so they went to buying high powered sprays. I'm not finding any fault with the high powered sprays today, but the thing about it is, you should use. If you must spray, why not add the nutrition right along with it? In other words, do 2 things at the same time. It's cheaper to add your minor elements in nutritional form than apply them to the soil. They'll get on the soil eventually. Are there any questions now about this first formula I've given you?

Q – Will it keep indefinitely? Won't settle out?

A – Yes, it will keep indefinitely.

One of the major problems of the people who spray is, it doesn't matter, every night when you finish the days work, that is if you work thru the day. Some people spray only at night. It has its advantages and we'll talk about day spraying and night spraying, because of the humidity conditions. Some people, if their machines are going to set out 8-10-12 hours, they don't wash their machines. Any time your machine is not going to be busy for 8 hours, please take time to wash your spraying machine, really clean it. And one thing, if you're going to change sprays, run insecticides, be sure you really clean it. This is one of the factors that do damage, because some of the nutrients accumulate and accumulate on the walls of the tank and then all of a sudden you get one that's a solvent and bang! You've had it. So keep that tank clean, really clean. It is very important that you thoroughly clean it every day even though you're using the same kind of a spray.

You know, I've never seen a prosperous farmer that had dirty machinery. This is one thing that he does, is keep his machinery clean. The farmer who doesn't take care of his machinery is a poor farmer. You must keep it clean. I'm not talking about a little bit of clay sticking to the tires or gets splashed up on the side of it, I'm talking about a grease film all over the tractor or machinery. A farmer that's too busy to keep his machinery clean or oiled, is too busy. So It's better to take care of your machinery and do it well, than to half do it and the expense will eat you up. Do you realize that the film of oil or dirt on you machine will pick up the temperature of that machine as much as 25-30 or 40 degrees? The higher the degrees or temperature of your machine that's already running

up at a very hot pace – say 150°, will put it up higher, causing your machine to wear out a lot faster? So you need to keep your machinery clean, this is very important. Did you every try to hoe with a rusty hoe? It'll work you twice as hard until you get the rust off. Then it slides thru the ground gently, so this grime on you machine does the same thing. Are there any questions at this point? I'm going to give you a number of nutritional spray formulas to use.

Q – One question. When you're spraying from a tractor, you're supposed to get on the bottom of the leaf, how do you get on the bottom if it's a row crop?

A – What I just told you didn't sink in, so I'll tell you again. Do not spray too close to you. Spray at a distance, 20-30 feet. It forms a smoke, it rolls when it gets out that far. When it hits the ground it rolls in a fine form. The density of the particles keeps it all from going to the ground.

Anytime the force is hitting, with very much force, over 2 lbs. of pressure, the same force that put it there is also taking it away. There are machines that do homogenize the spray, in fact the spraying that is done by airplanes, homogenizes the spray. Many times it's cheaper for you to take and pay an airplane \$3 per acre to spray your crops 3 times than it is to do it by yourself if you don't have a machine that does homogenized work. You supply the materials, but let him put it on because he will only use 2-3-4 gallons per acre or more. The very fact of the amount you're saving on materials will more than pay the cost of hiring aerial spraying. When he sprays it, it forms a smoke, it's homogenized, it covers everything, inside, outside of the leaf and all. In fact you can put out one gallon to the acre and cover the acre, but it's still not enough to form enough nutrients.

How do you know how much to apply? I'll tell you the way to tell. Take some microscope slides and tie a string around them and put them out about 75% of the distance that the spray will cover, down in, under the plants. Then after the spray has gone over and has dried for a little while, go back and get your microscope slides and see if it's wet. See how many particles are on it. See the coverage you get. Many times you won't see very many on it until you put it under the microscope and then you'll see an absolute film all over. But the thickness of this film matters much. In other words, one hundred thousandths of an inch is very good. But when you get up to 8-9-10 thousandths

of an inch it is very good. In other words you try to get the maximum amount on, that the plant can hold without dropping, without letting it drop off.

Lets just take an orange grove. The trees are 15-20 feet high, producing 1,000 boxes to the acre. You would need 30 gallons of spray to cover an acre, homogenized. That's a lot of space, that's a lot of leaves and that's a lot of trunk. You'll need 30 gallons. But in a corn field you'll probably not, even at the tassel stage, you would not need over 4 gallons or 5, providing that you can get it out equal. But these corn stalks have a way of getting in each others way and in order to get coverage you're probably going to have to use about 6 gallons to the acre. In other words, about 8 acres to 60 gallons, something about like that it varies. But use your microscope slides to determine how much you get. Or you can use any kind of a glass, it doesn't matter. I just suggested microscope slides, because they're cheap and easy to handle and plentiful and fit under a microscope and very good to determine the coverage you get. Are there any questions?

Q – What about rainfall, does it take it off?

A – It's under the bottom of the leaf, so it won't. That's the reason God put these hairs on the bottom of the leaf, so the rain won't wash it off.

What about the top of the leaf? You know plants have bowel movement or urinate just like everything else. And this spray goes thru this leaf and takes out the nutrients that it wants and sends it down to the roots, down thru the stump and mixes it with other substances and sends it back up thru. And then it becomes a part of the plant, the frequency of the plant. But the water, extra water that it gets in to keep that plant growing, sweats out thru the top of the plant. The extra water that it picks up from the soil that it doesn't need, and also the protein. If you've ever taken a plant and caught this water that drips off the plant and analyzed it, you'd be surprised at how much protein is in it. However, you only get a fraction of the protein that's there. Most of it is evaporated in the air, the N you haven't got it. But that droplet contains quite a bit of protein that's sweated out.

A few minutes ago, I said add phosphate to this water in the spray. Why did I suggest adding phosphate to the water when you already have your 400 pounds per acre that's needed of the P_2O_5 ? Why would you add phosphate to the water? Why do you suppose we did that?

R – For one thing, it raises the specific gravity.

That's one thing that's good, but what's the chemical reason for adding it? It's a wetting agent and trace element but something else. There's another reason I wanted.

R – The phosphorus in the soil is not available, it would have to have moisture in order to be readily available to the plant.

That's true, but come again, you're getting warmer.

Q – Doesn't it have specific relation to the nitrogen as to holding that nitrogen from leaking out of the leaves?

A – Way out indirectly. If you'd have said any element except nitrogen, it would have been true.

In other words, the mineral nutrient that the plant takes in is phosphate of iron, phosphate of copper, phosphate of zinc, phosphate of magnesium. So therefore it puts a binding agent to pick up the nutrients out of the air. Get the idea?

Now, also, let's see what's happening here. Now we're having our first problem on the board. Water is hydrogen and oxygen. I'm not worried about the ratio H_2O and so forth. I'm not concerned with that at the moment. Forget about your numbers at the end, just think of your overall picture now. We'll get down to the numbers in a moment, of the atomic value of the hydrogen and oxygen. People breathe in oxygen from the air and they breathe out CO_2 and plants breathe in carbon dioxide. So we put a C over here and we have CHO as far as the plant. What does that mean to you?

R – A Carbohydrate?

That's right, phosphate. But how did it do it? Just what happened there to join this carbon to the water? What happened? Something happened, but how? You said phosphate did it but how did it do it? Any idea? To make it simple and to save drawings, I'm just drawing circles, should be in octagon shapes. This is just a rough estimate, but it'll give you an idea of the particles in the C_6 . This would be the carbon. This would be the hydrogen. This would be the oxygen. Now phosphate is the catalyst that joins these together and the way it does it is this. It spreads out these molecules, it forces them farther apart than they'd otherwise be, because the carbon has a water attraction. In other words it's trying to grab too much water but the phosphate won't let it do that, because the phosphate says I can use some of it too. In other words he gets in there. So as he gets in there, then what happens? Just what happens that forms the sugar? It's ready not to

form a crystal of sugar so to speak, but it's got to be in solution. Just what happens now that causes that to form? The phosphate now has spread them out so the carbon could get in there. Something's going to happen now, there's a chemical action going to take place and what brings about this chemical action?

R – Ionization.

It is Ionization, but there's something else that happens here at this point. What time of day does the process of photosynthesis take place?

R – During the sunlight.

During the sunlight, that's right, but when the sun goes down what happens? There is an energy loss, right? And the night becomes cooler and your ionization process takes place. Now when this happens, now water expands when it's heated and expands when it's cold, but what about phosphate? What happens whenever it gets cooler? It shrinks, gets smaller. Therefore it did shrink, the very fact of the ionization of the night causes the phosphate to be squeezed out of there. What do you have left? Carbon, hydrogen and oxygen caught in a trap and once it's mixed it can't get loose and that's the way sugar is formed. You know we can do this commercially? You can make sugar commercially without growing sugar cane? I have all the math on these. God showed me how to do it a number of years ago and I have not released it because it would cause chaos to a large part of the world today if we did that. It would throw thousands of people out of work who are now growing sugar cane and I have not released it. But what I am telling you is the principle by which sugar is formed in plants. So the phosphate you add to the spray becomes a crutch to the leaf to supply the little extra amount it needs. The higher the sugar content, the higher the mineral content and the higher the sugar and mineral content, the less bugs you have. Why?

R – The alcohol kills them.

Yes, the alcohol kills them, but there's another reason too. There's one more reason I haven't told you about. It increases the oil content and it gives him a physic. That's right, exactly what happens. In other words he gets diarrhea. You who've studied bugs and worms, you know what I'm talking about. You've handled them and you go to do something with them, the whole business would get diarrhea and you'd have to start over again. In other words they'd just go to nothing. I don't know of anything sicker than

a sick worm with diarrhea. I'll tell you he's a sick one. He looks like just a dead mass of stuff, really a sick worm. Are there any questions about this? I'm only giving you a first formula, but I'm telling you not only what to do, but why you're doing it.

Q – That formula for sugar, the carbons, why are there only 6 carbons? Isn't it true that carbon can only hook on to 4 other things?

A – This is ordinary white cane sugar, refined and purified. I just took an easy one, there's many more.

Q – I thought it was $C_{12}H_{22}O_{11}$.

A – It was C_6 when I went to school, but I'd have to look it up again, but you could have a $C_{12}H_{11}O_{12}$, that would be Glucose.

Q – We've tested $C_6H_{12}O_6$

A – There is a variable, but all I'm trying to do is to give you the idea. There's many different formulas it could be. Mainly I didn't want you to have natural gas or something like that. You could have many different formulas and still have a carbohydrate or some form of it.

What I'm trying to get at here was the fact that phosphate spreads these molecules far enough apart for the carbon to get in from the air.

Do you remember something I said to you last time that might be confusing to some? That all molecules, elementary molecules under the same temperature and the same pressure were the same size? Do you remember me telling you that? This is not true of compound molecules. Why? Because of the water content they hold. It's a variable. I know this is not what's taught to you in college, but I know the unlearning process is difficult. If that wasn't true there wouldn't be any stabilized specific gravity weights or standard of weight. That isn't what I was taught in college, this is what I learned the hard way by actual practice. But the more you study and the more you put it into practice, the more you can evaluate what you are, and where you are. And unless you can figure the energy in it, then you'll be unable to figure the results to expect in the long run and duplicate your findings.

Why do you think it is necessary to know these little details about farming? Why is it important to know? What's the main reason that makes these details so very important, what is there about it? There's one real reason for it and what is it?

R – To build self confidence.

Self confidence, but there's something deeper than that.

R – To know why things happen.

You want to know why, but why do you want to know? What good does it do you to know why things happen?

R – To get your maximum yield.

Maximum yield, you're getting warmer all the time. The idea is so you can create the condition you want and you can reduplicate it any time you want to. In other words unless you can create an unfavorable condition at will, you cannot correct it at will. Because the conditions under which it existed, is a variable. But once you can create the unfavorable condition, then you can correct the unfavorable condition. Comprehend? Unless you can reduplicate and do over and over and over again the exact situation that you expected, then you're not getting anywhere, you're gambling. No farmer has to gamble. You can know what you're doing, but you've really got to know the reason why. This is the reason we study these steps so you can take any kind of a situation and reduplicate it anywhere on earth. And the principles I'm giving you will fit anywhere on earth providing you control the moisture and the temperature. You can grow at the North Pole just as well as you can at the Equator provided you control the temperature, moisture and light. It matters not where.

Let's take another formula for sprays. We've taken one now and taken its variables. What is the purpose of a wetting agent?

R – To lower the surface tension.

Give us some other reasons; what is the purpose of a wetting agent?

R – Makes the sprays stick on the plants.

That's beautifully said, but for ionization purposes. That is the purpose of a wetting agent. What makes a postage stamp stick to an envelope?

R – The magnesium.

The magnetism, not the magnesium. The magnet that's created there. So actually the wetting agent creates a magnet, a magnetism that causes it to stick. In water that has trace of sulfur in it; the sulfur is a wetting agent. Did you ever take a bath in sulfur water, then stand up? The water was $\frac{1}{4}$ inch all over your body, in droplets, sticking to you. Did you ever take a bath in water that had extremely low mineral content and come out? Low ionization content? When you got out you were almost dry. Dry water because of the

ionization. The greater the specific gravity of a given drop of water, the greater the mineral content of the water. Not necessarily the mineral content. That's true of the mineral content, but it's also true of the ionized particle that's in the water. Unless you've had the first course it will be a little confusing what we're talking about, unless you heard the record on the first course. Then you'll know what we're speaking about. Because water is a variable. There is no 2 drops of water in the ocean that are alike, they're all different. Yet, they are so near alike you can't tell the difference. You can't weigh the difference, but they are different.

So what we're trying to get across to you is to get as much of the plant food to stick to the bottom of the leaf as possible. The more it sticks to the bottom of the leaf, the more apt you are to get nutrients into the leaf. In what form does plants take in mineral content with the exception of nitrogen?

R – Phosphate form.

That is correct. So in all your nutritional sprays, never, never, never forget your phosphates. Do not forget your phosphates. Always add phosphates to your nutritional sprays. One of the things that's very important too, in applying your sprays is, if you can use lake water over other waters, it is generally superior. Lake water or river water. it is generally superior because you know it's not oversupplied with minerals. There are streams of water that come out of the ground. Or wells that contain so much calcium or silicones and other inert products, that it is very difficult to get the water to hold enough of the reagents or to even homogenize them so that nature can take them apart. What happens when a particle is deionized? What happens?

R – Takes a negative charge.

Negative charge? And also what? The negative charges are separated from what? Your positive charges. Therefore lets conclude this now. Will you agree with this statement? Regardless whether the plant food comes from organic, inorganic or from nutritional sprays, the way that this plant food enters the plant, the energy is identical. Would you agree with that? Is that a true statement or is it false?

R – It seems like would be true.

It is a true statement. Regardless of whether it comes from an organic or inorganic, it doesn't make any difference, it is true. Energy enters the plant in the same

form. Does anyone want to question that? Alright, what is the advantage of using organics then?

R – Cheaper.

More economical, that's one reason, what else?

R – Doesn't leech.

Right, it doesn't leech. Why?

R – Carbons for sugar?

Yes, but it gets most of the carbon from the air, some from the soil, it helps. Because it contains more energy, more energy. It has no filler in it. It's 100% basic energy, that's what it is. It contains more energy so that's the advantage of using it. Think you left your thinking caps home this morning. That's why it's more valuable to use, because it has more energy. Is there energy in an inert base that the plant can use? No, very little if any. There's more potential energy there, that's what makes the organics more available. Not only that, there's a wider range of nutrients in it of elements, elementary range is much wider and much different. Anything hard about that? It's easy, this is why the advantage of organics. Now, one more thing that carbon does. Is carbon an anion or cation? I'm talking about in the plant food form.

R – Cation.

That is correct, it is a cation. Now you realize that out of your carbons there, it is your carbons that controls your millimicrons of your plants? Do you realize that? What is the millimicron of the plant structure?

R – Color.

That's right. The millimicrons determine the color. What color should most plants be? Green is correct. Now we've made a complete circle and we've made a complete circle and we've come right back to the same place. Now we're going to take this equation right here. Now what have we got?

R – Chlorophyll

Right, chlorophyll. Carbon determines your chlorophyll. Now, in what form is it now? We don't call this carbon, carbons at this stage, what do we call it? In the plants?

R – Energy

No. Tannic Acid. It forms a tannic acid. What is tannic acid derived from?
Commercially?

R – Tea?

No. That's tannin.

R – Bark?

Yes, but not exactly bark. It can be done that way, but where does most of it come from today? What we have on the commercial market? If I sent you down town to get me some tannic acid, what would you bring me back? Vinegar. Vinegar is dilute ascorbic acid right? Vinegar is a tannic acid, one kind of it. Did you ever walk into a branch in the trees and the water had a brown tint to it? That was tannic acid, ascorbic acid. Whenever you talk about ascorbic acids and vinegar, you're talking about thousands and thousands of kinds of it. But anyway, what do carbons do to plants? Supplies the moisture and determines the moisture content. But what does it do, just what does it determine? We had that just a few minutes ago and I asked that to drive it home now.

R – Color.

It determines the color, that's right. Did you ever see oranges or after fruit matures they start turning green again? Did you ever see that? You know oranges turn a golden yellow in the winter time then in the summer turn green again? Why did it turn green in the summer time again after it'd been a golden yellow orange color in the winter?

R – Lack of carbon.

That's right. If you have got plenty of carbon in your soil, those oranges will stay their golden color all summer long. Not only that, peaches will have a better color, alive, glossy, just a mouth watering color to them. Because the carbons are controlled in the soil.

Did you ever see corn that looked a sickly color? I don't mean just the stalks, but the grains after it was grown? A sickly pale color to it? That's lack of carbon in your soil. Did you ever see corn that you had trouble getting the chlorophyll green enough? And you put on more nitrogen and it still looked pale? The more you put on, well it would make it grow, but it just didn't look waxy, a sheen. Let me tell you this, when you see a crop that has no sheen on it or a grove or an orchard, that the leaves do not have a waxy

sheen to, you're going to see a grove or orchard or crop that is low in carbon. When you have this kind of condition existing, you need to apply a nutritional spray that will supply your carbons. There are conditions that make this impossible. Can you think of one? I don't care what kind of spray or nutritional spray you add; the crop will not have a waxy, glossy sheen to it. Can you think of something that would prevent, even though in one case you'd get a waxy sheen or improvement from the nutritional spray and in another place you wouldn't? Can you think of a reason why this should happen? Don't all speak at once.

R – Lack of phosphate?

No, not phosphates this time. Phosphates really have very little to do with the color directly. There's phosphate of carbon a lot, but by themselves, very little. But this product I'm telling you about has a lot to do with the sheen on the crop. Can you imagine what element that would be?

R – Nitrogen?

No, not nitrogen. It has a little, minor, but it does not give the sheen. It's calcium, calcium. In other words you've got to have your calcium in the soil because whenever a crop doesn't have a waxy sheen on it, you're deficient in carbons and you can't get the carbons from the air or soil without the calcium content. Plants and crops are just like little kids. They tell the world what kind of a farmer or gardener you are. They scream it to the world. Boy, this guy doesn't know what he's doing. They let the world know. And I'll tell you who is going to know too, your banker is going to know. These are down to earth principles that you can use and turn into profits right now if you'll do it and know what you see. I had a professor one time that said this, "See everything you look at." And a few years ago I saw trees and crops that had a beautiful sheen on them and I went to find out why and this is what I found out and this is what I'm teaching you now. I'm teaching you what I found out by actual experience. I found soil that would dry out within 24 hours after a 3-4 inch rain. They were "ashy" dry again and I found others that would stay wet for 2 weeks and I found out why. The ones that had a high carbon content in them actually held the water and the ones that didn't would not hold the water. Also, I found out that the soils that held the water, the oranges didn't turn green in the summer time. Putting things together, also I found out that those trees also had a beautiful waxy

sheen on them. Also, citrus trees that have a waxy sheen on them don't need to be sprayed, why?

R – They're healthy.

There's something else different about this. They're healthy, but what is it that makes a citrus tree not have to be sprayed if it has a waxy sheen on it? Kind of like a bald headed man. If a bug lights on it, it slides off. He has a job getting his feet to hold on there. But there's another reason besides that. I've seen a moth light 15 times on a leaf and finally get up and try another leaf and it does the same thing. Finally she flies out and goes somewhere else.

Let me tell you something else about a citrus leaf. The citrus leaf has citric acid in it and it's hot stuff. And if a bug bites a citrus leaf with citric acid in it, I'm telling you, he gets a hot foot and he doesn't like that at all. He's not even going to start there because it'll burn him up. And citrus requires the least sprays of any providing you keep the carbon contents of your soil, your phosphates and calciums high enough in your soil. You'll never have to spray. There's one exception to one bug that this will not work on. What bug is that? There's one bug that you can do all of everything I tell you here and he pays no attention to it. What bug is that? Aphids. When that little leaf comes out of there only ¼ inch long, he builds a web from one end to the other of it. Very soft, very tender and as the leaf grows, it curls over and over and over and that aphid can eat that dilute weak citric acid that's in that leaf. So the one thing you need to do is to make a spray for aphids. This nutritional spray I have given you this morning will not work for aphids. If you want aphid sprays, then spray that forms a gas. I would recommend Cystox for one. The best way to use Cystox, is to take the small plastic bottles that hold 2-3-4 oz. That you get by the gross at drug stores. Your local pharmacist can get them for you. Take a hot needle, pair of pliers and a candle. Punch a hole in the top of that plastic bottle while the cap is on. It punctures very quickly and very easy. Get you some ordinary spools of fishing thread, the nylon thread, and tie a knot on the end of that thread and put it thru the lip inside to the outside and tie another knot in it so it won't slide back thru. Take the needle and punch 3 small holes ½ inch under the cap or there about, very small holes. Then fill that bottle full of ordinary Cystox spray, following the formula on the bottle or can. You can also add a little Chlordane or rubbing alcohol if you like. Put the cap back

on and hang it in the tree and no aphid or bug will be on that tree. Do this about every 10 feet in your garden in your backyard and you won't need any sprays in your garden. It keeps all the bugs out and it works.

Q – Can you give us a little demonstration on the board of just what it looks like where you put the holes?

A – Half inch under the cap when the cap is on it.

Q – Will that take care of tomato worms too?

A – Yes, it will take care of all of them. Especially the bug that stings the young papaya. Just hang up 2-3 in the papaya tree and it keeps all the moths and bugs out of the papayas that sting the young ones and cause them to fall to the ground.

It is an excellent thing to do, a little bit of trouble, a little bit of a problem, but not nearly as costly as spraying. I've even done that on 100 acre orange groves to keep the aphids out. Especially on young trees, when you set out a young tree aphids almost eat it up. The leaf never grows to maturity and the leaf is needed in order to pick up enough energy to cause the tree to grow up rapidly. Any questions?

Q – These 3 holes are not in the cap but in the plastic bottle.

A – In the plastic bottle, yes, under the cap.

Do not make the spray too strong. If you do it will melt or dissolve the bottle. It doesn't need to be too strong, just follow the instructions. No it is the gas escaping from this bottle that causes the canopy of the tree to form an umbrella to keep the odor within the tree, under the tree. If you use Chlordane, on a hot day at 2-3 p.m. you can smell the Chlordane if you stick your head in the tree on a good warm day. This also works on apples, peaches, pears, grapes, etc.

Q – I first got the idea that you wanted the Chlordane to follow up the string but, that's just to hold the thing up in the tree. Then it evaporates thru the holes that you pushed in the bottle.

A – That's right, don't make the holes too big, because it will evaporate too quickly out of there. In other words, just barely get the hole thru and you need a rather small needle too.

Are there any questions? Now there are many different sprays you can use, you don't have to stick to just those. Cygon is another one you can use, Cygon 267. Use them as they tell you, but don't use them stronger than they tell you and it's very, very excellent.

There are times that whenever you have soil that has a copper deficiency. What happens to young plants or onions or peppers, beans, tomatoes – row crops; whenever there's a copper deficiency? What happens to your young plants? They rot off at the ground.

Q – Mildew or something like that?

A – It's a mildew, they call it "Blue Mold."

Q – Dampening off?

A – Yes, dampening off, Blue Mold is what causes it.

Blue Mold causes plants to damp off at the ground, because the soil is deficient in copper. How much copper do you think should be applied per acre in order to stop Blue Mold?

R – Two lbs.?

That would be a 20 year supply. A half ounce would do it if you could get it out. Two lbs. would be a 20 year supply. It would be alright providing you could get something to hold it.

Q – What form is that copper?

A – What form would you apply it in? Copper sulfate and what's it called? What is the name of it?

R – Bluestone.

Yes, Bluestone. I would get the fine grind because it is very difficult to apply. Also to apply, back to the nutritional spray I have mentioned before, it's also good to add 4-8 oz of copper sulfate one a year. Because copper sulfate does 2 things to trees. Suppose you have an orchard deficient in copper sulfate, or just copper. When you put copper sulfate into a spray tank where there is phosphate, P_2O_5 what do you have? You've added one pint of P_2O_5 to 100 gallons of water and now then you've added copper sulfate. Now what does that do to the copper? You have phosphate of copper. What does phosphate of copper do to trees now? It does something to plants, but a little bit differently. Just what does it do to a tree? It doesn't matter which kind of a tree it is whether it is deciduous or an evergreen. Just what does the copper do for the tree? How does the tree bark grow? It splits and heals up, splits and heals up, so this is the way a bark grows on the tree. So now what happens is when it doesn't have enough copper, it

won't split, it's too tight and that bark is so tight around that tree until the sap can't flow up and the fruit is small and you get a light production. It just isn't sufficient. But the copper makes the bark elastic. Just like a little boy that out grows his britches, they're too tight. I makes the bark elastic like and lets the sap flow. Therefore gives you a greater yield. I've seen a 300% increase in yield just because copper was added. The same thing happens in the corn stalks or in your row crops. Now in your row crops, when it first comes out of the ground and the soil is deficient in copper, this Blue Mold starts.

Actually is isn't the copper, notice this now, in the tree, it makes the bark stretch, but in the soil in this little crop that is just coming up. It rots off at the ground. I've seen Tomato plants 6-8 inches rot off at the ground. It does something differently there. It doesn't make the bark stretch. What does it do? How does the copper work to keep the plants from rotting off at the ground? It's a germicide, it kills the Blue Mold. The Blue Mold can't stand it. It's the greatest enemy Blue Mold ever had. Then it also makes the bark stretch in the plant and give you greater yields. It's a germicide.

Q – Do you apply this to your corn early in the season?

A – I just use it in my nutritional spray

Q – But do you spray early?

A – I'd spray 3-4 times at least on the corn.

Q – Use copper in it?

A – Yes. Right.

Now on corn, wheat and soybeans, there's one other ingredient you should use on any crop that you're growing for the grain. It's manganese. Manganese is the element of life and without manganese there's not any life. Therefore the lack of manganese can cause a great loss of yield in the long run. So it's a good idea to add manganese to your nutritional spray. On your manganese there is a variable. It comes in different strengths, so it's a good idea to read your label. You could use chelated manganese excellently on any kind of crop without fear of defoliating the trees, but use it lightly. Would you ever think about applying manganese on marsh seedless grapefruit or navel oranges? Would you ever apply that?

R – No.

Why?

R – It'll make them go to seed.

No it won't make them seed but you're just wasting your money. Would you ever use it on cabbage or lettuce?

R – No. You're not working toward seed.

That's right. You only use it where you're growing a mature seed. Would you use it on green beans? You would, yes, if you don't you'll have skinny looking beans. Yes, you need it in the beans, because nature is trying to leave offspring there. But in the cabbage you just want the head of it. You don't want it to bolt. Otherwise it will burst open and go to seed the same day it heads up almost. I've seen lettuce bolt almost before it heads up because there was too much manganese in the soil. How much manganese would you think you should add to 100 gallons of water? Say for corn? About 4 oz. is average. If it's really high concentrated stuff, $\frac{1}{2}$ oz. Would be enough, but 4 oz. would be the ordinary formula you'd use in the manganese chelate. What is a chelated molecule, what is it?

R – It's got a claw on it.

It's got an extra electron is all and it's called a claw. That's right. What does this claw do?

R – Picks up minerals and holds them tight.

Yes, but how does it do it? Well, like a boy and girl walking down the street with their arms around each other. They're connected together by their claws hooked around. It hooks one thing to another, joins it together. Now a man and wife, they don't do that, they walk every way. I am speaking for myself, from experience. All this is from experience. I sure didn't get it out of books. When we can face the facts we're getting pretty close to reality.

Q – On that copper sulfate, how much per acre?

A – For what crop? For Blue Mold?

R – Yes.

Generally 6 oz per acre for 100 gallons of spray, providing your 100 gallons of spray would cover it. If you're homogenizing it, it will cover a lot more than that. Whether or not your spray is homogenized or not use the same concentration. Do you understand what I'm saying? It makes no difference whether or not your spray is

homogenized or not use the same concentration. But it goes a lot farther with a homogenized spray.

Q – What if you just had a garden and you had Blue Mold and you wanted to get some copper sulfate on it?

A – I'd get some Bluestone and dissolve one level teaspoon in 2 gallons of water and put it in one of these little back sprayers and just spray it on.

R – The old "Bordo" mixture was Bluestone and lime, used for potatoes and other things. Even works on grapes at ½ strength.

Very good. Yes, it would. It is excellent. Bordo is copper sulfate.

Q – Use 5-5 and 100 right?

A – Right. Yes, old fashioned Bordo.

Q – Is this Bluestone that you normally buy from the drugstore?

A – Yes, or the fertilizer plants have Bluestone by the 100 lbs. a lot cheaper, about \$160 a hundred pounds. Something like that. You can get the powdered if you want.

Also, if you have a pond that is all muddy all the time, generally about 5 lbs. to a 2 acre pond will clear the water without killing the fish. It will make all the materials go down to the bottom. Dissolve your copper sulfate in water though and sprinkle it on your lake like you're sprinkling it on the ground. Also, one thing you don't use copper on and that is mushrooms. It'll coolly kill them, spore and everything else. You don't use copper on mushrooms. Any questions about this subject so far?

Q – Can you apply the copper to the soil?

A – Yes, you can. But it is quite expensive today. Now on peaches, if the bark is not slipping enough, you'll generally get enough copper out of the calphos to make the bark stretch, providing you add a little to your sprays each time when you spray your peaches.

I've seen trees that the bark was so tight on just took my knife and cut thru the bark. I've seen it spread out wide enough to put your finger in it, way too tight. The sap couldn't flow thru it. That's not a good idea, but I do know a lot of people who do split their trees open with a knife. But it would be a lot easier to add the phosphate of copper and get them to spread.

R – You can make money on it.

That's right. Your net profits you make on your farm is your report card. Is everybody here now? He knows everything anyway. About that age, I knew it too when I was his age. But I sure don't know it now.

Mark Twain said, take boys at 16 and put them in a barrel and only leave a bung hole. Then not take them out until they're 25 and it'd be a good idea to close the bung hole. Boys are not like that. They never have any self confidence. That's what makes the difference. So long as you learn self confidence and have some way to prove it, to substantiate your knowledge, then it makes a lot of difference.

One of the things I want to tell you about AFF is there's many different brands of it, but it doesn't matter. One brand is about as good as another. There's also many different brands of liquid Sea Kelp. It's very good. It doesn't matter which you get, whichever one you can get the closest to you or most economical. Get delivery when you want it, all that makes a difference. So use it as it's instructed.

Now we come to the subject of soils. In order to understand soils, we should understand the specific gravity of soils. What does specific gravity mean?

R – Weight per unit volume.

That's right. It's the weight for any given volume in soil. Which of our soil nutrients will be on top?

R – The lightest ones.

Where will the heaviest ones be?

R – On the bottom.

Right. Each one will seek its own strata. Remember this, the calcium strata is the 10th strata. There are places where this 10th strata comes clear out of the ground and goes a mile high. Like the Rocky Mountains. Even calcium carbonate strata comes above the ground. But as a general rule when it is a mixture of substances, put into a centrifuge in solution, it will seek the 10th strata when it settles. What is the lightest of the elements we find in soil?

R – Not counting hydrogen, it'd probably be magnesium or lithium, if you're counting lithium.

Really we don't consider lithium as a soil nutrient.

R – Nitrogen?

No, something lighter than that. Carbon. Carbon 12. what determines the thickness of your topsoil?

R – Amount of carbons.

Right. Carbons determine the thickness of your topsoil. We had this in your first course. So all your carbons keep coming to the top. So if you disc and push this carbon to the left or the right, both ways, are you getting the carbon back down deep enough? Are you thickening, increasing the topsoil? You are not. So the idea then is in row crop farming, you turn it, but in orchards you can't. now how do you get your carbons deeper in your orchards and groves? How do you get your carbon down, it has a tendency to come to the top. How do you get it further and further down?

R – Put it down and with your calcium. Put your calcium on top and drive the carbon down in.

Well, it helps a little but there's other ways to do it too. That's one. Use the calcium it has a certain amount of carbonates with it. But how do you get the actual carbons themselves deep in the soil?

R – Put it on top and disc your soil.

You don't disc in your orchards. You don't plow.

R – Put them in water?

Water makes them come to the top, they float. They're lighter than water. what about the density of your soil? Ever hear of carbon density? Also, your phosphates do what? What do your phosphates do to your soil? What effect do the phosphates have on the sodium in your soil? What does baking powder do for bread?

R – Make it rise.

Right. Makes it rise, aerates it. When it aerates it as deep as the oxygen goes in the soil, it aerates. Then what happens? How do you get down in there with it though? It'll still float. I will still come to the top. How does it get down in there deeper? Bacteria. As deep as the bacteria goes is how deep as the carbon goes. Earthworms make a carbon also. They make crystallized carbon 12. Now earthworm castings are a wonderful form of carbon. Also, I'm trying to get this Trilby 3 for you to use for carbons and it is a most wonderful product. But we've been unable to locate the crude carbon from which it is made. But we're trying still to find it somewhere. Maybe in some of the islands or some

foreign country. But we'll find it somewhere. In order to manufacture the carbon 12. about, during the early 50's, I was sent from England, some carbon 12 and it was from Earthworm castings for evaluation. I was only sent a pound and it was valued then at \$300 a pound. It's carbon extracted from earthworm castings. So I took this carbon and I worked out a formula, that I could make this carbon and manufactured it and we came out with what we called Trilby I, II, and III. Three is the one you'd use on the farms and it is remarkable the results you can get when you apply it. Especially in areas in which the soil does not have enough moisture in it. Also where you have excessive heat. And if you want to raise or lower the temperature of your soil, what ingredient would you add?
R – Ammoniacal nitrogen.

That is right. Ammoniacal nitrogen is the one you'd use. So how much would you apply per acre? About 100 lbs. at a time would be sufficient to change your temperature. Now, as we go into study stratus soils and soil temperatures, which go along with the soil strata. Do you see how important it is to know the specific gravity of the anionic and cationic energy that these substances contain in order to know what strata they're going to be in? Which strata would you find copper in? We have copper, magnesia and we have iron. Which of these 3 is the heavier in the metallic?

R – Iron, no copper is heavier.

Copper is heavier than iron, so copper is correct. So the copper then is 9th strata and iron is the 8th strata, manganese is the 7th strata. So as you begin to study the nutritional value of the elements, then keep it in mind. phosphate is the 3rd strata and potassium is the 4th strata and magnesium. . . Anionic substance. . . I had my mind on anionic. Then magnesium is 24, so it would be the 2nd strata, then carbons. Now your hydrogen, oxygen is a compound, we do not consider those in elementary form. So you can fill in your stratus by your atomic numbers.

Q – What's 5th then? Did you give that one?

A – Magnesium? What is zinc 65, that's way up there. Copper is 9th, 63. Zinc it takes from the air. We do not count zinc one of them. What is aluminum? 27? It's not considered a soil nutrient but it does have a place in the stratus. Then that's the 5th one, aluminum. So you find that in stratus.

What does aluminum do for soil? It's not a soil nutrient or plant food nutrient. What does it do for soil? Why is it important? Is it important?

R – Is it a catalyst?

No sir, but you're getting mighty warm.

R – Conductor.

Right. Electrolyte. It's like little transformers in there. Picks up the electrical charge and makes the soil carry an extra bit of current thru the soil. What voltage do plants live on? 110 volts of electricity. There are certain plants that are said to go to sleep; they fold their leaves, close up. What causes those plants to do that?

R – Someone turns the electricity off.

What causes those leaves to fold at night?

R – Magnetic energy from the sun.

Well, you can have the temperature even hotter at night than it is in the day and they'll still close up at night. What causes those leaves to close up? Any idea? The heat from the sun beam itself, the radiation, even though you may have thick clouds. That sun beam still comes thru those clouds enough to cause that plant to loose its magnetic attraction. And by closing its leaves tightly together at night, nature then permits it to pick up more nutrients from the air at night, by being folded than if they were opened. If you ever examined the structure of those leaves under a powerful microscope, you're going to see that they're extremely different from all other plants, very different. They are about as different as the Jellyfish is from a Toadfish. In other words they have a very pores leaf. Unless they closed up, the tree would die. So this is the reason that nature lets them close up, because the sunbeam light itself separates them. The radiation from the sun. you can have clouds 2 miles thick and that beam will still come thru to cause them to open in the day. And when that sunbeam ray is not there, even though it's a dark, dark, day, they will still open and that sunbeam comes thru to open it.

Q – Infra red or ultra violet?

A – Infra red, yes, opens that leaf.

Now, what I'm trying to get at, is this. Nature is at work in plants forever and you're not supposed to try to make a plant do anything. What you are supposed to do is to co-operate with nature. In your soil program, one thing that you want to always keep in mind is your ionization of your soil. Keep your soil highly ionized. And you do this with the metallic particles that are in the soil. But don't let that aluminum fool you. It will fool

you if you are not careful. It'll lead you astray, so just don't let it lead you astray. How could aluminum lead you astray in the soil? How could it fool you?

R – Makes you think you have a nutrient when you really don't.

How would that show on a soil analysis report?

R – Ergs? Nitrogen test? Say there's more energy than there really is?

That's right, you'd say there's more energy there. Now what makes energy?

R – Anions and cations.

And how does that show on your chart?

R – As ergs, but.

No, not as ergs, not as ergs.

R – pH.

pH, that's right. It's a measure of the resistance. It can make you think you've got more resistance than you have got there. It can lead you astray. pH is always a measure of resistance. It can fool you, it can lead you astray. Now is pH a quantitative or qualitative measure?

R – No.

Why? Then you said no, why isn't it?

R – Because in the first class you said that.

I know, but I want to know why it isn't now, I want to know why it isn't.

R – Because all we're after is how many anions and cations are available. Not the quantity. Well, I know it's not a measure.

The experiment stations say if you got a low pH, you need calcium. If you have got a high pH you don't, is that true?

R – No.

Why isn't it true?

R – Well, there's a lot of other things that could influence pH besides calcium. You can have very low calcium and an extremely high pH.

That's right. The pH has nothing to do with whether the soil nutrients are there or not. Are you trying to tell me that a pH does not measure volume of calcium?

R – Sure it measures the volume of calcium if there was nothing there but calcium, if you were just measuring calcium.

I mean in the soils, in the total nutrient of the soil?

R – No.

You're right. No it doesn't. Just trying to see you stick to your guns.

R – If you lime by your pH, you are going to go bankrupt.

That's right, that's the fastest way to go bankrupt. A pH is not a measure of volume. It's a measure of resistance. Give me an example.

R – You could have a soil that is very high in magnesium and very low in calcium and you are going to come up with a pH which he'll tell you, look, you don't need any lime.

Right.

R – Or you get a high calcium soil with a really great pH and you won't do anything else for it.

Right, that's right. What about water? What's the pH of pure water?

R – Well, the pH of distilled water is 7.

Seven. That's right. How much acid and how much alkaline is in it?

R – None.

Comprehend? What about white sand, pure white sand?

R – Seven.

Seven? No acid, no alkaline? If you sent that to the Experiment Station they'd tell you, you didn't need it, you had plenty, by a pH reading. Does it make sense? Doesn't make any at all. So what I'm trying to do is to get you to evaluate your soil by the factors that you have.

We've studied a lot about the things that we are applying to soils. The pre-planting stage, or the pre-blossom stage on orchards and groves, etc. In this study that we have taken up so far, what. . . let's assume, that we have our phosphates on now. We have our calciums on. And we go out there and we take a sample 6 inches deep and we run this sample of soil. We know we have applied 400 lbs. of phosphate per acre, we know that. We know that we applied a ton of calcium. We know we've done that. And we've applied chicken manure until we know that we have at least, we will say 40 lbs. of nitrogen per acre. But we go out there and we test this soil 6 inches deep. Oh, we've applied these things 6 inches deep and we come up with a reading that's only a little bit better than what we did to start with. Why?

R – It hasn't got to the depth.

It hasn't got down. What do we call that? There's a name for it and there is a phrase that we use here, always in this regard. What is that phrase? Density. We didn't get a true reading because of the soil density. It had not been evenly mixed with the soil yet. Comprehend? So don't get disappointed to think that you got gypped or something on that order. Now, let me tell you what I used to do with at least 2 soil samples out of every group. I always hoped that the farmer would do exactly what I told him, but sometimes he didn't. So I'd always take 2 samples out of the 6 samples and I'd just take the top inch, just the top inch after the plain top was just barely moved off. And I'd run an NPK test on just those 2. and from that, if he'd applied something and his weather had been dry and hot and hadn't got enough rain to blend it thru, then I would know how much to count on to magnetize the earth down 6 inches deep. Sometimes he did what I told him, sometimes he didn't. But you know what happened when he didn't? he got a letter telling him what he had done and was he surprised. He was quite surprised. You see what I'm saying. If you're in the engineering business, don't take any chances. And one more, one of the most dangerous things in the world for you or anyone else to do, is to use a little bit of something and get a marvelous result and then assume that a lot would do a lot of good. It'll do a lot of harm. Just because a little does a lot of good, don't think that a lot will do a lot more good, it won't.

I know one man one time, which put 200 lbs. of cottonseed meal on per acre on his sugar cane. It did a marvelous job. In fact it was so beautiful that he went out and added another 1,000 lbs. to the acre. Cottonseed meal burned it up – burned it up. A little bit did that much good and he was going to do a whole lot, so as he . . . As you work with soil, work out the amount that you need, and go from there. Cottonseed Meal is a wonderful fertilizer if you can get it. It's got about everything in it. It's a good fertilizer, it's a good top dressing. However, every ant this side of San Francisco will come to get breakfast there and stay for supper. Ants really love cottonseed meal. So if you must add cottonseed meal, you better add a little fumigant with it. Harmless fumigant with it, like, well, I would suggest snuff. By the way, that's good stuff to add to your sprays too. Two or 3 cans of snuff to each hundred gallons of water. it sure forms a fume for a long time in that tree. Bugs got more sense than some people, they won't even have anything to do with tobacco, won't have anything to do with it at all. So this snuff is an excellent thing

to use specially to use in home gardens. It makes a wonderful stuff to dust the plants with. And if you'll dust the plants when they're wet, it'll stay on there. And a bug can really get hooked 'til he can't ever get un-hooked.

Q – Is it really worth it though for a preacher to go buy snuff? People would. . .

A – It will work the same for a preacher, same as anybody else. It doesn't make a bit of difference.

R – They're already talking about my "still" now because I'm drinking every hour on the hour.

Q – Could you add any snuff to your little capsule bottles?

A – No, it won't work there. It has to be applied directly as a dust. It has to be applied as a dust.

Please do not do what I knew one farmer to do. There was a shipment of flour that got condemned and he bought it cheaply. He was going to use it as a base for a dusting agent. He did, he lost some "dough", it didn't let the plants breathe. It plugged up the air holes. That was some dough he had, he wished he didn't have. So please don't use flour as a wetting agent.

There's a number of things that determines soil moisture in the soil. And did you know carbons are one? What are some other things? What are other things that controls or helps to control soil moisture?

R – Organics.

Your organic substances, o.k. You got carbons in your organic substances. What's something else?

R – Phosphates.

Phosphates help somewhat, yes. There are a whole slew of other things, just keep on naming them. The size of your soil particles, the number of holes that's in each grain of sand. What are some more now? There's a whole lot more.

R – Humus.

Humus is organic substances, yes. What about your soil temperature? That's the major factor in the controlling of your soil moisture. What would cause soil temperature to be below normal?

R – Full Moon.

Well, sometimes it works out like that. But that's not the main reason. That's for the air. You're saying the air does, for one thing. But what are some things that cause soil to drop lower in temperature than it should drop? Lower than you would like at least?

R – Would ammonia do it?

Lack of ammonia is one, lack of ammoniacal nitrogen, that's one. What are some others? Lack of compost. What is the difference in the raw manures and the compost? What is the difference?

R – I say the difference is decomposition.

Decomposition. Now whenever compost is breaking down, what happens?

R – Produces heat.

I mean whenever manure is breaking down, what happens?

R – Produces heat.

Produces heat. And what does the heat do?

R – Evaporates the moisture.

Evaporates the moisture, exactly right. Now there's another reason. Now we've got 7 reasons. There's some more reasons, what are they? There's more reasons why the soil loses its moisture. Did you ever hear of soil being dead soil? What does that mean? What is a dead soil?

R – No bacteria?

There's no bacteria. Soil lacking in bacteria. Now, why doesn't the soil have bacteria in it? It's got plenty of humus, but why doesn't it have any bacteria in it?

R – Might have too much chlorine.

Too much chlorine in the soil o.k. That's nine now. What's another one? You have problems with the soil temperature, what's another? Air drainage, you ever hear of that? Your air drainage. What does the air drainage have to do with soil temperature? Is the soil moisture, I mean is the air moisture generally, but not always, I'm talking about generally. Is it generally lower when the wind is blowing, or higher?

R – Lower. Higher.

Generally the moisture in the air is lower when the wind is blowing. Now what does that do to the soil?

R – Dries it out.

It dries it out, how? If you hang clothes on a line, and there's a wind blowing, do they dry quicker with the wind blowing or without it?

R – Blowing.

With the wind blowing, it also dries the soil out. So your air drainage has much to do with your soil moisture. Did you realize that?

R – Definitely.

That's right. Now, what can you do about it?

R – Plant windbreaks.

Windbreaks, that's exactly right. You plant windbreaks, now what else are we going to do about it? That's just one thing.

Q – How about putting leaves as a ground cover?

A – Well, it'd blow those away I think, but it'd be a good idea if it didn't

Ground cover, o.k., we'll say ground cover, plants especially.

R – Cover crops.

Cover crop? But do you want a cover crop in a corn field?

R – No, not at all.

No, o.k., cover crop. But I thought I really drove this point home this morning. But what else is there that keeps that moisture from drawing out of that soil? There's one major factor that keeps moisture, now we discussed it very thoroughly this morning.

R – Carbon?

The carbons hold the moisture and take it out of the air. But, that's not the factor that really determines the holding power.

R – Phosphates?

Well, it's a part of it. One of the links in the chain, but what over all chemical reaction in the soil, what is it?

R – Protoplasm?

Protoplasm. That's exactly right. Why can't the wind draw the moisture out of the protoplasm?

R – tied up too well?

Tied up to well, there's another reason why. Why can't it? There's a reason why it can't. Chemical reason why it can't get it out.

R – Part of the molecule is tied up?

Because it can't get to it, that's why. It can't get to it. In other words, it forms a thin crust there, very, very thin. And this thin crust the wind passes over, it can't get to it. Haven't you seen that little crust form on soil? And after the wind stops blowing, if you don't break that crust what happens? Air can't get in and out of the ground. That is why you have to break the crust. This brings us to the point and importance of cultivation.

Now, what are some of the factors that determine whether we should cultivate or not?

R – Weeds?

Weeds are one.

R – Weather conditions.

O.k., be more specific.

R – Humidity.

Humidity in the air.

R – To break that top crust.

That's right. When that crust form, you want to break that crust on the top of the ground. But what are some other things that determine the factor of cultivation? What is the primary factor of it?

R – To stir the soil up deep enough to get the moisture down. aerate the soil.

Aerate the soil, but there's one more factor very important that I want you to get to.

R – To move the dirt up towards the plant.

That's another factor to move the dirt closer to the plant.

R – Ionization.

Yes, all of it has to do with ionization. But the other is to help nature break that sodium content. This is in your early applications. A little later you won't need to. In other words you are aerating the soil. That's one of the factors. But the idea is to keep that sodium content. In other words, what does sodium do to the soil? Just how does it work? What does it do to the soil when the soil contains too much sodium or when the sodium is out of ratio with the other elements? What does it do?

R – It becomes hard.

It compacts it. Compaction, that's right. In other words, you cultivate to break that compaction. That's exactly why you do it. And those are the reasons that you cultivate. No, a lot of people get there and cultivate, just to be cultivating when it doesn't even need it. Do you realize that? Does it make sense? Are they saving money?

R – They're tearing up the roots.

They're tearing up the roots? How deep should you cultivate when you cultivate? I'm talking about row crops now or truck crops. Just as shallow as you can cultivate it actually. Very, very thin, very thin, unless you have a very high sodium content and have to cultivate deeper.

Q – What is the sodium on the strata?

A – It's all thru – it's equal, it's hard, it's what makes soil hard like a brick. It really makes it hard.

Are there any questions now up to this point on cultivation of row crops?

R – One reason for going deeper would be to turn up your soil from the center into your crop.

Yes, yes. Also, to get rid of the grass. It's good to get rid of young grass.

Now, in the early spring of the year you have a lot of weeds called "May" weeds. May weeds you know, only last about a month. A lot of people get terribly upset about those. They're not going to do you much harm, very little. There are certain grasses though that gives you a fit in the spring of the year. Can you name some of them? That really gives you problems? What's that?

R – Bermuda.

Yes, it's a Napier grass. One of the Napier's.

R – Chickweed?

That's not a grass. It can give you trouble though. Chickweed can really give you trouble. What did you say?

R – Foxtail

Foxtail, yes.

R – Dandelion.

Dandelion, in certain areas can really give you problems.

R – Deer tongue, Johnson Grass.

Johnson Grass, yes. It's one of the Napier's. Now one thing too about the phosphates. It will not kill the Johnson Grass or Napier grasses because it comes up from stools. And when it comes up from stools in that order, it won't kill it. It will kill a seed from it, but it won't kill the stool that comes out from the roots itself. So these are factors that you need to keep in mind closely when you're cultivating a crop, is cultivation the right time, the right way, at the right moment. Now what is one of the things that will retard the growth of grass in your crop? Anybody have an idea? Shade. Shade. Grass needs lots and lots of sun, so shade will create and put a lot of retardant to it. So consequently the closer you can plant your rows together, the less cultivating you need. That's a very important factor.

Q – You don't like this plastic deal that they're starting in Florida. Putting their tomato plants down in holes?

Very good, very good. But very expensive on large commercial scale, it's very expensive. Whenever you're doing concentrated farming on a very small area, I say about a small area, I mean 20 acres or less, it's alright. But when you talk about hundreds of acres, you can't do it. And in a lot of places, the wind blows with such fierceness it vacuums it off of there. But down in that sand, it forms an adhesion that holds it on there, but all sands won't hold that material. Now for certain things it's excellent, like strawberries, tomatoes, and peppers, it holds the moisture in. but you also need to prepare to get water into that crop, even with the plastic down. It's an excellent thing. So as you begin to work with these soils and cultivation of soils, be sure you don't cultivate just because somebody else is. Cultivate when you need it. And it is this shadow that will stop more grass from ever getting started than anything in the world. So the closer you can put the crops together, the closer you can put the rows together, the less cultivating you are going to have to do.

Q – Do you recommend any minimum width apart?

A – Well corn, I like to plant 20 inch rows.

Q – That's about as close as you want it?

A – That's right, about 20 inch rows. You can work it out one time then.

Q – Like beans or so, you can put a little closer?

A – No. Beans are a little different crop. You need a little bit more room on beans than you do corn.

Q – Do you dress the sides of the row with manure?

A – You put it in the row, put your compost in the row. Now your manures, you broadcast it.

Q – It seems like it would kill the weeds if you put it on in between the rows?

A – I misunderstand you perfectly.

Q – Will it burn the weeds if you put it in between the rows?

A – No, no it will not. So in working with this, with these problems, you need to work with them so that you will be prepared to plant your row crop as close as you can together.

However, there are machineries that are going to have to be made or fixed for these closer rows. If you do mechanical harvesting, you've got to stay within the bounds of your machines in order to do that. But many times you can do that. So your averages are the same and plant a double row, say 6 inches apart. And your corn then will come up and it will still catch into your machine. But if you're not careful, unless you have a very good machine, it'll stay clogged up all the time. It'll stay jammed up.

Q – How do you account for planting your rows east and west if you plant them 6 inches apart? How did you plant them?

A – The same parallel.

Q – So the one didn't run into the other one?

A – I'd plant them parallel.

Q – But would you plant them north and south or east and west?

A – If I could, I'd plant all of my corn and row crops east and west.

Q – If you put them 6 inches apart, you'd have the one from this running right thru the next.

A – That's so close it isn't going to make any difference. It's the same as one row, it's the same as one row there. You're still feeding out of the middle again.

Q – One more question, is there any way to get rid of nut grass?

A – Yes. The finest way in the world to get rid of nut grass is to build you a pen around it, fence it in, and it won't go outside that fence if you have good hog wire fence. Then you put a hog in there and he'll get the last grain of it out of there. And that's true, I've done that on big fields. Fattened a bunch of hogs on nut grass by fencing it in with hogs wire. And believe me they can really get it out of there too. And that's the quickest, cheapest, most economical way. And not only that, but you can at least break even while you're getting it out. The money you have to spend on the wire, you just about break even with the hogs. But then you can sell the wire to somebody else and do the same thing.

Don't eat the hog meat, just use him to get the nut grass out. I always knew a hog was for something, o.k. But they will, they'll dig the last one out, just like they will peanuts.

R – I got rid of some nut grass and don't know what happened, but evidently that what happened.

That's right, hogs will really get it out of there. They'll get the last, just like putting a hog in a peanut patch. They'll get the last peanut out of that ground until you can level it and a year later you can look for a peanut hill and there won't be one. They'll get the last peanut. I think his nose is magnetized to hunt a peanut because he'll get the last one. He'll sure get them, and that's the best way in the world to get rid of nut grass. I've done large fields that way where there were just open fields and it's a pesky thing. And it will go down, 18 inches deep some of those nodules. But please don't use the Yorkshire Hogs, his nose is too short. Get one of those ones that's got a long nose you know. If you pick him up by the ears and if he balances, you know he's fat. But you can fatten a bunch of hogs on nut grass and they really like it. So, it's fun, but it's true folks, it's absolutely true. Now you might be in the city in zones where in that there might be a city ordinance. But anyway you can get him in and get the nut grass out and get him gone before the ordinance has time to take effect. But it really does get the nut grass out.

But, learning your farming practices makes a lot of difference. I mean, it does a lot of good. There's also what is called a Dollar grass, Dollar weed. You know what the dollar weed is? Now that is pesky, that is a real pest in some areas and a hog will not bother that at all. And the best way to get rid of that is to add some sawdust to your soil. It hates potassium with a passion. In golf courses, you can't add sawdust on golf courses on the tees at all. But the thing about it is, you're not harvesting that grass. And if you use a little bit of potassium wisely, you can get it down there and it will rot that root. It looks like something like a violet root or palmetto root and it'll get down there and rot it. And then move your phosphates up real quickly and you can get away with it, even on a golf course. But they'll ruin a gulf course. It'll clinch out every bit of the Tifton or the other grasses that you have on a golf course. That dollar weed is a little old lily-pad looking thing. And one other thing that you can often do to it, is to let that green dry for about 2 weeks until the grass almost dies. And then wet it for the next couple of days and bring

the grass back and let it dry again. And sometimes you can dehydrate it. But it's a job to control by moisture.

So these are cultivation practices that you should keep in mind. And in putting in corn, generally always plant it in the bottom of a furrow so you can pull the grass to it. I mean the dirt to it and the grass too that's growing. And generally one time cultivation after corn is planted in 20 inch rows or double rows, should be sufficient cultivation for the entire crop of corn. But you must have all of your nutrients down in the soil practically before you plant your crop. Do not try to get by with side dressing, only as an emergency case of an extremely heavy rain. But even then at 6 or 8 inch corn, you still can evaluate what type top dressing you'll need, and apply it accordingly. Are there any questions now about cultivation? Cultivating of row crops?

Q – I was going to ask you another thing. You said you would recommend a single sweep to stir your soil?

A – Right, one single sweep, that's right.

R – I had farmer tell me one day he took and sprayed his corn when it was just coming up with Atrazine, at the rate of 1/3 pound per acre. And he said it didn't kill the weeds, but it just stunted them enough that the corn grew up away from the weeds. The he would go cultivate and cover everything up.

Yes, I wouldn't have used Atrazine, I'd just cover them up to start with.

R – Yes, I don't advocate Atrazine either, but that's what he did.

I don't advocate it at all, period. I have never seen a weed killer that didn't do harm in the long run. One of the greatest things it ties up is phosphates, terrifically. Every one of them does.

Q – Are you going to discuss the laying the land aside for one year out of 7?

A – No.

Q – There's a question on soil. Now there's quite a few people that are still fumigating soil. It's done where they're doing a lot of vegetables and root crops. Maybe I'm ahead of my subject here, but they are harmful aren't they?

A – Yes. There's 2 cheaper ones that's used, 2-4-D and 2-4-5D. Those are the most common. And also one of the safest one to use of all is Tear Gas.

If you are going to use any of it, use tear gas. That's the safest one to use. And it rots the seed out and then it evaporates and your soil is in pretty good shape. But tear gas is the safest soil fumigant that there is.

R – Besides steam.

Yes, besides steam yes. Now you can do steam on a small area, but you got a large farm, it's really a problem. You're talking about a hundred or two acres of steaming it, you really got a problem. But you really don't have a problem if you have tear gas to use.

Q – I have a question here. Maybe I shouldn't bring it in. if you don't want to answer it, it's alright. It's a little bit out of range here, but I had one of my customers call me and he said that he had used a fumigant and he'd used it for tobacco plants. And of course they sowed radishes in there also. And somehow or another, I guess it was about the first month of pregnancy for his wife, when his wife had one of those times you know, they have a peculiar stand on what they want to eat. He said she almost lived on radishes. And when the child was born, it was born with one leg. And he wondered whether this would have had anything to do with the fumigant they used in that field?

A – Probably did. Yes, it probably did, had a genetic reason. It's dangerous, let it alone. Stay away from it. The gas is safe to use, because it takes about 42 days for it to go out. And you should wait at least 42 days from the time you use it, before you apply. Now they say 2 weeks, but if you'll wait 42 days, it'll be out, o.k.

Q – This is after planting?

A – No, this is long before you plant. It will kill everything on the acre. You don't use this type of thing. If you cannot afford to grow the weeds, you can't afford to farm. So please remember that.

Your weed control is economical because those weeds you can turn into green organic, and please do. I had farmers that set out orange groves and they sprayed their weeds around the tree and killed the grass. And those trees grew up much faster than those that didn't. I mean in his own farm that he didn't use the grass killers on. But I had also, groves that I serviced that grew up faster than anyone that had used the week killers. Because, I used the grass to make the trees grow. I kept them mowed. I did a better job. Now, the thing that had happened is this. The trees just did fine for the first 4 years. And then they began to get stunted and stunted and stunted. And the fruit was hard and woody and had black spots on it, difficult to control. In fact the production was way down. So I would say just let them alone. You're not doing it nature's way, you're drugging them. You'll have a whole grove of plants all drugged on drugs. And when you got a crop drugged, you are drugged too, financially drugged. The drug bit will drag you in mud really, yes.

Q – On this straight chicken manures, is it safe to stockpile it?

A – Yes, certainly is. but in stockpiling chicken manure, you ought to have a certain amount of moisture in it. You ought to get this black plastic and put over it. So it won't rain on it. Water on compost piles keeps your temperature too low. And you should let the temperature get up to 144°.

At what temperature do plants grow best in soil, most crops?

R - 68°.

Sixty eight to what? 85°, 68-85° is the ideal soil temperature. Suppose everybody's in such an awful hurry to get out there and plant their crop before that temperature gets up to where it should be. And the soil temperature is running too cold, what happens?

R – The plant becomes stunted.

That's right, it becomes too woody and doesn't grow up as fast as it would otherwise. So you may see seeds sprout from volunteers and things of that nature. But if you'll notice that they're a lot more light colored than they should be. They don't have the deep green that they would have if the soil temperature was warmer. Now, that's certain crops that need a lower temperature than others, i.e. cabbage, lettuce, escarole, romaine, onions, English peas, garden peas, radishes, beets. They can stand the temperature a lot lower than some other crops.

Q – Turnips?

A – Turnips, yes, turnips can stand quite a bit, but not quite as low as these others.

Now, the high temperature crops are your green beans, pole beans, soy beans, corn, and etc. Those are your high temperature things, also grapes, oranges, citrus, papayas, bananas, and pineapple are others. But you get into apples, peaches, plums, pears, they can stand a lot more temperature. But did you ever notice that a grape vine is about the last one that sprouts out in the spring of the year? And a pecan tree is another. It's real late. It's going to be real sure that the winter is over before it sprouts out. It's not going to take any risk. So it's those soil temperatures that determine. And if you'll wait on your corn, many times at least until the pecans begin to bud out and the pecan buds begin to come out and grape buds and then plant at that time. You will increase your yield of your corn by waiting until your soil temperature gets up. Providing that all things are constant. Because corn does get retarded and it effects your yield in the end.

When you are setting a hen on eggs, which is the strongest chick? The one that hatches first or last? The one that hatches first is the strongest. Now, which one grows up the fastest the one that is the strongest at first or the one that hatched last?

R – The last.

No it isn't. It's the first one, the healthiest one. He grows up the fastest. So it is with corn. Let me tell you this about the process of osmosis. The process of osmosis is not limited by time. The shorter length of time that you can bring things into production, the higher the yield. We had that in the first course. The quicker you can produce it the higher the yield. Why?

R – Goes into fruit and less into the plant.

Right, also because it's not retarded. It's not hindered, it must have everything that it needs, including soil temperature, weather temperature and everything else. So the shorter length of time that you can use to grow any produce, the higher the yield per acre. What determines the height of the yield per acre?

R – The mineral content?

The mineral content, but there's one factor in the plant itself that determines it. What is that?

R – Potash.

It determines some volume, but there's one more factor besides that. It's the sugar content. The higher the sugar content, the higher the mineral content. The higher the mineral content, the less time it takes to grow. So one of the factors that I have learned over years of work is, don't be in to big of a hurry to get crops in, in the spring of the year. However, it is excellent to be prepared when the soil is right to go and go rapidly. Now, for instance, suppose you plant your corn, we'll say real early. And it doesn't grow off too fast, then you have a grass problem, grass problem, grass problem, you just fight, fight, fight, fight. But suppose you wait and let a couple of crops of this get off first, waiting 'till that temperature, soil temperature gets ready, you might have to disc a time or two, very quickly and very fast. But in the meantime the grapes haven't sprouted out and the pecans haven't started, then you've got the first 2 or 3 flashes of grass disked in first. And you get out there then and plant, when the pecan buds and so forth. And then it really grows off, and with one cultivation, you can do a terrific job and you have saved at

least 8 or 10 dollars an acre in this one factor alone. Does that make sense? It makes a lot of sense. Yes.

R – If you're doing it for yourself, if you're doing it for the market then there's an optimum point where you can pick up an extra dollar by getting it first on the market.

Well, some people think that, but I'm going to tell you this. Top quality produce brings a top quality price providing that you know what you got. One of the weaknesses that farmers have down over the years is growing produce, some of them poor, some of them good, some of them medium, some of them excellent and yet they say to the buyers, "What will you give me for it?" Stupid, he should know what his produce is worth.

However, every farmer thinks his produce is better than anybody else's. but I'm going to tell you this, when you know what your crop is, all you have to do is put a label on it giving the sugar content and have your brand label on your product. And the first year you probably won't make any more than anybody else. But the second year, they are going to be looking for that label. And you won't have to raise the price. You won't have to say, what are you going to give me for it? They'll be bidding for it. The very moment they see that label, they'll know it's a superior product and they'll holler for it. Not only that, but they will be coming to make a contract with you for your produce. You won't have to hunt. The first year you might take it, but the thing about it is, if you ship your products that you know are superior to others, actually by refractometer sugar test, if you know that and you don't label it so that it's recognized in the market, then you're already licked. You got something superior and you haven't labeled it so they don't know what it is. so I encourage people even if they have their produce packed thru a commercial packer. That they watch it go thru and they put their labels on it, put a label on it. Believe me, it'll bring a price. It doesn't matter whether it's early or late, the market's never been flooded with top quality produce. If you're going to produce the same junk that everybody else is, then you're going to have the same problems that everybody else has. My advice to you is never get into competition with anyone about anything. You don't have to unless you want to, so why do it? Produce something superior and the world will cut a path to your door. Be superior, do it better. And you won't have to worry about a market for it.

The higher the quality you produce, the greater the yield per acre. For instance, a person that plants early and gets a 40% yield of U.S.#1 and he gets in 20% yield of U.S.#2 and he has a 40% loss, there's where his profit goes. Suppose that you have U.S.#1 at 95% and nothing else. Who makes the most profit? The 95% even at the same market. The lower the quality, the less the quantity. And there's no exception to it. So watch your soil temperatures. It has much to do with your cultivation program. Don't be in too big a hurry to plant in the spring of the year, but get your soil ready. Get the problems out of the way. Do you know there won't be a weeks difference in the corn that you planted 3 weeks ago and the one you planted 3 weeks from now? Actually there won't be over 10 days difference in it if that much. And the yield will be that much greater. Do you know that oranges that come on the blossom over a 6-7 week period will mature at the same time? Do you know that? Do you know that peaches that blossom anywhere, we'll say over a 40 day period, will mature at the same time? Do you know that? If you fertilize your peaches so that the first blossoms get killed off and second blossoms get killed off and the third blossoms killed off, you can still have a heavy crop with the fourth crop of blossoms? Now where that blossom has come out on the end of the stem, another one won't come out, but down further on the stem there will be some coming out. And they'll all come in at the same time. It won't make any difference. Do you know that? Try it, it works. Anybody go any questions?

Q – I have one, a little one. When I was raised up north, we had a lot of flat land and a lot of sun all the time and back in the mountains where we are now, we don't get anywhere near the amount of sun. we get the same or about the same amount of crop.

A – That's right.

Q – So sunlight really doesn't have that much to do with it?

A – Solar radiation. This is what I was talking about a few minutes ago, solar radiation.

It has a lot to do with it, but its solar radiation. That sunbeam that anionic sunbeam can come right thru the cloud, just like the antenna beam can go to the bottom of the ocean and touch a submarine without even touching a particle, and still a crop can pick up enough.

Now, let's talk about something that we haven't talked about yet and some theory on it which I'm hoping to be able to try in the next few years. I would like to get some uranium rock that runs 8 or 10 or 12% uranium. And I'd like to grind that rock down to a

fine dust. And I'd like to apply 200 lbs. of it to the acre. And then I would like to try to grow an acre where this uranium dust isn't applied, over where it is applied. Now, why would I want to do that?

R – Possibility of harnessing the electronic energy.

I want to bombard that electronic energy every way I can bombard it. It may pay me to put it in strips across the field in opposite directions from the way your crop grows. But this is some research I'd like to do. I'd like to see the difference. I believe it would decrease the time in which we are growing our produce.

Now, what are some factors that will help decrease the time in which we grow our crops? What are some of the factors?

R – Temperature.

Temperature is one, Name some others.

R – The right food.

TDN, total daily nutrient, that's another one. What's another?

R – The number of hours of sunlight?

Well, it has a lot, somewhat to do with it. We'll just say light. And what else?

R – Electrical energy.

Your ionization factor, yes. And what else?

Q – How can you increase the ionization?

A – This is what we're talking about now with the uranium.

However, that's what your ergs tell you. Someone just asked, how can you increase your ionization? We've already answered that in the first course. Does someone remember?

R – Hoe it up, hill it up, hill up a row?

Hilling it up, but what does that do? There's a reason.

R – Increases the distance the polar system has to travel.

In other words it does have to do with polarization, but there's a word we use in there. What is that word? Just what does it do? What do we use to do that with? What do we increase the polarization with?

R – Electrical energy.

I know, but what substance do we apply to do that?

R – Electrolyte.

Electrolyte and what one is that?

R – Nitrogen.

No.

R – Nitrogen would do it.

I know, but suppose we have enough of nitrogen .

R – Sulfuric acid is an electrolyte.

In certain alkaline soils, we use some sulfuric acid, but suppose we didn't have an alkaline soil. What would we use?

R – Aluminum?

No, no super phosphate. Don't you remember me telling you that? To use that for a buffer. Super phosphate, use super phosphate about 100 lbs. to the acre and then that releases a lot more energy. How does it do that?

R – Changing from an anionic to cationic.

That's right. You're working a cation against an anion. Where's the anion? What form is it found in the soil? What's the name of your anion. What are the names of your sources of anions in the soil?

R – Calcium.

Calcium is one and what's the other one?

R – Potassium.

Potassium is the other. That's right. Those are the 2 chief ones.

Q – What about ammonia?

A – Ammonium sulfate would be one, but it would be also a buffer too. But the one to use that's most economical is super phosphate. That's the one that gives you a bombarding of the atoms.

Do you understand the principles of a Radar Oven? Do you understand the principles that makes a Radar Oven heat something real fast? What happens?

R – The molecules bounce around in there and cause friction.

That's right, it's a bombardment of the molecules and they're bouncing back and forth and that creates a friction that creates the heat. So now this is what happens in the soil. When you bombard those anions in the soil, with cations in the sulfuric acid, which is in the super phosphate, they begin to bounce and it raises your temperature. Suppose

though, you raise your temperature too much, what happens? You have a loss in soil moisture. So you have to be careful how much you use. Now what determines, which one of the soil tests determines how much available plant food you have?

R – pH?

That's your resistance. What is the soil test you know?

R – Solu-bridge, ergs.

Ergs, it's your erg test. Lets you know how much energy you have. Which uses the most ergs of energy, little plants or big ones?

R – Big ones.

Big ones, so when do you need the most ergs?

R – When the plants begin to mature.

When they're big, that's right. At what stage does your increase in production increase the most rapidly?

R – The latest stage of growth.

The latest stage of growth on corn? Where would that be then?

R – Near maturity, after the tassel.

After the tassel, 'til when?

R – Until mature?

No, there's a time there from the tassel to what? Not to maturity, but until?

R – Silk stage.

Until the silk dies, to the dying of the silk, from the tassel to the dying of the silk.

That is the time that your ergs should be the lowest or the highest?

R – Highest.

Highest, Why?

R – You're using energy.

How long is it from the tassel to the dying of the silk? How many days roughly speaking?

R – 10 days to 2 weeks.

Up to 21, yes. Up to about 21 days. That all depends on weather conditions, but many times it is 10-12 days if things are just exactly right. But about 21. So therefore you've got a chance to double your production during that 21 days.

Q – How are you going to get the super phosphate on during that time?

A – You don't. You've got to put it in way earlier. You've got to calculate on that energy way back there when the corn is only about 10 inches high.

You see what I mean? You put it on top of the soil, you don't work it in and it will slowly mix and keep gaining and gaining and gaining and come in at that time.

You're working on delayed action.

Q – You told us how to make the ergs test, but you never told us what a good value is. What should be the minimum value when you plant your crop? Forty, is that right?

R – I had 100 on one of my crops.

A – That's your maximum. 100-200 is maximum. But 40 should be the minimum that you should have to even plant a seed.

Q – When you ran the test on the soil that you brought in from out there, that is the one where you took 2 ½ cc's to 87 ½ and with your Solubridge, I got 900.

A – You just happened to hit a hot spot.

Q – Forty then is a minimum?

A – Forty is the minimum.

Q – What's the test you're talking about now? I never heard of those figures.

A – The erg test.

R – Yea, but I mean those figures you gave.

The Solu-bridge.

Q – Yea, but those particular figures, what were they?

A – 2 ½ cc to 87 ½ cc, yes, or you can use the other one with the 20-40, either one.

R – 20-60 is what we had from this course.

O.K., 20-60 then.

Q – 20 drops in 60 milliliters of water?

A – That's alright too, you can use that one also.

R – The one that I quoted (2 ½ & 87 ½) you have to multiply by 4.06.

Yes that is right. Then you multiply by 4.06 that's right, but your ergs of energy now, if you had soil. Suppose you have soil that had 600 ergs, what would that mean?

R – It means it's jumping.

It means you'd have an extremely great loss of energy. Plants can't take it in that fast. They cannot take it that fast. Where would this energy be going?

R – Into the air?

Into the air, that's right. Now some of this energy could be being picked up by the leaf, by the bottom of the leaf. Did you ever figure out why the bottom of the leaf was downward? Nature made it that way so that It could pick up the energy loss form the soil, so you can get some of it back again. It's even from the air though. Get the idea? The Lord knew what He was doing when He put the bottom on the bottom.

Q – What's the maximum that plants can utilize?

A – About 200. If you've got 200 ergs per gram of soil over that whole acre and your crop is at the climax, it can use that much and maintain it. But if it's greater than that, you have a terrific loss. You think soil chemistry is important?

It's just like burning money almost if you get your ergs too high.

Q – When corn is going from the tassel to the silk, is that a good time to foliar feed?

A – O yes, excellent time to use manganese, excellent time.

Q – How often?

A – Well, once or twice anyway, but after the silk dies, it's too late.

Q – Would it be a good idea after the silk dies, to de-tassel, to get that foliage to the soil?

A – No, no.

Q – You were talking about ionization a while age and it intrigued me. I was really thinking in terms of electrical. Is there any way you can increase electricity?

A – When you increase the ionization, it is increased electrically, yes. The voltage doesn't go up any, but the magnetic field is broadened.

Q – The amperage is greater?

A – No, it doesn't affect the amperage very much, no.

Q – When you're nearer to the pole, of course the closer you get to the earth, it gets stronger ionization. Is there any way you can increase that?

A – Yes, by using copper is one way to do it.

Q – Synthetic or mechanically?

A – A little bit of copper, a little bit of iron, your manganese and etc. that's in your soil.

Q – Can you do it by electrical conduction or anything like that? Induction I mean.

A – This is what I was speaking about, was the radium, not the radium, the uranium. Was to put that in the soil. This is what I'd like to see done.

But let me also tell you something about it too, this Min-Col phosphate will drive a Geiger Counter plumb crazy. It'll just scream at you. So it has a lot of well, enough uranium in it to really drive a Geiger Counter clear nuts.

Q – There's no harmful radiation to the body is there?

A – No.

Q – It isn't Gamma Rays?

A – No, it's not big enough to pick it up.

Q – That's the stuff you have in Min-Col capsules?

A – Yes.

Q – Electron activity, but not Gamma radiation?

A – That's right.

Any questions? We're talking about cultivation now. Now on watermelons, let's study about watermelons and pecans and things that have seeds in them, like grapes, that have to mature in order to get the crop up to its maximum. Do you know one reason so many small grapes fall off the pod is because there is not enough manganese for all of them? Not enough manganese. Also, don't forget that I told you in the first course that grapes like a lot of boron, chicken manure. Pile it up, and they will really appreciate it. Any questions?

Q – Black heart is a lack of boron. Is it possible to get too much boron on potatoes and stuff like that?

A – Not from chicken manure, no.

In using your soil nutrients, always keep in mind the effect of those soil nutrients upon your ergs in your soil and your timing. And remember this rule, a quick change in applications does not mean a quick change in your soil chemistry. In other words, after you apply your soil nutrient, it's quite awhile before it's going to take effect. It's something like flying an airplane, a quick change in your controls does not give you a quick response. It isn't like an automobile, it moves right now. You'll get a response, but it takes a little bit more time to do it. So you've got to allow for those timing changes that's in your soil. And your soil instruments are the best guide that you have. And actually when a pilot flies a plane, he's flying by instruments, so you as a farmer are farming by instruments. Does heat rise or does it settle?

R – Rises.

Are you sure?

R – Maybe it's just that cold air settles.

O.k. let me ask you a question. Why is the temperature lower in a furrow where you're planting corn, than it is up on the surface? Why is it warmer in the furrow than it is up on the surface?

R – Radiation? By actual temperature. The wind carries it away.

That's right, the wind carries it away. And if the wind carries it away, it passes over that furrow and what happens in that furrow? It pulls out the warm air and sticks down in that furrow and pulls the cold air out. Do you ever run a temperature check on furrow or ditches?

You know one night when we were boys and we were camping and they were digging some ditches, canals, between 2 lakes, but they hadn't opened up each end yet and it was a dry season when the lakes were low while they were digging it. So whenever the rains come, in the winter time, the water would rise. With the canals you could drain from one lake to another and also go thru with a boat, but that wasn't the idea. It was a water level proposition. But it started to get cold, I mean really cold and you know what we did? We got down in those ditches to sleep and kept warm. It was warmer in the ditches than it was up on the surface. Many times I've gotten in a stump hole and slept when I was a boy. Where an old stump had burned out, and it was warmer in that stump hole than it was up on the surface, because, the wind went over and drove the heat out of the soil. And before it had a chance to mix it and concentrate it and freeze it, it got back down in that hole again.

Now, let me ask you another question. If there's a lot of dead grass on the soil, does it warm the soil, or make the soil colder?

R – Warms it.

Haven't you heard people say that dead grass draws cold? Haven't you heard people say that? How did they draw that conclusion?

R – Because the frost gathers on it.

That's right, the frost gathers on it. Why did frost gather on it?

R – Because there is moisture in it.

It was warmer, that's why. The frost gathers on it and the vapor went up and the vapor froze. How wrong can they get? You know how I found out it was warmer under there? I put a thermometer in it and it was warmer under there than it was out on the topsoil. My Granddaddy died at somewhere near 90 years, and he always believed it was colder where the grass was.

Now if you wanted to warm your soil in the wintertime, how would you go about doing it, providing that you've used all methods of fertilization that you know, to get the soil warmer? What's the next thing that you'd do to keep your soil warmer?

R – Scatter old hay on it.

Scatter old hay on it, that's one thing and what else would you do?

R – Put black plastic on.

So you'd put black plastic over it? What would somebody else do?

R – Compost old leaves?

Yea, I'd plant a cover crop. Did you ever notice going thru the forest when the snow melted, that it melts under the tree before it does out from under the tree? Why? Those roots are so busy growing down there in the winter time, it's hotter, it's warmer under the tree, even deciduous trees. They're still growing. It melts under the tree before it goes out somewhere else. So, one of the finest things in the world to do to keep your soil warmer in the winter is to grow a cover crop. It can be oats, barley, wheat, rye, you name it. There's a lot of things you can use. Is there anything hard about this? See everything you look at. Can you do that? See everything you look at. Now suppose that you have squashes and if you got your soil, just right, exactly right, as best as you know, the tests and everything were just setting right on, but all the blossoms shed off, now. . . on tomatoes or peppers, all your early blossoms, or watermelon, how are you going to stop it?

R – Phosphate.

You've already done that. You got your phosphate, you got your lime, you got your calcium, you got your potash, you got your sawdust, you got your chicken manure, and they're great big plants now. But the only thing about it is, all the blossoms shed off. What are you going to do?

R – Would changing to a cationic, anionic to cationic?

Right, you're exactly right. What's the rule on that?

R – Super Phosphate.

No, no, there's a rule, give me the rule. What is the rule?

R – To make fruit you use cationic, growth you use anionic.

Anionic plant food makes growth, cationic plant food makes fruit. So now you're going to change it from anionic to cationic. You know when the blossoms start to shed off, regardless, there's a fine delicate point there in your soil chemistry that you're not going to be able to measure. It's too delicate, but when the blossoms starts to shed off, what are you going to do to stop it?

R – Add acid.

Well, what's the name of that acid you're going to add?

R – Super phosphate.

Super phosphate, yes, or you can use just plain vinegar, if you've got a backyard garden. It's a lot quicker and a lot cheaper and a lot handier. And it's in any store. Add one teacup full to two gallons. Just sprinkle it around the ground. If you can't get that, just give it a little Epson salts; just give it a physic, o.k.

Q – That releases the nitrogen?

A – That lowers the nitrogen but also changes your anions. The delicate little balance is so little, but yet what a difference it makes.

Q – How much Epson salts per gallon of water?

A – I'd use a tablespoon full to two gallons of water or one teacup full of vinegar, which I prefer to Epson salts, to 2 gallons of water.

Anything hard about that? Isn't it easy? Suppose you had a 100 acre field, what would you do?

R – If you could, you could use sulfuric acid in water.

You could, but I wouldn't go that route, not on a 100 acre field. It could be done, but I wouldn't go that route. I wouldn't do that.

Q – Use Dolomite?

A – No, I wouldn't use dolomite, because it works too slowly. It works quickly in people, but not on plants. How would you change it real quickly? Suppose you wanted to change it in just 24 hours?

Q – The cause of the blossoms falling off is you got too much nitrogen, correct?

A – That’s one of the reasons yes, but also you got an anionic condition in your soil. All your plant food is still going in anionic form.

Q – Alright, what would happen if you used a little bit of burnt lime and then turned on your irrigation? Would you stop the nitrogen?

A – Yes, but it’d take 2 weeks and you got to do it quicker than that.

Q – Regular burnt lime, it would take that long to stop it?

A – Yes. That is the one that has the iron in it. You need to change it real quickly. How would you do it?

Use the nutritional spray I gave you this morning, it’s cationic, o.k. And if you wanted to, you’d add 2 gallons of vinegar to 100 gallons of water. It does a marvelous job. 2 gallons per hundred. It does a wonderful job. You see how these things link together? Just makes a circle and comes back. All fits right into place.

Q – One gallon of vinegar and water?

A – Two gallons per hundred gallons of water.

Q – You put it right on the plant, spray it right on the plant?

A – Yes.

Q – Is there any difference with cider?

A – No, it won’t make any difference, cheapest one you can get hold of.

There’s one more thing I haven’t told you about soils that I should tell you. And that is, if you can get oil, old motor oil, real cheaply, and you get a bunch of sawdust and begin to mix this old motor oil up with sawdust, you apply 2 or 3 hundred pounds of this old motor oil and sawdust to the acre, you need to do that after you harvest the crop, or it won’t hurt to put 500 lbs. to the acre, if you want to, but I’m going to tell you, it’ll really do miracles. One of the great things in soil today, it loses its oil capacity because of the synthetic fertilizers used by yourself and your neighbors. What your neighbors use affects your farm too. So I would use old oil, 3-500 pounds of sawdust, something like that per acre, with the old oil in it. And man, o man, o man, did you ever see an old poor piece of ground, so poor that it couldn’t do anything but make a used car lot out of it? In about 3 years there was weeds 20’ high, couldn’t hardly find the cars for the weeds. What happened? It was the old oil, rust and iron it got out of it, out of those old automobiles.

Q – How much oil for the 2-3 hundred pounds?

A – O, I’d saturate it, make it like it would be a good floor moping material.

It does wonderful things for your soil. Another cover crop to use occasionally too, is Castor Beans, a crop of castor beans about every 5 years, short term. Now let me tell you about your castor beans. That's something you can plant real early in the year, and they'll come up and start to grow like mad. About the time they get this high, just cut them in and plant your corn. You got a lot of oil in the ground. Don't wait until they go to seed, if you do, you'll be fighting castor beans the rest of the year. Also, we used to grow a lot of cocklebur. Cocklebur is rich in oil also, but don't wait until they go to seed, if you do you'll be fighting cockleburs. I knew a young fellow one time that got mad with a man he was working for. And he got a whole lot of cocklebur seed and went out and sowed it on his farm. Later he married the farmers' daughter and he fought cockleburs for the next 40 years. And if he'd just cut them before they went to seed, he'd had the problem solved. But the Lord didn't, He closed his mind to that, so he could reap what he'd sowed.

Q – If you can't get rid of them the first year, you have to wait until they are all sprouted, they come up 2-3 years later?

A – Seven years later.

Q – How can the seeds preserve for that long?

A – It's preserved in oil.

R – Other seeds will go longer than that.

Yes. Isn't farming interesting? I said in my first course, you do not have to be a soil engineer, but it sure does help. The more you know about the farming practices, the more you can do.

Let me tell you about another type of farmer. If you do much soil engineering work, what your going to do, which I told you about in the first course, Doctors and Lawyers are very bad about this. Lawyers like to postpone a case as long as they can and whenever you give him a prescription to apply on their farm, they're going to postpone the case until it's too late, too late. They didn't get it done, even when you gave them a 4 week period to do it in. They just didn't get around to it, so consequently, when I learned how they did, I wouldn't serve a Lawyer unless he would put his Superintendent directly under my supervision. Or a medical Dr., I would not service him unless he put his superintendent directly under the engineering supervision, so that we could get what was

done. And some of them I wouldn't service at all unless they put the money in the bank to do the whole job with, so that we could draw on it as needed to get the job done. Another thing I wouldn't do to many of the Lawyers I serviced, I wouldn't order anything for them unless I had a right to draft on the bank, because some of them don't pay their bills and all my clients paid their bills or I'd put a lien on everything he's got until he paid his bills, until he did it. I was his worst enemy until that bill was paid, even though I was still servicing his farm. Because he had to pay me off in order to get rid of me. I was there until he did it. You have to have teeth in these things if you're out in the engineering business. I mean you better have teeth in it. However, thru the years I didn't have any of the engineering firms or people I couldn't go back to. They realized that in the long run what I did was for their protection, not my greediness. So I have a wonderful rapport after 38 years of working with people in this field. I'm delighted that God made it that way, I didn't do it. He did it for me. But some of them you've really got to lay it down in no uncertain terms, exactly what you mean and what you expect. Any questions?

Q – I ant to ask you a question about this sawdust and oil. In the course that we took you said use about 5 tons of sawdust per acre. Now if you use this oil, what would be the difference in using the oil base sawdust?

A – You wouldn't use over about 20-25 gallons of oil for any given acre. That's a big dose, that's a lot of oil.

Q – You'd use that on the 5 tons of fertilizer?

A – No, I'd just make this up separate and I'd put out about possibly, let's see, oil weighs about 7 lbs. to the gallon? About that. So say 20 gallons, I'd say 150 lbs of oil per acre and then put it in sawdust for instance. You might have to have a thousand pounds of sawdust or a ton of sawdust to get it to absorb that oil to keep it from being sticky. All we put it in the sawdust for is to get it out. You can't get it out otherwise. But you put it in enough, actually you ought to spray in into the sawdust with a fine misty sprayer. Heat the oil and spray it in. and it'll do a lot for your soil, but it should be down in the fall of the year. Please don't do it while you've got a crop out there, o.k.

Q - ?

A – Yes, just old motor oil. They'll give it to you to haul it off.

I'm going to ask you a question about the magnesium bond that releases nitrogen. In dolomite you have your magnesium bond and you have your calcium bond. Something like this, roughly speaking, this would represent about we'll say 35% of 0% moisture and this one about 65%. This would be calcium, this would be magnesium. Those 2 things are

together, but they are separate. They're not bonded together. Nitrogen, what nitrogen will do, nitrogen then will destroy this bond. In other words it'll X it out, turn it loose into your air, into bubbles. Then your calcium will slowly become available. About 18 months later, providing you've got enough nitrogen in your soil to break this bond.

But then you have another magnesium form that is Sul-Po-Mag. Now in your Sul-Po-Mag you have a bond something like this. There you would have the bond of Sul-Po-Mag or it would be something like this. Something like that. It's a variable. You have Sul-Po-Mag there to break it down and you'd have something like that. Now that bond is together, you have magnesium, sulfur and potassium and it's in one unit, in one molecule and it's bonded together. And it does not come apart whenever you use it. And it will not release nitrogen. Sul-Oi-Mag will not release nitrogen. Any questions? At what time of the year do you apply Sul-Po-Mag?

R – July to September.

Why? Why do you apply Sul-Po-Mag, what's the purpose of it?

R – Open up the bark.

Makes the bark stretch, but what is it? How does it do it? How does it make the bark stretch? At this stage it joins with the phosphate in the soil. In other words, it takes on 2 more molecules. And what are these other 2 molecules it takes on? It takes on 2 more molecules. The sulfur takes on so in her there will be a bond that takes on a bond of P_2O_5 . Now there's one more it's got to have. What's the other molecule it's got to have? One more.

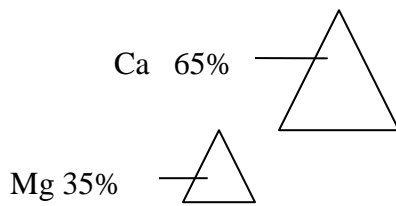
Q – Would it be calcium?

A – No, one more molecule it's got to have to make this union complete. Did you forget the lecture I gave this morning? It takes 2 of them, what is that?

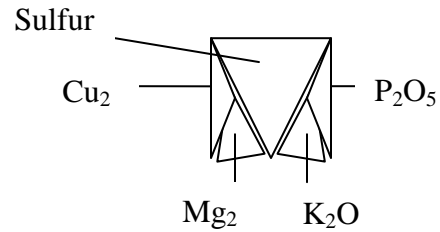
R – Copper.

Copper. Remember me telling a story about a little boy that's too big for his britches? O.k. copper. Now you've got the complete molecule.

Dolomite



Sul-Po-Mag



Is there any question now at this point? Suppose you've got soil now that has too much water soluble magnesium in it. How would you tie it up? Why would you want to tie up the magnesium anyway?

R – Keep it from interfering with the nitrogen.

That's right, because if you don't, you can't keep the nitrogen down. So how would you tie up the magnesium? In other words you'd send a policeman out there and arrest it, but what would the policeman's name be?

R – Calcium.

Calcium, that is right, calcium will tie it up. How could calcium tie it up. How could an anion tie up a cation? Because your anionic energy is greater than your cationic energy and it surrounds it. The cations are trying to get back to the cations and the anions are trying to keep it from it, gets in its way. So it surrounds it, puts it in prison. He that gets there firstest with mostest wins. As nature follows the line of least resistance. Ever hear that before? Why didn't you tell me? I was just dying to know. Isn't that easy, just as easy? Any questions about that now at this point? You tie it up with calcium.

R – There's only one thing I think we need to make clear here and that is if we get a very high pH doing it, we're going to know how to get that energy back.

What did I tell you about pH's in the last course?

R – I know what you told us, I don't know what you told them.

O.k., well, I'll tell you all the same thing. Suppose you were down in well, we'll say Haiti where the pH is 14 down there, solid lime rock. What is the first thing you'd do to make that soil possibly producible?

R – You have to put in what you don't have, put acid on it.

That's right, You'd use sulfuric acid. Then what? If you apply the sulfuric acid to the lime rock, what would it do, what would you have?

R – Change it to a cation.

Yes, but what is the name of the substance you'd have?

R – Calcium sulfate.

What is calcium sulfate? What is it?

R – Gypsum.

That's right, you'd have gypsum. Is gypsum hard or soft? It is a soft material or a hard material?

R – It can be either one depending on the moisture that's in it.

No, it's fluffy material when it's dry and it's not too bad when it's wet. So then you start adding then after you get it in gypsum form you forget about your calciums completely and just begin to add your phosphates and potassium, etc. and you can grow bountiful, bountiful crops in absolute lime rock. Can you name a few plants that like high amounts of calcium?

R – Alfalfa, Peanuts.

Alfalfa yes, but peanuts don't like it too high, but it can get along. There are certain things that like very, very high calcium. What are they? Certain grass crops, but let's talk about fruit trees for instance. What are those that you just can't have too much calcium for? Do you know what they are?

R – Citrus?

No, in citrus you can have too much. Well, coconuts, they'll grow right out of solid lime rock. Avocados, mangoes, sea grapes, they'll grow right out of solid lime rock. Papayas, they'll grow right out of solid lime rock. So these things you can produce in bountiful amounts. O yes, there's other things too for instance, breadfruit will grow, pineapples will grow right out of solid lime rock.

Q – Without adding phosphates and potash?

A – Without doing anything to it. They have the ability to take their nutrients from the air if you've just got something for them.

Now a pineapple is a cactus. It can get along with lots of water or none at all. Don't matter to a pineapple. And a pineapple doesn't have any roots. It has tubers. You

take the Philippine Islands, potassium lava rock, high, high in calcium and sulfur. They make some of the finest pineapples in all the world there and some of the biggest ones. Well, also you'll find it also in New Guinea and some of the South Pacific Islands. But in this pineapple, there's something rather peculiar about the pineapple in its growth, that most of them have a saw tooth edge on those leaves of the pineapple, blades of a pineapple. Now, why do you suppose that's there? Those blades out there are little antennas that pick up the mineral that is leaking out of the ocean. And if you get too far from the ocean a pineapple doesn't do too good, unless you supply the ionization. It gets about 98% of its feed from the air. Do you know what one thing pineapple plants don't appreciate? When you try to fertilize it, it doesn't appreciate any help at all. You've insulted it. And if you get the least bit, you're going to get a pineapple about that big, and as hard as a rock.

Q – What do you plant them in, white sand?

A – In white sand or if you've got a lot of lime rock in the soil. Lots of sea shells in the soil you can do that. But they grow best straight out of the old lava rock, potash and lime. They just do beautifully there.

You know they've got them in Hawaii that's never been fertilized? Do you know they got them in Hawaii that they actually have to put machines in and chop them down to keep them from growing so thick they can't even harvest them? Did you ever try to walk thru a pineapple place when there was no road? They'll cut you to pieces, utterly cut you to pieces.

R – Walk on stilts.

Well, you can't even walk on stilts because they're too thick. They tangle up. But these are factors that you need to know about it. It's things that will grow out of lime rock. Let me tell you something too about the mangoes that grow in dolomite lime rock. When you eat one, you better be sure that you've got a private bathroom because the first one you eat, before you get used to it, is going to go thru you without stopping. In about 15 minutes! And if you know your pineapple, well pineapple will do the same thing that's grown in lime rock. But if you know your fruit, you'll only eat one bite the first day and it'll be just right, just like a tablespoon full of Epson salts. About 3 days later, you can eat 2 bites and it won't be quite so bad. In about a couple of weeks, you can be eating them

just fine. But don't jump onto one right now. If you do, you better extend your reservation, o.k.

Q – What fruit is that?

A – Mangoes, mangoes.

R – In Central America where they cook everything in coconut oil, it does the same thing.

It sure will. Coconut oil will anyway. Just plain coconut oil will really give you a workout. But coconut oil used wisely is a wonderful product. But a little bit goes a long way, quickly. Enough said for that.

If you had some soil that the State Experiment Station said had a pH of 2.50, what would you do? How would you start on that soil?

R – I'd go back and run another test and find this out first.

O.k. and suppose you did and you found out it was 2.5? What would you do? What's the next thing you'd do? Well, we'll say it was 3 just to be different from them.

R – You'd have to find out what's in it or what isn't to know where you were going and what you were going to add, right?

That's right. If you had that kind of an engineering job and, suppose that you had, we'll say that you had a water control that was satisfactory. And that you had a nitrate nitrogen of 10, had an ammoniacal nitrogen we'll say of 20, you had a phosphoric content of 160 and you had a calcium we'll say 300. And you had an Erg content we'll say of 25. And you had a pH we'll say 3. How would you start? What would you do with that kind of soil? Assuming that you had your water control or water, moisture under control, what would you do? Where would you go from there?

R – Treat it just like any other soil to start with. Phosphorus and then a lot of calcium.

Right. Exactly. You follow the same procedures, exactly the same procedures. It wouldn't make a bit of difference. Suppose that you did everything you were supposed to do, we'll say that you moved the calcium up to we'll say 4,000 pounds per acre within a 6 month period and that you got your other ingredients up. Up to where they're supposed to be according to your standards and your pH was still 3. Would you plant a crop?

R – Sure.

Would you expect a yield?

R – Yes.

Right, pH doesn't make a bit of difference.

R – You could add more calcium later too.

You could add it till you put 50,000 pounds per acre and it may still stay 3. Why? It could be 2 reasons. Because of sulfur in the soil or it could be because of the high aluminum, could be because of the high Iron content. That would be colloidal iron; it would be in colloidal form. And then your pH did rise, would you be disappointed? Suppose your pH jumped up to 10, what would you say about that?

R – Nothing.

Not at all. Put the nutrient in there and the plant doesn't know a thing in the world about your soil analysis reading and it'll grow. It doesn't know a thing about it. It'll grow just as well with a pH in one place as another. Providing you have volume. Your pH is like your OHMS. It depends on the resistance that's behind it. In other words, with a pH of 7 in water, you have no resistance, but as you increase the acid and alkaline in that water, you increase the resistance. In other words, it equals your OHMS and that's what really counts, not your pH. But your OHMage, your force that's behind it. Anything difficult about that? Isn't it easy?

Q – The only time pH makes that much difference is when you don't have anything else in the soil.

A – That's right, that's exactly right. To him that hath

R – and to him that hath not, it's taken away.

That hath not shall be taken away, and to him that hath it shall be given. That's the rule of science and that's God's law. Nothing hard about that at all is there? To him that hath not it shall be taken from and to him that hath it shall be added unto. It's a law of physics, the law is chemistry. God is a God of math.

Now we're talking about differential here. The ratio between the resistance of the anions and the cations. Suppose you had a soil that had that the first test you ever ran on it, you had, we'll say 700 lbs. of water soluble phosphoric acid, that you had 6,000 lbs. of water soluble calcium, that your nitrogen we'll say was running a total of 80 on both nitrogens. But your potash was zero. How much potash would you add?

R – Certainly not over 300. Depends upon the crop too. 150 with alfalfa.

You're. Just a minute now. How much phosphate did I say?

R – 600.

600 yes, 600 to 700. It doesn't matter. It's not that important. But how much potash would you add? What's your ratio?

R – 2-1, 4-1 on grasses.

No, I'm just talking about general farms.

R – 2-1.

Q – Would it be alright to add 300?

A – What would happen if you added 300 lbs. of potash at one time to that acre?

R – Too much of a jolt.

It would kill that ground as dead as a doornail because you had too much at one time. So you're going to have to divide it up, o.k., divide it up. So I might add 100 lbs. of sulfate of potash per acre. I might add 5 tons of sawdust and I might add a ton or 2 of tobacco stems. And that way I'd get my potash up and in about 6 months later I'd add whatever it takes to move it up again. But what I'm trying to say is be careful, when you calculate your amounts on potash, to put it down.

Q – Is 100 lbs of sulfate of potash the most you could add?

A – Well, that all depends on your total soil chemistry and your crop and what your soils are used to. If it was zero, I'd say yes. If your total was zero, I'd say about 100 lbs. at one time would be enough.

Q – Say you had about 70 lbs. available there?

A – Well then you could add another 100 lbs. to it.

But I'm talking about to keep from wasting your money. Now, suppose that you had your calciums and everything working in and then what would be the chemical action that took place there? Just chemically speaking now, don't think in terms of pounds. But think of the chemical problem. What would happen if you put 300 lbs. down at one time? You said it would give it a jolt, but how? What kind of a jolt? What would happen to the Ergs?

R – Too high wouldn't it?

Go sky high, you'd have a terrific loss of energy, a terrific loss of energy. You'd also have a burning. This salt would be so caustic, it would cause the bark to slide off of the root, rootlet. So now if you were to do this in the fall of the year, and were not going

to plant until next spring, that might be alright to get it up. But I'm talking about just the pre-planting stage.

Q – It still would be wasting it though, wouldn't a lot of it still go out?

A – A lot of it would, yes. In other words, do not make a violent change in soil chemistry unless you have to do it.

But let's suppose that you had this same soil, same problem and that you found out that the crop was already on, its near maturity and ready to mature, but it was rotting in the field. Then what would you do? The crop was rotting in the field. With all these numbers that I have told you and yet the crop was rotting just as it matured.

R – Put some sulfur on.

You'd put some sulfur on.

R – Sulfur or copper.

What would you do? What's causing it to rot at maturity in the first place?

R – Too much sulfur.

Too much sulfur, that's right. Too much sulfur is causing it to rot at maturity. So then how are you going to, what would you do?

R – Put calcium on it.

Which form of calcium would you use?

R – Burnt lime, slaked lime?

Calcium hydroxide, the hot lime. Just about 100 lbs. to the acre will knock that sulfur right out of existence. As far as availability to the plant is concerned. And in 3 days you've stopped the rot. Calcium hydroxide, this is the hot lime. This is the hot stuff they like to make plaster out of for inside of building.

R – Before it's slaked.

O yes, before it's slaked, yes sir. How do you get that on? How do you apply it?

R – To the dirt and not to the plant.

That's right. You put it on the dirt, but how do you get in on the dirt?

R – Down the middle of the row.

Down the middle of the row, but how do you do that? They have what they call a Georgia buggy that scatters the thing in a very narrow strip. They fit on a tractor, some of

them on fertilizer distributors, puts it out in a little tiny funnel right down the middle of the row.

I got a call from a man one time, that had 80 acres of cabbage and I was called as a joke. I was called there as a joke. 80 acres of cabbage and there had come freeze and that cabbage was laying down like rags. I think I've got the picture. I'll look tonight and see if I can't find those pictures. They were laying down like rags, half grown cabbages. cabbage half grown, laying down on the ground. And he said, "I want you to raise these cabbage back up so I can grow them". I said o.k. So I ran a soil test on them and got the word back and we used calcium hydroxide. They were up on beds and right down the middle of that bed I had them to apply 2 bags -50 lb. bags of calcium hydroxide per acre. It cost then \$8 an acre to buy it and put in on. And you know what happened? In one week those cabbage were standing back up – growing like nothing had happened. What happened, now what had that cold done to those cabbage? What happened there that caused them to lay down like rags? What happened there?

R – It was either the sulfur or a nitrogen excess wasn't it?

What is your rule now, go back to your rule? What's the rule? There's a rule there.

R – Anions grow.

Make growth, alright, the cold air had turned all the Anionic plant food to Cationic plant food and the poor little cabbage were starving to death, starving to death, absolutely starving. And this calcium hydroxide ionized the soil and it went right over. And he said to me, "Well why don't you put it on the cabbage?" I said – not necessary, we'll just put in right down the row in the middle in the bed. The rows were about 30" apart from one bed to another. And you know, they did it to make a monkey out of me, to show me up. But you know about every college in the southeastern part of the U.S. and even some as far away as New York, sent people down to see this cabbage field. You know what other people did? They plowed them up, disked them up. But do you know that guy sold those cabbage for \$10 for 50 lbs. He was the only one that had any. And I've got pictures of it. I'll try to get the picture of it and show you tomorrow. Now, they said that Dr. Reams raises the dead.

Q – What's this mechanism now, cold weather doing that change?

A – The coldness, well actually we don't have time to go too far in it, but the only anionic air and a cationic air is the temperature. Did you know that?

R – No I didn't know that.

Well, that's the difference in hot and cold air, nothing but that.

Q – Cold air is cationic?

A – Yes.

Q – And hot air is anionic?

A – Right.

Q – Because of the anionic from off the sun?

A – They're bouncing. They're bouncing back in an anion. The friction within the molecule makes the difference in temperature. cations will move very slow but anions will move very rapidly.

Q – Then you can control the weather a lot?

A – To a point, control temperature, not the weather, but the temperature to a point. You can do a lot about it. Yes.

Anything difficult about this folks? It's all back to the first days lecture. All I'm doing is just telling you what I told you on the first day, just going back at a different angle, explaining it to you.

Q – The cold air just simply stops the growth is that it?

A – Well, they starved to death. The food ran out. Anionic plant food makes fruit. Well we were growing the cabbage for the head not the seed and the food ran out.

My fee on that field was \$8,000 and he made over \$150,000 on it, net.

Q – Was he still willing to pay you that for a joke?

A – No, he paid me. He didn't say a word about it. He paid me, you bet he did.

Q – Before or after?

A – Part of it before and part of it at the finish.

Q – What if you'd have put ammonium nitrate on there. What would it have done?

A – It didn't need ammonium nitrate, it had plenty of nitrate nitrogen.

Q – Plenty of nitrate nitrogen, but. . .

A – I understand he had plenty. In other words, if I had put ammonium nitrate on there, what would have happened now?

R – Would have been too soft.

No, something else would have happened. What would have happened? I had to have violent action quickly so I took the nitrate; the nitrogen in the soil was cationic then, so the other turned it to nitrate nitrogen. I did it the cheap way. It's been a lot more expensive the other way. But suppose I'd add more nitrogen, and then I'd had cabbage that would have folded up, rotted. You see what I mean? Is there anything difficult about that folks? I can't see a thing difficult about it.

R – Not when you know it.

What's that? Well, I hadn't you see, this was my very first experience in it.

R – Yea, but you know what cold air does.

Sure I know what cold air does.

R – We don't.

I also know what energy is and I know how to create it quickly. I know how to decrease it, increase it, decrease, so this is what you need to know. Is to work out, while you're riding or traveling on a plane or this that and the other. Try to see how many conditions you can get your land into and then how to get it out. You know what I mean? Get your land in trouble on paper, so whenever, if it ever does happen you know how to get it out. And it's lot of fun, as long as it's on paper.

R – If you can remember all that.

What's that? You don't need to remember it. Remember the basic foundation and then go from there. Just remember your foundation from the very beginning and go from there. Remember your principles of how energy is derived and know you know what kind of energy. You know how much, so just apply these rules and God does the rest. God does the rest.

I had people come down there that saw the pictures and I mean the exact telephone pole and everything else and the field markers. I mean Doctors from the Agricultural Colleges and looked at it and said I don't believe it. I mean you could see the cabbage laying down like rags and look at it and see the cabbage up in big beautiful heads and said I don't believe it. Well, you can't convince anybody against their will. People convinced against their will are of the same opinion still.

R – But they can't say you didn't tell them.

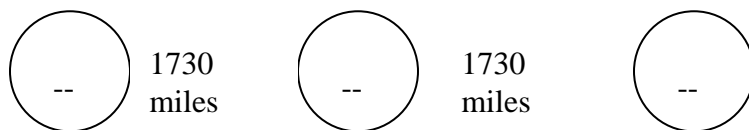
Proving a thing doesn't sell it, doesn't sell it at all. The difference between is differential mathematics. Let me ask you another question about this. How did I know how much calcium hydroxide to use? Why did I say 100 lbs. per acre?

R – By the amount of energy it took.

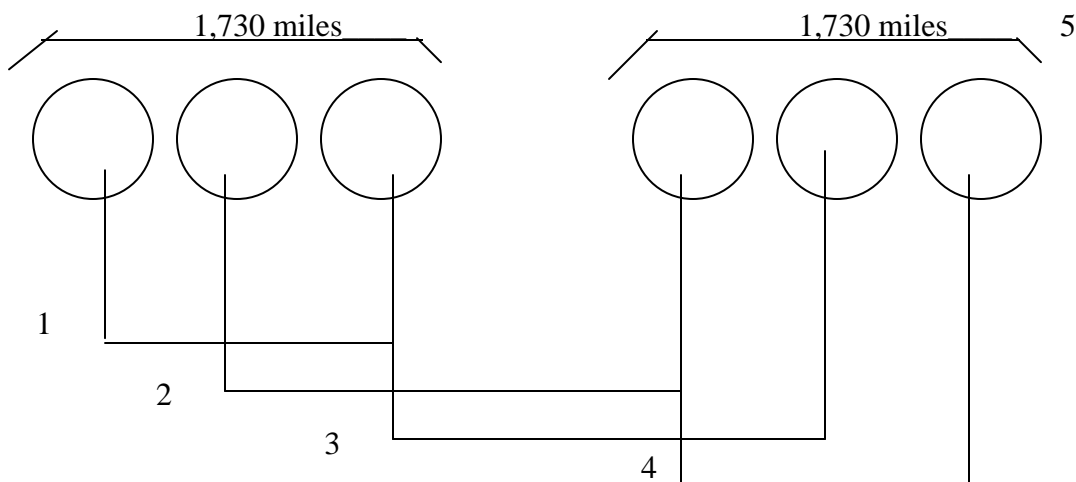
There's a reason. I'm not trying to get you to brag on me, I'm just trying to get you to know how to handle it. What makes calcium hydroxide different from just regular calcium? O.k., I'll draw it here on the board. You remember I told you that if you took one little anion and blew it up the size of a golf ball, that it'd be traveling 1730 miles apart? Do you remember me telling you that? What makes calcium hydroxide, well do you remember me telling you that?

R – Yes.

Now calcium hydroxide, for instance, we'll just take calcium oxide. It'd be like this. Let's do it a little different than like that. Let's just draw it in golf balls, golf ball sizes. Some golf ball I'm drawing here. Our distances are not the same. This is one of these little anions like this. It still is not exactly correct. This would be 1730 miles between these anions that's traveling in calcium oxide providing one of these little anions was blown up to be the size of a golf ball.



Now, in calcium hydroxide here's what you have. I'm going to have to start out here to do it. . . . and then this is true. For instance it can be this way ¹ – it can be this way ² – it can be this way ³ – it can be this way ⁴ – in other words, like this. ⁵



Q – Would that be 3,460 miles?

A – No, 1,730. Do you understand that?

Q – No, if you have two 1,730 wouldn't. . . . I still don't see.

A – No. No. These would be traveling 1,730 miles apart, but you have, I mean these three would be traveling in the same distance and where there would be only one, 1,730 miles apart, there's three of them within that 1,730 miles. You see that?

So what you've got here is not a single anion, but you got a triple anion, in calcium hydroxide. In other words you got dynamite! The other molecule you have, three instead of one. You have a triple anion there. A double is powerful, but a triple is very powerful. Now, it was no problem at all when I got my soil analysis to figure out how much it would take, two 50 lb. bags to an acre.

Now, let's look at something else. These cabbages were on beds like this. And they were about 30 inches from here to here from the center of this bed to the center of this bed was 30 inches. And the cabbages were growing up here like this on these beds. Some cabbage, this is the cabbage leaf. Now you put this calcium hydroxide down here, you put this triple, triple material down here like this. How did it help that cabbage up there on top of that hill? Up on that ridge when they put it down at the bottom?

R – That's where the roots are, down there.

Was this calcium hydroxide, was it a plant food?

R – No, but it increased the ionization.

What do you mean by increasing the ionization, tell us just what did it do?

R – Well, I don't know, I guess it drew it up from the roots. I guess it combined with the ionization of the air somehow?

Your ionization, not in the air, but in the soil. In other words, it set up a static electrical magnetic field that went thru the soil. How fast do you think this energy was traveling? About what speed do you think it was traveling? You must remember it was cold weather. It was very, very chilly and the soil was wet. About how fast do you think this energetic, energy field was traveling?

Q – Isn't it a constant?

A – Pretty much so, but what is the constant?

R – 186,000 miles per second?

Yes, just about, just about 186,000 miles per second this energy was moving. Now, how far did it move? How far was this energy moving?

R – 15 inches.

It moved 15 inches yes, but how far apart was this energy moving do you suppose? See, it was a bombardment. Going on about like the molecules would be moving when you put soda and vinegar together. You get the idea of the bombardment that took place in there? Suppose I had used twice that much, what would have happened? Would the cabbage have got up twice as fast?

R – You'd have burned them.

What would have happened? You know what would have happened, they would have stood up and rotted off. You know what happened in some spots, they got a little too much and it did rot them off. Oh, here, yonder and there, rotted them off. It put too much nitrate nitrogen into them. They couldn't take it to fast. It was forcing them and consequently it rotted them.

Like the little kid was. He came in from school in 4th grade and the Mother said, "What did you study today?" He said, "We were studying some Geography." Well, what did you study about Geography?" He said, "We were studying about Germany." "well, what did you learn about Germany?" He didn't want to tell his Mommy, he looked kind of sheepish, the he said, "Mommy, is it any harm to say Rotterdam?" Mother said, "No it's no harm to say Rotterdam." He said, "Sister ate my candy this morning. I wish it could Rot-ter-dam teeth out!" It is sometimes how you use things that makes the difference.

Q – Nitrate nitrogen is cationic right?

A – Nitrate nitrogen is anionic.

Q – Ammoniacal nitrogen is cationic?

A – Yes.

So it's all how you look at things sometimes that makes all the difference in the world.

Q – I still don't see how you figured out how much to put on there, your soil analysis?

A – Yes, it was my soil analysis, it was zero. My available anionic plant food was zero.

You get the idea? It was zero. I had plenty of cationic plant food, but my anionic plant food was zero. So I wanted so much energy over. . . How many square feet are there in an acre?

R – 43,560.

Alright, and 100 lbs. of this kind of energy into 43,560 square feet, comprehend? Now, let me ask you this, since you've asked the question. How much energy did I have there? In equivalent of nitrate nitrogen. How much did I get? Where did I want the nitrate nitrogen to be. . . . a certain place. . . . on the scale. But where on the scale did I want it to be? Between 2 numbers, in a certain range. What was the range I wanted it to be in for cabbage?

R – Between 18 and 22?

These cabbages were half grown remember.

Q – It wouldn't take that much?

A – It would take that much, but it needed more than that. It needed more than that, so where should I have had it? What is the total amount of nitrogen you need for the average crop as it nearly climaxes? What's that?

R – 200 Ergs.

No, not in ergs. In other words 40 minimum, 80 maximum. So I wanted my nitrate nitrogen at this stage to be near 40 if I could. But I wanted it to be above 30. so I put enough calcium hydroxide to move my nitrate nitrogen above 30. See how it works out now, over your soil moisture content. We had a sandy soil, and the soil had sufficient moisture in it and about what was the moisture content of sandy soil? What is the percentage of weight in sandy soil? In fact it was Northport Island sand, is what we had. What would be the maximum, what would be the desirable moisture content?

R – 50%

50%, that is correct, 50%. Now in 6 inches of topsoil, which is the average, how many gallons of water would I have on that acre?

R – 600 lbs, at 50%, 1 inch would be 220 lbs.

Gallons, figure it in gallons now. Figure in gallons because it's much easier to figure water in gallons than pounds. So how many does it have?

R – 12,500 gallons.

Nope.

R – 3 times, 40,000 gallons.

Nope. There's 27,005 X 3.

Need to know to figure how much calcium hydroxide to use. This correct?

Alright, that's good. I've figured out the amount of soil moisture that I was dealing with. Now, per acre. The balance should have 100 lbs. of soil moisture to 100 lbs. of calcium hydroxide to one, 82,000 lbs of water. I've got a ratio then of 100 we'll say one to make it round figures and we'll start off this to 825. Right? See?

R – Yes, one. You add 1 lb. of hydroxide to a gallon.

That's alright, my ratio is still 1 lb., that's exactly, still dealing with it o.k. I'm using this in gallons. In other words, if you want to get real technical you can multiply it out by 8 and then come up. But I'm using pounds and gallons here. Why? There's a reason now. Then how much? Lets go a little lower in this, get it down in laboratory figures. So this one pound equals 16 oz. right? You're dealing with ounces. Now, you've got 16 oz. To 820,000 gallons of water, comprehend? Now, how much. . . now I'm giving you the problem now. How many ounces would that be? I mean how many gallons of water would 1 oz. be into it? Approximately, roughly, in round figures?

R – 50

50 ounces that's right. I mean 50 gallons. So I've got 1 oz. to 50 gallons of water, right? Alright, one ounce of calcium hydroxide to 50 gallons of water will give me a pH of what? Roughly speaking?

R – 1 oz. to 50 gallons of water?

1 oz. to 50 gallons of water, calcium hydroxide. In other words the water would have a pH of 7 to start with by I'm adding 1 oz. of calcium hydroxide to 50 oz. of water.

R – You mean 50 gallons.

50 gallons of water I mean. 1 oz. to 50 gallons of water, about what would you think my pH would be of that?

R – It wouldn't change much would it?

O yes, it would, yes it would.

Q – On the 50 gallons?

A – Yes sir.

Q – Would it go up more than one pH?

A – O yes. Measure resistance now, remember resistance.

R – Water is cationic and calcium hydroxide is anionic.

But the cation in water is not going to give up any cations just because you add something to it. It's going to keep everyone of them. It's not going to turn loose one of them. The pH would be 10, o.k.

Now, I have a soil here that has many, all the food is cationic, completely. And it's not available to the plant. Then I've got a water solution that has a pH of 10.

R – That's popped up . . . for us ignorant ones, how did you get that 10?

You go back to the 1st days lecture and measure out your cation. Anion by anion and that's the way it's. . . you remember the ration between a single anion and a single cation? Do you remember?

Alright, let's assume it's 250 and 750 o.k.? Then what have you got? 1:3 right? O.k. now, 1:3 now and that'll give you 3 + 7 is how many?

R – 10.

Isn't that easy?

Q – 7 what?

A – 7 + 3 is 10.

Q -

A – Kind of like an old kitchen pump. It's in there if you guys will pump it out. It's 10.

Alright, now then we've got our plant food absolutely tied up, locked up. It's all Cationic. Now if you add a 10, lower pH with a 10 to a plant food, ammonium nitrate, I mean ammonium sulfate. Then you have an ammonium nitrate of, how much will be available then per acre? How many pounds of nitrogen are you going to have per acre then?

R – 10:1 ratio, 10 lbs?

10 lbs. what? What's your nitrogen or specific gravity?

R – 14.

14 is right. Figure 14 is how much?

R – 47

42 is right. So that gives me 42 lbs. then. Exactly the amount I needed of nitrate nitrogen to get those plants growing again. Is anything difficult about that? It's so easy folks, I can't see why it's a problem to you. Now there's one little factor we missed in that. How long did it take to do that? How many hours did it take? It took 96 hours.

R – You had to guess.

I didn't, I measured it as it became available. I didn't, I knew it would, but I didn't know how long it would take. It took 96 hours. I know now how long it'll take, but I didn't know then.

Q – Where'd you take the sample to measure it?

A – Middle of the bed.

R – Middle of the bed.

Q – Let's go back to one more thing. You said 250 and 700, 250 and 750. alright, now why couldn't you have taken 299 and 799?

A – I could have.

R – Alright then your answer would have been different.

It would have been different, yes. That's the reason I got so rounded off in places too. I took the middle line of least resistance, between the 2 extremes. If I'd have, my answer would have been different. Then I'd have used 3, I'd have used 150 lbs. where they were all rotted off. I should've used a little less than that because.

Q – Then you guessed and guessed right?

A – No, you. . . the rule of thumb is when you don't know, use the averages.

Whenever you don't know, us the averages. We said that in the last course. So use your averages.

R – O.k. I understand. I'm with you now.

Whenever you don't know, use the averages. We said that in the 1st course. I said use your averages. I used an ounce or a little bit more than I should have used, because

that's why I got tips to rot off yonder then. It could be that the distributor wasn't putting out exactly like it was directed to. But after it was out you couldn't do anything about it. I know one thing. We harvested about 95% of that crop. Is there anything difficult about this? Whenever you don't know, use your half way mark, o.k.

R – Use 2:1.

Somewhere in your proper range, it's alright to use. Can you tell me what a top dressing is? What's a top dressing?

R – Something you put on for a quick change? An overcoat?

What is a “soil” top dressing?

R – Something you broadcast on the soil. But usually you call that. . . for late change in the soil that you need to make a little adjustment on.

Q – What's the difference between that and a side dressing?

A – A whole lot of difference. Top dressing is any plant food containing more than 16 units of nitrogen products. It does not quite contain any phosphate. If it contains phosphate it's a side dressing.

R – You know how to be a farmer, but it sure helps to know that one.

7-11- N-O-K, N-O-K.

R – Top dressing.

Does not have phosphoric acid, it's a side dressing. What is it? They don't have to put in any potash either. It can just be nitrogen. That all depends on your soil analysis. You've got plenty of potash but the nitrogen is low, they you should apply just the nitrogen. Go by the numbers.

Q – You mean the side dressing has all 3? May have all 3?

A – No. The side dressing only has. . . if it has one, but it must have 2. That's right, side dressing, you're right. Top dressing is what I'm saying. The top dressing is NK but it doesn't have to have any K, just be an N. but the side dressing has an NPK in it, generally.

These are all organic, generally. Not always, but generally. For instance, Chilean Nitrate of Potash would be considered a side dressing or a top dressing. 15-0-14. Suppose that you had a soil analysis that had a total calcium of 30. That's ammoniacal and nitrate nitrogen or via versa. I'd put nitrate nitrogen at the top and the ammoniacal nitrogen as the next one. Let's suppose that your crop, we'll say 30 days old or 30 days since it's been planted. Assuming that you've obeyed all the rules at this point, but a rain had come

and caused your soil chemistry to change. And you needed to apply some more N. What form would you apply it in?

R – You use one with the 36% right? That's a . . .

Ammonium nitrate?

R – Ammonium? No. . . The one that's 36%.

You'd use that one. Anyone that would do anything different?

Q – Ammonium nitrate, that's Anionic, right?

A – That's both. It and nitrogen is both of them.

That's one way you'd do it but I'd do it the sulfate way, with 20.5. I'd go that way because my crop is near enough then to the stage it'll be producing. I'm only 15 days away from the time the crop is starting to produce whatever it's going to grow. In other words the blossoms would be setting and I'm drawing now on that lime in the soil to determine a certain percent of ammonium sulfate into nitrate nitrogen to carry the crop on into production. So how much would you apply per acre? Yes?

R – Wouldn't be over 200 lbs would it? In that area.

200 lbs. per acre.

R – Wouldn't be more than that would it?

A – Do you have any idea why?

R – No, I just took a guess at it, I don't know.

Why did you choose 200 lbs.?

R – I wouldn't think it'd go too high in any of this stuff.

What was the amount you'd need of nitrogen alone?

R – 200.

On nitrogen.

Q – At that stage of the game?

A – Yes.

R – Between 30 and 40.

No. The total should be at this stage, what should it be?

R – 80 lbs.

80 lbs., that's right, 80 lbs. And you've got to figure. Now, why did you say 200 lbs.?

R – Just a wild guess.

I know, but you shouldn't guess. In this case the answer is correct, but you shouldn't guess at it. Why guess when you can be sure? For instance you've got 30 lbs. this is the norm – N – And you need 80 lbs. about that. So you need 50 lbs roughly, don't have to be quite 80 but ammonium sulfate is 20.5 so 2 times that, you've got 41 lbs. isn't it? 2 times 20 is 40 and .5 is .10 so you've got 41 lbs. with that decimal there. So this puts it 41 lbs. You got one, you come up with 90 lbs., that's near enough. 175-200 lbs. should be alright.

Q – Why did you multiply by 2?

A – Because I got 200 lbs. You said 200 lbs., this is 200 lbs. It's 20.5 per hundred lbs. of nitrogen and it's 200 lbs. That's what he said, so it's 41 to 50 and you got 91, that's fair enough. 175 would be alright. Any questions?

Q – Go over the first part on that again? You would use that to turn the

A – Alright, the first reason that this, I've got a reading now a total of 30. that means I got a little bit of both, but the total of it is 30 o.k.

I know I got my lime in. And I know I'm 30 days from the seed. I know I got 15 day before the blossoms will be setting on, approximately. Well, that is an ordinary crop. Now green beans and so forth, you'd have a lot less than that. On beans and field production, this is different, but I'm talking about the country we live and up here temperatures. So you would subtract the 30 from 80 which would be a good ideal amount to have and it gives you 50. so he said ammonium sulfate. I know also that source, that ammonium sulfate, that the lime that I have in the soil will turn some of that sulfate into nitrate.

Q – Alright now, how much? How much?

A – Very little, very little at this late in the season. Very little.

So then I'd have 91 lbs. so probably I could count on say 25 lbs. of that being used at plant growth and energy loss. You must count on a certain percentage of being energy loss, accounted to your rainfall, your weather conditions and cultivation, weeds, grass and etc. Suppose that you had a good crop of grass that came up in this stage, and then you plowed that grass under. That grass will probably take out 14 or 20 lbs. but you would also gain, probably 50 lbs., for the amount of grass that you got. Do you see how to figure this? Do you understand it? You don't have to guess. If you're going to guess,

then why do you need your numbers? What help is it? Don't guess. Why guess when you can be sure?

Q – When you first plow under a crop like that, you have a loss don't you, of nitrogen?

A – Not much, not with this kind of soil, no. You have very little loss.

Q – Until the bacteria can work on it or something?

A – Bacteria don't have to work on a top dressing, no. When it comes in contact with a water solution it's immediately available.

Q – I mean when you plow grass under, that's what I'm talking about.

A – Well, yes, the bacteria does on the grass. You would have a loss, but you would also have a long range gain.

Q – Long range gain?

A – Yes.

Q – You couldn't count on it for immediately though?

A – No.

I knew a farmer one time that told his colored man to go down and put the . . . in fact, told him Chilean Nitrate of Potash on his cabbage. The cabbage was just heading up and that's what he did. He said, "Put a teaspoonful on the cabbage." And he dropped teaspoon full on the head of every cabbage. Boy, it rotted it. It cooked it. Boy, was he a mad farmer, yet the fellow did exactly what he was told. Kind of like the maid did my wastebasket. She did exactly what she was told, take out the wastebasket. She did, she poured the paper on the floor. This really happened. So be careful how you tell people, because some of them are going to do exactly what you say.

I sent a fellow down one time with great big Onions, as big as saucers almost, and told him to rototill the onions, asked him if he knew how to run a rototiller. So he did, he rototilled. He put the rototiller thru the onions, chopped them into giblets with the rototiller. And he came back up and said, "Do you want me to get that grass between the onions?" This happened, this happened. We had about 50 bushels of Onions there and he went out and he turned the rototiller in the Onions. Boy, I mean he chopped them beyond, you couldn't even pick up enough to make soup out of!

Q –

A – It was a Shoemakers handshake.

When I was just a boy there was a grocery man there, had a little old Country Commissary. He told the colored boy to go out and grease his buggy, put axle, give him a can of axle grease and said, "Go out and grease my buggy." He came back and said, "Did you grease my buggy?" He said, "I greased that buggy all over, only thing about it," he said, "you know them there things that hold that there wheel on, those bolts that hold that wheel on?" he said, "I couldn't get them off." I mean he greased that buggy from top to bottom, there was nowhere he didn't have axle grease. But on the axle, he couldn't get the nut off to grease the axle. Are there any questions about top dressings now? Any questions about top dressing?

Q – Nitrogen at 80 lbs. is that the maximum amount at any given point?

A – That's a good range to keep it in. It can be more than that. It can be up to 120 lbs. That depends on how close your rows are and etc.

We were figuring here on 30 inch rows. I might have told you that, this is figuring on 30 inch rows. Any problem here with your top dressing? All I want to do is to show you how to figure it. If you'd added 175 lbs. to the acre, it would have been alright.

Q – That just stays on top of the ground, you don't dig it in?

A – It goes in, in one night it'll go in. it will go in by itself.

See how easy this is? Go by the numbers, go by your numbers to figure it. If you're not going to go by the numbers, you don't even need them, so go by the numbers. It's very easy to figure, it's very simple arithmetic.

Now I want to ask some questions. How many kinds of top dressings can you think of right quickly? Name some of them.

R – Ammonium nitrate.

Ammonium nitrate.

R – Ammonium sulfate.

Ammonium sulfate.

R – Chilean nitrate.

Chilean nitrate is one, yes. Chilean nitrate of potash is another. They're 2 different things. What are some more?

Q – Cottonseed meal would be quick enough would it?

A – It is not a top dressing.

R – Chicken manure.

No, chicken manure is not a top dressing. It's an organic. Your top dressings are synthetics. Name some more of them.

R – Arcadian Nitrate.

Arcadian nitrate, Arcadian Nitrate of Soda. What's some more?

R – Urea.

Urea. What's another one?

Q – Anybody list ammonium phosphate?

A – Ammonium phosphate would be, not a top dressing. That'd be a side dressing. It'd be a side dressing. And what else?

R – Nu-Green.

Nu-Green, yes, what else?

R – Calcium nitrate.

Calcium nitrate yes, what's some more? Nitrate of Soda.

R – We had that one.

Chilean Nitrate of Soda you said, but there's a Nitrate of Soda that's not Chilean.

R – Yea, we said that.

You did? What about Urimon? O.k. that's some of them. So you know now what top dressings are.

Now, let's name some side dressings. What are some side dressings?

R – Most of your organics are used for side dressings.

No, you are altogether into your synthetics. Why would you ever want to use a top dressing anyway?

R – For quick results, wouldn't you?

Not exactly. Why would you want to use a top dressing?

R – Replace the Nitrogen.

Well, that's one reason, but what else? What's the main idea for it? Replace the Nitrogen, yes, because of the adverse conditions, yes. That's one reason, but why would you want to use a top dressing? Other than that, there's another reason.

R – Add electrolyte to the soil.

Yes, add an electrolyte to the soil and one more thing it does, really important.

R – Increases the ionization.

Right, increases the ionization, that is true. Is the ionization of the soil important? Why? Explain why it's important.

R – Can't get your full growth out of it, full production of it without it.

How does the ionization help it grow?

R – Increases the rate that it gets the nutrients.

Yes, that's true, but how does it do it?

R – Well, it's the anions versus the cations.

That's right, but just how does it work in the soil? There's a plan now that I told you, how it works in the soil, how does it work? Which way is this magnetic field in the soil?

R – South to north.

South to north and then if you've increased the ionization, what have you done?

R – Broadened the magnetic field.

Yes, broadened the magnetic field. How does that help a plant?

R – Draws the minerals into the plants magnetically.

Draws the minerals into the plants magnetically. How does it do it? How does it draw it in? You're getting warmer all the time.

R – Anions seek to go to anions and cations seek to go to cations.

That's right, but. . .

R – Gives the phosphorus a better chance to grab hold of them.

Yes, how does the root grow?

R – By ionization, building.

That's right, by ionization. In other words, the ionization of the soil builds the roots. As the root is built the process of osmosis takes the particles thru the plant. Plants don't have blood you know, they have what?

R – I know what you want. You want us to call you a sap.

Yeah! I'd thought somebody would accommodate me. The process of osmosis works in the sap of the plant. And how does the process of osmosis work?

R – Photosynthesis.

No, not on photosynthesis. Photosynthesis is the process of osmosis in reverse.

R – Absorption of water.

Yes, absorption of water, but by what? By squeeze method. Just pushed it on up, squeeze, squeeze, squeeze method. That's the way it does up there. Isn't it interesting to know how plants feed?

Now, I want to ask you some questions about plants. If you were walking into a hay field or an alfalfa field and you'd never been in that field before, you didn't have any analysis. And we'll say the alfalfa is now 4 feet high and 2 weeks before it is ready to harvest, and you want to evaluate that alfalfa. How would you do it?

R – Chew it, see if it's sweet.

That's one way, but there's another better way.

R – I'd like to check the bottom and see if the leaves have fallen off, if there are any yellow leaves along the bottom. See if they are green, tender plants at the bottom.

That's another way, but how would you check the mineral content?

R – Use the refractometer.

No, we can do that later. Suppose you didn't have your refractometer? Suppose you had lespedeza or corn field or any other field? There's one way to check it.

Q – Could you do it by checking the pith?

A – That is it exactly. Cut it off and look to see if it is hollow in the middle. That's exactly right, look at the pith. And look if the pith is solid and full. You have higher sugar content. Low sugar content gives you a hollow stem, a reed.

That's true of most any kind of pangola grass or fescue or any other kind of grass. In the stem, cut the stem off and look in it. If it is hollow, you have hay, low mineral content. You can even evaluate dry hay the same way. Dry hay should not have a hollow stem. If it does, it has a low mineral content. Isn't that simple?

R – You mean the stem will be completely solid all the way thru?

Right.

R – We have all this low mineral content. I don't think I've ever noticed it any different.

I know, but it should be solid and full. Now, I'm not talking about when it is dead and dry, but I've seen it dead and dry and still be full. I mean hay. I've seen it still be full and I've seen them hollow in the middle, the stems.

Q – Is this true of Wheat?

A – Yes, it is, sure is. Soft wheat has hollow stems and hard wheat has full stems. Did

you know that? Well, you're missing half your life if you don't know these things.

These are fact folk, that you need to know. You've got to know them in order to do something about it.

I remember a good many years ago, I gave a lecture on the Biology of life to a church group of about 200 people. The Miracle of Life. I went into quite a bit of the Biological Phenomena of life and of course I was young and didn't have any better sense than to use a whole lot of big college words. When I finished, I opened the meeting for discussions and questions. Finally one of the fellows at the back of the house got up and said, "Dr., me and my wife, we have 11 kids and I don't see how we done it without knowing all that!" When you know these principles about farming, you wonder how come the people have not starved to death a long time ago. You don't see how you did it without knowing all that. So, it's quite interesting to note how much goes on that we can change if we knew how to change it and we can change it and we will change it, if we know and go by the numbers.

Q – Side dressing again, what is that, potassium?

A – A side dressing is any NPK, inorganic NPK. All 3 are used in side dressings.

Now, I told you something about a side dressing the last time that I want to know if you remember this time. I told you very, very important things about a side dressing in the first lecture. Do you remember what it was? Something about applying it. What was that fact about applying a side dressing? Do you remember? How many hours should it be mixed before it is applied?

R – Same day.

The same day, why?

R – So it doesn't set up.

So it doesn't get hard. Why? Why do you want it, why would it get hard?

R – You're mixing anionic and cationic and you want it to create energy in the soil and it would get hard if you didn't put it on the soil immediately.

That's right. Then what would it do in the soil? It gets hard in the bag, what's it going to do in the soil?

R – Make a gum.

Going to make a chewing gum, right. And it won't wash out. It'll be right there until the plants use it.

Q – I thought this was peculiar to the triple super phosphate?

A – It is, but triple super or super will do it, either one, if you mix it with anionic plant food. It'll just take a little longer.

Q – Why doesn't the NPK fertilizer get hard when they mix it up?

A – Because it is either all anionic or all cationic.

For instance, the potash is anionic, but what they do is put the potash in and mixer it first. Then they put their filler in next and coat that so thoroughly with it that when they add the other ingredient, it won't set up you see. You can cover up your tracks for a little while, but it'll get hard too, if it sits long enough. Any other questions now about top dressing?

Q – Now, on this fertilizer getting hard, if we mix that and it gets hard on the farm and we dynamite it loose, is it alright? What happens to it then?

A – What would happen if you dynamited it? What would happen?

R – Well, I know a place where that was done, that's why I'm asking.

On an NPK? And they had something left?

R – Yes, they dynamited it and then run it thru their mill and on the screen.

It wasn't nitrogen. There was no nitrogen in it, if you did, you wouldn't have been anything.

R – They did. They come out with a 4-12-4 and 10-10-10 and.

They added something to it after they dynamited it. You don't dynamite things with nitrogen in it or it goes too. Don't you remember that ship that blew up in Texas? Because they were welding and the steel got red hot and caught fire and it exploded. Well, it blew up a city and the ship was in the port loaded with Chilean Nitrate of Potash. Don't you dynamite nitrogen, ever, unless you want to see St. Peter in a hurry.

R – I know it works, because pouring that mixture down in the holes will dynamite the stumps out.

You just don't use it. Don't go dynamiting anything that has nitrogen in it or you think has nitrogen in it.

Q – Would you go into when we apply a side dressing?

When would you apply a side dressing? Where would you apply a side dressing?

R – When your soil shows all of the items are down.

Yes, or you might be a little short on nitrogen, little short on potash or you might need a buffer, just a buffer. Suppose your crop had just come up and you had a 10 inch rain that washed your nitrogen out or thinned it out to . . . Let me explain something about this nitrogen. It may not wash it out. But suppose you had an acre of soil that we'll say had 50,000 gallons of moisture in it and you have, it'll be clay soil naturally with that much water in it. And you have, say 40, say you have plants under 40 days old. You have 40 lbs. of nitrogen in this soil and suppose you had an 8 inch rainfall with a residue of a2+. In other words then this meant that this has come up to 100,000 lbs. of, gallons at least of water in that soil and your surface water was just below that at a much higher rate. What does that do then to your nitrogen?

R – Increase it.

It lowers it. 2+, this was after the 10 inch fall, it increased your soil moisture content by 100%. This is what that means, in other words, twice as much as you had up here.

Q – Wouldn't you have some added from the rain?

A – No, not that heavy a rain. You only get it from a very light misty rain. Rains coming that heavy don't.

So this would cut this down to 20. but suppose we'd come up here with a 4, then you'd only have a 10, you see? Suppose that lasted now, we'll say for 3 weeks? Well, you'd have about the sickest crop you ever saw in your life. So you better get back in there as quickly as you can and increase this one back up to 40. in other words, you want to add 150 lbs. to the acre of ammonium sulfate so to speak. It depends on which one you need. So you've got 40 here again and suppose you have a dry spell after that? It turns very dry. Well, then you still have to. Naturally, your plants are going to use some, but your grand total won't be over 80. So now what does this mean? It means you're not throwing your money in a rat hole. As long as you've got 80 you're just as well off as if you got 200 lbs. to the acre. About 80 it don't make any difference, but you're wasting your money. You see how this fits in the pattern? This is the replacement of your nitrogen due to water. Well, you've got to do your soil analysis to show you. Go by your

soil analysis and work on this goal and it works. Don't try to figure out anything, and go by your soil analysis.

Q – Then you don't have to figure out how many gallons of this water. . look for a 10 or?

A – You know how much, any farmer worth his salt will have a rain gauge. I mean he's got a rain gauge and he really goes by that rain gauge.

But suppose now that this hadn't happened. You'd had a 48 hour drizzle. How many pounds of nitrogen would you have gained with a 48 hour drizzle? 4 lbs. per acre for 24 hours, 8 lbs. o.k., approximately.

Q – How do you gain anything by the drizzle?

A – The slow drizzle of a rain takes 4 lbs of Nitrogen out of the air each 24 hours, slow drizzle. A slow drizzle over 24 hours, you probably only get 1 ¼ inch of rain or such a matter.

I've talked to you now about side dressing and replacement of side dressing. Is there anything else you want to know about side dressings?

Q – You said something about putting on your soil, plant food, of which you would need as a source of nitrogen. Does it matter whole lot which nitrogen?

A – It sure does. Why does it matter which nitrogen you use? Why?

R – Depends on what stage your plants are in.

Yes, that's one thing. Why? What difference does that make?

R – Anionic. It depends on whether your looking for stalk or seed.

Anionic, that's right. It matters a whole lot whether you want to grow cabbage or beans or tomatoes, or peppers. It depends on the fruit that you are growing. On lettuce you certainly want to use anionic plant food on lettuce, cabbage, cauliflower, broccoli. You want to use anionic plant foods on those. But the other, that are bearing a seed or fruit, then you use your cationic plant food. What is the rule on that? Give me the rule.

R – Anionic grow fruit. Cationic grows stalk.

Anionic grows growth, growth. Cationic grows fruit, o.k.

Q – Cationic nitrogen are what? Which ones by name? If I look for it on the bag.

A – What are the cationic nitrogens? Somebody tell him.

R – We might as well have a list of them.

I know I think I gave you a list on the board. Name some, name a cationic nitrogen somebody.

R – Urea.

Urea.

R – Nu-Green.

Nu-Green.

R – Ammonia nitrate.

Ammonia nitrate has both in it. What's another one?

R – Sodium nitrate.

No.

Q – That's anionic?

A – That's right. What's another? Ammonium sulfate, ammonium phosphate, those are cationic nitrogens in top dressings.

Now we're going to take up the study of nematodes. Let me ask you a question. The only way I can learn anything is by asking questions. Is the buzzard there because the dead cow is there? Or is the dead cow there because the buzzard is there?

R – The buzzard's there because the dead cow is there.

That's right, that's right. Is the nematode there because he has something to eat, or is he there just to keep company, keep the soil company?

R – He's there because there's something there to eat.

Yes, now what created that food for that nematode to eat?

R – Not enough phosphorus and not enough sugar.

Not enough phosphorus, well. . .

Q – How about a plant that wouldn't have been fit for animal or human nutrition, so the nematodes get it?

A – Yes, but whose fault is it that the nematodes were there?

R – The farmers.

What did he do wrong?

R – He didn't put down phosphates.

Yes, but suppose he had put down phosphates and he still had nematodes. What else could he have done wrong?

R – The ratio was wrong.

The ratio was wrong between what and what?

R – Phosphates and calcium?

There's one reason, that nematodes attack plants and only one. What is that? There's too much salt in the soil. No other reason, but too much salt in the soil. The nematode cannot attack the root until the salt weakens the root, until the bark will slide off and then he gets in. He cannot attack the root until this happens. Now, you apply too much nitrogen what happens to the roots?

R – The bark slides off.

Yes, but something else happens to a lot of the roots, even before the bark slides off. What happens? If you get too much nitrogen on radishes, turnips, or sweet potatoes, what happens?

R – Break open.

They split open, that's right, they split open and that root does the same thing. And then you've said to the nematode, I've built you a house, furnished your room and board. Won't you please, please move in? And he does. And then nature heals that root over then and he's got a dwelling. He's in the ark and the door is closed. He's in there to stay too. You can't get him out. No way to get him out without killing the plant. The nematode is there because you furnished him room and board.

Let's suppose now, it's a very difficult thing to control this nitrogen now with a slow drizzle, rainfall and one thing and another. So what method of attack are you going to use to get rid of the nematode? How are you going to get rid of him? What plant food are you going to use to get rid of him?

R – Needs a little sugar.

Yes, that's one way to get rid of him. How does the sugar get rid of him?

R – Takes the moisture.

It makes the soil hold too much moisture and he can't stand it. In other words there's too much moisture. There's another way to attack him though that's very, very effective. How do you think that would be? What is it?

R – Gas.

Well, you have to do that before you plant. I'm assuming that it's already there. You can use heat or fumigation and you can use things that we mentioned this morning like salt fumigants and tear gas and 2-4-D and 2-4-5D, and etc. But let's go the real way.

I like to answer my own questions. So what would you do in order to keep those salts from being too high? Organic fertilizer is rich in what?

R – Carbon.

Yes, but something else, rich in what? Bacteria, aerobic bacteria. You know what their favorite breakfast is? Nematode eggs. Boy, they can eat up more nematode eggs than the nematodes can lay. And make fertilizer out of it. Boy, those little bugs can eat up more nematodes in 3 minutes than can be hatched out in 3 weeks. Isn't that a simple way to handle nematodes?

Now, there's also a material called Nema-gone which is a salt and you sprinkle that very lightly around tomatoes and it does a very nice job without the bacteria. It also kills the bacteria and therefore you have to be dependent on the Nema-gone. It does a very nice job on tomatoes, but please don't use in on peppers. It kills them. I mean it will kill peppers if you get anywhere near it. So don't plant your tomatoes and peppers together, they're enemies anyway. They don't like each other. Don't plant them anywhere close together. Either one or the other of them won't amount to anything, or both of them won't. this is your nematode control we're talking about.

Now, in your citrus nematode, I'd like to tell you something about him. He's called a burying nematode, burrows. And I have examined a lot of citrus roots, sterile, washed them, dipped them in 125° for 3 minutes and then taken them out and put them in cool water jars to bathe for 3 days. You know what happened? There was plenty of nematodes that hatched out that was on the inside. You know there were about a dozen different nematodes come out of that root. You know what the State Department of Agriculture said? It was only the burying nematode that did the damage, the rest were there just to keep him company. Do you believe that? This is in their booklet. Yet all those nematodes are in that same root. And the cause of it was the fertilizer.

In 1939 I wrote an article about the salts that were accumulating in the fields and in the citrus groves. And I predicted that in 15 years the citrus industry would be in great difficulty. This was before WW II. I missed it by 2 years. In 13 years they were in great difficulty, because this salt was built up in the soil from their fertilizers, synthetic fertilizers. And the fertilizer companies didn't want to get sued, so they hired some

scientists that said it was the nematodes that cause it. And they kept from getting sued, but oh, how they lied.

Nematodes do not cause plant disease. They only aggravate it. I'll admit they do aggravate the condition, they really do, but they do not cause it. The farmer is the one that causes it. Are there any questions now about these nematodes, before we take up another point about nematodes? Well, the nematodes, both male and female, they lay eggs, they are little snakes and I've seen nematodes 6 feet long.

Q – You said the reason for them is too much salt in the soil?

A – Yes.

Q – Which particular kind is it, the chlorides?

A – It can be a chloride, it can be ammonia salts, nitrogenic salts, calcium salts, iron chloride salts, yes, it can be many different kinds of salts.

Q – Will they attack asparagus after you put salt on it?

A – You don't put salt on asparagus for nematode purposes. You do it for ionization and it increases the ionization enough and the nematode can't start. In other words, it tingles him and he doesn't like it.

Q – That would be the opposite effect then wouldn't it?

A – No, it's alright. It's effective on asparagus, but it doesn't work on everything.

Q – How do you know when there is too much salt?

A – How do you know when there's too much, look at your nitrogen reading. The soil is low in nitrogen, low in salt, generally speaking.

That's not always true, you may be near the ocean, something like that. There may be an exception. Or you may be in a salt deposit. But one of the easy ways to tell if you've got too much salt, is to take a pound of your soil and put it in about 2 or 3 quarts of water, something like that and shake it for about 15 minutes and then precipitate the water off. Put the water into a container and steam it until it crystallizes. Then you can see where you've got too much salt in the soil. However, with this system I have given you. If you'll keep the ocean off, you can grow on the sand beach, if you'll keep the tide from covering it. Use this system and you can grow wonderful crops, even right on the beach. I've seen beautiful pasture grass growing up within 6 inches of salt water, right up there. Salt water does not kill plants necessarily, unless it covers them, because the soil will precipitate the salts out real quickly.

Q – Is there anything to salt sprays harming the citrus trees?

A – 10% solution, no., but from blowing in from the ocean from a hurricane for 48 to 60 hours, yes.

Q – How about, say I live about 4 blocks from the beach and normal sprays, would they kill or affect my citrus plants in the yard?

A – It shouldn't if you follow the rules. Just ordinary weather, but if the strong hurricane is blowing for 3-4 days you should turn on the fresh water and wash off the trees real good and also wash out the salts out of your soil. In that coarse sand, the fresh water washes the salts out quite rapidly.

Q – How long did you say the nematodes get?

A – I've seen them 6 feet long.

Q – What's the diameter?

A – O, big around as an earth worm. Earth worm is a nematode too, did you know that? Snake is a type of a nematode also. It's all in the reptile family.

Q – So how do you get the salt out of the soil?

A – Add your phosphates, potassium and other things to get them high enough. Potash is always a salt. Calcium nitrate is a salt, sulfate of ammonia is a salt. Nitrate of soda is a salt. All those are salts. You can't get along without salts and carbon. That's where your organic salts come from in your vegetables. It's necessary to have them in there. Any questions?

Q – Too much is what caused the root to split?

A – That's right, too much nitrogen salt, yes.

Q – What do you do to prevent this?

A – Raise your phosphoric acid content. Your copper, you make the roots stretch. Raise your calcium content and copper ratio.

In other words, your nitrogen is too great for the other elements. Follow the rule that we gave you already. Raise this thing into proportion. Keep these numbers where I say and it won't split. Which has more sugar in it, the root or the top? I don't mean the fruit; I'm just talking about the top of the root.

R – Root - top?

They both have the same amount. Both of you are right.

Q – Sugar cane is sweeter down at the bottom than it is up at the top?

A – You know why? Because the soil is too short on phosphates and when the soil has plenty of phosphates it's sweet all the way to the top.

Q – This sugar cane they make to syrup, is that syrup o.k. for us to eat?

A – I don't know about, without a lab report. It's good food, if you're good and healthy. If you're sick, I'd have to have numbers to know.

Any questions about these nematodes before I take up another viewpoint on these nematodes? There's a lot to learn about nematodes.

Q – Now the corn root worm, wire worm and all that stuff is still a nematode. And if they would correct their soils the way they should have them, there wouldn't be any problems?

A – The wire worm is not a nematode, no.

A – But the corn root worm is, right.

A – Well, some of them are and some of them aren't. There's one of them that bores on down thru the center like a worm, and he's not. But the nematodes are different. Worms have legs and nematodes don't.

Q – Earthworm is not a worm?

A – That's right. He's a nematode, not a worm. We say earthworms, but actually he's a nematode, because he doesn't have legs. Worms have legs.

Q – In other words, most worms are laid by a moth right?

A – Right. Nematodes are not.

Q – All worms are laid the . .

A – All worms are laid by some kind of a moth or a beetle.

But, nematodes bear young. There's nematodes that bear young and there's nematodes that lay eggs. Some of them don't lay eggs, they just get so full, 'till they can't hold any more and then they explode. And then the eggs hatch out. They do strange things. It takes the male and female nematodes to . . they have intercourse in order to fertilize those eggs. These can be seen under the microscope. They wrap around each other like snakes and they have a conception period of time. Sometimes it's 3 hours, 5 hours, from the time of conception until the eggs begin to form. Generally within 24 hours the eggs either begin to hatch or else they fill up so full with the eggs, that the mother explodes then all the eggs hatch out. You can watch all this under a microscope if you are interested. They'll never get a divorce.

Q – Get another wife when she explodes?

A – Don't think it makes any difference.

Q – Do you know how many eggs they hold?

A – Generally about 300-3,000 eggs is what one can hold. It takes a 1,000 power microscope to see some of them. I mean the eggs. But you can see the eggs right thru the female skins.

Q – Let me ask you a question. Parasites in animals and people, are they worms or are they nematodes?

A – Some of them are nematodes and some are worms. For instance, most of them are nematodes, but I have seen some that have little tiny legs, that are so short you couldn't see them without a microscope. But they had little tiny legs there near the front. Those are the kind that gets in sores and things of that nature. But they're mostly nematodes. They do not require moths.

Q – What kind of sores, human sores?

A – Yes. Isn't it interesting?

Q – How do they get in people? Where do they come from?

A – Well, a lot of times, the one that's got legs, a fly will sit on the sore and lay eggs there while you're looking at it if you're not careful. He'll lay eggs there while you're looking at him.

Q – Is that what you call ringworm?

A – No, ringworm is a nematode.

Q – I thought that is what you were talking about?

A – They're called worms, but they're actually nematodes. They bear their own young. Nematodes bear their own young and lay eggs. Worms have to have a moth or beetle or something on that order to propagate them. Like a butterfly in a cocoon.

What is the best way to control nematodes? I should say when is the best time to start your nematode control?

R – Before you plant.

Before you plant the crop, that's right. What is the great enemy to the nematodes in your fertilizer program?

R – Organic.

Organic bacteria, but there's another one thing I'm thinking about, one of your synthetics. No, it's not ammonia, it's potassium. If you've got your phosphate high enough and your ratio of potassium to the phosphate it's 2 lbs. of phosphate to 1 lb. of potash and you've got 200 lbs. of potash per acre, and 400 lbs. or more of phosphate per acre, I want to tell you, he's going to have a hot town in that old town tonight. He'll have a hot time. It's too hot in there for him. In fact that's too hot for earthworms. You've got to get much lower than that and if you lower your NPK in your soil below that level, low

enough for the earthworms to get in, you're going to find that it's too low for maximum production. Unless you've got an awful lot of humus to substantiate and back up the material that the earthworms make available. Aerobic bacteria does a much finer job than the worms. However, the worms manufacture carbon that the aerobic bacteria does not manufacture. You take earthworm castings, and you shake and dissolve it in warm water and then precipitate the water off and then crystallize it. You have a salt that looks very much like a billion diamonds under a microscope. It's crystalline carbon. Very soft material, but it surely does hold a lot of moisture in the soil. In soil that holds plenty of moisture you do not have a nematode problem. But one of the great mistakes in growing crops is that the farmer does not regulate his TDN or Ergs in the soil with the moisture content. I've ordered moisture content gauges. It's a thing that every farmer should have. Just stick it down in the soil and measure the moisture content of the soil.

Q – Will we be supplied with those?

A – You may get them. I don't know how much they'll be. But we've ordered them to see if they'll do everything they've promised to do. I've tried it and it's very satisfactory.

Q – The opinion I get here is this. The ordinary cause of nematodes is probably an under fertilization of phosphorus, P_2O_5 , potassium and an other fertilization of nitrogen?

A – That is true, out of ratio that is correct.

Q – I've also heard that earthworms are good to have in the ground, because they indicate that the soil is right?

A – It's right up to a point. But you can improve it a great lot for a heavier yield.

Let me give you an example. Suppose you had earthworms it a maximum and you had your soil to a maximum, we'll say in a cabbage field. You would approximately get about 5-7 tons of cabbage per acre with these earthworms moving your soil up to a maximum. But suppose you did not have the earthworms and you had your soil in proper ratio and you had it to a maximum, you could probably get 20 tons of cabbage per acre. With the salt concentration and your plant food nutrients, density would be too great to support the earthworm. Understand what I'm saying? Your soil density would be higher than the earthworm could stand. But, yet the cabbage loves it. Another thing that doesn't work very well is nematodes in orange groves. I beg your pardon, earthworms, which are nematodes, in orange groves, because the citric acid in the roots is very difficult for the

nematodes. And the nematodes can't live in citrus soils or any other soil that's too dry. What one product dries the soil out mostly?

R – Triple super phosphate.

It's one of the products, but it's not the main one. There's one that's even worse than that.

R – Ammoniacal nitrogen?

No, not that one. Nu-Green is another, but there's one more serious than both of these. About 10 times more serious than these.

R – Urea.

No.

R – Anhydrous ammonia?

No. It's muriate of potash. It's a no, no. That's not the greatest damage that muriate of potash does to soil, but it is your results that causes it to dry out. What is the factor that causes the soil to dry out after the addition of muriate of potash?

R – Kills the bacteria.

Right. Kills the bacteria and the soil dies and all it needs then is to be buried. It needs a funeral. Now, this muriate of potash, you can drive by a pasture and tell if the farmer's using it or not, because you see the manure laying for weeks and weeks and weeks in clods all over the field. Then you can see that muriate of potash will spread out a little bit and then you'll have a clump of grass here and there and half the field is covered with clumps of grass that the cows won't eat because the soil is dead. In time it will get a start again, but the cows not used to the odors, so they don't eat it. They smell that phosphate odor in it, so they won't eat it.

If you didn't have a refractometer, how would you test your produce to see which one had the most sugar in it?

R – Weight?

That's one way. How is another way?

R – Check for hollow stems?

That's another way, but there's another very simple. Get some of somebody else's and some of yours and hand it to a horse or a cow and see which one they eat. They know

which one has the most sugar in it. And that's the one they'll eat first. They're pretty good chemists.

Q – Can they smell it?

A – O yes, they can smell the sugar content in it. They've got a very sensitive nose. Anything hard about that?

Q – Can you do the same thing in a pasture?

A – Yes, sure. Isn't this simple, don't you find this really simple?

R – All you really need to do is to get a farmer to correct half his meadow and watch where the cows eat.

Right.

R – They'll eat exactly on that line.

Right, just as straight as you can draw a string across there. In fact you can write the farmers name in the pasture and they'll keep it mowed so you can read it from the air. I've done that. You can see it from the air, see it from anywhere. They can tell the difference. There's nothing hard about this, just go by the numbers.

Now, I've given you the foundation and hope that all of you prosper greatly in this field. Now are there any questions to be asked, to be covered about nematodes?

Q – The aerobic bacteria also eat live nematodes, right?

A – O yes, grasshoppers, ants, cockroaches, anything else they come across, worms. They really eat them.

Q – Do those bacteria eat a grasshopper?

A – O yes.

Q – When they're still alive or when they're dead?

A – O yes, when he's still alive if he gets under the ground a little bit. But the thing about the aerobic bacteria is that the sunlight kills it. Any other questions about nematodes?

Q – What is your definition of precipitate? You use the word quite a bit.

A – A precipitate is to drain the liquid off of something.

Q – You mean separation, is that what you mean?

A – That's right, separation of the soil from the moisture that's in it, precipitation.

Q – Well, in my chemistry class, of course if you filter something, what's left on the filter paper is the precipitate and what goes thru is the filtrate. Are you used to those terms? Well, we used anything you could oxidize or crystallize or get out of the other. We used the. . . well now, in early chemistry yes, but in the advanced

chemistry we took anything that was left to the solution as a precipitant.

Q – Left in the solution?

A – Yes, in other words, we would evaporate the moisture out of it, or the liquid out of it and then that was called a precipitant also.

R – O yea, or crystallized, that would be crystallization as I understand it.

Yes, anything that can pass thru the paper is also considered a precipitant.

R – I never understood it that way.

That's the way it was when I went to school. I don't know, and it was this way and wrote this way in England too.

Now we come to ground moles or moles at least. Let's not just limit it to ground moles. There's a mole cricket that actually does more damage than a ground mole. But they're very easy to get rid of, the mole crickets are. You take a pan of water and a light at night, especially a red light or ultra violet light, or just a light. It doesn't have to be any kind, just a plain light, but the ultra violet lights are better. You don't need it to be too bright. You put it over that pan and every mole cricket as far as he can see that light, has got to come get in that pan and drowns. Now we used to have a garden and all around it was forest. We could keep them out of the garden, but they'd walk out of that forest every night. In fact the whole . . . forest was there a couple hundred thousand acres adjoining it. And why we'd get a dishpan full every night, of these mole crickets. They were so busy getting thru the garden to that light see, they never stopped to do any damage. They really didn't.

Q – What do they do? I've never seen one.

A – Well, they just chew things up like crazy. They eat it up.

Q – Why are they called a mole cricket?

A – They grow just under the ground and they eat the roots off and then get up to the top. They look like a cricket, but he crawls under the ground.

Also, that's one way to get rid of him. You can also get a mole cricket food. Scatter it over the garden in the afternoon in little pellets. Next day you'll find the mole crickets dead all over the garden, because it kills them in about 2 hours. What it does, is when he eats it, it dehydrates inside of him and constipates him real quick and he can't go forward or backward. As he's dying, he'll walk a few steps forward, then back up a few steps, walk a few steps forward, then back up a few steps. All the time that stuff is drying.

First thing you know he'll kick over on his back and that's the end of him. He is really stopped up. You know he eats all the time and he has bowel movements all the time. And when he stops that bowel movement he only lives about 2 hours. Like a guinea pig, it's going in one end and out the other all the time, 24 hours a day. And that's the way these mole crickets live.

Q – Make good fish bait. How high a pan?

A – Just an ordinary dish pan, 6-8 inches.

Q – Can he get up over that?

A – O yes. They'll fly. I've seen them try to climb up the pan and couldn't but what we used to do was put sticks to it so they could walk up it. We helped them.

R – Put up the ladder for them.

Right, put boards up there so they could walk up. We've seen a few too stupid to even climb the board. He'll try to climb, then back off it and run and try to fly in there and the light blinds him and he'll hit the pan and bounce and lay down and think awhile, then go back out and try it again.

Q – You have the light just above the pan?

A – Oh, about a foot and a half above the pan.

There's also the ultra violet lights you can connect up to the electric sockets and that light will get every bug in really, in half a mile. If there's a moth or bug within a half mile he's got to go fly thru that ring where that light is and then there's a fan that blows him into a bag. And at the edge of this forest, we didn't spray the garden, and that's before I invented these bottles, but every night we'd have about a 50 lb. bag of bugs that we drew out into this forest. Well, what we did was we just dug a hole dumped them in and stomped them in and made good fertilizer out of them, because they were too deep to get them out of it. Another thing we did to our garden too. We burned the tin cans and we buried them in the garden about a foot and a half deep, all over the garden. We buried it ditch by ditch by ditch. We had tin cans buried all over that and had actually a layer of iron under that garden, of tin cans. That was iron and believe me it makes all the difference in the world in poor soil, these tin cans that you do. You can also get 50 gallon drums and put a 10% solution of salt water in it. Keep the drum full of tin cans with a bung hole down near the bottom to dray this iron rust out. Then when you get ready to

spray, get about 5 gallons of this iron rust in your spray tank and it's the finest iron you've ever used into your spray tank and it's the cheapest source of iron in the world from burned tin cans. It's amazing how much iron you can make out of tin can, just in 50 gallon drums, but burn the tin can first. Mash them flat, burn them a little bit and you can have all the iron. With 10 drums, you can supply all the iron for a 100 acre farm. And it's cheap, plentiful, quick and easy. It is lots cheaper than buying your iron.

Q – How often do you have to replace your drums?

A – Well, I've used them for 8-10 years. Of course the drum rusts too, but the rust on the drum is just as good as any of the rust.

Q – What if you're a health minded farmer and you don't use food in tin cans? Once you start to eating health-wise, you don't have too many of those tin cans.

A – No, you don't. But they're always plentiful. We use the DelMonte, things of that nature. You can get plenty of them to fill up the drum. In fact they're still available. Old nails, any old thing like that, that will rust.

Also, you can put a few copper wires in there. They'll rust, oxidize those and you've got your copper and iron at the same time.

Q – Anything else you could put in there?

A – Some liquid phosphate, yes. But that goes to the bottom too quickly and eats the bottom out of your drum.

Q – How about aluminum? And zinc?

A – Aluminum you don't need. Zinc it takes from the air. I've never had to add zinc to plants at all. I have made hydrogen peroxide of zinc in order to get the rotten cabbages out of our woods, in an oak or an orange tree or something, in order to keep the bacteria from rotting the limb off or something. Nothing hard about that is there?

One of your problems is to know your chemicals. To know their power, know what they will do, and then use them. Chemicals are my business. Just like whatever you do is your business and they're your tools that you use.

Q – What about ground moles now?

A – Ground moles are easy to take care of. All you've got to do is mash the hole in early morning and watch for him to kick it up. The just catch him, put him in between 2 bricks and sock them together. And if that don't kill him, repeat the dose.

R – I don't have to do that, my dog gets all of them.

Your dog or cats will, but really seriously, if you really have problems get some sodium cyanide. Don't touch it with your hands please. Stick your finger down into the

mole hill, then drop one of those little balls down in there and take your foot and mash it in. he'll come along and find it mashed in and he'll push it up then have an awful time getting across that cyanide ball. That'll be the end of him. Or, you take a little bit of cyanide powder in there and just mash it down in. He'll have to really work to get thru it. That's the end of that boy.

Q – Do they use that more than once?

A – O yes, many times, many times they use it.

Q – How about if you have moles on large scale?

A – This will get them on a large scale or you can use a little chlordane in that hole if you like. They're easy to get rid of. They've never been a problem to me, is the ground mole. Any questions?

Q – What do moles go after in the soil? What is their diet? What do they live on?

A – Seeds, roots, root hair, bugs, earthworms. They eat about anything they can get hold of in there.

I know one thing, they can bite you if you give them a chance. They'll bite, like a rat. Some of them are very vicious and some just as tame when you pick them up. You never know. Did you ever look at their teeth? Like a rats teeth, all front teeth, a beavers teeth or something.

How many of you have ever experimented with guinea pigs? Have you ever done any work with them? It's a good idea if you're going to work with the medical course very much, to do some experimentation with them. I'll tell you this, if you ever pick one up by the tail, his eyes will fall out!

Q – What tail?

Anything hard about that? No, he ain't got no tail, almost hardly. You heard that poem about a frog is a funny bird? He hasn't got any tail, almost, hardly. When he flies he jumps, when he jumps he hops, when he hops he stops, because a frog ain't got no tail, almost, hardly. Used to say that when I was a kid. So problems have answers. Never be satisfied until you find the answer.

Q – Are you going to discuss anything about the tomato blight that's common here in the south that they don't have in the north?

A – I don't know of any blight that you have here and not up there.

R – I never had any black blight in tomatoes up north, but I've got it down here.

Black blight in tomatoes, black blight is caused because there's too much potassium in the soil. I thought you were talking about the rust.

R – No, it was like frost hit it. It just died all of a sudden.

Then it's nematodes or something on that order. I haven't seen one die like that without nematodes or something cut it or damaged it, something on that order.

R – We spray for this blight all the time. Everybody, otherwise you can't keep them.

Check the roots; see if the bark slides off.

R – There is blight up there that is a fungus.

Yes, if the leaf touched the ground.

R – Yes, but damp weather will finish the plant in no time.

Then your nitrogen is somewhere and your phosphates are not right or your soil is too sterile and you don't have enough bacteria in it.

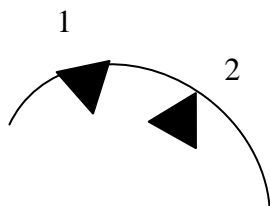
R – Well, I never get it in the garden.

I see.

Q – I've had this happen too. All the ripe tomatoes would be spotted and I picked the green ones off and put them in the refrigerator, because they were beautiful, had no blemishes on them. But when they ripened, they rotted also.

A – There can be too much sulfur in the soil too. There are a whole lot of factors. You've got to know why. Any of you run into problems that's close around, get me some of the sample so I can examine it to see if it comes from within or without.

Let me show you something about a plant that you can tell. If you will examine very closely the stem of fruit, it doesn't matter whether it's a fruit – banana, tomato, or radish, doesn't matter what it is. If that decay is like this (1), if this is the decay part in here like this, then it's something from the outside that's causing. But if this decay is like this (2) coming to the outside, this all decayed in here. Then it's a mineral deficiency. This is a bark, something has struck it and damaged it or mechanical damage or something on that. So notice the cone to see which way the cone is. the mineral deficiency starts inward and moves to the outward, the outward edge starts outward and moves inward.



Q – Is this just fruit or is this vegetables?

A – No, it can be turnips, sweet potatoes, onions, it doesn't matter. Any questions?

Q – The one that's big on the top is? Inward is mineral?

A – The that's big on the outside is from damage on the outside. The one that's small on the outside is damaged form the mineral deficiency from the inside.

R – Come to think of it, that tomato blight must be something from the soil.

Examine it and see which way.

R – Up north, I never sprayed that much.

Q – If everything is in proper ratio, the plant also has quite a bit of protection from something from the outside don't they?

A – The oil, yes. The lower the sugar content, the lower the oil content. The lower the sugar, the lower the oil, the lower the mineral, it's a chain reaction.

R – All goes back to phosphorus.

Yes, right. Now, let me call your attention to something else about a mineral deficiency. We're looking down onto the fruit now; don't matter whether it is a tomato, orange or what not. This is the stem end right here that you're looking at. Right here is the stamens. Now if it's citrus and there's plenty of mineral in the soil, it has 5 stamens. Tomatoes have many more than that, little hands that hold it on there. The greater the mineral deficiencies, the smaller these stamens are. In fact you'll see some with only 3 on it. Minerals are getting pretty low on that. If these shrink small enough, that fruit is going to fall off the tree. So if you want to evaluate the mineral content of your soil, study closely the stamen that holds the fruit on the tree or the vine. Now some fruits don't have that. Watermelons don't have a stamen. For instance you have a watermelon vine and you have the leaves going out like this. And then you have a young watermelon coming out here and on the other side of the stem is a little curly cue like this on the other side of the stem from the watermelon. If it's a little thin, skinny corkscrew of a thing, you have a

mineral deficiency. The end of it starts to die off, you got problems. But whenever that melon ripens, the whole thing will die.

R – That’s the way I go about telling when they’re ripe.

I can tell you one way to tell if a watermelon is ripe. Cut it open and taste it. That little curly cue, I’ll tell you what. When that little stem does, it’s as good as it’s ever going to be. Are there any questions?

Q – Do you wait until that curly cue dies and then you pick it?

A – That’s one way to do. I can just look at a melon and tell if it’s as good as it’s going to be, without even looking at the little curly cue. Just look at the melon and tell.

Q – Going back to the thing about the tomatoes, you get these brown spots on the tomato with the black spot in the middle kind of. They call it anthracnose.

A – Yes, copper deficiency.

Q – Same thing in alfalfa?

A – No, alfalfa can be too much potassium.

Q – Causes anthracnose?

A – No, I’ve never seen anthracnose as such on grass. It may be mislabeled, but it’s generally a mold. It can be too much potassium, it can be a lack of iron. You have to examine some of these things under glass to really evaluate them. Any more questions?

We’re bringing this to an end for today. If you want to know anything else about what we’ve covered today, right now is the time to ask or forever hold your peace as far as this class is concerned. Have you learned anything today?

R – Amen.

Q – About that light that you have to get those crickets. Can you use this kind of light in them?

A – That’s good, it’s alright, yes. Just a light bulb. He’s just got to get in that pan, just got to get in there. Accommodate him, put a board up to there for him to walk on.

Q – Put water in the pan?

A – Yes, put water in the pan. He can’t climb out once he gets wet, he’s in there.

R – A little kerosene will really do the job.

It sure will, it will really get them. You don’t have to have kerosene, he can’t get out anyway once he gets in that dishpan, can’t get out. I’ve seen so many get in there that they couldn’t get out, yet there wasn’t enough water to cover them. The rest of the

drowned ones on the bottom and the ones that were alive on top were walking around on those dead ones still in there. So you want to be sure the pan is at least half full. It's kind of like getting turtles out of your pond. You've got a pond you can't get the turtles out of. The greatest thing in the world is to get you a barrel out there or a screen and cut a lot of holes in the barrel. Up at the top, fix a board so they can climb up. And when they get to the top, a trap door with a spring on it. And he climbs out on the trap door with the spring on it and it flops down and leaves him in the barrel and the trap door flaps back up waiting for the next turtle.

Q – You mean that really works?

A – Yes, it works, you bet it works. You can get a barrel of turtles out of a pond that way. Every one of them will climb up on that barrel to get in the sunshine. Not only that, but they're going to make a noise scratching on the tin and the other turtles will come to see what the scratching is and then they'll climb up on the board.

Q – Somebody said there wasn't any fish out in the pond out at the camp, because of the turtles, is that right?

A – O, there's a lots of fish in there. We got a ½ a barrel of turtles out of there last year and there's another half barrel.

Q – Is there a market for them?

A – No.

Q – I thought there might be fore soup?

A – No, I don't eat turtle, but they'll make good fertilizer though.

Q – In other words, you just keep one turtle for bait until you get a whole barrel full?

A – Might be a good idea.

Yesterday we were learning to go by the numbers, but today we're going to go by established principles. It's much easier to handle. We're going to learn how to farm, taking some of the gamble out of farming.

A few years ago when I was a young man, they were having a terrible drought down thru Georgia and Tennessee. It was terrible, very bad. So, the ministers and governor ordered a day of prayer to pray for rain. It wasn't a Sunday, it was thru the week. I believe it was Wednesday. The whole state was supposed to go to church and pray for rain. One little lady, crippled, walked with a walking cane, went to pray for rain. She took her umbrella! You know, it rained. That's faith, the faith of one can accomplish much, but if you gamble, you accomplish nothing but heartache. So what you need to do

as soil physicists and soil scientists, is take the gamble out of it, get God in it. Whenever God is in it, the gamble is gone. So put God first, put Him first in everything. When you get to the place in any profession in which everything you do is wrong, I mean everything is wrong, you will know you are a full grown man or a full grown woman. That's a sure sign you are grown when you recognize that everything you do is wrong. And when you do that the Lord takes over. You are learning to do the impossible here, but remember one thing; God has reserved the miracles for Himself. God reserves the miracles.

A few years ago I was going to a little Community Church and it needed a coat of paint, the roof leaked. Every time it rained, the Lord baptized people. You had to keep shifting around to keep from having water dripped on you if it rained at church. But I decided to put this. . . was in early September. So I got permission from the church to put the roof on and paint it and clean it up and make it look like a church. We hadn't been going very long and they gave me permission. We started to put the roof on that church and just as we got the roof off, there was a storm going down the west coast of Florida. It was not supposed to hit Florida at all. It was supposed to not even come hardly a shower of rain. But when that storm got right due west of us, it turned right straight across the state eastward. And do you know we started. . . we were putting the roof on that church and I saw rain go south of that church, I saw rain go north of that church, I saw rain come up to that church and stop and slide around one way or another. But do you know that not one drop of rain for 2 days fell on that church until that roof was on. And the workers worked right on. I saw that this really happened. So there's nothing God can't do. But whenever anything you do is wrong, you know you are a grown man. Then you can let God do the rest.

So what I'm trying to tell you, follow the rules He made and we're going to learn more about those rules today. And the more gamble you take in farming, the less God is in it. Remember that. The more gamble you take, you're supposed to move out every providence of chance before you start and then when you do that, and then you are seeking to be perfect. You're not out there gambling with nature, you're not gambling with God. You're not in the Insurance business. In other words, the Insurance Companies bet you're going to get sick and you bet you're not, so you pay them to pay you when you're sick. It's a gamble in other words. Insurance bets that you're going to die and you

bet that you are going to die, so you consequently die too early. That's what Insurance is. I'm not against Insurance; I'm just saying it's a gamble. It's a gamble you take. I'm not for it or against it, I'm leaving that between each individual, that's between him and his God. But what I'm trying to get you to do is to take the gambling out of farming. And we're going to learn more about that today. And I appreciate your questions. So many people when they teach a class do not like to be asked questions they don't know, but I do. Because the more questions you ask, that I don't know, the more you know about the subject and the more you know about the subject, the better I like it. And what we don't know, we'll all strive together to learn. If I learn it first, I'll tell you and if you learn it first, you tell me, o.k.? Then we can divide. There's a lot of things I don't know and there's a lot of things I'd like to know how to do that. Like producing those beans in 4 hours. I'd like to know how to do that. I believe it can be done, I know it can be done, but I don't know how to do it yet. But, we're going to learn more about it. It's kind of like the fellow that was asked, "if your wife died, would you ever get married again?" He said, "If I did, I wouldn't get married as young as I did the first time." So this is looking up and looking on the bright side and the side of reality. We'll get there. Not only that, we'll be able to know that we know what we know. Prayer.

They tell me, the Amish people, their people get well on lemonade and stale jokes. What does it matter? Just as long as you get well, what matters what they get well on?

We're going to study about irrigation today and one of the first things I want to tell you is, if you're going to be successful you must plan to have water, water control. Irrigation is not only for putting water on, it's for taking water off. You must plan to have water. I don't know of any place in the U.S. where water is not available or could be more available. However, there are farms where it's not available on that farm. But, there is water, some of it 1,000 miles away, but there is water. one of the great mistakes in farming today is that you don't prepare in the winter for the summer. Now the ant, he prepares in the summer for the winter. But it's high time the American Farmer starts to prepare in the winter for the summer. You say, what are you talking about? I'm talking about water now. Do you realize that in many areas you have 4-5-6-8-10 feet of snow? Do you realize that can be turned into water and put in vats? Covered and used in the

summertime for water? Do you realize that? You can. Do you realize you can irrigate an acre with only 100 gallons of water? Do you know that? I mean 100 gallons a day. I'm talking about on corn, waist high, or wheat half grown. Do you realize that? Do you know why it isn't done? Because whenever the drought hits your humidity, it's maybe zero, and you put it in the air and you lose 90% of your water. You know how to get it in the ground, it has to be gotten under the ground, and you have to put this water under the ground? And do you know that water rises at night and goes down in the day? It rises in the night and goes down in the day and every night it rises and every day it goes down again. So what you need to do is when you irrigate, in a drought, is to put the water under the ground at night. Now how in the world can you put water underground? There's many ways you can put it underground. Put it on the ground. It doesn't have to be under the ground, put it on the ground, i.e. the price of hose today is real cheap. A lot of times at night, the humidity is as low at night as it is in the daytime. But you need it on the ground's where you need it or under the ground. Actually a foot under the ground is better. You can put this plastic pipe under the ground and it'll last for years and years. What you need to do with this plastic pipe is to bore holes in it and put it out. Put it out so these pipes are maybe 3 feet apart and not put holes on top of the pipe, but stagger it on each side about 18 inches apart. The holes about 18 inches apart. Now, when I say a hole, I mean one that a needle, a very small needle will go in, that is what you should have. Whatever your depth of plowing is, it should be 2 inches below that depth. I'm talking about a 6-8 inch good top soil and don't plow deep enough to get into your water lines and they're down for 20-30 years.

I put plastic hose down 25 years ago and it's still working perfectly today. This black plastic pipe underground is excellent, excellent pipe. But you need to work out your water supply. In your big, large pipe, your holes can be further apart, in other words, 30 inches apart. Now I mean needle size holes. You shouldn't put the hole all the way thru the pipe. Stagger it, put it thru and the 18 inches on the other side. Put it thru again and again and put this pipe underground. You can work it out. It's a simple thing to work out how many gallons of water you need to the acre according to the type of soil you have. But if you get 100 gallons of water into that acre every night and you say it's 12 inches underground, we'll say 12 inches, when the drought starts, don't wait until the soil dries

out, put 100 gallons to the acre. Do you realize that you can keep that soil and that crop growing bountifully with only 100 gallons of water?

Now, not only this, in this water you can add certain minerals that will go out and help take care of that crop. You've already got your phosphates in you've got your blowing sand under control. You've got a high humidity already in the soil. Your problem is the top inch of soil. Don't worry about the top inch if there's plenty of plant food in the next 5 inches and that moisture will come up every night, you've got it solved. Let's suppose you are in an area now where you do not have zero percent humidity. It's just a matter of getting the water on the ground. There's a lot of places where you have a drought for 2-3-4 weeks that cuts your crop by 20-30%. There you can use a above ground irrigation plan. There are many of them you can use, but what you need to know in the irrigation is, how far is that water going to be thrown out? The radius of that water? in other words, about 35 feet radius is as small as you want to give in any sprinkler. Let's figure on the 35 feet radius or 70 feet diameter. Then you stagger those faucets out thru the field. These are permanent in other words, then your pipelines then are 70 feet apart. Now, if you'll take a 2 inch main and go so far with the 2 inch, then down to 1 ½ inch and then down to 1 inch, then down to ½ inch, that sprinkler system will carry 18 sprinklers that put out 4 gallons of water per minute. Each sprinkler head will be putting out 4 gallons of water per minute and you'll have a radius you'll have a place then that you're irrigating. I'm talking about with no wind now. You're going to have to have wind variations. But we'll get to that later. So if you've got those sprinklers 70 feet apart and you've got 18 of them, how far apart is that? 70 times 18 is 1,260 feet. So you've got 1,260 feet and you've got also 70 feet. So it's 18 times 70 and then you've got it times 70 again, because it's 70 feet. So it's 18 times 70 and then you've got it times 70 again, because it's 70 feet wide. These sprinklers are 70 feet apart like this. Which is also 35 feet out here and 35 feet out here. So this is the area that you're irrigating with that main. So you've got 70 feet again. So you've got 2 acres you're irrigating there with a 2 inch line and one 2 inch pipe. But now let's look at one more thing about this.

Q – Excuse me, do you mean 2 horse power.

A – 2 horse power yes, 2 horse power for this.

Let's say we're figuring on 2 acre blocks here. This is only to give you the idea of it, but I'm going to do a little bit wrong here. That is correct for the acre, but this is your 2 acres here like this. This is not an X right here, it is a zero. So this is 2 acres you have here and the next acre would be placed here like this in the middle between these two. This would be your next sprinkler line like this. It's 70 feet like this, the sprinklers, we're putting them in.

Now, how much more water can flow thru a 1 inch pipe than can flow thru a 1/2 inch pipe?

R – 4 times as much.

4 times as much, alright. So your main line out here, your main line that you're going to supply 4 – 2 inch lines to have. . . you have to have a 4 inch line out here. This is a 4 inch line coming out like this, would be your 4 inch line. After this goes your 2 inch line. This would be your 2 inch line and a 2 inch line here. And then down here would be another 2 inch line which would be like this. Sprinkler heads. . . these are sprinkler heads with an X, for sprinkler heads. You can put. . . in order to supply a 4 inch line, what size pump must you have?

Q – In horsepower?

A – No. Inches. In inches, what size inches must you have to supply 1-4 inch line? What size outlet on your pump must you have?

R – At least 4.

No sir, you must have a 6. You've got to have a 6 inch or else you won't have your pressure. It takes a 6 inch pump to supply a 4 inch line with your pressure. You would fill it with a 4 inch lime, but you're not using pressure pump, you're using a volume pump. You don't want to get into pressure pumps at all. You don't need the pressure because these sprinklers work on a 15 lb. head or more. But then they're designed for that. So if you have a 6 inch pump outlet, what size horsepower motor must you have?

R – About 30?

10 - 10.

Q – Is that 10 on gas or electric?

A – It doesn't matter, either one. If electricity is available always us it, always use electricity, it is cheaper.

So then, your 10 horsepower pump will handle a 6 inch pipe. That is a submersible pump. Use the submersible pump because it is highly satisfactory, more economical in the long run than any other kind. Now, a 6 inch submersible pump, what size well does it take for it? It takes an 8 inch well for a 6 inch submersible pump. But suppose you're pumping out of a river or a lake? Don't make any difference if you pump it out of the lake or the reservoir. Now, one of the great mistakes that people make or had not planned on doing now, is to irrigate their farm. This is only one system. I'm going to show you 3-4 systems of irrigation, depending on your water supply. This would be one system where you could go above the ground, where you didn't have a humidity problem. Some places you have a humidity problem during the day and you don't have one at night. So whatever time your humidity drops at night, watch your humidity and if it drops we'll say below 50, say it raises to 50 from zero in the daytime, like they have in Las Vegas in that area. Suppose at night now, the humidity rose to 50%, then you would use it at night and it would still pay you to irrigate above the ground with a 50% humidity even with . . . well, let me say this. Suppose the air were up to 50% humidity, what percentage of the water would you lose in your irrigation? That's if the sprinkler heads were above the ground? Remember zero during the day and 50% at night. How much? You'd be amazed to learn that you're losing 75%.

Q – In the air?

A – Not when it went out, but your zero percent humidity the next day, sucks it out of the ground. That's the total loss. I'm speaking of the total loss.

Q – Top irrigation?

A – Yes, top irrigation.

Q – How about underground?

A – Loss very little underground?

Q – So it never really penetrates that dust?

A – That's right.

There are materials that you can use if your irrigation is under the ground, to spray on the ground that forms a film like plastic right over the top of the ground that keeps the air from drawing the humidity out. That film is only about 1/10,000 of an inch

thick. You spray it on the ground. It's like a plastic and it holds that water in the ground something terrifically and it's absolutely harmless.

Q – Water can't go thru it?

A – Yes, water can go thru it, but the thing of it is this is for underground irrigation and not above the ground irrigation, because it doesn't go thru very fast. It's a film like plastic that you spray on the ground.

You can also spray this on the trees just before a cold comes and it doesn't let the cold wind strike the tree or the bark.

R – Soapsuds.

Well, that's one of them, but there's one even tighter than soapsuds. Soapsuds only last one night or two. It's very, very nice, but. . . these things you need to learn about irrigation.

One of the things you've got to calculate on your irrigation is maximum production, or you can't afford it. You know why more irrigation is not done? Because, they put the irrigation in and don't back up the acre with enough nutrients to pay for the irrigation system. Do you understand? In other words, you've got to have all the links in the chain, not just a part of them.

A few years ago, a man by the name of Bell, he owned a paper company in Savannah, Georgia, decided to irrigate a 100 acre orange grove. To irrigate it, he had plenty of water and put a sprinkler on top of every tree. It happened that that winter it turned cold. It happened to be a cold near the Gulf of Mexico and there was high humidity in the air. He turned his sprinkler system on and covered the trees with ice, and 32° doesn't freeze an orange tree. You've got to get below 26°. He saved his grove and everybody else lost their fruit just about. Most of the people lost their fruit. Then he put in a system of selling these irrigation systems all over the State of Florida and sold an awful lot of them. There's still a lot of them in action, In 1962 and '63, there was the coldest night and the coldest weather that Florida had ever seen in this century. The humidity went down to zero and the temperature went to 14° and these people that had irrigation systems –when that humidity dropped to zero in the daytime, I called all my clients that had these irrigation systems and said, - don't turn those irrigation systems on! Because the humidity is zero and if you ice your trees with the humidity at zero, you'll kill your trees to the ground. You can't do it. I'm telling you, I thought they'd lynch me

before daylight the next morning. They really got angry with me. They really got peeved with me when I told them not to turn it on with zero percent humidity. But, some of them listened and some of them didn't and you know what happened to those that didn't? They lost their trees to the ground. The ones that listened, their trees are still big orange groves today. What is the difference in putting water on the tree at zero percent humidity . . . that is at a temperature of 14°, then putting it on at a high humidity? What is the difference?

R – The temperature drops even lower, evaporation.

Something else happens, what is it?

R – Trees take some of the water in?

No, that's not it. Because if the temperature is 14° at zero percent humidity, the ice draws the heat out of the tree if it's an evergreen. The same thing happens when a tree sprouts out in the spring of the year and there comes a freeze and kills the tree. Some of them kill peach trees 20 years old. In other words, the sap has risen. So whenever you study irrigation, watch your humidity meters. What is the humidity saturation point?

R – 100%

100% humidity, except, what does that mean?

R – Whatever water the air will pick up at that temperature.

That's the maximum amount, but at 100% what happens in the air?

R – Starts to rain.

That's right. The little fog droplets begins to fall. This is your dew point at 100. What is your total pure water? What is that percentage? When you've got a solid wall of water, what percentage is that?

R – 101%.

If 100% is the dew point, what is pure water? It's 200%, the same in measuring alcohol in proof. 100 proof alcohol is 50% alcohol, 200 proof is pure alcohol. Same measure, cockeyed, but that's the way it is. These things you've got to understand in order to do your irrigation problem.

Whenever you put out sprinkler head systems, the first thing you want to know is how many gallons per minute that sprinkler puts out. Suppose now, in this sprinkler system I have on the board here, that you have 18 sprinkler heads, and each head is putting out 4 gallons per minute. How many gallons per minute is that pipeline putting

out? 72 gallons per minute. Now, how long would it take to put 1 inch of water on 2 acres? If they're putting out 72 gallons of water per minute then how long would it take to put it on one acre, I mean?

R – 6 hours and a half.

How did you get it?

R – Multiplied 27,500, divided it by 72, got 382 minutes, divided that by 60 and got 6 hours and 36 minutes.

On one acre or 2 acres? One way to do it is 9 times 72, another way is that correct? No, no, no, there's 9 sprinklers to the acre and each sprinkler is putting out 4 so 4 times 60 is 320 and you'd multiply 320 gallons per hour per sprinkler. Is that correct? You take out 320 gallons per hour, per sprinkler. Is that correct?

R – We figured one acre with 18 sprinkler heads.

No, two acres with 18 sprinkler heads. I thought it didn't sound right to me. So, one sprinkler head would put out 240 gallons per hour. Is that correct? And 9 times 240 will get your 2,000 for round figures, so that's 2,000 gallons an hour. And you've got 27, let's say 26. So you've got 13 hours there is that correct? You've got 13 hours to get 1 inch of water. Is that correct?

Now, suppose this is what you want. But suppose you've got 50% saturation in the first 6 inches? That you wanted to maintain. Suppose your humidity drops and therefore, within a 24 hour period that your saturation point has dropped down to 40 and you want to raise it back to 50 again. How long should that sprinkler system run?

R – Almost 8 hours.

You only have a 10% loss there.

R – Over 6/10.

Six tenths is 13? You know how long it actually takes? It takes about 2 ½ to 3 hours to do it. Why? I know how it figures, but I know what actually happens in the field. Why?

R – The saturation rate is not linear, it differs, it increases faster than a linear rate.

You're getting warm, you're really getting warm on it. What happens? Because when that water that you put out of there hits the ground, the heat expands the water about 300% and it covers, wets a lot more ground. It doesn't form steam, but the

expansion of that water is pretty cool when you spray it on there. So don't forget your expansion of water and etc. You hadn't thought about that had you? But it happens, the water expands that much.

Q – Then that would make the sprinkler system more practical than the underground system?

A – No, because you're only using 100 gallons per acre underground. Get the idea? Don't forget about your water expansion.

I learned all this from experience, but you can get it all from books now. You can get books on irrigation and this is in books, all in books. Now with certain plants it is to a certain advantage to have overhead irrigation. Anything whose bud will hold water, like corn or banana plants, it is an advantage to have that irrigation above system, because the corn stalk can take in water thru its buds and supply it beautifully even though it's zero percent humidity. So you can take a spray tank and a tractor that is high enough above the corn and put just plain water and fill those water buds with about 100 gallons of water per acre. Isn't it easy? But you have to have a tractor that's built way up on stilts. You've seen these tractors. They only have about a 50 gallon tank on the PTO. That's what it is, yes, PTO. And then they have supply tank out there where they're not carrying too much water, and fill that bud. It just does a beautiful job. Do you realize you can cut 5 months off of growing a stalk of Bananas by putting water in the bud every day?

R – I'm going to try that.

That's right. Fill that bud every day. It's amazing what you can do. Now, you can water that corn once or twice a week and fill that bud and just do beautifully with it. Even in dry weather.

Now let me tell you something else they're doing in the citrus industry. They're not only irrigating, but they're fertilizing by spraying their grove thru their irrigation system. And they used to put that sprinkler above the tree, but now they're putting it down in the tree to start with. That's what I did to start with. I never did put one on top of the tree. I put mine in the middle of the tree. Not only that, but at the top I had a different kind of sprinkler. I had a mist. You only put out a mist in there, a very fine mist and it was near the top of the tree. About 4-5 feet under the top of a big tree. As that mist falls in there, you can do more with a mist in 15 minutes under a tree than you can do with a sprinkler an hour outside of a tree. Why?

R – Gets in the bottom of the leaves.

That's right. It gets in the bottom of the leaf. It gets out of the heat, out of the resistance. And believe me, I'll tell you this, some of you fellows I hope will go out in Las Vegas, plant a 40 acre orange grove, put your sprinkler in where you can turn it on every night, just a few minutes, where they have zero percent humidity. Put a wall around it, charge \$1 a person to come in and see it. There's plenty of water in Las Vegas, worlds of it, the lakes out there. And I'll tell you it'll be the greatest attraction in Las Vegas. Grapes, apples, peaches, and pears you can grow out there in Las Vegas. Why the opportunity is just great at anything you start. You can first plant 10 acres, then 20 acres and I'd advise you to grow a lot of lemons there. Do you know where Las Vegas gets the eggs you get for breakfast? If you're ever in Las Vegas, don't miss eating your eggs for breakfast. Finest eggs in the U.S. Do you know where they get them from? They get them from Loma Linda, California. Every day of the world, that truck runs from a poultry farm in Loma Linda, California, to Las Vegas, carrying a truck load of eggs. Do you know what they pay for those eggs? F.O.B. the farm, \$1.50 a dozen. Now, that is for the medium size eggs. Now they have a breed of chickens out there that produces 2 yolks to each egg. For those eggs they pay \$3 a dozen for them. They serve you one egg for 2. It's a good breakfast. It's a big egg. Why do you suppose they have this one poultry farm to produce their eggs? Do you know what the average egg price is? 43¢ a dozen and they are getting \$1.50 average because they've pullet eggs they sell too. They take all the eggs that are produced at this farm. Do you know why? Do you have any idea why they pay that superior price? They're getting a superior product.

R – The mineral content.

The mineral content. Not only that, it is a low cholesterol egg. Practically no fat. That was one of the engineering jobs that I did, worked it out. Producing an egg with low cholesterol. Do you know that today you can produce eggs with low cholesterol? Very low? People will pay almost twice the price? Well, I'll tell you something, when you smell those eggs cooking, it makes you hungry. They don't smell like a sulfur dioxide egg. It doesn't smell like it and it's got a fresh taste and I mean it's really good. It really smells good. Do you know they have 10 acres of Bermuda grass there? And do you know they mow it every day? Do you know that this Bermuda grass is put in this chicken feed?

Do you know that 25% of the chickens food is Bermuda grass cuttings? There's one day of the week they don't cut and that is Saturday. They're 7th Day Adventists. But every day they mow this Bermuda grass down and put these little fine clippings and mix it into their own feeds. They're grinding their own corn fresh every day. They're doing their own mixing. They mix their own feed. That chicken feed has to be less than 4 hours old from the time it's ground until the time the chicken consumes it.

Q – Do they feed them distilled water?

A – No sir, they don't. But in the water we put the minerals for the water. But they have a deep well where they get their water out of. And the water is highly satisfactory. It's calcium carbonate water, so it wouldn't pay us to give them that when the chicken needs the calcium carbonate to make the egg out of.

Q – Any particular different breed of chicken?

A – It's a 284 White Leghorn, high production.

Let me tell you this, they also feed these chickens pantothenic acid, B₅ and they've got hens that are still producing maximum eggs 3-4 years old. The only way the hen could get out of there is to be dead. They keep them producing 3 & 4 years, big eggs.

R – They eat better than we do.

Yes, I'll tell you, you won't believe their hens are 4 years old because they look like pullets almost. Their spurs and feet are as yellow as light, and the comb is as red and it's amazing what they do. These old hens, they have their production pens, when the hen gets about 3-4 years old, she's put into a separate place and they always move them during the molting stage so she can get adjusted to a new apartment with running water and everything in it. It ruins their feeds I mean and it hurts the chickens' production so they move them while they're molting. They molt then twice a year and maybe their production will drop down to 10 dozen eggs a year instead of 20 dozen. But it still pays to keep a hen that's producing 10 dozen eggs a year, of these big eggs, because of the price they get for them. One thing about it is that an old hen doesn't consume as much feed as a young hen and the old hen will use less feed and produce a bigger egg. So they're going to work that down to a cats' whisker on production.

Q – Do the chickens run out into the field?

A – No, they're not. They're in cages, they've never been on the ground. They have been

in the cages.

They also have breeding pens. They take care of their breeders and everything else. Even then 50% of their layers were graded out. They do not meet the standards to go into the laying pens. They sell those to the other poultry farms at a high price because of their production schedule. Do you know they won't tell anybody what they do? They won't tell anybody what they get for their eggs. But they know that truck goes to Las Vegas every day. What I'm trying to do is tell you to do things superior. Even with your irrigation. Work out your problem accordingly.

Now, if you must drive a well, to get irrigation, don't get on the lowest part of your farm. Get on the hill where you've got the benefit of the drop. In other words, irrigate from the hill. Ditch irrigation is the most expensive unless the water is almost absolutely free. Let me show you something else about irrigation.

Q – Are those eggs available in the whole city of Las Vegas or just. . ?

A – No, no, the restaurants get them all. No, just the restaurants. Occasionally they'll have a case or two that they'll put in the store, something like that, but they're hard to come by.

Q – How do the restaurants advertise the eggs?

A – They don't. they don't advertise it at all. When the saints of God start serving as good a food as the underworld, I'm going to tell you, the world is going to know they're saints.

Q – What would a breakfast cost you?

A – The same price you might pay anywhere else, there's not hardly any difference in it. It's equal all out thru the west and California.

A good breakfast is around \$2.50. About \$2.50 is what you pay for a breakfast out thru that area. I'm talking about in the above average restaurants. I'm not talking about the filling stations.

Q – Well, what do the stores charge for those type eggs?

A – Those stores, you can't walk in the store and get them, because they've got standing orders for them.

Q – But would they charge the same price, \$1.50 a dozen?

A – No, they charge more. A whole lot more, probably 10-15-20% more. The stores claim to have a 10% markup.

Q – Well, why would they say the chickens would produce better eggs if they don't run on the ground free?

A – Because instead of running on the ground, we take the food to them.

You can tell the difference in the taste of eggs if you just grind the corn every day. You know when you break a grain of corn, wheat, rye, or oats the vitamins go out within 4 days and it's stagnant and therefore the egg doesn't taste good.

Q – Is it the freshness of the food that accounts for the low cholesterol or is it the Bermuda grass?

A – No, it's something we put in the feed.

Q – Trade secret?

A – No, it's not a trade secret, but you haven't asked what it is yet.

Q – O.K., what is it?

A – We put B₅ to keep the chickens young and happy. It's lecithin. We put 1 quart per hundred pounds of feed of lecithin.

Q – How do you spell that?

A – Lecithin.

Suppose you have a farm with a hill. Something like a hill. What I'm trying to show you. . . I don't mean quite this steep, but it's turned fine. You know what I mean? And I had to draw this quite. . . like I want it. . . to much plateau up there. . . but you have a farm. . . we'll say something like this. And you've got your valleys out here. The place to put your reservoir is up on top of the hill here. Put your reservoir on top of the hill here and let it fill up with snow. Instead of having one big. . . wide. . . open top reservoir, it is better to have one 14 feet wide or 15 feet wide and 100 or 200 feet long and about 10-15 feet deep. Why?

R – Less surface exposure.

Less surface exposure and also, you can cover it. You can cover it with plastic real cheaply and it doesn't hurt for that plastic to lay right on the water, not a thing. The plastic comes in 20 foot wide sheets and 100 feet long pieces of plastic is about \$35-38. as long as it lays on that water, it won't oxidize. And then you can roll it back if it rains and in the snow. . . You can also. . . in the bottom of this thing. . . What's going to keep the water from going out you say? Put plastic down. It's real cheap plastic you can get to put down in there to keep the water from seeping out. You lap it over about 6-8 inches and the weight of the water holds it down or you can . . . there's a hot roller you can roll along on it and it seals it. It runs by battery and it seals that plastic together and the

pressure on it holds it. Holds that water in and you can have thousands of gallons of water on top of every hill in a vat or two that will supply irrigation in a dry spell and you get it from the snow. The thing about it with your snow is, you ought to put in a solar radiation heater to melt that snow as it runs in there and let it freeze. The ice doesn't evaporate as quickly as the other. But the same solar system you want to have run into your ice to turn on in the summer time to melt it as you need it on your crop. Anything hard about that?

Q – Can you do the same thing with black plastic?

A – Sure, that is the cheapest. You'll want to get a 4 mil plastic and that is all you'll need.

Q – I mean to absorb more down and melt the snow?

A – Yes.

But I tell you, they're not even trying to solve their problems at all as I talked to you last class about pumping salt water out of the ocean to fill up the Great Salt Lake Basin. That would solve a lot of water problems in the west. If the Lord permits me to go on the national television, I'm going to throw it out to the nation, the people.

R – They're doing engineering on this I believe. . . I read an article.

I've been preaching this now for 40 years. It's high time they get started at it.

R – It will siphon once it gets over the Rockies. . . ?

Right. So in addition. . . .

Q – How do you get that snow to melt, on top of the hill, not just what falls in there, but?

A – Yes, but you use the Solar system to melt it as it goes in there, because

out from the side it's got the gusher. And this propeller turns like this and as it turns it gushes this water out. It puts it over the dike or dam. Also, the submersible pump is made on the same principle, only smaller.

Q – Then you didn't get anything. . .

A – It doesn't matter, just so we help humanity, whether we get anything out of it or not. The fun of it is in doing it and making it to start with.

The simplicity of it, would you have ever thought of getting a patent on that or a copyright? It was so simple, in fact I didn't know you could get it on anything that simple. But the man got it and he. . . well out of it. . .you know today it's the big machinery company at Lakeland? Food machinery. That was the beginning of Food Machinery Corp. The man that started that was the man the made that pump. He doesn't even know me today. However, we also made a tomato grating machine that they made for us and they've sold thousands of them. They're so simple. It took 2-3 trucks to carry the ones they had; now they can carry this one on a 2 ton Chevrolet truck and it'll do the same work. The other one costs around \$35,000 and the one we made, when we made it, cost about \$4,000. And this one could run on quarter horse power motor and the other one had to run off a big Dynamo. No -\$3,500 for a good second hand Dynamo then, not \$35,000. So use your head folks when you get out there, don't try to copy somebody else. Education is in books, are only tools to work with. Take what you learn to the books and use it to do things with. Do things with the education if you can't go any farther than the books, you're only a teacher. Books are great but one of the things that I hated about my first 4 years or 3 years in school, was a book. And I said I'd never write a book and have kids to be reading it. I wouldn't punish kids that much, so far I haven't. everything I wrote, I got in trouble about it.

One more thing about irrigation now. I want to talk about it, that is using water out of the ocean to irrigate. You can use the water right out of the ocean to irrigate and do a beautiful job with it and do an excellent job. But there's a way to do it. Do you remember me telling you about this in the first course or do you want me to put this on the board again?

R – We didn't have it. . . we had it, but I don't think most of us understood it.

Well, o.k. we'll put it on the board again, because we may hit something you didn't see before. For instance, you have your ocean and then you throw up a dike to keep the ocean out to start with if you need it. Whatever you need to keep the ocean off. This is the ocean out here. What you do then is, you put your ditches on this side of the dike and have your ditches, this is the level of your land. Then you put these ditches, depending on the type of soil and on each side of these you have a dike, like this. This dike goes down like this. . .this is your mound on each side of your ditch, your bank. Let's look at it from the other angle. It's like this, not quite, but this will be alright like this. This is your salt water in here. Now what happens is, this dike filters the salt out and lets this moisture come out like this. This is your moisture coming down like this and only thing about it is you've got to keep this water rotating. The water has to go in and down here you should have a way that the water comes down like this at the other end. In other words, it's flowing like this and comes down somewhere else. You've got to keep that water flowing or else it will become so salty it can't give up any more. It becomes a slurry. Clear? You understand? Water right out of the ocean. But you need to keep that water above your land level all the time, in your ditches and keep it flowing enough to keep the right amount of water in you soil. It also helps to control temperature terrifically, also. And this makes some of the finest pasture land in the whole wide world.

Q – What happens? Does that water carry salt right back out as it's flowing?

A – It carries the slurry back out, yes. In other words you can measure the salt as it goes in and as it goes out. It's greater as it goes out because of the loss of water and of the water filtering out.

Q – How far between those ditches?

A – That varies with the type of soil. A fine soil you could have it maybe 100 feet apart, but if it was a coarse sandy soil, 40 feet might be as much as you could go. Clear?

Q – How wide are they?

A – They don't have to be very wide. I'd say 2 feet at the bottom.

Q – Can you operate that with the tides?

A – No, it takes pumps. There's very few places. . . I don't know of any place where you could operate it with the tides because winds come in that causes it to sweep over the tidelands that's why you have to have the dike out here to start with. Understand? You've got to have pretty flat country to do this on, unless you could pump it and have dams to do it. Believe it or not, in Japan, they've done this for centuries and centuries.

Q – If you were working with the tides, you might use them to generate the electricity to run your pumps, just use your dams?

A – You might, but you might do this over here to help some. The water that you pump in on this side, you drop over there on this side to produce a certain percentage of electricity. Comprehend?

R – Electric companies do that all the time. Use storage tanks.

So I'm only making a suggestion about using salt water for irrigation. It's excellent, you can do lot of things. I have never seen so many opportunities.

R – Along the sea, you've always got the wind. Take and build yourself a 12-14 foot windmill in there, do a lot of pumping.

In Holland, my, my, what they do with windmills over in Holland.

R – I know in Pennsylvania where there's better than an acre pond and he's only got a 10 foot mill and he's always got that pond full in the winter.

Is there enough wind up there for 2 windmills?

R – You send them out, we'll put them up. Those air motors do a beautiful job.

Yes, they do, but over in Holland they've got windmills that have a fan on them. . what do you call them? Fans? Propellers? Blades?

R – Blades.

They've got them 25 feet long and made of wood. They're thin and man how they turn. And they've got them a foot and it looks like planks almost. . . .

Q – They're designed like the airplane wing with the vacuum on the back, right?

A – Yes, they turn, but my goodness we don't have any windmills in this country like they have over there. I believe if we put a windmill up, that would turn like that, it would be our cheapest source of electricity.

They really put windmills up there. I mean they really turn. I've seen those windmills turning when you could hardly see a bit of breeze. They were still turning around. It's really remarkable, the opportunity we have today. You'd be amazed how much wind blows on a desert all the time as a general . . . at night there's a wind blowing on the desert. What causes the wind to blow?

R – Changes in temperature.

That's right. A change in temperature brings about change in pressure. That causes a wind to blow. Change of temperature. Any questions?

Q – You don't think there is any danger then of raising salt then by irrigating? In other

words, some claim the Imperial Valley is salty underneath.

A – It certainly is.

Q – Now what has caused that? That’s mainly irrigated right?

A – No, it isn’t irrigated. The reason is because of the lack of irrigation. Because the salt water is seeping up. . . even all around the Gulf of Mexico up into the Texas area. The water now is in the top foot of the ground and is killing a lot of Orange groves out there.

R – Need more water to push the salt out.

Right.

Q – How can you get water in there to do it, because if the salt level is that high, you’d be pumping salt water, right?

A – That ‘s right, but you can still filter it out. This is subterranean salt water that I’m telling you about.

R – You can use that to collect the water on the other side of the dike and pump that around to. . .

Right, exactly. Let me also say one more thing too. Down in Sanford, Florida, 45 years ago, the water was not salty out of the wells, but those Artesian Wells now are so salty. All around Sanford, Florida, the great celery belt, used to be celery belt of the world. That you can’t water plants with it, but you can put the tile underground and let the water come up. You can put the tile 18 inches underground and fill those water levels up to 6 inches to the top of the soil and you can have beautiful farms. All that’s tile farms there now. The only way you can farm is with that underground tile put in sawdust. They have to take it up about every 10 years and put it back down. Clean it out and put it back down. Any questions?

Q – If you have a problem with erosion on slopes, would it be practical to install ponds and hold this and then use, instead of taking it all the way down thru? That would wash your soil, hold it in ponds until you need it later? Would this be the way to do it?

A – Yes, you can, certainly practical, yes, but you’ll have a lot less erosion whenever your sodium content goes down in your soil. A high sodium content is why you have erosion to start with. The harder the soil the more it washes. Why?

R – It can’t hold the water.

That’s right. It can’t hold it, doesn’t hold it. Any other questions?

Q – What has really caused the salt to come in like it has? Is it the lack of rainfall to keep it pushed down? Or what is causing it?

A – There's quite a lot of reasons for it. One of them is, out in the west is a lack of rainfall because the salt basin is being emptied. Another reason is in the Sanford area, because over the Lake County over along the ridge, there's so many deep wells, that they're pumping the fresh water out by the millions and millions of gallons to irrigate their orange groves and crops on the ridge until it's letting the salt water rise in the valley.

Q – Just pulls it right out of the ocean?

A – Yes, it's ocean water coming up.

Q – What would be the engineers' design other than the tile to remedy this?

A – There isn't any, none at all. But there is wells on the ridges we used to get plenty of water at 100-110 feet. There's a lot of them now that we're going down to 600 feet to get fresh water, in abundant amounts. In other words, we pumped the water level down that much in the last 25 years.

There's hundreds and hundreds of 12 inch wells down thru Florida. Also, it's against the law there to let an artesian well flow. If it's a flowing well, you've got to turn it off and there's a lot of artesian wells down the coast of Florida, a lot of them on both coasts where the water flows up out of them along the ground. It's against the law in Florida not to just turn one on and let it flow.

Q – How do you turn them off?

A – You cap them. You put the well down to start with. I'm not talking about springs, I'm talking about wells that you drive and get flowing water out of it.

R – The casings.

The casings, yes. Also in Palm Springs there, I can remember when water gushed out half that much in Palm Springs. I can remember when it just gushed out of there.

R – When they drilled my artesian well. . . the water used to come up maybe 1 ½ -2 feet from the casing, but it's way down now.

Yes, it's way down because they're pumping so much water out of the ground in some places.

R – They're pumping some in some places, some slurry, slop and stuff in there, some waste.

That is true. Sometime someone asked me, what effect does sulfur water have, where you have a lot of sulfur? If you've got a lot of lime and you can have your water controlled it is an asset to you, providing you build up your calcium, etc. to do with. I tell you when you're irrigating with your sulfur water, strong sulfur water, it sure will wreck the pH. It really will. It also has a tendency to keep the sodium content of the soil very

high. Soil has a tendency to compact a lot more. Now suppose you lived in an area where there was no other water available for drinking purposes except sulfur water. How should you get the sulfur out of the water for drinking if you don't have a distiller?

R – Let it stand.

Let it stand and it evaporates right out of it. My children were raised on sulfur water. They didn't know any other kind and when they tasted water that wasn't sulfur they couldn't stand the taste of it. They thought it was terrible. Now when you take a bath in sulfur water, you're really wet when you come out. I mean you feel the wettest you've ever felt. And if you get your clothes wet in sulfur water, the first time they'll feel like they're made of lead, how heavy they are. You'll notice the difference in your clothes wet in rain water and wet in sulfur water. It makes a lot of difference.

One more type of irrigation I want to talk to you about that we haven't covered today. Can you think what kind it is? What kind of irrigation haven't we covered?

R – Rain?

No, it's not irrigation. That's the Lord's water. Irrigation is something done by man.

R – Hydraulic irrigation.

No, we've talked about that. It's greenhouse irrigation. Inside a greenhouse, I'll bet you didn't know that really existed did you? What is the major problem that causes so many people to fail in greenhouses?

R – No carbon dioxide.

Not enough carbon dioxide in the greenhouse, that's why. That causes more people to fail with a greenhouse than anything in the world. Not enough CO₂ gas in it. Ever hear that before? Now, the second thing is your water control. Where would you get CO₂ gas from in a greenhouse? How would you get it?

R – You told us sawdust and moldy hay on the floor.

Yes, that's where you get it from. That's right. Now, in a greenhouse, you got one very, very important factor in your greenhouse, in regard to your irrigation, what do you think that is? Does a plant grow better with a high humidity or a low humidity?

R – Depends on the plant doesn't it? Different compartments of a greenhouse have different humidity.

What do you think? They do better in a high humidity. But there's one problem with a high humidity, you have to have it set how high? Now that humidity when you consider humidity, you've got to also consider one more factor. What is that?

R – Temperature.

Temperature, o.k. You should not let the temperature inside a greenhouse rise above a certain point, what is that point? That is for ordinary. . .

That's part of it, you bet, you get that food in it every way you can get it. There's also such a thing as giving a plant a hypodermic to get food in it a lot faster. I've even done that with great success at times. Give them a hypodermic. It is very interesting to know that if you give a tree a hypodermic about 10 at night and put a stethoscope on it about 2 hours later, you can hear it using that plant food, even a tomato or pepper plant. It's rather interesting and the one you didn't put it in you don't hear anything. How would you give a plant a hypodermic? Takes a very fine needle and put it under the bark. But one thing about it, when you pull that needle out, you have to put a little wax over it or that stuff will leak out unless you have got it pushed downward. In other words, you have to push it down into the tree where it forms a little well, but if you push it thru the side a way, even a little short needle, every bit of it will run back out.

Q – Put it in the cambium layer is that it?

A – Yes, just where you can get the needle in.

That needle is now. . . That's another question. That needle has to be very, very small and it takes a soft plant like a tomato or pepper or eggplant to get it into. You can't get it into a tree. I've given big trees, orange trees, hypodermics before. You know what I've used? A brace and bit or electric drill and then I put a cork in it. That's excellent.

Q – What would be the purpose of doing that?

A – The purpose would be that there were parasites in the tree I can't get to. There's a rotten limb that's grown up and cancer starting inside and you can see a hump starting in there. You bore a hole in that thing and if you don't the limb is going to rot and fall off 2-3 years later, or break off, and then it'll grow back up.

R – I've heard of drilling hole in the bark, taking a soft drink bottle and sticking it in there. . .

Yes, that's done too, you can certainly do it. Folks, there's so many things to do in such a short time. We need to live to be at least 500 years old to get some of it done.

R – We have to learn how to live to be 500 years old first.

Right.

Q – What are some of the foods you put in it?

A – Yes, well you can use. . . in fact. . . suppose you put straight copper sulfate in some of these big trees, it wouldn't hurt it. It'd only take what it needed. You can put straight . . . straight things in.

One thing you want to be careful about is not to add anything with too high a concentration of volatile salt. That will kill it. Like sodium chloride, magnesium chloride, something on that order. But you can put copper sulfate right into the hole and I don't know anything that will clear up internal rot or Black Heart on a citrus tree any quicker than just plain old copper sulfate.

R – Drive copper nails in a tree and it'll kill it.

Not in an orange tree it won't.

R – Telephone Company kills trees by driving copper nails into them.

Well, some trees it might, but . . . well it may be something that's in the copper. Also, we used to drive . . . in pecan trees, to get them to bear, we used to drive ordinary iron nails into them.

R – Walnuts too.

Walnuts, drive nails in them, get them to bear. But it's lots cheaper to put it on the ground and bury some tin cans around it. Any other questions about the greenhouse?

Q – About how long would you leave this mist system on in the greenhouse at a time?

A – About 3 minutes out of every 20, in the heat of the day. But you also need your vents in to control your temperature.

If you've got ice water, pretty cool water like we have up here, you can have an old fashioned radiator and water flowing thru it. . . like from a spring. Put a fan on that old radiator and old auto radiator and just let it flow thru it and then you can control the temperature in the greenhouse. Not only that, it'll warm it in the wintertime.

Q – Same water?

A – Yes, same water will warm it in the wintertime.

R – The water temperature in the soil seldom varies, it's about 45° year round.

That's right.

Q – You could use this to water your greenhouse with?

A – Yes.

Q – And cool it in the summer?

A – Yes. It'll help some. It'll take a lot less than of electricity.

Q – What was that?

A – It'll take a lot less other heat to do it; it'll help a terrific amount.

But for example in your greenhouse boxes. . . one more thing that people make a mistake on, they don't have the boxes deep enough. They have them too shallow and therefore the temperature changes too rapidly on the root and if it's deeper. . . Also, today in your greenhouse, you can put these tapes down thru your troughs thru the dirt and control the temperature in the winter time. Therefore the temperature of the top is not affected near as much as the temperature in the soil. If you can control the temperature of the soil then you have a lot to do with controlling the temperature of the top of the plant, because the plant gives off heat.

Q – Are these little boxes about 12 inches?

A – About 12 inches, yes. Your best hydroponics boxes, your water solution is 10-12 inches deep. A lot of them recommend a lot shallower than that, but I don't. I like them about 12 inches, the water itself. About 12 inches in you hydroponics tanks.

I ordered 4 gallons of Reagent #1 and I got 4 cases of Reagent #2, that's what I got. About \$6,000 a case.

R – Bargain basement prices. What's the difference, the age?

It's different material, yes. It has something to do with age, but the price is about the same, very little difference. If they'll just keep it I'll be very happy, if they don't keep going up like they've been doing the last year or two. Now, anyone that will buy 6 bottles of this material, I'll give them the 7th one. \$50 for 6 oz. It'll help a whole lot to get bulk off my back. If you want to do that, it keeps, it's good right on and on. There's no such thing as deteriorations. Only to certain stage, just enough to make a little difference. It's Reagent #2 for agricultural purposes. If you want that, it's o.k., if you don't, that's alright. I just wanted to tell you. It'll help a whole lot, in other words, you can get \$350 worth for \$300 if you want it. If you can't use it, don't get it. If you can use it and you are going to use it, it is a real; bargain. In other words, you'll get 7 bottles for 6. now even at

that, that's less than I paid for it, in the long run. But anyway, if you want it, it's alright. I'm just telling you. Not only that, I've still got to buy the other ones. So all I can do is praise the Lord, that the bank of heaven can't be broken.

Q – I'd like to ask. What is the difference between that Reagent #2 and LaMottes' Universal Extracting Solution?

A – There's quite a bit of difference there, quite a bit.

Q – You would never get the same results?

A – I wouldn't know, I haven't tried it. When I find something that works, I don't see how far out I can go.

Q – I've heard some people say that they'd tried it side by side and they couldn't find any difference.

A – Well, if it works, it works, it's alright with me, but if it don't, it don't. But when I fool with human life, I'm not going to take any chances. But if you want to take it with farming I have no objections.

R – I'm talking about in agriculture now.

I understand. You can probably use Reagent #1 for #2, but I'd never use #2 for #1. You know what I mean? You could probably get way with it. But when I'm dealing with human life, I won't take any chances.

R – I'm not talking about #1 against #2, I'm talking about #2 against LaMottes' Universal Extracting Solution.

I do not know. This is a product I've been using for years and years. And if you know that you're going to use any of their products for human work, brother, you are in hot water with them, they'll cut you off from everything. They really will, because when they found out that I was using some of their products like. . . well any of the reagents for testing the pH solution or anything else for testing of urine, they said no way can you use it, with our labels on it. So I said, well you manufacture the labels for me and I'll do it. So this is it, all I know is what works and if I find one thing that works, I'm really happy. Many times I've been asked by Shaklee products, evidently they're doing a fine job, a lot of people think so, but I have never tested them, analyzed them, never evaluated them and I do not recommend anything unless I put it thru the mills and know what it will do. You know what I mean? I don't take any chances. I'm chicken when it comes to dealing with substances. I'm telling you principles that I know will work, that I can prove that you can recreate and o over and over again. Now, this is one thing the doctors are going

to have to learn in their course, that this is the reason they have to come back 9 times. So they will learn not to deviate from the principle.

Now, you fellows in agriculture, it don't make any difference to me how much you deviate. But if you deviate very far from these principles, I'll tell you one thing, you'll get into hot water. Supply and demand, ionization, frequency, of which we haven't even started dealing with. The frequency of plants. There's a lot more if you fellows want to keep on going deeper and deeper in it. It's alright with me. But you can. . . need not work on backyard gardens, whenever you're going to the frequency of crops like cotton or corn or citrus. Then you can begin to split hairs on it, but we haven't even discussed the frequency yet of nutrition. In other words, you get down to the point you split hairs, but when you start with soil, that's way out. You don't need it. You only need it when you begin to split hairs. That's where the economy comes in. suppose you could work up a plan where you could save one penny per square foot on your fertilization? You know how much that means per acre, net profit? Approximately \$44, yes. We haven't got onto splitting hairs yet. But suppose you only save \$5 and you own 100 acres. That's \$500. That's a good bit of your tax money for the year. You see only in small garden crops you don't have to fool with frequency, but when you get into specialized planting then you want to deal with frequency, because it matters much and then you do not want to rotate crops. You want to plant the same crop on the same soils every year. Never rotate, because you're just simply rotating yourself out of business. So get back into farming . . . and when you get into a larger scale, I call 40 acres a large farm. 40 acres or more in that area, you begin to deal with larger. . . I mean with economy enough to economize. Why would I say that 40 acres is a large farm, have any idea? Why is that number considered. . . 40 acres would be considered a large farm?

R – Care for it as you ought to it is. All one man can take care of well.

That's not the real reason. Because you can buy a truckload lot and you can sell in truck load lots. Now if a truck has to come out to your farm with only 1 ton on it, it's going to cost you a lot more money than if it comes out with 20 tons on it or something. In other words, you can buy in truckload lots. So we need to keep these things in mind. Economy. Under 40 acres you don't. . . there's really no such thing as economical farming, because of your less than carload lots that you order. But when you get above

that, you can begin to bargain for prices and you can also begin to vie for markets. In other words, you can begin to demand something.

One more thing that is very important in farming, especially truck farming or food that is sold on the market. And we're talking about marketing now. Next thing on your list, is in marketing. Is to have the same crops in the same week at the same time, available every year. Why is that important do you think?

R – So your buyer knows when to expect you.

Right, exactly. So your buyer knows when to expect it. In other words, a fellow that just runs out and plants a crop, all the farmers in the whole country is going to try to bust him if he can, so he won't be a threat to them in the future. They're going to take him every way they can take him. Because they don't want him there. they want to be the only ones. They may not say that but it's true. The packing house the same way, the shipper, the trucker, they're really going to take him on every angle. What you need to do is to produce a high quality produce. Let your buyer know it and tell him, I'll have this every year at the same time, the same week. And when he knows that you're going to have it there, then you've got a home for it before you plant. Unless you have a home for it before you plant, you don't do very much planting unless you know what you're going to do with it. Have a home for your produce before you invest very much money in it or otherwise, you're just taking a chance with it. I knew of a man one time that had about 20 acres of honeydew melons, he was the only one that had it. So the A & P Company bought every one of his melons at a very high price and told him, we'll take all that you can plant next year. So what he did, he forgot to say at what price. They didn't discuss price, he just said they'd take all he could produce next year. So he planted everything he could plant and he got all his neighbors to plant. . they did and they took it. Everybody took a loss. Get the idea? See what I'm saying? Whenever you make a bargain for produce, also don't forget to make the price at what. . . You're going to produce a certain grade of produce, with a certain sugar content, certain specific gravity and it'll be ready at such and such a time and your price is such and such. Comprehend? And you'll be ready for the market when it comes and they'll be ready for you.

R – That contract isn't any good unless you have it in writing.

You should have it in writing, not only that, suppose you don't produce that much, then you've got to go out and buy that much. So always estimate this. . . only contract for about 50% of your yield and then you won't have to buy. If the market is short, you've got your profit. You've already made a profit on your 50%. And the rest of it is just gravy for you because you've already got your money back and got everything else, so it matters little. You're in the drivers seat regardless. Comprehend? It might be that if you have the quality. . . and you know the quality of everybody else's produce, which you are entitled to know or entitled to find out. Go to the auction, pick up one bean, squeeze the juice out of it, put your refractometer on it and go on to the next one. If you find some beans as good as yours, and the market's busted and you've sold yours out and this other is a high content, buy his on the busted market and sell them for yours. It's honest, it's right, it's fair. It is yours, because you bought it, but be sure the sugar content is equal. If the sugar content is equal, the mineral content is equal. It may not be the same minerals, in fact it may not be the same mineral in any 2 beans, but the overall picture is the same. Does that make sense? Any questions up to this point?

Marketing. We were discussing that after the break, I'm one ahead. But I just as well discuss this at the present moment. Because you need to know where it's going even before you plant the seed. How can you know what the sugar content is before you plant the seed?

R – By the amount of mineral you have in your soil.

What mineral?

R – Phosphate.

Phosphate, if you have 400 lbs. of water soluble phosphate per acre and you plant beans we'll say in 24 inch rows. What will the sugar content of those beans be?

R – Between 6 & 7.

Between 6 & 7, yes, between 6 & 7%, yes.

Q – The average bean that you buy on the market, what would that be? 3-4?

A – Most of them less than 1%.

Q – So when you sell your beans, you need to have your refractometer with you?

A – Absolutely, you bet.

Another thing I did at the market with my refractometer, I wouldn't let anybody take it in their hands and look thru it. They looked thru it in my hands. Mine was \$1,000 one. I wasn't afraid of them running away, but they sure wished that thing was broken. So I held it in my hand for them to look thru it. I didn't run the risk of them dropping it and getting rid of it. Wouldn't they have liked to have gotten rid of it! Especially some of those other farmers who had ½ of 1%, boy they hated that refractometer. They hated it with a passion. "My beans were as good as anybody's", but the refractometer didn't say so. So one day a man said that to me and there was another guy out there that had a horse. So, I said, o.k., let's take some of both beans, yours and mine and go out there and offer them to the horse. So he mixed them up and handed them to the horse. The horse picked out the ones that had the higher sugar and they all looked alike to your eye. He was very particular, but he just took the ones he wanted out of his hand. Then he'd turn his hand around the other way and the horse would nudge his hand to get it around. The old horse is just as good a refractometer as you can buy. But the thing about it is you don't know how much sugar. They can tell the difference to within ½ of ½ of 1%. They can pick out the difference in that small amount. Your marketing is very important.

I'm talking about marketing fresh produce, that's not the ideal thing to do. Put yours in a freezing house, and freeze your produce. Prepare it for the table and put it in a beautiful package and you'll make a much greater profit on it. Frozen food, prepare it for the table. You can also sell it salt free. And salt free means sodium chloride, it doesn't mean organic vegetable salts. Or you say no salt added or you don't have to say it at all. All you can say is it contains so and so and so and so and don't put it on at all. But a lot of people on diets that are salt free, wouldn't buy it. You don't have to say salt free. You could say it contains green beans, honey, molasses, and allspice. You can make the thing so small they have to have a magnifying glass to read them. Or if you add any corn oil to it, add it on it. But I want to tell you, the market can't be supplied. I don't care what it is, if you've prepared it excellent for the table. Even with turnip greens, collard greens, you cannot supply the market in just those 2-3-4 products. You cannot supply the market. Also, I suggest that you get some top quality tomatoes that you freeze. Wash them, then freeze them vine ripe.

Q – How do you do that?

A – Just put them in the freezer and freeze them.

Put them in the freezer whole. Then when you take them out, put them in the blender and blend them and you've got some of the finest tomato juice you've ever tasted in your life, beats any canned or bottled tomato juice. And make it with your fresh tomatoes. I'm going to tell you folks, you can't produce enough top quality tomatoes.

But, I'm going to tell you, tomatoes need lots of calcium in the soil so it won't taste tart. It tastes good and it's absolutely excellent. In other words, what I'm saying is, any farmer that tries to do all his work himself and gets too busy farming to take time to sell, is in financial trouble. In other words, you can hire people to work on your farm, but you get busy and sell your crop and really sell it and get your maximum amount on it, that's different. But, if you're in a Co-op where they take all your grain and everybody gets the same price, well folks, it's not the way to make any money. They're not going to let you make any money. They're going to keep you broke and begging the Bank. Begging them for another loan for another year. Like working for a mule. You don't know whether you're working for the mule or the mule works for you. So what I'm trying to tell you is, to get out of the rut of bankruptcy and get into farming. Stand on your own feet and let God bless you. It's out there for you.

What was the method I suggested to keep the weeds down in your crops? Plant your rows closer together. Have your machinery made so you can handle the rows. How many corps should you pick off of ordinary bush beans?

R – 6-7 maybe or more.

6 or 7, good. Three? You should have them all mature at the same time and pick them once.

R – I keep picking them all summer.

I know, but you can't do that commercially. You have to have a bean picking machine, get it all at once and then replant. You can do that in a home garden, but commercially you can't do it, because it costs you \$1.50 a hamper to get it picked by hand and these machines pick them for 15¢ a hamper. Then it has to go to the market and be graded. But you can get 3-4 graders and you can grade it out at 150-200 hampers an hour, then you pack them. Did you know there's a way to pack things in a hamper if you're going to sell them? Did you ever notice that beans packed in a hamper brought

more money than those that are not packed? Why? Weight. The weight is the same, you're talking about weight. They look prettier, that's what sells them, they look prettier. Now I'm talking about you who are selling beans now for the market and. . .fresh beans for market, that's the hard way to go. If you were preparing them for the table and plant a lot less of the, only what you can handle, you can't use a bean picking machine. But if I were producing beans for market, I would not produce the bush bean. I would produce the pole bean only. Just the pole bean. It's more flavorful and everything. Much more flavorful. And I'd be a bean cutting machine, very easy. Just cut every bean the same length so it goes into the can or freezer compartment. Then you've got the odds and ends of your beans. These that can't conform to even size, I'd also take these odds and ends and extract the juice out of them with the juicer. Then I would cook these other beans in the juice of the odds and ends. And I want to tell you, you've got beans that taste like beans. You don't add water to them. You've really got beans. So make something delicious. That's something the market can use and wants and needs and they can't get enough of it. You know if you taste something good, you want some more tomorrow. If it isn't good, you don't care whether you ever have any more again. The only reason you ever eat it again is because it's put on the table and there's nothing else to eat. These are factors you've got to remember and keep in mind.

R – The pole beans you pick. . .

In pole beans you can pick right on and on and on because you have to take those beans. You can't harvest pole beans by machine. Because every bean tries to hide behind the stalk, you've got to hunt it out.

Q – I understand pole beans hydroponically grown would continue to produce for 3 years.

A – I do not know. We planted them last spring and we picked up until late, late, though.
Picked pole beans.

Also, in planting pole beans, it's a good idea to plant them on one side of the stake and plant them under the middle of the stakes. About the time they get to growing real good that's planted on the side of the stake, by the time those come in, the others will be going out. Then plant on the other side of the stake and you can have the same stakes for both crops or the same wire. That's the thing to do.

Q – Do you pull up the ones when you're finished with them, so that they won't pick up the nutrients?

A – No, they'll produce a few beans right on, but if they die, it doesn't make any difference. What makes a bean vine die?

R – Lack of nutrients.

Well, could be, but suppose it isn't a lack of nutrients?

R – It reaches maturity.

What's that? What reaches maturity?

R – The bean.

That's right. When that bean makes one bean of dry seed, the vine is going to die because it's performed its full duty. So just don't let it come to full maturity. Take it off and it'll make another one and another one. So it's easy to keep working with it. One more thing I want to tell you about green beans too. You've got 3 days to pick them, that's at their prime. And if you pick them before that they're not very flavorful. In other words, the flavor hasn't reached its climax. And if you pick them 3 days after, they're woody, they're fibery, they're not so hot. So one thing you must do whenever you plant your crop, is plant them so they'll come in on a Monday where you can harvest them.

Q – On Kentucky Wonder Beans, if they get stringy is that too old then?

A – No, Kentucky Wonder Beans have strings on it. I'm not talking about the string. I'm talking about the woody part of the bean.

Q – The strings are formed before it gets woody?

A – Even a young bean will have strings on it when it's only half grown. No, it has . . . it's still got a string on it.

So it's nice to get them right at the exact ripe stage. They're more flavorful than anything else. Any questions about your soils or your harvesting of beans now? We're going to talk about some other crops besides beans.

Q – I there a way to anticipate that 3 day period with a refractometer, by sugar content?

A – Sure, when it reaches its climax, yes.

Q – How do you know what it's going to reach?

A – Well, you study beans a little while, you can know. If it's above 6 I count it maximum. And if it gets above 6 I'll be really happy.

Whenever you pick that bean and the bean is completely dry, I don't mean dry like you're going to plant it, but if the bean comes out or doesn't snap, you bend it and it

doesn't snap, it's past its stage that is its best. And if you've got your sugar content high enough, it'll snap 2 weeks later just as well as the day you took it off the vine, or even 3 weeks later.

Q – If you've got your minerals right, 3 days to pick it is not so critical?

A – It is, 3 days is very critical, because it is still on the vine. If you took it off, you've got plenty of time. In other words, you've got a week or 2 in the refrigerator. It's just as good as the day you took it off the vine. But if you leave it on the vine, it'll pass its stage at its best.

Q – In freezing those beans, you don't blanch them do you?

A – No, you cook them like you're going to serve them on the table. Blanching ruins them. And they're just as good 2 years later as they are the day you put them in there.

Let's talk about something else besides your green beans. What about your squashes? Well, let's go back to green beans first. We're going to take the bush beans. How far apart is it a good idea to plant the rows in your bush beans? Good idea to plant them is 24 inches. If they have to be picked by hand, one person can pick 2 rows. If they're wider than that they can only pick one. It's a good idea to have them on high beds, because you don't have to bend over so far to pick them. Another very important factor about them is, in your machinery. . . If you're going to be harvesting by machinery, is to have your rows planted so your machinery will fit them. Fit the rows to harvest them. This machine cuts the vine right off at the ground and puts the bush right up on the harvester and picks off the beans. Now, it's going to break about 3-4% of them, breaks them as it gets them off the bush. But it gets them off, pulls the leaves off, not only that but takes the leaves off and leaves the bean in there. Then chops up the stalk and puts it back on the ground again, all in one application. A time or two after the bean harvester went thru we just fertilized and started to work and let them sprout up again. They came up and we got another good heavy crop off. We saved about a week on it. Just about one weeks time to let the bushes sprout out and come back up.

Now, on pole beans, how far apart do you plant pole beans?

R – Around the pole, you circle around the pole.

No, no, how far apart are the rows? Not the hills, but the rows. How far apart do you put the rows?

R – You have to have room to walk in there don't you? About 30 inches.

You can't walk in 30 inches, you need about 72 inches, about 6 feet. They take a lot of room. About 6 foot rows then. . .that leaves you . . . there's a whole lot of ways, many different ideas for your pole bean and that is, you can take brush, just brush tops and stick them in the ground. Cut them in such away that you can stick them in the ground. The beans will climb it. It's a good idea also, to run a string down thru the brush and also to tie from one side to the other and anchor to each side. In other words, it looks like a mass of electric wires in a city and this keeps them from falling over with a windy breeze. You do have to dodge under those strings, and they're real good at jerking your hat off, but it does a terrific job in the production of beans. If you've got some old hog wire or old chicken wire or something that's cheap enough, that does a better job and quicker for a few rows of beans in a home garden. But you get on a large commercial garden 40 – 60 acres, that's too expensive to go that way, you have to use the string. Then you have to put a pole about every 6 feet, run the string down to this pole, half hitch around it and go right on. It doesn't have to be tight. Those things will climb those strings. Then when it's all over, your stakes are very thin, just take your tractor and drive it right thru these stakes, strings and everything else. The strings will be rotten enough that it'll chop it to pieces and the wood will rot and you'll be rid of your string and all. Just a hemp string is rather cheap, not real expensive, especially when you buy many rolls, it's very cheap.

Q – How high should you have the string?

A – about 6-9 feet high, they'll climb that high.

Q – How close together should the poles be, down the row?

A – Well, we put them in triangles. We cross them and we have them about one stick 20 inches – 30 inches form. . .they've got a bushy top on them.

The leaves all fall off and the beans really get in there. takes not time to fill a hamper of those beans. But in home gardening and canning, don't start too heavy, because they'll come in so fast you can't handle them. On commercial scale you better be prepared to handle them, because they really come in a hurry. Wherein you'd get \$6-8 for 32 lbs. of beans, that is for a hamper. . . the hamper will cost you \$1, your picking will cost you \$1 for grading, so you've got \$2. So now you're down to \$4. If you prepare

those for the table, those 32 lbs., you can get around 40¢ a pound to you and 30 pounds is how much a hamper?

R - \$12 a hamper.

Is it worth the difference?

Q – You have to freeze it? That’s all?

A – Well, what you do. . . Thing is to freeze it and get it to your local store or somewhere and let them handle it for you.

You must have U.S. Inspectors see it, approve it, grade it, evaluate it. It is necessary, it is a must. That is if you cross state lines. If you don’t cross state lines, you can sell it anywhere you want to. But right here where we have 3 states all within a few feet, it’s kind of hard. It’s difficult. You don’t know where it’s going. But you have to sell it to merchants within your own state and then you can sell it without. . . But once you cross the state line, you have to have all kinds of Federal Inspections. Anything difficult about that? Learn what it’s like.

How far apart should you put pole beans in the row? The pole beans that’s going to climb the stake. The first row you plant 3 rows together, but you plant one in the middle first. Right in the middle of the stakes, but how far apart do you plant them?

R – 3 feet.

In the row? Well, let’s suppose you put the poles up. . . how far apart do you plant the beans? Each hill of beans?

Q – Between the poles?

A – Yes, but how far apart are the hills? About 6 inches, about every 6 inches you drop a bean.

Now in your row crop bean, not your pole beans, not your runners, how far apart in your row do you put those, assuming you’ve followed all the rules you’ve learned in farming. How far apart do you put them? 3 inches – 2 inches? Generally plant them in a double row 1 inch apart. That is when you have plenty of nutrient in the soil. In fact, under that bush of leaves is an mass of beans under there. You can just reach under there and get a hand full of beans out.

Q – These are your rows?

A – Your row beans, yes.

Q – Double row, 6 inches apart?

A – No, not quite 6 inches, about 2-3 inches is enough. 6 inch maximum, that's the row crop.

That's not the runner. Kentucky Wonder Beans are runners, they have to have something to climb on. That's the difference in a bush bean and a Kentucky Wonder vine. The vine is what makes the difference. Why will one hold the beans up and the other has to climb on something? What's the difference between a vine and a tree? Why does the tree stand up by itself?

R – You didn't tell us that.

Yes I did tell you. What is the difference?

R – Different frequency.

Yes, there's a different frequency alright, that's true.

R – Cellulose.

Yes, but how do we say it? It's the phosphoric content in the soil that makes the difference. Also, the way I've described it, it has more colloids in it. The tree has more colloids in it. The vine doesn't have enough colloids in it to hold it up, so it's got to climb on something. It's the colloidal properties in phosphate form that makes the difference. Now, I'm going. . .

Q – Did you say about how far apart the row beans. . .?

A – About 30 inches apart, but you plant them in double rows. You also do that to English peas when you plant them. Same thing only you don't space. . . There's 2 kinds of English peas, a runner kind and a bush kind. So you do English peas the same way.

Now lets talk about growing cucumbers. Did you ever try growing cucumbers on wire or strings? Trellises? That's really the best way to grow cucumbers. When the cucumbers grow they're hanging over wire, they're clean. They're pretty and you can see them and they don't hide from you. They're not sandy, they're not gritty, they've got a wonderful color. The wire makes them grow faster and grow more of them.

Q – Are you talking about fencing wire?

A – Cheap 4 inch wire. 4 x 6 inch wire, very cheap wire and you can use it year after year.

Q – They climb right up that?

A – O yes, you have to start them sometimes, they're kind of lazy. But you can get them started.

Q – How far apart?

A – How far apart in the row do you plant cucumbers? 3 inches – 3 – 6 inches you plant 3 seeds, or you can plant and thin them out.

How far apart do you plant the rows that the cucumbers are growing in the wire? How far apart do you plant them if you're going to let them lay on the ground? You plant them 6 feet if you're going to grow on wires and plant them about 5 feet if you're going to grow on the ground. How long will it be from the time the cucumber blossoms, until you harvest the cucumber? How many days?

R – 3 days . . . 2 weeks.

How many – 3 days? 3 weeks, what did you say days or weeks? 3 days is correct. 3 days from the blossoms and it's ready to go. How many days from the blossom is a bean ready to go?

Q – You're talking about maturity of the crop?

A – That you harvest, yes, harvest days.

Q – From blossom to harvest?

A – When the blossom is wide open until you harvest them at their maximum. I'm talking about green beans now. For home cooking, canning or for fresh market. Takes 7 days.

Q – Takes 3 days for cucumbers?

A – Right. From the blossom until it is ready to pick that is correct, a cucumber.

Now, on the watermelon blossom. How long does it take from the blossom until the watermelon is ripe?

R – 21 days.

21? Anybody else have an opinion?

R – 4 weeks.

Someone said 4 weeks, that's 28 days. Anybody else got another opinion? A little bit is determined by the size of the melon. If you were producing melons less than 20 lbs., 21 days. Producing 30 lbs. melons, it takes about 4 weeks. If you're producing 40 lb. melons, it takes 5 weeks from the seed.

Q – From the seed?

A – No, I mean from the blossom.

This is how long it takes, so whenever you see the blossom, get ready to market. Get everything ready to go. Don't wait until it's ready to harvest. Then you're going to do everything yesterday. You see, farming is a fast game. You've got. . . whenever the produce is ready, you've got to be ready to get it. Work, rain and shine, you've got to get it when it's ready. It's very important to pick it just at the right time.

What about your squashes? How many days from the blossoms until you harvest your squash? Let's take yellow, whether it's the crookneck or yellow straight squash or the white patti pan. Someone says 3 days, someone 10 . . . 2 days? 4? If you picked it in 2 days, you'd get a mighty little squash, 3 days would be medium, 4 days a pretty good size squash. In other words when 1 or 2 little bumps begin to appear on it, then they're ready to mature.

Q – Tell me, why do they pick the zucchini squash when they're only this long? And they wait until asparagus gets this long before they pick it?

A – Well, the zucchini squash takes from 3-5 days. . .

Q – But it's just as good this long.

A – Well, there's no market for them that size, that's why. But the asparagus will get 6-9 inch long in one night's time. One night. It's this long today, but tomorrow it's 9 inches high. It really grows like a mushroom.

You may go out one night and not see a mushroom and yet there may be a lot of them tomorrow. Does any of you know how to tell whether a mushroom is edible or not? Is there any rule that you know of?

R – I know one kind of mushroom, that's all I know. The other I don't trust.

Yes.

R – If you're not dead in 3 days, then it's alright.

I don't know which one is good and which one is bad, that's one thing I have no experience in. except the cultures, I know how to make the cultures grow, but I do not know anything about the evaluation of a mushroom other than it's rich in penicillin, very rich in penicillin. So those factors are factors that you need to keep in mind before you. . . in the ground to your growing of things.

Now, on your production of your cabbage, etc. It's very easy in a home garden to grow too many cabbages and one of the things I would suggest you do in a home garden, or you could do it on a commercial scale. Make homemade sauerkraut. Make it taste

good, make it mild and prepare it for the market. But don't freeze it solid. You almost freeze it. It is absolutely delicious and all you make sauerkraut with is, you need a shredder. You leave the shreds long and you need to put it down in salty brine and it will be absolutely out of this world in about 5 days. When the little flies begin to cover the door, then you know it's ready to go. And what I do with that sauerkraut is this. . . The way it tastes best and sells best. Take the sauerkraut out and put it on the drain board for about 10 minutes and then put it on a screen and dip in a solution that has a little bit of sweetener in it of your choice and also a little allspice, little dill, something like that, very mild. Then you put it in packages, but don't freeze it, do not freeze it. Keep it chilled but not frozen. And the public like it, the Americans do not like sauerkraut unless you make it really delicious. And this is really excellently flavored. The canned sauerkraut is over cooked, it's not really good sauerkraut. But the Germans make a sauerkraut out of cabbage that is absolutely fabulous and this is one of the recipes they use. You can also add a little lemon juice to that water with sweetener in it, gives it a zing to it that's really good. You can make a dinner out of fresh sauerkraut made from fresh cabbages.

Q – How much salt do you put down?

A – Pretty salty. In other words, you want about a 6 inch layer of cabbage and a thin layer of salt.

And, it must be weighted down, you must press it real hard. Then the salt causes the water to run out of the cabbage solution and it's preserved in it's own water. don't try to use this water twice, it's only good once. It's too salty to drink or use anything with it or for. So it's very important that you get this sauerkraut just right. There is a terrific market. . . You can produce about 20 tons to the acre. It brings about 80¢ a pound. How much is that? (\$32,000)

Q – You don't put any water in it, just a 6 inch layer of cabbage and then the salt then another 6 inch layer of cabbage then the salt?

A – That's right. You can have a 3 inch layer and less salt if you want to, but that salt drains down thru it and it really gets that cabbage ripe. Really ripe.

Now there's other things you can consider growing in a garden. Corn, and the market cannot be supplied with whole corn on the cob of top quality corn. It cannot be supplied with 3-4 ears per plastic package. In the shuck and freeze it and it's absolutely out of this world. But you need a little bit of direction on that package. Say, please soak

this ear of corn in cold water from the faucet, for 30 minutes before you cook it. It's absolutely delicious. The corn won't take up more water than it needs and it's delicious!

Q – Cook it in the shucks?

A – No, you shuck it and put it in this water for 30 minutes.

Also, you can say, dip in hot water for 5-10 minutes, then serve. What's going to happen is this. You're going to be eating corn on the cob as hot as you can stand it and the yet inside, the cob is still going to be ice. Still ice inside the cob. You can handle the cob real nice. You can get about 50¢ for 4 ears of corn put up like this. Top quality corn. That's \$2 a dozen where you'd get only about \$3.50-\$5 a crate. The crate costs you 80¢ in great lots.

Q – The corn is frozen right in the shuck, right?

A – Yes.

Q – You don't even cook it or anything, just . . . ?

A – No, you don't do anything. Just put it in a plastic container that's all. Put it in a zip-lock bag or something like that. About 4 ears and seal it quickly.

Q – Shuck and all?

A – Shuck and all, take off the outside layers so it looks nice.

Q – Do you cut your end?

A – Yes you cut one end a little bit and the silk off the other end. Don't have the silk hang out. That's right. When you cut off the end, you can tell if there's any meat with it or not.

Q – Meat?

A – If there is, well, don't put it in.

Q – You mean if there's a worm in it?

A – That's right.

Q – How long did you say to cook it?

A – You do not cook it at all.

Q – How much cabbage per acre did you say?

A – About 20 ton.

Q – And 80¢ a pound?

A – Yes.

R – For sauerkraut.

Why?

R – Seems like it's a good bit. . .

It is a good bit. What I'm talking about is on small acreage you can produce terrifically high amounts. High amounts, very high amounts. What's that?

R - \$32,000 on 40,000 lbs., \$32,000 it brings.

Yes, that's what I'm talking about. I'm talking about money. Listen, I'm not talking about pauper farming. I'm talking about it's the greatest way to make money today whenever you do it. If you're going to go out and copy everybody else and be a competition with every body else, even the old timers, you'd better stick to your back yard garden. I'm telling you know to farm commercially, economically and profitably. If I couldn't . . . I don't care how much debt a farmer is in, if he'll do what I tell him in his farm in 2 years he should be out of debt completely. Completely out of debt if he does what he's told. In our engineering business, it only took 24 hours to turn a farm from a loss to a profit, from the time we got there. Now, what I'm trying to do with you is to lay the foundation. But don't try shortcuts, do it the sure way. Don't copy your neighbor. Don't do like the fellow did about his mule up here. You know what he did don't you?

R – Yes, the quart of turpentine.

Yes. We were also studying crop evaluation. Let's go back to those green beans that we had in the row crop. 24 inch rows, 32 lbs. to the hamper. How many hampers of beans should you get per acre? About how many hampers?

Q – We're talking about a hamper which is a bushel?

A – Yes.

R – 100-125 bushel.

How did you get it?

R – I thought we ought to get about 4,000 lbs. divided by 32, gives 125.

Is that the way you figured it? That's not the way I would figure it. How may bean seed would you need to plant to the acre in double rows? Count on about 6 good bean seeds to the ounce.

Q – 3 inches apart?

A – 2-3 inches yes.

R – About 15,000 beans to plant to the acre.

That's right about, between 12-15,000. Is that a single row or double row?

R – Double.

How far apart in each row of a double row?

R – 2 feet.

No, no, the beans in the row?

R – 2 inches, I say 1 inch apart.

You see, they're actually 2 inches apart, but it averages 1 inch in a single row.

How many pounds of beans does it take to plant the acre? How many feet of row is in an acre 24 inches apart? How many feet of row would there be in the acre?

R – Should be 110 rows.

Yes, 110 rows or 105 rows. Now how long are the rows? 210 feet and the beans are 1 inch apart and you've got 2,500 beans to the row. 2,500 times 105.

R – 262,500.

That's just about right. How many pounds of beans is that? Say the beans weigh 6 beans to the ounce, that'd be about 350 beans per pound, so . . . So how many pounds of beans would that be?

R – 750 lbs. of beans.

750 lbs. of beans to the acre. Generally it's about 600 lbs., because some of the beans are different sizes, etc. But good beans will weigh about 6 to the ounces. But some of them are not so good, but still they produce. . . Use about 600 lbs. of beans.

Now how many beans do you get per stalk? How many?

R – Maybe 10.

Is that how much you've been getting?

R – I don't know, my wife picks them, I don't see them until . . .

Ought to get about 20-25? If you've got a good crop you can get up to 30. But 20 is considered pretty good. So let's figure 25 beans per hill. Let's figure that these beans on this hill will weigh a pound and a half. 1 ½ lbs. total, but only 1 lb. are marketable, one pound of marketable beans. How many beans have you got?

Q – And a hill every 2 inches?

A – Right.

R – Dr. Reams. . . home. . . down here. . .you could have answered that question. I pick

them. . .

I see.

R – 1,260 lbs. to the row times 105 rows should be. . .

Let's say 1,000 lbs. to the row for easy figuring.

R – 105,000 lbs. of beans, that's a lot and 105,000 lbs. divided by 32 is 3,381 $\frac{1}{4}$ bushel.

3,000 bushels. It's nothing unusual to get 500 bushels. What happens to the rest of them? I have seen 600 bushels of good marketable beans. What happens to the rest of them? In beans you have a genetic problem. A lot of them are not marketable. Lot of them are short, dwarf, some of them get specks on them, etc. So you plan on 4-500 hampers to the acre. But now generally, beans bring \$6 a hamper on an ordinary market.

R – 2,500 net.

Yes 2,500 – 3,000. You can generally count on \$3,000 if you put them on the market. But it cost you about \$2 a hamper to harvest them. Costs you about \$2 a hamper to grow them. Get your soil ready and everything else. You've still got an excellent profit there, you've got a net of 33 $\frac{1}{3}$ % profit. You can stay in farming for that.

R - \$1,000 an acre.

Yes, very good. This is what it figures out to, \$1,000 an acre.

R – You can grow them in 20-30 days.

35, no problem in 35.

R – You could grow 2-3 crops a year.

Now, this is the kind of farming I'm talking about. Do you know how many actual hampers they get now? 80-125 hampers is what the average farmer is getting. You know what happens? He's broke all the time. Now, pole beans, you don't get near as many pole beans as you do the others in ton weight. Not near as much. It costs a lot less to harvest them and they're much better flavored and they're in much more in demand on the market. And where the other beans bring \$6 a hamper, pole beans bring generally \$15-18 a bushel. Now, just let me show you something. Suppose pole beans were 32 lbs. to the bushel and in the market you're 45-60¢ lb. for them. You see, that's pretty close and I'm talking about 3rd rate beans. I'm talking about poor, poor, poor quality beans. Understand? You can't do it for that, so in top quality pole beans you've got to produce an awful heavy, bumper crop. And pole beans you have got to pick many times and it

doesn't pay to pick bush beans hardly over once or twice for the commercial picker. But there are machines that run these beans thru that cuts them and everything else and prepares them, ready to cook. Washes them and everything else. Believe me you can pick these beans and do it quickly and fast. But one of the mistakes they make in canned beans is, they cook them under pressure and I've never tasted a good canned bean. But there's a lot of very good frozen beans that's delicious. I mean they're cooked, well done, no seasoning, nothing else, just the beans. I don't mean mushy, just cooked to the right stage. They've been blanched just to the point of being really delicious and holding their flavor. But what I'm trying to get you to do is to plant in plenty of time to market your produce to the Nth degree. Market it and have it tip-top quality.

There's one or two products you can grow on a farm that's not good frozen even after they're cooked or before. A beet is one of them. The beet itself, even if you froze them, or freeze it, it's a gooey, tasteless thing. Even if you cook it before or what not. It still doesn't do itself justice anyway can do. But I'll tell you what you can do with beets, is this. Take your beet and wash it really good, leave your top on it. Clean out that bud really good because there's more trash that can get in that bud than you ever thought of. Then freeze your whole thing, top and all. Then take it out, put it in the blender and into the juicer and you've got some of the finest beet juice you ever had in your life. You've got beet juice right out of this world. Beet juice is a wonderful physic. it's a laxative. It also builds red blood cells, vim, vigor, vitality. It gets you ready to go in the morning. That's the way you do beets, top quality.

Now, let me tell you this. The Health Food Stores, once they're shown how to do this, they can't supply enough beets, beet juice, fresh beet juice, frozen beet juice and it's really, really good providing the beets are top quality beets when you start. If they're low quality beets, etc., then the juice is low quality. So, in working with these foods and food stuffs, try to plan, work, use your heads as farm managers and farm owners, etc. to get the most you can get from your top quality produce. Take time to think on how to get your produce marketed and there are many other things you can do also. These are just some suggestions, just the beginning of it. Any other questions to this point?

Q – After you make that beet juice, you freeze it again?

A – No, you drink it just like that. You could freeze it again, won't hurt a thing. It's

perfectly alright to drink it fresh, right then.

Q – What I mean is, you could wash it good and leave the tops on, put it thru all the processes and freeze the juice?

A – O yes, you could, you could do that too. Just freeze the beet juice, yes.

These are factors that you really need to work on, to study out what to do with it. Also, there's something that I've thought about over the years that can be done that has not been done and that is. . . In your sweet potatoes, it makes one of the finest bases in the world for some of the most delicious candy you've ever tasted in the world. You grind up your dried fruit just long enough, not to make it soggy, but just long enough to give a little zing to it. Grind it together with your sweet potato and you might add some raisins to make it into candy bars. Something like a, what's some of the names of the candy bars that are around? O'Henry? Do they still have the O'Henry candy bars on the market? Something like that. Wrap it into paper and you can get a dime for every one of them and it's half sweet potato. You have got about an ounce of sweet potato in it and the rest of it is dried fruit, raisins, peaches, apricots, etc. candied up and then use a little wheat germ, powdered milk with it. Just work it out.

Off an acre of sweet potatoes you should make \$10,000, right. You fellows are you getting the picture I'm telling you? Instead of all this big acreage, big acreage, do the simple things, get them on the market. And also if you will take about one Min-Col tablet and put in each Sweet Potato Candy Bar, you'll grow the kids teeth in while they eat candy.

R – Dr. Reams, I've often thought about what could be done with sugar cane juice frozen. . . Can you . . .

I have worked with sugar cane juice until I'm red in the face and I still haven't done anything with it. But make sugar syrup with it. You freeze it, it separates, it crystallizes and goes as fat as a flounder. It tastes like sweetened water. it is the most contrary thing I've ever seen to do anything with. What you can do with sugar cane is. . .if you freeze it, it's still flat. . . even. . .I've even tried to freeze the sugar cane in the stalk and it's still flat. It isn't worth anything. I just haven't learned what to do with it. I'd still like to do some research on it.

R – Like lemon juice, you have to use it fresh.

Right, you've got to use it fresh, you can't do a thing with it, it just doesn't work out like that.

There's many other things you can do. . . Let me tell you something else that can be done with squash. In fact I like it better than I like pumpkin. Make squash tarts, something like apple turnovers, only make it with squash. Squash pie, yes, sure and it's as good or better than pumpkin. You make these little squash pies out of it and you take your squash and make a pie out of it and really, the market can't be supplied. The thing to do is to make up everything for it and get a baker to do it for you. Get your local baker to make them. Get the idea? Use your 100% Whole Wheat, freshly ground wheat for the. . . hard wheat for the crust of it. You just can't get enough of it.

Let's get to okra. The high manganese. . . I had a young couple that couldn't have any children and I ordered them both to eat okra 3 times a week and now they've got 3 children. They had been married 6 years and no children.

Q – They cut back a little bit or what?

A – About 10 years now and they've got 3 children.

Q – Is that better than cranberry?

A – We used both.

But anyway, okra is an excellent product. But let me tell you about okra. How often do you have to harvest okra?

R – Every day, twice a day.

Well, it should be a least every other day at least, it shouldn't be longer than that. When an okra pod is 4 inches long, it's too long.

R – I raise it every year.

It's excellent food. now, if you've got high quality soil, you'll produce a high quality okra. And it's absolutely delicious to eat right off the stalk, absolutely delicious. Eat it right off the stalk. Now, on your okra, the finest way to put this up is freeze it, but you need to steam it until it's done. Only take about 3-4 minutes. Steam it and then put it in the package and freeze it quickly and each pod will be separate and not sticky. Then simply take it out and put it in your Radar Oven and put it in for about ½ or 1 minute and it's just right to eat, stem and all. And it's out of this world. There's absolutely nothing to it at all. Nothing to it whatsoever, your okra. If you do this, you cannot supply the market

with okra. It cannot be supplied. Top quality produce brings a top quality price, anytime, anyplace, anywhere.

Q – Dr. Reams, may I correct you?

A – Sure, I love to be corrected.

Q – Maybe I’m not right, but I thought it was soft wheat for pastries and hard wheat for bread?

A – It is, except if you want to do it differently. You soak the hard wheat overnight. You do have to do it, you soak the hard wheat overnight. If you don’t do that, then you were right about it.

Q – Then grind the sprouts?

A – No, no, you grind the flour overnight.

R – O, I see.

That’s true, thank you for reminding me of it.

Q – Soak the hard wheat flour overnight?

A – That’s right, exactly or you can soak the wheat overnight and grind it in a blender.

Q – In what? What do you soak it in?

A – Water or milk, skim milk or whatever you use to cook it in or you can soak it overnight and then grind it into a flour in the blender. And it is delicious, absolutely delicious.

Your hard wheat is far superior, even in your pastries. You can do the same thing. But if you soak it overnight and then grind it in the blender, you’ve got a milky soup and if you grind it into flour first and then soak it, you can have any thickness or viscosity you want. That’s the difference. You were right for making pastries, but if you’re not going to soak it overnight. . . same thing as corn. . . you can make the finest corn biscuits in the world out of corn flour. But you should grind it and soak it overnight and you’ve got corn biscuits made out of corn flour and it’s hard to tell the difference between wheat flour.

Q – How about making corn meal out of sweet corn?

A – It’s very good and even pop corn. You can even make it out of pop corn and I’ll tell you if you make it out of pop corn, the biscuits will not turn themselves inside out.

R – I’ve never heard of anybody making corn meal out of sweet corn.

It does, it’s excellent. Also, if you make your corn,. . . use your dry corn. Soak it overnight and the next day, whip it up in your blender, so it’s a milk. Absolutely a milk,

like flour. Then you add some whole grain corn either frozen or canned and whip that up with it and then make that into biscuits, just plain biscuits. You've got corn biscuits, you've never tasted so good in your life. It's kind of like a corn bread flavor, but it's as fine as flour. And you use your regular buttermilk or your. . . actually if you are cooking or grinding your corn into . . . after you've soaked it in water overnight, is to whip it up. Use buttermilk to whip it in your blender and then add your fresh grain corn and you've got it. Out of this world. You've got food folks that you just can't imagine how good it is. also, you add the eggs and other things that you add to corn bread you know. Don't add too many eggs, because if you do, you have a pudding. So these are things that I want you to know.

Let's come back to the corn. One more thing I'll tell you to do that you can't supply your market. That is, to get your corn grater and just as your corn is just, almost past the milk stage. . . in other words, just deep into the milk stage, that is just a little too hard to eat. Then at this stage, you can cut the corn off the cob, put it thru the blender, mildly, not to much. Then make it into corn puddings. Cook this in an angel food cake pan and make it like a corn pudding and you freeze that and you need small ones and you cannot supply the market with corn pudding. You take it then and just slice it into sections. Put it in your Radar Oven for just ½ a minute and you've got a dish that's out of this world. A complete meal that you can make out of it. It's just out of this world and of course these are in boxes. Something like your angel food cakes or your coconut cakes, only corn pudding.

Q – Field corn or sweet corn?

A – Either one, don't make a bit of difference.

Now, the thing about it is to use your refractometer and get your right amount of sweetening in it. You want your sweetening about 10% or 10 brix or your refractometer.. it's out of this world folks. . . you just market the things. It doesn't matter if it's field corn. Field corn is just as good as sweet corn. Just as good because in your field corn, you add a little honey to it or a little black strap molasses. But in your sweet corn, you don't need to add any honey or sweetener to it. But make it taste good. You can't supply the market with it. It can't be done.

Q – What's the sugar on the field corn?

A – Good field corn runs 12%, tip top. That is in the milk stage. Sweet corn runs 18 – 20 brix. It's way up there, in fact I've even. . . I'm talking about top quality. I'm not talking about what you buy in the market. I've eaten some that was so sweet it was really sickening almost. It was too sweet.

Q – Too much phosphate huh?

A – No, it's just the nature of it.

Q – How about good old corn meal mush. Nothing any better for breakfast?

A – Or corn meal mush is excellent made from dried corn, but you should soak it overnight.

Also, in your corn meal mush you can add some fresh corn to it, it will make it taste like fresh grits almost. Not only that, corn meal mush would sell excellently on the market if it was made, if it was tip top, high quality food. And then in the corn meal mush, add some cooking oil. There's not enough oil in our corn today, because the sugar is too low. It's a wonderful, wonderful food, excellent food. What I'm trying to get you to do is to get the vision of marketing your crops. Don't grow it and say to the folks, "What will you give me for it?" the Ford auto company doesn't do that.

R – A point here to bring up, about the whole country. . . is based on agriculture as being a factor of one and the gross national income of seven. Everything's based on that and the farmer has never had any way of getting the price out of his good so the country is really in bad shape.

Well, I got the price out of my goods when I sold it.

R – If the farmer had some way of charging a price instead of taking what they offered him, why then he'd be a lot better off.

Well, he can if he'll get out and market it.

R – Usually he's not organized in that way to do it.

He can't, if he does all the work on the farm himself. Let me tell you what I have done for farmers. I have worked up produce routes for them thru their local wholesale jobbing house. . . I have trained men for the produce man that was already in business, for farmers that would supply this produce man with certain kinds of produce. So what we do in this high. . . top quality produce, we make it so the produce company makes more profit on that than they are on the average stuff they buy on the market or else they're not interested. We also furnish a man around with them until they get this brand into the stores. So what we do is we guarantee the sale of this brand of produce, it's got a seal of approval on it and it is guaranteed to sell. If any part of it is lost it's taken back

and given full credit for it. So it's guaranteed sales to the merchant which is the only produce he buys that is a guaranteed sale. Now the next part of it. He's told at what price to sell it. He cannot sell it at just any price. He's got to sell it at that price. You know what happens? He can't get enough of it, everybody wants it. They do not mind paying for what they get. Consequently he can't sell the other stuff and he gets less and less and less of it. But he make more profit, so what does he care? He cares less about it. He cares less about it, so he's making more profit on it. And his salesman gets it open and on the market then he goes with another and another and another and he sells it regardless. And he gets it out there and it's picked up. Now, let me tell you what will happen. You're going to find one or two smart-aleck grocers that have got more greed than they have common sense. So they're going to put some of that other stuff in the hamper and send it back and say, "We couldn't sell it." Then we get it into the lab and we send it back and say, I'm awfully sorry, this was not the produce you got in that package, because this produce had such and such and such numbers to it, sugar content, mineral content and the one that you sent back has such and such and such. He's left with no leg to stand on. Now if this happens again, this produce will not be available to you. I'm telling you, I doesn't happen again. I'm talking about in the produce market now. The word will get out from city to city that such and such a product is on the market at such and such a time every year and the people are looking for it, waiting for that produce to come on the market at that time next year. Because it's already been introduced and it's already known so consequently they're waiting for it, when it comes to market. Now, in adjoining cities, they'll get word that it's there and when you get to that city they'll say, 'yes, we were expecting you.'

R – Get you a brand name and extend that from tomatoes to celery to whatever see and have something each season of the year with that brand on it.

That's right. You could do that with commercial farming. But what I'm trying to say is, use your head to market the top quality produce and if you don't do it, you're going to have a somewhat. . . you're going to make more profits even with it, but it isn't fair to you to sell top quality produce at the same price they're buying junk for. It's not fair to you. And if you don't know what you've got, there's nobody going to tell you. Nobody is going to tell you.

I think the hog is the only thing they market every bit of it. They take the hair and make paint brushes out of it, they take the skin and make pork rinds out of it, pickle the feet and then they have Pig-Tail Soup, the intestines for casings for sausage and then they even kept the squeal for modern music. They market the whole hog.

Now, one thing about the growing of your vegetables is this, never, never grow more than you can market. On your fresh produce I'm talking about. Fresh produce now. You dry corn and you've got much extra weeks to harvest good corn in because it will not mildew. It's your poor quality corn that will mildew. Your good corns will not mildew. I don't care how much rain falls on it or how much dew. The top quality corns will not mildew.

Now, your wheat, if you've got top quality wheat it will not shed off the stalk even when it's ripe. The whole head will bend over, the head will break and bend. When you see ripe wheat with the heads breaking and bending, you know you've got fairly good wheat. But the best wheat will stand up all winter long until beat down by snow or after the stalk is dead. Providing, it's got plenty of pith within the stalk. Now oats will do the same thing. Have you seen oats, wild oats stand up the whole winter without even. . . until the 3rd or 4th snow before it knocked them down?

Q – How about a bad storm? Will that affect them?

A – O yes that will lay them down, even corn it will lay down. It will even blow corn out of the ground just about. In fact it gets it so tangled up it make it very difficult to harvest.

You must consider these things, but I'm just talking about the top quality. You've got more time to produce it. So in harvesting your truck crops, you should plant with how many days it's going to take you. In other words, figure out your yield. What you want before you plant your seed. Determine how much you can handle. . . day by day. . . and give yourself a 3 day period to handle X number of pounds of beans or squash or whatever you are going to put up or black-eyed peas or what not. Give yourself a certain number of days to get it off the vine. Then you can put it in a cooler and hold it for a week or two until you can get to it. But do not plant more than you can get off the vine at a given time. So what I'm suggesting to you is to rotate your planting. In other words, I would suggest planting beans about every 3 weeks. About every 3 weeks, plant your beans. And in planting your beans or beets or what not, whatever you're going to plant.

Plant them so that you will not be rushed with everything coming in the same week. Any questions?

Now okra, you can plant in the springtime and pick until frost. But about the time half the summer gets over, begin to prune your okra. Clip it back and let it sprout out again and produce a lot more okra. The wood stalk of the okra plant gets too old and too woody and cuts the production way down. So if you do some pruning, the okra will spurt out.

Q – How would you prune it?

A – Just cut it off.

Q – About half way or . . . ?

A – Yes, about half way or I've cut it about a foot from the ground. Let it send up 3-4 stalks and it's excellent.

Now, on your other crops, say beets, you've got 2-3 weeks to get your beets out of the ground. One thing I'd suggest you plant very light on which most people plant too heavy, is Irish Potatoes. That's the poorest of foods, poorest of the poor. Now an Irish Potato is at its best when it's only the size of a marble. It's about 1/3 skin. That's the only time it's going to be like that. In fact they're almost to the stage where you can swallow them whole and they're just about as tasteless when you swallow them whole as when you chew them up. As far as the potato is concerned. So most people plant far too many white potatoes. It's nice to have a few hills and have the little creamed potatoes, etc. but if you want to grow potatoes and grow good top quality potatoes, if you really want to make money on potatoes, there's just one way to do it, that's grow potato seeds. There's money in that. They bring up to \$30 a hundred lbs. Potato seed, grow them for seed. I grew potatoes one year on a muck, about 20 acres. Had a client who wanted to plant 20 acres of potatoes on a muck farm. He wanted them to come in May. That's when he wanted them. So we planted them in early January to come in, in May. On the muck farm at Dellwood. And those potatoes, he wanted large potatoes. He wanted those potatoes to come in, in May. So the first week in May that year we had about a 12 inch rain and we were ready to start harvesting those potatoes on a Monday. And I mean the rain just came in torrents. We couldn't get in that muck Farm for a week. And he just knew those potatoes were just going to be rotten. Rotted right in the ground. But he went out there

when that ground was sill kind of soupy, just barely enough for a man to walk on, you still couldn't drive a truck on it. And he pulled up a hill and it was just loaded with the firmest, nicest potatoes you ever saw. Not a potato rotted, not one. He took those potatoes. . . and the market then was real. . . didn't turn out like they expected. The market was real low. And all he could get offered was \$2 a hundred pounds and he wouldn't sell them. Well, that fall he . . . he decided to keep them for seed potatoes in the fall. Well, whenever he tried to sell the seed potatoes in the fall, the people didn't believe it was spring potatoes because they hadn't shrunk any. They looked just like the day they did when they were taken out of the ground. The most beautiful red potatoes you ever saw. The eyes hadn't even started to sprout, so he couldn't sell them. I mean, he couldn't get his price for seed. So the next spring they really sprouted. They had the prettiest sprouts on them you ever saw. And he sold them for about 3 times what he could have gotten for potatoes as seed potatoes, but he had to keep them almost a year. At least 9 months before he could sell them. And they were just as solid as they could be. They never did shrink any. You know how a potato stem will get a sickly white, grayish color on it? These potatoes were just as pretty as the day they were taken out of the ground and they were delicious. They were really delicious.

Also, in growing bell peppers, I want to tell you something about growing bell peppers. You can grow bell peppers under this standard and I mean they are big ones. They're very large. And you can stuff these bell peppers with your favorite stuffing and bake it and it looks just like you picked it off the vine. It doesn't shrink, it doesn't wilt, it doesn't fold up. It's absolutely beautiful. I mean it still looks just like you plucked it off the vine even though it is baked. The most beautiful peppers you've ever seen. And it doesn't take very many of them to fill a bushel.

Q – Why is it that you can't plant bell peppers and tomatoes close together?

A – Because they hate each other. The frequency is too far apart. Or hot peppers either. Don't plant them close to tomatoes. The frequency is too far apart.

These are practices you need to do, plan. Now, on your hot peppers, let me tell you something else you can do. Every year I grow about 200 hills of hot peppers. About 25 hills of bell peppers and 25 hills of the yellow banana peppers. And we pick all these peppers about every 3 weeks. We get about a bushel of peppers. And we take these hot

peppers and stem them and put them in a blender and . . . the bell peppers, yellow banana peppers and the hot peppers we generally use the cayenne, what you call the old fashioned rams horn. Well, we add vinegar to it, the Heinz Sweet Pickle Vinegar. Pickle and all, add lemon juice to it in the blender to make it the consistency that we want. Then we add some honey, black strap molasses, some allspice, then we bring it to a simmer - 180° for ½ hour, stirring it gently and believe me that fumes that come off will burn your eyes! Then we put it in bottles and put it in the refrigerator and it's one of the most delicious hot pepper sauce you've ever tasted. We can't get enough of it. In fact we could sell more than we could produce. Just that one thing alone at \$1 for about 4-5 oz. of it. It's absolutely out of this world. It's fabulous how delicious it is. Why the guests buy every bottle they can possibly buy out there that we can spare. So these are things you can do with hot peppers. However, hot peppers are a little bit tedious to harvest. Not that they're hot enough to burn your fingers. It's just kind of a slow job.

So, the opportunity is very, very great on what you can do with most any crop. One thing I would advise you to do if you're going to do it commercially, is, do not diversify too widely. In other words, do one or two things well, then take on one or two more things and then one or two more. One thing I'd suggest you'd stay away from pretty much for commercial crops and that is the English Peas. Unless you're prepared with a harvester and a sheller and everything else. Because they are very difficult to pick by hand and they are very costly. And it's very difficult. However, they've come out with a little English Pea now that has about 2 peas to the pod that you cook the pod and all. But I tried some of them and they're not very flavorful. There's not much taste to them, very little flavor to them. Also, there's a field pea call the White Acre Pea or we used to call it the little cock. That is one of the finest field peas you've ever seen and it is absolutely delicious. You can take this little White Acre Pea and have a pea sheller. . . now the way you've got to do this little pea sheller to work it is. . . you must first dip these peas in hot water then put it thru this pea sheller and it pops the peas right out without breaking them. And these little White Acre Peas cooked ready for the table are absolutely one of the finest foods there is in the garden. I mean it is about one of the most complete protein foods that you'll find in a garden. Minerally speaking, sugar speaking, oil speaking and

everything else. It's a delicious, delicious pea. It is much more delicious than the Black-eye Pea or the Lady Finger or the Whipporwill or the Blue Goose or any of those.

Also, now I want to talk to you about the pureed foods. What do I mean about pureed foods? P U R E E or purees, whichever you say, well –

Q – For soups?

A – No, I'm not talking about for soups at all. I'm talking about loaf, loaf food or loaves.

You can take puree foods and work up some kind of a formula and call it something like this. . . you know this American Cheese that comes in these little boxes? These little 3 lb. boxes? O.k., make it into a loaf alike that and put in on the market at around \$1.50 or \$2 for the package. Then you take it out and slice it, put a slice of that into the Radar Oven or another oven and in just ½ a minute you've got one of the finest, quickly, well prepared, nourishing meals you ever tasted. It is absolutely out of this world. And there is nothing like it on the market today. We used to put up these like that. We used to mix some corn with it, even some cooked up okra in it at times and we put it in containers. In fact what we did, we'd use these little . . . put the aluminum foil down in the box and then we'd put this in and freeze it. It was rather thick, kind of thick to start with, real thick like a soup, thicker than a soup. Put it in these boxes and freeze it and then take the aluminum foil and wrap it up and take the box out and use another one. Or we'd use these long bread pans to put it in. And absolutely, the children just thought it was out of this world and you could fix a dinner in a matter of minutes. Even . . . we didn't have a Radar Oven then, just an ordinary electric oven. Just cut it in slices, put it in there and toast it for about 5 minutes or less and you've got a complete meal almost, with the Pureed Loaf?

Q – What is the base?

A – Season it just like you're going to serve it.

Q – What is the base?

A – Sometimes boiled peanuts, young, tender, boiled peanuts or the White Acre Peas, or the Black-eye Peas you know? Or fresh . . . make it into a loaf. This is what it was made out of.

Q – Do you run it thru the blender or colander?

A – Yes, we put it thru a blender, yes.

Q – How do you save it?

A – You take it out, like if you're going to have it tomorrow, we take it out today and put it in the refrigerator. We take it out and put it in the refrigerator, like you would anything else.

Q – What if you didn't use the whole loaf?

A – O yes, with a family, we'd use the whole loaf.

If there's only one or two people, then you put it in smaller packages as you put it in there. But it's absolutely a food that's almost a complete dinner all by itself. We also used this in lunches for the children. You take a slice or 2 of this and a boiled egg and a lettuce leaf and roll some salad in it you know. Make a salad of just the leaves. You don't chop the salad up. Make the salad out of whole leaves and roll it out in a little mayonnaise or a little of this, little of that between the leaves. And roll it in a tight roll and just put a little string around it. The child can unwind it and he has his salad in a roll. But don't add any salt to it, if you do it'll all turn to water. And the child has a complete lunch. His salad and his complete dinner that's very, very good with no bread in it.

Q – When you heat that puree, it doesn't melt or anything?

A – No, it doesn't melt, no. you can also take and add a little piece of cheese to the top of it and cover it with the cheese and the cheese just wilts over it and it's a beautiful dish.

One more thing you can do about your beans when you freeze them, either your pole beans or your green beans, cook them ready to serve and cook 2 boxes. One of them the Golden Wax Beans and add just enough of those to your packages that you're going to freeze, to give you a beautiful color whenever you have. . . one of the most colorful dishes of beans you can set on the table. You ought to add a few of the wax beans, cooked ready to serve, they'll still be yellow. Now, if you cook them together in the same pot, it makes them a kind of a dull yellow, but cook them separate and mix them just before you freeze them and it makes the most beautiful dish to serve on the table, you've ever seen, lots of color. Also, what you do when you're growing your own garden, instead of picking your peppers green, wait until they turn red, you bell peppers. Then get your bell peppers around the plate and some pieces of celery with some cottage cheese in it, couple of olives, you've got one of the most beautiful dishes. You can set it before a king. Out of this world, no meat and they won't miss it. No salt, and yet they don't feel . .

. miss the salt. And when they get up they don't feel stuffed, they've had a wonderful meal. Easy isn't it?

We Americans today, most of the people have lost the art of setting attractive dishes on the table. In other words, they make too many filling stations and not enough really beautiful gourmet dishes. This is one of the things, if you ever visit England or Europe, you'll notice how beautiful their dishes are. Did you notice that when you were there? They really set it like a picture before you. It really looks like a bouquet when they set it before you.

There was some Irishman that came over to this country, different in Ireland from other parts. So they went into this restaurant and they served them a little bowl of broth, then they brought them a salad and then they came back to take their order for the rest of their meal. The Irishman said, "I drank your dirty dish water and ate your pretty bouquet, now I'm ready for some food." The Irish like real food, they don't go in for this . . . most Irish don't go in for this beautifully dressed up foods.

So we need to learn to make our food attractive. Now when do you start doing this? When do you start making your foods attractive?

R – When you harvest it. Before you plant it.

Before you plant it is correct. Before you plant the seed that is correct. That's when you start. Do you remember me saying most farmers don't plan enough in advance? They don't plan for the inevitable. They are caught off their guard. They didn't prepare for the season ahead. You can not work all day on a farm doing all the work, driving tractors, doing this, shoveling hay and milking cows and have time to plan. You can't do both. You must plan your work and it takes a lot of planning to do it. And I'll tell you this, you'll never have a crew that will get as much done as you do, but they will get it done by and by. By and by they'll get it done. They'll get it done by and by, but you have to keep encouraging them. Encourage them and you can get more work out of most people by bragging on them than you can by finding fault with them.

There's one point I haven't discussed yet in planting your crops and that is, under cultivation and over cultivation. It's just as important to cultivate at the right time as it is not to cultivate at all. You can cultivate too early or you can cultivate too late. What is one of the primary factors on good timing of cultivation?

R – Water content of the soil?

On some soils your gumbo soils, that would be true, yes. Or your soil was so wet you couldn't get in there . . . your muck soils, yes. That is one factor. But what is another one that is a primary factor on your cultivation? We've discussed it now I just want to know if you know what it is.

R – The breaking the crust is one of the things.

The sodium content of your soil, that is correct. In other words, you must get your soil aerated. Now that is, when you first start this program, you're going to have a little problem with aeration. But the program moves along, and you'll have less and less trouble with aeration.

One of the factors I want to call your attention to, that is a very, very important factor. One that gives the farmers a lot of grief, lot of grief. They'll work their toenails and fingernails off on the farm, but along the fence row and the ditch row and the hedge rows, there's a jillion weeds, producing a billion seeds that they pay no attention to. That's very, very important to keep these weeds sprayed, so these weed seeds will not scatter over your farm. This is very, very important and I know some of them will blow for half a mile. But those that's on you adjoining ditch bank will supply about 75% of the weeds that's in your farm. So watch those ditch banks and etc.

Now, what are you going to do with those ditch banks? Well, that depends on which part of the country you're in. Most ditch banks and corners and road hedge ways, many of them can be put into fruit trees, rows, and a place for birds. They'll shade out the weeds and also be a windbreak and this alone is worth a lot to your crop. Also a lot of your problems can be solved if you'll just remember to plant a few sunflower seeds along on the banks around and believe me birds recognize a sunflower long before the seed is ready to eat. While they're waiting for the seed to eat, they'll eat a million bugs. These things encourage your birds to come into your crop and to your field. They won't pay any attention to those little bottles you've got hanging in your tree. However, they won't put a nest in there either. But they'll go in and eat a plum or an apricot or this that or the other. But what I'm trying to tell you is this. On your hedge banks, try to do something in order to keep them from raising seeds that you're going to have to fight the rest of the year. Down in Florida, you can grow papayas along on those banks and it just produces a

terrific amount of papaya. When I came up here, I had one papaya plant in a 5 gallon can. And I grew about 15 papayas that weighed about 1 ½ lbs. a piece on that one plant before the roots got too root bound and I didn't have a greenhouse, so it kicked the bucket and rotted off because the roots became too cramped.

When I was a young man, we got a call one time to dash over to my Mother-in-laws, she'd kicked the bucket. So when I got over there, all she'd done was turn a little 'pale.' Never get so serious that you can't get a smile up some part of the day.

When we were boys, we were hoeing out the corn one afternoon, in the spring of the year and it was a hot afternoon. I think that sun got hung up there in the west on a peg, it just wouldn't move. It wouldn't go down. That was the days we started at daylight and you worked until dark. It wasn't no 8 hour day. One of the fellows said if we don't get some fun going out here in this field, the sun is going to be until after dark going down. You know, whatever he did, he got that sun going down a lot faster. But it just gets hung on a peg sometimes and won't go down.

There are some things I can't tell you what to do with them, I don't know. For instance, cucumbers, there's no way I know of to do anything with them but pickle them, make some kind of a pickle out of them. I don't know anything else to do. You can't freeze them. You can freeze it alright, and then put it into . . . there's one thing that you can do with it, because a little bit of cucumber goes an awful long ways. So does a bell pepper. You can freeze that cucumber and when you take your tomato out and put it in the blender, put a small cucumber in there with it and also put a little pepper in there with it and you've got a good salad. But also, you need to add a little bit of mayonnaise to it. And you're drinking a salad that's out of this world, that's frozen. It's very good, but that's as far as I know to tell you to go with a cucumber. Because there is very little you can do with it besides pickling it. What little pickles the average family uses, they can buy cheaper than they can fool with it. Are there any questions you want to ask at this time about any special thing you grow in the garden?

R – The Amish say they plant pickles, they don't plant cucumbers.

That's right, they also say they plant porkers too. They got 6 little porkers out there.

Q – What's the best perennial crop to grow for commercial? Would it be asparagus or

berries of some kind?

A – I don't know. It depends on what you want to do with it. I don't know what is best, that all depends on an individual and how he's going to harvest it.

I'll tell you one of the cheapest things in the world to grow and something that is in terrific demand in this area and that's collard greens. Most people don't know what to do with collard greens. But they grow bountifully and they grow an awful lot to an acre. In fact you can sow them and cut the heads up on the leaves and chop them, not shred them too finely. Then add about 2 quarts of water to an 24 quart container and in that you can put about 50-60 lbs. of collard greens and then cook it while stirring it. They have to be stirred and turned. Add your honey, allspice, blackstrap molasses. You can also add a small amount of lemon juice and a small amount of pickle juice to it. But boil it, not boil it, but steam it for about 8-10-12 hours and about the 5th, 6th or 7th hour it really get rough. The odor of it. It smells like overcooked cabbage. But you still cook it further. And it's got a very nice odor after awhile. That odor will get gone. Let it set overnight and get cold or set it in the cooler or a cool place for 4 days until it mellows, just as smooth as velvet. Just put it in packages and you have a . . . it's still leafy, it's not cooked to a goo or anything. It's still very leafy like turnip greens. Then you've cooked it and put it in these 1 lb. packages. When you get ready to cook it, take it out of the package and whip an egg up in it, stick it in your Radar Oven for 3 minutes. And you'll get a dish fit for a King. It's really excellent. Just whip one egg up for about a pound serving. It's just like egg and spinach you know, together. You've got a beautiful color, the deep green. And it's absolutely . . . it's dry and it's not gooey and very, very tasty, excellent.

Q – Does that way of cooking it get that kind of bitter flavor out of it?

A – Yes, it doesn't have a bitter flavor at all. But if you don't cook it long enough, it's not good at all. It's woody or fibery or cellulose. It's not smooth. It take that 4 days of setting in that container to really get smooth like velvet and then you freeze it and it's good 2 years from that day. It's just as good as the day you put it in there and it is very rich in iodine and iron.

Q – What about harvesting collards? Do you just take certain leaves or do you take them all or what?

A – You can take certain leaves or . . . we just harvest the young tender leaves. At the top, just the top of it and it's absolutely excellent. What we generally do with the collards that's got a high quality sugar and mineral content, we harvest them in crates and then set them in the cooler for 4-5 days until they really get crisp. We already

washed them, get them ready to serve and put them in the cooler until they get really crisp and then we cook them and they are out of this world. You'd never guess that they'd ever been a collard green. You'd never guess it at all. O, you put Mazola Oil on it also.

Q – I've heard people say, even doctors say that collards didn't have any food value in it.

A – It's very rich in iodine and in iron, very rich. It's even better, got more nutrient in it than a cabbage.

Q – Does it have pretty good calcium for your teeth?

A – O yes, it has calcium in it too, yes.

R – A lot of beautiful white teeth I've seen in the people that eat it.

Yes, it's excellent, it's very, very good. So these things that there's terrific demand on the market for them folks, you can't supply the market. Instead of farming 80 acres, why you can't even farm 5 acres and produce the material and do \$1,000 an acre on big acreage. You can do \$7-8-10,000 on one acre or one greenhouse for that matter. It's remarkable how much you can produce.

Now, lets talk about 2-3 crops for real quick money crops. You get the soil fixed like I told you, but one thing you don't add to this soil is chicken manure. This is strawberries I'm talking about now. It's a quick crop. Very quick, and you make an awful lot of berries very quickly. Also, one thing you need about your strawberries is a low manganese in it. I don't like those woody seeds that are on the outside. Those diamond cutter seeds they've got. They can shred your intestines faster than anything I know of if you . . . unless you really got a pretty good hose system in there to take the seed thru. But in strawberries, in 90 days you've got the crop in and completed. Now ordinarily you grow 10,000 strawberry plants per acre and each plant should produce at least one quart of strawberries. That's the minimum that should be produced. I'm talking about top quality, high sugar strawberries. Strawberries that are so sweet that you do not need any sweetening on them whatsoever. And you should plan on about 40¢ F.O.B. the field, per pint of top quality strawberries and that gives you 80¢ a plant and 10,000 times 80¢ is how much? \$4,000 isn't it? No, \$8,000, o.k. so you can count on about \$2,000, no more than that, about \$3,000 per acre for planting them, harvesting them and everything else and you have made approximately \$5,000 an acre. Any ordinary farmer can handle 20

acres of strawberries. If you can't make \$100,000 on 20 acres of strawberries, you just aren't any farmer. I'm talking about top quality strawberries.

Q – How do you go about marketing that quantity?

A – Thru your supply houses, you're A & P stores. You're A & P store will take all you've got if you've got a high quality strawberry that will hold up and won't rot and it's red all over, instead of just the tip end red and a high sugar content.

And not hollow hearted, that's one more thing that you need to add on strawberries, many times is a little boron, just a little boron, plain boron, 20 Mule Team Borax. If you get berries with a hollow heart to them just spray them with a little boron, about 1 lb. per acre and it will close up the heart. You will not have hollow hearted strawberries.

Q – What's a good brix reading for strawberries?

A – A good brix reading for any fruit is between 10-14, 12 is excellent.

Q – Do you keep spreading those strawberries each year?

A – No, I get new plants every year. I'd get new plants every year unless you want to grow your own.

Now you take one acre of your top quality strawberry plants. Stake your plants that made the very finest berries and then take those and put out about one acre of seed bed and get your own plants from it. But then you've got to keep a man busy all the summer producing these plants of 2 or 3 acres of strawberries or you'll want to do 5 acres of the top quality plants. They you can sell enough plants to pay for your plants and everything else. Now good strawberry plants today cost approximately . . . in large lots, I imagine they are \$10-12 a thousand for the strawberry plants. Any questions about the strawberries?

Q – Do you try to keep most of the boron off, but just a trace of it?

A – Very little goes a long way.

Q – Chicken manure is too much?

A – It's too much in chicken manure, yes.

What happens now, if you put chicken manure on? I'm not joking now, I mean actually. . . what biologically happens if you put too much boron on your strawberries? They are woody, they taste like wood, they're very hard, knotty things.

Q – Is that a good crop for land that's just turned over for the first time?

A – O yes, right now is time to plant strawberries on this mountain. Right now is the time to put them out. But it's a back breaking job to pick strawberries.

I planted about $\frac{3}{4}$ of an acre when my boy was about the 3rd or 4th grade and my wife never could get enough strawberries, but she got enough that year and she's never hollered for them since. We really had the strawberries. I had also, a field of broccoli. I told the colored man . . . I had to go somewhere. I told him to put the chicken manure on the broccoli, do not put it on the strawberries. Well, when I came back he had it on the strawberries. So I had to take a broom and sweep it off. Swept it off of the bed. We picked it up and got it on the broccoli and then these strawberries come in about 2 weeks before Christmas and they come in at \$1 a pint. My boy had a bicycle and he went peddling the first few pints of them around in the neighborhood. But then the neighbors started coming to get them. They just called day and night, how good those strawberries were. But they couldn't get enough of them. He was going to school and so wouldn't let them get into the field until 4 in the afternoon when he got back. And all the townspeople came and picked their own strawberries and he just stood on the end of the porch and collected the money for them. And he let them put as many berries as they wanted on the basket. He didn't care how high they piled them. They could still pile them on as many as they wanted, because they could pile the strawberries on there cheaper than we could have picked them. And he made \$1,600 of that $\frac{3}{4}$ acre, and that was way back yonder. That was way back.

Q – Other berries like blackberries. Do you keep the chicken manure off them?

A – No, no, you put anything on blackberries.

Q – Blackberries – Raspberries?

I've brought 2 plants blackberries back from Canada. They got almost as large as silver dollars. Biggest berries I've ever seen. They really got big! I sneaked them into the country, wrapped in dirty clothes. To go thru inspection or else they would never have let them get in here, but anyway they're here now. And I took them thru the lab and sterilized them. So out of 3 plants I got 2 that lived. So when I go back to Canada this year, I'm going to try to bring back a few more of them if I can get 2-3. The cuttings, every time they touch the ground, they do a marvelous job of spreading and these are

some of the biggest berries I've ever seen. These little wild ones that grow down thru there, I think they're about $\frac{3}{4}$ seeds.

Q – How far apart should those blackberry/raspberry rows be?

A – I'd have them 10 feet apart on trellises about 4-5 feet high and I do a lot of pruning so my middle is about 4 feet wide on those things, in about 10 foot rows.

Q – You don't want too much manganese on these blackberries do you?

A – No, you sure don't, you sure do not want manganese. But these are the nicest, biggest blackberries that I've ever seen, almost the size of a silver dollar.

Q – The blueberry would be about the same distance apart?

A – No, you can plant blueberries about 6-7 feet apart and let them tangle up, really tangle up.

On your blueberries, I'm talking about blueberries now. Blueberries practically need no fertilizer and just a wild natural soil with plenty of water. One of your problems is harvesting blueberries. But every blueberry district where they're really raising blueberries in terrific amounts, they lay a sheet down on the ground and they've got a machine they drive along there with static electricity going across into that tree and all the ripe berries fall off onto that sheet. They're picked by static electricity. The same as the cranberry crop is picked. Only the cranberries fall into water. They go thru there with this machine and they stay beyond the berry plants all the time and they let them fall on the ground while it's dry, while they've got a tractor going thru there. Then they turn the flood in and flood them and when this water floods out they've got a machine there that picks them up. Straining them out, down at the dam, picking the cranberries out of the water. but the blueberries they have these sheets laid down under the tree. I've been working on the theory of a machine that you would drive down thru the orange grove and it would make all the oranges fall off the tree. Electric, static electricity and when you get it just right, it will do it, because they're doing that with 2 kinds of berries now. The Blueberries and also the cranberries. In other words the electricity goes in there and makes the berries turn loose. The ripe berries turn loose, but doesn't affect the green ones at all. Because it's on the same frequency as the berry is, which disconnect it, from the berry bush. The green berry is the same as the bush and it doesn't hurt it but the ripe one, the protoplasm that actually holds the berry onto the stem, it turns it loose. It falls gently to the ground on the sheet.

Q – Well, you must have certain nutrients in there for the blueberries or you wouldn't raise them at all?

A – Well, down near a stream. . . in fact they grow in the poorest ground in the world and the way to kill them is to fertilize them a little bit.

That's also true of camellia and guava. The only thing you need to put on a camellia is bone meal. Forget about everything else and of course you need a little lime. If you fertilize a camellia it'll just quit growing completely. And also if you get the least little bit too much nitrogen on the camellia, the blossoms will shed off, then all you have to do is give them a little Epsom salts and it'll hang them on. Just needs a phytic.

Q – On blueberries, it would be alright to put shavings under them and etc.

A – Yes, a little shavings or Epson salts, they need acid. Quite a bit of acid like an azalea.

Q – Calcium?

A – Calcium, yes, the gypsum is better if you can get it. Then you don't have to add the shavings. They need very little of this worlds goods.

Last year I had some Blueberries about this high and the berries were just about ready to turn ripe and this guy comes thru with a . . . I had a stake sticking out – about a 5 foot take there, with a tractor, he moved the stake and mows my berries down then sticks the stake back down in the ground. And those bushes were loaded with berries.

Right, he did, that really happened. I also had 3 Chinese Umbrella Chinaberry trees, they were this high. Deciduous you know, they shed their leaves. I had a stake sticking up by them you know about 6 feet and a bucket sitting down by them, because it was dry when I first put them out there. well, they'd been out there 6-8 months and already had a top on them. They were already branching out. But the bucket hadn't been moved yet. He gets out and takes the stake out, mows the tree down, puts the stake back in the ground. This happens.

Q – Should you have the pH lower than say 6.8 for blueberries?

A – pH don't have anything to do with it my boy.

R – But you said they need an acid soil . . .

They need an acid soil, but your pH doesn't have anything to do with it.

Q – How are you going to determine how acid it is?

A – Whether the blueberry grows or not.

R – You have to do better than that.

No you don't, let me tell, you. They tell me that you can't grow azaleas in lime rock, pH 14. all I do is add 1 cup of vinegar to 2 gallons of water and water it every 2 weeks and get beautiful azaleas.

R – Well then maybe I'd better put some vinegar on the blueberries.

Right, if it doesn't grow and look just right. I'll tell you how to tell. There's a way to tell, but you didn't ask me that. O.k., notice the little tender leaf and if it's a real green, deep green color, it's got plenty. Also notice the bottom leaves of the stem, if it sheds those off, it don't have enough. Because, if it has enough acid in the soil, it'll keep the leaves all the way from the ground to the top. But if the bottom leaves start shedding off it means it needs acid. But if the top leaves are not deep green when those little tiny leaves come out, oily an waxy sheen, it means it needs a little bit more vinegar. To 2 gallons of water, add 1 teacup of vinegar. The pH doesn't have anything to do with it.

Q – A couple teaspoons of Epsom Salts doesn't hurt an azalea bush does it?

A – No not at all. Whenever you get too much fertilizer on it, that's the finest thing to do.

Also an azalea, if you just take it up and move it a couple times a year, it loves it. It don't matter how many times you turn it around or which way the roots point. Just move it, it loves it.

R – Must be a crazy bush then.

It is.

Q – Blueberries need more calcium so you put gypsum on them is that right?

A – Yes. That's the best form to put it on.

Suppose you didn't have any gypsum and you wanted to make some. How would you do it?

R – Sulfuric acid and calcium?

Yes, just hydrogen peroxide. Pour some on some lime. Quickly and easy isn't it?

Q – How much do you put on?

A – Enough to wet it.

I'd make me a dough, spread it out and dry it and take a screen wire or something and grate it on a screen wire, grate it up. Then put it around. It forms something like a plaster of paris only much softer. Do you have any problem now you can't solve?

R – I don't have a problem, I guess, but I was wondering about the second formula you were talking about. . .

You read my mind. I was just ready to tell you. I didn't want to leave it though. Just read my simple mind. That was easy to do wasn't it? Remember one thing about these sprays in bottles. You might have a spray that forms a fumigant, remember? You must have a spray that forms a gas. Name some sprays that do not form a gas, spray substances. I mean sufficient to get a bug. Well, Permaguard, that's one. Black Leaf 40 is another, Rotonone, it does form a gas. What is Rotonone?

R – It's a root isn't it? The root of a plant from South America. I don't know what it is chemically.

What's Pyrethium?

R – From a daisy.

Q – What's Ryania?

I don't know, never heard of it.

R – You use the 3 of them together. My father mixed the 3 of them together.

I don't know what Ryania is, but Pyrethium, what is Pyrethium? Where does it come. . . how do you make Pyrethium?

R – Shasta Daisies.

A daisy?

R – Pyrethium Daisy.

No, not a daisy, but you're almost right. But not a daisy.

R – There's a plant growth called pyrethium.

That's the variety, but what's the name of the plant though? Chrysanthemum. Pom-Pom – Chrysanthemum. So you can take the flowers of the Chrysanthemum and make your own pyrethium. It's an excellent thing to grow some Chrysanthemums out thru your garden, because they give off an odor that the bugs don't like. The Chrysanthemums. Now Rotonone is made from the root of the Chrysanthemum or the stem of the Chrysanthemum and it does form a gas. But in order for it to form as gas, you need . . . you can use . . . by the way it is not poison to people or to plants. It's also an organic. You can also buy the pyrethium Oil which is excellent to spray on plants. pyrethium Oil, it's about \$85 a pound, but it is available. Put 3-4 drops to a gallon, it's sufficient, goes a long way and lasts about a week after the oil is sprayed on. The only

problem you'll have with the oil is learning how to put it into water solution. It doesn't dissolve very easily. One of the finest ways to dissolve it is to take any kind of soap mostly. I generally like the Octagon Soap and rub it into a dry cloth. Rub that soap, dry soap into a dry cloth. Just keep rubbing it and rubbing it until that cloth gets filled with the dry Octagon soap and crumbles. Then you add the pyrethium oil to the cloth. Then you dip it in warm water and wash the soap out. Then you take this solution and you can add it to gallons and gallons of water. You can also add a little kerosene to it, it makes it stick a lot better. You add it to the same cloth and that forms a very, very excellent spray material. Just common things. Also, you can always add a little snuff to it too and also little flowers of sulfur you and add to your spray materials that you put on. But if you put it in these bottles for fumigants, you've got to have something that forms quite a lot of gas coming out of that bottle.

Now what you can do is this. But be careful when you use sulfur. You can take a glass bottle that you can fit one of these little bottles into the top of. Understand what I'm saying? Just a little bit. And you can take some household ammonia, just a few drops and put it in the water. just a few drops now, just a few drops of pure household ammonia. Add that to your alcohol and your pyrethium and believe me it will really knock your hat off if you are anywhere near it. It won't hurt plants at all, but it sure is strong. In the little bottles I'm speaking about.

Now, if you're in mountain country, 3,000 – 4,000 feet above sea level, there's a lot of money to be made in growing pyrethium. The market cannot be supplied with it. Up in the mountains, it's terrific. If you want to grow papayas and take the pectin from the green papaya, it sells from \$45-50 a pound. The papaya pectin comes out in milk, crystalline milk. On the side of your papaya, puncture it full of little holes and it drips out into your container. It's kind of a slow job, but you can get quite a bit of it. A person can get enough for a pound a day. What is that used for do you suppose? The crystalline papaya pectin?

4 – Meat tenderizer.

Meat tenderizer, right. Improves the flavor and digestibility of meats quite a lot. A meat tenderizer. So there's a vast opportunity anywhere in the world today. If you want to produce food, but if you're really going to make money at farming, don't get in

competition with the 'hoi poloi', let them have their show, you have yours. Keep your farm for sale, keep your bank happy. If you do what I tell you, you can buy the bank in a few years. That is if you want it. That is, you could own a bank with a clear conscience. Any questions?

Q – How about tomatoes? Do you stake yours up or . . . ?

A – Yes, I stake tomatoes. I grow them on high beds.

This is one thing I suggest you put the black plastic around. Cover the ground with it. Try to keep their feet a little bit drier. Also, have a lot of compost in the soil where you grow tomatoes. Very little synthetics. Stake them about 6-7 or 8 foot high. I mean it, I'm actually serious about it. I don't care if they're Pictures, Marglobe or whether it's the Oxheart or the Ponderosa or any of the other good canning tomatoes. Then thin it out to one or two stalks or even 3 at the most and whenever it gets about waist high, then begin to prune it pretty close. Don't let the leaves touch the ground, keep it tied up to the stake. Also, it's a very good idea to have some Iron filings or rusty nails around it. Draws a lot more ionization into the plant. Some people even run a small, fine, copper wire around the stake so it gets the ionization from the air. About the size of a thread. Get it out of an old transformer or battery or something along that order and that tomato plant should bear you at least one bushel of tomatoes. About 60 good tomatoes that'll weigh almost 1 lb. apiece.

Q – How long to maturity from planting, say?

A – You ought to get your first tomato within 45 days.

You can also take a bushel basket of sawdust with a lot of compost in it and have a wire about 6-7-8 feet high so that the hamper won't turn over. It takes a real good pole to hold this one and keep your plant pruned and it's amazing how many tomatoes you can get. But you must fertilize it with the fish fertilizer or some hydroponic solution because it'll fill that basket real full of roots.

Q – Now this type of ionization, will it work on other plant too?

A – On cucumbers it helps a lot, yes.

Q – Rusty nails or something like this?

A – On cucumbers it does a fabulous job.

R – Now I've been watching a vineyard for number of years and this man still has a little

bit of Black Rot, but if he brings them in thru these wires that used to be #9 galvanized wire and not it's rusted. Any one of the grapes that are beyond that, the cluster of grapes that's beyond the wire, has never got any disease on it. Before they get thru the wire, he's got some Black Rot. He's never got Black Rot after they've touched the wire and then went away from it.

You mean where the vine has touched the wire he has Black rot?

R – No, he doesn't.

He doesn't have? The ionization, yes, of the earth keeps it from it. Yes, that's right. It's the ionization that makes all the difference in the world. I have ordered 3 instruments, in fact I've got one in use now. It does the most marvelous job in taking down adhesions I've ever seen. And it's a little old thing that looks worthless. But it does a marvelous job in taking down adhesions and the swelling out of tissue. And it works on the same kind of principle. These instruments will not be for sale, they'll be for release or rent. Any questions?

Q – On an ordinary garden, how long after you plant it do you figure would be about the proper time to go in there and put about 100 lbs. of super phosphate on the acre in order to turn your nitrogen?

A – Have to go by your soil analysis and your erg reports. Your Ergs will determine that.

After your plant gets 6 inches high, it's then time to step your Ergs up to 45-50-60-70-80 or up to 200 is alright. That's when you step your ergs up, but don't step them up . . . if you step your ergs up to 200 when your plants can't use it you are losing energy. You want to move it up in proportion to the size of your garden. You can take plain table salt and raise your ergs. You can take sugar and raise your ergs. You can take water out of the ocean and raise your ergs. You can just take plain rusty water out of a can and raise your ergs. But the thing about it is, follow this principle and then you know why the ergs are there. Just the fact that you've got ergs of energy doesn't mean anything. You've got to know why the ergs are there. Comprehend? Any questions?

Now, one thing I'd like to tell you about okra. It's highly subject to nematodes, highly subject to nematodes. And one of the reasons it's highly subject to nematodes is because you get the least bit too much nitrogen on okra and it doesn't do too good. okra is a legume. Black-eye Peas are legume. Peanuts are a legume, Bermuda grass is a legume. Only in a different kind, from the peas or peanuts. These nitrogen molecules get

into the root and cause them to swell and nematodes like to get in those legume areas and release that nitrogen.

But those knots that you see on those roots are . . . mean it's a legume. But one of the legumes don't have knots, like Bermuda grass. I have down in Florida, there's a lot of soil that has little white rocks in it, it looks like sand stone almost. But I picked up about 1 lb. of those little particles of silicone or particles of material, they're not silicone, but looks like it, very, very high in nitrogen. So in sandy soil, if you can pick up little white dull in color. It might pay you to analyze them to see if it is nitrogen. And if it is then take steps to help nature break it down where you can harness it and use it. And it's amazing how much benefit you can get from these little particles of nitrogen in the soil. Any questions?

Q – On this 20 ton of alfalfa per acre you're talking about, are you talking about green weight or dry weight?

A – I'm talking about at 18% moisture. Pellet size. Hay is about 28%. I'm talking about pellet weight.

Q – Then you're saying keep the potash low in alfalfa?

A – Yes, it's a grass.

Q – Calcium high?

A – Yes.

Q – Phosphorus 400 minimum, right?

A – Minimum, yes.

Q – What's the minimum on calcium?

A – What's the minimum? 1,800 is the minimum over the board, but you shouldn't talk about alfalfa until you've got 4,000 lbs.

Q – 6-8 would be better?

A – Yes, 6-8-10-12-14 is alright.

Q – Then it would have to be added over a period of 2-3 years?

A – That's right.

Q – How many ton of lime do you add per year, in other words, you're getting ready to grow your alfalfa now. How many tons do you add a year to get it up where you want it?

A – I would put 2 tons.

Q – Ground limestone?

A – Yes.

R – I've got people that want to try this. They're heading for 20 ton and I want to know what'll happen.

It'll take 2-3 years to get there, but get these other thing in there and you'll be there. One thing about it you're going to have to watch is this . . . When you get this soil right, instead of this alfalfa starting to seed at waist high; it'll start to seed at about 7 feet high. It'll only take a week for it to grow the difference in waist high and 4' more.

Q – How are we going to get it dried?

A – It'll dry just as quickly in one way as the other, won't make a bit of difference.

Q – What stage of maturity should it be harvested?

A – Just as it starts to blossom. Just as the buds and just a few blossoms open.

Q – Bud stage?

A – Yes, bud and just the early blossom. Just whenever it begins to look like a lettuce field over the top.

Q – I've never seen alfalfa like this, does it have a lot of leaves or . . . ?

A – It has a lot of leaves to the bottom if you did it right, yes.

Q – That's what I was wondering. I didn't want tall, stemmy alfalfa.

A – No, no, it has a lot of . . . if you get your potash and everything right, it'll have a lot of leaves clear to the ground on it. In other words, it grows fast. It doesn't have time to fall off.

Q – How about protein content?

A – That's when it's your highest. It'll be about 22-23-24% at 18% moisture.

Q – What ratio should the potash be compared to the 400 lbs. of phosphorus?

A – One to four. I mean 4:1 at least. One part potash to 400 phosphate. You put your high number first.

Q – that 600 phosphorus isn't going to hurt a thing is it?

A – No, but 800 is better.

R – We've got quite a few fields that we got 500 on and we've never had crops like we've got on there. But farmers are not putting much of anything on there and they're still getting crops. They're right out on easy street.

God bless the ignorant.

Q – Is it necessary to foliage feed alfalfa?

A – it's a good idea providing you've planted it so you can get thru it, yes. It's an

excellent idea.

Q – Now what feed do we use? The one that you gave the other day?

A – You foliage feed it but you leave your . . . on alfalfa, leave off your detergents, I mean your sprays and things of that nature. You do not need any pesticides on it at all.

Q – On this alfalfa, how many plants do you figure on in an acre or how do you figure? Or how many to a square foot or how much seed are you sowing in here?

A – I would suggest 30-40 lbs.

Q – Seed per acre?

A – Yes.

Q – How often do you go out and seed back in?

A – Every time . . . I'd add about 10-15% of the original, every time. Even up to 5-10 lbs. That depends on how thick it is. Every time that I mow, I replant some seed in there.

R – About \$100 an acre it looks like. Selling for \$70 a bushel now.

That's very reasonable. I wouldn't harvest it for \$70 a bushel. That little old seed is fine as dust almost. You can take ½ a teaspoon and grow 2 quarts in a 2 quart jar and fill it up in 3-4 days.

Let me also make one more suggestion to you, also that you ought to do. In feeding your cattle, be sure that if you're feeding a lot of alfalfa, that you have got a lot of wheat in their feed, because the alfalfa has a tendency to make the blood too thick. And if you thin that blood a little bit that cow will produce a lot more milk.

Q – What would you call a lot of Wheat?

A – Well, I'd say, . . . for instance, if you're feeding that cow 10 lbs. of commercial feed a day, I'll just pick a number out of the air, I'd say, have 2 pounds of it wheat.

Q – Does Bran do any good?

A – Bran is just as good, yes. Providing it doesn't have the oil removed from it. There are 2 kinds of bran, one that's had the oil removed from it and one that hasn't. If it's had the oil removed from it, it is worthless. As far as the Vitamin E is concerned, the E is in the oil.

Q – What's in the germ?

A – Yes, that's in the germ, but sometimes they take the oil out of the germ.

Q – But do they separate the germ and the bran at the same time in the same batch?

A – Yes, it's a separate thing altogether.

Q – What I mean is, do they separate the germ from the bran or is that done later when it's first milled out?

A – I misunderstand your question perfectly. The wheat germ is what they make the flour out really.

Q – Well, there wouldn't be any oil in the bran?

A – Yes, there's oil in the bran. That's where most of the oil is really. But it's also in the bran too. But they also take this oil out of the bran and then sell the bran. Get the one with the oil in it.

It's also rich . . . also cottonseed meal. That has not . . . there's two kinds of cottonseed meal. There's one that's had the cottonseed oil removed and one that isn't. Be sure you get the one with the oil in it and that's also rich in Vitamin E.

Q – That would be your cold press?

A – Yes, I'm talking about feed, commercial feed grades of it. And there's a whole lot of difference in the smell in it.

Q – In other words what you are saying is, bran does contain quite a bit of Vitamin E?

A – Yes, if the oil is in it.

Q – It's also quite rich in phosphorus isn't it?

A – O yes.

Whenever I was a kid, we used to feed our . . . we called it 'shorts', that's what we called the wheat bran is 'shorts.' Well I used to eat some 'shorts' every morning. I liked it, I didn't know why I wasn't eating it, but it was good enough for the cow, it was good enough for me. And I liked it and I didn't know I was getting Vitamin E and bunch of other vitamins, but I'd eat some every morning. My Dad said one time to me, "Gonna' kill you, eating all that bran." I'd just eat a little bit you know, every morning. And I said, it didn't kill the cow did it?

Q – I have another question here. Of course we're in dairy country, that's the reason I'm bringing these questions up. In these alfalfa fields, how often is it going to be necessary to go out there and take an erg test? It isn't quite as necessary in that alfalfa field as it is in other fields right?

A – Well, I'd take one every time I harvested.

Q – Well, the alfalfa, in rooting very deep it would enable it to rather mix its diet better wouldn't it, than another plant that doesn't root too deep?

A – It doesn't matter. You take care of the top 6 inches and you're well taken care of all the way down.

You can have your topsoil in alfalfa . . . this is one of the crops that you need to plow deep with. Over a 2-3 year period. I'm going to tell you folks you can't . . . you'll be amazed at how much alfalfa you can produce. If you can't produce 20 tons, you ought to be ashamed of yourself. Real ashamed, in 6 months.

Q – Any suggestions on the chickweed in alfalfa?

A – If you plant that alfalfa thick enough, you won't have any chickweed.

R – Chickweed wouldn't survive . . . chickweed wouldn't have a chance like a snowflake in a frying pan.

No sir, it sure won't. That's the way you get rid of the chickweed, is to plant the grass too thick. You know on golf courses we have a lot of trouble with chickweed. You know what we do? We fertilize the grass and don't fertilize the chickweed. It dies. So what I've given you is the formula for alfalfa, not chickweed.

R – Chickweed grows while alfalfa is dormant.

Well, that doesn't matter, it'll come up later.

Q – Thru the chickweed? If you have a solid mass of chickweed?

A – Why sure it will, quench it out. How high does the chickweed get? About a foot high?

R – Not a foot.

Not a foot, o.k. I've seen it a foot high. But if it doesn't get over a foot high, that alfalfa will root it out of there. But I sure would tear it up before I planted the seed and give the alfalfa and the chickweed an equal time to start. Let me ask you, do you plant your alfalfa new every year? Or do you . . .

R – We keep the stand up to 6 years.

Well, you ought to keep it up to 40 years. Keep putting your mineral down and you'll get more and more every year, that is up to your maximum.

Q – Then our top soil should be deeper, so we should plow and farm another crop in there until you can get your cover crop plowed down so you've got enough to keep your top soil?

A – Well, after you harvest in the fall of the year, just simply plow up your field. But don't disc it, just roll it. You're going to replant in the spring time anyway. Suppose you've got half a crop in there, then just go ahead and plant your seed. Only plant half as much.

R – Can you imagine the amount of calcium you're headed for in alfalfa, would be way up the scale someplace.

Something like 50 lbs. to the acre.

R – 100,000 lbs.

That's not too much.

Q – How often are you going to put it down?

A – You don't, you've got to be in soil like you've got out west where there is plenty of it. You don't need that much, but it wouldn't hurt if you had that much.

Q – In other words, where you don't have it in these soils, what would you add? What would it be?

A – I'd work toward 8-10 ton over 5-6 years.

Q – You mean putting that much on means that much available calcium?

A – That's water soluble, yes.

R – 20,000 lbs.

Yes, keep working it up higher and higher. I've grown alfalfa in almost solid lime rock, solid lime rock.

Q – What did you add? A little sulfuric acid and turn it to gypsum?

A – No. It had a lot of Bermuda grass growing in there and the Bermuda grass had already made the gypsum out of it. It'd been growing in there for about 150 years I guess.

And we had about an inch of top soil so we plowed it about 6 inches deep. Then we added our phosphates. We didn't even add any calcium at all, just added our phosphates. Already plenty of potassium, then added about a ton and a half to 2 tons of compost to the acre. And I should have brought some that compost to show you today. What it was like, just to let you look at it. Anyway, that alfalfa got 10 feet high before it started to blossom and leaves all the way to the bottom. And they say you can't grow alfalfa in Florida. In fact the man planted a young orange grove and he wanted a cover crop between the orange trees, leaving about 2 feet between the trees and the alfalfa strip on each side. He went north on vacation and when he came back, he'd never seen such alfalfa in his life. And he didn't even harvest it, all he did was cut it down for a cover crop. Then he let it come up again and he cut it down about 10-12 times before he got tired of alfalfa and then plowed it up. And he had to keep plowing it 3-4 times. But you talk about a mulch, he had it. He had it and he never had to do a thing to those young

trees, because of the high protein in the alfalfa and the fertilizer. And in 3 years those trees had a half box of fruit on them.

But something else happened. The Lady Bug loves alfalfa blossoms, this is down in Florida. Now the Lady Bug we have, we have 2 kinds of Lady Bugs, in fact we have 3 kinds. We had a Lady Bug down in Florida that was a pest on truck crops. So out of Italy they imported another kind of Lady Bug that wouldn't eat crops. So they could cross breed and destroy these crop eaters. So what happened is, they got married and then they ate citrus. They ate all the citrus leaves off. But they also like the alfalfa blossoms. And that's the reason he got rid of his alfalfa because they ate all the leaves. The lady bugs would eat all the . . . that is all these cross-breed lady bugs would eat all the leaves off the citrus trees. They'd chew them up like they were chewing gum.

R – Roy, I'm waiting for you to cut that 10 foot alfalfa.

Q – Seriously, is there any problem? My concern is when you get that kind of tonnage, is the sun going to be able to dry it?

A – You don't dry it in the sun. this is material that has to go into a harvester. This is a harvester or silage material. You don't dry that kind of material when you take that kind of tonnage off.

One of the great problems with people with alfalfa is, they cut it too short. It ought to be cut at least a foot high. They cut the alfalfa too short. Cut it at least a foot high. Why?

R – So it has more time to sprout out.

That's right, exactly. That's right. I wouldn't be a bit surprised if you didn't get 10 tons the first cutting. Then you've got 2 more cuttings and you'll get 7 ½ and the last one 5 and maybe the last one 2 or 3. that is after you get the soil right, that calcium up. You know alfalfa is mostly calcium. That's what it is. it's mostly calcium, that's exactly what it is.

Q – Must be good for us, if you grind it up and eat it or something?

A – It thickens your blood thicker and thicker and thicker. People that's got blood problems. It certainly is a good thing.

Q – It's got lot of Vitamin K doesn't it?

A – Yes, it's rich in Vitamin K.

Q – People that have low calcium can go on alfalfa then?

A – No, you may have low calcium and thick blood too.

Q – Another question on the 10 foot alfalfa. What brand seed or what variety?

A – I don't think it makes a lot of difference. Don't think it makes very much difference.

Q – Suppose you want to sell your hay as a cash crop, you alfalfa as a cash crop. It's worth \$120 a ton at times. Could you mow it at a shorter stage and it would grow up again?

A – O yes, it'll still grow up, but you wouldn't hit your high protein. The high protein comes at blossom.

Now, you've asked a very good question. Suppose you wanted it to blossom at an earlier stage and still cut it more often?

R – Use super phosphate.

No, that isn't what you'd do.

R – Add potash.

That's right, you'd add a little extra potash and throw it into maturity a little earlier. Right, exactly. That wasn't hard was it?

Q – Can you get 10 cuttings a year or . . . ?

A – Well, you can cut it every 2 weeks if you want to, but your protein will be lower.

Q – You know these County Agents are telling these people they need 300 lbs. of Potassium on alfalfa a year in order to grow it. Are they supposed to keep applying that much?

A – No, if that County Agent didn't sell what he was told to sell, he wouldn't be County Agent very long.

R – But that's what they're telling them.

I know, but he's . . .

R – Every time you cut it, you go out there and put 100 lbs. of actual potassium on it.

I know what he tells them, but he has to tell them what he's told. Do you realize that the County Agents get in because they promise the fertilizer companies and spray companies to sell so much business?

R – I know that.

This is the way they get in there. They are already hooked before they get in there.

R – They grease them all up, every one of them.

You bet they are greased. You bet they are.

R – When the County Agent doesn't sell enough, why, he's fired.

Right, he's got to sell so much to stay County Agent. Just like a doctor. He's got to sell so many drugs and send so many people to the hospital or out he goes. What's wrong with it?

Q – We were discussing it over supper and did I understand you correctly to say that in the fall when you're finished with your last planting, you plow to get your soil deeper?

A – Yes.

Q – In the spring you work your ground and reseed?

A – Yes, but you must roll it.

R – That's not the way Grandpa did it.

I know, but you must roll it in the fall. You cannot leave it rough. If you put a disc in there, you'll put so much air down in those roots that they will die.

Q – You mean you could plow that and it would come back up in the spring?

A – Sure, just turn it over.

Q – How deep do you plow?

A – Well, if you've only been using a disc back in 2 on your soil, about 7-8 inches, but the next year you can go down to 10 inches and the next year down to 12 inches with it.

Q – Do you hit clay?

A – It doesn't matter if you hit clay, doesn't matter. You just don't want to . . .

Q – Plow a little bit of clay out?

A – Why sure, plow a lot of clay up. Sure, that's right.

Q – Got your top soil deeper?

A – Sure, that's right.

Q – What depth should we shoot for?

A – 12 inches.

Q – 12 inches on the alfalfa?

A – Yes, right. Shoot for 12 inches all over your farm.

Q – What about 18 inches?

A – Well, 18 wouldn't do a bit of harm on it if you could, but 12 is your first primary and when you get there you can go even deeper.

Q – You're saying then that the alfalfa stand in the fall, just plow it and roll it. Then next fall do the same thing again?

A – Yes. Why do you roll it? What's your purpose? It has to be rolled, Why?

R – Pack it down firm.

If the air gets in there, those stools will dry out and then they won't sprout in the springtime. Either roll it or just drive the tractor wheels over it so as to pack it. That's all. Have you got dual tires on the back of your tractor? Well, it don't matter, just so you can roll it and mash it in. have you got a roller? Well, o.k. if you've got a roller, roll it. That's the easiest way. It's just like setting out a tree or a plant. If air is in there it will die. But, one more thing, let me tell you what you don't do. Plants that are balled in burlap, you do not stomp them in. Because if you do, you stomp the dirt out of the burlap. Balled burlap plants, you do not stomp them in. You stomp all around where it is, but you don't stomp on the balled burlap, because if you do you push the dirt off that's already saved on there. Any problem?

O.K., no, my time to learn something. Suppose you get a call. A fellow's got 40 acres of cabbage. He tried to grow them organically, but worms have gotten into it, are getting into it. How are you going to get him out of it and what's it going to cost him? Cabbage has still got about 6 weeks away from harvest. How are you going to get him out? It's too late to add any phosphate. Too late to add any lime. What are you going to do for him?

Q – Is this that top worm, a little light green worm?

A – Loopers, cabbage loopers. What are you going to do for him? He's got to have help and have it in a hurry.

R – You spray it with light chlordane? Fine mist or something?

You write out what you're going to do and then I'll let you read it.

R – I don't know whether it's allowed or not. I don't imagine it is. your real low percentage of chlordane you said you could get by on.

Just what would you do to get the guy out of trouble?

R – Well, the idea is to get the worms sick, but I don't know what you're going to put on it.

Yes.

R – Can you figure out a bad worm diet Floyd? Feed them something with plaster of paris in it. It works for rats.

I thought you had all the answers by now.

R – Spray them with nicotine.

Right, that's exactly right. That's one thing you'd do or could do. Why would you use nicotine?

R – Because it's harmful to eggs, bugs and insects and safe for people.

Alright, suppose you can't get it? You've got to do something else now.

Q – Will Rotonone work?

A – It's a little dangerous, because your cabbage has already begun to head up a little bit.

Q – Did it have more than a 10 day residue?

A – Yes, it does. You mean the Rotonone? Pardon me, you're talking about the Rotonone oil. No, you could use Rotonone if you could get it. I had something else on my mind when you said it. You could use Rotonone.

What about Cystox? What about Cygone? Either one of those will do a beautiful job. It lasts 4 days.

Q – Cystox. What is it? A carbon poison?

A – Phosphate poisoning. Phosgene, not phosphate, phosgene poisoning. Cystox, yes.
C Y S T O X.

Q – How about the other one? What was that? The last one you mentioned? How do you spell that?

A – Cygon? C Y G O N.

Q – What is it?

A – It's another form of Cystox. Just a different little formula

Cygon 267, there it is in the book. There's one of those sprinklers I told you about that works. On the wagon that wines up.

Q – That's with the spinner?

A – Yes. Does about 20 acres in about 4 hours.

Q – That's a rain bird?

A – Yes. Rain bird sprinkler head. Takes a 4 inch water line to supply it though.

Now, alright, tell me about this bug spray. You've just told me what you'd use, but you haven't told me how much you'd use. How are you going to get in on the cabbage? How much water are you going to put it in?

R – Depends on what kind of sprayer you use.

No, it doesn't matter what kind of sprayer you use. You're going to use the same amount of water.

How much is that? What's the directions say?

R – I don't know that.

O you don't know?

R – I've never seen it.

O goodness.

Q – I thought you meant how much water per acre. You meant the ratio of these chemicals?

A – Yes, I'm talking about the ratio of the chemical. How much would you use?

R – Follow the directions is all I know. I'd just follow the directions they recommend. I wouldn't know any different.

You wouldn't know. That's a good idea but generally you can cut it in half.

Q – If you were using the chlordane, liquid chlordane, you'd use 20 drops to 100 gallons?

A – Yes, that would be alright. That would be fine.

Now, you generally use on that, most of those is around a pound to 100 gallons of water is generally what they are. Read the directions, but the last time I used, that's how much I used, one pound. Now, let me tell you, there's a few no – no's about these.

Phosgene sprays, not phosphate sprays, but phosgene sprays.

R – Poison gas.

That's what it is exactly. Phosgene sprays. One of the things you don't want to do is this. Never, never, never let any of it get on you hands. Now the way to do it to keep it from getting on you hands is to have a bucket about half full of water and pour it into this bucket. Put the bucket down and pour it very, very gently into this bucket of water. Stand away from it, because it's going to slop out on you. Then pour the bucket of water into your spray tank. Always pour your spray into the water, don't ever do it the other way. Because, many times an awful fume comes up from it and the fume of it is very, very serious. I've been made very seriously ill by just riding by a farm or grove that's been sprayed with some of this spray. However, they have cut them way down from what they used to. I've been made ill just by . . . in fact, one road was cut off completely, just stopped the traffic on it because they had been spraying a grove with material and the wind was blowing the odor right across the road and everybody that got a whiff of it was sick from it that went thru. That was #27 between Clairmont and Haines City. Boy, they

had quite a stink about that for quite awhile. The Commissioner of Agriculture was really in hot water. They blame him for the whole thing. Actually what they did, was they sent a colored man out there to spray and he didn't like to spray anyway with the stuff, so he was really going to do a good job. So he put twice as much on, so he wouldn't have to spray anymore that year. He was getting thru with it forever. He had a gas mask, had to wear a gas mask and he didn't like that either in order to use the spray.

Q – With this Chiron Sprayer, if you use these chemicals, is there a danger of exposure to the fog that his Chiron Sprayer generate?

A – Yes, there is.

Q – Then you have to wear rubber gloves?

A – You should wear rubber gloves and a gas mask if you use these sprays, yes. Some people don't, but I wouldn't. I wouldn't take any risk with it. But if you know how to use a Chiron and use it wisely, you can stay out of the mist completely. Or most any other spray machine.

R – Watch the wind direction.

Watch the wind direction and wind drafts. But if the wind is shifting from every direction, don't spray that day. Don't spray that day.

Q – What happens?

A – O yes, it does happen.

Let me ask you one more time. We haven't talked about this now, is dusting. Dusting is a very, very good form to use on many plants, but it's a very crude form to use on the other. My advice to you is to never dust when you can spray. Because the dust goes on dry and it has the tendency to draw the moisture out of the plant. So try not to dust and if you must dust, dust when the plant is wet. And it's very difficult to get nutritional sprays on in dust form, very difficult.

Q – This Cygon and Cystox, can you use it on any other plant?

A – It's very good for any bugs on most any plant, yes. Most – very, very good. It's a very good spray for any bug that breathes.

Now, you've got 2 kinds of bugs that you'll find in a garden crop. We haven't talked about the bugs yet. Was trying to save that for the next course, but I guess I'll tell you something about that. What are the 2 kinds of bugs?

R – There's a hard shell and an Aphid-type.

That's the 2 different kinds, but what makes them different?

R – The flying, crawling?

No. that's not the 2 types. Now the flying and the weevil. But some weevils fly.

R – Yes, well, the hard shell has his frame outside.

Yes, but there's something else different about the 2 bugs. What is it?

R – They grow legs or something.

Well, that's true, but that's not the point. You pay attention to them you spray, all of them breathe oxygen.

Q – Doesn't have anything to do with the frequency does it?

A – No.

Q – Chewing and sucking?

Chewing and sucking, that's what it is. You have a chewing bug and the sucking bug. The one of them sucks it up thru the proboscis, that's what it's called. The proboscis. It sucks it in. Now you cannot kill a sucking bug with poison sprays that he has to digest to get it inside. I'm talking about the . . . the Black Leaf 40 or the things he'd have to eat to get it. So therefore, every time you can . . . it's a good idea to use the gas sprays. phosgene sprays. Use them as dilute as possible to do the job. Now suppose you want to put out a cabbage field on 40 acres, and you have the ground, everything that you're supposed to do . . and the first thing . . . you have all your ground ready. You have your beds put up and everything for cabbages you're going to grow. How far apart would you set the cabbage in the field? How far apart would you plant the plants?

R – About 12-14 inches?

The plants in the row.

R – 16-18 inches.

18 inches. How far would you put them apart?

R – It depends on the plants, on the variety.

No, no, it doesn't matter whether it's Copenhagen or what variety. You put them all about the same distance.

R – Well, if we get 12 inch heads, we better go at least 18 inches.

Who wants a 12 inch head of cabbage?

R – I've seen them . . .

I know, I've seen them 36 inches around. Who wants a cabbage that size besides the sauerkraut company?

R – And the County Fair.

Right, I would say about 4-6 inches, 4 inches. Why, why would you put them that close together?

R – To keep the heads small.

Right. How many cabbage does it take to be U.S. #1 cabbage in 50 lbs.? 19 cabbages has got to be 50 lbs. to be U.S. #1 cabbage. So you got to grow small heads of cabbage or else the market doesn't want them you can't even give them away. What happens when you feed your cabbage milk? I mean what happens to the milk when you feed your cows cabbage? What happens to the milk?

R – It gets a head on it.

If that was all, it'd be excellent, but something else happens to it, what happens to it?

R – Tastes like cabbage.

No it doesn't. it gets 'ropey'. The milk gets ropey and if they eat cocklebur, it will get ropey too. Stringy, the milk will get stringy.

Q – You mean a Mastitis infection?

A – No, not Mastitis. I'm not talking about Mastitis. I'm just talking about the milk will be stringy.

Q – You mean raw milk?

A – Yes, it gets stringy.

R – I've had milk tasted like onions if they eat garlic.

It sure will if they get into grass that's got wild onions in it. It sure will taste like it. And if they get into eating old oranges, seed and all, the milk will taste bitter. The seed will make it taste bitter. What they have to do to the citrus pulp, or order to make citrus pulp, they have to get the seed out or the milk will be bitter. You can feed chickens citrus pulp and it will still make the eggs bitter even if the seed is take out. So chickens, they're not allowed to put citrus pulp in chicken feed. Makes the eggs bitter.

R – Pine seeds too. Makes them taste like pine seeds.

Yes, turpentine. Now learn to solve your problems by using ordinary common things. But the thing you should do to get him out of his hot spot is, get his cabbage to market, but tell him how to grow good cabbage. In other words, produce a high kind of cabbage. But you're going to be called a lot of times to service a farm, whenever the guy won't do half what you want done, that you're trying to get him out of the hot spot . . . to make him . . . to help him produce as much as he can.

One of the best ways for a fellow to make money in farming that doesn't know how to farm, is don't farm. You really want to save money and you don't know how to farm, you better not farm, because that's the best way to save money, is not to farm. Any questions?

Suppose that you have a crop of beans now in the garden. And leaf roller gets on it. How are you going to get him off? The leaf roller bites the leaf and rolls it over, you know?

R – They get on a lot more than beans.

O yes, I'm just talking about beans. Thought if I talked about 2 things it might confuse you. It's pretty late in the day to confuse you now. How would you get him off?

Q – A chewing insect isn't he?

A – Yes, he is.

R – Nicotine.

Black Leaf 40, right. Nicotine is a wonderful thing to use to get him off. Another very good thing, if you don't have very many beans, where the leaf is folded over, just squeeze it. But be sure your mouth is shut because it'll go right straight in your mouth, if you don't hold your mouth just right. It'll go right in your face if you have your mouth open.

R – Extra protein.

Well, we got the loopers out of the cabbage and the leaf rollers off the beans, let's try another one. See how we come along with this one. Let's have our squashes. You walk thru the garden in the morning and you see the moth sitting out there flapping her wings like she's getting ready to take off to go somewhere. That's the time to spray the squash. Don't wait until the afternoon, because she won't start laying eggs until after lunch anyway. After about 12 o'clock. Whenever she sits back and flapping her wings

back and forth about like this you know how they do? O.k., she's getting ready, she's just pumping up those eggs getting ready to lay about 250,000 every hour all afternoon. What are you going to do with her?

R – Chlordane.

Chlordane is the finest, quickest, fastest thing to get rid of her.

Q – Is this the stem borer you're talking about?

A – Yes, there'll be a stem borer, but this is the moth. You go for the moth.

R – Yes, I know that lays the eggs on the tips.

Also, it's a good idea to spray the blossoms, etc. down in the plant with nicotine also. Whenever you're growing squash, which comes out first, the male blossom or the female blossom?

R – The Male.

That is right. The male blossoms come on first. How do you tell the difference?

R – There's a little squash there . . .

That's a little squash on the females and there isn't on the male. If you have squash that puts on all male blossoms and no female blossoms, what do you do? You've already put your phosphate down, but it's still manufacturing too many male blossoms, what do you do?

R – Manganese.

Manganese, you spray with Manzate, that is true. Spray Manzate, exactly right. Manzate is chelated manganese. That's exactly right. Suppose you plant Black-eye Peas or Ladyfinger Peas and they get about this deep, and they won't pea, not one. They won't put on one pea, what do you do?

R – Manganese. Shift it to cationic.

Nope, you don't. yes, you should put the cationic, but how do you do it?

R – Sulfate of potash. Mow them.

That's right, you mow them down to about a foot high and you can change them from an anion to a cation. And man in just a few days that whole big field will be just one great big blossom patch. It will really put the blossoms on.

R – The theory behind that is shock them and it uses up the last of the ionic fertilizer to get some more things out. Then it's ready to . . .

Also, the juice that drips out of the vine that's left on the ground is cationic.

Q – Do you leave the vines there?

A – O yes, just leave the vines out there.

Now, lets talk about one more phase of this soil building. Today we don't have to feed horses like we used to feed, but some of us raise cattle. After you get your soil built up pretty good, your phosphates and your limes and potash in proper ratio. If you're harvesting for a harvester or silo or even for a pellet mill, you should mow your ordinary grasses. Now, I'm not talking about alfalfa, just ordinary pasture grasses. It can be any number of them, Fescue, Bermuda, Coastal Bermuda. It can be Bangola or whatever grass, it doesn't matter. But you should mow it about every 3 weeks, those grasses. But about every 3rd time, you should mow it and leave the grass on the ground. About every 3rd time. That pasture will be perpetual except for your calcium and phosphates. That juice will drop onto this ground and go back in and supply you with enough TDN for 2 more crops. It's a lot cheaper to leave this ton and a half of grass you've cut off, on. That is you took it off, you'd get about 1 ½ tons of pellets out of it, so it equals about 1 ½ tons of fertilizer.

Q – is it better to use a flail mower for that purpose?

A – We're coming right to that, right now. Which kind of a mower would be the best kind of mower to use?

R – Sickle mower.

Why?

R – You don't damage the stems and so it can evaporate, so the juice goes into the soil.

That's right, it lays it down in a mass like a feather bed. And the top little bit dries and the juice drops down on the ground. If you tear it all to pieces with a rotary mower, all the juice evaporates and goes in the air. All you have is very little potassium left. So use your sickle mowers for soil building. Now, I know a sickle mower . . . if there's anything in the world that will make a saint out of anybody, it's a sickle mower. They've almost gotten as many people to heaven as a Model T Ford, but the reason for it is the people try to keep one too long. After you've mowed 1,000 acres with a sickle mower, it's time to depart, lose it, give it away, throw it away. You're finished with it. Don't keep trying to repair it, because you can't keep it up. But remember, these things and it will be

money in your pocket. And how long will it take that green grass to simply melt and go down into the ground? How many days?

R – It'll lay there and dry first . . .

No sir, it won't dry, it'll rot. But how many days will it take?

Q – The whole stalk and all?

A – For most of it to be in the ground. 90 days someone said. 25-30 someone said.

Q – This is the 3rd mowing you're talking about, letting it lay on the ground?

A – Yes, it's about 8-10 inches thick after you mow it down. I mean there's quite a little bit on there.

Q – You're not going to do anything, just leave it lay right there?

A – Just leave it lay right there, yes.

Q – It'll smother out the grass below won't it?

A – Nope, it will not.

It takes about 5 days, just about 5 days. O, you'll see a little sprig here and yonder laying there were the sun dehydrated it, but 90% of it will be in the soil. Within 5 days, rotted completely rotted, in just 5 days. Remember this, in the summer time the nights are cooler than the days and it really rots in a hurry.

Q – What about the other 2 mowings? You let them lay on the ground and die didn't you?

A – No, well, listen, wait a minute.

You do not leave high protein hay on the ground to dry. It's got to be picked up. Your high protein has to be dehydrated or used in silage or it will rot. You can't do it. Hay is made after all the proteins are already digested. I mean already gone out. That's the reason hay is such a poor, poor quality. The only way to have high quality hay is to have a dehydrator. They do have dehydrators for hay now, but you must cut it green and put it thru a dehydrator or you're going to have low protein hay. Because you'll have to wait for that grass to get old enough, moisture will go out of it for it to lie out there and dry. Because you've already lost your protein. What I'm trying to tell you is how to produce higher protein hay. You cannot let it lay out there and have high protein hay, both. It's got to . . . you must cut it at the blossom stage and if you cut it at that stage, you must dehydrate it. Now, one fellow tried to roll it to squeeze it out and then dehydrate it

in the sun. Well, it was still low protein hay, because the stems were broken and crushed and mashed flat and you've got to dehydrate the water out and leave the sugar content in.

Q – That's the way they do it all the time now isn't it?

A – Yes, right, yes. No they don't roll it, they shouldn't roll it.

Well, now if it's going into a silo, it's alright. A chopper they call it.

R – That's what most of the farmers do up our way. They have these stem crushers, they go out and mow it and crush it, pick it up and bale it.

Right, but they're ruining it. What they need to do is put it in the dehydrator.

Q – What principle does the dehydrator work on?

A – Evaporation, heat, steam heat.

Q – But how do they generate the heat?

A – With electricity or gas, either one.

Q – Go thru the field with it and dehydrate it?

A – No. you have your dehydrator. It's a building and you put it on this conveyer. Takes it across and drops it on another conveyer, carries it across like this. Then this is like a big oven and the time you put it in at the top and it's coming out at the bottom down here. You can do 20-30-40-50 tons a day with a building no larger than what we're in here. They're about this size. Maybe not quite this wide. No, not quite this wide. They're about 12 feet wide and it goes in at the top on a conveyer and this is the way it goes thru and the lower it gets the hotter it gets.

Dehydrator, and then you get high protein hay. But if you crush it, the very juice that you want, the very sugar, evaporates out of it.

R – That's the way they do it now up north all the time. Most of them are going it that way. I've seen hay get up to 20%.

Yes, you bet you have.

R – Dried in the sun. . . yes, dried in the sun.

That's alfalfa though.

R – Yes.

Alfalfa, yes, but I'm talking about these other grasses. On alfalfa it's nothing unusual to get up to 25-28-30-32, if you dehydrate it, protein. Let me say this for alfalfa, I was real lenient, but I have seen it 45% protein. Now, how much nitrogen would 45% protein have?

R – 6.4.

Be right at 7% wouldn't it? 7% protein. That's not unusual for alfalfa or nitrogen 7%. What's your percentage of protein in cottonseed meal? What's the percentage of nitrogen in cottonseed meal?

R – 7-10 somewhere in there, isn't it?

Nope, about 6%.

Q – On this hay dryer you're talking about. Is it run thru there loose first? Or is it baled and then run thru?

A – No, no, it's run thru there loose. Let me tell you what you can do too.

Q – How do they pick it up if it's loose?

A – Well, they sweep it into a wedge row and then it's a regular wagon that picks it up and puts it in and hauls it up there and then the conveyer in the wagon puts it out on this belt.

Q – Well, then it's cut in short lengths?

A – It's not real long, I mean it's whatever the length of the hay is. You don't have to have short lengths at all.

Now we're talking about the highest of protein. If you let alfalfa dry enough for hay and mature enough, you're going to lose protein by it. If this is the way you must do it and it's the only thing you can do, then you should turn it every day with a hay turner so it won't retard your other grasses. Now turn it, and even on a good hot day shiny day, turn it twice a day, with a turner. Because you can turn a 10 acre field in 30 minutes with one off these hay turners.

R – That knocks all your leaves off.

No it doesn't. All it does is pick it up and plop it so it can dry. Also, if you're going to do that, try not to crush it, let it dehydrate even if it takes a little longer. Even if it comes a rain on it, then you can go fluff it again. Also, while you are doing this, you are mashing your alfalfa into the ground. You understand? Especially your young plants. Now, it's better if you must harvest your hay, to have a field and move it out onto this shed. Build you a long shed where you can harvest. We'll say 20 tons a day and put it in this shed. Understand? I would have a plastic roof over it, a very cheap plastic roof over it. I'd have it about 100 feet long and maybe 40 feet wide, something like that. Where I would drive down thru there and drop this hay into this shed and let it dry, cool air dry. It's got plastic, a certain amount of heat comes down thru it, but you're still going to have

to turn it in this shed. You're also going to have to turn it and what you try to do is to keep from mashing your other alfalfa into the ground so that you can get the greatest amount in the shortest length of time with the juice still in it and you'll find quite a difference in the ratio of it. Then put your baler in there and bale it, when it gets down there. at what percent moisture do you bale hay?

R – 20-25%

25-30 is good. About 28% makes the best hay with the highest sugar content. And it won't rot, won't go thru a heat, not nearly so badly as the one with the low sugar content. The higher the sugar, the less trouble it is to go thru a heat? Why? What is protein?

R – Nitrogen.

Nitrogen. Did you ever stick your hand into a bale of hay and it felt hot, warm? Did you ever stick your hand in another bale of hay and it felt cold? Even on the same kind of temperature? I have and the one that was hot inside was rotting, decaying because it had a low sugar content. And one more thing too, it had a low protein content. The one that you put your hand in that felt cool to you, it had a high sugar content and a high ammoniacal nitrogen content and the heat cooled it. See what I mean? This is very important to know.

One thing you never use on alfalfa is nitrate nitrogen. Because your chicken manures and sawdust will work against your calcium and give you sufficient nitrate nitrogen and if you add more then it will have too much water in it and have a tendency to decay too quickly. However, as you work the cations against that high nitrogen it will be anionic naturally. You don't add an anion to an anion in this case. Clear? Understand? Comprehend? Is there anything in your chart we haven't covered?

Q – Could you give us a list of vegetables and their sugar content?

A – Yes, I can give you a list of vegetables and sugar content.

Cucumbers, squashes, green beans, bell peppers, hot peppers, rutabagas, turnips, onions should have between 6 & 8 brix, which is percentage. Then you have your sweet potatoes, carrots, kohlrabi, pumpkin, acorn squash, English peas (that's the garden pea), these have about 8-10% sugar – brix. Now, let me go back to one or two things. Your cow peas, all the field peas has about the same as the beans or should have (6-8%). O, by

the way, cabbage is in that list too, the first one – 6-8%. Cabbage, cauliflower, broccoli, lettuce, endive, escarole, romaine, parsley, peanuts, they're on that list.

Now let's go into another group. This one goes from 10-14%. Watermelon, cantaloupe, honeydew, oranges, pineapples, peaches, pears, grapes, did I say apples? Apples. And I believe that's about most of them. Casaba Melon, Christmas Melons – 2 different, that's in the cantaloupe family, you have the Honeydew Melons and etc.

Q – Lemons?

A – Lemons don't go in that group, they go in the 6-8%, in that group.

Also cumquat.

Q – 6-8%?

A – Yes, calamondin, Limes, the fruit – Avocado, the mango is in the watermelon group. It's way up there.

Q – How about Papaya?

A – It's in the watermelon group. Cantaloupe – way up high.

Q – Strawberries, where are they?

A – Strawberries are in the watermelon group.

Q – Tomatoes?

A – Tomatoes should be in the 8-10% group.

These are goals to work towards

Q – Bananas in this group?

A – Bananas are in the 10-13 group, yes, or 10-14. Which is sweeter, a big banana or a little banana off the same stalk?

R – Little one.

Right, the smallest one is sweeter. The banana puts the same amount of everything in every banana, mineral wise. So does an orange tree. Are there any vegetables? On corn, now you have 2 kinds of corn. Your sweet corn is in your watermelon group, but your field corn is in your 8-10 group or should be at least. And your hay, alfalfa should be in the 6-8 group.

Q – In checking these sugars, do you get any of the meat of these, or just the straight juice from it?

A – I misunderstand you perfectly.

Q – Can you use the, well, I call it the meat of the food or do you just use the juice?

A – Just the juice. You mean for the refractometer test? The juice, has to be the juice.

Pomegranate is one we haven't had, figs is another, in the top group 10-14.

R – I've tested grapes up towards 20.

Yes, but this is a minimum. You'll test grapes and you'll test oranges that'll go 18-10-15, but when they get that sweet they're really too sweet to eat. When a grape first comes off the vine it should run about 10-14%. But after the grape has laid out and dehydrated for 6-8 months, then the sugar content goes up, even 40-45%, and you get a raisin. You get it at the raisin stage and it's about 72-75%. So it is a dried peach. The more it's dehydrated, the higher the sugar rises. I'm speaking about the fresh, right off the vines or right out of the garden.

Q – What about beets?

A – Beets run anywhere from 9-10 on you beets.

Any other questions you need to know?

Q – What about grapefruit?

A – It's the same as oranges. Should be in the top group, sometimes it isn't. The law says it's got to have brix of 9.25 in order to ship it which is too tart.

Any more questions?

Q – These are all brix except that raisin figure, that was 75%, is that right?

A – Well, no, brix is percentage too.

Q – Well, you told us times 2 to get percentage.

A – No, per hundred pounds. Whenever you're weighing 50 lbs. of anything, you multiply it by 2, but I'm talking about 100 lbs. weights now. I'm using 100 lb. weights instead of a 50 lb. weight.

Q – But you are using the reading on the refractometer, right?

A – That's right, but I'm using it on 100 lbs. of juice instead of 50 lbs. most juices it's measured on 50 lbs. of juice and you multiply it by 2 to get the percentage. But I've given you the percentage wise on the 100 lb. weight.

Q – Where it goes up so high like on your raisins, can you dilute it?

A – O yes, by soaking it in lemon water.

Let me explain something to you about brix. Brix is the percentage, but in fruit and measuring your volume of fruit juice in oranges and citrus, out of 2 bushels of oranges, you're supposed to get 50 lbs. of juice. Therefore, in order there to know how

much is in the hundred pounds, you multiply it by 2. But now the brix hydrometer or the refractometer is based actually on 100 lbs. Comprehend?

Q – In other words, that would give you that many pounds of sugar in 100 lbs. of juice?

A – That’s right.

Q – So it’s really running true percentage, in other words, if it would run a 10, it means it would have 10%?

A – Right, exactly. That is true, exactly on 100 lbs. of juice.

But suppose you were working on a scale of 50 lbs. of juice then you’d have to multiply it by 2. I don’t know why, for some reason they start at box weight instead of pounds . . . now they work in pounds on it. I’m going to tell you if you could get . . . Suppose these numbers were multiplied by 2 and you get 25 lbs. of sugar out of 100 lbs. of orange juice? Man that would be better than sugar cane. Get the idea?

R – You misunderstood me perfectly.

Yes I generally do.

Q – I asked about where raisins, so you dilute on that juice so you could read it on the refractometer, because it doesn’t go up that high.

A – O yes, you could, you could do that.

How would you do that though? How much water would you dilute it with?

R – You’d probably take a dropper and take a dropper of juice and a drop of distilled water. About 3 drops of distilled water.

No, that’s not the way you do it. You don’t work by the raisin.

Q – I don’t get it. If you don’t work by the raisin, what do you do?

A – Nope.

You have to weigh the raisins on a gram scale and you have to weigh the water. Then you put it thru a blender and whip it up then you take a drop of the precipitate or drop of the juice and then you put it on the refractometer. Then what have you got?

Q – Can the difference in the specific gravity of those 2 juices when it’s mixed up? The juice and the water together make that much difference?

A – Yes sir.

Q – Would you multiply it by 2?

A – Yes, you multiply it by 2.

You'll come up about 37 brix is what you'll come up with on a 50 lb. weight. You see there you've got 50-50 you see? There you've got a pound and a pound and you've got 50-50 there, so you come up with about 37.5. Multiply it by 2 and you'll come up with somewhere about 70-75, somewhere along in there. Anything hard about that?

R – No.

Just as easy as a bob-tailed dog falling off of a log. A bob-tailed dog can't walk a log, he doesn't have his tail to balance him and he'll fall off every time. Did you know that? He sure can't. he'll fall off as sure as he tries, he don't have his tail to balance him.

R – What you don't learn when you come to these . . .

It's sure interesting to watch a bob-tailed dog walk a plank and fall off.

R – A bob-tailed cat can do it though.

He has a little bit of a problem with it though. You know when a dog walks, he doesn't walk straight, he walks at an angle.

R – Sideways.

But when he runs, he runs straight.

Q – Are you sure?

A – Yes, if he's a real fast running dog, he runs straight.

R – Ours is a fast runner, but when he gets the ball and brings it back, he's crooked every time.

I've seen them chasing foxes and rabbits and they run pretty straight.

R – That's a different kind of dog than ours.

O.k.. anything else you want to know about farming you better ask it.

Q – Can you put some of that . . . about tomatoes, you say you can get too much water on them . . . Can you do this Doc? Getting back to whether I should put this plastic underneath the ground. Put down under our tomatoes?

A – Not underneath. Put it on top of the ground. Too much water, the tomato cannot stand too much water.

Q – I shouldn't put the irrigation underground where the tomatoes are?

A – Why yes, it's perfectly alright to put it underground where the tomatoes are, but just don't keep it too wet.

That's a wonderful question. How do you know when a plant needs water? Like a tomato or pepper plant? They do something to let you know what they need. . .

R – Leaves curl up.

It's pretty . . . it's damaged . . . in other words, when the water runs down the leaves a little bit, something happens in the plant, what happens?

R – It gets wilted looking?

Something else happens, you just notice what is . . . Let me ask you, when a plant gets sick, where does it show it first?

R – Droops doesn't it?

Yes, but you can't see the roots, they're under ground.

R – No, I said it droops.

It droops, but where does it droop first?

R – The top.

The top, that's right, the top droops first. You know it's sick at the top. Anybody can see it when it gets to the bottom, but a good farmer watches the top of his trees. The top, watch the top and there it shows you when it doesn't have enough water or not. Any questions?

Q – If you had a mulch down, like between the berry rows or something, and you laid this rubber hose down that sprayed and that will keep that mulch wet, will that make it decay faster? Will that help?

A – If it's thin it won't make much difference, but if it's real thick it will.

In other words, this is one of the things you've got to consider in making a compost pile. You should have it at least 6 feet deep and about 8 feet wide. If you don't make it that deep it isn't deep enough to hold the heat in.

Q – Then make a big pit?

A – No, you don't want a pit, because it can't get the oxygen. Keep it above the ground. Do not put your compost in a pit, because it cannot get the oxygen. Build it above the ground.

Q – On the alfalfa now, if you want to put it in the harvester, you crimp it then let it wilt then chop it, right?

A – Well, it doesn't matter. For instance, if you're cutting alfalfa, the best thing to do is . . . on your grasses for your harvester, is to start about 4 o'clock in the morning and cut them and then about 10 o'clock start putting them in your harvester.

Q – One thing. Your nitrates would be too high. The sun hasn't shown on it at 4 o'clock in the morning and you may poison your cattle, right?

A – No, not if there's a high sugar content you won't. You'll poison the cattle because there's low sugar content in it. You will never poison the cattle with a high sugar

content.

Q – What moisture would that be by 10 o'clock?

A – Let me ask you this. You asked a very good question. What percent of moisture would you expect? What is the total amount of moisture you would have in the alfalfa approximately? What's your total amount?

Let me say this, how many pounds of solids would you have if the alfalfa was reduced to zero percent moisture? We'll say the alfalfa has a 25% protein and we'll say it had 16% sugar. Alright now, that's good alfalfa. That's top quality alfalfa. But now what would be the percent of solids that you would expect at zero percent moisture?

R – You'd have at least 60% when you mowed it, maybe 70, wouldn't it?

Yes.

R – It's more than that . . . At 4 o'clock in the morning you'd have more than you would later.

A little bit. The point is, you'd have approximately 70-72% in the fast growing season, of moisture. I'm talking about minimums now. It's possible to have a little bit more than that. But 28% you should have in solids at zero percent moisture. So if you mowed it at 4 o'clock in the morning, it should drop to somewhere to 45-48% by 10 o'clock in the morning and that's not too damp to put alfalfa into a silo or harvester. Because in airing it out and in getting it in and dropping it in, it'll probably be 45 by the time it drops into the . . . off the conveyer.

Q – You don't have to have a day with a low humidity?

A – Yes, no, not too much because when you first cut that water supply off, it goes out in a hurry in the first few hours.

Now, what percent of moisture is good harvester feed?

R – What do they recommend, it is quite low. 45 would be o.k.

45, that's right. So you've got to get in there at about what it'll stay. 40-45% is the amount of moisture that good haylage has or cornage. That's right. That's what makes the harvester or silage a lot better than hay. Because of the high moisture content. Now, let me just give you one more thought right here on this process. If you dehydrate the hay or the alfalfa lower than that, it increases what?

R – Sugar content.

What else?

R – Nitrogen content.

The nitrogen content, the protein content, yes, that's right. So alfalfa at its best is best between 40-45% moisture for feed. Comprehend? Now suppose you're cutting it at its maximum amount of protein. Now, suppose it's growing at its maximum amount of protein, but you think it's too green in order to cut to make the best hay and you let it pass the blossom stage. What happens to it after the blossom stage?

R – It drops the protein content.

The protein decreases, yes. And the protein decreases and something else decreases also. What is that?

R – Sugar.

Sugar also drops, yes. Now where does that protein go to?

R – Goes into seed.

Some of it goes to seed, but some of it goes somewhere else, where is that?

R – Back into the roots.

No.

R – Into the air.

Into the air is right. You cannot poison cattle with protein if the sugar content is high enough in the produce you're feeding them. But you can if it is souped up. Low sugar, high protein, then you can. It can be done, because if you've got the high protein in there, you have the natural magnesium from the air in the high quality food. Now let me tell you something else too. When you feed cattle high protein food. that is natural and a high sugar food, they're not going to care 2¢ worth whether you feed them any grain or not. They're not going to pay much attention to it. In fact they'll actually leave it in their trough, the grain that you feed them. Why? Because the food had the TDN natural mineral in it. You know that? It really works. How can you tell when cattle are mineral deficient? By the looks of the animal.

R – The oil in their hair.

That's one way, but there's another way too.

R – A very tight hide.

That's one way and there's one more way to tell.

R – Long hair over the back . . .

Yes, but how can you tell whenever there's not enough mineral in there, long before any of these show up? There's no kink in the tail, the tail hangs straight.

R – I never saw a kinky cow's tail.

O yes, a healthy a cow has a little kink in the tail right up at the body there. A little curl there. and if that tail is hanging straight, that cow is not getting enough mineral. They got a little kink right in their tail there if they're healthy.

Q – Can you draw it, what you're talking about?

A – Sure I can draw it.

R – We're just dumb farmers, never seen a healthy cow.

Now, then the tail comes like this and there's a bushy tail down here, if the cow is healthy. But if that tail hangs straight, they're mineral deficient.

R – If I saw a cow's tail like that I'd think I'd switched him too hard.

Maybe you did. I don't know very much about raising pigs, but how can you tell when pigs are sick?

R – Yes, I know that.

The tail hangs straight. The tighter the curl in the pigs tail, the healthier the pig. In fact I've seen little pigs tails that curled so tight their back feet didn't touch the ground!

Q – I've got another one here. If an alfalfa stem is broken in more than one place, why does this matter where the moisture comes out in 3 places or 1 place at the bottom?

A – The point is, it isn't necessarily coming out so much out of the bottom, it's not being supplied to the top.

Let me tell you something that you can do. You can take a gourd vine, 40 feet long and keep lifting it up so the roots can't go in the ground and cut that gourd vine off from the main trunk. How long will it take before that will start to drop?

R – Matter of minutes, pretty fast.

About 3-4 minutes. O.k., now, that's what happens in that alfalfa. The water supply is cut off. That plant is dehydrating it very rapidly. There's a lot of moisture going into that air from that plant. It goes right out of the leaf and everything else. The energy is going out of it. The heat energy that takes that plant to live. Plants live on heat too, just like everything else. And as that heat goes out that moisture goes out. It is dying in the early stages of growth because the water sap supply has been cut off. So it goes down in

an awful hurry. Now, if you cut it at 4 o'clock in the morning, it'll go out faster, 4-6—7 o'clock in the morning than it will if you cut it from 2-4 o'clock in the afternoon. Why?

R – The sap goes down thru the night.

No. Because there's more in there at 2-4 o'clock in the morning.

R – That's right.

That's right, it'll go out faster. And it vacuums itself out. It goes out faster than if you cut it in the heat of the afternoon. It really will.

R – In other words, it's more like a siphon.

Right, exactly right.

Q – You don't think there's too much advantage in crushing the stem in drying it?

A – There's a disadvantage in crushing the stem, there's a disadvantage in it, because you loose the vitamin in it a lot faster.

There's one thing that makes peaches and apricots so excellent whenever they're dehydrated naturally. The vitamins are still in there, with natural dehydration. But if you mash the grass, you loose the vitamin, and you crush it, you kill it, it dies.

Q – How does crushing kill the vitamin?

A – How does cracking corn or wheat kill the vitamin?

R – By oxidation.

By oxidation, that is correct. It dies, it starts to die. I tell you what you ought to do. Take some of it and crush it and take some of it dry it without crushing it. Offer it to your cow or your horse and see which he'll take first. He knows which one you didn't crush.

Q – It all gets ground up before you put it in the harvester anyway, but it isn't as long a period, right?

A – Right. All I'm talking about is your valuation right now of it, your value.

If you cut it at say, 2 o'clock in the morning or 4 o'clock in the morning to 8, 4-8, and then you start say at 10 o'clock to put it in the harvester, it doesn't matter a whole lot. But if you crush it, it does matter a whole lot. There's no need at all to crush it if you put it in the harvester. Now let me ask you something, suppose you put . . . now wait a minute, let me make something real clear here. I'm talking about produce that you have grown under the standards that I have told you. Please remember that. Now, if you are not going to grow it under the standards I have told you, forget what I am telling you

now. Because, suppose that you cut alfalfa at 4-6-7-8 o'clock in the morning that had a low sugar content. It wouldn't lose too much moisture. Probably 15% - 20 and then you put it in the harvester. What would happen?

R – You'd have a herd of dead cows.

Well, you'd have something else first. What else?

R – Heat.

Not exactly a heat, but . . . the juice would be running out the bottom of that harvester. It's a sloppy mess. And whenever you see a harvester filled with any kind of hay that the juice is running out of the bottom, you've got poor quality hay in that harvester. Poor quality hay, poor stuff, because it was put in there wrong.

Let me tell you something, you won't get anything better out of a harvester than you put in it. Not a bit. You'll get just what you put in it out.

R – Unless you put in chicken manure.

Well, it sometimes is an advantage to put chicken manure in your silage, providing now that your protein is too low when you put it in there. but if you got too high protein grass for the mineral content, then you're asking again for Nitrogen poisoning.

R – You put the chicken manure with the corn.

Yes, that's very good, but let me also say about the corn, if your corn calcium is high and your corn sugar is high, and you put chicken manure in with that, you're going to have some sick cows or dead cows on your hands. Because corn . . . do you know the average protein of the average corn going around? What percent protein is it?

R – 7 or 8.

Well, it's real good if it gets to 7-8. A lot of it is 5 and 6. But you know what the protein content of corn is going to be, grown under this standard?

R – 10-11-12.

14-16% corn, I'm talking about dry corn. And you pick up a bushel of it and you're going to know you picked up a bushel of it, because it's 10 lbs. heavier. This is really true, it really works.

R – Praise the Lord!

Good, you bet you praise Him. If you don't do it, you will praise Him. If you do, do it, don't get so much money, you forget about Him. Any other questions?

I taught you all I know, so I guess we better adjourn.

R – Since when? Everybody that believes that, stand on his head. I don't believe that one.

Q – When will we have a course on feeding animals?

A – Whenever you get 20 people. 20 Vets or something. 20 people that wants it. We haven't even talked about feed yet.

R – I'm going to have to get a whole bunch of my cousins to come down here.

But folks, I'm telling you, the farmer is still farming like Grandpa did. I mean he really is.

R – He's not farming as good as Grandpa did.

Yes.

R – Grandpa had better land then. Too many worn out farms.

Q – So you don't put chicken manure in the harvester with your same corn? Not on this program?

A – That's right, you sure don't.

Let me ask you something. How would you test for protein with the methods I taught you? Nitrogen content? Run a nitrogen test on it?

Q – How would you do it?

A – We'll learn that in the Feed Course

Nutritional Spray Formulas from Pages 25-53

<u>Material</u>	<u>Purpose</u>	<u>Amount</u>	<u>Comments</u>
Black Leaf 40 (Nicotine Sulfate)	Insecticide, Nutrient	1 pt/100 gal. <i>1 t. / gal</i>	Use carefully – deadly
Calphos (Soft Rock Phosphate)	Wetting/Binding agent, Anchor, trace nutrient	2 lb/100 gal <i>2 t. / 1 gal</i>	Do not exceed 2 lbs.
Liquid Phosphate (Phosphoric acid – P ₂ O ₅)	Nutrient, catalyst, anchor	1 pt/100 gal <i>1 t. / gal</i>	Use in every spray formula
Iron Chelate (powdered)	Nutrient and anchor	*1-2 oz/100 gal * <i>1/8 t / gal</i>	Do not use on high Carbonate soils.
Iron Sulfate (very fine grind)	Nutrient and anchor	8 oz/100 gal	For high Carbonate soils.
Alaska Fish Fertilizer	Nutrient and oil	2 qt/100 gal <i>4 t / gal</i>	Use most economical brand.
Sea Kelp	Ionizing agent, nutrient	4 oz/100 gal <i>1/4 t / gal</i>	Use most economical brand.
Cystox or Cygon	Insecticide	1/10 recommended	For use in Moth season.
Liquid Chlordane	Insecticide	20 drops/100 gal	Same as Cystox
Potassium Hydroxide (Powdered)	Nutrient	4-6 oz/100 gal	Use when Potash is low. (Do not use Sodium Hydroxide)
Octagon Soap (Basic H) (bar – not powder)	Nutrient, wetting agent	5 lb/100 gal	Check ingredients for Sodium use only if Potassium.
Sea Water	Ionizing agent, nutrient	10% of spray	Don't exceed 10% ocean or bay water
Copper Sulfate (Bluestone or Blue Vitriol)	Germicide, nutrient	4-8 oz/100 gal <i>1/2 t / gal</i>	Helps tree bark stretch.
Chelated Manganese (Manzate or Maneb)	Nutrient	*4 oz/100 gal * <i>1/4 t / gal</i>	Use only for fruit or seed corps
Chelated Zinc (Zineb)	Nutrient	*4 oz/100 gal * <i>1/4 t / gal</i>	Alternate with Manzate
Snuff	Insecticide	2-3 cans/100 gal <i>1 t / gal</i>	Forms fume – keeps bugs off.
Vinegar	Increases Cations in spray, Opens pores	1 pt/100 gal <i>1 or 2 t / gal</i> 2 pt/100 gal <i>5 T / gal</i>	For changing plant to Cationic.

** Do not use this amount on high Calcium soils.

Additional Spray Formula information from Dr. Reams has been added to this list.

Sea Spraa (S) dilution	6 T / gal -- 1 gal/acre	AFF 9 water 1 AFF	MAXIMUM
Gen II 12 t (4 T) / Gal		1 T / Gal	STANDARD

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ONION PATCH

I was called to 80 acre onion field 33% of onions were dying about size of little finger nail.

County agents – agriculture experiment station – fertilizer Co. and chemists were already there to see what they could do – knew them

They said – If you're so smart – tell us what's wrong with these onions.

Said – Just got here – give me a few minutes – Went out – pulled up one – washed roots off checked to see if root bark would slip off root – Would not – broke a top – looked at it with magnifying glass – full of worms – nematodes

Said – There's your problem – They scattered like popcorn – embarrassed

We were told that nematodes didn't bother onions.

Said – LOOK I wasn't there 15 minutes –They said – What do we do?

I said Add 100 lbs white sugar per acre on the onion.

Got rid of the parasites

Carbon made soil hold more moisture than the nematodes could stand, drowned them.

A few years ago when I was a young man, they were having a terrible drought down thru Georgia and Tennessee. It was terrible, very bad. So, the ministers and Governor ordered a day of prayer to pray for rain. It wasn't a Sunday, it was thru the week. I believe it was Wednesday. The whole state was supposed to go to church and pray for rain. One little lady, crippled, walked with a walking cane, went to pray for rain. She took her umbrella! You know, it rained. That's faith, the faith of one can accomplish much, but if you gamble, you accomplish nothing but heartache. So what you need to do as soil physicists and soil scientists, is take the gamble out of it, get God in it. Whenever God is in it, the gamble is gone. So put God first, put Him first in everything. When you get to the place in any profession in which everything you do is wrong, I mean everything is wrong, you will know you are a full grown man or a full grown woman. That's a sure sign you are grown when you recognize that everything you do is wrong. And when you do that the Lord takes over. You are learning to do the impossible here, but remember one thing; God has reserved the miracles for Himself. God reserves the miracles.

GRAPEFRUIT

(wrong fertilizer Saved \$2.00)

Man had hundreds of acres of orange groves bought a 30 acre grapefruit grove that was 35 years old – had it 3 years – almost had picked a bushel of grapefruit off it – beautiful trees – called me – asked if I could make it bear – Said yes – He asked, How do you know – haven't even seen it – I said – you told me what's wrong – Went to see it – Walked all over it – found 6 grapefruit in whole grove – and they weren't any good.

He asked me how many boxes of fruit can you put on this grove next year? I said 20,000 boxes – What month do you want them to ripen in? He said September 1 – This was late October – I recommended an application of fertilizer to be put on in December. Only 4 or 5 lbs to the tree – Next year on August 28th 10:00 A.M. the grapefruit passed quality inspection. He shipped on September 1 and got \$10.00 a box in N.Y. for 20,500 boxes.

He asked how many boxed we would put on next year – I said 30,000. We got 34,000 also picked in August.

I recommended another application of fertilizer. In February I checked the soil – It was not what I said – I called him – told him he had a problem – the fertilizer I recommended to be on in Dec was not applied but such and such a fertilizer was applied – I told him he would not have a crop of fruit this year.

He said I don't believe it – I told him that your opinion or mine doesn't have anything to do with scientific facts – I'm not telling you my opinion – I'm telling you what's going to happen. He asked if it's too late to change it? I said yes – I told him that if fertilizer company changed formula you can sue them for \$300,000 but if you changed it – you're out – did you change it or fertilizer company? – Said he changed it – I saved \$2.00 per ton – Saved \$20.00 by changing one ingredient in it.

I told him that by saving \$20.00 he is losing over \$300,000 worth of fruit.

He said I can't believe it but come back when they blossom – Said OK – Went down then – there were NO BLOSSOMS.

We are dealing with laws that God made – we must obey them no matter what we think. He said – You set me a crop of fruit on this grove next year and I'm going to sell it – I'm not going to keep a grove that I have to have a doctor attending it all the time to put it in fruit – I was a county farm agent for 10 years and this insults my intelligence!

You've got to put the nutrient in the ground to get the produce out. Not all of it, just 20% of it, God does 80%.

That grove had been starving for years.

A few years ago, a man by the name of Bell, he owned a paper company in Savannah, Georgia, decided to irrigate a 100 acre orange grove. To irrigate it, he had plenty of water and put a sprinkler on top of every tree. It happened that that winter, it turned cold. It happened to be a cold near the Gulf of Mexico and there was high humidity in the air. He turned his sprinkler system on and covered the trees with ice, and 32° doesn't freeze an orange tree. You've got to get below 26°. He saved his grove and everybody else lost their fruit just about. Most of the people lost their fruit. Then he put in a system of selling these irrigation systems all over the state of Florida and sold an awful lot of them. There's still a lot of them in action, In 1962 and '63, there was the coldest night and the coldest weather that Florida had ever seen in this century. The humidity went down to zero and the temperature went to 14° and these people that had irrigation systems –when that humidity dropped to zero in the daytime, I called all my clients that had these irrigation systems and said, - don't turn those irrigation systems on! Because the humidity is zero and if you ice your trees with the humidity at zero, you'll kill your trees to the ground. You can't do it. I'm telling you, I thought they'd lynch me before daylight the next morning. They really got angry with me. They really got peeved with me when I told them not to turn it on with zero percent humidity. But, some of them listened and some of them didn't and you know what happened to those that didn't? They lost their trees to the ground. The ones that listened, their trees are still big orange groves today.

MISSIONARIES IN COLUMBIA

I did some work for missionaries in Columbia. That was east of the Andes about 1000 feet above sea level.

The soil was so poor and low in lime. Many times it was higher in gold than lime.

We taught them how to burn the lime rock out of the mountains there.

Now they produce bountiful supplies of corn, rice, potatoes, okra, and tomatoes.

Before, they had a hard time growing anything except tomatoes as big as your thumb with about 12 inch high plants. They only had 3 or 4 tomatoes per plant.

Now they are growing tomatoes on trellises 20 feet high.

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You can know your yield, quality, date of harvest before planting. If you don't you need to learn more about farming, you are only gambling.

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It's better to plant 6 weeks late and have the food in the soil than to go out half cocked and do what grandpa did and owe your soul to the bank.

160 ACRES OF MELONS

He decided then to put out 160 acres of watermelon in an area – went to see it – was a bottom of an old pond that had been only 2 or 3 feet deep – but was dry now – was in grass – I said would service it if you will make a ditch from here – ¼ mile over to that drainage canal – You have all the equip –

He said that would cost \$2500 – I said if you want me to service it you'll have to dig that ditch – won't do it if you won't.

He said why – I said we haven't had flood in 20 years – about due one now –

He said I haven't seen water in this for 20 years –

He didn't hire me – Went on put watermelons in – I went down there about week before harvest supposed to harvest them on Monday – I was there Wednesday afternoon – Told me about the beautiful crop and melons –

Friday night started raining – by Monday noon 12" rain fell. Every melon was floating – Lost \$180,000 of melons because wouldn't dig \$2500 ditch.

If you're going to farm, be prepared for worst that can happen – if don't have water – get it – too much – get rid – TAKE THE GAMBLE OUT

BERMUDA GRASS

There's a farm in Florida where a man only works about 6 months a year and makes \$200,000 on Bermuda grass. He has "For Sale" signs on about every 10th post and then when it comes time to sell, his wife won't sign the papers. He is getting rich on Bermuda grass and doesn't want anybody else to get into it, and he puts up the poorest mouth you ever saw. But he travels the world, has a yacht, airplane, everything else.

It's 12% or higher protein if you don't let it seed. Get 10 – 12 tons Bermuda grass per acre in 6 months.

(Fescue should be 16% protein at 28% moisture with at least 20 tons per acre)

When cows eat high protein, sugar, mineral hay they eat less grain. They won't eat any.

I had one person who had, I believe, 60 acres of citrus. I did a soil test and told him what had to be done. He said, I cannot afford it, and I'm not going to do it. I'm just not going to do it. I said, well, you know what you should do, Sell your grove. He said, Then what should I do? I said, Well, you're owing your soul to the bank now wearing yourself crazy. I said, Get into something that there's a lot of demand for. He said, What? I said, Orchids, for instance. I said, I can take a half-acre greenhouse with only what you get out of 5 acres of this grove, put you in orchids and you can make \$50,000 a year and only work 2 days a week. And he did it. He makes \$50,000 a year now.

Another man, he had about 80 acres of citrus. Same thing. He said, I am just not going to spend \$200 to \$300 an acre to do what's got to be done to bring this grove into top production. He was getting 150 to 200 boxes when he should have been getting 1,000 boxes to the acre. He wouldn't put in the \$200 to \$300 to get it because he just couldn't see it, didn't believe it. And he sold out, and I put him in a four acre nursery. He's got a fabulous place there with four acres. And he nets \$75,000 a year on four acres. He has his own analysis equipment. He took the course.

One of the most dangerous things in the world for you or anyone else to do, is to use a little bit of something and get a marvelous result and then assume that a lot would do a lot of good. It'll do a lot of harm. Just because a little does a lot of good, don't think that a lot will do a lot more good – it won't.

I know one man one time, that he put 200 lbs. of cottonseed meal on per acre on his sugar cane. It did a marvelous job. In fact it was so beautiful that he went out and added another 1,000 lbs. to the acre. Cottonseed meal burned it up – burned it up. A little bit did that much good and he was going to do a whole lot, so as he . . . As you work with soil, work out the amount that you need, and go from there.

DEAD CABBAGE

I got a call from a man one time, that had 80 acres of cabbage and I was called as a joke. I was called there as a joke. 80 acres of cabbage and there had come a freeze and that cabbage was laying down like rags. I think I've got the picture. I'll look tonight and see if I can't find those pictures.

They were laying down like rags, half grown cabbages. Cabbage half grown, laying down on the ground. And he said, "I want you to raise these cabbage back up so I can grow them". I said o.k. So I ran a soil test on them and got the word back and we used calcium hydroxide. They were up on beds and right down the middle of that bed I had them to apply 2 bags -50 lb. bags of calcium hydroxide per acre. It cost then \$8 an acre to buy it and put in on. And you know what happened? In one week those cabbage were standing back up – growing like nothing had happened.

And he said to me, "Well why don't you put it on the cabbage?" I said – not necessary, we'll just put in right down the row in the middle in the bed. The rows were about 30" apart from one bed to another. And you know, they did it to make a monkey out of me, to show me up. But you know about every college in the southeastern part of the U.S. and even some as far away as New York, sent people down to see this cabbage field. You know what other people did? They plowed them up, disked them up. But do you know that guy sold those cabbage for \$10 for 50 lbs. He was the only one that had any. And I've got pictures of it. I'll try to get the picture of it and show you tomorrow. Now, they said that Dr. Reams raises the dead.

TWO MELON GROWERS

They say you can produce watermelons or tomatoes only once every 7 years on the same soil. I've got farmers in Florida producing them on the same ground every year.

I serviced a 160 acre watermelon field for a fellow who had never grown melons before. He leased the north 160 acres to a melon grower that had been growing melons for 20 years and owed his soul to the bank.

Instead of getting the watermelon grower to teach him to grow melons he hired our firm to teach him how to grow them. He was the laughing stock of the community, that he would hire somebody to teach him to grow melons who had never grown melons before.

We guaranteed to produce 20 tons of melons per acre. The old melon grower said it's impossible to grow over 5 tons to the acre. We told him the sugar content would be between 11 and 12%, and that the melons would be between 18 and 24 lbs. each. We told him the day they would be harvested before the seed were planted.

The other melon grower was depending on luck.

Two weeks before my grower was ready to harvest the little vines were only 5 or 6 feet long and very puny looking. But you couldn't put your feet in the field for melons. They were everywhere. They were planted 3 ½ feet apart. The melon grower planted his 8 feet X 8 feet and had melon vines waist deep. You couldn't see a watermelon in the whole field.

They really razzed me, because the melon grower had completely outdone me. I just smiled.

My grower started selling melons 2 weeks before the others were ready to sell. When they sold a few they found out how sweet they were and trucks were waiting to be loaded until the last melon was out of the field. It took 8 weeks to get them all out.

The melon grower had his melons stacked up for a quarter mile on each side of four roads 3 or 4 deep two wide, and he couldn't give them away because the sugar content was only 9.2 to 9.5 % and they were all kinds of sizes. My grower had 11% sugar content.

I said to the man I grew melons for, if you wanted me to grow vines for you why didn't you say so, but you told me you wanted to grow watermelons and that is what I produced for you.

It cost my grower \$100 per acre more to grow his melons than the old melon grower. He got 5 tons, my grower got 20 tons. Was it worth it?

The greater the yield, the lower the cost. The lower the yield, the higher the cost per pound to produce it.

The fertilizer company is still telling the world about my grower having to pay \$100 per acre for growing his melons. But they don't tell the difference in yield.

100 ACRE ORANGE GROVE AND THE BANK

You need people who make different products but you don't need them to dictate how to run your farm.

In getting started in farming you need the bank. But don't let the banker tell you how to run your farm. If that's the terms then go to another bank.

I was servicing a 100 acre orange grove. The man said, I can not grow enough fruit on these big trees to pay the fertilizer bill. I asked how much his fertilizer bill was each year. He said \$18,000. I said, I don't blame the trees. I wouldn't produce enough either.

If that's all the food you gave me I wouldn't produce enough either. I made a soil test and brought back the report. I told him I can produce 55,000 boxes of fruit for you this year. It will cost you \$45,000 to grow this crop.

He blew his top, and almost had a heart attack. After ye got done raging for two solid hours about how ridiculous the cost was, I said, If you are so poor that you can't feed that grove what it needs, then sell it, because it is a disgrace to your reputation.

He said, If you think I'm so poor I can't pay a \$45,000 fertilizer bill, I'll just show you, I'll do it!

He did and we produced the 55,000 boxes of fruit.

The second year we produced 85,000 boxes of fruit on the same grove at \$50,000 cost.

Then he as in a car accident and died a few months later.

His wife went to the bank that they owed no money to. The courts made the bank the trustee for the estate. The bank said that was ridiculous to pay \$50,000 a year for fertilizer for 100 acre grove. They wouldn't do that.

Next year the production went to nothing again. Now it is a real estate development.

I want to tell you one story that happened. I was doing an engineering job. The way we got this job was, this man had a little Saloon and Bar and lunch counter in a small town and his Uncle had died and left him a Fernery. A Coco-Fermosis Asparagus Fernery and he did not know what to do with it. He didn't know a thing in the world about it. So he hired our engineering firm to guide him and teach him how to make this Fernery profitable. We were guiding him from month to month, year to year. After I'd been servicing him a few months, I'd always go into his office and place a business, this little Saloon and Bar where they sold beer and wine and where they drank it at the counter, etc. One time I went in there and I asked, "Is there anything I can do for you?" "Yes," he said, "Tell me how to make a million dollars." And there were half a dozen or so fellows in there, maybe 7 or 8, drinking beer. And I said, there's no use to tell you, you won't do it. He said, "I hired you to teach my Superintendent how to run that Fernery, have I done everything you said?" I said, "Yes, you did." He said, "If you tell me how to make a million dollars, I'll do it." I said, "Well, you've asked for it and it was your idea not mine. But, I said, "If you want to make a million dollars, pay your debts." And his face got as red as a beet. He said, "Do I owe you anything?" I said, "No sir." He said, "You tell me one person I owe and I'll pay them." I said you owe the Lord Jesus Christ a Tithe of your income and you've never given him a nickel. Consequently you have nothing and you're going to have a hard life." His wife was there and she said, "Richard, I've been telling you we ought to do something." "Well," he says, "Every preacher comes in here, points his finger at my nose and tells me I'm going straight to hell. I know that, but I don't want them telling me and I wouldn't give them a nickel." I said, "I haven't told you where you were going, because I don't know, but I know one thing, if you want to make a million dollars, you tithe."

You know what happened? I looked down there and all windows. You can find that in Malachi 3, read it and prosper and may God bless you thru this course, Prayer.

ALFALFA

- R. You will be amazed at how much Alfalfa you can produce. If you can't produce 20 tons per acre in six months you should be ashamed of yourself.
- Q. On this 20 tons of Alfalfa per acre you're talking about, are you talking about green weight or dry weight?
- R. I'm talking about 18% moisture. Pellet size. Hay is about 28% moisture. I'm talking about pellet weight. When you get the soil right, instead of the alfalfa starting to seed at waist high, it'll start to seed at about 7 feet high. It'll only take a week for it to grow the difference in waist high and 4 feet more.
- Q. I've never seen alfalfa like this, does it have a lot of leaves?
- R. It has lot of leaves to the bottom if you did it right.
- Q. I didn't want tall stemmy alfalfa.
- R. No, no, it has lot of leaves clear to the ground if you get your fertilizers and everything right. In other words, it grows fast, it doesn't have time to fall off.
- Q. How about protein content?
- R. That's when it's the highest. It will be about 22 to 24% at 18% moisture. You do not need any pesticides at all. A man in Florida got alfalfa 10 feet high before it started to blossom and leaves all the way to the bottom. They say you can't grow alfalfa in Florida. He planted an orange grove and wanted a cover crop so he planted alfalfa between the trees. He went on vacation. When he came back, he had never seen such alfalfa in his life. All he did was cut it for mulch. He had to cut it 10 or 12 times then got tired of cutting alfalfa, so he plowed it up. He had to plow it 3 or 4 times. But because of the high protein of the alfalfa, he never had to do anything to those young trees. In 3 years those trees had a half a box of fruit on each one. It ought to be cut at least a foot high.
- Q. So it has more time to sprout out?
- R. That's right. I wouldn't be surprised if you didn't get 10 tons the first cutting. Then you have more cuttings and you will get 7 ½ and the next one 5 and the last one maybe 2 or 3. That is after you get the soil right.
- Q. Suppose you want to sell your hay as a cash crop. Could you mow it at a shorter stage and would it grow up again?
- R. Oh, yes! It will still grow up, but you wouldn't get your high protein.
- R. The high protein comes at blossom. You must put the correct amount of the right fertilizer on at the right time to do this. Then you can cut it every two weeks if you want.