Catching a Vision

Dr. William A. Albrecht

It is abundantly clear that connecting with Professor William Albrecht during this journal's formative years was a godsend. Be it astute observation and outreach by our founder or kismet, the end result was needed tutelage as Acres U.S.A. *was discovering what there was to know about ecological farming and an eager student willing to learn and carry the good professor's knowledge to a new generation.*

Dr. Albrecht was narrowly known in this community for his contributions on the appropriate ratios of several key fertility elements. But his insight, research and writings were much deeper and far reaching. He truly connected the dots and brought the discussion full circle — from healthy soil to healthy people capable of thought and reason.

So as we reflect on the past and look to the future, we thought it appropriate to unearth an interview which appeared in our third issue and has remained largely buried since then.

Acres U.S.A. *has always held that its mission was to report and further new science and to preserve and promote the timeless wisdom of the brilliant thinkers from the past. Now partway into bringing all of Dr. Albrecht's writings back into print, the mission is as alive today as it was 40 years ago. Read the timeless wisdom of Professor William Albrecht, one of our true guiding lights, and be inspired and informed anew.*

— The Editor, June 2011

Dr. William A. Albrecht, Emeritus Professor of Soils and former Chairman of the Department of Soils at the University of Missouri College of Agriculture was born on a farm in central Illinois. One of eight children, he was the only one in his family to receive a college education. He grew up with an intense interest in the soil and all things agricultural. These he approached, however, through the avenues of the basic sciences and liberal arts, and not primarily through applied practices and economics of the hour. His disenchantment with salt fertilizers came early. As he and his associates unlocked the secrets of nature, they recorded their findings — a monument more enduring than brass.

Dr. Albrecht holds four degrees — A.B., B.S., M.S., and Ph.D. from the University of Illinois. He has traveled and studied soils in Great Britain, on the European continent and in Australia.

During his long teaching and learning lifetime, Dr. Albrecht has written no less than 445 papers on sound agriculture, and it is safe to say that almost all have been reprinted in the world's major languages. His approach has hardly changed since he first investigated agriculture. "Let me help you catch a vision" was the phrase with which he greeted the Acres U.S.A. *interviewer. The conversations reported here started with medicine because the editor of* Acres U.S.A. *was once associated with a journal in veterinary medicine. Indeed, Dr. Albrecht once considered medicine as a profession, he said, and in a roundabout way his career remained true to that early consideration. Once, during the interview, Albrecht noted that the interviewer must have come from central or western Kansas — "a high-calcium area," he said, "judging from your teeth." The interviewer actually came from Ness County, Kansas. In any case the conversations went that way. Here they are.*

WILLIAM A. ALBRECHT. If you want to reduce human medicine or veterinary medicine to a common denominator, you have to remember that when the animal's physiology is deranged, it doesn't make much difference what you call the problem — but it is very probably a mistake in nutrition often founded on the attempt to be economical. I have come to the conclusion that deficiencies are more often at the base of health irregularities than we realize. I have had occasion to test some trace elements. And two M.D.s hooked up with me at one point. So I jumped in at the deep end because if I got into trouble with the medical profession — and that's very easy to do — I'd have two M.D.s to pull me out. I put a student on studying brucellosis contagious abortion, which they call *contagion,* which it isn't at all. And we proved it with four generations of a herd of 85 milk cows that were labeled to be slaughtered. We fed them trace elements, and we treated the soil with trace elements while we were getting ready to feed the animals the products of the soil. In four years we had 17 female calves that became heifers and raised calves, and their calves were clean according to the veterinary tests. Because, you see, they introduced an artificial microbe they call a brucellosis abortus as though it were a grand name. It is nothing but the symptom name given to the microbe. We had 17 heifers mature after we started feeding trace elements, and they give us calves, and those 17 calves were as clean as could be by any test the veterinarian could run on the bloodstream.

ACRES U.S.A. The remedy turned out to be nutrition?

ALBRECHT. All by just feeding trace elements, and the four trace elements we picked were those a Cleveland concern showed were missing in the nervous tissue of the animals which were infected, and were not missing in the animals that were not infected.

ACRES U.S.A. What were the trace elements?

ALBRECHT. The four trace elements that were missing — manganese, some iron — and I put that in parenthesis, because that wasn't necessarily missing, but it is always necessary to have iron, copper, cobalt and zinc.

ACRES U.S.A. Were these findings reported in the professional literature?

ALBRECHT. Oh, yes. It was a volume, but not too many were printed. In 1949 we held a clinic because I got the state medical association on my neck. The doctors down in Springfield had been giving the people inoculations for brucellosis. The women and the men moved over to Dr. Allison, who fed them the trace elements, changed their blood corpuscles from all white pussey ones to red ones. He was feeding these trace elements with a coating so that they didn't open until they got into the alkaline part of the intestines. We showed that Bang's disease was the result of a trace element deficiency.

ACRES U.S.A. Did you ever consider becoming a physician?

ALBRECHT. Yes. I had a good doctor friend who spent his lifetime teaching people about health, and when he died he had 72 percent of his business still on his books. So I got discouraged as a boy. I said, "I am afraid that I don't have enough association with the medical profession to make a go of it." Having been a country boy with a lot of curiosity, interested in the physiology of plants, animals and man, I decided I'd better stay with plants and agriculture. So I took soil fertility and soil microbiology for my major, and they brought me here to put out cultures of legume bacteria, because at that time soybeans were new and there were no cultures.

ACRES U.S.A. Where did you take your training?

ALBRECHT. All at Illinois. Four degrees. A.B., B.S. in agriculture, M.S. and Ph.D. I'm probably more of a plant microbial nutritionist than anything else. In other words you get down to the single cell.

At this point Dr. Albrecht started questioning the editor of Acres U.S.A. *The editor recalled his early training in veterinary medicine publishing, cited the controversy that went with the introduction of stilbestrol implants in cattle, and ended by noting that many farmers no longer know which way to turn as far as production technology is concerned.*

"The microbes in the soil are the decomposers. The plants are synthesizers. All else that grows is a predator on those two. That's why it is so important to treat microbes in the soil with respect, and why it is so important to rebuild soil."

ALBRECHT. Does the veterinarian know which way to turn? His animal is on that soil and eats plants from that soil. Why doesn't he get down to the basics? Why doesn't he go down to the foundation?

ACRES U.S.A. You can't get them to listen. Despite the evidence, you can't make anyone listen if he doesn't want to.

ALBRECHT. Now that's one of my disappointments in teaching and writing and studying. They don't use logic to explain what it is all about. They're only commercial-minded. As a boy — before I left country school — I told my mother I'd learned something. There are no hoop snakes. And I said, "Mother, I'm going to study snakes." I got myself an Osage orange cane with a little fork at the bottom. And a cane is longer than most snakes. That snake has to keep at least half of its body down to get the leverage for the other half to strike. It has to have an anchor. When I finished my graduate schoolwork, I had over 200 specimens of various things of that nature preserved and put away on the stockboard nailed on the joists in the basement, all cured.

Alcohol only cost 50 cents a quart. And I knew the saloonkeeper. The thing that disgusts me is that your scientists go to technology instead of teaching. They patent everything and make it secret. I don't like that. So I decided that I was going to study and learn. If you analyze what I've done here that they've paid me for, it's nothing but learning what nature did which had never before been recorded.

ACRES U.S.A. What has been the biggest revelation?

ALBRECHT. In agriculture, and soil microbiology, and in medicine, I discovered what the country boy said when he came home to his dad from the college of agriculture. He said, "Dad, they teach so much that ain't so." So I've spent most of my life finding what is so. As I learned, I wrote everything out and studied it out, and put it into manuscript form.

ACRES U.S.A. On the basis of your research, should fertilizers be soluble?

ALBRECHT. No. Fertilizers are made soluble, but it's a damn fool idea. They should be insoluble but *available.* Most of our botany is solution botany. When it is solution botany, the first rain would take it out. There's a big difference between the laboratory and the farm.

ACRES U.S.A. Is this the reason we have so many farm wells that are too hot to use?

ALBRECHT. There you are. And we live with our own damnable ignorance because we don't sit and think. We copy to make money. And they teach copy stuff in college. And if a student has an idea, he never gets to say, "I have a hunch." And teachers do not encourage students to have a hunch because they want them to memorize what they've said.

ACRES U.S.A. Is that why the "insoluble but available" idea has not been taught in school?

ALBRECHT. I wrote this (a paper entitled *Insoluble Yet Available)* and got it published in the British papers. We've put money between scientific study and publication of the results. So we only tell farmers about products that can make money for the companies.

ACRES U.S.A. I go around to these schools — including the University of Missouri — and all they're teaching is this "soluble" business. There are regulations in some states that in effect define fertilizers as products that are NPK rated, and make it difficult for farmers to have ready access to humates, natural mineral fertilizers and the like. Some of my associates inform me that you are the best spokesman — with academic standing — in America today.

This report ran in the Chicago Daily Tribune on August 8, 1957, during the era when sliding parity for agricultural crops got underway. Under pressure of low prices and sinking parity, farmers grasped at the straw technology provided — and turned their backs on scientific agriculture. By sending the lion's share of their gross dollars into the tills of big chemical companies, farmers earned less net income, structured more debt, and proceeded to deplete the nation's topsoil, all at the same time.

Did scientific farming demand all this? ...

"No," according to this report.

LINK SOIL FERTILITY TO PLANT PESTS

Can plant pests and diseases be reduced by balancing soil fertility? Recent soils research suggests that possibly they can. If further research establishes this as a fact, it could mean improved crop yields and savings of hundreds of millions of dollars annually for farmers, less woe and more attractive gardens for gardeners.

Nature grew most of the present day farm crops in a healthy condition before they were taken over by the human race. Generally, plants in their natural state were in a pure stand, had been growing at the same location for many years, accumulated much of their own residues as soil organic matter, and were free from diseases and pests.

W.A. Albrecht, chairman of the Soils Department of the University of Missouri, says these facts are in direct contradiction to present-day references . . .

Plants, as found in nature, were growing in soils where no fertility was removed, in present-day agriculture, far more fertility is removed than is returned to the soil. This, says Albrecht, is the basis for the theory that depleted soils and the consequent poor plant nutrition results in plant disease and insect attacks.

In tests with fungus diseases of soybeans, research demonstrated that attacks were highest on soils with low calcium levels. These attacks weren't evident where there were higher levels of exchangeable calcium in the soil.

Other studies have indicated that the presence or absence of leaf-eating insects varied with the levels of nitrogen and exchangeable calcium. These two fertility elements are usually connected with the production of protein-producing legume crops.

Corn grown on soils with high fertility levels has been found better able to withstand grain borer attacks in storage than corn grown on poorer soils. Corn, fertilized with nitrogen only, was much more susceptible to borer damage while in storage than was corn getting phosphorous and nitrogen in the form of a soil treatment.

In Albrecht's view, this is good evidence that nature was able to produce crops without destruction from disease and pests. It's also evidence, he adds, that while soils may be managed to give larger yields, there is still much to learn about a soil management that nourishes plants so well that they can protect themselves from diseases and pests without "poisons or medications."

— *Richard Orr*

ALBRECHT. I've had to stand alone.

ACRES U.S.A. I note that you've done a lot of work, and that this work is not being made available to younger generations — farmers under 40.

ALBRECHT. That's the reason I'm happy to see you. As a journalist you can use quotation marks. You can report. I'll just give you a simple principle. A root puts out carbonic acid and treats the rock with that acid and gets its nutrition. And yet we fight soil acidity.

ACRES U.S.A. In other words, this acidity breaks down the rocks?

ALBRECHT. Of course. The only acid you like to drink is carbonic. You don't drink hydrochloric acid.

ACRES U.S.A. Why, then, have these states come to proscribe against acidity with their fertilizer laws?

ALBRECHT. Because what I say doesn't amount to anything in the eyes of these people. They've bought a conventional truth because there is profit in it for a few big firms.

ACRES U.S.A. What you're telling me isn't what they're teaching in this university?

ALBRECHT. That's the sad part. You see what people take is what the horde take. Not what the fellow who sits and thinks takes.

ACRES U.S.A. Would you agree with the aphorism, "People take leave of their senses as a group. They come to their senses individually?"

ALBRECHT. Always, if they have the courage of their convictions.

ACRES U.S.A. Is this reprint, *Insoluble Yet Available,* your anchor piece?

ALBRECHT. Just horse sense, that's all. I tried to put together the observations that mean something. Let's take this matter of the plant's nutrition. When I came here as a microbiologist, they wanted me to grow a culture. And they thought I could grow a bacteria that would make a plant fix nitrogen and be inoculated. And I was here six months before I discovered that was what they believed, and I was terribly disgusted. I said, I'll have to tell those people that when a bull and a cow get together, the cow has to do her part too, not just the bull. All of my research here is merely that conviction that when my cultures do not make nodules on their legumes, I've got a plant that is too sick to carry its half. But I haven't got that across so far.

ACRES U.S.A. Why has your research turned out so differently from results others have had — results, I might add, more pleasing to commercial firms?

ALBRECHT. Well, Professor Miller thought I should grow bacteria that would make the cow have a calf whether she wanted to or not. And I had to politely show the points I wanted to make. Here (at which point Albrecht produced a report titled, *Some Soil Factors in Nitrogen Fixation by Legumes)* is increasing calcium saturation of an electrodialyzed clay. I separated the finest part of the clay out in the centrifuge running 32,000 rpm after the clay had been suspended and settled for three weeks. At the bottom that clay plugged up finally, because the clay was too heavy. But we had thinner and thinner, smaller and smaller clay until about halfway up in that centrifuge — you know what the milk separator is? — there we had it as clear as Vaseline. Now we took the upper half of that clay — a clay so fine that it was like transparent Vaseline. We made pounds and pounds of that because we had put it into the electrical field and made it acidic and took all the cations off so it was an acid clay. That was the thing with which we studied plant nutrition. We studied plant nutrition with that clay by putting different elements on in different orders. We grew plants. We studied plants with this fraction of the clay in the soil that holds the positively charged nutrients. And we could mix them and balance them.

ACRES U.S.A. As controlled experiments, I suppose you reduced the variables so you could take up one element at a time. How did you start?

ALBRECHT. We began with calcium because we found that we had to come up here to 65 percent saturation. In other words, you've got to load that clay

in that soil with 65 percent of that clay's capacity to hold calcium against rainwater before you can grow a plant with enough calcium to be healthy.

ACRES U.S.A. Will you explain acidity to me?

ALBRECHT. Your acid clay is nothing more than one that doesn't have the positive ions on it — hydrogen, calcium, potassium, magnesium, sodium and the trace elements. I've got to have 65 percent of that clay's capacity loaded with calcium and 15 percent with magnesium. I've got to have four times as much calcium as magnesium. You see why we ought to lime the soil? We ought to lime it to get it up to where it feeds the plant calcium. Not because it fights acidity.

ACRES U.S.A. You can't perform this function with any soluble fertilizer?

ALBRECHT. It's got to be a positively charged element like your calcium, magnesium and so on.

ACRES U.S.A. When were these findings revealed?

ALBRECHT. This paper was given at the International Society of Soil Science the day Hitler moved into Poland, 1939. In this paper I summarized the work of about a dozen graduate students.

ACRES U.S.A. Why this clay method for research?

ALBRECHT. As a result of using this clay method of learning what plants are fed, I learned about plant nutrition in the soil, not in solutions, as is common laboratory procedure.

ACRES U.S.A. To what extent did the farm press pick up this material and make it available to farmers?

ALBRECHT. Very little. They say it's too complicated. They say, "I don't know anything about it," and out it goes. But here comes something from the chemistry lab that's advertised for sale, and they swallow it hook, bait and all.

ACRES U.S.A. Do research grants influence scientific findings?

ALBRECHT. Let me answer you this way. I have a concept as to how those positively charged elements are held in the soil against water. My problem is to get a vision, and my graduate students, helping me a leg at a time, let me catch the vision. I say let's put it into the common man's language of the Creator's business of creation. Not commercialism. *The moment you throw money into this thing for a boy to study, you're on the wrong track.*

ALBRECHT. Yes. And it's been grown with crops that suck only the back teat, we'll say, and remove certain elements more than others. The buffalo didn't go far east and west, but north and south. He went with the winter and summer, back and forth. He went long distances north and south, but he didn't migrate far east and west, because he would have gone to less rainfall and more rainfall.

ACRES U.S.A. This would put the center about the middle of Kansas?

"Wide carbon ratio is the safety of your soil. You can't do that out of a chemical company's paper bag."

ACRES U.S.A. A couple of years ago, I was writing a book on farm bargaining. I came across some information to the effect that the continued application of salt fertilizers is delivering less and less production. In other words, the American farm plant is over the hill and on the way down. Would you care to comment?

ALBRECHT. I have excellent data on the half-life of our soils. You see the soil is like a radioactive element newly created. When this soil was balanced out there in man's absence, and before man took it over, it was virgin soil. It was in equilibrium with the forces of soil development and leaching. If you start with the desert in the west, on the east side of the coast ranges — because water has all been precipitated on the west side — that's the raw rock with a slight weathering. As you come east, then it is heavier rainfall, and you develop the soil into more than a desert. And that American bison lived where conditions were about balanced, and that's a little above 25 inches of rainfall. Because when you go above 25 inches of rainfall you began leaching. But at 25 inches, you're just about balanced. That buffalo was smart. He had mineral rich soil and not mineral-leached soil.

ACRES U.S.A. Yes, but that same soil is now being irrigated, and nature's 25 inches of rainfall is being sidestepped?

ALBRECHT. That's right. Here in Missouri, we have virgin soil east of Columbia — soil that has never been plowed. The farm across the road hasn't been farmed since it was broken out in the early days. So we studied that soil, and we have the rate of decline under the old-fashioned horse and collar days against that of virgin prairie. How rapidly did this system of farming tear that soil down after 60 years? Well, the 60 years show how fast it went down. On Sanborn Field we grew corn continuously with nothing put back. Everything taken off. In 40 years we took 2/5 of the fertility out of the soil. Where we put out corn continuously, in 40 years we exhausted 2/5 of the fertility. I grew wheat continuously for 25 years and used nitrogen fertilizer at 25 pounds per acre. And, including the nitrogen I put back, in 30 years we burned out 50 percent of the soil.

ACRES U.S.A. So you can't farm, say, 100 years on this ground? Not with techniques being used in America.

ALBRECHT. Not if you take half of the remaining fertility out every 30 years. You see, with salt fertilizers NPK rated, you're churning that soil to make the microbial fires burn.

ACRES U.S.A. What can farmers do to farm scientifically and still preserve the topsoil for future generations?

ALBRECHT. Supplement with the first item that is most exhausted. But this isn't as simple as just putting nitrogen back. You have to know that nitrogen is an extremely significant item in the microbial life that is going to live in that soil. You've got to maintain the living soil, and not a dead soil. And the moment you start putting nitrogen on the soil, you burn the carbon out. And you burn out more than you put in.

ACRES U.S.A. How can nitrogen be returned soundly?

ALBRECHT. On my garden I take the leaves of the trees and I compost them. And I keep that carbon high for the nitrogen I put in, and not the nitrogen high to make that carbon burn out and shoot the life out of the soil. I put calcium into that compost — it's all leaves, kind of woody, so it's like wheat straw — ratio of carbon to nitrogen of 100 to 1. But I just put a little nitrogen, and just that so that during the year I get down to where I've got still a lot of carbon. But there is enough nitrogen being used this way. The microbes don't let it leach out because it's always tied up. Carbon ties up the nitrogen.

ACRES U.S.A. Do you do anything else to that compost?

ALBRECHT. Oh, yes, you've got to take care of your phosphorus, calcium, potassium and magnesium. That's nature's way. But it has to be broken up. Now we haven't learned how to appreciate carbon as excess because we've got 3/100ths of a percent in the atmosphere, and what does a plant do mainly? It ties up the active element into that excessive carbon. So you've always got to keep a black soil.

ACRES U.S.A. That's the significance of the black? Carbon?

ALBRECHT. Yes. And you never can go very deep with the black because the air is shut off, and you can't have a deep soil unless it is granulated with calcium. So we had our black soil in the prairie that still had a lot of calcium. And the depth of that black soil merely shows that balance, that accurate balance of good nutrition.

ACRES U.S.A. Since I was a boy in Kansas, we've been growing wheat —

ALBRECHT. High protein wheat —

ACRES U.S.A. — but the protein is slipping.

ALBRECHT. Oh, yes, I kept the records of Kansas, and in the time I studied it protein dropped dramatically.

ACRES U.S.A. Now they have deep wells, fantastic milo crops, and soil that is starting to leach out.

ALBRECHT. In other words, they're moving it to where the microbial fires are being fanned.

ACRES U.S.A. This is being characterized as efficiency in agriculture, is it not?

ALBRECHT. *Efficiency in mining.* Once the soil is exhausted, you're on an ash heap. You don't know what's missing except that nothing grows. The mysteries of creation haven't all been put under button pushing technology. And the trace elements are a part of it. I had a letter from a man in Florida. He had read something about my remark that we aren't including an inventory of all the elements that are nutritional. He wrote, "Albrecht, I'm growing citrus down here. I graduated from Purdue." He said, "Tell me what to put on the soil as trace elements. I'd like to try it." I gave him a gunshot. Copper, magnesium, zinc — I gave him a list. Come Christmas he sent me some fruit. Earlier he said, "We're having trouble keeping our dairy cows out of our citrus grove. Every morning that herd of cows goes through the fence. Now we have a strong fence, but we have one cow that goes right through it anyway. She's in every morning." So I said. "Don't laugh at that critter. She's just a little smarter. She's an A student." Anyway, I received this citrus; I put the fruit in my wine cellar. When we finished that grapefruit bushel, the

last two in the bottom had been cracked. But they hadn't spilled any juice. They had split so that the slices separated out. And I checked the shipping date, and it had taken six weeks for them to come to my place. This was interesting, because the fruit hadn't been taken by the green mold, and citrus turns green in a hurry if it isn't properly fertilized. I think the copper he had put on that land at about 5 lbs. per acre protected against the green mold. Later he wrote that he had corresponded with some 100 experts. Not one thought we knew what we were doing. But, he said, "I just closed my contract for all of my citrus at a nice markup because I had a better fruit."

ACRES U.S.A. Then the whole business in Florida is a matter of trace element deficiency?

ALBRECHT. Of course. Now why can't our farmers here see that? I've seen that Florida thing for years. They went to seedless fruit because they could grow more seedless fruit without making seeds because you've got to have balanced fertility to make seeds. I just talk straightforward to those people. They're on sand down there, and they have to literally spoon feed their citrus fruit.

ACRES U.S.A. Recently I visited with a man in Minnesota who told me it was costing him twice as much per pound of feedlot gain in Minnesota than it was costing him out West. Is that because the corn is deficient? What about blight? If grapefruit develops green mold because of mineral deficiency, does the same hold for corn blight?

ALBRECHT. I have written several letters telling people that before they fight this corn blight, see what 5 lbs. of copper per acre will do to help corn protect itself. I ate the grapefruit. Mrs. Albrecht ate them. They were not green moldy.

ACRES U.S.A. A lot of farmers are coming to their senses — one at a time. What's the best starting point in considering sound farming, rather than soil mining?

ALBRECHT. We should not start before we include all the potential stages, and see how they fit together. The first stage, when this farmer made his power and his manure, and handled it all himself, he was more nearly natural. We have lost sight of three factors. The microbes in the soil, and on top of the soil, they are the forces that which by decomposition do the recycling. Then we've got the plants that profit by that. And they synthesize sunshine. The microbes can't do that. The microbes have to have synthesized plant foods. My *Wastebasket of the Earth* outlines this. The microbes in the soil are the decomposers. The plants are synthesizers. All else that grows is a predator on those two. That's why it is so important to treat microbes in the soil with respect, and why it is so important to rebuild soil. Now the German manure system was a tremendous force in rebuilding, but you see that's too much work.

ACRES U.S.A. How can you farm and rebuild that soil if you pursue monoculture or one-crop farming?

ALBRECHT. You can't because you haven't got the manure. You have got to go back to the profile of the soil, maintain the carbon because the carbon reduced is what holds the other things there. When it is not black, she's gone. Wide carbon ratio is the safety of your soil. You can't do that out of a chemical company's paper bag. And this whole business of what's pollution is nothing more than having run the thing lopsided — out of balance.

ACRES U.S.A. Can you give me a precise take on calcium?

ALBRECHT. Calcium granulates your soil, and keeps it black. That granulation lets air go deeper. And that lets the microbes burn. Now if you don't have enough air in there, you ferment, and you make alcohol. So when you make that soil anaerobic and don't granulate it, you got too much hootch in it. Oh, that thing is delicate. You can't put nitrogen in that soil without damage.

ACRES U.S.A. Can you comment on natural minerals?

ALBRECHT. I like to use natural minerals. That's what limestone is. That's what rock phosphate is. Your humates. That's when your decomposition is carried under enough air exclusion.

ACRES U.S.A. Humates are not soluble?

ALBRECHT. No. And humus deep down in the soil is anaerobic and tends to be black. You bring it up and cultivate it and oxidize it and you release the things that were reduced.

ACRES U.S.A. It is a sound approach?

ALBRECHT. Oh, yes. Nature builds its own humus down only so far because it gets no air and is preserved down there. Down in Texas you do pretty well because your panhandle of Texas is high calcium. Your Kansas soils are high calcium. But they've been burning the calcium out awful fast.

ACRES U.S.A. What will irrigation do?

ALBRECHT. That saturates the land with water, gives it a fermentation and quick oxidization. Nature does this so gradually. And if there is plenty of cal-

cium there to granulate it, the humus will move down and your roots go down, and you've got a deeper feeding.

ACRES U.S.A. If 25 inches per annum rainfall means perfect balance in the high plains, what effect does irrigation have, especially when carried on to the point where catch basins are used?

ALBRECHT. If you waterlog the field, you're going to be in trouble. It doesn't take many years. Just look what 25 years did on Sanborn Field — burned out 50 percent of our fertility.

ACRES U.S.A. To have an idea of what's wrong with soil, you'd have to test the soil, wouldn't you?

ALBRECHT. Yes, But how many men doing the testing look for it to be balanced? They only start with the one element, that's least, and dump on an excess and go overboard. So you might talk about the soil in terms of a balanced diet for the plant. But the plant has an advantage. As a root goes down, it is hunting. So you need a deep profile for that plant to be fed in. The plant struggles to survive. Its roots are hunting. The plant does a lot of scratching around. So they're trying to feed this plant and don't realize that as the soil gets dry that root's going for water. When they put water-soluble salts on that soil they unbalance the thing as if you took too much whiskey.

"Your acid clay is nothing more than one that doesn't have the positive ions on it – hydrogen, calcium, potassium, magnesium, sodium and the trace elements."

ACRES U.S.A. Let's go back to your statement that fertilizers should not be water-soluble.

ALBRECHT. It can't be water-soluble because the preceding rain would have taken it out. The clay humus is a colloid on which the positive ions are held because the clay is negatively charged and holds positive elements. So your calcium is held on the clay. Your hydrogen is held on the clay humus. Your magnesium is held on the clay. Your potassium is held on the clay. You've got the cations — the positive ions — and they have to be balanced for the plant. And I told you, you had to have 65 percent saturation of the calcium, 15 percent of the magnesium, 2 to 5 percent of the potassium ... for your legume plant to take nitrogen from the air, and grow, you've got to have 65 percent saturation on the clay of the calcium, and so on. Now that's a balanced plant diet. But how many plants are fed on that kind of a diet? Nobody talks about a balanced plant diet in terms of positively charged elements because they don't understand it. They only understand mining the soil for a fast profit, with no thought of future generations.

ACRES U.S.A. Some of these points seem complicated. Does this plant physiology have a counterpart for illustration purposes?

ALBRECHT. For about 25 years I've worked on this Epsom salts business. Frequently, after a hernia is repaired, bowels won't move past that hernia. So they give Epsom salts. And if they check they'll see that urine is throwing the protein out of the blood. Protein is wasted because the Epsom salts ruin the membrane in kidneys and keep them from doing their normal work. When you take Epsom salts, that salt replaces the calcium in the wall of your intestines and it throws everything it can because that membrane is no longer normal. It just throws everything from the blood stream till it flushes it and can go back to your bones to get some calcium to rebuild intestine walls. When I gave that to Dr. F.M. Pottenger, he said, "You've got a good theory because if we've got a highly rheumatic person and give him Epsom salts, he's so low in calcium he throws the calcium out so badly that it kills him." Now the medical profession knows that they shouldn't give Epsom salts, but they do. But you see with this hernia, the kidney wasn't functioning when the magnesium went through. The magnesium that the bloodstream had to throw out through the kidney was knocking the kidney. Now here's my theory. Now remember my work. If I didn't have my soil loaded high enough with calcium, the nutrients were going from the plant back to the soil exactly the way they go from an intestine. If I don't have this calcium-saturated soil high enough, the plants throw their fertility back to the clay, instead of from the clay to the plant.

ACRES U.S.A. The plant feeds the soil instead of the soil feeding the plant?

ALBRECHT. The plants will build the fertility up in the soil and the plants will starve to death. Now you see what I mean when I had a different vision of plant nutrition in the soil than solubility. This thing is delicately balanced, but who has a vision of it. If you put chemicals into that soil you've ruined that cell root. These laws of physiology — it doesn't make much difference whether it is a person or a plant. I'm convinced that the Creator knew his business, and man still hasn't learned.

ACRES U.S.A. There is one problem with what you're saying. Hardly any of these farm magazines put this information into laymen's language so that farmers can understand.

ALBRECHT. That's the sad part of it. I just want you to do your own thinking. Let me fill you in on why we've been on the wrong track. You can then pass it on to your readers. I just want to say it the same way and have it repeated that way. Don't worry too much if you don't always understand. Keep on studying and it will all come clear.

The Albrecht Papers: *Albrecht's Foundation Concepts, Soil Fertility & Animal Health, Albrecht on Calcium* and *Albrecht on Pastures* are all available from Acres U.S.A.