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\* \* \* SPECIAL REPORT \* \* \*

## A Policy for Preventing Agricultural Suicide

In an eloquent report on how our agriculture has gone astray, Dr. Albrecht points to the necessity for approaching soils from the biology of agriculture rather than the technology of the chemical laboratory in pointing the way from a confused policy based on economics and the destructive forces of technology to a workable policy based on the creative forces of life

By WILLIAM A. ALBRECHT, Ph.D.

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**M**MUCH IS BEING SAID ABOUT, and claimed for, our scientific progress. We are about to believe that we are approaching the pinnacle of it, now that the alphabetical progress from the A-bomb exceeds our expectations. But that "excess" of progress is not in cooperation with the creation of life. Rather it is "progress" in the destruction and death of life. It seems well, then, that we inquire whether we are not allowing ourselves to be de-

ceived by our technological successes. There is a terrific danger in overconfidence because of past success, particularly when that has been obtained mainly in the area or fields of technologies. There is serious danger in believing that such success with transformation of matters, that are dead, can be the basis for success necessarily in agricultural production which deals with matters that are living.

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The soils on which Nature grew the prairie grasses and pastured the bison were those with deep black soil surface horizons, and an extensive level terrain. They are under moderate rainfalls which did not wash <sup>off</sup> the nutrient elements they weathered out of the rocks. Those, then, served to nourish the many legumes and other protein-rich vegetation.

Even though by chemical technologies we have fertilized the soils for agriculture to have produced 300 bushels of corn per acre, let us not believe that we are already controlling Nature at the point of "take-off" of her creative activities of life. As farmers, we may well remind ourselves that the study of the soil, from which Nature starts her creation, is the study of the starting point of life and the living. Agriculture is biology first. It is not only technology. It is not plows, tractors, seed, soil conditioners, and mechanical manipulation, first. It is creative capacity, and creative chemistry first. After that, then, the products which the soil creates become objects for technology. We do not grow crops as a technological procedure. Rather Nature and her soil create them by our cooperative and supplemental helps.

We need only to recall the seasons, like 1952, 1953 and 1954 (in Missouri) for example, to be reminded of how feeble our efforts are in controlling Nature's creation of crops, and how quickly we make the weather the scapegoat when we can't get high crop yields. It is fitting, therefore, to provoke some thinking about the troubles originating in our technological applications to agriculture while disregarding the basic biological nature of the work of growing good crops, good livestock, healthy boys and girls.

Much that is apt to be called agricultural science and applied as technology has seriously upset the biology.

Some cases are now bringing us around to reaping the poor harvests, or even no harvest. Our attempts to streamline, to compel, to crowd and to shortcut the biology are bringing us to realize that we are mistaken when taking credit for performances which are Nature's acts and not ours. We are slow to comprehend clearly the basic principles operating in Nature. Our disregard of her laws is not tolerated long before her retaliation becomes costly. The soil under the natural laws operating in and through agriculture is a good case for consideration and illustration.

### **I. Technologies lured man to fringe soil.**

Man's technologies have put him on lands and their soils where the Creator had no other life forms of similar body demands or corresponding physiological processes. By means of his machines and many technologies man carried himself to places to which he requires shipments of foods from other places to keep himself and his animals living. Can he depend on long lifelines forever to keep him properly nourished when exhaustion of the soil fertility, shifting economics and mounting populations are shortening those lifelines and even cutting them off completely? Have we not upset the biology of human life when we pushed into the regions of higher rainfall and far away from the semi-humid, near-desert soils on which primitive man lived with almost no technological lifelines? Primitive man on those drier,

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unweathered soils, survived by his own crops created in limited areas where windblown, well-mixed fertility supported him completely. Are our long lifelines not allowing us to push on to soils where we are not so well fed, if degenerative diseases now so numerous are giving us any suggestion? Have we not upset the biology of ourselves possibly as much and more than any other biology?

## II. Nature's monoculture of crops replaced.

The soils which Nature uses to grow grasses and animals are quite different in fertility from those She uses to grow forests. Yet even with our technologies we try to use those same forest soils where Nature grows only wood, i.e. fuels, carbohydrates, to grow a variety of crops arranged in what we call "rotations." We hope to compel legume crops to grow and live where they never grew before. We expect them to create proteins. We speak of those soils as "forest soils," as though the trees made the soil rather than the soil made the trees. We speak of the "prairie soils" as if grass made the soil and the grass made the buffalo, when it was the soils with higher lime and other higher fertility contents because of the lower rainfall where legumes grew to take nitrogen from the air that made both the nutritious grass and the well-boned and well-muscled buffalo or bison. Nature put the animals on those soils. She was in the cattle business there. She didn't put any squirrels into the pine and other coniferous forests. If, then, we cut away the coniferous forests where Nature herself could do no better than make wood by putting every crop completely back into the soil, can we create nutritious crops with no fertility uplift of the soil? Is not our faith in mere rotations of crops as soil improvement a blind faith? Will we not upset crop biology completely by merely rotating crops and taking all of them off the land?

## III. The badly broken soil body goes unrecognized.

Now that we are seeing the soil, we realize that depletion of the fertility

brought about a soil body so weakened that it cannot stand up under the hammering raindrops without serious erosion. In order to stop that erosion, we are calling for a "grass agriculture" to give grass cover over much of the country where once a forest cover prevailed. Will the growing of grass on those soils without their fertility improvement put nutritional quality into the forage to keep healthy the cows we expect to eat it? If any national committee sits down to plan a grass agriculture, it is the cow that should be the chairman and should direct the deliberations and plans. In setting up a grass agriculture to arrest erosion we upset most seriously the cow's biology

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supplying our food supply in meat and milk when we believe that we are as wise as the cow in judging the feed quality of the grass.

## IV. Biological order has been overrun by Chemical treatments.

Nature feeds plants by having their roots use acidity, as a byproduct of their respiration and growth, to move nutrients from the soil into themselves. Roots grow our crops by making the clay of the soil more sour. Yet we would fight against that root activity by having the carbonate of limestone so plentiful in the soil that it could never be acid. We fail to see that root acidity, and soil acidity resulting therefrom, are helpful in breaking down the lime-rock, and other rock, to make the calcium and magnesium or lime elements available to the roots as crop nourishment. Excessive liming would keep the soils neutral or non-acid. Soil acidity is a benefit if we use it according to the biology of agri-

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culture rather than the technology of the chemical laboratory.

**V. The sustaining fertility is not recognized.**

When the rock minerals of plant nutrient services in the soil decompose to become soluble there are such large quantities that the plant roots will not absorb all of them or the clay's absorption capacity cannot hold them, then those active fertility elements wash out of the soil and pass into the sea. Yet we make fertilizers of water-soluble salts in the belief that they are taken into the plants more readily from the soil because they are in

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that soluble condition there. If they remained as soluble salts in solution in water they would soon be gone to the sea, or if the rains were not sufficient to wash them out, the generous use of them would "salt" to death the seedlings from planting with their application.

We use soluble fertilizers with the seedlings in but small amounts to avoid that danger. We place them aside or below the planted seed. They are, therefore, only "starter" fertilizers and cannot supply the need for the complete crop. The reserve minerals in the soil must supply that, consequently we must follow Nature's method of using lime-rock, phosphate-rock, potash-rock, and other minerals as the "sustaining" fertility. Dust storms from the West, or from the Missouri River flood bottoms are the Creator's help on loessial and wind-blown soils in the form of fresh minerals because of the Missouri River floods. We would upset the geo-biological arrangement by putting dams across the river behind which, and

under water, there would be the silt deposits now blown from the river on to North Missouri and Iowa to keep those soils productive. Our technologies make mineral fertilizers soluble in the factory. Biology makes them soluble within the soil. Our technologies wear out the soils. Nature's biology builds them up and maintains them in fertility.

**VI. Nature's criteria for good crops have been replaced.**

Biology of Nature doesn't seem to strive for big yields as tons or bushels. Rather, growth seems to be a struggle for protection against disease for fecund reproduction. Technologies under economic controls strive for big yields of mass, rather than of good health and of high fertility in reproduction. Neither does Nature make excessive fat. When we manage production we soon suffer from over-production (and over-weight of body) because our high yields have brought in the carbohydrate-producing crops or shifted them to produce mainly carbohydrates and less of the proteins. Shall we not see declining concentrations and qualities of proteins in our crops as possibly reasons for the increasing insects, diseases, and troubles in reproduction? Managing plant life and animal life as we would make them fit our economic desires, more than their own biological requirements, has upset the biology seriously. Corn hybrids have pushed yields as bushels up now to 300 per acre. But they have pushed concentrations of proteins down. Corn will fatten older animals. It does not serve to grow young ones. We can stay in the cattle fattening business seemingly only as long as there remain the Plains of the west where the cattle can grow the young ones themselves. Gain in weight, as the sole objective, has brought us face to face with a biology upset so badly that midget calves are so numerous as to make the business nearly impossible, in spite of the once implicit—but now shaky—faith in the noble pedigrees of the fathers of the calves.

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The fertility of the virgin soils located to the northeast of the Missouri River was self-perpetuating by the wind-blown, or loessial, deposits of a thousand pounds per acre annually of the equivalent of granite dust with its many elements brought from the arid west and picked out of the winter-dry river bottoms by the prevailing winds. Little erosion and a diversity of crops under cultivation mark those soils among the highly productive of quality crops.

## VII. Agronomics have been submerged by economics.

We have not only upset the biology which is the basis of agriculture, but we would even believe we can push out biology completely were we to follow the thinking of the economists who say "We can now substitute capital for land by the use of fertilizers. We can use capital to make the equivalent of more acres by making each acre produce so much more." While that may be a compliment to those studying soil fertility and plant nutrition, let us not be led astray by the fallacy in that reasoning. Were it sound reasoning, we might use fertilizers on any open spaces (even pavements possibly) and grow crops. There is so much more in crop production than just fertilizers as we now have them, that we dare not believe we control creation so completely that we can prescribe from the chemist's shop all that a soil is giving when it grows our nutritious foods and feeds. Capital cannot substitute for the soil fertility both inorganic and organic, in the land. All the gold in the bank vaults or in Fort Knox, Kentucky, couldn't give birth to a calf, have a litter of pigs, or even lay a single fertile egg. Money doesn't make crops any more than tractors and farm ma-

chinery do. Thinking about money in place of soil has upset biology of agriculture already too seriously during the last quarter of a century. *Attention to the soil as a biological matter more than an economic matter is the basis from which to start searching for the agricultural policy we seem to be calling for now.*

While we have technological bases for our pride in much that has raised our "reduced-labor" standard of living out on the farm, we have not so much basis for pride in the creative standards, if the problems of degenerative diseases are faced squarely. With 52% of our hospital beds taken by the mentally ill, we certainly are in no position to boast about ourselves. With cold wars the custom, and destruction of life pushed up to H-bomb proportions, isn't it time to confess that only very slowly are we coming to understand, or appreciate, the creation in process that operates as agriculture? We understand some fragments of agriculture as a natural art, which science has lately analyzed. But as yet we have not been able to manage creation which still depends on the soil.

Men of success in agriculture must understand the natural forces of crea-

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tive production which operate under the power of rainfall and sunshine, but are controlled by the fertility delivered from rock breakdown of the soil. Confusion now astir in agriculture is slowly coming to see the soil. Soil conservation is a part of the picture but more of it must be integrated into the farmer's management of his farm so that it will be a by-product of good farming for his living and not an added expense. Superimposed by those who view agriculture in terms of only technologies of making terraces to stop running water, or in terms of economics of higher yields per acre or per man for less cost per unit of product, the conservation of the fertility of the soil will not be the result. *Conservation of the soil will result only when the farmer on the land can con-*

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*serve it with the rewards for that service accruing to him, instead of to all who do not share enough in the work and costs required to arrive at soil conservation.*

**Confusion Will Prevail Until The Soil Becomes The Basis of Agricultural Policy**

Our prosperity in technologies applied to industry moved forward because the application of the same technology to mining the soil fertility gave us ample food under a westward march. But because we disregarded the biology of agriculture and some basic laws of Nature, we are now confused about agriculture as we look ahead. Too long have we viewed farming as if it were a case of running a factory. We view it as only another technology. But factories manipulate the dead, not the living, matter. The natural forces of sunshine, rainfall, decay-processes within the soil, the

depth to which the fertile surface soil is dried during drought, the duration of a flood, and others, are not unforeseen to upset the productions of the finished factory goods. But they are serious upsetters in the plans for the products put out by the farmer. The factory manager can predict very accurately the amount of his output and the sale price required to guarantee his margin of profit. He sells, then, on a seller's market. The public pays his price.

Our urban population is concerned with that kind of economics. That kind of procedure is theirs in making a living. That share of our population now amounts to 85%. They live by technologies, by figuring costs plus, and by the control of their margins as they set them in relation to costs. Their assets are always protected. Even for him whose assets are mainly the brawn he invests, there is the group behavior in strikes, lock-outs, etc., to give him a margin above costs of living. The merchant invests his capital in a stock of merchandise. A dollar sale is not a dollar income subject to tax. Instead, 60 cents, or per cent, are exempted to replace the depletion of the stock of merchandise; 25 cents, or per cent, are exempted from tax as costs of operation. Only 15 cents, or per cent, i.e. the margin of profit, are subject to tax. *Thus the invested capital is always protected, and the business is self-perpetuating.* This is the urban custom whether the investment is brawn, skill, brains, or money. The productive capital cannot be lost, but instead, it is guaranteed or protected.

Such is the economic setting within which technologies represent the earning powers. Such is the thinking on which taxation rates, depletion allowances and the many obligations by property toward the community are assessed. It is from the business groups that our legislators come. Laws are formulated with the urban type of business in non-living matters as the pattern of thinking.

**Significance of Soil Neglected**

In that type of thinking the signif-

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icance of soil as a natural resource in food production and in the creation of living things does not present itself. In that type of thinking food is only a commodity of barter, trade, price, volume, perishability, spoilage, etc. Milk there is a matter of so many quarts with a fixed margin of profit per quart. Milk once in the city is not a matter of failing conceptions by the cows, excessive dry periods of too many in the herd, abortions, mastitis, shortage of protein supplements, failing pastures under drought and all the biological hazards which make milk production as a sequel to the birth of calves an almost unpredictable matter as to the costs. Milk becomes a commodity under technology and control after its creation and delivery by the cow under biology. In like manner, once the animal becomes a carcass, it shifts from a creative result of many biological processes to an object of technology.

When 85% of our people see milk, meat, and eggs—our major protein foods—as commodities under the same business transaction as washing machines, furniture, etc.; when such a large share of our people have had no experiences in the hazards of the biological creations bringing us milk, meat, and eggs on the farm; and when our spokesmen in economics, politics, and matters legal come mainly from that majority, can we prevent confusions in matters agricultural? Can we reason out a wise policy coming from those commodities on the shelf? In our search for an agricultural policy should we not start our thinking by considering the soil fertility, which is the beginning point of all the biological creations which are agriculture? Should agriculture not have help in perpetuating the creative, the productive power, in which its capital is invested? *Were we to establish the possibilities and the costs of perpetuating the fertility of the soil (or enlarging its possibilities) as we protect other capital investments, then in our humble opinion, we would be in good position to settle on some semblance of a rational agriculture policy. Should we not start thinking from the ground up?*

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As the result of agricultural research, we have come to understand some of the soil processes by which crops are grown. We have learned that the soils are not self-perpetuating. Soils may be rapidly exhausted of their capacity for quality-crop production. Rotations of crops per se do not build up, or even maintain, the soil fertility. Either the landowner or the operator must do that by returning the organo-inorganic fertility equivalent of the crops removed. He, too, must restock those shelves regularly. In the drier regions or near them, as primitive man illustrated, we may enjoy the good fortune of having fertility blown in as dust. Missouri, Iowa, and other states of the mid-continent have enjoyed that good fortune in their loessial or wind-deposited soils.

We have learned that depletion of the soil organic matter and of the nutrients exchangeable on the clay, has pushed out some crops. The introduced new ones are making less of proteins and more of carbohydrates. We have weakened the soil body and brought on its erosion. We need grass cover, but the grass, like the hybrid corn, would not grow calves, though it would serve only to fatten older animals unless the soil fertility is improved. We have also learned that *fertilizers must eventually be more than starter treatments. They must be the sustaining fertility* as we learned for limestone and rock phosphate in the case of rebuilding the soil in only three elements, calcium, phosphorus, and magnesium. *We are gradually learning that capital assets, namely, the fertility of the soil, in our farms have been under liquidation while no depletion allowance for them has been made.* It is on that fact that the agricultural dilemma on a national scale now rests. We have exploited the soils in a westward march, and can now go west no farther. We are given the responsibility of world leadership, which is calling also for world leadership.

If any agricultural policy is to be formulated, shall not agriculture speak first for such? Shall not the biological processes of the soil managed by the

farmer in the rural areas come under the same categories of taxation, self-perpetuation, margins of profit, etc., as the technological processes of the factory managed by the industrialist? When as a farmer you invest \$100,000 in a farm, you are purchasing the supply of mineral and organic fertility. That is your productive capital by which alone the rainfall, the sunshine, and the fresh air are fabricated into food for all of us. But, with the sale of the products grown on your farm, you are liquidating those fertility assets without recovering their original costs in the price of the sale. The rate of depletion of soil fertility per bushel of corn, at present prices of it and fertilizers, is near 20% of the sale price of that grain. In our income tax regulations, the depreciations in the farming business consider only buildings and fences. No depletion allowances are made for the fertility of the soil. Yet you liquidate your original investment with every sale, but make no charge therefor. You sell on a buyer's market. You buy on a seller's market. *We have been liquidating our national food sources and the farmers' capital investment in fertility of the soil, but under the erroneous belief that the farmer was taking a profit. We are now all crying for an agricultural economic policy.*

#### Depletion Allowance

Let us consider then, the reasonableness of viewing the soil and its mineral contents in the same category as a limestone quarry, as a gravel pit, or an oil well. Depletion allowances

of 15% are common in the mining of the minerals. If the removal of calcium as mineral from a quarry warrants 15% depletion allowance to protect the investment so as to provide another quarry on the exhaustion of the first one, shall we not view calcium removal from the soil in crops as deserving a depletion allowance correspondingly or higher when it represents potential food? Isn't it fair that the minority protecting the national food source should speak up and protect its investment? Shall the capital assets of the farmer be liquidated for the privilege of his protecting the food resource of the country?

The faith of the farmer in his compatriots has not yet fallen so low to let him believe that his voice calling for just consideration will go unheard. The time is now upon us to present the case of the soil as a natural asset for which there is no substitute. We have exploited our forests but have found substitutes for wood for our shelter. We have exploited our wildlife but are content to forget fish and other wildlife. But when the soil fertility is the creative means of food, we dare not forget that for which there is no substitute. As yet no Congressional debator has been found to take the negative side of the proposition "Man must eat." On the affirmative side of that proposition the farmer wins the argument when as a minority he reminds us that our national strength lies, not in the technologies of destruction, but in the biologies of creation of life, all of which takes its start from the fertility of the soil. ●

