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GENETIC ENGINEERING — COMPLEX PATH TO FAILURE

Today plant diseases destroy one-fifth of all food produced in the world!

"Bent over a microscope, armed with minuscule manipulators, Roy U. Schenk, a crew-cut bio-chemist at the University of Wisconsin, spends many hours each week guiding two ghostly plant cells in an attempt to fuse them. So far, he has tried to unite only cells from the same species, but his ultimate aim is nothing less than fusion of different species, to create plants that never existed before... The eventual results, he hopes, will be plants engineered to have extraordinary resistance to disease and insects, plants so high in protein content that they will produce the nutritional equivalent of steaks on the stalk" (*Fortune,* April 1969, p. 127).

By careful manipulation of genes and chromosomes, many plant geneticists are striving to produce the ultimate — *plants strong enough to overcome disease.* Will plant breeders succeed? Can they genetically engineer the *'super-seed',* the living dynamo of vitality that will produce seedlings resistant to all attacks by plant disease?

Press releases often say they can. Unfortunately they are dead wrong! This edition of *Your Living Environment* will show the real *cause* of plant disease and *why* plant breeders can *NEVER* genetically engineer disease-resistant varieties that will last.

ALL professional men inevitably view their own work as one of great importance to the world. But few believe this more thoroughly than plant geneticists.

Seldom has any group of men taken so much power unto themselves and yet remained as innocent as babes in the eyes of human society! Geneticists have elected to bail the food producer out of very real trouble. Man's food supply is at stake and whether 3500 million humans know it or not, the geneticist has moved in to *re-engineer* that part of God's creation which directly sustains human life!

The scale of this genetic experimentation is little realized, but it has enormous financial backing! Recently the sales director of a British seed company told a group of growers:

"...the total investment necessary to get a hybrid variety on to the market could exceed £1 million" *(Farmers Weekly,* Feb. 20, 1970).

A staggering figure in itself, but multiply it worldwide by the rapidly increasing number of replacement varieties being "released" every year! Would you believe that this director was warning British seed breeders to spend *MORE* money developing cereal hybrids or face being squeezed out of the market by the Americans?

BRITISH PLANT BREEDING — SUCCESS OR FAILURE

Few countries have devoted more money, material and effort to plant breeding than Great Britain. Years of devoted effort have been expended in a running battle with disease. But has lasting success been achieved? Have the genetic manipulations of professional seed breeders given lasting success? The farmer ought to know, so let him speak:

"All is far from being well in the cornfields of England; [*wheat, barley and oats are collectively called corn in Britain*] *from every side* there is *talk of reduced yields caused by disease,* spread of wild oats and black-

grass..." (*Farmers Weekly,* December 29, 1967, p 35).

"At present new varieties of cereal grains [*the pride and joy of England's plant breeders*] are not achieving their disease resistance potential and were *unsatisfactory* relative to older varieties once they were on the market" (*Farmer and Stockbreeder,* Nov. 11, 1969).

"Some of the newer barley varieties have succumbed rapidly to new races of the disease when under large-scale cultivation" (*Farmer and Stockbreeder,* Feb. 24, 1970).

"Experience has shown that *no* variety can be relied upon to remain resistant for many years" (*Farmer and Stockbreeder,* April 30, 1968).

Many more quotes could be given to prove that a veritable disease explosion is occurring in the world's grain fields — nearly all of which have been planted with genetically engineered 'super-seeds'. These seeds have all been widely proclaimed as *resistant* to the very diseases with which they are now plagued. Any ideas that our self-appointed plant-engineers are on the verge of a break-through and need only a little more time is an illusion that must be shattered.

PROOF VIA SUBSEQUENT EVENTS

It is now just on three years since this particular issue of *Your Living Environment* was first printed, so it is most interesting to look at subsequent results of plant breeding. Put another way, one might say that this *reprinted* issue is in part, a progress report on the contents of the 1970 original issue.

That which we wrote then would have been totally unacceptable in most scientific circles. That which we write now will also be unacceptable to those same people. The important thing then is to assemble the facts and let them speak. That way you can draw your own conclusions.

Within months of our original article, *Corn Blight* swept through the American maize industry. And amid the subsequent soul-searching came such international news headlines as:

"CORN CROP DAMAGE SPURS QUESTIONS ABOUT HYBRIDS"

"Starting with corn, the National Academy of Sciences (NAS) is taking a hard look at the genetic vulnerability of this nation's food crops. [*That means a number of crops are in trouble, not just maize.*]

"And the question is whether seed hybridization, and the genetic tampering it implies, may at some point subject entire crops to unexpected disaster. ['DISASTER' *is no exaggeration! In some states the No. 1 food crop of America was slashed by 50% and the total estimated loss was 700 million bushels!*]

"The question now before the panel is whether wide use of hybrid strains of seed corn may not be producing a genetic uniformity that could subject an entire U.S. food crop to destruction via a single new pathogen.

"The hybrid strains of certain corn seed ... carry the so-called Texas male-sterile (TMS) cytoplasm. ... the TMS genetic base corn is highly vulnerable to a mutant fungus form, helminthosporium.

"Seed corn, it appears, has a much narrower genetic base than previously believed. By upsetting the genetic composition of seed corn ... the seed's resistance to the fungus seems to have been impaired.

"This particular group has no authority to go into the broader subject of genetic engineering as it may affect, beneficially or adversely, mice or men.

"But the experience with hybrid types of corn suggests that any plans to alter the genes of higher forms of life require extensive exploration before anything is done in the new scientific realm" (*The Christian Science Monitor,* Thursday, March 18, 1971).

A recent report states that:

"South Africa still imports seed potatoes from abroad at a cost of R850,000 annually but every effort is being made to produce adequate supplies of certified seed locally...

"But there remains one big nigger in the wood pile — the source of virus diseases which can reduce the crop by up to 50 per cent...

"The Chief Inspector responsible for the potato seed certification scheme, has appealed to seed potato growers to get to know these diseases as speedily as possible and to take timeous precautions against them!" (South African *Farmers Weekly,* Jan. 7, 1972).

One wonders if it would not be more appropriate for this gentleman and the South African potato growers to become more concerned about the real cause of these disease problems. From this report it looks as though it could be worth at least R850,000 per year to their industry, plus the annual value of disease losses on commercial production! Eventually they will have to realise that NO amount of *plant breeding, insecticides* and *systemic fungicides* will remove the cause of these expensive problems. This is indicated later in the article where it continues by stating:

"About a year or two ago, it was assumed that complete control over virus diseases in seed potatoes would be achieved, but results of the past two seasons have again given cause for alarm" *(ibid.).*

And may we predict that they will CONTINUE to give *"cause for alarm"!*

The latest evidence we can present is a retrospective view of Britain's last grain harvest and the commentary is devastating when viewed against the earlier claims of plant breeders.

"WHAT ELSE CAN WE TRY?"

That was a recent headline in the British farming press to an article on the latest problems facing its grain industry. It sounds more like a plea made in desperation than the lead-in to a success story. It continues:

> "Our yields of barley have been declining, our average is hardly 23 cwt an acre. We cannot afford to let it go lower. What else can we try?" (*Farmers Weekly,* Nov. 3, 1972, p. 84.)

WHY PLANT GENETICISTS HAVE FAILED!

New *varieties* released by modern plant breeders usually meet with initial success. Over the long-term however, they *fail!* That is proved by today's accelerating variety replacement. At the same time remember that the geneticist has brought our plants and animals to almost the same point that man himself reached immediately prior to the *Flood!* With such a record, isn't it futile and dangerous to believe that genetically-engineered super-seeds spell success?

You may still not fully perceive the long-term *danger!* I don't think we in this Department do either. But the *'futility'* of the geneticists' work will be better understood once we see *WHY* food producers experience increasing failure of *new* plant varieties.

There is a very simple reason for these failures. Among others, Albrecht and Howard, (two eminent agricultural scientists working independently and on different continents) discovered, or perhaps *re-discovered* the real CAUSE of plant break-down.

Sir Albert Howard (who was knighted for his agricultural research of more than 25 years in India) pinpointed the basic *cause* and *purpose* of plant disease. He states that:

> "It was observed in the course of these studies that the maintenance of soil fertility is the real basis of health and disease. ... Insects and fungi are not the real cause of plant diseases but only attack unsuitable varieties or crops imperfectly grown. Their true role is that of censors for pointing out the crops that are imperfectly nourished and so keeping our agriculture up to the mark.
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> "... the diseased crop is quietly but effectively labelled (by rust, smut, mildew, root-rot or insect attack) prior to removal for the manufacture of humus ...
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> "Mother earth has provided a vast organization for indicating the inefficient crop. Where the soil is infertile, where an unsuitable variety is being grown, nature at once registers her disapproval through her Censors Department. In conventional language of today the crop is attacked by disease.
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> "In recent years, another form of disease — known as virus disease has been appearing. When the cell contents of affected plants are examined, the proteins exhibit definite abnormalities, thereby suggesting that the work of the green leaf is not effective" (*An Agricultural Testament,* Sir Albert Howard, pp. 39, 156, 161).

Dr. Wm. Albrecht (Prof. Emeritus of Soils at the Missouri Experimental Station), with over sixty years of practical experience in crops and soils agrees with Howard when he states:

> "Much reliance is put on the belief that by selecting and propagating certain plants of a crop we can eventually find those which *tolerate* 'diseases' like smut, rust, foot-rot and others. Much is said about *'breeding resistant crops'* or those which will *'tolerate'* such troubles. We fail to see the 'germ' diseases as attacks by those invading foreign proteins [*viruses, bacteria or fungal organisms*] ... in their struggle to get their necessary proteins ... We fail to see that immune plants are those getting enough soil fertility support for creating their own protective proteins or antibiotics ...
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> "Any hope that we might *'breed* plants to *tolerate disease'* is a vain hope when it is *not drugs, not poisons,* but *soil fertility* which protected the virgin crops ... of nearly 'perfect' plants.
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> "If deficient plant nutrition, especially with regard to proteins, brings on diseases and pests as Nature testifies then to believe that we could 'breed' for such resistance is the equivalent of believing that we could 'breed' a plant to tolerate starvation" (*Soil Fertility and Animal Health,* Dr. Wm. Albrecht, p. 193).

In effect modern plant breeders are engaged in the losing battle of providing food producers with a constant succession of 'new' varieties. How could they win anyway when it takes fifteen years to establish a new variety and only three years for farmers to destroy it on low fertility soil?

Properly interpreted, plant breeders are merely attempting to patch up *mistakes in soil management.* And all their talk about 'miracle' grains is merely bragging about the size of their *patches.*