

VIEWPOINTS

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Social Responsibility in Horticultural Research and Teaching¹

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Dramatic increases have recently occurred in the productivity of the major food crops (rice, wheat, corn, grain sorghum, potatoes). These advancements have characterized a worldwide "green revolution" and received much publicity (2). An equally remarkable and parallel record of production efficiency, accompanied by an enhancement of quality, has also occurred with most fruits and vegetables (7). Many of these remarkable changes have transpired where as an increasingly greater percentage of the commodity is being utilized in the processed form.

We have helped create a technology that has liberated 95% of the people of this nation from earning their bread by the "sweat of their brow." We have a food supply that is abundant, tasteful, attractive, nutritious, convenient, and safe. The cornucopia of plenty has been turned into reality as a modern all-time miracle. Never before in history have so few done so much and the scientific achievements come so rapidly.

An element of discontent, however, was voiced 10 years ago. A book, *Silent Spring* was published (1). As a best seller, it shook the establishment and changed the course of much research in the plant protection area. Its impact is still being felt.

Ten years later, June, 1972, another document, *Hard Tomatoes—Hard Times* (5) appeared. It was a preliminary report (over 300 pages) of the Task Force on the Land Grant College Complex Agribusiness Accountability Project and authored by Jim Hightower, with the help of Susan DeMarco. Much of the content is horticulturally oriented and is stimulating criticism and a greater demand for accountability of our actions. Note these harsh words: "Land Grant colleges have become closed communities. The administrators, academics and scientists, along with USDA officials and corporate

executives, have locked themselves into an inbred and even incestuous complex, and they are incapable of thinking beyond their self-interest and traditional concepts of agricultural research." (p. 145-146)

"The greatest failing of Land Grant research is its total abdication of leadership." (p. 149)

"It is difficult for fresh air, much less a fresh idea, to pierce the chumminess of it all." (p. 150)

"Tax dollars buy new tinker toys for agribusiness, misery for migrants, death for rural America and more taxes for urban America. All in the name of efficiency." (p. 111)

"These researchers are playing around with games while rural America falls apart. It is a tragic perversion of the Land Grant mission, and it is evidence that the system is incapable of monitoring itself." (p. 104)

A third report, *Failing the People* (6) has leveled an outright attack on the relevancy of the agricultural research and extension programs of one of the most prestigious Land Grant institutions — Cornell University. The claim is that agricultural technology has been over-emphasized at the expense of the well-being of rural people.

Hard Tomatoes—Hard Times is an attack on the state and federally supported Land Grant colleges and universities of America. *Failing the People* is highly critical of a state institution. *The Great American Grain Robbery* (4) the most recent release, is an indictment of leaders in the United States Department of Agriculture.

We and the horticultural industries, meanwhile, are facing state and federal courts, and tribunals of public opinion on issues of residues in foods, pesticide use, migrant labor, worker housing, processing plant run-off, safety and health regulations, open burning, food prices, air pollution from orchard heating, clear cutting, predator control, recreational infringements, land use, corporate farming, vertical integration, collective bargaining, secondary boycotts, cosmetics in food production and processing, and concern for "Generally Recognized as Safe."

Most of us are affiliated with Land Grant universities that devote a major portion of research investment to the promotion of greater agricultural production efficiency through mechanization, the use of fertilizers, pesticides, and superior crop varieties. In state experiment stations we still expend 62% of our budget on efficiency of production and protection of crops and livestock.³ We still carry on as though the United States were in desperate need of new technology to increase farm output and save the world from starvation. We've been telling this story so long now with no major calamity in 30 years, and none in sight, that no one longer really believes us. This is underscored in a nation that annually pays billions of dollars for diversion and taking agricultural land out of production. If there was ever an example of a good thing overdone, this is it, and we are guilty. The continued expenditures of taxpayers money for horticultural research necessitates that we as servants of the people, and on public payrolls, look above the plan beyond our personal prejudices, biases and hobbies.

Many of us were forged by the Great Depression of the 1930's and honed by the Second World War. Today we are facing the first generation in history where food, shelter and clothing are not the primary concerns. Youth are reacting against our establishment as to what they eat, where they live, and the clothes they wear. They've never known hardship.

Our system has already turned out a generation of students that have been steeped in myths that cannot be supported by fact because we in the classroom have not taught a sound basis for the science they know.⁴ These

³Current Research Information Service, Cooperative State Research Service United States Department of Agriculture, Washington, D. C.

⁴The author is grateful to Dr. Dale D. Harpstead, Chairman of the Department of Crop and Soil Sciences, Michigan State University, for some of the thoughts in this paragraph.

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myths include (a) *plants resupply the air with oxygen*. This is not true. Oxygen is in a very short cycle involving the life, death and decomposition of the plant. (b) *Crops can be made to produce twice as much on only half as much nitrogen*. The truth is – the plant doesn't waste nitrogen. Nitrogen may be lost to the ground water because of solubility or transformations or lost to the air by denitrification, but don't blame the plant. (c) *Strange-sounding plant components* (zinc, copper, lead, cobalt, selenium) are by definition harmful. (d) Finally, in the words of Emanuel Epstein "we have witnessed in recent years an amazing recrudescence of a quaint lore about 'organic' gardening and food production that reveals an almost total ignorance among many people, including a sizable fraction of our college population, of the most basic facts concerning the nutrient elements of plants and their absorption. The neglect of this subject in the current teaching of biology has no doubt contributed to the ready acceptance among so many students of thoroughly discredited ideas about the nutrition of plants." (3)

Agriculture, particularly horticulture, could become the academic darling of the 1970's. Crops, livestock, flowers, gardens, and the environmental sciences are no longer of low prestige as far as students are concerned. Almost everyone is interested in plants. Every

backyard gardener, homeowner, businessman, shopworker, housewife, and even college student could have an interest in or become fascinated by horticulture. Many high school and college students today want practical firsthand exposure to crops and livestock. Perhaps it is hobby farming or recreational horticulture, a renewed interest in health foods, or the romance of horses, beef cattle, gardening, and hydroponic greenhouse tomato production, or just the thought of being close to nature and in the out-of-doors.

The unprecedented is happening in the College of Agriculture and Natural Resources at Michigan State University. I am sure this is true of many other Land Grant colleges and universities. At Michigan State University there is an all-time record enrollment of undergraduate students in agricultural and natural resource courses. Over 1,300 were turned away Fall Term, 1972. Much of the interest is in long-time traditional basic or core agricultural courses. Are we equal to the challenge? Is there a message? Will we pass up this opportunity? Horticulture for millions should be our motto. We are entering an age where the "millions" are not concerned with dollar costs and returns on their investments.

Restructuring of investments in research and training is called for both at the graduate and undergraduate levels. Greater opportunities should be

provided in urban and landscape horticulture; recreational, environmental, and therapeutic horticulture; in fruit, vegetable and flower gardening; in addition to meeting traditional needs in commercial fruit, vegetable, flower, and nursery production, and processing and handling.

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Letters to the Editor

Binomial for Apple

From time to time someone asks why we can't use a single binomial for apple. Yet recent papers in the *Journal* (ASHS) and *HortScience* have used *Malus sylvestris*, *Malus domestica* and *Pyrus malus*. Many horticulturists use *Malus* for apple and *Pyrus* for pear. Yet many botanists and some horticulturists lump pears and apples into the single genus *Pyrus*. In such controversies we should ask, "Are there sound reasons for having two genera and would those working with such plants benefit by such separation?" If not, then they should be lumped. In this case I can list several reasons for retaining two separate groups. I am presently co-authoring papers dealing with the taxonomy of both pears and apples, which provide details supporting such a separation.

Considering such traits as graft compatibility, breeding behavior, phenolic constituents, flower

morphology and flower odor, there is much less variability within *Pyrus* than between *Pyrus* and *Malus*. All pear species are graft compatible, but most pear-apple grafts are incompatible. The 20-odd pear species are all self-sterile cross-fertile sexual diploids ($2x = 34$), while apple species are $2x$, $3x$, $4x$, and $5x$ and include some sexual forms along with both facultative and obligate apomicts. Apples rarely cross with pears and any resulting offspring are sterile. Yet pear \times pear or apple \times apple interspecies crosses are common and the hybrids are usually fertile. The apple inflorescence is determinate, while all pear species are indeterminate. Chemically, apple species contain phloridzin and other phenols which are lacking in all pear species. Conversely, pear species contain a large number of phenols never found in apple species. All pear flowers contain amines which result in putrid odors, whereas apple species have pleasant smelling flowers characterized by certain volatile esters.

In all these traits, within-group variability is minor but between-group variability is large. There is as much logic in lumping *Sorbus*, *Cydonia*, *Mespilus* and *Crataegus* into a single genus as in lumping *Pyrus* and *Malus* into one.

If we agree that apples and pears should be separated, can we now decide on a standard binomial for the common apple? I would suggest that we use only clonal or cultivar designations for domestic forms, e.g. 'McIntosh' apple rather than *Malus domestica* cv. McIntosh. Domestic forms of most fruits which have been selected by man for thousands of years are complex hybrids of two or more original wild species, thus a binomial has little meaning. Papers dealing with taxonomy, variety origin, breeding or wild forms would benefit from appropriate binomials so long as the authors don't extrapolate too far beyond their personal knowledge of the species under study.

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