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## LEAPFROG RESEARCH

**W**E ARE ACCUSTOMED to defining research as basic—for knowledge only—and applied—for our direct financial, social, or physical benefit. We soften or focus these definitions with adjectives—"mission oriented" basic research—or "problem solving" applied research. We also use the adjectives "adaptive," and "development," and "fundamental" and, recently, "utilitarian." The latest descriptive phrase is "interdisciplinary research relative to the problems of our society."

But there are only two ideas in all these definitions: there is research for new knowledge, unrelated to our problems; and research to directly solve problems. The latter type of research is *always* accompanied by the application of knowledge not before applied in that particular way. It is characterized by shotgun or multiple approaches, and sometimes even actual fumbling. If it is not thus characterized, it is more apt to be true development, the problem being solved by logic or design.

I suggest a new approach to solving our problems in agriculture, that of leapfrog research. This means by-passing or leaping over the immediate problems and jumping ahead to new methods without experiencing the problem pains. The early settlers in this country, and the settlers in some parts of the world even now, cultivated a plot of ground until it was "worn out" and then moved to a new plot. These days were over for us in the United States by 1920. Since then our great advance in food and fiber production has been through the application of knowledge developed in our laboratories. Occasionally, we still have an opportunity to use new land but we have reached the stage of not being able to leave our old land. But sometimes I believe we could walk away and leave some of our old problems.

Leapfrog research would require a change in state of mind rather than a new research method. It would require driving with the car headlight beams in the raised position rather than depressed, so we could see the future rather than just the obstacles immediately ahead. It would mean following Albert Einstein's advice: "... imagination is more important than knowledge."

There is space here for only a few examples of what I have in mind. We have been farsighted enough to take a few leaps into the future. Forestry research is foreseeing a time 20 years from now when most of the great trees will be in parks (museums), and is preparing now for production and harvesting of small trees. These fast-growing small trees must produce several times the amount of lumber we get from the big trees.

We have people considering ways to grow disease-free plants in the fields through tissue culture. What an engineering design problem application of this technique will be!

### Abscission Secret

We are energetically trying to solve the abscission secret in citrus so bulk harvesting can be accomplished. If only someone had taken a leap in this direction 30 years ago!

We have a tremendous problem with us in soil compaction due to our heavy machinery, multiple field operations and multiple cropping. Engineering and management could leapfrog this problem today.

Some of our research and extension staff are trying to solve the problem of waste disposal through recycling manure, leaving harvest wastes in the field for direct return to the soil, and through utilization of straw and rice hulls.

Leapfrog research may be a state of mind. It may require that extension staff members become design engineers, looking sometimes for knowledge already in the bookshelves (but never used) to solve our problems in new and imaginative ways. It may require that we all try to sell new ideas to those who will apply them (as the old-time county agent did) rather than to wait until we are deluged by industry problems.

It may require that the researchers state the problem in a new and imaginative way, as did the MIT professor of engineering when he asked in a final examination "How far can a crow fly on a spoonful of corn." The answer is not in a book, but the data to solve this problem and many in agriculture today are available if we search diligently, and make full use of our knowledge centers.