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AGRICULTURAL SCENE

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AGRICULTURAL SCENE

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It has been suggested that our approach to agricultural bird problems is perhaps wrong, and I feel it would be valuable to ask several individuals to give their ideas as to where their programs are heading right now. I would first like to ask Jerry Besser, the Chief of the Bird Section of the Denver Wildlife Center, to give just a brief statement as to where they are now.

BESSER: Most of our efforts are being channelled into the agricultural area on a broad scale. Many of the problems are national ones. We can put our finger on the losses much more easily, and they are quite substantial. Corn loss for a two-year study in the United States has shown to be six million bushels. We have multi-million dollar losses in crops as substantiated by statistics dealing with such crops as grain sorghum. Recent data have been assembled to show that there are quite large problems existing, though they may not affect a substantial portion of corn production. However, they still are sore problems and, if solved, would allow the export of millions of bushels of grain and a great number of pounds of fruit or allow these products to be consumed by people in the United States. This is better than having the crops go to the birds. We are not worried about the birds' starving during the summer or the early fall when seeds are in great abundance.

The immediate future of our program in not pesticide development, but I would call it plant protection. We have had a number of programs in this area that have had considerable success with most of the crops tried. It will probably be difficult to get the agents developed. We have tried non-chemical means, physical means, and auditory means, in particular, and ecological means. I know that cultural practices, or habitat manipulation, have a great place in long-range programs. In the immediate future, 70-80 percent of the solutions will probably come from the area of chemical protection. We are working now principally with three types of environmental chemical agents; we no longer put as much emphasis on toxicants. We have found agents that will fully solve 6 percent of the total problems that we have in our agriculture.

It has been extremely difficult to get the details registered. It is becoming more difficult, and it will probably be even more difficult in the 1990's; and this is why we are putting much more emphasis in this area of repellent chemical practices. I feel that you will hear more about these agents in the future.

DYER: I would like to suggest that present research is incomplete. The present research that I know of, or have been associated with in the past, and some of the other Bureau programs certainly have the right intentions; and the objectives are well defined. What I will try to do then is to explain to those of you who are not familiar with some of the systems level programs the incompleteness that presently exists in ecology today.

It is not due to any particular agency's or individual's fault; it is just something that has finally come on the scene, and I think that we can probably benefit from these types of programs.

Basically the International Biological Program (IBP) was set up in the mid-1960's to take a look at the various world ecosystems. The program was conceived in Europe and patterned after some of the IGY programs. It was scheduled to go for approximately a 10-year period. The U.S. was very slow to get into this proqram, but in the late 60's came through with rather awe-inspiring programs that swept over the rest of the world.

Basically the U.S. set up, with the National Academy of Science's blessing and under National Science Foundation funding, five biome programs. There were originally six scheduled, but one did not get off the ground; and this was the tropical biome. The ones that were funded were the Grasslands, Coniferous Forests, and Deciduous Forests Biomes, located in Oakridge, Tennessee in the east; the Tundra Biome centered in Fairbanks, Alaska; the Coniferous Biome centered in Seattle; and the Forest Biome located in Logan, Utah. The objectives of the groups were to study the structure and function of natural ecosystems and to emphasize energy utilization. I think these are the areas of the future.

There are several world bodies set up, such as Terrestrial Productivity (TP), and the "Biomes" program falls under this TP section. Another active group on a world-wide basis under this TP section is the Granivorous Birds Group. Several people in the United States are associated with this program. It started originally with *Passer domesticus,* the House Sparrow, and expanded into the free Sparrow of Europe, Quelea of Africa, and finally, through requests to us when I was working with the Bureau, the Red-winged Blackbird and other birds that are of major interest to the world.

STONE: What does all of this mean? It means simply that we put together under the basic research guise the potential for systems analysis in the true sense. There were a number of analysts associated with the development of this program, some good ecologists such as Fred Smith (University of Michigan), who set up the analysis of ecosystems studies and who defined the basic concern: Is the ecosystem a biological entity? I feel that we can answer, on a theoretical and a practical basis, yes; we can identify an ecosystem. What does this mean then for the birds?

For one, it means that there are a number of spin-offs coming from these programs. Funding has been in, the neighborhood of $30 million, and we have been given a three year phase-out schedule, because many of the original objectives have been realized or are on the horizon. The birds that are problems in agriculture or in the urban areas exist within these biomes. Thus the biome analyses have direct implications on all the structures of the bird populations and the growth of bird populations towards utilization potentials that man has designed for these biomes.

To handle such a tremendous amount of data it has been necessary to borrow the engineering tools developed by the space age, mostly by NASA, and continuing development of computers, which has brought us to the biologically-based computer simulation model. It is a tremendous tool, and I think it can be called a major breakthrough. It is nothing more,

however, than the utilization of good biology in a computer sense. In its early development, it was heavily critized because computer experts were needed to run the models. I can tell you that at this particular time, it is no longer necessary to employ pure mathematicians to run these models. Because of a lot of advances in computer technology, they can be run by virtually anyone.