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BLACKBIRD DAMAGE AND CONTROL--AN INFORMAL SEMINAR

Dr. M. I. Dyer, Chairman

DR. DYER: Through some conniving of Dr. Jackson and Dave Schneider, I have been placed in the chairing position of this very informal seminar. The object is to hash over a few problems as we see them on this red-winged blackbird situation. Perhaps first a round of introductions would be in order, so that we will all know who is here. I'm Mel Dyer, University of Guelph, Guelph, Ontario, so let's go around the table and state our names and affiliations.

Tom Stockdale, Extension Wildlife Specialist, Ohio Cooperative Extension Service, Columbus; Maurice Giltz, Ohio Agriculture Research and Development Center, Wooster, Ohio; Joe Halusky, U.S. Fish and Wildlife Service, Columbus, Ohio; Daniel Stiles, U.S. Fish and Wildlife Service, Washington, D.C.; Paul Rodeheffer, U.S. Fish and Wildlife Service, Columbus, Ohio; Brian Hall, Blackbird Research Project, University of Guelph, Guelph, Ontario; George Cornwell, Virginia Polytechnic Institute, Blacksburg, Va.; Dick Warren, Peavey Grain Company, Minneapolis, Minn.; Bob Fringer, N.J. Department of Agriculture, Trenton, N.J.; Charles Stone, U.S. Fish and Wildlife Service, Columbus, Ohio; Larry Holcomb, Ohio Agricultural Research and Development Center, Wooster, Ohio; Doug Slack, Ohio Agricultural Research and Development Center, Wooster, Ohio; Charles Wagg, N.J. Department of Agriculture, Trenton, N.J.; Dick Smith, U.S. Fish and Wildlife Service, Columbus, Ohio; Jim Caslick, U.S. Fish and Wildlife Service, Gainesville, Fla.

DR. DYER: Fine. I have a few things to say, and perhaps I can throw out some controversy, then we can take it from there. As I see the situation, as a director of a red-winged blackbird research project, we have a problem which has been defined in human terms concerning a natural animal population. This has been the underlying current of the whole session here. I would like to start by directing the discussion to the human aspect for a few minutes and see how far we get. I have been suggesting recently to some of the agricultural people that perhaps we should seriously look at an alteration of the human aspect of planting early maturing varieties of corn early in the season. We have two problems in Canada, and I'm sure elsewhere; there is the agricultural problem and an animal problem, definitely. We have decided at this conference that the task of deciding whether the animal population is

too low or too high is a very difficult task. So maybe we can approach the problem from the other end, the agricultural end.

This approach is not anything new, but it strikes people strangely. They say, "Well, birds are causing damage to agriculture, so why don't we do something about the birds?" The crops people at our University tell me that they have been on a program for several years to revitalize the corn industry. Some of the things they say makes sense to me, and I try to understand them when I see them in the field, and I think that an adjustment or revitalization will help the bird-crops problem. The crops experts think that the business of getting the corn seed into the ground can be greatly altered. There is a lot of evidence that earlier plantings can be made; they will have to work out some of the technical details such as how early can the ground be worked, etc. Assuming that this is a possibility, and that early maturing varieties have a good yield, and that the revitalization story of improved fertilizing, tilling, etc. can be put across to the farmers, and that this will increase the cost-profit margin, this system will help reduce the bird problems immediately. We saw this a year ago in one Ontario corn crop which was mature on August 15, long before the blackbirds were there in great numbers. Unfortunately, a small unattended flock decimated the farmer's field. Still the promise of bird-free corn was there.

So, I'm suggesting that this be looked into more seriously. I don't know about conditions south of Lake Erie, nor Michigan, nor New Jersey, but Ontario is one place where it could work. It seems to me that we have to bifurcate our activities. So we have a bird problem and an agricultural problem. Just how active can we get the agriculture people to look at their past planting and harvesting activities. Can they alter their pattern to produce a shift within the season, to time the growing season to avoid the masses of birds during the migration season? Agriculture, I think, has a responsibility to us to give this a try. With this, I'd like to sound out your feelings along this line.

R. SMITH: I'll say that many of the Ohio growers have, of their own accord, gone toward this direction by trying to get all growers to plant at the same time, so that it matures at the same time, and they don't have this staggered effect of bird damage.

DR. DYER: Yes, that means that damage can be evenly distributed over the whole area. Damage to the economy as a whole will be the same, but no one farmer is taking the brunt of the blackbirds.

R. SMITH: We have also had instances in the past few years of birds going to other crops, such as cabbage. This, I think, is because of the pressure of the numbers of birds more than anything else. With a change to an earlier variety of corn, perhaps a shift of attack to other crops may occur.

DR. DYER: Without a doubt, if you change one thing, you run the risk of coming up with another problem. So you have to stay pretty loose, if there are masses of birds in the region.

R. SMITH: Many farmers are individualistic, and I think that selling such an idea based on change would be difficult. But, of course, the farmers will go to the crop which produces the highest yields; perhaps the crops people could "sell them" in this way.

DR. DYER: Tom, you have worked in this business. Economy is a very important part of this. If you can show that a crop is profitable, do the growers take hold of the idea readily?

T. STOCKDALE: The thing which has concerned me for the past several years is that I hear very little from the agronomists, the segment of the agricultural community which I think should be very concerned. We have not had an interest expressed from either research or extension agronomists on our Coordinating Committee for the Control of Depredating Birds in Ohio. I think that this is the place that we are going to have to start. It's not wrong to say that growers in Ohio look to their agronomists for leadership. I don't know what we need to do to "sell" the agronomists.

DR. CORNWELL: A year ago I wrote the project leaders in agronomy at all land grant universities to solicit their point of knowledge on bird problems and agronomic practices. Although all of them answered, the answers were negative, except for five agronomists who had some interest in some program for alleviating bird damage or had some program under way at their school. Most of the agronomists who answered weren't even aware of bird-resistant strains of corn nor were they conducting any tests in their states on the suitability of planting bird-resistant corn. In Virginia, the eastern half of the state is ideal sorghum country, but it is not planted because they can not get a crop off because of blackbirds. The agronomists and farmers are all hooked on the white-seeded sorghum, and even though we have some excellent bird-resistant sorghums, which would be the crop of choice in this region, bird-resistant varieties are not even being field tested. So this is a critical problem. It isn't just the agronomists, but the farmers have evolved these practices over a long time and they believe in them. And extension agents have learned through the years, that when the farmer believes in something, you don't change it readily.

T. STOCKDALE: I think another point here, George, is that up until the past 15 months, our farmers have raised their voices at the time their corn is being damaged, but once the corn is harvested, they forget about the bird situation until the following year. I say, 15 months ago, because

Ohio now has three very vocal organizations of corn growers, one embracing 400-500 farmers in the Sandusky Bay area. They are doing a lot to keep the voice of the farmer who is suffering a loss loud and clear throughout the year. This in itself will stimulate more concern on the part of the agronomists; it is obvious that there is now more concern from the College of Agriculture and State Department of Agriculture. I think that we are on a threshold right now.

DR. DYER: I have observed this seasonal nature of bird damage complaints also. It occurs to me that the biologist is doing several jobs that perhaps he should not do. He's become an economist; he decides that the situation is serious. He also attempts to do a job in psychology understanding the growers' attitudes. The biologist becomes the proverbial "jack-of-all-trades." But if we do recognize a bifurcation of the problem: one agricultural and the other biological, I don't really see any sense in the biologist having to handle a couple of fields in which he really isn't very expert. I speak from personal experience. Perhaps I am speaking out on a complaint which no one else really cares about, but I would prefer to work on understanding the birds. With expanding human populations and a world hunger situation facing us, the problem is going to get worse before it gets better. We are going to have to concentrate more of our energies on the bird itself rather than on immediate problems; this is where the biological solution lies.

We seem to need better description of ways of attacking the bird depredations problem. Should we become more noisy about the concept of team research, and bring in public relations people, economists, agronomists to work in close proximity with existing blackbird projects?

DR. GILTZ: You have hit on several things which I think we must accept. This summer, at our North Central branch, we had an experiment on sorghum to determine the susceptibility of some varieties to blackbird depredations. Oddly, there was no connection between this test and the blackbird research also centered at the North Central farm. I did not know of this test until I saw the sorghum. There are several varieties of corn also sent to the farm by agronomists for test under different conditions of planting, fertilization, etc. But the only result which they want can be answered yes or no to: "Is there any corn left on the cob?" Whatever happens regarding the birds between planting and final evaluation will not be recorded. We need someone who is well enough versed in agronomy and bird biology to run through these tests and wring out the pertinent facts regarding both studies for both interest groups.

We also need considerable help with the farmers who press for help especially when the birds are flocking and damaging corn. As you

say, a biologist can not do all this. But the farmers have a solution which is, "Bird don't fly over my land." The farmers resent the biologist who says "I can't stop the birds from flying over your land." They will urge and force you to do something other than what you are doing. We know, as biologists, that you can't keep the birds from getting to the farmer. We need someone who can tell the farmer this at a time when he is willing to listen. I agree that the Fish and Wildlife Service is doing everything that all the biologists have thought of. I can't think of a single item which they are researching either at Denver or Patuxent which will not eventually result in a control. But in the meantime we need someone to tell the farmer, "If you are going to grow corn in these areas, you are going to have to protect it." They are not willing to accept this yet.

T. STOCKDALE: In my seven years of peripheral association with agricultural administration, if I haven't learned anything else, I have learned that the wheel which squeaks the loudest gets the grease. We witnessed this with the cereal leaf beetle introduction, with the alfalfa weevil in Ohio, where some research programs were either discontinued or deemphasized so that emergency funds could finance these specific problems. I think that one way the administrators were able to do this was because there were good economic facts and figures available on the significance of these insect pests on our crops. People want dollars and cents reasons, whether they are administrators, legislators, or whoever, and we are not yet in a position to give them anything concrete.

You may know that we now estimate that we have between 5 and 15 million dollars worth of loss to corn annually in the State of Ohio. To me, when you use a figure with a spread like that, it comes to mean very little. I think that we are going to have to get these dollars and cents figures, and it will probably be up to the biologist to get them. Once we get the figures, we'll get the administrators, legislators, economists, and agronomists behind us.

DR. GILTZ: The first question we hear from agricultural economists when we ask their help on a survey is, "How much money do you have for this?" Right there we lose.

DR. DYER: In some respects, unfortunately, this points out that there is really no problem, except to the biologist. To society as a whole there is really no problem; it has not reached serious proportions where people are concerned about it. We see this even in our farm communities where one grower will be very concerned, but a neighbor who has not suffered losses will not even be aware that there could be such a problem. We seem to have gone full circle already.

DR. CORNWELL: I think that you are right, Mel; and in many parts of our country the problem is not severe enough to bring about concerted action. But when you think about where the problems have been, such as the Yakima Valley, where the farmers were going out of business and land values went down, they got together and solved it. You folks in Ohio may be just now seeing the beginnings of concerted action in these farmers organizations. In Virginia we don't see any action because individuals are suffering losses, but the economy has not felt it.

I think that the agronomists are about ready to move with a little push. Perhaps an effective way to push would be to get some of us before them at a national meeting. Devote a morning of their program to the relationships between agronomic practices, crop genetics, and bird damage. I suspect that with the right approach, this could be accomplished.

DR. DYER: This is a good point, because I don't think that we can sit back and say, "Well, we have gone this far, now it's your turn now." We probably are responsible for the inauguration of such a program. I have been in touch with some of our agronomists, and they are very sympathetic, but they have their own programs. The first thing that they would do if they could expand is to add to their own manpower, summer labor, making crosses, harvesting, etc. So if we bring this up, the point is again, we may have the responsibility for getting this kind of program in front of the right individuals, those who allocate funds for additional personnel on small budgets to start pilot programs with agronomists.

DR. CORNWELL: The other problem was this extension which Tom mentioned. Most of you are probably aware that only a minority of the states have an extension wildlife specialist. There is not anyone at the national level in this capacity either. Here again, the bird problem, as it exists nationally and internationally, could change this with the proper use of pressure techniques.

Something which did not come out strongly at this meeting is that this bird business is really international. We have nothing to compare with the damage of the red-billed quelea and what it does against agricultural efforts in Africa. As far as the need for bird control technology perhaps we in Canada and the United States, have the greatest capability to help with bird problems in these emergent countries where the total economies are being suppressed by these millions of quelea.

DR. DYER: This is again a good point. And I think we need to pay more attention to the Food and Agriculture Organization. FAO is very active in the underdeveloped countries. We should bolster the lines of communication internationally. We know little of control efforts against the quelea. We do know that it is probably the worst agricultural bird

pest in the world. It holds down whole economies in some countries. Perhaps we have a responsibility to keep this from occurring in other bird populations as the stress on food continues. Perhaps we are remiss in not getting out to meet the proper individuals in FAO, United Nations, and so on. I'm not sure how much influence this would put on the local situation, but I think the idea that we have to sell is the attitude that we are planning for tomorrow. I get pretty gloomy when I think about this in the future.

R. SMITH: I'd say that the Bureau's been trying to sell this idea for some time.

DR. DYER: Yes, and you of all people should have the best organization for selling this.

R. SMITH: It reflects in Jim's budget.

DR. GILTZ: There is another budget situation going. I think that for perhaps five years the Bureau didn't think that the farmers in Ohio had as great a problem as they said they had. I agree that they are doing everything that can be done, this is true, but the evidence of this has not been apparent in Ohio until the last couple of years. The farmer asks why something is not being done, and we explain that it's being researched in New Jersey. They are not quite willing to accept that; the farmers feel that they are more unique than those in New Jersey.

Secondarily, it might be possible to entertain a grant to work on that problem right where it's bad. Let the university or research agency give them a sound proposal so that the Bureau could say, "Go ahead, find out which way these birds are going, how many are we dealing with, what good would it do to eradicate them." It seems that we could move faster if we would allow people seeing the problem to come up with a solid proposal to do something about it; they could choose their personnel. This would seem to work better than to start with a building, staff it, add research personnel, then solve the problem. The university at Bowling Green has one of the best facilities for holding such a meeting that I have ever been to. Some of the other high schools and extension offices of Bowling Green or Ohio State might have similar meeting places or facilities for research. One reason we have a blackbird research program in Ohio is that we have 150 acres of cattail marsh adjacent to 150 acres of corn lands, where we can run both ends of the problem. Without this we would have no research program at all.

If we would take advantage of facilities for research of a particular phase of bird problems wherever we have the facilities and the manpower. One reason we have a program is because we have several men who were experienced in running traps, looking at birds, knowing

one species from another, keeping banding records. Also, it takes a unique individual to work at half salary; he has to have another incentive such as a graduate degree, or furthering his education, before you can pin a man down to do this work. Let the job be done where the problem is worst and where there are people to do it.

DR. DYER: Really then there would be two programs: one of continuing research and the other of stopgap mobilization. With the latter, you would have to amass a lot of manpower and machinery in the field to placate a certain situation with the hopes that something of value will come of it in terms of increased corn yields, moving the birds around, and learning how to move them around. I think that's a very good idea.

Perhaps, then, we have beat this around enough. We can all recognize that we are understaffed, underpaid, without enough budget money, the right people not helping us, and the wrong people hindering us. That about sums up all our work to date.

J. CASLICK I fully appreciate what Dr. Giltz has said, and would appreciate if he would tell us how this NE 49 committee of experiment station directors is working out.

DR. GILTZ: I'll be glad to sum that up and can do it after talking with the chairman of NE 49 during the last couple of days. [Chairman is Dr. Phillip Granett. Ed.] As you know, this was a program primarily approved by the northeastern experiment station directors. This was after much deliberation over two or three years. They decided that they would not let us evaluate anything; we couldn't run exploders nor test for bird damage. This was hard on us, but what they did not want was administrators second guessing the biologists. They did not want us chasing these birds from one area to another; what they said was in effect, "You have to get out and kill birds," but of course, there was no mechanism to do this, and they knew this. Therefore, we had to do pure research to come up with the tools for control. We did this work for a couple of years and compiled experiments much like the men at Denver and Patuxent have done. Fish and Wildlife has kept us from duplicating efforts by sending men to Ohio to work with us. Also the researchers were working on a variety of other than agricultural problems that kept them from putting as much emphasis on the agricultural aspects as they might have.

Over the past year now, I think that we have concluded that we've gone about as far as we can go from a non-agricultural standpoint; we need to concentrate our efforts on agricultural aspects of bird problems, of sorghum throughout the birds' range, of corn wherever it clashes with birds.

When I say "We" I'm thinking of the two members of the technical committee. We're feeling that we don't have anyplace to go at the

moment. We have our report stating that we are almost to a dead end. Our next step is to get the message to the farmer that he will have to protect his crop or go out of business. In the end, the agency which will do the control work, if any, I think, is the Fish and Wildlife Service; the experiment stations will not do the control. The stations will do the research to uncover clues to control, but then somebody has to take over. This is not the way we would like the farmers in Ohio to feel. This is actually where our money stops.

DR. DYER: I think a point that came up here will shift the subject somewhat: the responsibility of control. This gets to be a pretty ticklish problem, but its one that we are facing it all the time. Perhaps we should analyze the bases of who is responsible for control, limitation of the problem. I would see two or three different aspects. It was pointed out to me that the person most responsible for control is the landowner. In a sense we run the gamut of attitudes from "the blankety-blank government owns the birds and they'd better do something," all the way to the farmer who will not permit any federal officials onto his land at all and thereby assumes all responsibility for all damage on his land. We keep coming back to individual social implications, that would be the number one aspect.

The second one would be private enterprise: the pest control operators. I don't think that they are in a position to move into such a program, because they have little background in determining the economics of whether they can make a profit or whether they can save the farmer money. And certainly, they might wonder what to do once they accept a contract, because we so often wonder what we're going to do; techniques are just not established yet.

Maybe this information will be coming in future years, and the pest control operators may become very prominent in population limitations of this sort. I would hope that they would have very close connections with biologists, with farm groups, and with the public.

Then the third thing is a problem of governmental agency: who is responsible. I think if migratory birds are involved then certainly the Fish and Wildlife Service would have this responsibility at the moment, except. . . . And this is where the problems arise--Except what, except where, who, when. I think that this will be ironed out in the future. But any program which may have to have some coordination, the question is at what level will it be coordinated; at a governmental agency level which will send units around the country, or will there be mobilization to help private enterprise keep informed so that they can handle the problems locally? These are some decisions which we will have to face in the years to come and there may be other categories which I have overlooked.

R. SMITH: This, in part, will depend on the type and degree of control.

DR. DYER: Yes it will. One species problem is just not like a bird problem in another area with the same species. Perhaps a fourth aspect of who will do the work will be a combination of all three.

DR. CORNWELL: When you go to a landowner and approach his problems in an educational capacity, it is obvious that the only thing that any of these people are interested in is reduction of numbers, and you really can't blame them. Many of the arguments such as you, Mel, presented in the formal meeting just escape them, as you found out. Furthermore, I'm just biased enough toward Dr. Wallace's attitude on natural systems to wonder how much our present state of knowledge permits intensive thinking about reduction of numbers in a wide-scale plan. For example, even in Ohio, in terms of the bionomics of the blackbird populations at the time they are feeding on corn, what do we know of the importance of the grain eaten per bird to the life of the bird? What per cent of the population sustains its daily need of food on corn? These are fundamental questions that need to be resolved before we as biologists begin touting very loudly a numbers reduction program.

DR. GILTZ: This is an excellent idea. I don't see why that in this room the information isn't available; perhaps we could get a rough idea in just a few minutes. We have a representation of biologists who represent the international range of the bird. There is more detailed knowledge about the life of the red-winged blackbird in this room now, probably more than has ever been together before.

DR. DYER: I think that that is kind of an intriguing thing to start off on. We have a student working right now just trying to find out how much a bird is eating and its caloric value, depending on the season. We want to know how much insect material is being eaten; there are some sketchy reports already on this. These reports cannot be related to the energy values needed by the redwing. It's been my idea, whether right or wrong, that the birds don't really need corn.

R. SMITH: But they still eat it and that's what the farmers object to.

DR. DYER: I realize this, but this gets off onto another tack. What George said was very important. This is that control is divided into two things: either annihilation or diverting the birds. If we can divert them we're in good shape, if we can't we're faced with annihilation, and we don't know how to do that. We don't know whether we want to.

R. SMITH: I don't think that the individual farmer cares what you do.

DR. DYER: I think he will. If I looked into the crystal ball I would say

that he would not care very much if we removed them tomorrow, but next year. . . . This is the point we tried to make last year, and I'm afraid that we did not get very far.

R. SMITH: I see what you mean. And he might move on to judge birds somewhere else.

DR. DYER: There is this one point we don't know, and it keeps coming back and haunting us. As some of you know, I just returned from Australia, and I feel that because of special problems, the Australians are as advanced as anyone in population ecology. They have very simple problems, and in trying to work on population ecology they just admit that there is no single species that man knows enough about to do anything. In the meantime we are operating this stopgap business. And we've got to know through an intensive program of what value these birds really valuable they are.

R. SMITH: And for this you need a good public relations man to fend off the protestors.

DR. DYER: And again we have gone full circle.

DR. GILTZ: Another point I wanted to make while we were on George's point, Tom knows pretty well what the redwings need to get along in Ohio. You know what they need in Canada, Mel; Jim in Florida. I can only guess what those figures are, but I haven't heard your ideas. I think that the redwing can get along very well without corn; it's just something that he picks up on the way through.

DR. DYER: As a matter of fact, I think that it is actually detrimental to the blackbirds to be in corn. We can't see this in short term. We have to analyze the nutrition. If the blackbird ate corn exclusively over a period of time, could he maintain himself. The fall is a critical time in the life of a blackbird; there are heavy stresses on the bird; he is moulting and this takes a devil of a lot of energy, the weather is cooling down, and he has just come out of the stresses of the breeding season. These birds have evolved over many centuries attuned to foods other than corn; one can't help but wonder what an exclusive diet of corn does to the species. We simply don't have data of this sort in quantitative terms.

DR. CORNWELL: This has been well shown in ducks; they don't sustain themselves on corn. The duck population, such as the Illinois mallard, as far as condition factors go, is a much poorer, less thrifty duck than he was 30 years ago.

R. SMITH: But how long has the species been feeding on corn?

DR. DYER: I would imagine 20 to 30 years as a maximum, that's only 20-30 generations.

DR. CORNWELL: I thought that Denver film on the feedlot operations yesterday really was quite revealing when it compared the starling and redwing. There's an insight there as far as nutrition goes. That small body of excrement and the utilization it had indicates that this is a high protein feed. Corn could not be utilized in that way.

DR. DYER: Fortunately, we have the best background on the redwing in Beal's 1900 work. I don't think that we have taken advantage of it yet. There's so much work which could be done on this nutrition angle and compared to this work done in 1900. That would tell us a lot, because there was not that much corn grown then. This is going to have to be looked at in a much greater extent, but I'm not going to be able to get to it. I am sure that others would be quite intrigued with it. Perhaps it is more basic than massive numbers of birds than we realize.

R. SMITH: But you can't get to it because you've got to go around putting out "fires."

DR. GILTZ: That goes for every one of us and each of our projects. This meeting we had last year was purely a "fire" and it ruined our research for the summer. This seemingly was the objective of the farmer: to get us to quit research and start killing birds.

R. SMITH: You are going to have to have two programs; there's no getting around it.

DR. GILTZ: We need somebody directing things who is not working at the whims of a second-guesser.

DR. DYER: A problem which has bothered me for a long while, and I noticed it again last week, when I stopped off in Washington and Idaho, that is: the numbers of birds and their association with agricultural crops. It is sort of a "which came first, the chicken or the eggs." There seems to be this underlying thought that we have more blackbirds now than before because there's more corn being raised, or there's more something.

In central Washington, there are plans to grow corn on the old lava beds with irrigation systems and all. The area behind Grand Coulee dam is destined to become a very productive area, like 175 bushels of corn per acre. I've discussed this with Don Balsler, and we beat it around for a bit. Here's a new laboratory outside for us. We

may not have any data now, but it will be of interest to know if the birds will be increasing in numbers in the Pacific Northwest in the future. This involves birds associated with agricultural. It boils down to promotion of programs with simultaneous study of bird populations and something man does to mess up the present environment. Certainly man will be "messing" by planting corn in central Washington where they normally have 10 inches of rainfall per year. Should we not keep this kind of thing in mind to find out whether birds are here because of agriculture or because of food, or is there some other condition responsible for their increasing numbers? Are there any comments?

DR. GILTZ: Nothing more than the answer to your statement is "Yes." The birds we are concerned with are here in such numbers because of the way man handles North America and produces the best conditions the birds ever had in their history.

DR. CORNWELL: I mentioned this yesterday and I'd like to get the reaction to the group here. There is one thing that we haven't really tried on a massive scale; this is distress calls. I first started thinking of this after talking to Gordon Boudreau of Biosonics, Inc. He first got into using "real" distress calls with horned larks in lettuce fields of New Mexico. He manufactured several in the way that many of us have manufactured them, but he happened to record one real one of a horned lark being taken by a hawk. He started using this call exclusively, and after only two exposures to this call, these flocks avoided the lettuce fields. Gordon seems to be an excellent field observer, and this was his opinion based on flock size, etc.

Then I had some thoughts on Avitrol and on DRC-736, and I'm reasonably convinced that we could take a single crop and condition a local population to avoid these crops. This is biologically sound. This would take a concerted effort to reach the various sub-flocks which are causing troubles. This has not really been tried, I don't think.

DR. DYER: Ken Watts has played around with this; he has a report out on the limitation of populations. This is a look way into the future, but there could be some work on breeding experiments to hasten natural selection along these lines. I don't think that the business between genetics and environment has really been resolved. For instance, we take a group of birds and find which avoid corn when stressed with a distress call, which ones can be easily trained. We try to select those out which avoid the corn, like pigeon breeding. In this way we inject into a population a means of control, as Watts suggests. You are suggesting doing this with a natural population, George, this idea takes it a step further, and breed our own blackbirds. This, of course, has not been tried and we have no idea whether it will work. This brings out the points that there are a heck of a lot of things which have not been

suggested nor tried, and we have to keep thinking. This thing which George mentioned is a good case in point because it has not been tried.

DR. CORNWELL: As Maurice pointed out yesterday, I agree that this would cost very little. I think that an experiment could be carried out with the amount of money like the Ohio grant for blackbird research.

DR. GILTZ: We have to keep in mind that it is the alarm cry system to which the birds give a predictable response. The birds understand the calls; we can keep them out of nearly all corn. As a secondary objective, perhaps this behavioral modification would be well to work on; we have a lot of background information on this, even to the point of imprinting the bird before he is out of the egg.

DR. DYER: Yes, the alarm cry is the only way to communicate with the animals. If we try to communicate with the birds and try to get them to do something we want them to, the danger signal is the only way we have. The most powerful tool we have in this is imprinting to manipulate the birds. I mean imprinting both early and in later life. Control with a behavioral response to a natural condition is what Dr. Dave Davis has been saying for years. He says that we need two things to accomplish control: the natural behavior of the animal, and natural population control. With anything other than that, we are simply "fighting fires." Of course, right now, if we don't fight fires, we don't learn anything.

T. STOCKDALE: I think that a group of this sort should be organized on a more permanent basis. We are interested in a very narrow problem which is unlike other bird damage problems, like orioles in apple orchards in the Hudson Valley. Permanent organization would be difficult because some of us are researchers, some extension, some governmental workers. We don't seem to have gained much ground in the seven years that we have sat around talking at each other.

DR. GILTZ: We used to start off reciting damage; we don't do that anymore.

DR. DYER: There is a pathway we should investigate for the future. We are not too far away, I suspect, from what the entomologists must have muddled through before they came up with some of their better known tools, insecticides. We have an integration to make perhaps very shortly. We have an active group of entomologists in our school and they realize with many others that the control techniques they used for years weren't very good either. They got into troubles. They have now what they call, rather glibly, integrated control. This is what we have been discussing. It means hitting populations with whatever you

have at the most opportune time. It's a philosophy that we have not put into practice yet. In entomology, some pretty far out thinking has gotten them a long way. Perhaps we have reached a point where we can not all go our separate ways. We may have to set up things we might call pest control institutes, or whatever, to integrate the learning from other workers who do control. We have a lot to learn from other individuals in how we apply the tools we have and how we go about getting new ones. This is something we might be thinking of to coordinate the "brush fire" activities for the future. If we decide that three or four agencies are duplicating each others' work, well then we can go to the institute system. If we decide to break down international boundaries, we can campaign for this.

DR. GILTZ: I look rather enviously of your position in Canada because you seem to have a hold on so many facets of the bird problem. I look enviously also at the Canadian Air Force and the Wildlife man, Dr. Solman, who seemed to have a hold on so many problems, and such an excellent overall view from a radar screen of migration activity with help from the Air Force. He is able to bring off some very expensive data gathering experiments.

In the States, we don't seem to have anybody who is on top who can oversee both the research and the control aspects and understand our problems. Still I can't deny that the Fish and Wildlife Service isn't doing a fine job, both in control and research. But there isn't one man at the top who is seeing both aspects; I say that rather reservedly. I don't know of any at the top of the bird problem, who can take both the research and control aspect and tie it together, make a decision, and say what we should do. Such a person would be helpful in the States. Dick Smith comes close to doing this in Ohio. Perhaps you could name some people who come close to this in Washington.

DR. DYER: It's probably something that is not the fault of anybody except Mr. Parkinson who invented his law. It's something that we can't handle, I suppose. Well, I'd like to take the prerogative of the chair and bring things to a wind-up. We certainly beat things to a fare thee well in the last couple of days.

D. SCHNEIDER: Just one last item, Mel. For the benefit of all those here, Dr. Jackson and I would like if each one here who is presently engaged in blackbird work of some kind would state his name and post a synopsis of his work or project into the "magnetic monster." This record will help the dialog of those in blackbird work, and perhaps bring us closer to that permanent organization which was suggested this morning.

DR. DYER: OK. We can just proceed around the table once again.

T. SOCKDALE: Cooperative Extension Service, Ohio. I'm responsible for an educational program reaching our agricultural audience with the most up-to-date information on bird control. My secondary interest is in bird research, though this is somewhat handicapped by primary responsibilities.

DR. MAURICE GILTZ: I'm interested in biological research and I'll just conclude my other remarks with "Let's get on with controlling the birds."

J. HALUSKY: Currently I have been working with Dr. Giltz and Dick Smith on the blackbird control project out of the North Central Farm of the Ohio Agricultural Research and Development Center. I have been the manager of the projects with blackbirds in progress there. We have covered exploder evaluation and tabulating corn damage in exploder-protected fields. We also have a trapping operation which combines a banding program with blackbird control. We have also done roost location surveys in the Sandusky Bay and Catawba Island area.

D. STILES: U.S. Fish and Wildlife Service, Washington, D.C. Having just left a position of State Supervisor in New York State in June for one in the Animal Control Branch of the Washington Bureau; I wish I could speak with some authority about what the Washington feels about the blackbird-corn situation and available money at this time, but I can not. I am here to listen and learn, and I have learned a lot.

P. RODEHEFFER: Fish and Wildlife Service, Ohio. I'm a field assistant to Dick Smith. Right now our job is to pacify the farmer. We show them the control available and show them how to use them.

D. RICHARD: Graduate Student, The Ohio State University, Columbus. I'm currently doing research under Dr. Giltz in the Western Lake Erie Islands-Sandusky Bay area on the general population dynamics of the redwing. This involves a study of the local population throughout the season when the birds are here, approximate numbers of birds, the amount of population fluctuation, the immediate source of our population, where the birds are going when they leave here, and activities of the redwing within this hard-hit corn depredation area.

B. HALL: Blackbird Research Project, University of Guelph, Guelph, Ontario, Canada. I work with Mel, managing the field station on Lake St. Clair marshes. We have studies on bird behavior in the field, occupying the time of up to six graduates students per summer and fall season.

D. SCHNEIDER: Bowling Green State University, Bowling Green, Ohio.

I'm doing thesis work under Dr. Jackson on the development of flocking and roosting behavior of the redwing in the Ottawa County-Lake Erie marshes.

M. CARPENTER: Biologist, Bowling Green State University. I previously did some Avitrol evaluation work in the Lake Erie marsh area, but right now just listening.

DR. CORNWELL: Virginia Polytechnic Institute, Department of Forestry and Wildlife, Blacksburg, Va. In the research line, I recently had two master's students working on redwing feeding behavior and damage in sorghum and peanuts. We are also conducting experimental evaluations of Avitrol and sodium fluoride for field crop and feedlot situations. In terms of extension, we are cooperating with the department of agronomy trying to compile information on crop resistance and agronomic practices on a nationwide basis. We conducted a series of meetings on bird control throughout the state. We are also making an effort among retail rural merchants to stock certain equipment items which are used in bird damage control. We're in process of developing a picture circular on bird problems and techniques of limiting them.

D. THOMPSON: Chief, Game Management, Department of Natural Resources, Ohio: I'm here to look and listen. Our responsibility in this field is one which is not well defined, it's simply enforcement of migratory bird laws, not in the control of blackbirds per se. However, I have been a representative on the Coordinating Committee for the Control of Depredating Birds, and on this I'd say that I am a temperance guide. We are looking at propagation of game animals for sportsmen and recreation seekers, as well as trying to help out on this blackbird problem in Ohio. I will say that I didn't know a few years ago, but I now realize that we have a big problem in this section of the state and we have more than our share of good individuals working on it. I'm very proud to work with these people in the small measure that I may.

R. WARREN: Chief Engineer, Peavy Grain Co., Minneapolis, Minn. I am in the research department of the Peavey Co., and am electronically oriented. Peavey Company is a grain merchant, that's their principal business. We have had relatively good success in other areas of control, and I'm here gathering background information to determine if we should initiate a program in this field.

R. FRINGER: New Jersey Department of Agriculture, Trenton. We are just starting out with control activities with a \$20,000 appropriation from the state to control blackbirds. We have done some trapping work around some crops areas in New Jersey. Our work has been in close cooperation with Dr. Granett at Rutgers Experiment Station. We have

had some good results with Avitrol work.

DR. L. HOLCOMB: Ohio Agricultural Research and Development Center, Wooster, Ohio. I'm fairly new at the depredating work, but I worked with redwings for four years in the Toledo, Ohio, area, then moved to Nebraska last year and worked with them there also. I'm interested in birds other than redwings too, such as robins, catbirds and grackles which are depredating also. As an ornithologist, total population dynamics interests me. My past work has been with the entire life cycle of the redwing, both upland and marsh-breeders. We noted differences in productivity in these two areas.

I'm initiating now some basic physiological and behavioral studies of broodiness, with pituitaries, oviducts, broodpatch portions, gonads, and evaluating them histologically, cytologically, and hopefully biochemically for steroids. We want to get samples from all times of the year.

Other than that, I have submitted a budget for the next biennium which would expand our research, both basic and applied measures. Already I can see a real pinch in trying to get a full program started. Although Maurice Giltz has been working for years in this area, he has been pinched for funds, he has been working alone up until this year. We are hoping to get a program started here through the students of Dr. Bill Jackson at Bowling Green. Hopefully, we could instigate some kind of "central intelligence agency" where a graduate student or anyone else could find the basic materials published on either depredating species or just on Icterids. It often takes a man five years just to accumulate some of the basic published materials. If we could start some kind of clearing house for basic work in this field, we could shorten work time and eliminate much duplicating of effort.

D. SLACK: The Ohio State University, Columbus. I am working with Dr. Giltz in a corn damage area in central Ohio helping the farmers there disperse roosts in hopes of protecting corn fields. We also have a small trapping program also. When the birds fly south, I'm going to do some physiological work this winter.

C. STONE: U.S. Fish and Wildlife Service, Wildlife Research Unit, Columbus, Ohio. My past experience has been with decoy trapping in the Arkansas rice fields. I just transferred from Arkansas recently and hope to do some physiological or behavioral work on redwings for a graduate degree.

R. SMITH: State Supervisor, U.S. Fish and Wildlife Service, Columbus, Ohio. I guess I am the chief fireman of the fire fighters. We act as a go-between for the state operations and the Bureau. We work hand in hand with Dr. Giltz. Most of the operations have been in Ohio because we have few men available.

J. CASLICK: Research U.S. Fish and Wildlife Service, Gainesville, Fla. I work with a small crew of biologists in Gainesville on an assigned project of learning how to kill blackbirds.

DR. M. DYER: University of Guelph, Guelph, Ontario. Well, I guess that brings it around to me. It occurs to me that we have not explained the total project we have in Canada though you have heard smatterings. The project in Ontario is two years old. We built a base that is quite wide and not very high. We felt this was necessary to fight these so-called fires, plus get several things that my associates and I were interested in. We have a field station in the problem area on Lake St. Clair, where we're trying to establish what the problem is (this is our third year and we're still not sure what the problem is). We're into the various aspects of breeding ecology. We followed one population for three years and we think we may have enough data to start gingerly on some field experiments. We've been doing physiological studies with blood analysis of redwings, developing redwings. We haul the equipment to the field station and do the work there. Guelph is 150 miles from the field station. Our project is based at the University. In the Zoology Department, we have built up facilities there to take care of the laboratory aspects, such as holding cages, aviary, and light-dark rooms. We are studying other physiological aspects, this is what I am personally interested in, such as metabolism and population analyses. We have several graduate students working on projects. We have an interest in two electronics projects; one radar, one telemetry. We're attempting to follow bird population movements from a radar station at Point Pelee. This is the second year on this. The program I am now interested in is what we would call physiological ecology and development of the redwing, using telemetry measures to help us collect the data. This gets us off into another field of data collection and processing, another whole unavoidable field by itself. This was the reason I was in Australia the past two weeks, attending a symposium, which will be very interesting to anyone needing this kind of information.

These are some of the things we are into, and they are certainly getting too big for us. This is one reason why I think that these meetings provide a helpful impetus in giving cross-carryover. Other people will have to take some of our ideas just as we will incorporate theirs. With that, I'd like to adjourn. This has been a very worthwhile program this morning.

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