A PROBLEM AND A PLAN RELATIVE TO THE STUDY OF BIRD DISEASES

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AT a recent meeting of the Eastern Bird-Banding Association, the members agreed unanimously that the present winter (1936–1937) has been marked by an unprecedented scarcity of birds, notably the smaller species which usually are the mainstay of winter banding work. It was felt that this scarcity could not be attributed solely to the mildness of the weather, for the birds were not only absent in the vicinity of houses, but were also rare along their normal feeding ranges in old fields and in sheltered valleys.

It was reported by one of the members that the nation-wide Christmas Census of the Audubon Societies, reported in "Bird-Lore," disclosed an almost universal scarcity of individuals, although the number of species of birds seen was about normal.

On the basis of these reports the members began to suspect that this winter might be marking the low ebb or depression following a populational peak, according to the phenomona of ecological cycles, well-known among several of the larger animals and birds. It was felt, however, that the evidence, while suggestive, was at the same time too meagre to base valid conclusions upon, and the desirability for some sort of confirmatory study became evident at once.

The nature of such a study, it was felt, should be based upon known ecological facts. They were briefly reviewed under the following headings:

1. The Hudson Bay Company's data showing periodic fluctuations in the populations of fur-bearing animals.
2. The type of populational curve:
   a. Building up to a peak over a period of years, and followed by a sharp decline to the lowest ebb—the latter within one or at most two seasons;
   b. Peaks of curves occurring at regular intervals over many years of observation and tabulation.
3. Relationship of ecological periodicity to the sun-spot cycle:
   a. Coinciding among larger animals;
   b. Failing to coincide among smaller animals, which in general have a shorter periodicity.
4. Food-chains in relation to populations.
5. Normal index of reproductivity among various links in the food-chains.
6. Disease among animal populations:
   a. During low ebb;
   b. During "normal" concentrations;
   c. During overcrowded "peak" conditions.

This ecological information, which constitutes a very recently recognized branch of investigation in the field of natural history, is still in a nebulous state for the following reasons: (a) it can not

yet be applied generally to all biological situations, for its conclusions are based largely on the study of a limited group of animals, principally the larger game animals; and (b) there is scarcely any information on this subject in the province of the smaller birds.

Such indications as there are, however, point to epidemic diseases as the factor, causative in sweeping through the ranks of a populational peak and reducing a species to a scattered few survivors. Whether the diseases have a "cycle" too, or whether the periodicity of the diseases is a function secondarily of the overcrowding of the species consequent upon reaching a peak—the disease then flourishing because of the increased facility for its transmission—is also unknown.

The disease itself, however, if it exists, must be a most significant point in the cycle of any species of animal, and a knowledge of this disease would be an important adjunct to our understanding not only of the species in question but also of the life histories and evolutionary sequences of all forms of life.

The Eastern Bird Banding Association therefore agreed that it would be instructive to make a study of bird diseases at the present time, when evidence of the assumed recent epidemic might still be at hand. It was proposed that a nation-wide survey of bird diseases be inaugurated, and that the information so obtained be disseminated through the medium of *Bird-Banding* under the direction of a competent guiding hand.

In discussing possible methods of carrying on such a study, the members recognized many obstacles to the success of the project, and since that time these obstacles have been multiplied. Incidentally the most crucial of these has been the difficulty in being sure that the present period *does* represent a populational depression. Dr. Austin reports a normal concentration of birds at his banding station in Massachusetts, and a Delaware County, Pennsylvania, game warden states that small birds have been abnormally abundant in woods and fields this winter in sharp contrast to their scarcity near human dwellings.

Recognizing, however, that the majority of banders have observed a bird-depression, can one then justifiably assume that an epidemic has been at the root of it? The cycles of periodicity in numbers of larger animals sometimes show a relationship to one another, in such a way that the cycles of various species either coincide or follow one another at definite intervals according to their respective positions in the food chain. Does it seem plausible that almost all of the smaller species of birds should have coinciding cycles? Or does this very coincidence point to some recent and abnormal catastrophe which has affected all species indiscriminately of their usual ecological trends?

These questions, again, cannot be answered at present; indeed by their very unanswerability they make the proposed study more urgently needed. This may be said as a hypothesis: that the present populational situation has been discerned principally among so-called "winter-birds," whether migratory or not, and these "winter-birds" are fundamentally graminivorous. Hence, the first link in the food-chains in which they occur is identical among them, and therefore it is possible that the subsequent links—and the even more remote cycle-phenomona—may also coincide.

But, to return to the actual disease-survey, how can the nature of the epidemic be studied? Bird banders cannot slaughter the birds they trap, in search of internal disease. The only source of information must be the bodies of birds found dead, or birds which die at a banding station. Here is, perhaps, the greatest obstacle to the study, namely, that one finds so few dead birds during, let us say, the course of a year.

For this and other reasons, it seemed wisest to conduct the study from some sort of central bureau, dividing the territory first into a few sub-regions, and maintaining the bureau as a final agency for the correlation and analysis of all the gathered information. In each sub-region (such as Boston, New York, Philadelphia, and Washington) an effort would be made to secure the interest and coöperation of a competent pathologist, and all the banders of the region would ship dead birds to him as soon after obtaining them as possible, preferrably under conditions of refrigeration.

And here, it seems, the chief objections to the project have arisen from some of those to whom it has thus far been submitted for consideration. Those who have made occasional post-mortem examinations of birds all agree that the processes of decomposition take place with surprising rapidity in the carcases of these creatures, and for this reason one pathologist has already condemned this study as impractical and destined to certain failure.

It is quite possible, without advocating beyond the point of reason the desirability of undertaking such an investigation, to take issue with these pessimistic opinions. To do so, one must define the term "valuable dead bird." The dissenting pathologists brand the dead bird as valueless as soon as post mortem decay has been in progress for a few hours. At this time the blood parasites can no longer be recovered for microscopic study, and many of the viscera have deteriorated beyond even the possibility of recognizing them. Furthermore, they say, most dead birds are found to have died following an accident of some sort, rather than from any "natural cause" such as the diseases which it is hoped to study.

The value of a dead bird, from the standpoint of the ecological information it may impart to us, extends beyond such narrow limits, however. Following early decomposition, much significant

data is truly lost, but there is still something left. Many intestinal parasites remain, perhaps in a dormant state, but susceptible to observation and classification. There may be a few lingering ticks and lice—at least a search should be made for them. And—most significant of all—the skeleton and plumage remain exactly as they were in life, and years of deterioration in the soft parts will not erase the story which may be written in the durable remnants of a bird—possibly a sick bird.

The effects of diseases of all kinds (e.g., dietary, bacterial, etc.) on the human skin and skeleton are very well recognized. We at least *know of* a disease among the smaller species of sparrows which affects the bills and feet of the birds, producing strikingly recognizable defects. Is it not worthy of investigation, to see how generally such deformities can be found, and how they may have contributed to the deaths of birds? What other uniform changes in skeleton, feathers, feet, and bill are produced by other diseases?

Again these questions are asked in a field of pure speculation. For the answer may be that there are no such changes. But inasmuch as a series of dead birds has never been assembled for critical examination from this standpoint, it is not possible to say definitely that such changes do not occur; and if it were discovered that they *do* occur, an entirely new basis for the study of the pathology of wild birds might be established.

It might be proven, moreover, that there are certain basic deficiencies and diseases which predispose birds to the destructive invasions of blood and pulmonary diseases. The malarias and pneumonias, whose traces are lost during early decomposition, may be only the secondary agents in causing death; in other words the birds may be so weakened by some basic primary disturbance that almost any slight superimposed infection would be sufficient to turn the tide to decline and death. These secondary infections may be harbored quite innocuously during normal periods of health.

Finally, as to the scarcity of birds found dead from "natural" causes, it has by no means been proven that the birds which annually are killed in large numbers by hunters, automobiles, lighthouses, oil-pollution at sea, and so forth, are perfectly healthy birds. Even as secondary infections may single out birds already weakened by serious disease, so these mishaps may occur among individuals whose normal cautiousness and vigilance has been lessened by disease. It would be well, therefore, to suspect all catastrophic deaths of having an element of "natural cause" in them until it is fully proved that they have not.

The foregoing dissertation wholesomely disperses our aim, which at first was directed wholly at a hypothetical epidemic. We now seek the background upon which that epidemic can operate. If we can become oriented in this wider arena, we should be able to understand the consequences, such as epidemics, with greater ease.

Having enlarged the scope of study and source of materials for that study to this point, it needs only to be emphasized that bird banders themselves constitute so small a fraction of people who might find dead birds that this final weak point should be strengthened. It might be possible to interest the Game Commission in each state in our problem. If these bodies could be persuaded to instruct all their field agents to send dead birds to the designated regional pathologist, a far greater number of birds could be obtained for examination. Furthermore it is well known that many of our protected birds, found dead, are taken to taxidermists for mounting, but are relinquished there when it is discovered that a fee for possession of these species is required by the law. Therefore if each bander could coöperate with the taxidermists in his locality, many more specimens could be obtained for pathological study. It might also be possible to interest the Coast Guard, the Audubon Societies, and to spread the information to the public through local newspapers.

In conclusion, therefore, the Eastern Bird-Banding Association:

1. Recognizes the necessity for certain ecological studies among our smaller species of birds;
2. Recognizes the difficulties to be encountered in such studies;
3. Presents a plan for carrying out such studies in the face of the difficulties;
4. Suggests some of the possible valuable trends which such studies might pursue.

We hope that all bird banders will coöperate with us in suggesting further means of accomplishing this task. But let these banders not forget that the results of such work may be very slim in comparison to the time expended upon it. The field is practically unknown, and the discovery of even one small fact should be sufficient reward for the true pioneer.

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