Journal of the Hawaii Audubon Society



For the Better Protection of Wildlife in Hawaii

VOLUME 25, NUMBER 6

DECEMBER 1964

THE PESTICIDE DEBATE -- AN APPRAISAL By Hubert Frings (University of Hawaii) Second and Final Installment

What are the hazards to wild animals and to our environment?

To a biologist, the direct hazard of insecticides to human life, seems minor when compared with the possible effects of these materials on the balance of nature. He asks: What are the effects of insecticides on useful insects and vertebrates? What happens to useful animals when their usual foods are destroyed or contaminated with insecticides? Is the destruction of any pest species really desirable? Will one pest, if destroyed, be replaced by another, possibly worse, pest? While we certainly do not have complete answers for these questions, the partial answers that we have are sufficiently alarming that they should give us pause.

We have seen how difficult it is to assess the possible hazards of insecticides to man. Many days, or years, of testing are needed to determine the many different ways that an insecticide could enter the body and be distributed in the body, and the possible ways in which it could produce injuries. When the "body" about which we speak becomes a whole ecosystem -- the total complex of plants and animals in a given area -- it is small wonder that we know, in most cases, very little. We might well guess that, if we decimate or destroy a certain species of insect, and if this insect forms a major food item for some bird, we shall put stress on the bird. What we may not know is what alternative foods the bird could use, or what effects this insect has upon plant life which secondarily could change the birds' resting or nesting places. In short, the disturbance of one aspect of a total ecosystem is bound to have effects upon the whole system, and the effects are not likely, at this stage of our knowledge, to be very predictable.

I think it is perfectly fair to say that, until the recent public interest in the pesticide problem, many economic entomologists and pest control workers showed little concern for this aspect of their operations. They protest otherwise now, when the glare of adverse publicity is upon them, but I know from personal experience that this statement is accurate. Too often, they acted as if they were performing a neat, and often seemingly successful, laboratory experiment with a single compound against a single species, the pest. That this naive view is changing radically is well illustrated by the articles in a recent issue of the Bulletin of the Entomological Society of America (June, 1964), which emphasize that the principles of intelligent pest control are really those of ecology. Had this been fully appreciated previously, we would not now be so lacking in even the most elementary knowledge of the effects of pesticides upon environments in which they are applied. It is impossible, in a limited space, to review the vast ramifications of this subject. I shall not discuss, therefore, the problems created by the leaching of insecticides into ground waters and rivers, where in some cases, they have killed off fish or the food of fish. Nor can we consider cases reported in the scientific literature of transportation of insecticide by ground waters from regions of application to distant parts. Nor yet shall I consider the complicated problems involved in the destruction of useful insects, such as honey bees or insects that prey on other insects. Instead, we shall just cover sketchily a subject which should be of major interest to members of our Society -- the effects of insecticides on birds.

In the <u>AUK</u>, official journal of the American Ornithologists' Union (July, 1964), the Committee on Bird Protection, in their annual report, affirms:

"We think that the most urgent single, contemporary problem in bird protection is that posed by the high susceptibility of hawks and eagles to modern insecticides. We consider that the late Rachel Carson's statement of the poisonous character of these substances, and the dangers inherent in their persistence in the soil and accumulation in animal tissue, is not exaggerated. "There is evidence that hawks and eagles are highly susceptible and less

resistant than most other species. At the same time we are confronted with alarming declines in the numbers of raptors simultaneously in various parts of the world. It is the belief of your committee that much evidence indicates that certain, if not all, raptors are faced with a menace that could bring about their extermination."

This statement reflects the concern felt in many parts of the world, where drop in populations of hawks, eagles, and their relatives have been noted. It has been found that the eggs laid by these birds are not hatching, and that this is apparently because the eggs are loaded with DDT -- remember DDT accumulates in fatty materials, such as yolk.

Yet the raptors are only one group of birds in which evidence of DDT toxicity has been found. In a recent article from England, for instance, a number of species of wild birds were reported to be dying in inordinate numbers in the spring, when insecticide applications were being made. Laboratory tests showed that these birds contained sufficient DDT to do them harm. In California, a recent study has shown that the average level of DDT in the fat of wild pheasants is 741 parts per million, with one bird containing 2,930 parts per million! These are levels that are known to be harmful for other species of birds. One year ago, 80% of wild birds analyzed in the United States had measurable quantities of DDT in the body fat. There are those who believe that this may easily be higher now. All fish tested by the Fish and Wildlife Service recently, even those from far out in the ocean, contained detectable DDT residues. In short, DDT has become one of the most widespread of manmade chemicals. But DDT may be only the scapegoat, for methods of detecting other insecticides are not as well developed. The studies in England included Aldrin, Dieldrin, and others, and these too are getting around.

One of the first clearly documented cases of destruction of birds by insecticides is that of the robins on the campus of Michigan State University. Here Dr. Wallace and co-workers found that, after DDT had been sprayed on trees for control of Dutch elm disease, the robin population dropped drastically, and many robins were found suffering from typical DDT tremors. In one area studied, nesting success of the robins before application of DDT was 100%; after application of DDT it was 0%. These investigators found that DDT on the trees was not taken in by robins directly, but that it washed off the leaves to reach the soil, where earthworms picked it up, and thus brought it to the birds. Earthworms, it seems, are good concentrators of DDT.

We must note here a report in SCIENCE (31 July 1964) that, in Canada and Maine,

up to 50% of the DDT originally applied in one spraying to trees persisted in soil up to six years, and presumably would remain after ten years. This would mean that, even if all application were stopped in an area, it would be many years before earthworms would cease to be toxic to robins in that area. Of course, other food chains could be similarly poisoned.

Typical of the attitude of the advocates of wide scale use of insecticides, this report on robins was severely attacked. However, Wallace and his students have backed up their findings with laboratory studies showing that it is indeed DDT that has poisoned the robins. They found that mortality of robins in areas where spraying has occurred may be 86-88% the first year following, and at least 85% the second year. They compared populations of robins in two areas, where counts had been made for a number of previous years, one area of which was sprayed, the other not sprayed. After three years of spraying, the robin population in the sprayed area was 98% below that of the unsprayed area.

In spite of this evidence, however, the proponents of wide scale insecticide use claimed that they had not shown that DDT was the cause of death. So, their recent work has involved analyses of dead and dying robins for DDT, and experiments in which robins were fed DDT at various levels to determine the lethal dose. From these tests, they conclude that:

"Results from the analysis of robins found dead or dying in areas sprayed with DDT showed that 90.7% had sufficient quantities of DDT in the brain to justify the conclusion that they died from exposure to it. In all cases, robins found tremoring in sprayed areas had DDT residues in their tissues, while only one of the birds found dead was completely free of it in all the tissues tested . . .

"The finding of DDT in the female reproductive organs and in unhatched eggs, as well as in young birds, points to the need for additional research to determine the effects of this chemical on development of eggs, hatchability, and nestling survival. The limited data from this study indicate that DDT may be passed on directly from the female to the eggs and young."

Accumulation of DDT in the eggs of hawks and eagles, as we have seen, has had tragic effects. Wallace and his students conclude that an English sparrow with 65 or more parts per million in the brain, and robins with 50 parts per million or more will die of DDT poisoning. These are interesting figures to compare with the report on pheasants from California, keeping in mind, of course, that the analysis of the pheasants included body fat, not just the brain. The authors from Michigan State note:

"The storage of DDT in fat tissues, even at high levels, apparently does not poison birds directly, but serves as a storage depot. However, when the fat reserve are utilized (as in starvation), the DDT may be released to more sensitive areas (such as the brain) resulting in tremors and followed by death. Some birds might retain sublethal amounts of DDT in fat all summer and perish in winter or during migration when fats are utilized."

This example, from many that might be cited, shows that the hazard to bird life from indiscriminate use of insecticides is real. The answer often given that, if correctly used -- that is, applied selectively so that they do not reach the food of birds -- insecticides are safe to wildlife is no answer at all. These insecticides are sold in drugstores and supermarkets to people who know absolutely nothing about ecological relationships. Furthermore, even some large government agencies, which one might think should know about this, have often shown little concern for the good of fish and wildlife. Agencies of state and local governments, particularly, often show cavalier disregard for the rights of the wild populations in an area, in their zeal to control mosquitoes and other insect pests. Many times insecticides are bought by agencies of local governments to be turned over wholesale to people who know essentially nothing at all about biology, and therefore could have no appreciation of the problems they might create by their use.

If it were true that toxicants were given only to qualified, ecologically trained biologists, then we could feel that they were applied with intelligent regard for the ecosystem. In England there are fairly strict controls on insecticides, and, as we have noted, residues in humans and animals are much less than in the United States. Yet, even they are now having problems with bird poisoning. In the United States, insecticides and other pesticides are given to anyone who has enough money to buy them in the open market. It is small comfort to the biologist to have pointed out to him that, on the insecticide cans, are warnings telling these people what and what not to do, when a member of the research staff of one of the large insecticide companies, in a study a few years ago, found that people generally do not read the printing on the cans, and do nothing whatsoever, in general, about the warnings. The mere fact that these materials can be bought, along with sanitary supplies, in drugstores, suggests to the average public that they must be entirely safe. When their safety to human beings is advertised, blandly ignoring all the facts we are discussing, the ordinary person naturally thinks that he can spray or fog them around without hurting the environment.

So far, however, we have been discussing rather simple situations, in which birds are directly poisoned, but, as we have noted, the real danger may not be this, but the indirect effects resulting from the disturbance of the delicate balances of ecosystems. At the 28th North American Wildlife and Natural Conference in 1963, two scientists from the Bureau of Commercial Fisheries, in a paper called "Pesticides -a New Factor in Coastal Environments" point out that some Crustacea -- shrimps and crabs -- are remarkably sensitive to DDT and similar insecticides.

"Concentrations of heptachlor, endrin, and lindane in the range of 0.3 -0.4 parts per billion killed or immobilized half of the adult commercial brown and pink shrimp exposed in the 48-hour laboratory test. Other chlorinated hydrocarbons, including DDT, chlordane, toxaphene, and dieldrin showed similar effects at 1-6 parts per billion. In the laboratory, paralyzed individuals may live for days or even weeks, but in the struggle for survival in the sea this conditions results almost immediately in death. . .

"Few organo-phosphorus compounds have been tested on crustaceans. These materials show various degrees of toxicity but one, Bayer 29439, (Baytex), used in mosquito control, is the most toxic pesticide tested to date on shrimps and crabs in the laboratory. Herbicides are of relatively low toxicity to crabs. However, mud crabs, perhaps because of their small size, were irritated by 2,4-D at a concentration of only 1 part per billion."

To get some idea of what these figures mean, 1 part per billion would be 1/100 of an ounce in 78,000 gallons of water. This would mean less than a drop of ordinary commercial insecticide spray in 78,000 gallons of water!

Destruction of shrimp and crabs is serious in itself, but, when we consider that not only are these larger crustaceans destroyed, but also smaller crustaceans, which form a major item of diet for many fish, we realize the potential indirect hazard to fish life. Concentration of insecticides in small crustaceans, and from there into the fat of fish, is what has led to the near extinction of the Osprey on the eastern coast of the United States. These are not matters of opinion, as some have said, but matters of record, available in the scientific literature, the research done by scientists. If there were only one or two of these reports, we might ignore them, but again and again, in many parts of the world, the same reports appear.

The insecticide matter, actually, is just one phase of a much larger ecological choice we now face. In many parts of the world, predator control is carried out to

protect domestic animals. Often this results in releasing the predator pressure on rodents, which must then be controlled by other means. Destruction of useful insects which form food for fish and birds, and which are predator on other insects, may release many species that under ordinary circumstances are unimportant to become pests. The destruction of weeds by distribution of herbicides also changes natural habitats and so changes the animals which can live in them.

In a recent article in <u>ECOLOGY</u>, it was pointed out that the mainland United States now has an area equivalent to that of Georgia in the form of roadsides. These are sometimes planted, sometimes denuded, sprayed with herbicides, fungicides, and insecticides. So we have created, in the United States, artificial ecosystems of tremendous area following our highways. What has this meant to birds and mammals -to mention only these groups -- which formerly lived there and now can no longer find food and cover? It is easy to say: We don't care. But, as the ecologist, Sears, has pointed out, man is tied to his environment, and his level of culture is dependent upon his ability to use this environment properly. Does not proper use involve more than merely seeing how much can be grown at a given spot, or how much concrete can be laid down mile after mile?

Whether we like it or not, the human race has embarked upon a great experiment in tampering with natural balances. Chemists are apt to feel that, if natural means of production for any material are destroyed, they can come up with laboratory means for production. Biologists, on the other hand, are concerned that there may be some materials that may not be exactly reproducible in the laboratory, or that there may be human needs and desires that cannot be met by chemical factories and ribbons of concrete. Who is right? Unless some drastic changes are made in general attitudes toward nature and civilization, we are on our way toward an answer, whether we want it or not.

The President's Science Advisory Committee on the use of pesticides pointed out in their final report (Use of Pesticides. U.S. Government, Washington, 1963):

"Public literature and the experience of panel members indicate that, until the publication of 'Silent Spring' by Rachel Carson, people were generally unaware of the toxicity of pesticides. The Government should present this information to the public in a way that will make it aware of the dangers while recognizing the value of pesticides."

Rachel Carson has been accused of not doing the latter, that is describing the value of pesticides. Actually, she felt that she did not need to do this, for the virtues of pesticides are being sung at a cost of millions of dollars annually in advertising. I hope that I have shown that she did present the facts on the other side. The attacks on her by proponents of the mass use of insecticides, claiming that she gave only one side of the story miss the mark. The information about the side that she gave is true. Millions of dollars are spent to present only the other side -- that pesticides are necessary and valuable. One conclusion, however, is inescapable: application of pesticides and other chemicals to the environment is having profound effects upon this environment, and will continue to do so.

Are there other possibilities for pest control?

We may seem to be in an impossible situation here. We say that almost certainly pest control is necessary and desirable for food production and protection against disease. Yet we feel that pesticides may ultimately create more serious ecological problems. Are there other ways to control pests? As long ago as 1947, we pointed out that entomologists were ignoring many possible means of control in their pellmell rush to find more and more toxic chemicals. I venture to say that, had one quarter of the money that has gone into the development of new and more toxic chemicals been put into exploring some of the alternative methods of insect control, we would be far ahead with these right now. The truth of the matter is that money and time have not gone into these alternative controls, that economic entomologists generally have thought almost entirely of insecticides for pest control. I can mention only briefly some of the alternatives, and have no time in this article to cover their weak and strong points and possibilities.

In general, there are two ways to solve a pest problem: control the population of the pest, or prevent the pest's depredations. So far, the major effort in insect control has been toward the former. Even so, many possibilities for population control other than use of insecticides have been little explored. Thus, among chemicals themselves, the use of hormones, which are specific for insects and so have little or no toxicity for man is just being worked on seriously now. The use of attractants, particularly sex attractants, to flood an area with a sexual odor, and thus make it impossible for the sexes to find each other has been hailed as a new idea, but the bases for this were known 30 or 40 years ago. The use of chemosterilants -- chemical compounds that cause sterility, so that insects cannot reproduce -- is a relatively new idea. Unfortunately, some of the chemosterilants have similar effects upon higher animals, so that it may take many safety tests, as with insecticides. This is a field that also was open for research years before serious research was done on it.

Physical controls for insects except for the crudest sort of swatting and crushing, have hardly been tried. Thus, it is possible to kill insects by heat, attract them to their death by light or sound, kill them by electrical or radio-frequency fields, or kill them by X-rays and ionizing radiations. I shall not discuss the many problems involved in applying these for practical insect control. I need only note that these have been little explored, except for the use of ionizing radiations which have received much recent publicity, because of their use to destroy a species of flies by sterilizing the males.

By far, the best method of pest control is biological control, in which the environment is altered so that pests are reduced in numbers. Thus, the introduction of diseases, parasites, and predators, such as has been practiced so successfully here in Hawaii for sugar cane insect control, have by no means received the attention of entomologists that the use of poisonous chemicals has. Biological controls allow man to work with the environment rather than against it to achieve his results.

In this regard, we should note that, within the last year, a new organization, The World Union for Conservation of Life has been started in Germany and is gaining members throughout Europe. This organization is dedicated to the idea that life of any sort should not be destroyed by man without a very good reason. This group particularly emphasizes that getting along in this world means adjusting our demands to fit the productivity and trying to fit ourselves into ecosystems, not destroying them. The first issue of their journal, <u>DAS LEBEN</u>, has a cover picture showing airplanes spewing out insecticides over a vast area, and underneath it the words: Poison on the landscape. This wholesale tampering with the environment could be dispensed with if we had biological controls.

If the use of other than insecticides for population control needs increased attention, methods for control of depredations have been almost ignored. Chemical repellents, that keep insects away from crops or men, are few. Physical repellents, such as light and sound, are almost unstudied. Here again, biological controls, in which environmental management make conditions such that insects would not become pests, are almost untested.

I think this very brief statement can show that there are many alternative methods which have not been worked on as has the use of insecticides. The concern over the insecticide problem seems to be forcing some biologists to work in these fields. It is a heartening development, and one for which we have to thank

Rachel Carson.

Pesticides in Hawaii

On this subject I am speaking as a non-expert. I can only report some observation that I have been able to make on pesticide problems. To me, the striking fact has been the little concern about the pesticide debate. Many people to whom I have spoken seem to feel that this is a problem for someone else. I think that they do not realize that this is their problem, because cultivation of sugar cane and pineapple here is carried out with a minimum of insecticides. These people fail to realize that what happens in California, whence come most of their vegetables and fruits, has a profound effect upon life in Hawaii. The report on the occurrence of large amounts of insecticides in pheasants should be a sobering one for us, for this is in California, from which we derive so much of our food.

The use of insecticides around homes in Hawaii is sizeable. As we have already seen, research by the laboratories of the manufacturers themselves show that people usually do not read labels. Try asking someone using an insecticide to tell you its limitations and hazards. The publicity here has been almost all directed to showing that these are harmless, that reports of <u>damage to human beings</u> are overdrawn, and that dangers are small. As we have seen, the reports of damage to human beings may be overdrawn; even if true they probably do not prove that a major hazard to human health is created by the use of insecticides.

The danger of upsetting the delicate balance of the ecosystem, however, is real, and it is this with which we should be concerned. The broadcasting of DDT fog, most of which does not even reach the mosquitoes for which it is intended, but drifts into estuaries and so into the ocean, indicates a pathetic lack of understanding of the need for intelligent living in this environment. Except for some of these ill-advised campaigns, however, we in Hawaii have been rather lucky. Insects are relatively few compared with most parts of the world, and so there is little incentive to start indiscriminate killing. We should not, however, feel that we can ignore the problem of pesticides in the environment. Our decisions and those of all people of the world, on whether we are to work with or against the environment may very well -- more than any atomic bomb -- determine our death or life.

Field Trip, Shore Bird Hike, September 13, 1964.

The morning began well with 12 people turning up at the meeting place. As usual on our hikes, we had more visitors than members, which is always very pleasant since residents tend to take for granted our common introduced birds, but with visitors our own interests tend to be stimulated anew.

Our first stop was at Sand Island to search the shoreline of Keehi Lagoon and scan the ocean horizon. Very few Ruddy Turnstone or Sanderling were seen due to the high tide which had completely covered any potential feeding ground. Golden Plover also were few in number. Flying far out at sea it was possible to see Wedge-tailed Shearwaters and Pomarine Jaegers with the aid of the telescope.

From Sand Island we went to the water cress farm between Pearl Harbor and Pearl City. There were several Golden Plover and three Hawaiian Stilts feeding on a newly constructed taro bed. Cattle Egret were feeding in the water cress patches.

On the way to the salt beds at Waipio Peninsula, we made a brief stop by the dump and counted approximately 250 Hawaiian Stilts resting on a mudflat. A solitary Wandering Tattler was also present.

Parking the cars at the beginning of the sugar cane fields, we walked to the salt beds. Black-headed Mannikins and Strawberry Finches were heard though not seen. Cattle Egrets were fairly common in the area feeding in the drainage ditches though what they were feeding on was impossible to tell. Much of the former pond area had dried up during the summer with the result that there was only one small pond which had any really suitable habitat for shore birds. Since it was small it had the effect of forcing the feeding birds into a limited area. A pair of Black-bellied Plover were observed feeding in company with a number of Golden Plover - the former easily recognized by their light grey appearance. Many Ruddy Turnstone and Sanderling were also present, some of which had distinct traces of their summer plumage. Approximately a dozen Hawaiian Stilt were counted, resting on the drier mudflats in company with 65 Cattle Egrets. Just before leaving the pond we were fortunate in seeing a Wilson's Phalarope. This latter species seemed perfectly at ease while the group watched it with the aid of the telescope and field glasses. The interesting thing about its behaviour was the fact that although it was not in the water its feeding habits were identical with that of the bird in the water, namely turning in tight circles pecking left and right for insects.

Also seen in the general vicinity were Short-eared Owl, Black-headed Mannikin, Strawberry Finch and several Ring-necked Pheasants.

A vast amount of cultivation is going on in Waipio Peninsula with the result that the large flocks of Black-headed Mannikins are no longer seen. Their feeding habitat is being completely eliminated for additional sugar cane production.

The last stop on the field trip was at Iroquios Point to observe bird life in the alfalfa fields. Unfortunately, the alfalfa fields no longer exist - they too have been turned into sugar cane. The loss of the last two named locations will probably restrict the movements of the Skylark on Oahu to such an extent that it may well disappear from this island.

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W. M. Ord

Field Trip, to Study Shore Birds, October 11, 1964.

Our first stop was Sand Island. The day was beautiful but distressing from a conservation point of view; the many coconut trees planted on the site of "Harms Way" were in various stages of dying. It was a sad sight, and the odor was offensive. What has become of the saying, "Beautify the corner where you are?"

	0 07	•
Birding was fair.	With the use of the 'scope the	e following were identified:
Pomarine Jaeger - 6	Wedge-tailed Shearwater - 1	Tattler - 2
Sanderling 6	Stilt 75	Turnstone 16
At the clearing of	f Depot Road in Waipahu we sig	nted our first flock of Stilt,

and the count there was as follows:

Coot	- 5	Brazilian Cardinal	-	2	Cattle Egret	- 1	
Stilt	160	House Finch		2	Black-crowned Night Heron	l	
Tattler	1	Strawberry Finch		5	Ricebird	2	

Clearing of this former dump area has resulted in the removal of the mangroves, but the plat clearly indicates that soon roads and houses will be found where once we sighted our first Black-bellied Plover and other migrants.

At Waipio the birding was good, but here again the cultivation of sugar cane has made drastic inroads on whatever open water there is to be found at this locale. The count here was as follows:

Coot	- 11	Tattler	- 2	Black-headed Mannikin	- 3
Shoveler	13	Turnstone	12	Mynah	25
Sanderling	150	Barred Dove	100	Short-eared Owl	1
Dunlin	1	Chinese Dove	75	Ring-necked Pheasant	24
Pectoral Sandpiper	4	Strawberry Finch	12	Ricebird	8
Sharp-tailed Sandpiper	2	Cattle Egret	23*	Skylark	2
Stilt	106	*also 6 at the	water	cress farm	

At Kahuku the story was repeated; our usual approach road is now permanently closed; the birds were to be seen at distance. Our leader, Mike Ord, knows his way about this area, so trekking along dikes one soon heard the cries of Stilt. This area also proved to be good birding as follows:

Coot - 17 Western Sandpiper -N.A. Cardinal 1 1 Balpate 2 2 Stilt 100 House Finch Shoveler 24 Tattler B-c Night Heron 1 1 Sanderling 15 10 Green-winged Teal 2 Mynah Pectoral Sandpiper 2 1 Turnstone 200 Ricebird Sharp-tailed Sandpiper 12 Ruth R. Rockafellow On the way back at the Upside-down falls - 2 White-tailed Tropic Bird at the Nuuanu Reservoir 2 Gallinule W. M. Ord *****

ALOHA to our new members:

Regular: Alice Spalding Bowen, 2955 Makalei Place, Honolulu, 96815 Paul M. Scheffer, Tropicana Village, 4184-1 Keanu St, Honolulu, 96816 Junior: Gerald Lewdberg, Division of Fish & Game, Lihue, Kauai, 96766

FIELD NOTES:

Species	Kuapa Pond	Waipahu Dump	Waipio <u>Peninsulà</u>	Water Cress Farm	Total
Date	10/24/64	10/25/64	10/25/64	10/25/64	
Dunlin Northern Phalarope Pacific Golden Plover Semi-palmated Plover Sanderling Hawaiian Stilt. Ruddy Turnstone. Cattle Egret Strawberry Finch. Black-headed Mannikin. Ricebird.	1 1 80	200	1 1 1 75 12 50 6 12 6 12 12	12	1 2 1 75 292 50 18 24 12 6

Mike and Meredith Ord

MINUTES OF THE HAWAII AUDUBON SOCIETY General Meeting, October 19, 1964

The meeting was called to order by Mr. Ord. Minutes of the September 21, 1964, General Meeting were read and approved.

Bill Carney gave a report of the Field Trip to Sand Island, West Loch and Waipio Peninsula and then to Kahuku looking for shore birds.

Mr. Ord announced that the November Field Trip would be on the 8th, meeting at 7 a.m. and will cover the same areas as on the October field trip. Also announced that Mr. Udall, Secretary of the Interior, would give a speech on conservation at the First Methodist Church, Honolulu, on Sunday the 25th at 10 a.m.

Mr. Gene Kridler who is assigned here as the first National Wildlife Manager and Warden to be in Hawaii, was introduced by Mr. Ord as our evening speaker. Mr. Kridler told us of the responsibilities of the Bureau of Sports, Fisheries and Wildlife and its services. The Bureau is concerned with wildlife of international as well as local interest.

He pointed out that the seabirds do not have Federal protection once they are on the high seas as do the shore birds, songbirds and ducks.

Mr. Kridler said that all duck hunters sixteen years and older are required to have a duck stamp and that the duck stamp money was set aside for the purchase of new areas for refuges only. Therefore the Bureau has to depend on Federal funds for management expenses.

He showed slides of birds and animals on the various refuges which were established for their protection. He also showed slides of the Malheur National Wildlife Refuge in Oregon which covers an area of 184,000 acres, $37\frac{1}{2}$ miles wide by 41 miles long; and two films which were made at the refuge "Wings over the Blitzen Valley" and "The White Pelican."

The meeting was adjourned by Mr. Ord.

Respectfully submitted, heredith A. Ord, Secretary

1964 CHRISTMAS COUNT

This year's Christmas bird count will be on Sunday, December 27th. The areas to be covered will be much the same as on previous years, though to improve the thoroughness of the count certain areas have been assigned differently.

Group A: From Koko side of Diamond Head out to Paiko Lagoon and Kuapa Pond including the residential area.

Group B: From Ewa side of Diamond Head to Manoa Valley and downtown Honolulu - Includes the Zoo, Manoa Falls Trail.

Group C: Punchbowl and Tantalus.

Group D: Aiea Trail. Leader: Ronald L. Walker

Group E: Kaelepulu Pond, Kawainui Swamp and Kailua residential area.

Group F: Keehi Lagoon, Salt Lake, Nuuanu Valley and Kaneohe Marine Base. Leader: W. M. Ord.

Those people wishing to participate in the count, pleasecall Mike Ord at 587-328 specifying which area they would prefer. Group leaders will be announced at the December General Meeting on December 14th.

The National Audubon Society advises us that in order for our count to be printed in the Audubon Field Notes it will be necessary for all members to submit 50¢ entry fee, otherwise our count will not be printed. Group leaders will be asked to collect entry fees as well as the full name and address of participants for the Audubon Field Notes. *****

DECEMBER ACTIVITIES:

December 14 - Annual meeting at the Honolulu Aquarium Auditorium at 7:30 p.m. Program for the night: (1) Election of officers and details of the Christmas bird count will be worked out at this meeting. (2) Paul M Scheffer will play some tapes of songs of North American and British birds. (3) Mike Ord will give a report on the Field Guide and also show slides of the pictures that will appear in the book.

December 27 - Christmas bird count.

HAWAII	AUDUBON	SOCIETY	EXECUTIVE	BOARD:

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