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AFIELD AT SANDHILL GAME FARM PHOTO BY CHARLES CONRARD

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IN THIS ISSUE

The Board of Directors has authorized the reprinting of booklets containing the four spraying articles in this issue, to be distributed to legislators, conservationists, foresters, county and local government officials, chemical company personnel, and others who must make decisions about the use of sprays. If you know of persons who should receive copies, send names and addresses to the circulation manager.

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SPRAYING MUST BE CONTROLLED!

By SAMUEL D. ROBBINS, JR.
Editor, The Passenger Pigeon

When dead and dying song birds began being found in numbers in Milwaukee, Janesville, and other southern Wisconsin communities, in the spring of 1957, Wisconsin began to find itself face to face with one of the most perplexing and far-reaching conservation issues of this era. The dread Dutch Elm disease had just begun to invade Wisconsin; experiments elsewhere had shown that thorough spraying of elm trees with DDT is one of the most effective means of combatting the disease; so a program of spraying elms was inaugurated. How effectively the spraying helped stay the advance of Dutch Elm disease, only time will tell; but one noticeable immediate effect of the program was the heavy mortality of song birds in the sprayed areas.

In one sense this is not a new problem. Several Illinois and Michigan communities experienced similar incidents in 1956; other states have had incidents of widespread loss of wildlife following use of modern pesticides within the last few years. In another sense the problem is a new one. It was only during World War II that DDT—the first of the modern insecticides—began to receive extensive use; there has scarcely been time to appraise adequately the full effect of this "bug-killer."

Must we choose between song birds and elm trees? Is there some effective way of combatting Dutch Elm disease that will not involve severe ornithological losses? Is there comparable danger to wildlife involved in the aerial forest spraying with DDT for other insect pests? The articles in this issue of **The Passenger Pigeon** are intended to offer partial answers to these questions, and to point up the need for caution in the use of insecticides to the public in general, and to those actively engaged in spraying programs in particular.

When bird mortality resulting from spraying for Dutch Elm disease first occurred in Milwaukee, one of the first persons to awaken to the possible implications to Wisconsin bird life was Mrs. F. L. "Dixie" Larkin. Her article shows how her interest began, and merged with that of other concerned persons in developing the "Committee of a Thousand" to awaken public interest in the insecticide program.

One of the men most intimately acquainted with research on the effect of DDT on wildlife is Dr. Paul F. Springer, biologist with the U. S. Fish & Wildlife Service. In his article the knowledge gained from this research is summarized.

On the state level, Mr. James B. Hale has carried on experiments on the effect of DDT on wildlife through a program of spraying northern Wisconsin forests in 1957. Results are summarized in his article.

Primary Results Are Spectacular

The use of DDT in World War II produced spectacular results from the beginning. It is largely credited with keeping low the incidence among American troops of insect-carried disease like malaria and typhus. It has been used to spray mosquito-breeding areas in this country, where

the insects are largely mere nuisances, and in other countries where the insects are carriers of deadly diseases.

It has been found effective in combatting various forest insect pests: the fire ant that has invaded some southern states; the spruce and jack-pine budworms that have defoliated some of the northern forests.

It has been used to good effect in cutting down the population of elm bark beetles, chief carriers of Dutch Elm disease, and thereby slowed the progress of the mortal enemy of one of America's most beautiful shade trees.

The insect species that cause damage to forests, orchards, plantations and garden crops number in the hundreds. DDT has been found to be effective in dealing with a wide variety of insect pests. Many of the other new pesticides are proving to be equally effective—some more so—in combatting the insects that are deemed undesirable by one segment or another of our population. The U. S. Department of Agriculture has estimated that yearly agricultural losses to insect pests total some four billion dollars. DDT and other pesticides are being used in the confident hope that this economic loss can be greatly reduced.

One feature of DDT and other chemicals of the "chlorinated hydrocarbon" group of insecticides is its remarkable staying power. A single spraying may be effective for long periods of time, because the chemical is an extremely stable one, breaking down very slowly wherever it is protected from the weathering process. This means that a single spraying of an elm tree, during the dormant season when the spray can cover the bark effectively, will be effective for months. In one experiment researchers sprayed alfalfa with DDT, fed the alfalfa to cows, milked the cows, skimmed the cream off the milk, converted the cream into butter, and found that the butter was as effective for killing rats as the original spray would have been.

Some Secondary Results Are Hazardous

It is inevitable, of course, that when a given forest or a particular tree is sprayed, the "target" insect is not the only form of life affected by the spray. In order to determine the value of insecticides, it is necessary to appraise the secondary effects as well as the primary ones.

Sprays that affect undesirable insects are also inevitably toxic to beneficial ones. When beneficial insects are killed, other pests which are normally held in check by these beneficial insects increase. To kill off a large proportion of insects over a wide forest area would be to cut off the food supply for considerable numbers of birds that are primarily insectivorous. And birds feeding on poisoned insects can themselves be poisoned.

Spraying around elm trees contaminates the soil underneath the trees. This in turn poisons the worms, and eventually the robins that feed on the worms.

Spray that has been allowed to fall upon water areas in considerable quantity have, under certain conditions, had a disastrous effect upon the population of fish in the sprayed areas.

Spray that falls upon soil remains within the soil, with very little decomposition. Repeated treatments of the same area can cause the toxic content of the affected soil to increase, especially where soil is plowed.

ROBINS HAVE SUFFERED HEAVY LOSSES FROM D.D.T. SPRAYING IN SOME CITIES

PHOTO COURTESY "MAUSTON STAR"

Dr. Springer's article gives more detailed information about the effect of insecticides on various forms of wildlife.

Small amounts of toxic insecticides eventually get into the human body. Some falls directly upon people who are outdoors in an area that is being treated at the time of treatment; some comes through fruit and vegetables grown in treated areas, especially when crops have been sprayed shortly before harvest, for since DDT and allied pesticides are not soluble in water, ordinary washing will do little good; some may get on skin and clothes through direct contact with sprayed trees, residual puddles, etc.

Because the new insecticides are so effective in combatting insect pests, and because these same insecticides are potentially harmful to wildlife and humans in the course of doing their beneficial work on insect pests, considerable effort is now being made to discover how the primary result of insect control can be obtained with a minimum amount of secondary damage to other forms of life. Some of the results of this research are included in Dr. Springer's and Mr. Hale's articles and in the following paragraphs, as they relate to the two major areas of tree spraying now being carried on in Wisconsin: spraying for Dutch Elm disease, and aerial forest spraying.

Spraying For Dutch Elm Disease

At present no known cure for a tree already infected with Dutch Elm disease is available. So in order to combat the disease, it is necessary to combat the tiny elm bark beetles which are the carriers of the fungus. This is done partly by sanitation (removing dead or dying limbs that provide attractive breeding areas for the beetles) and partly by spraying.

Because the elm bark beetles reside under the bark during the dormant season, they can be sprayed most effectively by coating the bark thoroughly with DDT or methoxychlor (the two insecticides known to be most toxic to the beetles) when leaves are off the trees. As far as the effectiveness of the spray is concerned, treatment can be made once at any time between leaf-fall in autumn and leaf-growth in spring; the stay-

ing power of the pesticide is so great that one such treatment will be effective for a year. Weather factors limit the time of spraying further, however; best spraying conditions require temperatures over 40° and very little wind. This virtually rules out winter as a spraying season in Wisconsin, and limits the optimum time for applying insecticides to relatively short periods in late fall and early spring.

Research has also shown that heavy doses of insecticide are necessary to cover the bark of an elm tree as thoroughly as it needs to be. Such heavy doses have been deadly to birds that are directly affected, when the pesticide involved is DDT. The ornithological tragedies at Milwaukee and Janesville in 1957 are mute evidence of this. From an ornithological point of view, the obvious time for DDT spraying of elms is in late fall or early spring while most migrating birds are south of Wisconsin's borders. This further shortens the desirable season for spraying.

In some years weather factors may make it quite impossible for adequate spraying to be done with DDT before spring migrants appear in large numbers. The best answer then would seem to be to replace DDT with methoxychlor. This insecticide is more expensive than DDT, but has a staying power and an effectiveness on the elm bark beetle comparable with DDT. And methoxychlor is much less toxic to birds.

Whatever the chemical used, it would seem to be of primary importance that mist-blower equipment, rather than hydraulic mechanisms, be used, for the reasons listed in Mrs. Larkin's and Dr. Springer's articles.

Aerial Forest Spraying

Spraying for budworms and other insect pests in northern Wisconsin forests is quite a different matter. Control of these pests is possible with a much weaker insecticide solution than that required for the elm bark beetle. Good results in pest elimination have often been produced by aerial applications of one-pound-per-acre, and this is considerably less than the strength which is directly toxic to most birds. Consequently studies have indicated, as illustrated in Mr. Hale's article, that very little direct loss to wildlife has been traceable to DDT spraying when carefully applied at the one-pound-per-acre strength.

But when proper care is lacking, damage can result. Much spray landing on open waters can wreak havoc among fish. Lack of proper ground-to-air communication during a spraying operation can result in overlapping that will double or treble insecticide doses in some areas.

One of the hazards of aerial forest spraying is the tendency to treat large areas at one time. This could have a serious effect on insectivorous forest-dwelling birds, particularly during the nesting season. For such birds as flycatchers, vireos and warblers, such spraying can result in a severe and sudden drop in food supply. At some seasons of the year, this would merely mean that birds would have to move to unsprayed locations, be these locations a few yards or a few miles away. But during the nesting season—heavy from early May to mid-July, and especially heavy throughout June, in northern Wisconsin—birds are limited to small areas by territorial instincts and nesting activities, spraying is more apt to have an adverse effect on nesting success.

Entomologists have established that the latter half of June is the best time to spray for the jack pine budworm in Wisconsin. But ornithologists rate this as one of the most hazardous times for insectivorous birds in the midst of nesting activities. Perhaps further research will determine that the budworm can be controlled adequately by spraying at a different season. Until then, it would seem wise to limit spraying operations to small areas at a time.

Some Questions

While it is evident that distinct progress has been made in developing an insecticide program that avoids the most serious wildlife losses that have sometimes occurred in this and other states, it is equally obvious that a number of important questions are still unanswered, and will not be answered until much more research is completed.

Is it possible that a vastly increased spraying program in future years will bring about a permanently decreased insect population, and a consequent decrease of birds and other forms of wildlife that depend primarily on insects for food? To date, wildlife losses have been temporary, the researchers say. But with the use of toxic insecticides now increasing with astonishing rapidity, will such losses always remain temporary?

Or will insects develop an immunity to toxic insecticides as we now know them, creating a public demand for insecticides that are even more deadly to wildlife? There is already evidence that some insects are developing an immunity to DDT, and more different types of pesticides are being used in place of DDT in dealing with these pests.

Are insect pests permanently exterminated by one or two spraying operations? Or is control only temporary, resulting in the need for future spraying? How often will spraying need to be repeated in order to keep insect pests relatively harmless permanently?

Is it possible that widespread infertility of birds may result from a greatly expanded spraying program? Research has already indicated that sub-lethal amounts of toxic insecticides can affect reproduction. As the pesticide popularity increases, not only in the United States but also in Central and South American countries, can birds be adversely affected when exposed to spray for South and Central American insect pests in winter, for the fire ant in southern states in spring, and for budworm in the northern states in summer, all within a few months' time?

Is there likelihood that increased use of pesticides will be harmful to human beings health-wise? A few doctors have detected cases of insecticide poisoning in humans already. Will these cases increase, in number and in seriousness, as the whole spraying program enlarges?

Some Recommendations

Dr. Russell R. Whitten, chief of the Division of Forest Insect Research, U. S. Department of Agriculture Forest Service, writes (personal correspondence): "Before using any spray we must recognize that it is a poison and that it must be handled as such." To this must be added that the modern insecticides are still very new; many facts about their properties are still subject to continuing research. These facts point to the inescapable conclusion that **the use of insecticides must be carefully controlled.**

The proper use of insecticides is the responsibility of many people: farmers; foresters; nursery operators; park commissioners; government officials—national, state, county, city, village; health and conservation officials; property owners; the general public. To assist all concerned, in their efforts to make wise use of toxic insecticides, several recommendations are offered here. Most of these recommendations were made by the writer to representatives of the Wisconsin Conservation Department, the state Department of Agriculture and the state Board of Health, when public hearings were held in January 1958 preparatory to writing a new code governing the use of poison sprays in forest and non-crop areas in Wisconsin.

1. **Keep careful records of every spraying operation.** Widespread use of insecticides should be made by properly qualified persons only, and they should be licensed by an appropriate state agency. Careful records should be kept of each spraying operation, describing the area sprayed, reason for spraying, type of equipment used, name of insecticide, dosage, weather conditions, and observed effects on wildlife. These records could be of tremendous value for the much needed research that must still be undertaken, and be of assistance in the future refining of techniques for the most effective use of toxic insecticides. Such records should be filed with the state agency that grants spraying licenses.

2. **Spray for Dutch Elm disease by mist-blower equipment during the dormant season.** At present it is only in southern Wisconsin that Dutch Elm disease control is needed, but this may also be a concern of the northern part of the state in a few years. In order to avoid as much of the bird migration season as possible, it is recommended that DDT spraying for the elm bark beetle be carried on only between November 15 and April 1 in southern Wisconsin, and only between November 1 and April 15 in northern Wisconsin (the dividing line being drawn roughly between La Crosse and Green Bay). To allow for seasons when adverse weather conditions make it impossible to complete the desired spraying in the allotted time, it is recommended that spraying with methoxychlor be permitted between October 15 and May 1. All spraying for Dutch Elm disease should be done by mist-blower equipment, with nearby bird baths and feeding stations covered during the spraying operation.

3. **Spray forests only when specific needs arise, and use light solutions.** Forest spraying that is of a general precautionary measure, not directed toward pests that are known to be threatening specific forest areas, is a needless hazard to beneficial insects, important to birds and to the whole biological community. Spraying should be done only in response to specific needs, by the specific spray best suited to that need, using a minimum dosage and the minimum number of applications. Choice of insecticide should take into consideration the solution in which the desired chemical is mixed. No more than two-pounds-per-acre of DDT or a comparable substitute should be used in any given area per year. Spraying should avoid the height of the nesting season in June whenever possible.

4. **State agencies should be empowered to revoke spraying licenses.** Should future research show that there are real hazards to human welfare, not now generally recognized, in the continued widespread use of toxic insecticides, or show that long-term cumulative effects of poison in-

secticides result in serious upsets of the whole balance of nature, appropriate state agencies should be empowered to revoke any and all spraying licenses without delay. Or if wanton destruction of wildlife results from careless spraying, the state should be empowered to revoke the license of the offender.

5. **Carry on a vigorous sanitation program on elms.** Park personnel, property owners and all citizens should keep a watchful eye on elm trees throughout Wisconsin, and see to the prompt removal of all dead or dying branches, in order to keep down the elm bark beetle breeding population.

February 11, 1958
Adams, Wisconsin

COMMITTEE OF A THOUSAND

By DIXIE LARKIN

It was in April and May 1957 that many dead and dying birds were found in the Milwaukee area. Not only were several brought to me by school boys and girls, but also many telephone calls told me of others. Because I was working with a bird study group from the College Women's Club, with a cub scout den of my own, with boy scouts working for Eagle Scout honors, I was in Estabrook Park almost daily. Often dead and dying birds were found, and always with the same symptoms: unable to fly or walk; wings, head and body twitching uncontrollably. All died!

A few of the birds were kept and frozen, and later brought to the Humane Society manager, Mr. S. Eugene Matel, who sent them to Madison for autopsy. The game warden had suggested that this be done. It was June before we knew definitely that all died from DDT poisoning. Eventually Mr. Matel announced through the papers that the Humane Society could no longer pick up dying birds, as they did not have the personnel or equipment to care for so many. Birds would have to be brought in by the finders.

In the meantime Mr. Owen Gromme of the Milwaukee Public Museum was receiving phone calls, letters and birds relating to and showing the same symptoms, not only from Milwaukee County, but also from other parts of southern Wisconsin where DDT spraying for Dutch Elm disease was being carried on.

I brought some of these facts to the attention of the WSO convention at Green Lake in early May, but no immediate action was taken, other than to refer the matter to the attention of the incoming officers and board of directors.

I flew to Michigan over the Memorial Day weekend to attend the Michigan Audubon Society campout. After mention of the loss of birds in Wisconsin coincidental with the lethal spraying of elms with DDT, many members later told me they had experienced similar losses in Michigan in 1956. One of these was Mr. Forbes Miller, Conservation Chairman for the large and active Detroit Audubon Society. He said the losses

of bird life in the Detroit area during the spring migration had been so serious that they had launched a protest against the tragic results of poison spraying, and an investigation was made. After much research and correspondence they worked out a plan which was offered to 48 communities to protect their elms at a minimum loss to bird life. He offered to send me their ideas, plans and progress made to date.

It was their efforts which spurred me on to make some similar attempt in Wisconsin—particularly since, in the meantime, I had heard of terrible kills of birds in Elmhurst and Batavia, Illinois, and other cities. Since there seemed to be no organization interested enough to lead the project, I decided to enlist the aid of a few individuals.

Information Collected

The first move was to collect as much information as possible about Dutch Elm disease, its treatment, and the modern poison sprays which have come into widespread use since World War II. I was particularly interested in the residual, cumulative ones such as DDT, now used not only to combat Dutch Elm disease, but also for many other insect problems. My file grew to astounding proportions. Even the American Medical Society had 22 articles on these sprays and their effects on the human body.

While organizing the material, I enlisted the aid of the few individuals I knew who were as disturbed about the situation as I. My first call was to the Milwaukee Public Museum where Mr. McKern and Mr. Gromme were anxious to cooperate 100%. Mr. Gromme had long been gathering information on poison spraying. Mr. Matel's help was solicited; he "had almost given up hope of anything being done." Knowing John Dahlberg to be a strong and consecrated conservationist—treasurer of the Citizens Natural Resources Association, vice-president of the Milwaukee Audubon Society, active in boy scout leader training—I asked his aid and support, and he has worked unceasingly for the new group.

Also contracted were the City Club Bird Group, the Izaak Walton League, the County Federation of Garden Clubs, the Animal Protective League and the Milwaukee County Alliance. All were eager to back us. Other individuals joined our working committee. Meetings were held; museum artists whipped up a dramatic and effective letterhead; a letter was drafted carrying several recommendations:

1. Stop planting elm trees until Dutch Elm disease is under control.
2. Provide a single annual spraying while trees are dormant, without foliage, and bark coverage can be most effective.
3. Confine DDT spraying to the period from November 15 through April 1 by using the new dormant spray method, thereby avoiding the periods of heavy spring and fall bird migration.
4. Use only mist-blower equipment, thereby minimizing dripping that forms contaminated pools and puddles where birds drink and bathe.
5. Stress sanitation. Remove dying elms imemdiately. When weather is too cold for spraying, assign more men to remove dead and dying wood from elms. Enforce the State Department of Agriculture law that states that dead and dying elms must be removed within ten days.

6. Enact ordinance prohibiting private operators from spraying trees with DDT or other sprays destructive to birds between April 1 and November 15.

Along with these recommendations, we mail out supporting testimony from such authoritative references as: R. R. Whitten, Chief of the Division of Forest Insect Research, U. S. Dept. of Agriculture; Walter P. Nickell, naturalist with the Cranbrook Institute of Science; Dr. Paul F. Springer, biologist with the U. S. Fish & Wildlife Service; Joseph A. Dietrich, park superintendent and tree warden, Greenwich, Connecticut; John Baker, president of the National Audubon Society; Dr. J. P. Linduska, director of the Wildlife Remington Farms, and formerly chief of wildlife for the U. S. Fish & Wildlife Service; and Dr. Clarence Cottam, director of the Wedler Wildlife Foundation.

Some Accomplishments

We met often throughout the summer, made considerable progress, and have grown to such amazing proportions that we have the support of organizations totaling over 60,000 members. Our hope is to have 1000 organizations join our movement, which explains our name: Committee of a Thousand."

We have distributed reprints of research findings and views from national conservation organizations, articles by medical doctors and other authorities, and news about tragic results from areas where poison sprays have been used. We have studied the state administrative code dealing with the use of toxic insecticides in forest and non-crop areas, worked for an attorney general opinion that this must also apply in urban areas, and appeared at hearings that may lead to a revision of the state code. We have appeared before the Milwaukee City Council and the Milwaukee County Park Board, and mailed our recommendations to all Milwaukee County municipal governments. We believe this avoided early fall spraying and thus prevented bird kills during fall migration.

Our aims and purposes are fully expressed in our letter. We believe it is time for all those who are interested in getting a bird list, studying the science of ornithology, hunting, fishing, preserving our soil and plants and wildlife, and educating our youth in nature as well as in the health and happiness of people everywhere, to demand reasonable and intelligent controls over poison sprays. The indiscriminate use by man of these poisons throughout our country today without adequate research, and with complete disregard for the ecology of our natural areas with its accompanying tragic results in too many instances, will eventually turn upon and destroy man himself. There are many well-known authorities today who firmly believe this.

Some naturalists have been openly critical of spraying programs carried out by government agencies. Dr. Robert C. Murphy of the American Museum of Natural History in New York is one of the leaders fighting against the U. S. Dept. of Agriculture's spraying of Long Island over the protests of some residents—a program that resulted in great damage and some law suits.

Other naturalists are advocating holding off on poison spraying programs entirely, until further research can determine the long-term effects

of the sprays. Dr. Fairfield Osborn, president of the Conservation Foundation and the New York Zoological Society, has urged: "Let's stop DDT spraying of croplands and forests until we know more about it. Until it is certain that all known facts about possible damage are at hand, I am personally very much in favor of suspending the DDT program. Extensive studies must be made to determine how to prevent further loss." Dr. Osborn noted that over 65,000,000 acres of cropland and more than 3,000,000 acres of forests were sprayed in 1956, without adequate information about the poisoning of birds, mammals and fish.

The National Audubon Society has called for a stop to the proposed program of spraying 20,000,000 acres in nine southern states to combat the imported fire ant, and has recommended that the Department of Agriculture stop all insect control programs in which highly toxic chemicals are used, unless incontrovertible evidence shows that no serious damaged to human and wildlife resources will result. John H. Baker, president of the Society, has said: "The use of toxic chemicals for the purpose of protecting agriculture and forest crops has now skyrocketed to the point where cumulative secondary poisoning of human beings and wildlife, which already exists to some extent, may become catastrophic."

We must recall the fact that God has created a rich and abundant land here in America, with disease and insects playing their part in contributing to that abundance. Man can never improve upon this ecological biological plan. So may God bless America! Let's save some of it!

February 16, 1958
5333 North Idlewild Ave.
Milwaukee 17, Wis.

DDT: ITS EFFECTS ON WILDLIFE

By PAUL F. SPRINGER
Biologist, U. S. Fish & Wildlife Service

Whether we like it or not there is no escaping the fact that we are living in an age of chemical control agents. One need only have witnessed the rapid development within the last 15 years of many powerful new insecticides, herbicides or weed killers, fungicides and other pesticides to appreciate this point. Prior to World War II, man's chemical arsenal in the war against the "bugs" and other pests included only a few old standbys, such as arsenic, nicotine and copper compounds, pyrethrum and rotenone. Today, there are over 200 basic chemical pesticides and more than 6000 brand-named products on the market. Volume of production has increased correspondingly. In 1940, the estimated value of retail sales was about $70 million. In 1956, it was seven times as great, and representatives of the pesticide industry believe that by 1975 this figure will top $2 billion annually.

The effectiveness of these poisons in controlling unwanted animals and plants naturally has raised apprehension on the part of many concerning their effects on beneficial forms of life. DDT was the first of the new "miracle" insecticides and, for this reason, has been studied

longer and more intensively than those developed later. It still is the most important chemical in many programs, including those dealing with control of Dutch Elm disease and forest defoliating insects, which are of particular concern in Wisconsin as well as in many other parts of the country.

The effects of DDT on wildlife vary with the type of program and with the kinds of animals involved. In this paper, a brief review will be made of present knowledge, and recommendations will be given for reducing potential damage.

How Wildlife Is Affected

Mammals. Among vertebrates, mammals appear to be affected least by DDT poisoning. Dosages of the order of 5 pounds per acre are required to produce direct mortality. However, indirect effects have been noted at lower rates of application. In a bottom land forest in Illinois, DDT sprayed at 0.5 pound per acre killed most of the crayfish and caused raccoons subsisting upon them to change their diet to acorns and mussels.

Birds. Studies have shown that birds are somewhat less resistant to DDT than are mammals. In general, little direct harm to adult birds has been noted in forest habitats from single aerial treatments of 2 pounds per acre and below. However, four annual applications at this maximum dosage and one at 1.1 pounds per acre caused reductions of 28-44 per cent among certain treetop species. Following a 5-pound-per-acre treatment, many birds died and the population was reduced to one-sixth of the pre-spray level. Young birds are more susceptible than adults and may be affected at lower dosage rates. In addition, nestlings may lose weight and die if large reductions of insects occur and parent birds are forced to search longer for food. Such losses may not be restricted entirely to songbirds, since the young of Bob-white and Pheasants are primarily insectivorous during the early months of life. Laboratory studies have shown these species to be three or more times as susceptible to DDT poisoning as are Starlings, Pigeons, Mallards and Pintails.

DDT also can have more subtle effects. Doses below those that will kill birds directly may be stored in body fat, and this accumulation can cause poisoning at a later time when fat reserves are utilized. Furthermore, daily consumption of minute amounts, as low as 0.0003 ounce for a two-month period, may have no outward effect on adult birds, but will cause significant reductions in production and fertility of eggs and in survival of young.

Reptiles and Amphibians. These cold-blooded vertebrates are usually more susceptible than birds to DDT poisoning. Single applications of 1 pound per acre have killed some frogs and water snakes, but weekly applications at 0.1 pound per acre to ponds and marshes have caused only slight mortality. Terrestrial reptiles appear to be more tolerant, but suffer losses at a level of 2-3 pounds per acre.

Fish. Of all vertebrates, fish are usually the most sensitive to DDT poisoning. Individuals of some species are killed following single treatments of 0.2 pound per acre of DDT in oil. Weekly hand-applications at 0.1 pound per acre in shallow water caused mortality after the tenth treatment. When the same dosage was applied by airplane, no damage

occurred even after 17 weekly treatments. Aerial spraying of 1 pound per acre for forest insect control kills some fish but usually not a significant number in terms of the total population. Because of the protection offered by leafy canopies, the amount of DDT that reaches water surfaces is usually no more than one-quarter of the amount applied.

The type of carrier with which an insecticide is combined has an important bearing on how well fish survive. As a rule, emulsions are most harmful because they mix with the water and remain distributed through it. Dusts, wettable powders, and granules tend to settle to the bottom where they are not as readily available, except to catfish, suckers and other bottom-feeders. Since oil solutions float, their hazard, for the most part, may be considered intermediate. They are particularly dangerous to fish which feed at the surface of the water. On the leeward sides of lakes and ponds, wind and wave action can build up accumulations of insecticides in oil solution which may be several times the concentration originally applied.

Physical and chemical factors in the aquatic habitat also affect the extent of mortality. Survival is much greater in muddy ponds and streams than in clear waters because DDT is adsorbed by silt particles, and is then laregly unavailable to fish and other aquatic life. DDT mortality also is decreased by hard water, low temperature, and high oxygen content.

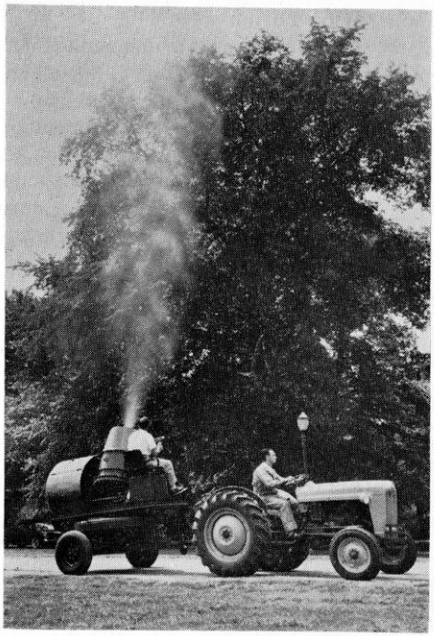
Insect and Other Invertebrates. Although snails and mussels show considerable resistance to poisoning by DDT, most insects, spiders and crustaceans (crayfishes, crabs, shrimps) are killed readily by this chemical, often by amounts as low as an ounce or two per acre. Aquatic forms usually are most susceptible, probably because they are in continous contact with the water and the chemicals it contains. Single aerial applications at 0.2-0.3 pound per acre in marshes may cause reductions of 15-40 per cent among the various groups. Reinvasion generally is rapid but if treatments are repeated a number of times a season, as is often required in mosquito control, they may cause decreases ranging from 50-90 per cent. Certain sensitive forms, such as small crustaceans, may be extirpated locally. In forested areas, single aerial applications at the rate of 1 pound of DDT per acre have caued 70-90 per cent mortality of stream insects. Within a year, some species will completely repopulate a treated area while certain larger aquatic insects may require two or more years.

Heavy losses also occur among terrestrial insects, but individuals in protected situations may suffer little harm. Egg and pupal stages usually are unaffected. Residual effects of a 1-pound-per-acre application last about a week. DDT also will kill honey bees. Losses can be reduced by treating fields in advance of peak blossoming or by confining applications to late afternoon and evening when most bees are inactive.

Dutch Elm Disease Control

Control of Dutch Elm disease is a problem confronting many eastern and midwestern communities, where as many as 80 per cent of the trees may be elms. Good results have been obtained by the use of DDT emulsionsto kill the bark beetles, which are vectors of the fungus disease. One or two treatments generally are recommended—one before the flow-

ers and leaves appear in the spring, involving about 2 to 5 pounds of DDT per average 50-foot elm tree—and sometimes a second in July at half this rate. The principal methods of application are by hydraulic sprayers or mist blowers.



MIST-BLOWER IN OPERATION
PHOTO COURTESY JOHN BEAN DIVISION, FOOD MACHINERY AND CHEMICAL CORPORATION, LANSING, MICHIGAN

The large amount of DDT needed to give adequate control is a recognized hazard to birds and other wildlife, although there has been little or no damage in some communities. Considerable mortality of birds has followed spraying operations in suburban Chicago and Detroit. Greatest losses occur following use of hydraulic sprayers. About 40 per cent of the large volume of DDT emulsion applied by such equipment runs off the treated trees, and may pollute bird baths and fish ponds or form puddles from which birds may drink. Studies at Princeton, N. J., conducted cooperatively by the U. S. Department of Agriculture and the U. S. Fish and Wildlife Service, as well as observations by others, have shown that the use of mist blowers instead of hydraulic sprayers usually results in a noticeable reduction in bird mortality, presumably because little or no drip is involved. When treatments are made at night, however, the use of mist blowers has been reported to cause greater mortality of birds than has hydraulic equipment. Birds are not frightened from their roosts then by a floating mist as they usually are by a stream of hydraulic spray, and hence are exposed to more dangerous amounts of insecticide. Wildlife losses can be reduced by covering bird baths and fish ponds during spray applications and by preventing puddling under trees and in street gutters.

Spraying recommendations issued in 1957 by the U. S. Department of Agriculture offer further possibilities of minimizing damage to birdlife during elm-spraying operations. Because of the long residual effectiveness of DDT sprays, the dormant applications can be made any time after the elm trees lose their leaves in the fall and before the new leaves and flowers appear in the spring. If applications are made in advance of the principal migration of birds in the spring, losses should be reduced considerably. The Department of Agriculture also indicates that a foliar application in July probably accounts for very little disease control and is likely to destroy beneficial insects, which, in turn, help prevent abnormal outbreaks of such pests as scales, mites and aphids. In this connection it is significant to note that the Midwestern Chapter of the National Shade Tree Conference in its "Guide for Community-Wide

Control of Dutch Elm Disease" issued October 1, 1957 states that a seccond (foliar) application ordinarily cannot be justified on an economic basis and should be reserved for trees with specimen, historic, strategic or recreation value, including those in parks. Elimination of the foliar applications in July would prevent the possibility of harm to birds, particularly the young, during and after the nesting season. Despite the benefit to birds, the foliar application cannot be eliminated if there is danger of infection by elm phloem necrosis. When this infection is probable, the Midwestern Chapter recommmends that the foliar application always be made.

Although DDT has been the insecticide of choice, the U. S. Department of Agriculture points out that methoxychlor is equally effective in controlling vectors of Dutch Elm disease. This chemical is about twice as expensive as DDT, but the total cost for both the chemical and its application is only about 30-60 per cent greater. Furthermore, tests by the U. S. Fish and Wildlife Service have shown that methoxychlor is much less dangerous to bird life than is DDT. Communities interested in protecting their birds may wish to consider the use of this more expensive but safer material. However, methoxychlor still has to be used with care around fish ponds, since its toxicity to fish differs little from that of DDT.

Forest Insect Control

Important forest defoliating insects, such as the spruce budworm, can be controlled by DDT in oil, applied by plane at the rate of 1 pound or less per acre. Since 1945 over 20 million acres of forest land in the United States have been sprayed in this manner. Because of the small damage resulting to wildlife and fish, and the fact that in most cases spraying has not had to be repeated oftener than once every several years, this generally has been considered one of the safer insect control programs. Recently, however, two incidents involving heavy losses of fish have occurred as a result of spruce budworm control operations.

In New Brunswick, Canada, large numbers of young salmon and of stream insects died from June to August 1954, following an application of DDT at 0.5 pound per acre. Studies the following year by the Fishery Research Board of Canada and the University of Toronto showed that there had been an extremely heavy hatch of salmon, but repopulation of insects comprising the principal food of salmon was still far from complete. Although there was further recovery in numbers and kinds of insects in 1956, the population level, particularly of larger aquatic insects, was still below that of an untreated area. Serious starvation of salmon hatched the previous year was indicated. The studies are being continued to determine more fully the effects of spraying.

The second destructive incident occurred in the Yellowstone River in Montana during 1955. Little or no mortality of fish followed a June spraying, but suddenly in October large numbers of whitefish, trout, and suckers started to die. Examination showed a serious reduction in the number of stream insects and severe emaciation of the fish. Since no other source of pollution was known, it is believed that the fish died of starvation owing to destruction of food organisms by DDT poisoning. Follow-up studies in subsequent years by the U. S. Forest Service, the

Montana Game and Fish Commission and the U. S. Fish and Wildlife Service showed good recovery of stream insects and fair to nearly complete repopulation of fish.

Since both incidents are contrary to previous experience, detailed studies were conducted in each area in 1956 and 1957 to determine the effects of other applications. In both years the usual heavy destruction of stream insects was observed, accompanied in New Brunswick by serious loss again of young salmon. In Montana, however, no fish mortality, either immediate or delayed, occurred.

To reduce damage in forest spraying operations, the U. S. Fish and Wildlife Service recommends the use of oil solutions or wettable powders of DDT instead of emulsions, since the latter involve increased hazards to fish. Because of the sensitivity of fish, crustaceans, and certain other aquatic life to DDT poisoning, it is desirable to avoid, if possible, treatments over rivers and lakes. Rivers should not be used as boundaries for spray plots because of the danger of double dosing. In order to restrict applications to intended areas, spraying should not be carried on in windy weather, and provision should be made for adequate ground-to-plane control. Also, it is desirable to treat infestations before they cover large areas and to leave headwaters, blocks, or srips untreated to serve as sources of repopulation by fish and stream insects. These areas can be treated at a later time or in succeeding seasons if necessary.

What Is Needed

Because DDT and other pesticides have harmed wildlife in certain programs, there are some who would forbid all future use of these materials. While it is not imperative that chemcials be employed to the exclusion of other control procedures, they often represent the only known means of effectively combatting pests. Further knowledge of the biology of unwanted animals and plants can and has revealed non-chemical methods of coping with them. These have included manipulation of environment (as by introduction of plant varieties resistant to damage by insects and disease) and use of predators, parasites and other biological control agents. The problem is to find the most satisfactory means of control which causes the least damage to desirable forms of life. This does not mean that the most effective or most economical means of killing a pest is necessarily the best procedure. Nor does it imply that all damage to wildlife must be avoided. However, it does signify a responsibility for the development of balanced control programs that have due regard for all legitimate public interests. Such programs can be obtained only through greatly stepped-up research and testing to provide the needed information.

January 30, 1958

U. S. Fish and Wildlife Service
Bureau of Sport Fisheries and Wildlife
Patuxent Research Refuge
Laurel, Maryland

BIRDS, BUGS, AND JACK PINES

By JAMES B. HALE
Biologist, Wisconsin
Conservation Department

Events at opposite ends of Wisconsin in the summer of 1957 served to emphasize a growing national problem concerning the effects of insecticides on wildlife. In the southeast part of the state, dead songbirds were found in several cities following the spraying of elm trees with a DDT solution to control the bark beetles which spread Dutch Elm disease. At about the same time in several northern counties, an extensive aerial spraying of jack pine forests with DDT was undertaken to control an outbreak of jack pine budworms. Observed wildlife losses here, however, were negligible.

In both of these situations, everyone with an interest in wildlife was understandably concerned about the dangers involved. Because of this concern, an attempt was made to find out what would happen to wildlife when budworms were sprayed with DDT. Let's take a look at some of the considerations involved and results attained:

The jack pine budworm doesn't look like much. In his last stage as a caterpillar he is about 7/8 of an inch long, with a dark-brown body banded with brownish yellow. When he gets to be a moth, he has reddish brown wings with a spread of about 3/4 of an inch.

He is a native of Wisconsin and a close relative of the spruce budworm, which has caused much forest damage in other parts of the country. It is believed that the moths lay eggs only on jack pine, but caterpillars will feed on any pine species they may find as understory in jack pine stands.

He is a big eater, and that's where the trouble starts. Pollen and needles are his favorite food. When he clips enough of a tree's needles, the tree dies. When a budworm outbreak is going on, the trees they have attacked have a scrawny, brownish green appearance.

He shows a preference for the coarsely branched, large-crowned tree, mainly because such trees grow the most pollen-producing flowers, which are an important food supply. Therefore, cutting practices that remove such trees do much to prevent a buildup of budworm numbers.

He is attacked by many species of parasites, mainly small wasps. It is important to consider the status of the parasites before using chemical control. In effect, that is what happened in Wisconsin in 1957; parasitic wasps increased faster than expected, so that aerial DDT spraying of jack pine forests was not needed on large areas where it had been planned to spray for budworms.

When chemical controls are necessary, 1 pound of DDT in one gallon of fuel oil per acre is a standard application for aerial spraying. This dosage was used in the 1957 Wisconsin sprayings.

What happened in northern Wisconsin was no sudden, over-night development. Entomologists had been watching budworm populations grow for several years, particularly in the northwest "pine barrens" section. During the summer of 1956, about 22,000 acres of jack pine were sprayed with DDT in Douglas County. No wildlife damage due to this operation was obsered or heard of, although no formal evaluation was made. By the end of 1956, it became apparent that chemical controls

would be necessary. Plans were made to spray about 300,000 acres of commercially valuable jack pines.

Surveys in the spring of 1957 indicated budworm numbers were larger than ever, so the aerial spray plan was activated. An evaluation of the effects of DDT was included. Personnel of the Wisconsin Conservation Department, University of Wisconsin, U. S. Forest Service, and State Water Pollution Committee participated in the design of the evaluation.

Spraying began on June 19 and ended June 30. At this time it was apparent that natural parasites had controlled the budworm to the point where no further spraying was necessary. A total of 40,575 acres were sprayed in 6 counties, including 7,400 acres in Oneida county, 4,290 in Polk county, 6,645 in Burnett county, 1,805 in Washburn county, 2,895 in Douglas county and 17,540 in Bayfield county (14,440 of these acres were in the Chequamegon National Forest).

About 200 man-hours were spent by the Conservation Department and University of Wisconsin entomologists, biologists, foresters, and game managers in checking many of these areas during and up to 2 weeks after the time they were sprayed. The only physical evidence of wildlife losses among birds and mammals were 5 Mallard ducklings found dead on a Bayfield county pothole several days after the area was sprayed. Small amounts of DDT were found in the tissues of these ducklings, but not enough to indicate more than circumstantially that they were killed by DDT. No other bird or mammal losses were found by or reported to the Wisconsin Conservation Department. Some small scale fish losses were noted, as will be described later.

In Oneida county, post-spray observations were made by B. H. Popov of the Wisconsin Conservation Department at Woodruff. He found no unusual circumstances relating to wildlife in sprayed areas, and concluded in his report on the matter ". . . there were no direct immediate adverse effects upon any forms of wildlife in the sprayed areas."

A letter was also received from J. T. Horner, District Ranger of U. S. Forest Service, at Washburn, Wisconsin, concerning the results of spraying in the Chequamegon National Forest in Bayfield county. He stated that, "we have noticed no adverse effects on wildlife in the areas sprayed, and there have been no comments locally in regards to the spraying."

Some specific evaluation studies were attempted by the Conservation Department in the northwest counties. Results are summarized below:

Insects

The effect of spraying operations on budworms was checked almost constantly before, during and after spraying by entomologists of the Conservation Department and the University of Wisconsin. They found a satisfactory budworm kill (90 per cent or more) in those areas sprayed with 1 pound of DDT per acre, but made no objective check of the kills of other insects.

Birds

The only effect of spraying on bird populations that was immediately apparent was the loss of the Mallard ducklings previously described. No

efforts other than general observations were made to follow game bird populations, because of their relatively low numbers in the heavy jack pine types, and of manpower limitations.

Considerable effort went into pre-spray checks of songbird populations in six areas in Burnett, Washburn, Douglas and Bayfield counties. The six areas included 4 to be sprayed and 2 to be left unsprayed as controls. Because of the parasite irruption and curtailing of the spray program, only one of ten areas (in the town of Hughes, Bayfield county) actually was sprayed. On the latter area and on its unsprayed check area (in the town of Solon Springs, Douglas county) fifteen listening stops were established, at each of which the name and number of each species of bird heard singing were recorded during 5 minute periods. The first stop in each group of 15 was begun at sunrise. Each stop was located a distance equivalent to a 3 minute walk from the previous stop. All stops were located in heavily-stocked jack pine stands, either natural or plantations. Large openings and hardwood areas were avoided as much as possible.

Unsprayed and sprayed areas were checked on June 11 and June 13 respectively. Spraying took place on June 25. The unsprayed control was rechecked on July 2 and July 18, while the sprayed area was rechecked on July 6 and July 17. To be effective on budworms, DDT must be sprayed at the period when larvae are in their last and most active stage before pupating. This is normally during the last half of June in northern Wisconsin.

On these areas the most common species were the Hermit Thrush, Clay-colored Sparrow, and Ovenbird. Seventy per cent of the birds heard were in 4 families: Finch (Fringillidae), Warbler (Parulidae), Thrush (Turdidae) and Flycatcher (Tyrannidae).

Following spraying there was no significant difference in the number of singing birds heard betwen the sprayed and unsprayed areas. A decline in numbers occurred on both areas, but was in line with the expected seasonal decline in singing activity.

These results are the same as those found in a similar study conducted by F. M. Kozlik in 1946 on a jack pine area in Marinette county which was sprayed with 2 pounds of DDT per acre for spittle-bug control. See **1946 Pass. Pigeon 99-103).**

Mammals

The small mammal populations in 4 jack pine stands in Burnett, Washburn and Douglas counties were sampled prior to the spray period using lines of dropping boards. Use of these boards by mice and shrews indicated extremely low populations, amounting to 5 out of 2,400 board-nights, so that no further checking was carried out.

The number of Red Squirrels and Least Chipmunks heard calling were recorded at the time songbird counts were made. No changes in these counts were noted following spraying.

No checks were made of the larger mammals, such as deer, bear, and rabbits, as there was no reason to believe they would be affected by normal spraying operations.

Fish

A special effort was made to leave unsprayed strips along streams and lakes. No evidence of fish kills or loss of bottom fauna was found in three trout streams in Polk and Burnett counties.

Four small lakes in Burnett and Washburn counties were accidentally sprayed; some loss of fish fry and frogs was noted in each, but the extent of such losses was not believed to be a significant portion of the total populations.

The conclusion is inescapable that these budworm spraying operations caused little immediate damage. It is true that the evaluation was far from complete, but enough effort was expended so that extensive losses would have been observed had they existed. The possibility of cumulative effects showing up in subsequent years cannot be discounted, although we are doubtful that they will occur, since these sprayings used small amounts of DDT and probably will not be repeated.

These studies have emphasized that potentially, at least, all insecticides (of which there are dozens) that can kill insects can also kill higher forms of life. Many things determine whether wildlife will be killed, such as the formula of the insecticide, how it is applied, when it is applied, and so on. It is hard to generalize; each use of an insecticide must be judged in the context of its local use and environment. However, the possibility of wildlife damage is always present, either directly through contact with the poison, or indirectly due to destruction of habitat or insect food supplies.

Actually, knowledge of the effects on wildlife of most insecticides is fragmentary at best, but enough is known to indicate the need for caution in their use. So far we seem to have been lucky nationally, because the wildlife losses which have been recorded to date were only local in effect and resulted in no long-term damage to regional or continental numbers of the species killed. We should not assume, however, that widespread severe losses cannot occur in the future.

February 24, 1958
Wisconson Conservation Department
Madison 2, Wisconsin

NEWS . . .

If you are located near an airport ceilometer or a high radio or television tower, try to make arrangements to check the ground nearby on as many mornings as possible this spring—particularly after nights of heavy migration. Even if you do not have access to such an area, keep a record of those nights when you hear substantial numbers of chips from night-migrating birds. This data is needed to determine the seriousness of the bird kill that sometimes results around towers and ceilometers during migration. Information should be sent to Dr. C. A. Kemper, Chippewa Falls, or to Mr. Clarence Jung, 6383 N. Port Washington Road, Milwaukee.

Feelers sounding out public opinion in 1957 about permitting shooting of Mourning Doves in Wisconsin brought a resounding "no" from many quarters. Not only did the Wisconsin Society for Ornithology and other organizations voice disapproval, but also the hunters themselves voiced disapproval in their Conservation Congress meetings last May.

After purchase of 40 acres of Prairie Chicken land last summer, sufficient funds were still left in the WSO Prairie Chicken Survival Fund to make possible the purchase of another 20-acre plot of land. By purchasing these 60 acres, the Society is making a very positive contribution toward a program of preserving this endangered species. But this is no time to stop!

(more news on page 169)

W. S. O. VISIBLE MIGRATION PROJECT

By HELMUT C. MUELLER

The response to the project was disappointing. Only four observers spent an entire day or more at an observation point. Several other observers contributed a few hours or occasional observations. There was little visible migration on the first three target dates but September 22 developed into one of the best hawk days of the entire fall. The observations are presented here.

September 14

Cedar Grove: Although the migration during the previous night was quite heavy (3-4 calls per minute heard at 11 p. m.) there was little migration during the day. The following migrants were noted: Hawks 4, Cedar Waxwing 200, Robin 200, Flicker 150. Many songbirds were in evidence in the area—461 individuals of 40 species were banded, establishing a new record for the station. Weather: temp. 55°-71°, overcast skies, barometer falling steadily from 29.19 to 28.92 in., wind light and variable becoming SE in the afternoon and increasing to 14 mph. Early Saturday the weather map was dominated by a large high pressure cell which covered the eastern two-thirds of the country. This cell moved eastward and was followed on Sunday by a low pressure system which centers in Wisconsin and Manitoba.

September 15

H. Bauers observed 12 hawks at Terry Andrae State Park eight miles north of Cedar Grove. We saw 75 hawks, 69 of them during the same period that Bauers was at his post. He saw about 120 Martins and swallows; we observed 350. In addition, 200 Flickers, 150 Robins, 200 Cedar Waxwings, 125 Nighthawks, many dragonflies and a few Monarch butterflies were seen at Cedar Grove. H. Young found no migrants during a several hour early afternoon watch at La Crosse. Weather: temp. 54°-74°, partly cloudy, wind SW to W, 10-15 mph, barometer rising slowly from 28.77 to 28.84 in.

September 21

R. Grimm, observing in the Kettle Moraine four miles north of Kewaskum, reported only one hawk for an entire morning's watch. We saw 27 hawks at Cedar Grove, plus the following: Chimney Swift 35, Nighthawk 8, Cedar Waxwing 100, Flicker 50. Weather: temp. 44°-64°, overcast, barometer rising slowly from 28.80 to 28.92, wind swinging from S (8 mph) to WNW (5-14 mph). The weather map showed a low center in Iowa with a trough extending to another deeper low in SW Manitoba. On the 22nd these lows consolidated in the James Bay region.

VISIBLE MIGRATION STUDENTS AT CEDAR GROVE
PHOTO BY FRANK KING

September 22

H. Bauers, E. Peartree, and N. Smith stationed themselves on Raasch's Hill in Dodge County Park near Horicon. Observations were: Hawks 13, Rose-breasted Grosbeak 8, Bluebird 5, Robin 15. In addition, birds of 32 species were seen moving through nearby cover. W. Boose noted a flock of 49 Broad-wings at Poysippi (Waushara Co.). Mr. and Mrs. C. Frister took up a post at Terry Andrae for two hours and counted 23 hawks. (118 were seen at Cedar Grove during the same period.) For the entire day we saw 811 hawks: Broad-wing 483, Sharp-shin 243, Pigeon 21, Red-tail 21, Sparrow 20, Marsh 14, Osprey 4, Cooper's 2, Peregrine Falcon 2, unidentified small falcon 1. Small bird observations included: Swallows 800, Blue Jay 20, Flicker 20, Nighthawk 1, Chimney Swift 50. Many dragonflies were seen. Weather: temp. 46°-67°, partly cloudy skies, barometer steady, 29.02-29.04 in., wind W, 5-14 mph.

A few conclusions can be drawn from this meager display of data: (1) Visible migration exists at places other than Cedar Grove, although the flight at the latter locality considerably exceeds that of any other known Wisconsin observation point. (2) The only large hawk flight during these four days occurred on the trailing edge of a low pressure cell which had its center North of Lake Superior. The day was further characterized by partly cloudy skies and westerly winds. Our past experience at Cedar Grove indicates that these meteorological conditions are necessary for a major hawk flight.

It is hoped that increased cooperation in next year's study will uncover some yet unknown flyways in Wisconsin.

Dept. of Zoology, Univ. of Wisconsin

APRIL 25-27, 1958
MILWAUKEE, WIS.

Convention News . . .

The 19th annual WSO convention will be held from Friday to Sunday, April 25-27, on the campus of the University of Wisconsin-Milwaukee, with vice-president Stanley Polacheck in charge of arrangements.

Headquarters: The Union, University of Wisconsin-Milwaukee, corner of Maryland Avenue and Kenwood Boulevard.

Registration: Begins Friday, April 25, at 7:00 p. m.

Supply Department: Open for business at the Union during most of the convention period, stocking a wide variety of books, records, and other items of ornithological interest.

Friday Reception: Features colored films by Mr. Steve Briggs: "The Gooney Bird," "West of Key West," "Along the Gaspe Road."

Papers: Papers by various WSO members, Wisconsin Conservation Department and University of Wisconsin personnel will be given Saturday morning (9:30-12:00) and afternoon (1:45-3:45) at the main building of the University of Wisconsin-Milwaukee on Downer Avenue.

Business Meeting: The annual business meeting, with election of officers, follows the afternoon paper session at 3:45.

Banquet: Saturday, April 26, 6:30 p. m., at the Union. Sam Robbins will be toastmaster; guest speaker to be announced.

Field Trips: Trips around the Milwaukee area are planned for Saturday and Sunday mornings.

Exhibits: On Friday afternoon, the Charles Allis Library (1630 E. Royal Place) will be open to WSO members, featuring a collection of the original Havell Audubon Elephant Folio Prints. The famous Teak Room of the Chapman Memorial Library will also be open to WSO members Saturday from 12:00 to 1:30.

SUPPLY DEPARTMENT NEWS

During 1957 a number of new titles have been added to the WSO Supply Department stock, including the following:

Warblers of North America, edited by Ludlow Griscom and Alexander Sprunt—price $15.00 (few copies available at $10, first come first serve).

The Bird Watcher's Anthology, by R. T. Peterson—price $7.50.

Hunting With the Camera, by Allan Cruickshank—price $4.50.

Reading the Landscape, by May T. Watts—price $4.75.

Native Ferns, by Bruce Metcalf—price $1.25.

Audubon Western Bird Guide, by Richard Pough—price $4.95.

Illinois Wild Flowers, Illinois State Museum—price $2.50.

These and other nature books may be ordered from Mr. Harold Kruse, Hickory Hill Farm, Loganville, Wisconsin. When sending cash with orders, WSO members should remember that they are entitled to an automatic 10% discount.

IN MEMORIAM

RUTH A. STILLMAN

A long and active career of teaching bird study and allied fields of natural science drew to a close for Ruth A. Stillman at Madison on August 1, 1957. She was born in Utica, Wisconsin, on September 22, 1888. Graduating from Milton College in 1917, she taught there a year, later attending the University of Wisconsin. From 1926 to 1954 she taught biology and related subjects at Madison East High School. Much interested in gardening and bird study, she was a charter member of the Wisconsin Society for Ornithology and the Madison Audubon Society, and was also active in the Madison Garden Club, the Madison Woman's Club and the Delta Kappa Gamma social sorority.

At East High School, she was responsible for the bird collection in the school museum, and conducted bird clubs among her students. In the Madison Audubon Society she was an active member of the membership committee and the scholarship committee that selected persons eligible to receive free scholarships to the National Audubon Camps. The Wisconsin Audubon Camp recently established at Hunt Hill is the proud possessor now of Ruth's two outstanding reference volumes, "Birds of Minnesota" by T. S. Roberts. In the Wisconsin Society for Ornithology she was active in attending conventions, field trips, and other Society functions, assisting greatly with preparations whenever conventions were held in Madison.

Her friends remember with pleasure her enthusiasm for field trips and her constant readiness to share her knowledge and her car for field trips far and near. The Council Ring in the University of Wisconsin Arboretum near her Terry Place home was a favorite spot of hers. This is dedicated by the Jens Jensen family to the ever-living spirit of a son. And Ruth's is an ever-living spirit.

—Ellen Hoffman, Gertrude M. Scott

MORE NEWS . . .

WSO custodian Walter Scott has made arrangements with libraries at Madison, Milwaukee and Stevens Point to house and make available to Society members many back issues of "exchange" magazines from various state and national ornithological societies, as well as volumes from the former WSO library that were not given to the Wisconsin Audubon Camp. Back issues of **Bird Lore, Wilson Bulletin** and **The Condor** have been given to the Library of the University of Wisconsin-Milwaukee. Back issues of magazines from state societies in Maine, New Hampshire, Massachusetts, the Carolinas, Georgia, Florida, Tennessee, Kentucky, Ohio, Indiana, Illinois, Michigan, Minnesota, Iowa, South Dakota, Nebraska and Oregon have been placed in the University of Wisconsin library at Madison.

Members are reminded that the Cliff Swallow nesting study begun in 1957 is continuing through 1958 under the direction of Dr. John Emlen, Department of Zoology, University of Wisconsin. Be on the watch for nesting colonies in late May and June, and write to Dr. Emlen for information blanks.

Although the cooperative spring migration project carried on by the U. S. Fish and Wildlife Service originated in Wisconsin, observers from this state are not contributing as much information as are people of many other states. Keep careful watch for the first arrivals of various species in your area, keep exact arrival dates, and send your data in. Forms can be supplied to you through the editor, the associate editor, or the Patuxent Research Refuge, Laurel, Maryland.

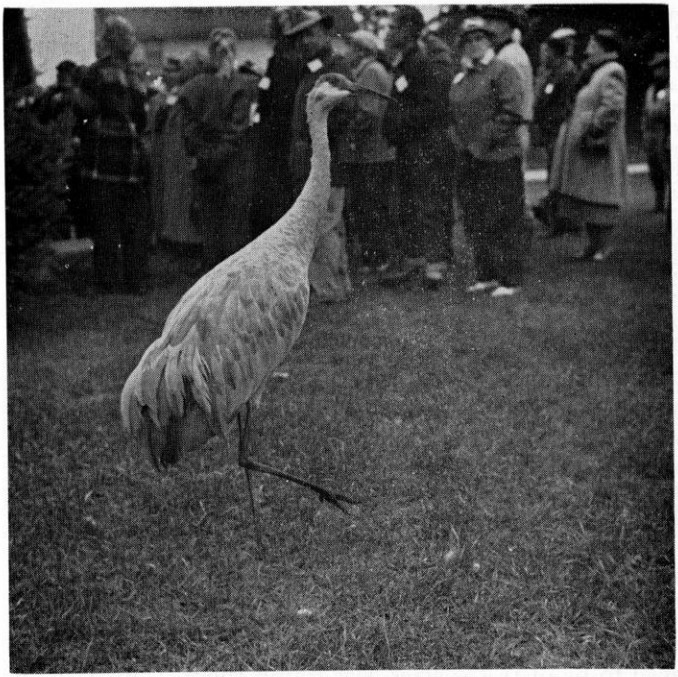
(more news on page 172)

W. S. O. VISITS
THE SANDHILL
GAME FARM AT
BABCOCK, WIS.

GROUP LISTENS
WHILE WALLACE
GRANGE MAKES
INTRODUCTION

BUT THERE IS
A DISTRACTION
FOR SOME OF
THE LISTENERS

RENEW YOUR W. S. O. MEMBERSHIP TODAY!



IT IS "SILVER," A PET CRANE OF THE GRANGES

GREATLY ADMIRED BY ALL CAMERA-MINDED PEOPLE

PHOTOS BY CHARLES CONRARD

KEEP "THE PASSENGER PIGEON" COMING!

MORE NEWS . . .

Those who attended the WSO convention at Two Rivers in 1950 doubtless remember how Convention Chairman Winnifred Smith Mayer outdid herself in hoping for a low-pressure weather system that would cause good bird migration to coincide with the covention that year—so much so that she was nicknamed "Mrs. Low-Pressure of 1950" when a violent storm brought spectacular birding to convention-goers. It also disrupted electrical operations and made it necessary to move some convention sessions from Point Beach State Park into Two Rivers. No one knows just what kind of excitement is in store for those who return to Point Beach State Park for the WSO summer campout this June, but there will certainly be thrills and satisfactions for all nature-lovers. Plan now to attend.

Through the efforts of Wisconsin's Senator William Proxmire, the Stamp Advisory Committee of the Post Office Department is now considering the issuance of a postage stamp honoring the Prairie Chicken in the "Wildlife Conservation" series that has recently included stamps honoring the King Salmon, Wild Turkey, Pronghorn Antelope and Whooping Crane. Strong encouragement from WSO members may help the committee to decide in favor of issuing such a stamp. Letters should be addressed to: Postmaster General Arthur Summerfield, Post Office Department, Washington, D. C.

By The Wayside . . .

Edited by MARTHA and ROY LOUND

Nesting of Bell's Vireo. In the summer of 1956 the Bell's vireo was present at the Arboretum during the nesting season. Later in the summer a nest, believed to be of this species, was found there. This year on June 10 I visited the arboretum, and near the first parking lot at the west end of the property, I found the nest, nearly completed, about three feet from the ground in rather dense shrubbery.

The next visit to the nest was on Saturday, June 15th. I flushed the bird from the nest, and found two eggs of the vireo, and one of the cowbird, which I removed. Upon returning to the nest two hours later, I found the bird on the nest, indicating, apparently, that incubation had begun.

Not until July 3 did I visit the nest again, this time to find two young in the nest, and one unhatched egg. The young seemed to be only two or three days old. Again on the 5th I visited the nest, taking motion pictures of the family chores.

No further visits were made to the area during the nesting season, so I am unable to report whether or not the young successfully left the nest. When I did return later in the summer the nest had disappeared. The vireos remained in the territory until late August, with an occasional song still to be heard.—Howard L. Orians, Madison.

A Productive Marsh. During the summer of 1957 I kept under observation a marsh about one mile south and east of Pardeeville, along the town line road. It covers an area of roughly 20 acres; I covered perhaps 5 acres of it. Most of it is water-fed by a small creek which has been partially dammed by beavers, but the depth is scarcely over 3 feet. Vegetation is predominantly cattails and willows, with many aspens along the borders.

I first checked the area on May 28 and at that time found the following: six Least Bittern nests with none to 5 eggs; one Sora nest with

JUVENILE LEAST BITTERN

PHOTO BY PRINS BROTHERS

8 eggs; 17 Black Tern nests with none to 5 eggs; 11 Redwing nests with none to 5 eggs and some young from 3 to 6 days old; six Yellow-headed Blackbird nests with no eggs. I subsequently found nests of the American Bittern, Mallard, Blue-winged Teal, Pheasant, Virginia Rail, Long-billed Marsh Wren, Yellow Warbler, Yellowthroat and Swamp Sparrow plus many more nests of the initial 5 species. This included two more Least Bittern nests, making a total of eight, all of which produced some young.

The large number of Least Bittern nests was the most interesting feature of my survey. Heretofore they were rather isolated discoveries. Also of interest was the definite increase in Yellow-headed Blackbirds. This is the second year since 1947 that Yellow-heads have been found in the Pardeeville area, and it is quite apparent that they are increasing prodigiously. I hope to do a more concentrated survey of the marsh during the 1958 season and try to establish trends in the bird life there.—Dr. Howard A. Winkler, Pardeeville.

Blue Jay Attacks Ovenbird. While visiting my bird banding traps on May 27, 1957, I witnessed the following in a small woods behind the Marinette, Wisconsin, radio and television station. I was walking between two traps on my rounds in this woods when I saw a Blue Jay in pursuit of a smaller bird. They were flying three or four feet above the ground. I stopped to watch what would happen. Within seconds the Jay overtook the smaller bird, grasping or striking the bird with outstretched claws much in the manner of a hawk. The small bird was downed, the Jay pinning him to the ground with his feet and proceeding to peck at the helpless one as hard as he could. At this point I advanced in order to get a better look, and found the victim to be an Ovenbird. The Jay flew to a tree as I approached and the Overbird fluttered off complaining. The Blue Jay threatened another attack but my presence sent him off. I followed the Ovenbird in hopes of capturing him to determine what damage may have been done, but he could fly too well and disappeared into the brush. As I was witness only to the attack, I cannot say what might have provoked it. In talking this incident over with Owen Gromme, Curator of Mammals and Birds at the Milwaukee Public Museum, I learned he had neither witnessed nor had heard of a Blue Jay attacking another bird in flight.—Wallace N. MacBriar, Jr., Milwaukee.

Red-bellied Woodpecker in Douglas County. This is an account of the sighting of an adult male Red-bellied Woodpecker at Amnicon Lake

in Douglas County, Wisconsin. Amnicon Lake is approximately 25 to 30 miles south of Superior, Wisconsin.

The habitat type was the climax forest. It consisted of oak, maple, basswood, white, and red pines. The understory was moderately light standing a maximum of 10 feet high, consisting mostly of hazel brush. The weather was hot, 80 to 85 degrees. The skies were cloudy, threatening rain at any moment. The wind velocity was negligible. The time of the observation was between 3 and 3:30 p. m.

The bird was observed for 30 minutes. It was first observed in a sugar maple, but it was soon found to wander to the three major deciduous species mentioned above. It showed no obvious preference for any of the species. At no time was it seen on a coniferous tree. It remained in an area of less than ½ acre during the entire observation, but it never went back to a tree which it had already visited.

To my knowledge it did not take any food during the time I had it under observation. It uttered no sound. The scarlet color of its head and nape was very bright. This mark and its ladder back and also its white rump left no room for doubt as to my identification.—G. C. Kuyava, Duluth, Minnesota.

FIELD NOTES

By MARTHA and ROY LOUND

Summer Season **June 1-August 15, 1957**

Were you birding during the summer of 1957? We suspect that a large number of our readers must either answer that question in the negative or else plead guilty to having records which might be of interest to other members of our organization which they failed to submit to the field note editors. Even Madison and Milwaukee, which normally have excellent coverage, produced few records.

What were some of the factors accounting for such a negative approach to the summer season?

First and probably most important was that Horicon Marsh, which in the past produced some outstanding summer records, was exceptionally poor summer. (See Owen J. Gromme's article, **1957 Pass. Pigeon, 99-106).** Not a single Little Blue Heron or Snowy Egret was reported from there, nor from any other location in the state. Common (American) Egrets, Great Blue Herons, Black-crowned Night Herons, ducks and shorebirds were found in disappointingly small numbers compared to previous years.

Secondly, Sam Robbins, whose enthusiasm for birding usually overcomes any obstacles which keep him from the field, was actually hors de combat for most of the summer season. An unusually heavy work load in June plus a vacation trip which took him out of the state most of July kept his observations and field notes to a minimum.

A couple of other deleterious factors were reported from the northwest area of the state by Dr. C. A. Kemper: "Water tables appear to be lower than in many seasons, and some favorite spots have been dry all summer. Another negative factor is the energetic highway building, some of it unnecessary and pure boondoggling. This makes inroads on the landscape; not only the land going out of production at the actual road sites, but the relentless gnawing out of gravel pits which are required. These occur along the Chippewa River bottoms in areas where some of the best remaining undisturbed woods are located."

The Breeding Season

But the picture is not all black. More actual nesting records were reported than usual. Nests, broods, or nestlings of 92 different species were found and reported. These included the Yellow-crowned Night Heron, Least Bittern, Hooded Merganser, Sharp-tailed Grouse, Piping Plover, Ring-billed Gull, Golden-crowned Kinglet, Bell's and Solitary (Blue-headed) Vireos, Parula, Myrtle, Black-throated Green and Chestnut-sided Warblers, and Leconte's Sparrow.

Whether Wisconsin can claim full credit for the Piping Plover and Ring-billed Gull nests is problematical. The nests were found on Barker's Island by the Duluth Bird Club. This island was formed by dredging the Duluth-Superior entry, and it actually lies closer to Wisconsin than to Minnesota. Jack Hofslund, editor of the Minnesota publication "The Flicker," reported that a census by the Duluth Bird Club revealed 108 Common Tern nests and single nests of the Piping Plover, Killdeer and Ring-billed Gull.

In general. nesting success appeared to be high. Representative comments were: "9 Bluebird nests between June 28 and July 31 provided a total of 42 offspring" (Dr. C. A. Kemper); "8 Least Bittern nests all produced living young" (Dr. H. A. Winkler); "34 Blue-winged Teal broods ranged in size from 3 to 12" (Norman R. Stone). The nesting success was no doubt in part due to favorable weather conditions. While frequent rains fell during most of June, no storms of any magnitude developed. Some storms, mostly wind and hail, occurred in early July, but these were generally confined to small areas. But even a minor storm can take its toll—for example, Dr. C. A. Kemper reported that on June 27 he found three separate young Baltimore Orioles at three sites which had apparently been blown out of their nests.

The Early Fall Migration

A trickle of shorebirds was noted early in July—the beginning of the southward migration following the nesting season. July 5 and 6 found Least Sandpipers and Lesser Yellowlegs back in Chippewa Co., and a night migrating Upland Plover was heard in Madison on July 8. But this trickle did not become a stream until the third and fourth weeks in July—and even then it was a minor stream. Shorebirds apparently largely

by-passed Wisconsin on their fall return as they did on their trip north in the spring. The central part of the state, Castle Rock Lake and ditch and Petenwell flowage, produced birds in very small numbers. Horicon Marsh was a mere shadow of its former self. Apparently no large concentrations of shorebirds had developed anywhere in the state by August 15.

There was some evidence of a bit of very early land bird movement. Seen south of their normal breeding range late in July or very early August were a Swainson's (Olive-backed) Thrush and Tennesssee and Black-throated Green Warblers. But a concerted southward push did not develop until after the end of the period.

The highlights of the summer season are:

Common Loon: Reported only from Vilas Co., June 1 (Alfred Bradford) and Madeline Island, July 4-9 (the Howard Winklers) and July 6 (the N. R. Bargers, the Roy Lounds).

Horned Grebe: Departed from Brown Co., June 3 (Ed Paulson).

Double-crested Cormorant: An active rookery was again present in Petenwell Flowage, Adams Co. (Sam Robbins); also reported from Madeline Island, July 4-9 (the Howard Winklers).

Common Egret: Fewer reports than usual: Brown Co., June 16 (Ed Paulson); Rock Co., Aug. 3 (Frances Glenn, Bernice Andrews); Horicon Marsh, various dates throughout the period by many observers.

Yellow-crowned Night Heron: At least one pair again nested in southern Racine Co. (J. A. Simpson) and there were three nests in the Mississippi River bottoms in Minnesota, across the river from La Crosse (Brother Theodore).

American Bittern: Norman Stone reported watching a bird spend twenty minutes swallowing a live twenty-inch Garter Snake.

Least Bittern: Howard Winkler found 8 nests of this species in a wet marsh in Columbia Co. (See By the Wayside).

Whistling Swan: Two adults at Crex Meadows, Burnett Co., for several days commencing June 26 (Norman Stone).

Canada Goose: Present all summer in Brown Co. (Edwin Cleary); 3 early arrivals noted in Adams Co., Aug. 3, and 16 more on Aug. 8 (Sam Robbins); 7 juveniles, 6 young of 1957 and one survivor of a 1956 brood, were captured at Crex Meadows, Burnett Co., Aug. 16 (Norman Stone).

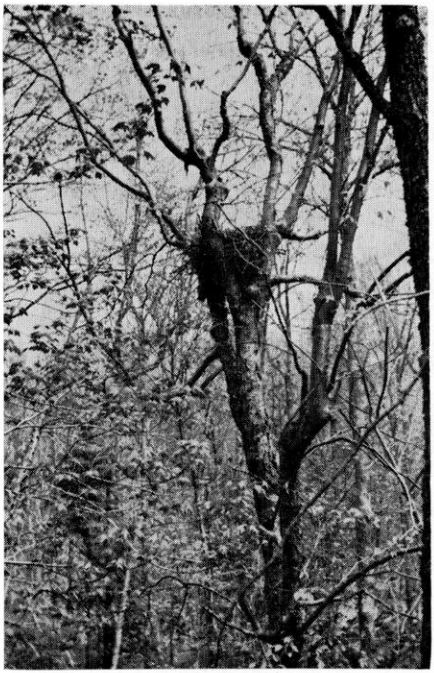
Gadwall: Only reports were from Brown Co.: July 20 (Ed Paulson) and present all season (Edwin Cleary).

Pintail: Only report was from Horicon Marsh, Aug. 9 (Mrs. A. P. Balsom).

Green-winged Teal: Present throughout the season in Adams Co. (Sam Robbins) and Brown Co. (Edwin Cleary); noted at Horicon Marsh, Aug. 15 (Mrs. A. P. Balsom).

Blue-winged Teal: Norman Stone made complete observations of 34 broods between June 18 and Aug. 12 at Crex Meadows, Burnett Co. The broods ranged in size from 3 to 12, with the first brood consisting of 9 appearing on June 18.

Wood Duck: Two broods of 5 and 4 observed at Crex Meadows, Burnett Co., between Aug. 5 and 12 (Norman Stone). Also reported present in Horicon Marsh and Adams, Brown and Columbia counties.



GOSHAWK NEST
PHOTO BY CARL RICHTER

Redhead: Still present at Goose Pond, Columbia Co., June 1 (Ed Peatree); one bird summered on the Yahara River between Lake Waubesa and Mud Lake, Dane Co. (Dick Wills).

Ring-necked Duck: 15 broods, ranging in size from 4 to 11, at Crex Meadows, Burnett Co., between June 24 and Aug. 8 (Norman Stone).

Canvasback: For the second summer a single bird remained on Monona Bay, Madison (Dick Wills).

Hooded Merganser: David Bratley saw 2 birds in Bayfield Co., Aug. 6. Harry Stroebe counted 7 broods while making a canoe trip on the Flambeau River (fide N. R. Barger).

Common (American) Merganser: Only report was from Vilas Co., June 3 (Alfred Bradford).

Red - breasted Merganser: Only report was from Madeline Island, July 4 (the Howard Winklers).

Turkey Vulture: Only report was from the Kettle Moraine area, Waukesha Co., where they were seen during the entire period (Mrs. Paul Hoffmann).

Goshawk: Noted on Madeline Island, July 4-9 (the Howard Winklers); no other reports.

Broad-winged Hawk: Present in two areas of Adams Co. (Sam Robbins); observed in Iowa Co., June 1 (Ed Peartree, Mr. & Mrs. David Cox). Winnebago Co., June 6 (Mrs. Glen Fisher), and Madeline Island, July 4-9 (the Howard Winklers).

Bald Eagle: Present all season in Adams Co. (Sam Robbins); also reported from Bayfield Co., July 4 (David Bratley) and Vilas Co., June 1 (Alfred Bradford).

Osprey: Two reports: present in Vilas Co., June 1 (Alfred Bradford); one bird observed migrating over Madison, Aug. 6 (Sam Robbins).

Peregrine Falcon (Duck Hawk): Only report was from Bayfield Co., July 24 (David Bratley).

Sparrow Hawk: Raymond Stefanski found a nest with 2 eggs in a bird box about 30 feet above ground, Marinette Co., June 1, and nesting activity was also observed in Jefferson Co. by Nils P. Dahlstrand.

Sharp-tailed Grouse: A brood of 4 chicks, believed to be about 8 weeks old, observed at Crex Meadows, Burnett Co., July 23 (Norman Stone).

Sandhill Crane: Present all summer in Adams Co. (Sam Robbins); noted in Jefferson Co., Aug. 6 (Eugene Parfitt) and Aug. 7 (Nils P. Dahlstrand); 4 birds seen in Germania Marsh, Marquette Co., during the week of Aug. 9 (Eugene Parfitt).

King Rail: Only report was of 2 birds in Rock Co., July 9 (Frances Glenn, Bernice Andrews).

Piping Plover: One nest was found on Barker's Island between Superior and Duluth by the Duluth Bird Club.

Semipalmated Plover: Last spring migrants reported from Columbia Co., June 8 (Donald E. Cors). Fall migrants first reported from Horicon Marsh, July 27 (the N. R. Bargers, the Roy Lounds); Adams Co., Aug. 5 (Sam Robbins); Manitowoc Co., Aug. 9 (John Kraupa).

Black-bellied Plover: Spring migrants still noted in Richland Co., June 5 (Dick Wills).

Ruddy Turnstone: First fall migrants observed in Manitowoc Co., Aug. 10 (John Kraupa).

Upland Plover: On at least six evenings from 9:30 to 11:30 P. M., between July 8 and Aug. 15, Tom Soulen heard birds of this species flying over the University Campus, Madison. On all but one occasion the weather was somewhat nippy with northwest winds.

Solitary Sandpiper: Early fall migrants reported from Dane Co., July 19 (Tom Soulen); Adams Co., July 26 (Sam Robbins); Horicon Marsh, July 28 (Ed Peartree).

Greater Yellowlegs: First fall movement reported from Crex Meadows, Burnett Co., July 22, when 28 birds were observed coming in from the north. Also reported from Rock Co., July 23 (Frances Glenn, Bernice Andrews); Horicon Marsh, July 27 (the N. R. Bargers, the Roy Lounds); Adams Co., Aug. 3 (Sam Robbins).

Lesser Yellowlegs: 6 birds observed in Chippewa Co., July 5-6 by Dr. C. A. Kemper. They were probably early fall rather than late spring migrants, although no other returning birds were noted until about 2 weeks later. Other early fall reports include: Brown Co., July 20 (Ed Paulson); Horicon Marsh, July 27 (the N. R. Bargers, the Roy Lounds); Adams Co., July 29 (Sam Robbins); Rock Co., Aug. 7 (Frances Glenn, Bernice Andrews).

Pectoral Sandpiper: Fall migrants reported from Horicon Marsh, July 27 (the N. R. Bargers, the Roy Lounds); Rock Co., Aug. 7 (Frances Glenn, Bernice Andrews); Adams Co., Aug. 8 (Sam Robbins).

Least Sandpiper: The first fall migrant was reported from Chippewa Co. July 5 and 6 (C. A. Kemper) followed by an Adams Co. report July 26 (Sam Robbins).

Dunlin (Red-backed Sandpiper): A late spring migrant at Goose Pond, Columbia Co., June 8 (Ed Peartree).

Dowitcher: Noted in Adams Co., Aug. 8, but not identified as to species (Sam Robbins).

Stilt Sandpiper: Fall migrants observed at Horicon Marsh on July 27 (the N. R. Bargers, the Roy Lounds) and on July 28 (Ed Peartree).

Semipalmated Sandpiper: Last spring migrant in Chippewa Co., June 3 (C. A. Kemper); first fall migrant in Adams Co., Aug. 5 (Sam Robbins).

Sanderling: Last spring migrants on June 6 and first fall migrants on Aug. 7 in Manitowoc Co. (John Kraupa).

Ring-billed Gull: One nest was found on Barker's Island between Duluth and Superior by the Duluth Bird Club.

Bonaparte's Gull: First returning birds were seen at Green Bay on July 30 (Ed Paulson) and in Manitowoc Co. on Aug. 10 (John Kraupa).

Common Tern: 108 nests of this species were found on Barker's Island between Duluth and Superior by the Duluth Bird Club.

Caspian Tern: Only report was from Brown Co. on Aug. 14 (Ed Paulson).

Mourning Dove: Dr. C. A. Kemper's banding revealed about 75% failure of nests between May and July. Storms took a heavy toll, but cats, squirrels and Blue Jays were also the cause of failures.

Red-bellied Woodpecker: A far north report for this species came from Douglas Co. (See G. C. Kuyava's report in By the Wayside).

Gray (Canada) Jay: 3 birds, apparently a family group, were seen and heard between Clam and Teal Lakes in Sawyer Co. on July 7 (the N. R. Bargers, the Roy Lounds).

Raven: Fairly common in Bayfield and Sawyer counties, July 5-7 (the N. R. Bargers, the Roy Lounds); observed on Madeline Island July 4-9 (the Howard Winklers).

Tufted Titmouse: Two adults and four young appeared at a feeder near Lake Winnebago on July 14 (Mrs. Walter Rogers). Also reported from Adams, Dane, Iowa, Sauk and Vernon counties.

Red-breasted Nuthatch: Found in Bayfield Co. on July 5 and in Sawyer Co. on July 7 (the N. R. Margers, the Roy Lounds).

Carolina Wren: The only report was from Sauk Co. on June 23 (S. Paul Jones et al.).

Swainson's (Olive-backed) Thrush: A late spring migrant reported in Winnebago Co., June 3 (Mrs. Glen Fisher); first fall migrant noted in Adams Co., Aug. 3 (Sam Robbins).

Blue-gray Gnatcatcher: Present all season in Adams Co. (Sam Robbins); at least 6 birds in Waukesha Co., June 20 (Tom Soulen); reported from Sauk Co., June 23 (S. Paul Jones et al.).

Golden-crowned Kinglet: Two broods, one of at least 6 birds, in Bayfield Co. on July 5 (the N. R. Bargers, the Roy Lounds).

Starling: On July 4 a child found 4 unfledged birds which were victims of vandalism; the nest had been destroyed and the young left to die. They were transported about a mile to Dr. C. A. Kemper's home in Chippewa Falls. He wasn't quite sure of their identity but put some sod in a bucket, placed the birds in it and put the bucket on a clothes post about 10 feet above the ground. The next morning a starling was feeding the noisy young, and in 3 or 4 days they left their bucket nest.

Bell's Vireo: Nested in Madison. (See By the Wayside).

Solitary (Blue-headed) Vireo: Several pairs were heard and seen in Bayfield Co. on July 4-7. One pair was observed feeding their 4 young which were in a nest built about 20 feet above the ground in a white birch tree. The young had left the nest by the morning of July 7, so the nest was collected (the N. R. Bargers, the Roy Lounds). Also found on Madeline Island July 4-9 (the Howard Winklers) and July 6 (the N. R. Bargers, the Roy Lounds).

Prothonotary Warbler: One bird seen on the edge of Lake Mendota, Madison, June 11 (Tom Soulen); also reported from Iowa and Sauk counties on June 22-23 (S. Paul Jones et al.).

Golden-winged Warbler: Present all season in Adams Co. (Sam Robbins); found in Sauk Co., June 23 (S. Paul Jones et al.). No other reports.

Blue-winged Warbler: Reported only from Dane, Sauk and Waukesha counties.

Tennessee Warbler: Two very early records of returning migrants: an immature bird was banded at Cedar Grove, July 28 (Helmut Mueller); one bird was seen in Adams Co., July 29 (Sam Robbins).

Nashville Warbler: Quite common in Bayfield Co., July 4-7, and found on Madeline Island, July 6, and in Sawyer Co., July 7 (the N. R. Bargers, the Roy Lounds). An early migrant was reported from Adams Co., where a few summer, on July 29 (Sam Robbins).

Parula Warbler: Observed feeding their young which had left their nests in Bayfield Co. on July 5; also seen on Madeline Island on July 6 and in Sawyer Co. on July 7 (the N. R. Bargers, the Roy Lounds).

Magnolia Warbler: Heard and seen near Port Wing, Bayfield Co., July 5 (the N. R. Bargers, the Roy Lounds).

Myrtle Warbler: Reported from Vilas Co., July 5 (Alfred Bradford); observed feeding young that had left the nest near Port Wing, Bayfield Co., July 5 (the N. R. Bargers, the Roy Lounds).

Black-throated Green Warbler: Observed feeding young that had left the nest near Port Wing, Bayfield Co., on July 5. Also seen and heard on Madeline Island on July 6 and in Sawyer Co. on July 7 (the N. R. Bargers, the Roy Lounds); reported on Madeline Island, July 4-9 (the Howard Winklers); noted in Adams Co., Aug. 3 (Sam Robbins).

Cerulean Warbler: Only reports were from southern counties: Dane, June 8 (S. Paul Jones, Ed Peartree); Sauk, June 23 (S. Paul Jones et al.); Waukesha, June 20, quite common (Tom Soulen).

Blackburnian Warbler: A late spring migrant in Madison on June 11 (Tom Soulen); seen in Bayfield Co., July 5, on Madeline Island, July 6, and in Sawyer Co., July 7 (the N. R. Bargers, the Roy Lounds).

Chestnut-sided Warbler: A singing male in Waukesha Co., June 20 (Tom Soulen); 2 young birds and a young cowbird in a nest in a hazelnut bush, Marinette Co., June 18 (Raymond Stefanski); seen and heard singing in Bayfield Co., July 4-7, on Madeline Island, July 6, and in Sawyer Co., July 7 (the N. R. Bargers, the Roy Lounds); reported from Madeline Island, July 4-9 (the Howard Winklers). Straggler at Milwaukee, July 31 (Dixie Larkin).

Blackpoll Warbler: A late spring migrant was seen in Bascom Woods on the University campus, Madison, June 5 (Tom Soulen).

Pine Warbler: Present all summer in Adams Co. (Sam Robbins); seen in Wood Co. on July 4 (the N. R. Bargers, the Roy Lounds).

Northern Waterthrush: Presumably a migrant in Madison on July 25, and in Adams Co. after Aug. 5 (Sam Robbins); present all summer in Brown Co. (Edwin Cleary); noted in Bayfield Co., July 5 (the N. R. Bargers, the Roy Lounds).

Louisiana Waterthrush: Present all summer in Adams Co. (Sam Robbins); seen in Sauk Co., June 23 (S. Paul Jones et al), and in Vernon Co., July 14 (Richard & Viratine Weber).

Kentucky Warbler: Three records of this southern species: one heard singing for almost an hour on the University campus, Madison, June 5 (Tom Soulen); a pair summered in the University Arboretum, Madison (Dick Wills); observed in Sauk Co., June 23 (S. Paul Jones et al.).

Mourning Warbler: On the University campus, Madison, June 5 (Tom Soulen); Bayfield Co., June 12 (David Bratley), and on July 5 (the N. R. Bargers, the Roy Lounds); Madeline Island, July 4-9 (the Howard Winklers) and on July 6 (the N. R. Bargers, the Roy Lounds).

Yellow-breasted Chat: Seen near Sauk City, July 25 (Sam Robbins); one banded at Cedar Grove, July 28 (Helmut Mueller).

Canada Warbler: Madeline Island, July 4-9 (the Howard Winklers).

Yellow-headed Blackbird: Summer reports were received from these counties: Brown, Columbia, Dane, Dodge (Horicon Marsh), Jefferson, Racine, Rock and Winnebago.

Brewer's Blackbird; Nests were found in Bayfield Co., June 5 (David Bratley); Marinette Co., June 19 and July 4-5 (Raymond Stefanski); Oconto Co. (Carl Richter). Birds were also reported from Adams, Ashland, Brown and Outagamie counties.

Dickcissel: Does not appear to have been as common in 1957 as in 1956. Dr. C. A. Kemper said that it was not reported in Chippewa Co. for the first time in 5 years. Reported only from Adams, Brown, Columbia, Iowa, Rock and Winnebago counties.

Evening Grosbeak: An early record from Bayfield Co., Aug. 11, when 3 birds were observed (David Bratley).

Purple Finch: Seen in Vilas Co., July 4 (Alfred Bradford); present on Madeline Island, July 4-9 (the Howard Winklers).

Pine Siskin: Heard and seen in Bayfield Co., July 5 (the N. R. Bargers, the Roy Lounds).

Savannah Sparrow: Dr. C. A. Kemper reported that an immature bird which he banded on Sept. 21, 1956, was killed by a cat and recovered on June 25, 1957, about 10 miles north of where it had been banded. It was the first recovery from over 1,000 banded Savannah Sparrows.

Leconte's Sparrow: Found in a marsh in southern Marinette Co. on June 22 and 23. One mature male was watched for several hours as he perched low and sang. He stayed in a fairly small area, so a long time was spent in an unsuccessful search for the nest. Thin call notes, apparently from several birds, were heard repeatedly. We concluded that the call notes were made by young birds which had left the nest (Carl Richter, the Roy Lounds).

Lark Sparrow: Present all season in Adams Co. (Sam Robbins) and Rock Co. (Mrs. Joseph Mahlum); seen in Sauk Co., June 22 (S. Paul Jones et al.).

Slate-colored Junco: 2 birds seen in Bayfield Co. on July 14 (David Bratley) and observed in Vilas Co. on July (Alfred Bradford). An adult male was sighted in Milwaukee on about July 25 (Dixie Larkin).

Clay-colored Sparrow: There were reports of summering birds from Adams, Ashland, Bayfield, Brown and Oconto counties.

White-crowned Sparrow: A late migrant in Iowa Co. on June 1 (Ed Peartree, Mr. & Mrs. David Cox).

White-throated Sparrow: Present during the season in Ashland, Bayfield, Manitowoc and Sawyer counties.

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FIELD TRIP NEWS

Past Trips

October 6 (Babcock). From all parts of Wisconsin, and even from Minnesota, came 58 ornithologists to visit with Wallace and Hazel Grange, their tame Sandhill Crane "Silver," and the many other wildlife features of the 9000-acre Sandhill Game Farm near Babcock. The group gathered at the Grange home under dull skies and in the midst of a drippy fog. After an explanation of the area by Wallace, the tour got under way. A fine flight of ducks and geese was witnessed, and the Sandhill Cranes seen were "lifers" for many of the observers. Many thanks are due Hazel and Wallace for allowing us to parktake of a small portion of their privacy and hospitality.—Ed Peartree.

Future Trips

May 3-4 (Plainfield). Annual trip to watch Prairie Chicken on their booming grounds. For those who have never attended, this is a great opportunity to watch the courtship display close up from blinds, and to contribute something—through these observations—to the research being carried on for this sepcies. Because of limited blind space, advance reservations must be made with Mr. Edward Peartree, 725 North Lapham Street, Oconomowoc. Observers meet at the Fred Hamerstrom home (three miles northwest of Plainfield) at 7 p. m. Friday (for Saturday trip) or 7 p. m. Saturday (for Sunday trip).

June 21-22 (Two Rivers). Summer campout at Point Beach State Park, with John Kraupa as trip leader. Further details in next issue.

DATES TO REMEMBER

March 31, 1958 (State-wide)—Field notes for December-March should be sent to Dr. W. J. Breckinridge, Museum of Natural History, Minneapolis, for inclusion in "Audubon Field Notes."

April 13, 1958 (Green Bay)—Green Bay Bird Club breakfast trip along West Bay Shore to witness swan migration.

April 21, 1958 (Madison)—Wildlife Research Seminar, with John Gates speaking on "Some Aspects of the Breeding Biology of the Gadwall," at the Forest & Wildlife Building (third floor), 424 University Farm Place, at 7:45 p. m.

April 25-27, 1958 (Milwaukee)—WSO annual convention on the campus of the University of Wisconsin-Milwaukee.

April 28, 1958 (Manitowoc)—Audubon Screen Tour, with William Wagoner speaking on "A Touch of the Tropics," at Washington J. H. S. Auditorium at 8:00 p. m.

May 3-4, 1958 (Plainfield)—WSO field trip to witness Prairie Chicken booming, meeting at the Fred Hamerstrom home the evening prior to the day of observation.

May 10-18, 1958 (State-wide)—May-Day Count period.

May 12, 1958 (Milwaukee)—Audubon Screen Tour, with William Wagoner speaking on "Wanderland," at Shorewood Auditorium at 8:00 p. m.

May 19, 1958 (Madison)—Wildlife Research Seminar, with James Hale speaking on "Reproductive Rates for Wisconsin Deer," at the Forestry & Wildlife Building (third floor), 424 University Farm Place, at 7:45 p. m.

May 31, 1958 (State-wide)—Field notes for April and May should be sent to Dr. W. J. Breckinridge, Museum of Natural History, Minneapolis, for inclusion in "Audubon Field Notes."

June 1-10, 1958 (State-wide)—Field notes for March-May, including May-Day Counts, should be sent to the Associate Editor.

June 21-22, 1958 (Two Rivers)—WSO summer campout at Point Beach State Park.