LOUIS JEAN PIERRE VIEILLOT (1748-1831)

BY PAUL H. OEHSER

Plate 16

THIS year, 1948, marks the 200th anniversary of the birth of Louis Jean Pierre Vieillot, the French naturalist whose name will always be associated with early American ornithology. In comparison with other birdmen of his day, such as Alexander Wilson and John James Audubon, little is known of his life. He left no journals or detailed accounts of his voyages; and his death, which probably occurred in 1831, passed almost unnoticed by his contemporaries. One obituary note, by Lesson, appeared in a scientific journal. At the end of his old age, blind and poverty-stricken, he was all but forgotten. It is indeed a curious fact, as Dr. Berlioz of the Paris Museum writes (*in litt.*), "that this man, who left after his death such a large amount of printed work, remains so mysterious as to any personal figuration and even private life. His bitter debates with Temminck on technical subjects seem to indicate perhaps but little sociability."

Vieillot did, however, produce works that were to make him, ornithologically at least, immortal, even though they may have possessed all the shortcomings that his critics pointed out. Master taxonomist, his name is linked with some of our best-known North American birds, such as the Wild Turkey, the Pintail, the Cedar Waxwing, and the Scarlet Tanager, for it was he who first gave them the Latin names by which they are known to science. In all, 26 genera and 32 species of North American birds now bear Vieillot's name as the original describer, and from South America the number is much greater. He studied and collected birds during his sojourn on the island we now call Hispaniola, and, as Wetmore and Swales have pointed out (U. S. Nat. Mus. Bull. 155), he was "the first naturalist to name in modern scientific form a species (Accipiter striatus) that he had taken personally on the island." Listed below are the North American birds first named by Vieillot, and it will be noticed that a number of his names still stand as he gave them, having miraculously run the gantlet of several generations of taxonomists.

NORTH AMERICAN BIRDS DESCRIBED BY VIEILLOT

(1931 A. O. U. Check-List and Supplements)

GENERA

Elanoïdes (Kites) Ictinia (Kites) Asturina (Hawks) Prunella (Accentors) Bombycilla (Waxwings) Vireo (Vireos) The Auk, Vol. 65

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Louis Jean Pierre Vieillot (1748-1831) From a Bust in the Division of Birds, Paris Museum (Courtesy Dr. J. Berlioz)

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Polyborus (Caracaras) Tinnunculus (Falcons) (now treated as a subgenus) Aramus (Limpkins) Porzana (Rails) Erolia (Sandpipers) Steganopus (Phalaropes) Coccyzus (Cuckoos) Troglodytes (Wrens) Thryothorus (Wrens) Oenanthe (Wheatears) Coereba (Honeycreepers) Mniotilta (Warblers) Icteria (Chats) Sturnella (Meadowlarks) Agelaius (Red-wings) Quiscalus (Grackles) Piranga (Tanagers) Passerina (Buntings) Pinicola (Grosbeaks) Pipilo (Towhees)

SPECIES

Vieillot's name Procellaria leucorhoa Anas tzitzihoa Anas cyanoptera Sparvius platypterus Buteo brachyurus Meleagris silvestris Rallus limicola Totanus brevipes Tringa melanotos Tringa fuscicollis Tringa minutilla Scolopax sakhalina Tringa subruficollis Steganopus tricolor Stercorarius longicaudus Larus leucopterus Trochilus leucotis Picus borealis Platyrhynchos virescens Hirundo bicolor Hirundo pyrrhonota

Troglodytes aëdon Troglodytes hiemalis Bombycilla cedrorum Lanius borealis Vireo flavifrons Muscicapa gilva Sylvia discolor Turdus motacilla Quiscalus major Quiscalus versicolor Pyranga erythromelas

Present A. O. U. name Oceanodroma leucorhoa leucorhoa: Leach's Petrel Anas acuta tzitzihoa: American Pintail Anas cyanoptera cyanoptera: Cinnamon Teal Buteo platypterus platypterus: Broad-winged Hawk Buteo brachyurus: Short-tailed Hawk Meleagris gallopavo silvestris: Eastern Turkey Rallus limicola limicola: Virginia Rail Heteroscelus brevipes: Polynesian Tattler Pisobia melanotos: Pectoral Sandpiper Pisobia fuscicollis: White-rumped Sandpiper Pisobia minutilla: Least Sandpiper Pelidna alpina sakhalina: Red-backed Sandpiper Tryngites subruficollis: Buff-breasted Sandpiper Steganopus tricolor: Wilson's Phalarope Stercorarius longicaudus: Long-tailed Jaeger Larus leucopterus leucopterus: Iceland Gull Hylocharis leucotis leucotis: White-eared Hummingbird Dendrocopos borealis borealis: Red-cockaded Woodpecker Empidonax virescens: Acadian Flycatcher Iridoprocne bicolor: Tree Swallow Petrochelidon pyrrhonota pyrrhonota: Northern Cliff Swallow Troglodytes aëdon aëdon: Eastern House Wren Troglodytes troglodytes hiemalis: Eastern Winter Wren Bombycilla cedrorum: Cedar Waxwing Lanius excubitor borealis: Northern Shrike Vireo flavifrons: Yellow-throated Vireo Vireo gilvus gilvus: Eastern Warbling Vireo Dendroica discolor discolor: Northern Prairie Warbler Seiurus motacilla: Louisiana Water-thrush Cassidix mexicanus major: Boat-tailed Grackle Quiscalus quiscula versicolor: Bronzed Grackle Piranga erythromelas: Scarlet Tanager

The biographical accounts of Vieillot are so few in number and so scattered that it may be of some value to bring them all together; and since they are all brief, I have thought it of more interest and use to ornithologists to reprint them, even with some duplication, than to combine them into a single account. Together they give us virtually all that is on record concerning Vieillot's life. All the accounts, of course, except Swainson's and Saunders's, are here translated from the French.

M. Marcel Boubier, in his 'L'Evolution de l'Ornithologie' (Paris, 1925), remarks that Vieillot "n'a pas eu l'honneur, qu'il eût bien mérité cependant, d'avoir sa place marquée dans les dictionnaires et les encyclopédies." This was, and is, all too true. No modern dictionary of biography or encyclopedia that I have been able to find contains any account of him. During his lifetime, however, there were two very brief notices. The first is contained in a biographical account of Vieillot's friend Jean Baptiste Audebert in the 'Biographie Universelle' (3: 22). Audebert, eminent naturalist and artist, had died in 1800, leaving unfinished his great atlas "des grimpereaux et des oiseaux de paradis." The account merely tells that the editor, M. Desray, brought the work to completion, making use of Audebert's materials and of the special drawing and coloring process that Audebert had invented and used, and that the text had been written by Vieillot, and "c'est sur le même plan et d'après les mêmes procédés que M. Vieillot a publié: Histoire des Oiseaux de l'Amérique septentrionale, qui fait suite." Eight years later, in 1819, there appeared a slightly fuller account of Vieillot's work in the 'Biographie des Hommes Vivants' (5:506):

FROM 'BIOGRAPHIE DES HOMMES VIVANTS,' VOL. 5, 1819

"VIEILLOT (Louis-Pierre), naturalist, born at Yvetot, May 10, 1748, has published: I. Histoire naturelle des oiseaux de Paradis, des Promerops et des Grimpereaux sucriers, with paintings from nature by Audebert and C. Sauvages, 1801 and years following, 32 livraisons, folio (see Biographie universelle under AUDEBERT). II. Histoire naturelle des plus beaux oiseaux chanteurs de la zone torride, 1806 and following, 12 livraisons, folio. III. Histoire naturelle des oiseaux de l'Amérique septentrionale, 1808 and following, 22 livraisons. These works are illustrated with many beautiful engravings, which by a special process, render with great accuracy the metallic reflections of these exotic birds. IV. Analyse d'une nouvelle ornithologie élémentaire, 1816, octavo. M. Vieillot has revised and applied it in the ornithological part (with which he is charged) for the Nouveau Dictionnaire d'histoire naturelle. He has made, at his own expense, many voyages to the French colonies and to the United States in the interests of the natural sciences."

In June, 1831, the year of Vieillot's death, an obituary notice by Lesson appeared in the 'Bulletin des Sciences Naturelles' (25:365-366). This was the first account to record any appreciable amount of biographical information concerning Vieillot or any estimate of the man: Vol. 65

LESSON'S NECROLOGICAL NOTE, 1831

"M. Vieillot, dean of ornithologists, died at Rouen. This industrious author found himself at the end of his days on the brink of poverty, and all his life he felt the effects of the misfortunes that came upon him at the time of the revolution in Saint Domingue, where he had established himself and where he was engaged in business. It was there that he acquired a taste for natural history; and when the color of the skin became a mark of proscription, M. Vieillot, having fled to the United States, threw himself wholeheartedly into the study of the birds that inhabited that country and which furnished useful distractions from the misfortunes that had plunged him and his family into distress. It was to this sojourn in the United States that we owe his book on the natural history of the birds of South America, an inaccurate and very incomplete work; but one can imagine that M. Vieillot did not find himself in circumstances conducive to a very high degree of perfection. On his return to France, a small post as a writer, which M. Dumont of St. Croix created for him in the office of the Bulletin des Lois which Dumont directed, enabled him to live modestly but assured him the means to indulge his tastes. He had already published with Audebert, who had just died, the Oiseaux dorés. M. Vieillot, who was fond of raising in cages finches from different countries, soon followed this work with Oiseaux chanteurs, without doubt one of his best works and lavishly illustrated. The natural-history dictionary of Déterville shortly gave him an opportunity to present a new system of classification of birds, and he wrote ornithological articles for this which later he combined in the three volumes of the Encyclopédie méthodique, of which he completed the part devoted to the natural history of winged animals. In the quarto work entitled Galerie du Muséum, M. Vieillot described a prodigious number of genera, accompanied by exact and valuable illustrations. This book is well known and is worthy of its reputation. Unfortunately M. Vieillot could not afford to own fundamental reference works, and he would often describe under new names genera already named by others. But in this matter it would be unfair to blame an author who loved science with such passion and who would often deprive himself of necessities in order to devote himself to his chosen work. In his last years he became blind, adding this misfortune to his already sad condition, although, thanks (they say) to the recommendations of influential people, he received a modest pension as a man of letters, which he was able to enjoy only a year.

"His perseverance in his work amid the vexations arising from so many of this world's intrigues may be called genius, for genius in a scholar consists of patience unrebuffed by baser passions and their machinations."

In 1840 the British ornithologist William Swainson published 'A Bibliography of Zoology; with Biographical Sketches of the Principal Authors' (*in* Lardner's 'Cabinet Cyclopaedia'); but in this we find no biographical sketch of Vieillot, merely a statement (pp. 364-365) that he was "an eminent reformer of systematic ornithology, and an indefatigable writer," followed by a list of Vieillot's works under seven headings. This list is of interest because of Swainson's critical comments:

FROM SWAINSON'S BIBLIOGRAPHY, 1840

"1. Oiseaux Chanteurs de la Zone Torride, Histoire Naturelle de plus beaux. 1 vol. fol. Paris, 1805. "2. Oiseaux de l'Amérique Septentrionale, Histoire Naturelle des. Paris, 1807. folio. Only two volumes of this work have appeared. It contains many valuable observations.

"3. Oiseaux Dorés, Histoire Naturelle des Colibris, Oiseaux Mouches, Jacamars, et Promerops, aussi des Grimpereaux, et des Oiseaux des Paradis. Paris, 1822. This magnificent work owes its chief scientific value to the descriptive portion, which is from the pen of M. Vieillot. The plates are executed by M. Audebert, and, although tolerably accurate, are not very good.

"4. Analyse d'une nouvelle Ornithologie Elémentaire. Paris, 1816. 8vo. It is generally believed that this pamphlet was written and published to anticipate the labours of Cuvier in this department; it certainly bears evident marks of haste.¹ The genera are intimated with great brevity, and often so imperfectly, that tney could not be understood but for the type or example which is quoted for each.

"5. Ornithologie Francaise, ou Histore Naturelle, générale et particulière, des Oiseaux de France. Paris, 1823. 4to. Published in numbers, each containing six coloured plates.

"6. Galerie des Oiseaux du Cabinet d'Histoire Naturelle du Jardin du Roi. Paris, 1821-26. 4to. The figures designed by M. Paul Oudart: completed, we believe, in 80 numbers. This publication owed its origin, also, to the Planches Coloriées of M. Temminck, to which it is superior in the descriptions, but very inferior as to the execution of the plates.²

"7. Histoire Naturelle des Mammifères. Paris, 1819-22. folio. Each number contains six coloured plates."

Under the editorship of the British ornithologist, Howard Saunders, the Willughby Society in 1883 reprinted Vieillot's 'Analyse d'une Nouvelle Ornithologie Eléméntaire,' which had long been out of print and a rare item. This reprint was prefaced by a biographical note on Vieillot, but it is clear that nothing new had turned up in the nearly half-century since Swainson's account:

¹Alfred Newton ('Dictionary of Birds': 29, footnote, 1893) elucidates this point: "The method [of classification] was communicated to the Turin Academy, 10th January 1814, and was ordered to be printed (Mém. Ac. Sc. Turin, 1813-14, p. xxviii.); but, through the derangements of that stormy period, the order was never carried out (Mém. Accad. Sc. Turin, xxiii, p. xcvii.). The minute-book of the Linnean Society of London shews that his *Prelusio* was read at meetings of that Society between 15th November 1814 and 21st February 1815. Why it was not at once accepted is not told, but the entry respecting it, which must be of a much later date, in the "Register of Papers" is "Published already." It is due to Vieillot to mention these facts, as he has been accused of publishing his method in haste to anticipate some of Cuvier's views, but he might well complain of the delay in London. Some reparation has been made to his memory by the reprinting of his *Analyse* by the Willughby Society."

³ An interesting note regarding this work appears in the Introduction to Newton's 'Dictionary of Birds' (1893): "The original project was apparently to give a figure and description of every species of Bird; but this was soon found to be impossible; and, when six parts had been issued, with text by some unnamed author, the scheme was brought within practicable limits, and the writing of the letterpress was entrusted to Vieillot, who, proceeding on a systematic plan, performed his task very creditably, completing his work, which forms two quarto volumes, in 1825 . . . It is a tradition that, this work not being favorably regarded by the authorities of the Paris Museum, its draughteman and author were refused closer access to the specimens required, and had to draw and describe them through the glass as they stood on the shelves of the cases."

PREFACE FROM WILLUGHBY SOCIETY REPRINT OF VIEILLOT'S 'ANALYSE . . .', 1883

"Louis-Pierre (or Louis Jean Pierre) Vieillot, was born, say his biographers, at Yvetôt on the 10th May, 1748. In early life he was in business in the island of St. Domingo, where he acquired his tastes for natural history. Proscribed during the Revolution, he took refuge in the United States, where he amassed material for his work 'Les Oiseaux de l'Amérique septentrionale,' published in 1808. Some years before that date, however, he had returned to France, and had obtained a small post in the Bureaux du Bulletin des Lois. In conjunction with his friend Jean-Baptiste Audebert he undertook the production of the descriptive portion of that costly work (only 200 copies of which were issued), the 'Histoire naturelle des Colibris, Oiseauxmouches, Jacamars et Promérops,' published in the year 1802. In 1805 Vieillot commenced the publication, in twelve parts, of the 'Histoire naturelle des plus beaux oiseaux chanteurs de la zône torride.' In these works, gilding was largely employed in the plates. These expensive folios were followed by the 'Histoire Naturelle des Oiseaux de l'Amérique septentrionale' (1807). In 1816 he produced the present 'Analyse d'une nouvelle Ornithologie élémentaire,' the main features of which had been, he says, communicated in 1813 to the 'Memorie della R. Accademia di Torino'; and, in fact, the receipt of a paper of this nature is acknowledged under date of the 10th January, 1814, but it does not appear to have been published there; on the contrary it is said to have been pushed forward in haste, in order to anticipate the publication of some of Cuvier's works. The main principles of classification adopted by Vieillot are applied by him in his portion of the 'Nouveau Dictionnaire d'Histoire Naturelle' (1816-1819), although some appear to have been modified, in consequence, perhaps, of the criticisms passed upon the 'Analyse' by Temminck. In 1820 Vieillot undertook the continuation of the 'Tableau encyclopédique et méthodique des trois Règnes de la Nature,' commenced by Bonnaterre in 1790; and in 1821 he began the issue of the 'Faune française,' which was left unfinished in 1828. In addition to this, in conjunction with P. L. Oudart, he published the 'Galerie des Oiseaux' in two volumes. It is believed that this prolific author died at Rouen, in 1831, in comparative poverty.

"In the present reprint of the 'Analyse,' the original errors of the press, which are tolerably numerous, have been faithfully reproduced.

"HOWARD SAUNDERS."

Unless a more exhaustive search than I have made should prove otherwise, the next account of Vieillot appeared in 1925 in a book entitled 'L'Evolution de l'Ornithologie,' by Marcel Boubier, published by F. Alcan. Boubier calls Vieillot "le très grand ornithologiste . . . sur lequel on a fait le silence le plus impressionnant." He was, says Boubier, one of the most expert among the masters of the art of naming genera and species, having an insight that enabled him to disentangle forms and separate them into generic and specific types.

FROM BOUBIER'S 'L'EVOLUTION DE L'ORNITHOLOGIE,' 1925

"Louis-Jean-Pierre Vieillot was born at Yvetot, Normandy, May 10, 1748. Like most of the French families of that time, his had interests in Saint Domingue. In due time young Louis returned to that colony, where he acquired a taste for natural history.

"Banished during the Revolution, he sought refuge in the United States, where he gathered materials for a work never completed on *Les Oiseaux de l'Amérique septentrionale*, published in 1808 in two folio volumes.

"In the meantime, 1800 or 1801, Vieillot had returned to France and had obtained a minor position in the office of the *Bulletin des Lois*.

"This modest post permitted him to pursue his ornithological work and to write a *Histoire des oiseaux dorés ou à reflets métalliques*, profusely illustrated, Paris, 1802, and a *Historie naturelle des plus beaux Oiseaux chanteurs de la zone torride*, folio size, illustrated by 72 colored plates, Paris, 1805.

"In 1816 he published his Analyse d'une ornithologie élémentaire. This little book, says Vieillot in his advertisement, had been communicated to the Turin Academy of Sciences in 1813. Indeed, in the Memoirs of that Society one finds a note to that effect, dated January 10, 1814. The promptness with which Vieillot communicated this Analyse, in a form so incomplete and hastily written, apparently should be attributed to a desire to anticipate certain works of Cuvier.

"The Analyse was the point of departure for Vieillot's great works in systematic and descriptive ornithology, which are scattered through the Nouveau Dictionnaire d'histoire naturelle, Paris.

"Vieillot was of a shadowy and difficult nature, a disposition that may be attributed to the degree of his poverty and to the feeling that he was unappreciated. Actually, the Museum always kept aloof from him. Cuvier at that time monopolized natural history in the learned world, and with the public at large Buffon succeeded in defending his prestige. Outside of France certain authors like Temminck had taken to writing in the French language and had started a competition with Vieillot that he did not regard without acrimony. These quarrels with Temminck have proof:

"'One would think,' wrote the French ornithologist, 'after what he has written on the pigeons and others, that the power to change their names is a privilege reserved for himself alone; for he never fails to revile anyone else who proposes genera and species. This Dutchman published a history of the gallinaceous birds and in 1815 the history of the pigeons, of which he announces a second edition, in which he may perhaps do himself more credit than in the first."

"Among Vieillot's works a special place ought to be reserved for his *Faune française* (1821–1828), which remained uncompleted. This work comprises two editions, octavo and quarto, with colored plates, which were not all published. It is a truly excellent work, in advance of its time, and complete sets of it are very rare.

"Louis-Pierre Vieillot died in oblivion at Rouen in 1831."

Of Vieillot's family we know little more than nothing, but the death of his two young daughters from yellow fever is recorded in an entry in the Journal of Moreau de St. Méry ('Moreau de St. Méry's American Journey, 1793–1798,' translated and edited by Kenneth Roberts and Anna M. Roberts, Doubleday, 1947). On his return journey from the United States he sailed from Newcastle at midnight on Thursday, August 23, 1798, on the *Adrastes*, arriving at Bordeaux on September

^{1 &#}x27;Nouv. Dict. Hist. Nat.,' article 'Ornithologie.'

28. Vieillot and his family were also returning to France on this vessel. On September 2, Moreau de St. Méry wrote of the tragic voyage:

"Another night of yellow fever carried off M. Gepory, a colonial from San Domingo.

"At noon they threw overboard another of Pepin's daughters-the blind one.

"The entire ship's company was in a turmoil.

"At high noon M. Neblon died of the same disease.

"My success in the matter of my son's cure made them regard me as a real physician. Nevertheless I had no medicine, no purgatives, no vesicator. Hence I could do nothing, though in these terrible circumstances I would have tried to do something if I had possessed the means. It wasn't long before I again regretted my helplessness. A pretty young girl of eighteen, one of the daughters of M. Vieillot, the ornithologist, was stricken with the fever. Mlle. Euphrosine coughed dreadfully, had spasmodic convulsions like those of rabies, and died in frightful agony. On the twentieth her younger sister, Virginia, was carried off, leaving the parents childless.

"What a scene! What to flee? Death horribly was everywhere in the narrow confines in which we were imprisoned."

There is evidently a family tradition that Vieillot's wife and a third daughter likewise perished on this voyage. This is recorded in the 'Compte Rendu of the Ninth International Ornithological Congress' (Rouen, 1938, p. 32). M. André Sanson, of Gonneville-sur-Honfleur, great-grand-nephew of Vieillot, had furnished some choice Calvados for the banquet of the Congress, and on this occasion he reported:

"Originally from Yvetot, where his grandparents were postmasters, this illustrious naturalist lived with his brother at the Quatre-Mares Manor in the vicinity of Sotteville-lès-Rouen. He went 'aux Amériques' to hunt and naturalize birds, for his brother, shipowner at Rouen, was engaged in the spice trade. During his return voyage, his wife and three daughters, who had accompanied and assisted him, died of a fever contracted in the tropics, and thus lost their lives in the cause of science. The record of Vieillot at the Museum won for him a world-wide reputation as one of the greatest ornithologists of the early 19th century."

Ornithologists since his day have memorialized Vieillot by naming birds after him, and Sherborn's 'Index Animalium' and other lists show that more then twenty-five avian species have borne the name *vieilloti, vieillotii, vieillotoides*, etc. Payraudeau in 1826 gave the name *Monodonta vieillotii* to a marine gastropod mollusk from the Mediterranean, with the note, "Dédiée à M. Vieillot, le doyen et le plus célèbre de nos ornithologistes." So, certainly, he was not without honor in his own country, even though the encyclopedists overlooked him. To students of Western Hemisphere birds his name is almost as recurrent as that of Linnaeus. When Vieillot came to the United States, Alexander Wilson's 'American Ornithology' held first place among works of its kind; it was not easy for another foreigner to attain front rank in the field. But Vieillot, though never so popular

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as Wilson or Audubon, left an imprint on American ornithology that time is not likely to erase, and it is fitting to pay him honor by observing the bicentennial of his birth.

So far as known to me only one likeness of Vieillot is extant, a bust in the bird division of the Paris Museum. Dr. J. Berlioz, Curator of Birds, has kindly furnished me a photograph of this bust for reproduction herewith. Dr. Paul Leverkühn¹ refers to a portrait of Vieillot that he had in his collection of ornithologists' portraits at Euxinograd Castle, Bulgaria, but this turns out to be another view of the aforementioned bust. The Deane Collection of Ornithologists' Portraits in the Library of Congress now has prints of both views.

Grateful acknowledgment is made to the following for information furnished in connection with this summary: Dr. J. Berlioz, Curator of Birds in the Muséum d'Histoire Naturelle, Paris; the Librarian of the Paris Museum; the Librarian of the Blacker Library of Zoology, McGill University, Montreal; Capt. Jean Delacour, of the American Museum of Natural History; Dr. Herbert Friedmann, of the United States National Museum; and Dr. T. S. Palmer. John P. Harrington, Bureau of American Ethnology, has helped me with the translations.

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PASSERINE BIRD POPULATIONS OF THE SAVANNAH RIVER REFUGE, SOUTH CAROLINA²

BY ARNOLD B. ERICKSON

Plate 17

INTRODUCTION

A STUDY of breeding bird populations on the Savannah River Refuge, South Carolina, was conducted from March 26 to August 8, 1946, as part of an extensive investigation on the effects of weekly airplane applications of DDT on wildlife. The U.S. Public Health Service and the U.S. Fish and Wildlife Service coöperated in the investigation. The negative effects of the sprayings on birds have been reported elsewhere (Erickson, 1947). The present paper is concerned with

¹ 'Ornithologists, past and present.' Papers Presented to the World's Congress on Ornithology, pp. 199-208. Chicago, 1896.

³ From the Communicable Disease Center, Technical Development Division (Savannah, Georgia), in Coöperation with the U. S. Fish and Wildlife Service.