Career Opportunities in Ornithology

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In ornithology, unlike many other fields of science, there is a continuum of participants from the amateur to the professional. Scientific journals devoted to the study of birds, such as *The Auk, The Wilson Bulletin, The Condor,* and *Bird-Banding*, as well as *American Birds* contain the results of many independent research projects that have been conducted by amateurs. Programs devoted to gathering information about widespread bird populations, such as the Christmas Bird Count sponsored by the National Audubon Society, and the Bird-Banding Program and the Breeding Bird Survey under the auspices of the U.S. Fish and Wildlife Service, depend upon the cooperation of thousands of volunteers. These people find it personally rewarding to observe the behavior of birds and at the same time they contribute valuable information to ornithology. Owing partly to the studies of amateurs and partly to the work of earlier ornithologists, more is known about the distribution and natural history of birds than of any other class of animals. This information forms a basis on which newer areas of biological research can be developed. Professional ornithologists today use birds as subjects for studies of systematics and evolution, population genetics, behavior, ecology, functional anatomy, physiology, and wildlife management. Many advances in our understanding of basic biology will continue to be made by means of research birds.

Universities do not offer advanced degrees in ornithology as such, but rather in the broader fields of zoology, wildlife biology, or ecology. Ornithologists are in fact biologists, with degrees in one of these fields, who have specialized in the study of birds. In the United States and Canada this applies to approximately one thousand persons. Most of them teach in colleges and universities; many are employed by the conservation and management programs of federal and state governments, or by private conservation organizations; some are curators in museums or zoos.

At Colleges and Universities

Most ornithologists holding the Ph.D. degree teach in colleges and universities, combining teaching with research. In addition to teaching ornithology they also teach courses in such other areas as introductory biology, animal behavior, physiology, anatomy, ecology, and evolution. In his or her first years of teaching, a Ph.D. ornithologist may not teach ornithology at all Clearly, persons interested in college teaching need broad training in the biological sciences Universities that have graduate programs provide the opportunity to faculty members of guiding graduate students in their research. During the academic year and especially during the summer, there may be opportunities to conduct research at field stations, university museums, or elsewhere. Ornithologists at colleges and universities often become involved in conservation activities such as preserving natural areas, contributing towards saving endangered species, and identifying and combatting the effects of pollution. One of the advantages of being at a university is that it offers a diversity of activities.

The fact that more and more students are enrolling as biology majors reflects the serious concern of both faculty members and students about the urgent problems of protecting the environment, producing food, and conserving resources Unfortunately, in spite of the need for work in

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areas that require skills in biological sciences, the jobs demanding the services of graduates are in short supply. Forecasts indicate that this situation will continue. Whereas there will be shortages of physical scientists and engineers, the current oversupply of life scientists will continue. The situation will be particularly discouraging in institutions of higher education, where 60 percent of all biologists are employed, and very little expansion of biology departments is expected. In spite of the fact that many of the most important problems facing the nation will require input from well trained biologists, the number of jobs at the doctoral level is limited and competition for the ones that become available in the next few years will be intense.

In Museums

Museums employ ornithologists to supervise the acquisition, maintenance and use of collections, to conduct research, and to participate in educational programs. Since the collections are a valuable resource of the national and international scientific community, their care and preservation are the curator's most important responsibility. The larger museums employ several ornithologists, but most institutions have only one. Sometimes one curator is responsible for both birds and mammals.

A Ph.D. degree in zoology and an aptitude for collection-oriented research are usually prerequisites for employment in the senior curatorial positions. Since there are fewer than 75 such positions in the United States and Canada, interested students are advised to prepare for a career as biologists rather than to count on an appropriate opening in a museum just when it is needed. Approximately 25 ornithologists are full time curators in the sense that they devote most of their time to the care of collections, to research on birds, and to museum-related programs. They are employed at the major museums of natural history and their research is usually in the areas of systematics and evolution. Some hold adjunct professorships at nearby universities where they do some teaching and assist in the training of graduate students. Approximately 35 ornithologists who devote a higher proportion of their time to the teaching and training of college students, are also responsible for curating university-held collections of birds. A few state and municipal museums employ ornithologists to curate collections used mainly for educational and reference purposes. In these positions the emphasis is on service to the public rather than on research. Some museums employ curatorial assistants to help with the care of collections. Qualifications for these support positions usually include a bachelor's degree in biology or the equivalent in experience.

Figure 1. An ornithologist studies specimens of birds that are being added to the collection at the American Museum of Natural History in New York.

In Government

Within the various departments and agencies of the federal government of the United States, approximately 200 biologists are employed in jobs dealing primarily with birds. Additional positions involve work with birds along with other species of wildlife.

The U.S. Fish and Wildlife Service (FWS) has broad authority for the study, conservation, and management of birds, primarily migratory species. Current research programs involve waterfowl, endangered species, birds on public lands, bird damage abatement, diseases and parasites of birds, and birds in relation to pollution. The FWS maintains five major research facilities: the National Fish and Wildlife Laboratory at the National Museum of Natural History in Washington, D.C.; the Patuxent Wildlife Research Center and the Migratory Bird and Habitat Research Laboratory in Laurel, Maryland; the Denver Wildlife Research Center; and the Northern Prairie Wildlife Research Center in Jamestown, North Dakota. These facilities also have personnel at 37 field stations located throughout the country.

Figure 2. Employees of the U.S. Fish and Wildlife Service, Department of the Interior, banding a Canada Goose prior to its release at the Blackwater National Wildlife Refuge, Cambridge, Maryland. (Courtesy of the U.S. Fish and Wildlife Service.)

The Fish and Wildlife Service operates Cooperative Wildlife Research Units at universities in 20 states. Other cooperators in this program include the state conservation departments and the Wildlife Management Institute. The Research Units conduct studies of birds and facilitate the training of wildlife personnel at the graduate level. The FWS also operates more than 300 National Wildlife Refuges, staffed mainly with people trained in natural resource management. Other FWS employees whose work involves birds to some degree include law enforcement agents, and biologists in environmental services who evaluate the impact of development projects on wildlife.

The National Park Service employs park naturalists, park rangers, management biologists and research biologists. Other federal agencies such as the Corps of Engineers, the Bureau of Reclamation, the Bureau of Land Management, the Forest Service, and the Soil Conservation Service hire and let contracts to persons having ornithological interests and training to evaluate the ecological impact of proposed resource development programs. This field is developing rapidly at the present time.

State agencies have positions for wildlife and resource biologists, park and game managers, conservation officers, and wardens. Those whose duties pertain largely to birds are about equal in number to those in federal agencies. They are employed by the Game and Fish Department, Conservation Department, Parks Department, or the comparable agency in the respective state governments. In the past, state conservation programs have emphasized game species, but now some states are hiring more broadly-trained biologists.

Both federal and state agencies hire personnel for summer jobs or for temporary appointments at other times of the year. Competition is keen for summer jobs so inquiries should be made the preceding fall or winter. Information can be obtained from the Civil Service Commission or from the personnel office of the agency involved. For information about opportunities in state agencies, write to the conservation department in the capital city of your state.

In Other Organizations

The National Audubon Society is the largest private conservation society in North America. Currently the professional staff includes 22 biologists, most of whom have special training in ornithology. It maintains a Research Department, headquartered at Tavernier, Florida, that sponsors investigations of declining populations

of birds in the Florida-Caribbean area. Biologists in the Sanctuary Department are professionally trained at either the bachelor's or master's level. Their work involves the management and administration of sanctuaries such as Corkscrew Swamp and Rookery Bay in Florida and Constitution Island in New York. In the field of education, the National Audubon Society publishes classroom aids and conducts Audubon Ecology Workshops in Maine, Connecticut, Wyoming, Wisconsin, Ohio, California, and Arizona. These workshops offer instruction in ecology and specific courses in ornithology that qualify for graduate credit at certain universities. They employ part-time instructors for the summer sessions, most of whom are university faculty members in the remainder of the year.

In addition to the National Audubon Society, several other private non-profit conservation organizations have added new positions for biologists in the last five years. Such organizations as Ducks Unlimited, the National Wildlife Federation, the Wildlife Management Institute, the Sierra Club, Friends of the Earth, The Wildlife Society, The Wilderness Society, the World Wildlife Fund, and the International Association of Game, Fish and Conservation Commissioners employ people with biological training in administrative jobs. All of these jobs require a broad academic background in biology and ecology, as opposed to a narrow specialization in ornithology. Applicants should write directly to the head administrative officer of the organization concerned. See the Conservation Directory, 1974, National Wildlife Federation, for addresses.

A limited number of biologists who have specialized in ornithology work for profit-making private companies in such activities as leading natural history tours, directing the conservation policies of timber companies, or as impact-statement consultants. The major zoos hire aviculturists to manage their collections of living birds and to do research.

Ornithology in Canada

The overall statement of employment opportunities outlined for the United States applies to the situation in Canada as well. Approximately sixty universities and colleges in Canada offer programs in terrestrial ecology, but none give degrees exclusively in ornithology. Many of the programs are new. Nevertheless, the period of post-war expansion is over and the competition for openings is intense. There are very few permanent positions for museum curators of birds in Canada.

The leading employer of ornithologists in Canada is the Canadian Wildlife Service, Department of the Environment. Approximately 20 research scientists work exclusively on birds and 100 additional persons work largely on game birds or on problems associated with toxic chemicals. The latter group are game bird specialists An equivalent number of persons are hired by the provincial game agencies.

A new source of employment in recent years has developed because the Canadian government has been letting contracts to consulting companies for the preparation of ecological impact studies. Thus, the Canadian market for ornithologists as such is very restricted, but persons who are broadly trained ecologists or wildlife biologists are in demand.

Salaries and Benefits

Salaries and benefits are adequate but not high in comparison to those of other professional occupations. They are not commensurate with the time and money invested in education, although they are in the same general range as those of other college teachers and government employees. Most ornithologists value the intangible benefits of pursuing work that is original and intellectually challenging, or of helping to improve the status of the environment.

A summary of the national register of scientific and technical personnel in the United States for 1970 gives the following figures for median annual salaries of biologists teaching at colleges and universities (9-month, academic year base): professor, $16,300; associate professor, $12,900; assistant professor, $10,800; instructor, $9,500 Median annual salaries for government-employed biologists are higher and are on a calendar year base. Most established ornithologists earn between $12,000 and $18,000 per year. Fringe benefits include employment protection, life and health group insurance, and retirement plans. Travel expenses are often paid by the employer when travel to conduct research or to professional meetings is required.

How to Prepare

Tomorrow's biological scientist will need the broadest possible kind of preparation. At the high school level this means the best courses available in biology, mathematics, physics, and chemistry A solid mastery of spoken and written English is essential. A substantial ability in at least one foreign language is desirable, sometimes essential. The study of foreign languages should begin in high school. An enterprising student can also acquire special ornithological skills out of school

There are a few summer jobs in university and field laboratories and in state and national parks, refuges, and wildlife stations, that are open to qualified high school and college students. Contacts with biologists in the nearest college, university, or museum, may turn into sources of job opportunities. By joining the state or local ornithological society it is possible to meet others with similar interests. One of the best ways to find out what ornithologists are doing currently is to go to a library that receives scientific journals. Look through *The Auk,* the *Condor,* the *Wilson Bulletin, Bird-Banding,* and the *Journal of Wildlife Management.* Consider joining at least one of the national societies that publish these journals.

At the college undergraduate level the story is much the same. In addition to taking courses on birds and other groups of animals, take mathematics, statistics, chemistry, physics, geology. Master a reading knowledge of a least one foreign language. Discuss possibilities for extracurricular projects and employment with staff members. Read as widely as possible. If you do not intend to go to graduate school, consider programs for high school science teachers, for laboratory technicians, or for wildlife managers.

The choice of a graduate school should be made on the basis of one's special abilities and interests and the quality of the school. If one's interests in particular aspects of ornithology are strong, it is recommended that contact be made with professors who pursue research in similar areas. Several but by no means all of the universities offering advanced degrees in the biological sciences are also recognized as centers for ecology, ornithology, or wildlife management. A list of some of the universities offering graduate degrees in the biological sciences with a specialization in ornithology is given beyond. Details of the programs at several of these universities have appeared in *American Birds*: Cornell University (25 10-12), University of California at Berkeley (25 537-538), Louisiana State University (25.611,805), University of Wisconsin at Madison (25:820,908), University of Michigan (25·949-950), Yale University (26:561), Harvard University (27:18,130).

The American Ornithologists' Union

The American Ornithologists' Union, or A O U. as it is familiarly known, is the oldest and largest professional ornithological society in the Western Hemisphere. Its members represent interests in all aspects of avian biology, and they include professionals and amateurs dedicated to its aim, the advancement of ornithological science. The total membership has progressed from 23 Founders in 1883 to over 3250 members. Members received *The Auk,* the quarterly journal and official organ of the A.O.U., now approaching its 100th year of publication, and containing almost 1000 pages yearly. Its primary object is the publication of the results of original studies of birds, but it also includes reviews of major new ornithological works, a bibliography and abstracts of recent periodical literature, ornithological news, reports and announcements of the Union, and biographical information.

The Annual Meeting of the A.O.U. usually takes place in late summer or autumn. Through a program of scientific papers, motion pictures, exhibits, field trips, informal gatherings, and a banquet, the Annual Meeting has become a clearing house for the exchange of ideas, a forceful stimulus to further study, and a tradition of memorable fellowship. For information on how to join the A.O.U. and other scientific societies concerned with the study of birds, see beyond.

Some major universities that offer graduate degrees in the biological sciences, with specialization in ornithology: Cornell University, Ithaca, New York 14850; Harvard University, Cambridge, Massachusetts 02138; Louisiana State University, Baton Rouge, Louisiana 70803; University of California, Berkeley, California 94720; University of California, Los Angeles 90024, University of Florida, Gainesville, Florida 32611; University of Georgia, Athens, Georgia 30601, University of Illinois, Urbana, Illinois 61801, University of Kansas, Lawrence, Kansas 66044, University of Michigan, Ann Arbor, Michigan 48104; University of Minnesota, Minneapolis, Minnesota 55455; University of Toronto, Toronto, Ontario, Canada; University of Washington, Seattle, Washington 98195; University of Wisconsin, Madison, Wisconsin 53706; Yale University, New Haven, Connecticut 06520

Sources of Information

American Institute of Biological Sciences, 1401 Wilson Blvd., Arlington, Va. 22209

The Wildlife Society, 3900 Wisconsin Avenue, N.W., Suite 176, Washington, D.C. 20016

Careers for women in the biological sciences Bulletin 278. U.S. Dept. of Labor, Women's Bureau, Washington, D.C. 20025.

Employment opportunities in the Bureau of Fish and Wildlife Service. Department of the Interior, Washington, D.C. 20025

Careers in ecology. Ecological Society of America. c/o. Dr. J. Frank McCormick, Graduate Program in Ecology, University of Tennessee, Knoxville, Tennessee 37916

Scientific organizations concerned with the study of birds. Membership includes a subscription to the journal.

Organization	*Address*	*Annual Dues*	*Journal*
American Ornithologists' Union (A.O.U.)	National Museum of Natural History, Smithsonian Institution, Washington, DC 20560	$12.00	*The Auk* (Discounts are given to members purchasing Ornithological Monographs)
Cooper Ornithological Society (C.O.S.)	c/o Treasurer, Oakland Museum, Natural Sciences Division, 1000 Oak Street, Oakland, CA 94670	$15.00 ($8.00 for students)	*The Condor* (Pacific Coast Avifauna published at irregular intervals)
Wilson Ornithological Society (W.O.S.)	Museum of Zoology, Univ. of Michigan, Ann Arbor, MI 48104	$8.00	*The Wilson Bulletin*
Northeastern Bird-Banding Association, Inc. (N.E.B.B.A.) (Other regional associations: Eastern, Inland Ontario, Western)	c/o Treasurer South Londonderry, VT 05155	$6.00	*Bird-Banding*
Ecological Society of America (E.S.A.)	c/o Business Manager Ralph E. Good, Department of Biology, Rutgers University, Camden, NJ 08102	$25.00 Sustaining Member ($35.00 in 1975)	*Ecology* *Ecological Monographs* *Bulletin of the E S A*
National Audubon Society, Inc. (N.A.S.)	Membership Department 950 Third Avenue, New York, NY 10022	$8.00 subscription and $15.00 membership	*American Birds* *Audubon*
The Wildlife Society	c/o Executive Director, The Wildlife Society S-176, 3900 Wisconsin Ave., N.W., Washington, DC 20016	$20.00	*Journal of Wildlife Management* *Wildlife Soc. Monographs* *Wildlife Soc. Bulletins*

Careers in animal biology. American Society of Zoologists. c/o Mrs. Mary Wiley, Box 2739 California Lutheran College, Thousand Oaks, California 91360

Careers in Wildlife Conservation. John Madson and Ed Kozicky. Conservation Department. Olin Mathieson Chemical Corporation, East Alton, Illinois 62024

Careers in biological systematics. Society of Systematic Zoology, Department of Entomology, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560

Careers in conservation. Edited by Henry Clepper. 1963. 141 pages, $6.00 Ronald Press Co., 79 Madison Avenue, New York, NY 10016

Careers in the United States Department of Interior, Directory for College Students Rev 1971. Pamphlet, 45 cents. Catalog No 1 1.73/2:3/3, S/N 2400-0587. Order from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

Sources for information on careers in biology, conservation, and oceanography. Compiled by Helen B. Deppe for the Department of Vertebrate Zoology, National Museum of Natural History, Smithsonian Institution, Washington, DC 20560. Leaflet 74-3.

Single copies of this article are available free from the Secretary of the A.O.U., National Museum of Natural History, Smithsonian Institute, Washington, DC 20560.