

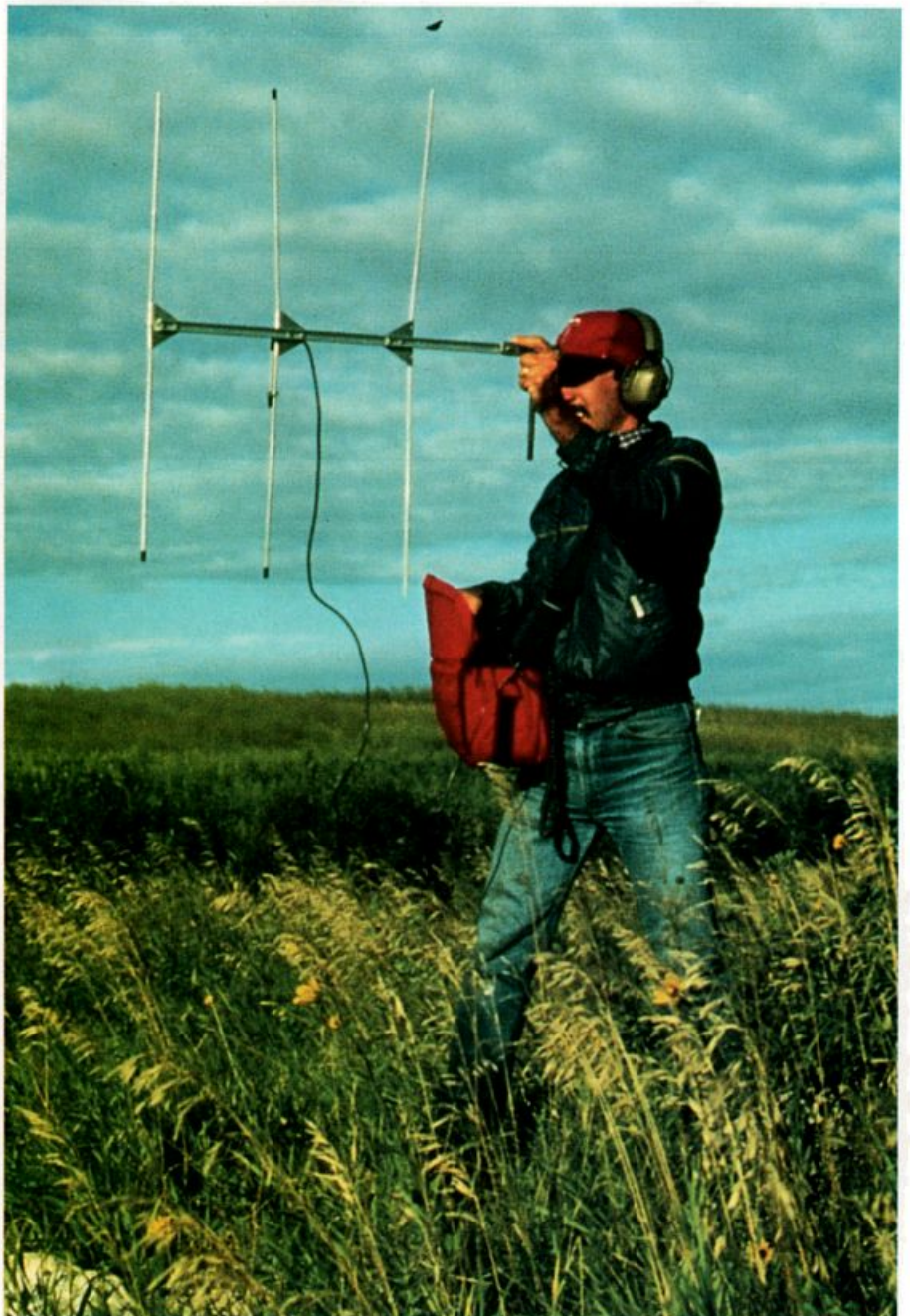
Career Opportunities in Ornithology

Prepared by
*The American Ornithologists' Union*¹

ORNITHOLOGY, THE SCIENTIFIC study of birds, encompasses both professional and amateur endeavors. All aspects of the biology of birds—ecology, behavior, anatomy, physiology, systematics and evolution, veterinary sciences, wildlife management, and conservation—are topics of interest. This broad field provides career opportunities in research, education, and administration, but there is intense competition for the limited number of positions available each year. At least a Bachelor's degree is necessary to be competitive at the entry level; more often a Master's degree is required, and a Ph.D. is essential for advanced positions. Aspiring ornithologists should understand the kinds of jobs available and carefully study the various degree programs offered at colleges and universities. This article introduces these opportunities and requirements.

Professional ornithologists are biologists who specialize in the study of birds. More than 2000 individuals in North America work in jobs involving ornithology. Most either teach in colleges or universities or are employed by federal or state agencies. Some work in university or public museums, and some work for private conservation and research organizations or consulting firms.

Most ornithologists divide their time between teaching and research or between teaching and administration. A museum curator also may teach at a university. In general, salaries for professional ornithologists are quite low compared with those available in the business and professional world, but personal fulfillment and intense interest in the work provides another aspect of compensation. Flexible work schedules, field work in ad-



Tracking released Burrowing Owls with radio receiver. Photograph/Ellen Lawler.



Banding Semipalmated Sandpiper chick. Photograph/Pam Miller.



Close-up photography of bird. Photograph/Barbara Clauson.



Ornithologist analyzing spectrograph. Photograph/Cornell Laboratory of Ornithology.

dition to office work, and the possibility of worldwide travel are among the attractions of an ornithological career.

How to Prepare

Experience with birds

Any background of work with birds or wildlife is an asset, especially experience in the field observing, identifying, capturing, and marking wild birds. Ornithological careers often

spring from an interest in birds, particularly bird watching. Many ornithologists first became interested in birds at an early age. Because experienced applicants for jobs have an advantage over newcomers, aspiring ornithologists of all ages should try to take advantage of opportunities to gain field and research experience as volunteers or seasonal employees. Volunteers can obtain positions at universities or colleges, state and national parks, wildlife refuges, museums, zoos, or field stations where ornithological research is conducted. Employers often fill vacancies with

well-trained former volunteers.

The *Ornithological Newsletter*, published by the American Ornithologists' Union and other major United States ornithological societies—the Cooper Ornithological Society, the Wilson Ornithological Society and the Association of Field Ornithologists—advertises job opportunities, paid and volunteer. You can receive this publication as one of your membership benefits if you join one of the sponsoring societies. Joining regional or state ornithological societies or bird clubs will also help you to meet other individuals who share your interest,



Building a weatherport in Alaska. Photograph/Pam Miller.



Bowdoin Scientific Station. Photograph/Nat Wheelwright.



Crew off to survey Arctic National Wildlife Refuge. Photograph/Pam Miller.

and enable you to become involved in local projects.

College Training

A list of United States and Canadian colleges that offer ornithology courses and advanced degrees in the biological sciences is provided in *The College Blue Book*, Volume I, published by MacMillan Publishing Company of New York. This standard source is available in most local libraries. *American Birds* periodically features articles on "Centers of Learn-

ing," which review in depth institutions that offer specialized ornithological training. Colleges vary greatly in what they offer. Study the courses available carefully; some curricula emphasize theory while others are practical, some emphasize cell and molecular biology while some stress organism and field biology. If you identify a school of interest, contact a bird-oriented professor there to discuss further possibilities.

As an undergraduate, you should take courses in general biology, botany, zoology, mathematics, statistics, biochemistry, computers, physical sci-

ences, and one or more foreign languages. You should also seek opportunities to be a research assistant and to build relationships with several faculty members. A strong undergraduate record, including enthusiastic recommendations from professors, will be essential for acceptance into graduate school. Try also to develop a record of publishing in scientific journals during your undergraduate years.

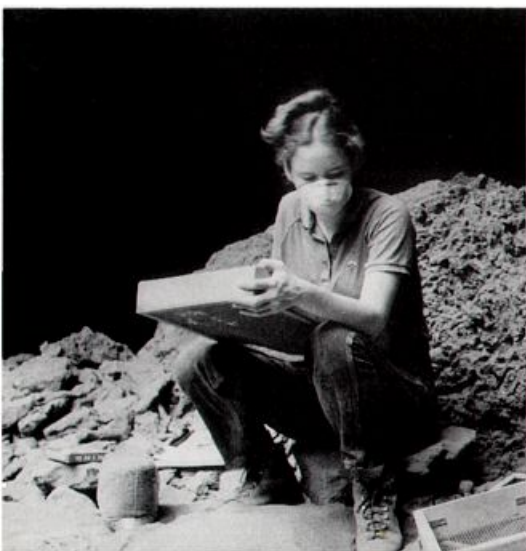
As a graduate student, you will begin to focus on advanced topics in biology and to develop your ability to conduct independent research. You should also develop teaching skills by



While most ornithologists choose to study living birds, avian paleontologists find excitement in tracing the history of bird evolution through time. Recent research has featured giant pseudo-toothed seabirds, vanished radiations of flying birds with primitive, ostrich-like palates, and more.

Field work for the paleontologist always holds the promise of discovery. Above, Storrs Olson and Aki Sinoto examine bones from an excavation in the Hawaiian Islands, where scores of unique fossil species disappeared after Polynesian colonization upset the ecological balance. Below, Helen James screens sediments to pick out tiny fossils at a site in the Hawaiian Islands.

New recruits to avian paleontology would have a choice of many promising research projects, because there are more fossils of birds than qualified investigators to study them. Photographs/Emilee M. Mead.



supervising labs for undergraduate biology courses. The choice of a graduate program may determine the orientation and perhaps success of your career. First, learn something about the reputation of programs and ornithologists that interest you. Many universities that offer advanced degrees in zoology are recognized as centers of ornithological, ecological, and wildlife management excellence, which means that a degree from one of these institutions can provide job leads. Second, you should choose a graduate school with a strong program that matches and complements your personal interests—in ecology, behavior, or systematics. Frequent interactions with other graduate students with similar interests will be the core of your graduate training. Browsing through the scientific journals (Table 1) at a college library is a good way to see who is doing what. Studying these will inform you about current research and will enable you to identify both topics and graduate groups with the greatest personal appeal to you. Finally, visit the universities that interest you most. By meeting the faculty and students, you can learn more about the requirements for a Ph.D. in that program, the opportunities for field work and research assistantships, and, especially, how satisfied the experienced graduate students are with the program and particular professors. Your chances of winning one of the limited annual openings in any graduate program will be enhanced if you

personally impress a faculty member with your potential and interest in graduate work.

Your graduate studies may be directed initially by a faculty advisory committee, and then by a faculty member who agrees to be your research advisor. Each graduate program has different requirements for course work and practical experience, and your program should be tailored to your individual needs and interests. Of primary importance, however, is that you should start on a Ph.D. research project as early as possible to insure finishing in the normal 4–5 years, and you should develop a record of publishing in appropriate scientific journals.

You may wish to work toward an advanced degree in a field other than ornithology, so that you will have a greater likelihood of success during a job search. The fields you may wish to consider include physiology, endocrinology, parasitology, systematics, ethology, ecology, evolution, population biology, genetics, paleontology, toxicology, anatomy, computer science, developmental biology, and wildlife management. Hundreds of jobs in these fields are advertised each year in such periodicals as *Science* or *The Chronicle of Higher Education*, and more than a few of the leading professionals in such disciplines work extensively or mainly with birds. Attending scientific meetings, such as the annual meeting of the American Ornithologists' Union, is an excellent source of information on job openings.

Jobs in the Field

Universities and colleges

University professors are responsible for teaching, conducting research, securing grants, and advising students. Normally, ornithologists are expected to teach a variety of courses, not just ornithology. University professors must establish strong research programs funded by grants, and train graduate students to do independent research. At smaller colleges, teaching responsibilities nearly always have priority over research.

New members of a faculty usually are hired as assistant professors with a

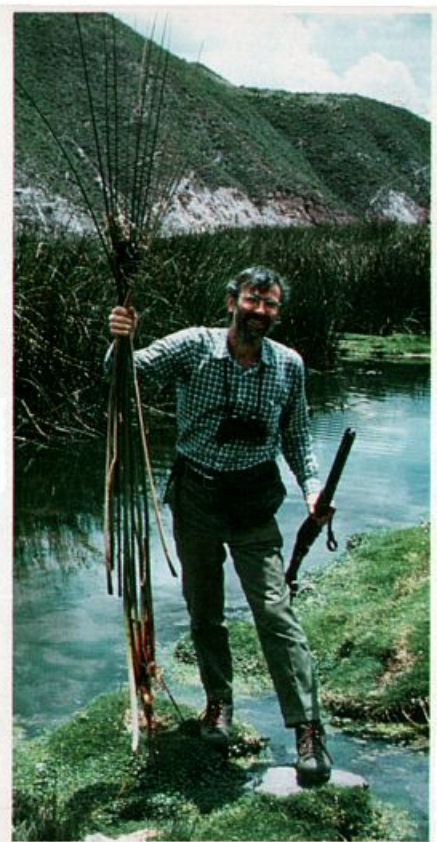
contract based on a nine-month academic year. After 5–7 years, satisfactory performance leads to promotion to associate professor with tenure and after 12 to 15 years, to professor. Promotions are based on a peer-reviewed record of scholarly achievement, including publications, research grants, and scientific reputation. In general, academic positions require far more than 9 a.m. to 5 p.m. jobs; a successful career often is based on extended effort in the evenings and on weekends. In 1986, average nine-month salaries ranged from \$27,000 for assistant professors to \$43,000 for professors. It is often possible to augment this income with a summer salary from research grants, consulting work, lecturing, or teaching.

To be competitive for an entry-level academic position, you need a Ph.D., research publications, teaching experience, and, increasingly, some post-doctoral experience. Strong writing and lecturing skills are essential. Usually people are hired mainly because they are zoologists or biologists, and only secondarily because they are or-

nithologists. To reiterate, a broad educational background will increase your chances for a job. Competition is usually keen, with several hundred applicants for every academic position that is announced. Top candidates for positions must present seminars on their research, and demonstrate mastery of advanced topics in biology during extended interviews.

Museums

Museum positions include opportunities for research, for curatorial care of bird specimens, and for international field work. Larger museums usually have at least one senior, full-time position dedicated to birds. In smaller museums, however, all or several of the vertebrate collections may be under the care of one curator. Non-research museum positions include collection managers, scientific preparators, and curatorial assistants. Many museums have service-oriented departments, such as education, exhibits and publications, where trained ornithologists.



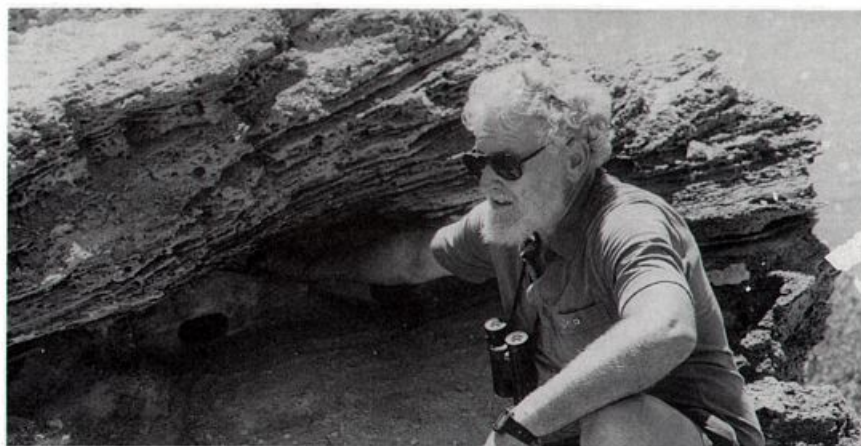
Researcher in Peru with stalks that contain nest he collected. Photograph/Barbara Clauson.

Table 1. North American societies concerned with birds and their scientific journals.

<i>Organization, Address</i>	<i>Annual Dues</i>	<i>Journal(s)</i>
American Ornithologists Union (AOU) Director, Ornithological Societies of America (OSNA) P O. Box 21618 Columbus, OH 43221	\$26.00 \$18.00 Students	<i>The Auk</i> (discounts to members purchasing Ornithological Monographs)
Cooper Ornithological Society (COS) Same address as AOU	\$25.00 \$15.00 Students	<i>The Condor</i> (Studies in Avian Biology published at irregular intervals)
Wilson Ornithological Society (WOS) Same address as AOU	\$18.00 \$14.00 Students	<i>The Wilson Bulletin</i>
Association of Field Ornithologists, Inc. Same address as AOU	\$16.00	<i>Journal of Field Ornithology</i>
North American Bird-Banding Association, Inc. (Other regional associations: Eastern, Inland, Western)	\$10.00–\$15.00 depending on region of country	<i>North American Bird Bander</i>
Western Field Ornithologists Art Cupples 3924 Murrietta Avenue Sherman Oaks, CA 91423	\$14.00	<i>Western Birds</i>
National Audubon Society (NAS) Membership Department 950 Third Avenue New York, NY 10022	Introductory Membership \$20.00	<i>American Birds</i> (1 year subscription \$27.50) 950 Third Ave. New York, NY 10022
The Wildlife Society (TWS) c/o Executive Director The Wildlife Society 5410 Grosvenor Lane Bethesda, MD 20814	\$53.00 \$44.00 Students	<i>Journal of Wildlife Management</i> <i>Wildlife Society Monographs</i> <i>Wildlife Society Bulletin</i>
Society of Canadian Ornithologists c/o National Museum of Natural Science National Museums of Canada Ottawa, Ontario, CANADA K1A 0N8	\$10.00 (Canadian)	<i>Picoides</i>



Above: Wildlife biology student checking Cliff Swallow nests under bridge. Photograph/ Art Gingert. Below: David Wingate inspecting Cahow burrows in Bermuda. Photograph/ Frank Schleicher.



thologists can find employment.

Positions in major museums usually are associated with research collections of scientific specimens. Curators in such museums are the equivalents of professors in major universities, the principal difference being that their primary non-research responsibilities include care of the collections instead of teaching. Many research museums, however, are part of a university and their curators are also members of the university faculty. Further, curators in non-university museums often have adjunct appointments with universities. Fewer than 25 curatorial positions are devoted to birds in non-university museums in North America, and no more than 35 university faculty members curate bird collections as a major responsibility. These numbers are unlikely to increase. Typically, research interests of curators include the study of the specimens in their care. The responsibilities of curators of small museums are often related to education and exhibition programs rather than research.

Most museum ornithology departments have from one-to-three non-research positions for collection managers, research assistants, technicians and preparators. Increasingly, these positions require a Master's degree. Thorough training in ornithology and museum techniques is essential, and competence with computer systems for management of collection databases is becoming mandatory. The responsibilities of collection managers and curatorial assistants include the direct care and use of specimens, as well as the acquisition of new specimens. Scientific preparators need specialized training and experience with a wide range of preservation techniques.

Salaries and promotions for curatorial research positions in major museums parallel those for university faculty. Salaries for collection managers range from \$15,000 to \$25,000, depending on experience.

Zoos

Zoos provide opportunities for jobs for students trained in ornithology and related fields. The continued growth of zoos will increase this segment of the job market. Positions are

available as curators and several levels of keepers. Fewer than 50 bird-oriented curatorial positions exist in North American zoos. However, each curator may supervise 4–20 keepers. A curator at a zoo usually has few if any research responsibilities; these jobs are primarily administrative. Education divisions at zoos offer opportunities similar to those at museums.

A Ph.D. is rarely a requirement for curatorial positions at zoos; however, a Bachelor's degree and experience with captive animals often is necessary to qualify for a job. Veterinarian positions at zoos require a veterinary degree. Salaries of positions at zoos are slightly lower than those for corresponding positions at museums.

Federal agencies in the United States

Jobs with federal agencies have proliferated in recent years, offering a broad range of ornithological opportunities, especially for wildlife biologists with a background in ecology. Most jobs are oriented towards wildlife management. Approximately 500 people whose jobs involve birds are employed by the United States Fish and Wildlife Service, National Park Service, Forest Service, and Bureau of Land Management. Other agencies such as the Bureau of Reclamation, Bureau of Indian Affairs, Tennessee Valley Authority, and some military bases, also employ ornithologists. Federal agencies are responsible for the study, conservation, and management of wildlife populations, including birds on their administered lands. Current federal research programs include management of waterfowl, preservation of endangered species, monitoring of viable bird populations, abatement of bird damage, study of bird diseases and parasites, and assessment of the effects of environmental problems on birds.

The United States Fish and Wildlife Service operates Cooperative Wildlife Research Units at universities in about half of the states. These units conduct studies of birds and facilitate training of wildlife personnel at the graduate level. The Fish and Wildlife Service operates more than 400 national wildlife refuges, staffed with people trained in biology, ornithology and natural resource management. The Fish and Wildlife Service also

maintains major research facilities that deal in part with birds: the Patuxent Wildlife Research Center in Laurel, Maryland; the National Ecology Research Center, in Fort Collins, Colorado; the Northern Prairie Wildlife Research Center in Jamestown, North Dakota; and the National Wildlife Health Laboratory in Madison, Wisconsin. These laboratories have field stations throughout the country.

The National Park Service employs park interpreters, resource managers, and research scientists in more than 300 parks. Each national park has at least one resource manager, responsible for birds and other animals. The National Park Service also operates Cooperative National Park Resources Studies Units at more than 15 universities. Many of the larger national parks (*e.g.*, Everglades, Yosemite, Yellowstone) have research centers with at least one individual who concentrates on birds.

Employment opportunities will probably continue to be available to those interested in pursuing an ornithological career with the federal government. However, many more entry level and mid-management positions than research positions will continue to be available. To obtain information about federal government openings, contact your local office or telephone the personnel office of the particular federal agency in which you are interested and ask where and how often notices are posted. Ask if your name can be placed on a mailing list so you will receive a listing of openings.

Entry-level federal positions usually have a GS-5 rating, with an annual salary of about \$15,000. A Master's degree qualifies you for the GS-9 level and an annual salary of \$23,000, while a Ph.D. qualifies you for a GS-11 or GS-12 level and an annual salary of about \$30,000. In general, federal salaries are higher than those available for academic jobs in the private sector.

State Fish and Game Agencies

Responsibilities of most personnel in state fish and game agencies involve game management and are likely to include projects dealing with wildlife in general, although some are devoted specifically to birds. Positions include research biologist, wildlife biologist,

game or nongame biologist, wildlife manager, wildlife conservation officer, and gamekeeper. A degree in wildlife management or ecology is essential for most positions. In general, specific training in wildlife management is preferred (in some cases it is required) to a background in general biology, the notable exception being for research positions devoted to nongame projects. In the past decade, many state fish and game agencies have initiated programs involving studies and status surveys on nongame animals, species of special concern, and endangered species. A variety of positions for academically trained field ornithologists will be available in these programs.

Salaries for research positions average slightly lower than salaries for comparable positions in universities and government agencies. Positions for wildlife biologists and wildlife managers usually start at \$12,000 to \$17,000 per year. Wildlife conservation officer and game warden jobs start lower.

Other organizations

In the private sector, there are many jobs available with profit and non-profit organizations. Many nonprofit organizations exist to foster the conservation of natural resources and wildlife, including birds. Some of these organizations, such as the National Wildlife Federation, have rather broad agendas in conservation; others, such as Ducks Unlimited, are oriented toward single species or groups of species.

The larger organizations often employ biologists, ornithologists, and wildlife management specialists in administrative positions or positions that involve the analysis of public policies related to conservation. A more limited number of positions involving field research and data analysis is available. The Nature Conservancy and the National Audubon Society are examples of two large, national and international organizations that have administrative, policy and research positions involving ornithologists; these same organizations also own and manage extensive sanctuary systems. Jobs related to land management and public education are often

associated with these sanctuaries. At the state level, independent Audubon societies in Massachusetts, New Jersey, and several other states have similar programs and job opportunities.

Scattered across the country are a few hundred relatively small, local and regional organizations that operate nature centers and sanctuaries, oriented toward public education in natural history. Two of the better-known examples are the nature centers in Cincinnati, Ohio, and Kalamazoo, Michigan. Positions at these nature centers may involve research, but rarely as a primary responsibility.

The *Conservation Directory*, published by the National Wildlife Federation in Washington, D.C., is the best single source for information about private conservation organizations in the United States. Several organizations publish regular newsletters listing job opportunities. "Environmental Opportunities" is published by the Environmental Studies Department, Antioch/New England Graduate School, Keene, New Hampshire 03431, and "Environmental Job Opportunities" is available from the Institute for Environmental Studies, University of Wisconsin, Madison, WI 53706. Another excellent source of information about jobs, especially at nature centers, is The Association of Interpretive Naturalists, 6700 Needwood Road, Durwood, MD 20855.

There is a handful of year-round and seasonal bird observatories in the United States and Canada. These are described below in the section on amateur involvement. Positions for ornithologists in private companies are growing in number, too; responsibilities include preparing environmental impact statements, leading natural history tours, or directing the conservation policies of companies that deal with mining, timber, or power production. Much private-sector activity deals with attempting to predict and then monitor the impacts of company projects on the environment, with birds often used as "indicator species."

Canada—Special Considerations

Many of the foregoing statements have emphasized job opportunities in the United States. Positions for ornithologists in Canada are similar to those in the United States, but are fewer because of the much smaller population. Eligibility to work in Canada is a prerequisite for most jobs; exceptions are mainly universities. The ability to speak French is an asset in senior positions, particularly in the federal government. Canadian universities currently employ about 50 people in the area of ornithology, at approximately 24 universities, mostly in jobs for ecologists or fields more general than ornithology. The Canadian

Wildlife Service, Department of the Environment, employs another 50 people. A few ornithologists hold museum positions, mostly in cross-appointments with university biology departments. Provincial wildlife agencies tend to hire people trained more specifically in management. In terms of local purchasing power, salaries are comparable to those in the United States.

A surplus of qualified ornithologists currently exists in Canada. Universities expanded in the 1960s, and as a result, few of the faculty hired will retire until the 1990s. Competition is keen for the postdoctoral fellowships that serve as springboards to university positions. The other major employer of ornithologists in Canada, the Canadian Wildlife Service, has recently de-emphasized its interpretive and research activities. It is relatively easy to find seasonal and contract employment with both federal and provincial wildlife agencies, but permanent positions are much more difficult to obtain. Those seeking wildlife management careers would benefit from specialized training offered by some community colleges and universities.

The Canadian private sector offers few ornithological careers. The majority of positions are with environmental consulting companies and non-profit environmental organizations. Opportunities exist, however, for enterprising individuals with fund-raising and administrative skills to create jobs for themselves, within such organizations.

Opportunities to gain experience and to take part in cooperative research are good for beginning ornithologists and amateurs in Canada. Small grants (\$200–\$2000 annually) are available for funding research, with more resources for university students.

For more details on Canadian ornithology, write for the pamphlet "Ornithological Resources in Canada" (published in 1984), available from the Society of Canadian Ornithologists (see Table 1).

Amateur Involvement

Ornithology is one of the few areas of science that has active participation by amateurs. Even if a person does not wish to make a profession of or-

Ernst Mayr, Glen Woolfenden, and John Fitzpatrick with Scrub Jays and predator Indigo Snake. Photograph/Fred E. Lohrer.

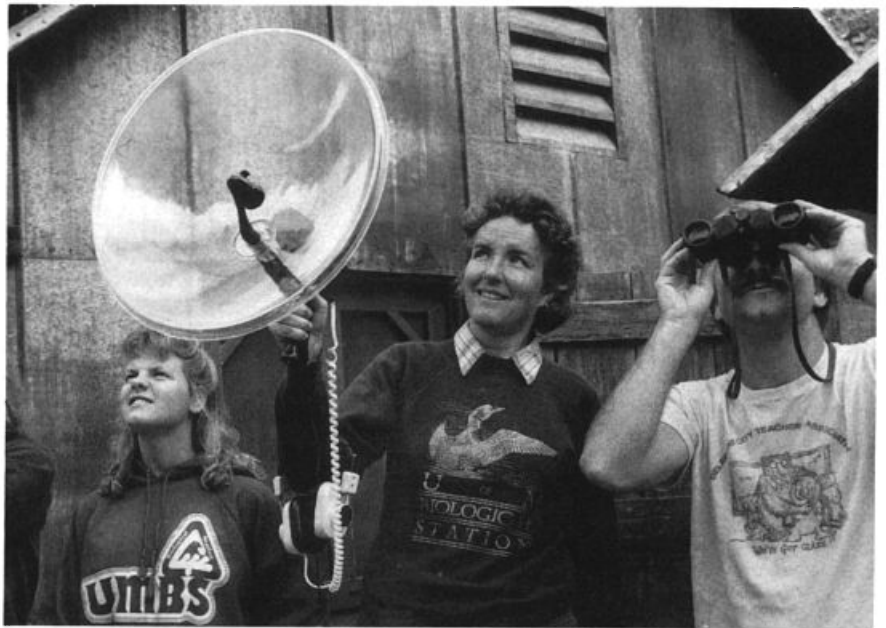


nithology, the opportunity exists to make significant contributions at a variety of levels, from participation in data-gathering for cooperative research projects to publishing one's own research. Cooperative projects range from the annual National Audubon Society's Christmas Bird Count to such projects as breeding bird atlases, or banding and nesting studies of particular species. Knowledgeable amateurs with blocks of time, from a week to a year or more, can usually participate in research at North America's major bird observatories, or as assistants to academic and government research projects.

Bird observatories offer important opportunities in research and education. The oldest is the Long Point Bird Observatory (P. O. Box 160, Port Rowan, Ontario, Canada NOE 1M0), and the two largest are the Point Reyes Bird Observatory (4990 Shoreline Highway, Stinson Beach, California 94970) and the Manomet Bird Observatory (Box "O," Manomet, MA 02345). Both the latter observatories employ about 25 full-time staff, plus many part-time volunteers and interns. The Cornell Laboratory of Ornithology (Sapsucker Woods Road, Ithaca, NY 14850) combines field and university programs with particular attention to amateur interests in ornithology. The Hawk Mountain Sanctuary Association emphasizes education, but also has a program on research and conservation policy (Route 2, Kempton, PA 19529). The Cape May Bird Observatory (Cape May Point, NJ 08212) is operated by the New Jersey Audubon Society. These organizations conduct a wide variety of work, including education at various levels, and research on land birds, shore birds, marine birds, and mammals. Most positions are filled from the ranks of volunteers and part-time, seasonal personnel. Observatories are excellent places to gain experience and contacts for future jobs, and to determine if field ornithology is of interest to you.

The American Ornithologists' Union

The American Ornithologists' Union is the oldest and largest professional ornithological society in the Western Hemisphere. Its membership represents interests in all aspects of avian biology, and includes profes-



Instructor with class of future ornithologists at University of Michigan. Photograph/ University of Michigan Biology Station.

sionals and amateurs dedicated to its aim—the advancement of ornithological science. The membership has grown from 23 Founders in 1883 to nearly 5,000 members at present. Members receive *The Auk*, a quarterly journal now past its 100th year of publication, which contains more than 800 pages yearly. Its primary objective is to publish the results of original studies of birds, but it also includes reviews of major new ornithological works, abstracts of recent periodical literature, ornithological news, reports and announcements of the Union, and biographical information.

The Annual Meeting of the American Ornithologists' Union usually takes place in late summer or early fall. 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, write to the American Ornithologists' Union, Department of Ornithology, National Museum of Natural History, Washington, D.C. 20560.

Sources of additional information

American Institute of Biological Sciences, 1401 Wilson Blvd., Arling-

ton, VA 22209

Careers in Wildlife Conservation, The Wildlife Society, 5410 Grosvenor Lane, Bethesda, MD 20814

Employment Opportunities in the U.S. Fish and Wildlife Service, Department of the Interior, Washington, DC 20240

Careers in Ecology, Ecological Society of America, Center for Environmental Studies, Arizona State University, Tempe, AZ 85287

Careers in Animal Biology, American Society of Zoologists, % Mrs. Mary Wiley, Business Manager, Box 2739, California Lutheran College, Thousand Oaks, CA 91360

Careers in Biological Systematics, Society of Systematic Zoology, % National Museum of Natural History, 10th and Constitution N.W., Washington, DC 20560

Careers in the United States Department of Interior, Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

¹ A committee consisting of E. H. Dunn, C. J. Ralph, C. van Riper III, K. G. Smith, and D. S. Wood prepared this report in 1988. F. B. Gill served as editor. Copies are available upon request to the American Ornithologists' Union, % Smithsonian Institution, Washington D.C. 20560.