

NATIONAL ACADEMY OF SCIENCES

ALDO STARKER LEOPOLD

*1913—1983*

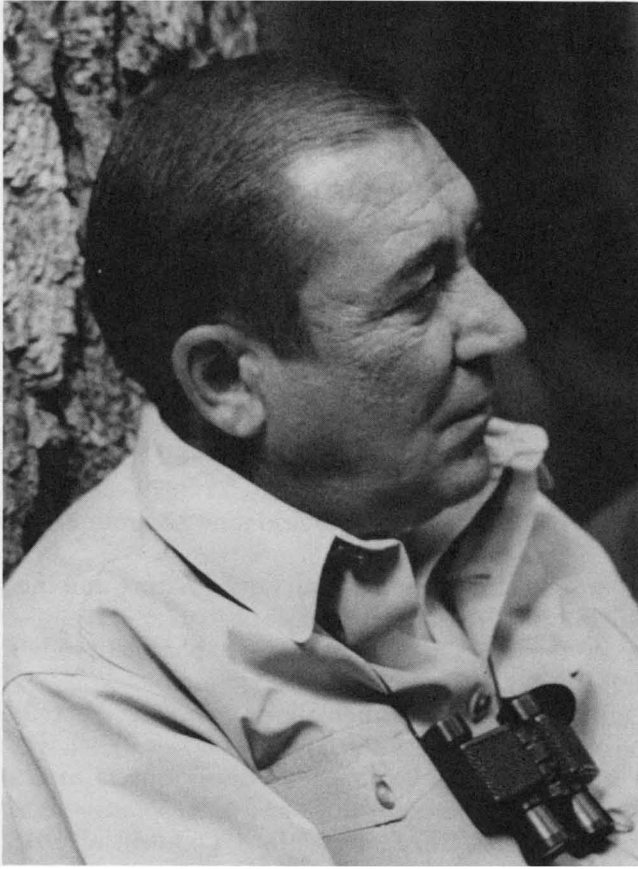
---

*A Biographical Memoir by*  
ROBERT A. MCCABE

*Any opinions expressed in this memoir are those of the author(s)  
and do not necessarily reflect the views of the  
National Academy of Sciences.*

*Biographical Memoir*

COPYRIGHT 1990  
NATIONAL ACADEMY OF SCIENCES  
WASHINGTON D.C.



Courtesy, A. Starker Leopold

*A. Starker Leopold*

## ALDO STARKER LEOPOLD

*October 22, 1913–August 23, 1983*

BY ROBERT A. McCABE

WHEN A CREATIVE, innovative, talented, and intelligent colleague dies, we mourn his loss and honor his accomplishments in print, and doing so honor him no less than did the ancient Egyptians who carved pictures of their noble dead on the walls of tombs. Such a colleague was A. Starker Leopold, who died of a heart attack in his home in Berkeley, California, on August 23, 1983.

A. Starker Leopold was born in Burlington, Iowa, on October 22, 1913, the oldest son of Aldo Leopold and Estella Bergere Leopold. Both his father and grandfather were outdoorsmen in the tradition of the early Midwest, and Starker in his turn was schooled in natural history and imbued with a sense of responsibility for the wild and free.

While he was still a young boy, the family moved to Madison, Wisconsin, where Starker grew up. In 1936 he graduated from the University of Wisconsin with a B.S. degree in agriculture and went on to Yale, then to the University of California at Berkeley for graduate study. In 1944 he received his Ph.D. from Berkeley, where the eminent ornithologist Alden H. Miller guided his zoological studies. His doctoral thesis, *The Nature of Heritable Wildness in Turkeys*, was perhaps the first attempt to address the subject of wildness in birds.

“The objectives of the study have been to determine insofar as possible the fundamental, heritable differences between wild and domestic turkeys and to compare the ecological relationships and general productivity of existing turkey populations which differ in degree of ‘wildness.’ The problem is of practical importance in wild turkey management because the intermixing of the domestic strain with wild populations has had certain adverse effects upon the hardiness of the native turkeys of Missouri. It is of theoretical importance in offering an opportunity better to understand the nature of wildness in a locally adapted, indigenous race of birds.” (1945,1, p.133)

Leopold’s results were commensurate with these stated objectives, and his paper, with its insights into the biology and behavior of turkeys, stands as a major contribution to the understanding of avian wildness.

Though Starker Leopold functioned well as a lone scientist dealing with an ecological problem, he was also an excellent team worker. He listened to and understood the opinions of others, appreciated skills he himself did not possess, and was tolerant of the shortcomings of his associates. In 1952 he teamed with an ecologist who had few (if any) shortcomings: F. Fraser (Frank) Darling, then of the University of Edinburgh. The two undertook an ecological reconnaissance of Alaska to assess the current and potential impact of economic growth and technology on the natural resources of that territory, with particular reference to big game. Together they spent four months traveling, observing, and conducting interviews sponsored by the New York Zoological Society and the Conservation Foundation. Their efforts resulted in a clear, concise book unencumbered by jargon:

“At the outset we stated that ideally a program of conservation and of land use should be devised before a new country is developed. Unfortunately the motive for conservation usually is impending shortage, which leads us to trim the resource boat after it is half full of water. But in Alaska, despite some buffeting about, the land resources are still largely intact, and what is more, they are still in government rather than private hands. The prob-

lem of planning and executing the best possible development of the Territory is therefore squarely up to the government.

“ . . . [if] mechanical and administrative difficulties can be overcome, we visualize an unusual opportunity for application of the principles of conservation to a fascinating and magnificent stretch of country.” (1953,7, pp. 114–115)

It is difficult to evaluate the impact of that report on a state that has had more reports on its welfare and its resources than any other, but what could be said was perhaps best stated by Fairfield Osborn:

“We could not have been more fortunate in the selection of the reconnaissance team for this study. Two eminent naturalists, one from the Old World and one from the New, have pooled their knowledge and experience to produce this report. On behalf of the two sponsoring organizations, it is a deep pleasure to commend and thank Dr. A. Starker Leopold and Dr. F. Fraser Darling for their accomplishment.” (1953,7, Foreword)

Realizing the plight of our natural resources, S. Udall sought to achieve adequate stewardship of the land through science and education. He called on Starker Leopold to chair the Department of Interior Advisory Board on Wildlife Management.<sup>1</sup> Leopold's Board first addressed the problem of wildlife management in the national parks, examining goals, policies, and methods of national wildlife management:

“The goal of managing the national parks and monuments should be to preserve, or where necessary to recreate, the ecological scene as viewed by the first European visitors. As part of this scene, native species of wild animals should be present in maximum variety and reasonable abundance. Protection alone, which has been the core of Park Service wildlife policy, is not adequate to achieve this goal. Habitat manipulation is helpful and often essential to restore or maintain animal numbers. Likewise, populations of the animals themselves must sometimes be regulated to prevent habitat damage; this is especially true of ungulates.” (1963,1, p. 43)

<sup>1</sup> Stewart L. Udall, *The Quiet Crisis* (New York: Holt, Rinehart and Winston, 1953), p. 209.

Ungulate excess within the National Parks became a core issue, exciting the hunting public, but the Committee concluded that:

“Direct removal by killing is the most economical and effective way of regulating ungulates within a park. Game removal by shooting should be conducted under the complete jurisdiction of qualified park personnel and solely for the purpose of reducing animals to preserve park values. Recreational hunting is an inappropriate and nonconforming use of the national parks and monuments.” (1963,1, p. 43)

This forthright position in the face of opposition was a cornerstone in National Park programs for wildlife management.

The Advisory Board then investigated unnecessary destruction of animals by the Branch of Predator and Rodent Control of the United States Fish and Wildlife Service “. . . augmented by state, county, and individual endeavor,” and recommended:

“. . . a complete reassessment of the goals, policies, and field operations of the Branch of Predator and Rodent Control with a view to limiting the killing program strictly to cases of proven need, as determined by rigidly prescribed criteria.” (1964,1, p. 47)

The Board’s report was—and still is—the most penetrating assessment of United States government control of animals, and it put the responsibility for correcting the unwarranted destruction of animals on the Fish and Wildlife Service. Its appearance was followed by a series of rebuttals and explanations in defense of existing programs, but changes also resulted.

Finally, the Board Leopold chaired evaluated the National Wildlife Refuge System to “appraise the significance of the national refuges in migratory bird conservation, with emphasis on waterfowl.” Their report recommended the establishment of eleven more refuges, better financial support for

existing refuges, and detailed long-range and multiple-use planning. Perhaps the most significant recommendation was that:

“National wildlife refuges should be extensively used for research and teaching by qualified scientists and naturalists. In many localities refuges are the only land units devoted solely to wildlife preservation, and thus offer unique possibilities for continuous research and ecologic education.” (1968,4, p. 52)

The Advisory Board's evaluations of wildlife management—or, as they are universally known, the “Leopold Reports”—are outstanding for their concision and depth of understanding. Though not everything they recommended came to fruition, the reports themselves are benchmarks in national conservation. Written with Riney, McCain, and Tevis, Leopold's ecological evaluation of the California jawbone deer herd (1951,2) was another significant contribution to the assessment of our natural resources. Though now nearly forty years old, both the data and narrative portions of this bulletin could serve as patterns for modern big game investigations.

In 1961 Leopold produced a book on the desert for TIME-LIFE's Life Nature Library series (1961,1), a testimony to his intellectual versatility. In keeping with the format of that series he traced the work of wind and water as well as the ecology of men and animals living in the arid environments of the world. His chapters six, “Life Patterns in Arid Lands,” and seven, “Man Against Desert,” are particularly enlightening.

But Starker Leopold's *magnum opus* was his survey, *Wildlife of Mexico: The Game Birds and Mammals* (1959,3). A skilled and astute field scientist, he began fieldwork for this impressive work in 1944 and ended it only with the book's publication in 1959. He followed up an initial two years in the field with

a variety of short trips, and in the summer of 1948 I accompanied him on one of these expeditions. Little escaped Starker's attention, as he recorded all facets of the ecology and natural history of his fifty-one camp study sites extending from the northern Sonorán border to the Yucatán. His fluent Spanish helped him in getting both official sanction from *comisarios* (officials) and guidance and information from landowners and *campesinos* (farmers).

Well written, easy to understand, and vital to Latin American conservationists, *Wildlife of Mexico* won the Wildlife Society's 1959 publication of the year award. As one reviewer aptly put it:

"This publication is not only indispensable to any serious student of Mexican game birds and mammals, but it is also a guide to all thinking Mexican citizens who are interested in managing a valuable resource through wise use. It sets a pattern that other Latin American countries might well strive to emulate."<sup>2</sup>

In order that it could be used in Latin America, Leopold's book was translated into Spanish in 1965 by Luis Macias Arellano and Ambrosio Gonzales Cortes. It is a landmark publication for conservation in Mexico and Latin America.

In 1979, Leopold again won the Wildlife Society's publication award for his book on the California quail (1977,1). One of the finest monographs on single species in the field of wildlife ecology, it contains not only insights into the ecology and life history of the species but also exemplary suggestions for the management of western quails.

On his last hardcover book, Leopold collaborated with Gutierrez and Bronson to provide information on the life histories of 135 game species of the United States, Canada, and northern Mexico. An encyclopedic assessment of species

<sup>2</sup> William B. Davis, review of *Wildlife in Mexico*, *Journal of Wildlife Management* 24,4(1960):446.



that are hunted or trapped, *North American Game Birds and Mammals* (1981,1) is a valuable and accessible source of information for wildlife students and administrators.

Choosing the right hypothesis to test and the tool most likely to solve a problem is an art. Starker Leopold's investigative choices were inspired, and he applied himself untiringly to follow them through to make worthy contributions to science. Excelling as a field ecologist, he was not parochial and in the field often found time to collect and prepare museum specimens for colleagues interested in classification and evolution. Nor did he limit himself to any particular species or group, as his many and varied published papers amply testify.

Though dedicated, he did not sacrifice everything to his science. Throughout his life he divided his time among work, family, and hobbies (particularly hunting and fishing) and managed to do justice to all.

Starker was a quiet and dignified man who was always neat and well groomed. He was jovial and fun loving without being boisterous. He was at ease among friends, with strangers, or on a lecture platform. Polite and well mannered, he gave special consideration to others.

He had friends in all walks of life—from a member of the President's cabinet to a Mexican farmer eking out a living on the mountain slopes of Hidalgo and a shepherd in the Australian outback.

He also came from a remarkable family, and both his brother, Luna, and his sister, Estella, were elected to membership in the Academy—a unique occurrence in the Academy's history. Although his father, Aldo Leopold, was a leader of considerable prominence in the field of wildlife ecology, Starker did not seek to trade on his father's name. Earning his own achievements and honors, he yet benefitted considerably from the education he received from his father,

and both men held to the credo that "good land use is good wildlife management." Today we know that good land use is imperative for the salvation of civilization itself.

Starker's wife, Elizabeth Weiskotten Leopold, and his children, Frederic S. and Sarah Leopold, survive him.

Ecologists and wildlife scientists universally—and particularly his fellow members of the National Academy—honored Starker Leopold, the kind of scientist who enhances the credibility of science. We all share in the loss of this outstanding colleague.

## PROFESSIONAL AND PUBLIC SERVICE

- 1972–1975 Marine Mammal Commission, appointed by the President
- 1970 Board of Ecology Team Consultant for U.S. Plywood-Champion Papers, Inc.
- 1970 Consultant on Research Policy, Tanzania National Parks
- 1969–1970 Chairman, Committee to Appraise the Program of the Missouri Conservation Commission
- 1969 Advisory Committee, Lawrence Hall of Science
- 1968–1972 Chief Scientist and Chairman, Advisory Committee, National Park Service
- 1968 Knapp Professorship, University of Wisconsin
- 1967–1983 Board of Advisors, National Wildlife Federation
- 1965–1969 Consultant, California Water Quality Control Board
- 1964 President, Board of Governors, Cooper Ornithological Society
- 1964 Advisory Trustee, Alta Bates Hospital Association
- 1962–1968 Chairman, Wildlife Management Advisory Committee, appointed by Secretary of the Interior Stewart L. Udall
- 1960 President, Northern Division, Cooper Ornithological Society
- 1959–1966 President, California Academy of Sciences
- 1957–1958 President, Wildlife Society
- 1956–1983 Member of Science Council and Board of Trustees, California Academy of Sciences
- 1955–1960 Vice President and Member of the Board of Directors, Sierra Club
- 1955–1959 Editorial Board, Sierra Club *Bulletin*
- 1954–1957 Council Member, Wilderness Society
- 1954–1956 Board of Governors, Nature Conservancy
- 1948–1966 Editorial Board, *Pacific Discovery*

## HONORS AND DISTINCTIONS

- 1947 Guggenheim Fellow
- 1959 Fellow, American Ornithologists' Union
- 1959 Wildlife Society Publication Award
- 1964 Department of Interior Conservation Award
- 1965 Aldo Leopold Medal of the Wildlife Society
- 1966 Audubon Society Medal
- 1969 Honorary Member, the Wildlife Society
- 1970 Member, National Academy of Sciences
- 1970 California Academy of Sciences Fellows Medal
- 1974 Winchester Award for Outstanding Accomplishment in Professional Wildlife Management
- 1978 Berkeley Citation, University of California
- 1979 Wildlife Society Publication Award
- 1980 American Institute of Biological Sciences, Distinguished Service Award
- 1980 Occidental College, Honorary Doctoral Degree
- 1980 Edward W. Browning Award for Conserving the Environment, Smithsonian Institution and the New York Community Trust

## SELECTED BIBLIOGRAPHY

1939

Age determination in quail. *J. Wildl. Manage.*, 3:261-65.

1941

Woven wire and the wild turkey. *Missouri Conserv.*, 3:5.

Report on the management of the Caney Mountain Turkey Refuge. Jefferson City: Missouri Conserv. Commiss. (mimeographed report). 19 pp.

1943

Results of wild turkey management at Caney Mountain Refuge, 1940 to 1943. Jefferson City: Missouri Conserv. Commiss. (mimeographed report). 13 pp.

With P. D. Dalke. The 1942 status of wild turkeys in Missouri. *J. Forest.*, 41:428-35.

The molts of young wild and domestic turkeys. *Condor*, 45:133-45.

Conservation of game. Address to Symposium on Science in Conservation During War Times. *Trans. Acad. Sci. St. Louis*, 31:63-67.

Autumn feeding and flocking habits of the mourning dove in southern Missouri. *Wilson Bull.*, 55:151-54.

1944

Cooper's hawk observed catching a bat. *Wilson Bull.*, 56:116.

The nature of heritable wildness in turkeys. *Condor*, 46:133-97.

With M. Leopoldo Hernandez. Los recursos biologicos de guerrero con referencia especial a los mamiferos y aves de caza. Anuario comisión impulsora y coordinadora de la investigación científica (año 1944), Mexico, D.F., pp. 361-90.

1945

Sex and age ratios among bobwhite quail in southern Missouri. *J. Wildl. Manage.*, 9:30-34.

With E. R. Hall. Some mammals of Ozark County, Missouri. *J. Mammal.*, 26:142-45.

1946

Clark's Nutcracker in Nuevo León, Mexico. *Condor*, 48:278.

1947

With David L. Spencer and Paul D. Dalke. The ecology and management of the wild turkey in Missouri. *Tech. Bull. 1* (1946). Jefferson City: Conservation Commission, Federal Aid to Wildlife Program, State of Missouri, pp. 1-86.

Status of Mexican big-game herds. *Trans. 12th N. Am. Wildl. Conf.*, Washington, D.C.: Wildl. Mngmt. Inst., pp. 437-48.

1948

The threat to our western ranges. *Pac. Discovery*, 1:28-29.

With William Longhurst. Deer damage in the Capay Valley. Report to the California Fish and Game Commission (mimeographed). 4 pp.

Clear Water. *Pac. Discovery*, 1:21-23.

Reviews of William H. Carr, *Desert Parade: A Guide to South-Western Desert Plants and Wildlife*; and E. F. Adolph et al., *Physiology of Man in the Desert*. *Living Wilderness*, 26:21-22.

The wild turkeys of Mexico. *Trans. 13th N. Am. Wildl. Conf.*, Washington, D.C.: Wildl. Mngmt. Inst., pp. 393-400.

With Randal McCain and William M. Longhurst. Preliminary report on the problems of deer management in California. Report to the Calif. Fish and Game Commission (mimeographed). 16 pp.

Of time and survival. *Pac. Discovery*, 1:28-29.

1949

Adiós, Gavilán. *Pac. Discovery*, 2:4-13.

Review of Trippensee, *Wildlife Management of Upland Game and General Principles*. *Calif. Fish Game*, 35:205-6.

1950

The pheasant kill on the Conaway Ranch—1947-48, Univ. of Calif. Berkeley Mus. Vert. Zool. (mimeographed), 14 pp.

Reviews of Henry E. Davis, *The American Wild Turkey*; and Robert J. Wheeler, *The Wild Turkey in Alabama*. *Bird-Banding*, 21:83-84.

- Deer in relation to plant succession. Trans. 15th N. Am. Wildl. Conf., Washington, D.C.: Wildl. Mngmt. Inst., pp. 571-80.  
 Vegetation zones in Mexico. J. Ecol. Soc. Am., 31:507-18.

## 1951

- Review of Richard H. Pough, *Audubon Water Bird Guide*. Pac. Discovery, 4:32.  
 With T. Riney, R. McCain, and L. Tevis, Jr. The jawbone deer herd. California Division of Fish and Game, Dept. of Natl. Res. and Mus. Vert. Zool., Univ. of Calif., Berkeley. Game Bull. 4, 139 pp.  
*Game Birds and Mammals of California: A Laboratory Syllabus*. Berkeley: California Book Co., 125 pp.  
 Review of Helmut K. Buechner, *Life History, Ecology, and Range Use of the Pronghorn Antelope in Trans-Pecos, Texas*. J. Wildl. Manage., 15:322-23.  
 With R. A. McCabe. Breeding season of the Sonora white-tailed deer. J. Wildl. Manage., 15:433-34.  
 Review of Ira N. Gabrielson, *Wildlife Management*. J. Wildl. Manage., 15:422-23.

## 1952

- With W. M. Longhurst and R. F. Dasmann. *A Survey of California Deer Herds, Their Ranges and Management Problems*. State of California, Division of Fish and Game. Game Bull. 6, 136 pp.  
 Ecological aspects of deer production on forest lands. In: Proc. 1949 U.N. Sci. Conf. Conserv. and Utiliza. Resour. U.N. Dept. Economic Affairs, Wildlife and Fish Resources, 7:205-7.  
 With F. F. Darling. What's happening in Alaska. Anim. Kingdom, 55:170-74.

## 1953

- With R. H. Smith. Numbers and winter distribution of Pacific black brant in North America. Calif. Fish and Game, 29:95-101.  
 Intestinal morphology of gallinaceous birds in relation to food habits. J. Wildl. Manage., 17:197-203.  
 Zonas de vegetación en Mexico. Bol. Soc. Mex. Geog. Estadist., 78:55-74.  
 Report of the Committee on Research Needs. J. Wildl. Manage., 17:361-65.

With F. F. Darling. Effects of land use on moose and caribou in Alaska. Trans. 18th N. Am. Wildl. Conf., Washington, D.C.: Wildl. Mngmt. Inst., pp. 553–62.

Too many deer. *Sierra Club Bull.*, 38:51–57.

With F. F. Darling. *Wildlife in Alaska: An Ecological Reconnaissance*. New York: Ronald Press Co. 129 pp.

What does conservation mean today? *Pac. Discovery*, 7:1–2.

## 1954

Review of Durward L. Allen, *Our Wildlife Legacy*. *Sat. Rev.*, 23:55–56.

Can we keep our outdoor areas? *Audubon*, 56:148–51, 179.

Review of William F. Schulz, Jr., *Conservation Law and Administration*. *Pac. Discovery*, 7:29.

The predator in wildlife management. *Sierra Club Bull.*, 39:34–38.

Dichotomous forking in the antlers of white-tailed deer. *J. Mammal.*, 35:599–600.

Natural resources—whose responsibility? Trans. 19th N. Am. Wildl. Conf., pp. 589–98.

Preserving the qualitative aspects of hunting and fishing. *Conserv. News*, 19:1–5.

## 1955

The conservation of wildlife. In: *A Century of Progress in the Natural Sciences*, San Francisco: California Academy of Sciences. Centennial volume, pp. 795–806.

## 1956

Foreword. In: *Arctic Wilderness*, by Robert Marshall. Berkeley: University of California Press. 171 pp.

## 1957

Public and private game management—we need both. *Calif. Farmer*, 206:12–13.

With R. A. McCabe. Natural history of the Montezuma quail in Mexico. *Condor*, 59:3–26.

Deer management or deer politics? *Cent. Calif. Sportsman*, 17:24–26.

Arctic spring. *Sierra Club Bull.*, 42:17–18.



Wilderness and culture. *Sierra Club Bull.*, 42:33-37.

1958

Review, ed. W. L. Thomas, Jr., *Man's Role in Changing the Face of the Earth*. Calif. Vector Views, 5:48-49.

Situación del oso plateado en Chihuahua. *Rev. Soc. Mex. Hist. Nat.*, 19:1-4.

1959

The range of the jaguar in Mexico. Excavation at La Venta Tabasco. Appendix 5, pp. 290-91.

Big game management. Survey of Fish and Game Problems in Nevada, *Bull.* 36, pp. 85-99.

*Wildlife of Mexico: The Game Birds and Mammals*. Berkeley: University of California Press. 568 pp.

1960

Save our remaining wilderness. *Pac. Discovery*, 13:1-2.

Lois Crisler, chasseur d'images en Alaska. *Flammes*, 95:10-12.

Biogeography. In: *McGraw-Hill Encyclopedia of Science and Technology*. New York: McGraw-Hill Book Co., pp. 204-7.

1961

*The Desert*. New York: TIME, Inc. 192 pp.

1963

With S. A. Cain, C. Cottam, I. N. Gabrielson, and T. L. Kimball. Wildlife management in the national parks. Report of the Advisory Board on Wildlife Management. Trans. 28th N. Am. Wildl. Nat. Resour. Conf., Washington, D.C.: Wildl. Mngmt. Inst., pp. 28-45.

1964

With S. A. Cain, C. M. Cottam, I. N. Gabrielson, and T. L. Kimball. Predator and rodent control in the United States. Trans. 29th N. Am. Wildl. Nat. Resour. Conf., Washington, D.C.: Wildl. Mngmt. Inst., pp. 27-49.

Mexico and migratory waterfowl conservation. In: *Waterfowl Tomorrow*, ed. Joseph P. Linduska. (Translated from Spanish

through the courtesy of the Mexican Embassy, Washington, D. C.) Washington, D.C.: U.S. Dept. Int., pp. 729–36.

## 1965

- Harrier observed catching a fairy tern in Tahiti. *Condor*, 67:91.
- Wildlands in our civilization. In: *Wilderness and Culture*. San Francisco: Sierra Club Publ., pp. 81–85.
- Fauna Silvestre de Mexico*. Mexico City: Ediciones del Instituto Mexicano de Recursos Naturales Renovables. 608 pp.

## 1966

- Effects of Rampart Dam on wildlife resources. In: *Rampart Dam and the Economic Development of Alaska*, Ann Arbor: Univ. of Michigan School of Natural Resources, p. 12.
- With J. W. Leonard. Alaska Dam would be resources disaster. *Audubon*, 68:176–79.
- With J. W. Leonard. Effects of the proposed Rampart Dam on wildlife and fisheries (Alaska's economic Rampart). *Trans. 31st N. Am. Wildl. Nat. Resour. Conf.*, Washington, D.C.: Wildl. Mngmt. Inst., pp. 454–59.
- Adaptability of animals to habitat change. In: *Future Environments of North America*, eds. F. F. Darling and J. P. Milton, Garden City, N.Y.: Natural History Press, pp. 65–75.

## 1967

- With R. E. Jones. Nesting interference in a dense population of wood ducks. *J. Wildl. Manage.*, 31:221–28.
- Quantitative and qualitative values in wildlife management. In: *Natural Resources: Quality and Quantity*, eds. S. V. Ciriacy-Wantrup and J. J. Parsons, Berkeley: University of California Press, pp. 127–36.
- Grizzlies of the Sierra del Nido. *Pac. Discovery*, 20:30–32.

## 1968

- Electric power for Alaska—A problem in land-use planning. *East Afr. Agric. For. J.*, 33:23–26.
- Ecologic objectives in park management. *East Afr. Agric. For. J.*, 33:168–72.
- Optimum utilization of East African range resources. In: *Report of a Symposium on East African Range Problems*, eds. W. M. Long-

hurst and H. F. Heady, Villa Serbelloni, Lake Como, Italy. (Leopold Abstract, p. 81.)

With C. C. Cottam, I. M. Cowan, I. N. Gabrielson, and T. L. Kimball. The National Wildlife Refuge System. Trans. 33rd N. Am. Wildl. Nat. Resour. Conf., Washington, D.C.: Wildl. Mngmt. Inst., pp. 30-54.

The National Wildlife Refuge System. Natl. Wildl., 6:4-9.

## 1970

Weaning grizzly bears: A report on *Ursus arctos horribilis*. Nat. Hist., 79:94-101.

With I. K. Fox and C. H. Callison. Missouri Conservation Program: An appraisal and some suggestions. Mo. Conserv., 31:3-31.

With Herbert L. Mason, et al. *The Scenic, Scientific and Educational Values of the Natural Landscape of California*. Sacramento: California Department of Parks and Recreation. 36 pp.

With T. O. Wolfe. Food habits of wedge-tailed eagles, *Aquila audax*, in south-eastern Australia. CSIRO Wildl. Res., 15:1-17.

*Research policy in the Tanzania National Parks*. Arusha: Tanzania National Parks, 15 pp.

What lies ahead in wildlife conservation. Ed. J. Yoakum, Trans. Calif.-N.W. Sect. Wildl. Soc., Fresno, Jan. 30-31, 1970, pp. 156-60.

## 1971

Editor's foreword. In: *Environmental: Essays on the Planet as a Home*, P. Shepard and D. McKinley. Boston: Houghton Mifflin Co. 308 pp.

Introduction. In: *The Environment, the Establishment, and the Law*, H. Henkin, M. Merta, and J. Staples. Boston: Houghton Mifflin Co. 223 pp.

Biogeography. In: *McGraw-Hill Encyclopedia of Science and Technology*, New York: McGraw-Hill Book Co., pp. 213-16.

*Sagehen Creek Field Station: The First Twenty Years*. Berkeley: University of California Press. 27 pp.

## 1972

Symposium on predator control: Remarks by A. Starker Leopold. Trans. 37th N. Am. Wildl. Nat. Resour. Conf., Washington, D.C.: Wildl. Mngmt Inst., pp. 200-2.

With S. A. Cain, J. A. Kadlec, D. L. Allen, R. A. Cooley, M. G. Hornocker, and F. H. Wagner. *Predator Control—1971. Report of Advisory Committee on Predator Control to Secretary of Interior and Council on Environmental Quality*. Ann Arbor: University of Michigan Institute for Environmental Quality. 207 pp.

The essence of hunting. *Nat. Wild.*, 10:38–40.

With R. H. Barrett. *Implications for Wildlife of the 1968 Juneau Unit Timber Sale*. Berkeley: University of California Press, Department of Forestry and Conservation. 109 pp.

1973

The hunter's role in wildlife conservation. 4th Int. Big Game Hunters' and Fishermen's Conf., San Antonio, Texas, pp. 5–6. Reprinted in *Penn. Game News*, 45(4):16–21.

1974

Needed—A broader base for wildlife administration. Ed., J. Yoakum, Monterey: Trans. Calif.-Nevada Sec., Wildl. Soc., pp. 90–95.

Hunting versus protectionism—The current dilemma. Address to the 1974 National Wildlife Federation Annual Meeting in Denver, pp. 5–10. Reprinted in: *Gun World*, 14(6):50–53.

1975

*Ecosystem Deterioration Under Multiple Use*. Wild Trout Management Symposium, Yellowstone National Park. Denver, Colorado: Trout Unlimited. 103 pp.

1976

With M. Erwin, J. Oh, B. Browning. Phytoestrogens: Adverse effects on reproduction in California quail. *Science*, 191:98–100.

1977

*The California Quail*. Berkeley: University of California Press. 281 pp.

Meditations in a duck blind. *Gray's Sporting J.*, 2:6–10.

1978

Wildlife in a prodigal society. Trans. 43rd N. Am. Wildl. Nat. Resour. Conf., Washington, D.C.: Wildl. Mngmt. Inst., pp. 5–10.

Wildlife and forest practice. In: *Wildlife and America*, ed. H. P. Brokaw, Washington, D.C.: Council on Environmental Quality. 532 pp.

1979

Search for an environmental ethic. Review of Robert Cahn, *Footprints on the Planet*. *Sierra Club Bull.*, 64:58.

1981

With R. J. Gutierrez and M. T. Bronson. *North American Game Birds and Mammals*. New York: Charles Scribner's Sons.