

CURRICULUM VITAE

GORDON HOWELL ORIANIS

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Born: July 10, 1932; EauClaire, Wisconsin

Married: June 25, 1955, to Elizabeth Ann Newton

Children: Carlyn Elizabeth; born May 28, 1957
Kristin Jean; born June 15, 1959
Colin Mark; born January 2, 1962

Education:

Bay View High School, Milwaukee, Wisconsin	9/46-6/49
Monroe High School, Monroe, Wisconsin	9/49-6/50
University of Wisconsin, Madison, Wisconsin (Bachelor of Science in Zoology)	9/50-6/54
University of Oxford, England	9/54-6/55
University of California-Berkeley, California (Ph.D. in Zoology)	9/56-7/60
Dissertation Title: The Ecology of Social Systems in the Red-winged Blackbird (<i>Agelaius phoeniceus</i>) and the Tricolored Blackbird (<i>A. tricolor</i>).	

Scholarships and Assistantships:

U. S. Government Fulbright Fellow, Oxford University	9/54-6/55
National Science Foundation Fellow	7/58-7/60
John Simon Guggenheim Memorial Fellow	9/73-8/74

Employment:

Assistant Professor of Zoology, University of Washington	1960-1964
Associate Professor of Zoology, University of Washington	1964-1968
Professor of Zoology, University of Washington	1968-1995
Director, Institute for Environmental Studies, University of Washington	1976-1986
Professor Emeritus of Biology University of Washington	1995-present

Professional Activities:

American Association for the Advancement of Science
American Institute of Biological Science
American Ornithologists Union
American Society of Naturalists
Animal Behavior Society
Cooper Ornithological Society
Ecological Society of America
Federation of American Scientists
Society for the Study of Evolution

Leadership Positions in Professional Societies:

Past-President, Western Section, Ecological Society of America
Vice-President, Ecological Society of America, 8/75-8/76
Vice-President, American Society of Naturalists, 1987-1988
President, Organization for Tropical Studies, 1988-1994
President Elect, Ecological Society of America, 1993-1995
President, Ecological Society of America, 1995-1996
President, Washington State Academy of Sciences, 2008 - 2010

Editorial Positions:

Editorial Board, *OECOLOGIA*, 1969-1973
Editorial Board, *Behavioral Ecology and Sociobiology*, 1980-1996
Reviewer of manuscripts for *Science*, *American Naturalist*, *Auk*, *Condor*, *Evolution*,
Canadian Journal of Zoology, *Animal Behavior*
Editorial Board, *Science*, 1986-1989
Editor-in-chief, *Northwest Environmental Journal*, 1984-1993
Editorial Board, *Trends in Ecology and Evolution*, 1988-1993
Editorial Board, *Biodiversity and Conservation*, 1992-present
Editorial Board, *Proceedings of the National Academy of Sciences*, 2004-2008

Other Professional Activities:

Washington State Department of Ecology - charter member of the Washington State Ecological Commission, 1970-1975. The only professional ecologist on the Commission. Wrote first policy statement for the Commission.

Washington State Department of Game - helped found the Nongame Wildlife Advisory Board to the Director, 1979; served as the first Chairman of the Board (1979 - 1981); continued to serve as a member of the Board until 1985.

American Ornithologists' Union - member of the Condor Advisory Committee which has provided scientific review and oversight for the Condor Recovery Program.

U. S. Environmental Protection Agency - charter member of the Ecology Advisory Committee (EAC) of the Science Advisory Board, 11/74-11/75; Chairman of EAC and member of the Executive committee of the Science Advisory Board, 11/76-11/79.

National Academy of Sciences - National Research Council - Member, Assembly of Life Sciences (now Commission on Life Sciences), 1/77-6/83.

Member, Board on Environmental Studies and Toxicology (BEST), 1991 - present. Chair, 1997-2003.

Member of the Committee, chaired by Peter H. Raven, Missouri Botanical Garden, on "Research Priorities in Tropical Biology".

Committee on Applications of Ecology Theory to Environmental Problems, Chairman, 3/83 - 3/86. This committee prepared two publications on the applications of ecological theory, concepts and knowledge to a variety of environmental problems. One book, entitled Ecological Knowledge and Environmental Problem Solving: Concepts and Case Studies was published in March, 1986. The second, dealing with the pervasive problem of cumulative environmental effects, was published later in the spring of 1986, in cooperation with the Canadian Environmental Assessment Research Council.

Member, NRC Committee on Environmental Research, 1991-1993.

Member, NRC Committee on the Formation of The National Biological Survey, 1993.

Chair, NRC Committee on Wolf and Bear Control in Alaska, 1995-97,

Chair, NRC Committee on Cumulative effects of Oil and Gas Exploration on Alaska's North Slope, 2000 - 2002

World Wildlife Fund, USA - member. Board of Directors, 1979 - 2004; Emeritus Member, 2004 - present

Organization for Tropical Studies - President, 1988-1994.

Organization for Tropical Studies - Member, Board of Visitors, 1995 - 2003

Member, Forestry Advisory Committee, Faculty of Forestry, University of British Columbia, 1992 - 2001.

Member, Smithsonian Council, 1994 - 1997.

Member, Advisory Board, Institute of Environmental Studies, University of Zimbabwe, 1995-1999

Member, Advisory Board, Brainerd Foundation, Seattle, 1998-2007

Member, Board of Trustees, Washington State Chapter of the Nature Conservancy, 2005-2012

Member, Advisory Board, Audubon Alaska, 2008 - present

International Scientific Activities:

UNESCO - served as Team Leader for Chapter 6, Animal Palaeography and Autecology, for the 1978 report Tropical Forest Ecosystems. A State of Knowledge Report. Published jointly by UNESCO-UNEP, and FAO.

Viet Nam - March 1969. Investigated ecological effects of the war, particularly of the herbicide spraying. Wrote papers and chapters of books on this work.

Japan - Research during the spring of 1979. Lectured on ecology at Kyoto University and Nagoya University at that time and again at Nagoya University in September, 1982.

Kenya - Research during the autumn of 1978 and winter of 1982. Lectured on behavioral ecology at the University of Nairobi.

Zimbabwe - Two visits in 1996 to assist development of UZ Institute for Environmental Studies.

Sweden - Lectured for a week in a graduate course in behavioral ecology organized by the Nordic Council for students throughout Scandinavia, Solbaka Conference Center, September, 1984. Advisor to MISTRA, the largest Swedish environmental foundation, 2003-2008.

Norway - Member, Science Advisory Board, Center of Excellence, University of Oslo, 2007 - 2009

Finland - Member of International Review Committee, University of Helsinki, August 1994.

Australia - Jock Marshall Visiting Professor, Department of Zoology, Monash University, Melbourne, September - October, 1987.

Latin America and Spain: have lectured (in Spanish) on ecological and environmental topics in many different countries:

University of Puerto Rico, Rio Piedras, P. R., April 1969 (two weeks of lecturing).

Instituto Venezolano de Investigaciones Científicas, Caracas, Venezuela. Have lectured in graduate ecology courses twice.

Universidad de los Andes, Mérida, Venezuela. Have lectured twice for two weeks each in graduate ecology courses, 1981, 1985.

Universidad Nacional Autónoma de México, México City.

Universidad Católica de Chile, Santiago, Chile. Lectured and participated in a workshop on uses of ecological information for management of renewable resources. Also lectured on behavioral ecology at the annual reunion of Chilean biologists at Vina del Mar.

Universidad de Río de Janeiro, Brasil. Lectured on behavioral ecology, September, 1973.

Universidad Nacional de Córdoba, Córdoba, Argentina. Delivered an intensive two-week advanced ecology course to 26 Argentine graduate students, selected country-wide, October 1975.

Universidad Centroamericana, Managua, Nicaragua. Lectured on tropical ecology, March, 1986.

Universidad de Barcelona, Barcelona, Spain. Lectured on behavioral ecology and met with graduate students, April, 1981.

Universidad de Buenos Aires, April 1997. Gave plenary lecture at annual meeting of the Argentine Ecological Society.

Universidad de Granada, September 2000. Gave plenary lecture at the Biennial Congreso Ibero-Americano de Etología.

Awards:

Brewster Award, American Ornithologists' Union, 1976.

Elected Foreign Member, Royal Netherlands Academy of Arts and Sciences, 1983.

Elected to the National Academy of Sciences, 1989.

Elected to the American Academy of Arts and Sciences, 1990.

Distinguished Service Award, American Institute of Biological Sciences, 1995.

Eminent Ecologists Award, Ecological Society of America, 1998.

Scientist Award, National Wildlife Federation, 2004.

PUBLICATIONS:

Arranged by major topical categories. Books are marked *.

Behavioral Ecology:

- This has been the most intensive area of my research concentration. My efforts have been directed primarily toward problems of habitat selection, mate selection and mating systems, selection of prey and foraging patches (foraging theory), and the relationships between ecology and social organization. The primary subjects of the study have been blackbirds of the Family Icteridae, a group of birds noted for the diversity of their social systems. My publications include theoretical papers as well as tests of theories carried out by means of experimental manipulations and comparative analyses of interspecific patterns. These studies have also stimulated some of my efforts in other areas, as will be indicated subsequently.
1961. Orians, G. H. Social stimulation within blackbird colonies. *Condor* 63:330-337.
1961. Orians, G. H. The ecology of blackbird (*Agelaius*) social systems. *Ecological Monographs* 31:285-312.
1962. Orians, G. H. Natural selection and ecological theory. *American Naturalist* 96:257-263.
1963. Orians, G. H., and M. F. Willson. Comparative ecology of Red-winged and Yellow-headed blackbirds during the breeding season. *Proceedings of the Sixteenth International Congress of Zoology* 3:342-346.
1963. Orians, G. H. and G. Collier. Competition and blackbird social systems. *Evolution* 17:449-459.
1964. Orians, G. H. and M. F. Willson. Interspecific territories of birds. *Ecology* 45:736-745.
1964. King, C. E. and G. H. Orians. Shell selection and invasion rates of some pacific hermit crabs. *Pacific Science* 18:297-306.
1965. Hamilton, W. J., III and G. H. Orians. The evolution of brood parasitism in altricial birds. *Condor* 67:361-382.
1966. Orians, G. J. Food of nestling Yellow-headed Blackbirds in the Caribou Parklands, British Columbia. *Condor* 68:321-327.
1969. Orians, G. H. Age and hunting success in the Brown Pelican (*Pelecanus occidentalis*). *Animal Behavior* 17:316-319.
1969. Orians, G. H. On the evolution of mating systems in birds and mammals. *American Naturalist* 103:589-603. (Has been reprinted in two collections of readings in behavioral ecology.)
1970. Brown, J. L. and G. H. Orians. Spacing patterns in mobile animals. *Annual Review of Ecology & Systematics* 1:513-546. New York Academic Press.
1972. Orians, G. H. The strategy of the niche. In: *Marvels of Animal Behavior*, National Geographic Society, Washington, D. C. pp.169-188.

- *1973. Charnov, E. L. and G. H. Orians. *Optimal Foraging: some Theoretical Explorations*. 160 pp. Department of Biology, University of Utah.
1974. Orians, G. H. Discussion of ecoethological aspects of reproduction. In: *Breeding Biology of Birds*, national Academy of Sciences, Washington, D. C. pp.27-29.
1976. Charnov, E. L., G. H. Orians and K. Hyatt. Ecological implications of resource depression. *American Naturalist* 110:247-259.
1977. Orians, G. H., C. E. Orians and K. J. Orians. Helpers at the nest in some Argentine blackbirds. In: Stonehouse and C. Perrins (eds.). *Evolutionary Ecology*. pp.137-151. Macmillan.
1977. Orians, G. H., L. Erckmann, and J. C. Schultz. Nesting and other habits of the Bolivian Blackbird. *Condor* 79:250-256.
1977. Orians, G. H. and N. P. Pearson. On the theory of central place foraging. In: D. V. Horn, R. D. Mitchell, and G. R. Stairs (eds.) *Analysis of Ecological Systems*. pp. 155-177. Ohio State University Press.
- *1980. Orians, G. H. *Some Adaptations of Marsh-nesting Blackbirds*. Princeton Monographs in Population Biology. Princeton University Press.
1980. Optimal foraging and evolution of discriminatory abilities. In: A. Kamil and T. Sargent (eds.) *Foraging Behavior: Ecological, Ethological and Psychological Approaches*. Garland STPM Press, N. Y. pp.389-405.
1983. Patterson, C. B., W. J. Erckmann, and G. H. Orians. An experimental study of parental investment and polygyny in male blackbirds. *American Naturalist* 116:757-769.
1983. Ewald, P. W., and G. H. Orians. Effects of resource depression on use of inexpensive and escalated aggressive behavior: Experimental tests using Anna Hummingbirds. *Behav. Ecol. Sociobiol.* 12:95-101.
1985. Orians, G. H. Allocation of reproductive effort by breeding blackbirds, family Icteridae. *Revista Chilena de Historia Natural* 58:19-29.
1987. Beletsky, L. D. and G. H. Orians. Territoriality among male Redwinged Blackbirds. I. Site fidelity and movement patterns. *Behav. Ecol. & Sociobiol.* 20:21-34.
1987. Beletsky, L. D. and G. H. Orians. Territoriality among male Red-winged Blackbirds. II. Removal experiments and site dominance. *Behav. Ecol. & Sociobiol.* 20:339-349.
1989. Beletsky, L. D. and G. H. Orians. Territoriality among male Red-winged Blackbirds. III. Testing hypotheses of territorial dominance. *Behav. Ecol. and Sociobiol.* 24:333-339.

1989. Beletsky, L. D., G. H. Orians, and J.C. Wingfield. Relationships of steroid hormones and polygyny to territorial status, breeding experience, and reproductive success in male Red-winged Blackbirds. *Auk* 106:107-117.
1989. Beletsky, L. D. and G. H. Orians. Familiar neighbors enhance breeding success in birds. *Proc. Natl. Acad. Sci. USA* 86:7933-7936.
1990. Beletsky, L. D., G. H. Orians, and J. C. Wingfield. Effects of exogenous androgen and antiandrogen on territorial and nonterritorial Red-winged Blackbirds (Aves: Icterinae). *Ethology* 85:58-72.
1990. Beletsky, L. D., G. H. Orians and J. C. Wingfield. Steroid hormones in relation to territoriality, breeding density and parental behavior in male Yellow-headed Blackbirds. *Auk* 107:60-68.
1990. Erckmann, W. J., L. D. Beletsky, G. H. Orians, T. Johnsen, S. Sharbaugh and C. D'Antonio. Old nests as cues for nest-site selection: An experimental test with Red-winged Blackbirds. *Condor* 92:113-117.
1990. Roskaft, E., G. H. Orians and L. D. Beletsky. Why do Red-winged Blackbirds accept eggs of Brown-headed Cowbirds? *Evolutionary Ecology* 4:35-42.
1990. Beletsky, L. D. and G. H. Orians. Male parental care in a population of Red-winged Blackbirds, 1983-1988. *Can. J. Zool.* 68:606-609.
1991. Orians, G. H. and J. F. Wittenberger. Spatial and temporal scales in habitat selection. *American Naturalist* 137:S29-S49.
1991. Skagen, S. K., R. L. Knight and G. H. Orians. Human disturbances of an avian scavenging guild. *Ecol. Applications* 1:215-225.
1991. Harms, K. E., L. D. Beletsky, and G. H. Orians. Conspecific nest parasitism in three species of new world blackbirds. *Condor* 93:967-974.
1992. Beletsky, L. D., G. H. Orians and J. C. Wingfield. Year-to-year patterns of circulating levels of testosterone and corticosterone in relation to breeding density, experience, and reproductive success of the polygynous Red-winged Blackbird. *Hormones and Behavior* 26:420-432.
1994. Beletsky, L. D. and G. H. Orians. Site fidelity and territorial movements of males in a rapidly declining population of yellow-headed blackbirds. *Behav. Ecol. & Sociobiol.* 34:257-265.
2001. Beletsky, L.D. and G.H. Orians. *Red-winged Blackbirds. Decision-making and Reproductive Success*. Chicago, U. of Chicago Press.
- 2002.
2003. Introduction, Part II. Variation among populations, pp. 145-148. In: *Lizard Social Behavior*. (Eds: Fox, S. F., J. K. McCoy and J. A. Baird) Johns Hopkins University Press, Baltimore.

2009. My life with Birds. In: *Leaders in Animal Behavior. The Second Generation*, pp. 405-428, (Eds) L. Drickamer and D. Dewsbury. Cambridge University Press.
2011. The Significance of Grouping in Blackbirds. In: *Felzmann Swarm*. Lea Muller Publishers,

Population Dynamics:

- This research has been oriented toward exploring the dynamical consequences of the rules developed in the field of behavioral ecology, particularly those relating to foraging behavior and habitat selection. I have used this material extensively in lecturing in Latin America and some of it has been published in Spanish.
1956. Orians, G. H., and F. Kuhlman. Red-tailed Hawk and Horned Owl populations in Wisconsin. *Condor* 58:371-385.
1958. Orians, G. H. A capture-recapture analysis of a shearwater population. *Journal of Animal Ecology* 27:71-86 (with a statistical appendix by P. H. Leslie).
1960. Orians, G. H. Autumnal breeding in the Tricolored Blackbird. *Auk* 77:379-398.
1962. Orians, G. H. Review. Animal populations and environment. *Ecology* 43:779-780.
1963. Orians, G. H. Notes on fall-hatched Tricolored Blackbirds. *Auk* 80:552-553.
1969. Orians, G. H. and H. S. Horn. Overlap in foods and foraging among four species of blackbirds in the Potholes of central Washington. *Ecology* 50:930-938.
1973. Orians, G. H. The Red-winged Blackbird in tropical marshes. *Condor* 75:28-42.
1974. Orians, G. H. (book review) Growth by Intussusception by E. S. Deevey. *Limnology and Oceanography* 18:347-348.
1974. Orians, G. H. (ed.) Tropical population ecology: In: Farnworth, E. G. and F. B. Golly (eds.) *Fragile Ecosystems*. Springer-Verlag, New York. pp. 5-65.
1980. Orians, G. H. Interacción poblacional en función de su significación adaptativa y evolutiva. *Boletín de la Sociedad Venezolana de Ciencias Naturales* 137:127-207.
1989. Beletsky, L. D. and G. H. Orians. Red bands and red-winged blackbirds. *Condor* 91:993-995.
1989. Orians, G. H. and L. D. Beletsky. Red-winged Blackbird. In: I. Newton (ed.). *Lifetime Reproduction in Birds*, pp. 183-197.
1989. Beletsky, L. D. and G. H. Orians. A male Red-winged Blackbird breeds 11 years. *Northwestern Naturalist* 70:10-12.

1991. Beletsky, L. D. and G. H. Orians. Effects of breeding experience and familiarity on site fidelity in female Red-winged Blackbirds. *Ecology* 72:787-796.
2004. Beletsky, L. D. and G. H. Orians. Factors affecting which male red-winged blackbirds acquire territories. *Condor* 95:782-791.
2000. Orians, G. H. Behavior and Community Structure. *Etologia* 8:43-51.

Plant-Herbivore Interactions:

- Ecologists have long recognized that herbivores consume very small amounts of the biomass of green plants annually in most environments. Many different ideas have been proposed to explain this pattern, among which is the possible role of chemical defenses of plants against grazing. My laboratory was involved with research on this topic for over a decade. Much of that work was published by other investigators, particularly Dr. David Rhoades who was first a graduate student and subsequently an independent investigator in my laboratory.
1960. Pitelka, F. A. and G. H. Orians. Range management for the animal ecologist. *Ecology* 41:406. Review.
1967. Orians, G. H. and S. P. Gessel. Rodent damage to fertilized Pacific Silver Fir in Western Washington. *Ecology* 48: 694-697.
1974. Orians, G. H. and D. H. Janzen. Why are embryos so tasty? *American Naturalist* 108:581-592.
1975. Cates, R. G. and G. H. Orians. Successional status and the palatability of plants to generalized herbivores. *Ecology* 56:410-418.
1982. Wheelwright, N. T. and G. H. Orians. Seed dispersal by animals: contrasts with pollen dispersal, problems of terminology, and constraints on coevolution. *American Naturalist* 119:402-413.

Community and Ecosystem Ecology:

- The powerful recent developments in behavioral ecology have many implications for concepts at other levels of ecology, particularly the structure of communities. This topic has been increasingly occupying my attention and is one in which I expect to carry out a great deal of future research. My involvement was, in part, stimulated by participation in the U.S. International Biological Program project on Convergent Evolution, in which we compared various aspects of community structure in the warm deserts of Arizona and Catamarca, Argentina.
1969. Orians, G. H. The number of bird species in some tropical forests. *Ecology* 50:783-801.

1974. Orians, G. H. Bird species living together: actually and in theory. A review of M. L. Cody, Competition and the structure of bird communities. *Science* 185:1158-1159.
1976. Orians, G. H. Stability, diversity and maturity in natural ecosystems. In: *Unifying Concepts in Ecology*. Proceedings of the First International Ecological Congress. The Hague, Netherlands, September, 1974.
1980. Orians, G. H. Micro and macro in ecological theory. *BioScience* 30:79.
1981. Orians, G. H. Aggregations: curse and necessity. In: *The National Research Council/1980. Issues and Current Studies*, pp. 57-66.
1986. Orians, G. J. Site characteristics favoring invasions. In: H. A. Mooney (ed.). *The Ecology of Invasions Into North America*. pp, 133-148. New York, Springer-Verlag.
1986. Orians, G. H. Cumulative Effects: Setting the Stage. In: *Cumulative Environmental Effects: A Binational Perspective*. Canadian Environmental Assessment Research Council/US National Research Council. pp. 1-6.
1990. Orians, G. H. and W. E. Kunin. Ecological uniqueness and loss of species. In: Orians, G. H., G. M. Brown, Jr., W. E. Kunin and J. Swierzbinski (eds.). *The Preservation and Valuation of Biological Resources*. pp. 146-184. Seattle, U. of Washington Press.
1990. Orians, G. H. Ecological concepts of sustainability. *Environment* 32:10-15, 34-39.
1990. Orians, G. H. Ecology and conservation biology: mutually supportive sciences. *Physiol. Ecol. Japan* 27:151-165.
1993. Orians, G. H. Endangered at what level? *Ecological Applications* 3:206-208.
1996. Orians, G.H., R. Dirzo, and J.H. Cushman (eds.). *Biodiversity and Ecosystem Processes in Tropical Forests*. Springer Verlag, Berlin.
- Orians, G.H. Biodiversity and terrestrial ecosystem processes. *Science Progress* 80:45-63.
1998. Orians, G. H. Biodiversity and Forests: Patterns and Implications. In: J. M. Calhoun (editor). *Forest Policy. Ready for Renaissance*, pp. 125-148. College of Forest Resources, Univ. of Washington.
1999. Biodiversity and ecosystem processes in tropical ecosystems. *Rev. Biol. Trop.* 48:297-303.
2005. Meyerson, L. A., J. Barron, J. M. Mellilo., R. J. Naiman, R. I. O'Malley, G. Orians, M. A. Palmer, A. SP Pfaff, S. W. Running, and O. E. Sala. Aggregate measures of ecosystem services: can we take the pulse of nature? *Front. Ecol. Environ.* 3:56-59.

2006. Orians, G. H. and A. V. Milewski. Ecology of Australia: the effects of nutrient-poor soils and intense fires. *Biological Reviews* 82:393-423.
2009. Orians, G. H. and D. Policansky. Scientific Bases of Macroenvironmental Indicators. *Annual Review of Environment and Resources* 34:375-404.
2013. Orians, G. H. and J. W. Schoen (eds). *North Pacific Temperate Rainforests. Ecology & Conservation*. University of Washington Press, Seattle.

Human Ecology:

- This research has its roots in my general concern with issues of environmental quality and in my work on habitat selection among birds. I was stimulated to explore the use of the approach to the study of habitat I had developed with birds on aspects of human behavior. This research has led me into cooperation with psychologists, geographers, planners, and landscape painters.
1970. Orians, G. H. and E. W. Pfeiffer. Ecological effects of the war in Vietnam. *Science* 168:544-554.
1971. Holling, C. S. and G. H. Orians. Toward an urban ecology. *Bulletin of the Ecological Society of America* 52(2):2-6.
1977. Orians, G. H. Natural selection, human energy expenditure and competition. In: Fazzolare, R. A. and C. B. Smith (eds.). *Energy Use Management*. Pergammon Press, N. Y. pp. 847-852.
1980. Orians, G. H. Habitat selection: general theory and applications to human behavior. In: Lockard, J. S. (ed.) *Evolution of Human Social Behavior*. Elsevier, N. Y. pp. 49-66.
1986. Heerwagen, J. H. and G. H. Orians. Adaptations to windowlessness: a study of the use of visual decor in windowed and windowless offices. *Environment and Behavior* 18:623-639.
1986. Orians, G. H. An ecological and evolutionary approach to landscape aesthetics. pp. 3-22. In: E. C. Penning-Roswell and D. Lowenthal (eds.) *Landscape Meanings and Values*, London, Allen & Unwin.
1992. Orians, G. H. and J. H. Heerwagen. Evolved responses to landscapes. In: J. H. Barkow, L. Cosmides and J. Tooby (eds.). *The Adapted Mind*, pp. 555-579, Oxford University Press.
1992. Gall, G. A. and G. H. Orians. Agriculture and biological conservation. *Agriculture, Ecosystems and Environment* 42:1-8.
1992. Orians, G. H. and P. Lack. Arable lands. *Agriculture, Ecosystems and Environment* 42:101-124.

1992. Orians, G. H. and C. L. Millar. Forest lands. *Agriculture, Ecosystems and Environment* 42:125-140.
1993. Orians, G. H. Policy implications of global climate change. In: P. M. Kareiva, J. G. Kingsolver and R. B. Huey (eds.). *Biotic Interactions and Global Change*, pp.467-486, Sinauer Associates.
1993. Heerwagen, J. H. and G. H. Orians. Humans, Habitats, and Aesthetics. In: Kellert, S. R. and E. O. Wilson (eds), *The Biophilia Hypothesis*, pp 138-172. Island Press.
1998. Orians, G.H. Human behavioral ecology: 140 years without Darwin is too long. *Bull. Ecological Society of America* 79:15-28.
- 2001 Orians, G. H. Aesthetic factors. *Encyclopedia of Biodiversity*, Volume 1, pp 45-54.
2001. Orians, G. H. An evolutionary perspective on aesthetics. *Bulletin of Psychology and the Arts* 2:25-29.
2002. Heerwagen, J. H. and G. H. Orians. The Ecological World of Children. In: *Children and Nature* (eds. P. Kahn and S. Kellert), pp.29-63. MIT Press.
- 2013 Why Practice Natural History? The Aesthetic Roots of Natural History, *The Journal of Natural History Education and Experience* 7:4-6.

Coevolution:

- My interest in coevolution was stimulated by our work on the Convergent Evolution project in Arizona and Argentina. Research on this topic continues, but it is a minor part of my concerns.
1977. Orians, G. H. and O. T. Solbrig. *Convergent Evolution in Warm Deserts*. A synthesis volume covering the results of a US/IBP project in Arizona and Argentina. I wrote two chapters and served as coordinated for a third. Dowden, Hutchinson and Ross, Stroudsberg, PA.
1983. Orians, G. H. and R. T. Paine. Convergent evolution at the community level. In: D. J. Futuyma and M. Slatkin (eds.) *Coevolution*, pp. 431-458. Sinauer Associates, Sunderland, MA.

Communication:

Animal social systems are held together by elaborate communication signals among their members. My work on behavioral ecology has naturally led to some research on communication signals, particularly those of blackbirds. This work was oriented toward understanding the relationship between the type of social system a species has and the kind and number of its social signals.

1968. Orians, G. H. and G. M. Christman. A comparative study of the behavior of Red-winged, Tricolored, and Yellow-headed Blackbirds. University of California Publications in Zoology 84:1-85.
1983. Orians, G. H. Notes on the behavior of the Melodius Blackbird (*Dives dives*). Condor 85:453-460.
1985. Beletsky, L. D. and G. H. Orians. Nest associated vocalizations of female Red-winged Blackbirds. Zeitschrift f. Tierpsychol. 69:329-339.
1985. Beletsky, L. D., B. J. Higgins and G. H. Orians. Communication by changing signals: call switching in Red-winged Blackbirds. Behavioral Ecology and Sociobiology 18:221-229.

Plant Ecology:

My work on convergent evolution between Arizona and Argentina led to my working together with Dr. Otto Solbrig on some models of the adaptations of plant form to arid climates. I am also working on gap dynamics in tropical forests.

1977. Orians, G. H. and O. T. Solbrig. A cost/income model of leaves and roots with special reference to arid and semi-arid areas. American Naturalist 111:677-690.
1977. Solbrig, O. T. and G. H. Orians. The adaptive characteristics of desert plants. American Scientist 65:412-421.
1982. Orians, G. H. The influence of tree-falls in tropical forests in tree species richness. Tropical Ecology 23:255-279.
1988. Brandani, A. G., S. Hartshorn and G. H. Orians. Internal Heterogeneity of Gaps and Species Richness in Costa Rican tropical wet forest. Journal of Tropical Ecology 4:99-119.

General Biology and Miscellaneous:

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