

## **CURRICULUM VITAE**

Bernd Heinrich

2007

### **PRESENT ADDRESS**

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### **PERSONAL**

Born: April 19, 1940; Bad Polzin, Poland/Germany

Naturalized U.S. citizen: Skowhegan, Maine, 1958

Married to: Rachel Smolker

Children: Erica, Stuart, Eliot and Lena

### **EDUCATION**

B.A. (Zoology) 1964 University of Maine, Orono

M.S. (Zoology) 1966 University of Maine, Orono

Ph.D. (Zoology) 1970 University of California, Los Angeles  
(awarded "with distinction")

Postdoctoral 1970 University of California, Los Angeles

### **HONORS**

Guggenheim Fellow, 1976-77

Harvard Fellow, 1976-77

University of Vermont Scholar in the Biological Sciences, 1985

Alexander von Humboldt Senior Scientist Fellowship Award, 1988-89 (Federal Republic of Germany)

Lady Davis Fellowship (Jerusalem, Israel) 1992

L.L. Winship Book Award (For In a Patch of Fireweed), 1984.

Burroughs Writing Award (For An Owl in the House), ~ 1991.

Rutstrom Authorship Award for Conservation and Environmental Writing  
(For A Year in the Maine Woods), 1996.

Sigma Xi Lecturer, 1995-1997

Maine Running Hall of Fame, 1996.

Maine Sportsmen's Hall of Fame, 2000.

Outstanding Science Trade Book for Children (By Children's Books Council)

Member Vermont Academy of Science and Engineering-1997.

Member Vermont Academy of Arts and Sciences- 1998.

Franklin Fairbanks Award for contributions of Vermont Culture- 1997.

New England Bookseller's Award for Nonfiction for 1998.

John Burroughs Medal for Nature Writing (for Mind of the Raven) 2000

Honorary Doctorate, University of Maine, Farmington – 1999

Honorary Master of Philosophy & Human Biology – College of the Atlantic, 2006

Honorary Doctorate, Unity College, Maine 1986 and-2000!

National Academy of Arts and Sciences. 2004.

Art Exhibits: "The Naturalist as Artist :the Artist as Naturalist". Fleming Museum, Burlington, VT. and the L C Bates Museum , Good Will- Hinckley School in Fairfield, Maine. 2005

### **TEACHING EXPERIENCE**

Assistant Professor, University of California, Berkeley, 1971-75

Professor, University of California, Berkeley, 1978-1981

Professor, University of Vermont, 1981-2003

Professor Emeritus, 2004-

Presently teaching Winter Ecology , research with ravens, writing & drawing

### **RESEARCH PUBLICATIONS**

- Heinrich B. 1961. Weasels in Farmington. *Maine Field Naturalist* 17:24-25.
- Cook, J.R. and B. Heinrich. 1965. Glucose vs. acetate metabolism in Euglena. *J. Protoz.* 12:581-584.
- Heinrich, B. and J. R. Cook. 1967. Studies on the respiratory physiology of Euglena gracilis cultured on acetate or glucose. *J. Protoz.* 14:548-553
- Cook, J. R. and B. Heinrich. 1968. Unbalanced respiratory growth of Euglena. *J.Gen.Microbiol.* 53:237-251.
- Heinrich, B. 1970. Thoracic temperature stabilization in a free-flying moth. *Science* 168: 580-582.
- Heinrich, B. 1970. Nervous control of the heart during thoracic temperature regulation in a sphinx moth. *Science* 169:606-607.
- Heinrich, B. 1971. The effect of leaf geometry on the feeding behavior of the caterpillar of Manduca sexta (Sphingidae). *Anim. Behavior* 19:119-124.
- Heinrich, B. 1971. Temperature regulation of the sphinx moth, Manduca sexta. I. Flight energetics and body temperature during free and tethered flight. *J. Exp. Biol.* 54: 141-152.
- Heinrich, R. 1971. Temperature regulation of the sphinx moth, Manduca sexta. II. Regulation of heat loss by control of blood circulation. *J. Exp. Biol.* 54:153-166.
- Heinrich, B. and G. A. Bartholomew. 1971. An analysis of preflight warm-up in the sphinx moth, Manduca sexta. *J. Exp. Biol.* 55:223-239.
- Heinrich, B. 1972. Temperature regulation in bumblebees, Bombus vagans: a field study. *Science* 175:185-187.
- Heinrich, B. 1972. Energetics of temperature regulation and foraging in a bumblebee, Bombus terricola Kirby. *J. Comp. Physiol.* 77:49-64.
- Heinrich, B. 1972. Patterns of endothermy in bumblebee queens, drones and workers. *J. Comp. Physiol.* 77:65-79.
- Heinrich, B. and P. H. Raven. 1972. Energetics and pollination ecology. *Science* 176:597-602.
- Kammer, A. E. and B. Heinrich. 1972. Neural control of bumblebee fibrillar muscles during shivering. *J. Comp. Physiol.* 78:337-345.
- Heinrich, B. 1972. Thoracic temperature of butterflies in the field near the equator. *Comp. Biochem. Physiol.* 43A:459-467.
- Heinrich, B. 1972. Physiology of brood incubation in the bumblebee queen, Bombus vosnesenskii. *Nature* 239:223-225.
- Heinrich, B. and T. M. Casey. 1973. Metabolic rate and endothermy in sphinx moths. *J. Comp. Physiol.* 82:195-206.
- Bartholomew, G. A. and B. Heinrich. 1973. A field study of flight temperature in moths in relation to body weight and wing loading. *J. Exp. Biol.* 58:123-135.
- Heinrich, B. and A. Kammer. 1973. Activation of the fibrillar muscles in the bumblebee during warm-up, stabilization of thoracic temperature and flight. *J. Exp. Biol.* 58:677-688.
- Heinrich, B. 1974. Thermoregulation in bumblebees. I. Brood incubation by Bombus vosnesenskii queens. *J. Comp. Physiol.* 88:129-140.
- Heinrich, B. 1974. Pheromone induced brooding behavior in Bombus vosnesenskii and B. edwardsii (Hymenoptera: Bombidae). *J. Kansas Ent. Soc.* 47:396-404.
- Heinrich, B. 1974. Thermoregulation in endothermic insects. *Science* 185:747-756.
- Kammer, A. E. and B. Heinrich. 1974. Metabolic rates related to muscle activity in bumblebees. *J. Exp. Biol.* 61:219-227.

- Heinrich, B. 1975. Thermoregulation in bumblebees. II. Energetics of warm-up and free flight. *J. Comp. Physiol.* 96:155-166.
- Heinrich, B. and C. Pantle. 1975. Thermoregulation in small flies (*Syrphus* sp.): Basking and shivering. *J. Exp. Biol.* 62:599-610.
- Heinrich, B. 1975. Bee flowers: A hypothesis on flower variety and blooming times. *Evolution* 29:325-334.
- Heinrich, B. 1975. Energetics of pollination. *Ann. Rev. Ecol. & Syst.* 6:139-170.
- Heinrich, B. 1976. Foraging specializations of individual bumblebees. *Ecol. Mon.* 46:105-128.
- Oster, G. and B. Heinrich. 1976. Why do bumblebees "major"? A mathematical model. *Ecol. Mon.* 46:128-133.
- Heinrich, B. 1976. Heat exchange in relation to blood flow between thorax and abdomen in bumblebees. *J. Exp. Biol.* 64:561-585.
- Heinrich, B. 1976. Resource partitioning among some eusocial insects: Bumblebees. *Ecol.* 57: 874-899.
- Heinrich, B. 1976. Flowering phenologies: bog, woodland, and disturbed habitats. *Ecol.* 57: 890-899.
- Heinrich, B. 1977. Why have some animals evolved to regulate a high body temperature? *Am. Natur.* 111:623-640.
- Heinrich, B., P. Mudge, and P. Deringis. 1977. A laboratory analysis of flower constancy in foraging bumblebees: *Bombus ternarius* and *B. terricola*. *Behav. Ecol. and Sociobiol.* 2:247-266.
- Bartholomew, G. A. and B. Heinrich. 1978. Endothermy in African dung beetles during flight, ball making, and ball rolling. *J. Exp. Biol.* 73:65-83.
- Heinrich, B. and T. M. Casey. 1978. Heat transfer in dragonflies: 'Fliers' and 'perchers'. *J. Exp. Biol.* 74:17-36.
- Heinrich, B. and G. A. Bartholomew. 1978. Roles of endothermy and size in inter- and intraspecific competition for elephant dung in an African dung beetle, *Scarabaeus laevistriatus*. *Physiol. Zool.* 52:484-494.
- Allen, T. S., S. Cameron, R. McGinley, and B. Heinrich. 1978. The role of workers and new queens in the ergonomics of a bumblebee colony: Hymenoptera: Apoidea). *J. Kansas Entomological Soc.* 51(3):329-342.
- Heinrich, B. 1979. Resource heterogeneity and patterns of foraging in bumblebees. *Oecologia* 140:235-245.
- Heinrich, B. 1979. "Majoring" and "minoring" by foraging bumblebees, *Bombus vagans*: An experimental analysis. *Ecology* 60:245-255.
- Waddington, K. D. and B. Heinrich. 1979. The foraging movements of bumblebees on vertical "inflorescences": An experimental analysis. *J. Comp. Physiol.* 134:113-117.
- Heinrich, B. 1979. Thermoregulation of African and European honeybees during foraging, attack, and hive exits and returns. *J. Exp. Biol.* 80:217-229.
- Heinrich, B. 1979. Keeping a cool head: Thermoregulation in honeybees. *Science* 205: 269-271.
- Heinrich, B. 1979. Foraging strategies of caterpillars: Leaf damage and possible predator avoidance strategies. *Oecologia* 40:325-337.
- Heinrich, B. 1980. Mechanisms of body temperature regulation in honeybees, *Apis mellifera*. I. Regulation of head temperature. *J. Exp. Biol.* 85:61-67.
- Heinrich, B. 1980. Mechanisms of body temperature regulation in honeybees, *Apis mellifera*. II. Regulation of thoracic temperature at high air temperatures. *J. Exp. Biol.* 85:73-87.

- Heinrich, B. and D. Vogt. 1980. Aggregation and foraging behavior of whirligig beetles (Coleoptera:Gyrinidae). *Behav. Ecol. J. Sociobiol.* 7:179-186.
- Heinrich, B. 1981. The mechanisms and energetics of honeybee swarm temperature regulation. *J. Exp. Biol.* 91:25-55.
- Heinrich, B. 1981. Energetics of honeybee swarm thermoregulation. *Science* 212:565-566.
- Waddington, K. D., T. Allen, and B. Heinrich. 1981. Floral preferences of bumblebees (*Bombus edwardsii*) in relation to variable vs. constant rewards. *Animal Behaviour* 29:779-784.
- Heinrich, B. 1981. The energetics of pollination. *Ann. Miss. Bot. Garden* 68:370-378.
- Heinrich, B. and S. L. Collins. 1983. Caterpillar leaf damage and the game of hide-and-seek with birds. *Ecology* 64:592-602.
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- Heinrich, B. 1983. Do bumblebees forage optimally, and does it matter? *Am. Zool.* 23: 273-281.
- Heinrich, B. and M. Heinrich. 1983. Size and caste in temperature regulation by bumblebees. *Physiol. Zool.* 56:552-562.
- Heinrich, B. and M. Heinrich. 1983. Torpor in foraging workers and drones of the bumblebee, *Bombus terricola*. *Physiol. Zool.* 56:563-567.
- Heinrich, B. 1984. Strategies of thermoregulation and foraging in two wasps, *Dolichovespula maculata* and *Vespula vulgaris*. *J. Comp. Physiol. B.* 154:175-180.
- Heinrich, B. and M. Heinrich. 1984. The pit-trapping foraging strategy of the ant lion, *Myrmeleon immaculatus* DeGeer (Neuroptera: Myrmeleontidae) *Behav. Ecol. & Sociobiol.* 14:151-160.
- Real, R. G., Ianazzi, R., Kamil, A. C. and B. Heinrich. 1984. Discrimination and generalization of leaf damage by blue jays (*Cyanocitta cristata*). *Animal Learning and Behavior* 12:202-208.
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- Heinrich, B. 1985. Men vs. Women, Marathoners vs. Ultramarathoners. *Ultrarunning* Jan. - Feb. 1985.
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- Heinrich, B. 1986. Thermoregulation and flight activity of the satyr, *Coenonympha inornata* (Lepidoptera:Satyridae). *Ecology* 67:593-597.
- Heinrich, B. and E. McClain. 1986. "Laziness" and hypothermia as a foraging strategy in lower scarabs (Coleoptera:Scarabaeidae). *Physiol. Zool.* 59:273-282.
- Heinrich, B. 1986. Comparative thermoregulation of four montane butterflies of different mass. *Physiol. Zool.* 59:616-626.
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- Heinrich, B. 1988. Why do ravens fear their food? *Condor* 90:950-952.
- Kukal, O., B. Heinrich and J. Duman. 1988. Behavioral thermoregulation in the freeze-tolerant Arctic caterpillar, *Gynaephora groenlandica*. *J. Exp. Biol.* 138:181-193.
- Heinrich, B. 1988. Raven tool use? *Condor* 90:270-271.

- Heinrich, B. 1988. Winter foraging at carcasses by three sympatric corvids, with emphasis on recruitment by the raven, Corvus corax. Behav. Ecol. & Sociobiol. 23:141-156.
- Heinrich, B. 1989. Beating the heat in obligate insect endotherms: The nonorganismal problem and the organismal solution. Am. Zool. 29:1157-1168.
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- Heinrich, B. and J. Marzluff. 1991. Do common ravens yell because they want to attract others? Behav. Ecol. & Sociobiol. 28:13-21.
- Esch, H., F. Goller and B. Heinrich. 1991. How do bees shiver? Naturwissenschaften 78:325-328.
- Marzluff, J. and B. Heinrich. 1991. Foraging by common ravens in the presence and absence of territory holders: an experimental analysis of social foraging. Anim. Behav. 42:755-770.
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- Heinrich, B. and J. M. Marzluff. 1992. Age and mouth color in Common Ravens, Corvus corax. Condor 94:549-550.
- Heinrich, B. and J. M. and C. S. Marzluff. 1993. Ravens are attracted to the appeasement calls of discoverers when they are attacked at defended food. The Auk 110:247-254.
- Heinrich, B. and D. F. Vogt. 1993. Abdominal temperature regulation by Arctic bumblebees. Physiol. Zool. 66:257-269.
- Cotterman, V. and B. Heinrich. 1993. A large temporary raven roost. The Auk 110:395.
- Heinrich, B., D. Kaye, T. Knight and K. Schaumburg. 1994. Dispersal and association among a "flock" of common ravens, Corvus corax. The Condor 96:545-551.
- Heinrich, B. 1994. Dominance and weight-changes in the common raven, Corvus corax. Anim. Behav. 48:1463-1465.
- Parker, P. G., F. A. Waite, B. Heinrich & J. M. Marzluff. 1994. Do common ravens share food bonanzas with kin? DNA fingerprinting evidence. Anim. Behav. 48:1085-1093.
- Heinrich, B. 1994. When is the common raven black? Wilson Bull. 106(3):571-572.
- Heinrich, B. 1994. Does the early bird get (and show) the meat? The Auk 111:764-769.
- Heinrich, B. 1995. Neophilia and exploration in juvenile common ravens, Corvus corax. Anim. Behav. 50:695-704.
- Heinrich, B. and R. Bell. 1995. Winter food of a small insectivorous bird, the Golden-crowned Kinglet. Wilson Bulletin 107(3):558-561.
- Heinrich, B., J. Marzluff and W. Adams. 1996. Fear and food recognition in naive common ravens. The Auk 112 (2):499-503.
- Marzluff, J. M., B. Heinrich and C. S. Marzluff. 1996. Roosts are mobile information centers. Anim. Behav. 51:89-103.
- Heinrich, B. 1995. An experimental investigation of insight in common ravens, Corvus corax. The Auk 112: 994-1003.
- Ybarrondo, B.A. and B. Heinrich. 1996. Thermoregulation and response to competition in the African Dung Ball-Rolling Beetle Kheper nigroaeneus (Coleoptera: Scarabaeidae). Physiol. Zool 69:35-48.
- Vogt, D. F., B. Heinrich, T. O. Dabolt and H. L. McBath. 1994. Ovary development and Colony founding in subarctic and temperate-zone bumblebee queens. Can. J. Zoology 72:1551-1556.
- Vogt, D. F., B. Heinrich, and R. C. Plowright. 1998. Ovarial development in bumblebee queens : The influence of abdominal temperature and food availability. Can. J. Zool. 76: 2026-2030.
- Heinrich, B., C.C. Joerg, S.S. Madden and E.W. Sanders Jr. 1997. Black-capped chickadees and

- Red-breasted nuthatches weight sunflower seeds. *The Auk* 114: 298-299.
- Heinrich, B. and J. Pepper. 1998. Influence of competitions on caching behavior in the common raven, *Corvus corax*. *Anim. Behav.* 56: 1083-1090.
- Heinrich, B. 1999. Sociobiology of ravens: conflict and cooperation. *Sitzungsberichte der Gesellschaft Naturforschender Freunde zu Berlin* 37: 13-22.
- Heinrich, B. 1999. Planning to facilitate caching: Possible suet cutting by a common raven. *Wilson Bull.* 111: 276-278.
- Stahler, D.R., B. Heinrich and D.W. Smith. 2002. The raven's behavioral association with wolves. *Animal Behaviour.* 64:283-290.
- Bugnyar, T. and B. Heinrich. 2003. Hiding in food-caching ravens, *Corvus corax*. *Rev.Ethol.Suppl.*5, 57.
- Heinrich, B. 2004.Overnighting of Golden-crowned kinglets in winter. *Wilson Bull.*115:123-124.
- Bugnyar, T., M. Stoewe and B. Heinrich. 2004. Ravens, *Corvus corax*, follow gaze direction of humans around obstacles . *Proc.R. Soc. Lond. B* 271: 1331-1336
- Woods, W. A. Jr, B. Heinrich and R.D. Stevenson. 2005. Honeybee flight metabolism: does it depend upon air temperature? *J. Exp. Biol.* 208 (6):1161-1173.
- Heinrich, B. and T. Bugnyar. 2005. Testing problem solving in ravens: string-pulling to reach food. *Ethology* 111: 962-976.
- Bugnyar, T. and B. Heinrich, 2005. Food-storing ravens, *Corvus corax*, differentiate between knowledgeable and ignorant competitors . *Proc. R. Soc B* 272: 1641-1646.
- Bugnyar, T. and B. Heinrich. 2006. Pilfering ravens, *Corvus corax*, adjust their behaviour to social context and identity of competitors. *Animal Cognition* 9: 369-376.
- Bugnyar, T., M. Stoewe and B. Heinrich. 2007. The ontogeny of caching behaviour in ravens, *Corvus corax*. *Animal Behaviour* (in press).
- Heinrich, B. and T. Bugnyar. 2007. Raven Intelligence. *Scientific American* in press
- Stoewe, M., T. Bugnyar, B. Heinrich and K. Kotrschal. 2006. Effect of group size on approach to novel objects in ravens (*Corvus corax*). *Ethology* 112: 1079-1088.
- Heinrich, B. 2007. The origin of insect thermoregulation. *J. Exp. Biol.* 210: 177-179.
- Bugnyar, T. Schwab, C., Schloegl, K., Kotrschal, K. and B. Heinrich. Ravens judge others' pilfer dispositions through play-caching. MS
- Heinrich, B. and T. Bugnyar . Smart scavengers? Foraging biology and social cognition in ravens. *Advances in the Study of Behavior*. In prep.

## **EDITORIALS, ABSTRACTS AND ROOK REVIEWS**

- Heinrich, B. (1972) Foraging energetics of bumblebees. *Am. Zool.* 12(3):202.
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- Heinrich, B. (1974) On bees and flowers. *The New York Times*, Thursday, February 21.
- Heinrich, B. (1974) Lost opportunity? (a letter). *Science* 184:1131.
- Heinrich, B. (1975) The invisible hand loses its grip. *Business and Society Review*, Winter, No. 12: 30-34.
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- Heinrich, B. (1979) Social Insects. McGraw-Hill Yearbook of Science and Technology, pp. 338-341.
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- Eppstein, M. J. and Heinrich, B. (1981) Pit-trapping as an optimal foraging strategy by ant lions. Am. Zool. 21(4):995.
- Heinrich, B. (1982) What is physiological ecology? Bull. Ecol. Soc. Amer. 63(4):343-344.
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- Heinrich, B. (1984) A book review of "The Dragon Hunters" by Frank Graham, Jr., New York Times, Oct. 14, 1984.
- Heinrich, B. and T. P. Mommsen (1984) Thermal Adaptations of winter moths. Am. Zool. 24, No. 3, p. 8A.
- Vogt, F.D. and Heinrich, B. (1984) Thermoregulation and demography of bumblebee colonies. Am. Zool. 24, No. 3, p. 7A.
- Heinrich, B. (1985) A letter. Audubon 87:99-100.
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- Vogt, D. and Heinrich, R. The response of workers to thermal stress in honeybee colony thermoregulation. Am. Zool. 25. No. 4.
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- Heinrich, B. 1991. Book review: The Ways of Coprophiles (Dung Beetle Ecology by I. Hanski and Y. Cambefort) Science:254:873-874.
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- Heinrich, B. 1993. Book review: *Insect Learning: Ecological and Evolutionary Perspectives* by D. R. Papaj and A. C. Lewis (eds.) *Science* 260:705-706.
- Heinrich, B. 1993. Book review: *Physiological Animal Ecology* by G. Louw. *American Scientist* 2:486.
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- Heinrich, B. & Esch, H. 1997. Honeybee thermoregulation. *Science* 276: 1015.
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## BOOKS

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- Jensen, W. A., B. Heinrich, D. B. Wake, and M. H. Wake. 1979. *Biology*. (Chapters 14-25 by B. Heinrich). Wadsworth Publishing Co., Belmont, CA.
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