

CURRICULUM VITAE OF FREDERICK H. C. HOTCHKISS

BORN: December 4, 1944, Oak Bluffs, Massachusetts
U.S. citizen

EDUCATION:

B.S. in earth science, Massachusetts Institute of Technology, Cambridge, Massachusetts, 1966

M. Phil. in biology, Yale University, New Haven, Connecticut, 1971

Ph.D. in biology, Yale University, New Haven, Connecticut, 1974

MILITARY EXPERIENCE:

1966-1969 U.S. Navy Deep Submergence Systems Project, Ocean Engineering Branch, Bethesda, Maryland. [Lt. USNR, honorable discharge.]

HONORS, AWARDS AND FELLOWSHIPS:

The Palaeontological Association Mary Anning Award, 2002

Fellow of the Linnaean Society of London, 2001

ASTM Committee E-7 on Nondestructive Testing Certificate of Appreciation, January 1994

ASTM Committee E-7 on Nondestructive Testing Certificate of Appreciation, January 1990

Smithsonian Postdoctoral Fellowship, 1973-1974

Connecticut State Scholarship Grant, 1972-1973

N.S.F. Graduate Traineeship. 1972-1973

N.D.E.A. Title IV Graduate Fellowship, 1969-1972

PROFESSIONAL SOCIETIES

Current: American Association of Zoological Nomenclature; Biological Society of Washington; Canadian Society for Nondestructive Testing; Linnaean Society of London; Mid-American Paleontological Society; New York Academy of Sciences (life member); Paleontological Research Institution (life member); The Palaeontological Association; The Paleontological Society. *Lapsed:* Acoustical Society of America; American Association for the Advancement of Science; American Society of Nondestructive Testing; American Society for Testing and Materials; American Society of Zoologists; Palaeontographical Society of London; Society for Integrative and Comparative Biology; Society of Sigma Xi.

PROFESSIONAL EXPERIENCE:

2004-date Director, Marine and Paleobiological Research Institute, Inc. [also President and Treasurer]

1998-date Departmental Associate, Department of Palaeobiology, Royal Ontario Museum, Toronto, Ontario, Canada

1980-2004 Acoustic Design Engineer, Engineering Manager, and Product Manager for Transducers,

- NDT Division, Panametrics Inc., Waltham, Massachusetts [in July 2002 Panametrics Inc. was sold to General Electric and became GE Panametrics.] Manufacturing Manager for Transducers August 2002; [in December 2003 Panametrics NDT was divested from GE Panametrics and became R/D Tech Instruments Inc] Manufacturing Manager for Instruments & Transducers [through 15 January 2004].
- 1978-1979 Visiting Assistant Professor, Department of Biology, Moravian College, Bethlehem, Pennsylvania
- 1978 Consultant to Multiprep, Inc., Ardmore, Pennsylvania
- 1978 Jan-June Adjunct Assistant Professor, Department of Biology, Lehigh University, Bethlehem, Pennsylvania
- 1977-1978 Executive Vice President, Erenow Books, Willow Grove, Pennsylvania
- 1976-1979 Research Associate, Department of Geology and Paleontology, The Academy of Natural Sciences, Philadelphia, Pennsylvania
- 1974-1976 Visiting Assistant Professor of Biology, Division of Natural Sciences, State University of New York College at Purchase, Purchase, New York
- 1973-1974 Smithsonian Fellow in Evolutionary and Systematic Biology, Department of Invertebrate Zoology, National Museum of Natural History, Smithsonian Institution, Washington, D.C.
- 1971-1974 Associate in Mathematics and Statistics, TCE Incorporated, Boston, Massachusetts
- 1972-1973 Curatorial Assistant, Division of Invertebrate Paleontology, Peabody Museum of Natural History, Yale University, New Haven, Connecticut
- 1971-1972 Teaching Assistant, Department of Biology, Yale University, New Haven, Connecticut
- 1962-1965 Summer Field Assistant, Beach Sediment Studies Project, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts

REFEREE FOR:

Journal of Paleontology; Bulletin of Marine Science; U.S. Geological Survey Professional Papers; Bulletins of American Paleontology; Alcheringa; American Naturalist; Malacologia; Journal of the Acoustical Society of America; ASNT Nondestructive Testing Handbook; The World and I; Journal of Testing and Evaluation; Palaeontologisch Zeitschrift; Acta Palaeontologica Polonica; Palaeontology; SEPM Ichnology Publication.

PRESENTATIONS/PUBLICATIONS

on echinoderms, biology and evolution:

1970. Hotchkiss, F.H.C. North American Ordovician Ophiuroidea, the genus Taeniaster Billings, 1858 (Protasteridae). Proc. Biol. Soc. Wash. (D.C.), 83(5): 59-76.
1971. ----- [Review of] Genetics of the Evolutionary Process by Theodosius Dobzhansky. American Scientist 59(5): 610.
1972. ----- & H.B. Fell. Zoogeographical implications of a Paleogene echinoid from East Antarctica. Journ. Roy. Soc. New Zealand 2(3): 369-372.
- . New paleontological data on the antiquity of the ophiuroid calycinal system. Presented at the 1st Echinoderms Conference, Smithsonian Institution, Washington, D.C.
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1973. ----- [Review of] Physiology of Echinoderms by John Binyon. American Scientist 61(5): 589.
1974. ----- Studies on Paleozoic ophiuroids and the ancestry of the Asterozoa. Ph. D. dissertation, Yale University, June 1974, vi + 147 pp., 24 pls. Abstract in Dissertation Abstracts International 35(6):2922B.
- Abnormal sea stars needed. Sea Secrets 18(4): 6.
- [Review of] The Biology of the Indian Ocean, Berndt Zeitshel (ed.). American Scientist 62(6): 741-742.
- New data on the ancestry of sea-stars. Lecture given at: Smithsonian Institution; Case Western Reserve University; State University of New York College at Purchase.
1975. ----- Theory of population densities from animal tracks. Lecture given at: Rockefeller Field Research Center; New England Population Biologists meeting at Worcester Polytechnical Institute; New York Population Biology Seminar, Columbia University
- & P.R. Seegers. Variable symmetry in starfish. Presented at 2nd Echinoderms Conference, Sept. 26/Oct. 1, 1975, Rovinj, Yugoslavia. Published 1978, Thalassia Jugoslavica 12(1): 173-180.
1976. Macomber, J.B., A. Pruzan, F.H.C. Hotchkiss & L. Ehrman. Competition between two reproductively isolated strains of Drosophila melanogaster (Abstract). Genetics 83(3): S47.
- & A.M. Clark. Restriction of the family Poraniidae, sensu Spencer and Wright, 1966 (Echinodermata: Asteroidea). Bulletin of the British Museum (Natural History) Zoology 30(6):263-268 + pls. 1-3.
- Devonian ophiuroids of New York State: Reclassification of Klasmura, Antiquaster and Stenaster into the Suborder Scalarina nov., Order Stenurida. New York State Museum Bull, No. 425:1-39.
1977. ----- Ophiuroid Ophiocanops (Echinodermata) not a living fossil. J. Nat. Hist. 11: 377-380.
- Antarctic fossil echinoids - review and current research. Presented at 3rd Symposium on Antarctic Geology and Geophysics, August 22/27, 1977, Madison, WI. Published 1982, pp. 679-684 in C. Craddock (ed.) Antarctic Geoscience, Univ. Wisconsin Press, 1172 pp.
- Antarctic and southernmost South American fossil echinoids (progress report). Antarctic Journal of the United States 12(4):81.
1978. ----- Studies on echinoderm ray homologies. Loven's law applies to Paleozoic ophiuroids. Journal of Paleontology 52(3):537-544.
1979. ----- Case studies in the teratology of starfish. Proc. Acad. Nat. Sci. Phil. 131: 139-157.
1980. Pruzan-Hotchkiss, A., I.B. Perelle, F.H.C. Hotchkiss & L. Ehrman. Altered competition between two reproductively isolated strains of Drosophila melanogaster. Evolution 34(3):445-452.
- The early growth stage of a Devonian ophiuroid and its bearing on echinoderm phylogeny. Journal of Natural History 14:91-96.
1982. ----- Ophiuroidea (Echinodermata) from Carrie Bow Cay, Belize. Pp. 387-412 in The Atlantic Barrier Reef Ecosystem at Carrie Bow Cay, Belize, I. Structure and Communities. K. Rutzler and I.G. Macintyre, editors. Smithsonian Contributions to the Marine Sciences, No. 12.
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1985. ----- [Notes on] Furcaster cf. F. leptosoma(?) (Salter, 1857). P. 241 in D.B. Sass & R.A. Condrate, Destruction of a Late Devonian ophiuroid assemblage: a victim of changing ecology at the Catskill delta front. Geological Society of America Special Paper 201:237-246.
1990. -----, S.E. Churchill, R.G. Gelormini, W.R. Hepp, R.J. Rentler & M.T. Tummarello. Events of autotomy in the starfish Asterias forbesi and A. vulgaris. Presented at 7th International Echinoderms Conference, Sept. 9/14, 1990, Atami, Japan. Published 1991, pp. 537-541 in T. Yanagisawa et al. (eds.), Biology of Echinodermata, A.A. Balkema, Rotterdam, 590 pp.
1992. ----- Footnotes on Lovén's law. Presented at the Second North American Friends of Echinoderms Conference and Workshop, Harbor Branch Oceanographic Institution, Inc., 9-11 July 1992.
1993. ----- A new Devonian ophiuroid (Echinodermata: Oegophiurida) from New York State and its bearing on the origin of ophiuroid upper arm plates. Proceedings of the Biological Society of Washington, vol. 106, no. 1, pp. 63-84.
1995. ----- Lovén's law and adult ray homologies in echinoids, ophiuroids, edrioasteroids and an ophiocistioid (Echinodermata: Eleutherozoa). Proceedings of the Biological Society of Washington 108(3):401-435
- . -----, D. K. Armstrong & D. M. Rudkin. A new occurrence of the genus Euzonosoma (Echinodermata: Ophiuroidea) from the Middle Ordovician Gull River Formation (Caradocian) of Ontario - first North American Ordovician record of the Encrinasteridae. Pp. 483-486 In: J.D. Cooper, M.R. Droser & S.C. Finney (eds.): Ordovician Odyssey: Short papers for the Seventh International Symposium on the Ordovician System, Las Vegas, Nevada, USA, June 1995, 498 pp., The Pacific Section Society for Sedimentary Geology (SEPM). Fullerton, California.
- , D. M. Rudkin and D. K. Armstrong. Euzonosoma (Echinodermata: Ophiuroidea) from the Middle Ordovician Gull River Formation in Ontario - Some palaeogeographic and palaeoecological implications of the first North American record of the Encrinasteridae (Abstract). In: P. A. Johnston (ed.): Canadian Paleontology Conference, Program and Abstracts No. 5: [The Fifth Canadian Paleontology Conference and International Symposium on the Paleobiology and Evolution of the Bivalvia. Joint Meeting, Royal Tyrrell Museum of Palaeontology, Drumheller, Alberta, 29 September - 2 October 1995.] [CPC-V Drumheller '95]
1997. -----, D. M. Rudkin, and S. Anderson. A case for rearmament -- the oldest known evidence of regeneration in sea stars (Abstract). 7th Canadian Paleontology Conference, University of Saskatchewan, Saskatoon, September 26-30, 1997. [Also: Rudkin, D. M., F. H. C. Hotchkiss and S. Anderson. A case for rearmament -- the oldest known evidence of regeneration in sea stars. Royal Ontario Museum Nineteenth Annual Research Colloquium, 20 November 1997, Toronto, Abstracts of Papers, p. 1 (abbreviated abstract).]
1998. ----- Discussion on pentamerism: the five-part pattern of Stromatocystites, Asterozoa and Echinozoa. Pp. 37-42 in R. Mooi & M. Telford (eds.), Echinoderms: San Francisco [Proceeding of the ninth International Echinoderms Conference, San Francisco. California, 5-9 August 1996] Balkema, Rotterdam.
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- . A ?rays as appendages? model for the origin of pentamerism in echinoderms. *Paleobiology* 24:200-214.
- & J. M. Lawrence. Origin of abnormal numbers of rays in starfish (Echinodermata) (Abstract). [North American Echinoderms Meeting, August 16-19, 1998, Wallops Island Marine Science Center, Wallops Island, Virginia, program and abstracts p. 16.] *Gulf of Mexico Science* 16(1):120.
- & P. H. von Bitter. Diminutive ophiuroids (Echinodermata) from the upper Windsor Group (Lower Carboniferous: Late Viséan/Asbian) of Nova Scotia, Canada (Abstract). Canadian Paleontology Conference Program and Abstracts No. 8 [The Eighth Canadian Paleontology Conference, 22-25 October 1998] [CPC-VIII Collingwood ?98], p. 11. [Also: Royal Ontario Museum Twentieth Annual Research Colloquium, 18 November 1998, Toronto, Abstracts of Papers, p. 8 (abbreviated abstract).]
- . On the number of rays in starfish (abstract). *American Zoologist* 38(5):2A. [full paper published in year 2000 -- see below]
1999. -----, R.J. Prokop and V.Petr. Isolated skeletal ossicles of a new brittlestar of the Family Cheiropterasteridae Spencer, 1934 (Echinodermata: Ophiuroidea) in the Lower Devonian of Bohemia (Czech Republic). *Journal of the Czech Geological Society* 44(1-2):189-193.
- , R.J. Prokop and V. Petr. Isolated vertebrae of brittlestars of the Family Klasmuridae Spencer, 1925 (Echinodermata: Ophiuroidea) in the Devonian of Bohemia (Czech Republic). *Journal of the Czech Geological Society* 44(3-4):329-333.
2000. ----- . On the number of rays in starfish. [From the Symposium Evolution of Starfishes: Morphology, Molecules, Development, and Paleobiology presented at the Annual Meeting of the SICB 6-10 January 1999, Denver, Colorado.] *American Zoologist* 40(3):340-354.
- . Inferring the developmental basis of the sea star abnormality ?double ambulacral groove? (Echinodermata: Asteroidea). *Revista Chilena de Historia Natural* 73:579-583.
- McDonald, K., B. M. Waggoner, F. H. C. Hotchkiss & J. A. Harper. Ophiuroids from the Imo Formation (Chesterian: Mississippian) of northern Arkansas. *Geological Society of America Abstracts with Programs* 32(7):A-446.
2001. ----- & P. H. von Bitter. Diminutive ophiuroids of modern aspect from the Lower Carboniferous of Nova Scotia. [Fourth North American Echinoderms Conference, 22-26 August 2001, Darling Marine Center, University of Maine, Walpole, Maine, program and abstracts p. 29.] *Gulf of Mexico Science* 19(2):189-190.
2003. Haude, R. & F. H. C. Hotchkiss. Observations on Aganaster gregarius and Stephanoura belgica (Ophiuroidea: Ophiolepididae). 11th International Echinoderm Conference, Munich, Germany, Oct. 6 – 10 2003, Programme and Abstracts.
2004. Blake, D. B. & F. H. C. Hotchkiss. Recognition of the asteroid (Echinodermata) crown group: implications of the ventral skeleton. *Journal of Paleontology* 78(2):359-370.

PRESENTATIONS/PUBLICATIONS/PATENTS

on ultrasonics and nondestructive testing:

1983. Fowler, K.A. & F.H.C. Hotchkiss. Computer aided design and comprehensive test procedures produce optimized transducer performance and uniformity. Presented at Programme-Colloque Sofranel, Paris, June 1983.
1984. Fowler, K.A., F.H.C. Hotchkiss & T.V. Yamartino. How the user can obtain consistent ultrasonic transducers from multiple sources. Presented at DoD Manufacturing Technology Advisory Group Ultrasonic Workshop, Test & Inspection Subcommittee, 12-14 June 1984, FABTECH WEST, Long Beach, CA.
1987. -----, D.R. Patch & M.E. Stanton. Examples of ways to evaluate tolerances on transducer manufacturing specifications. Presented at ASNT 1987 Spring Conference, Phoenix, AZ. Published in *Materials Evaluation* 45(10):1195-1202.
1988. ----- & J. Castel. Exemples de méthodes d'évaluation des tolérances de traducteurs ultrasonores à partir des spécifications de fabrication. Presented at Programme-Colloque Sofranel, Paris, 2 June 1988.
1989. Van Valkenburg, H.E. & F.H.C. Hotchkiss. Angle-beam calibration blocks: beam index anomalies. Poster presented at 12th World Conference on Non-Destructive Testing, Amsterdam, April 23/28, 1989.
1990. -----. Guide to designs of IIW-type blocks. *NDT International* 23(6):319-331.
Fowler, K. A., D. R. Patch & F. H. Hotchkiss. Ultrasonic transducer assembly. US Patent 04918990.
1992. -----. Guide to designs of IIW-type blocks [with addendum of further observations]. *Welding in the World/Le Soudage dans le Monde* 30(7/8):158-173.
- 1997/98. E.A. Ginzel & F.H.C. Hotchkiss. Ultrasonic beam profile modeling. First published on the Ultrasonic-Testing OnLine Journal (<http://www.ultrasonic.de>) June 1997. Published January 1998 in *CSNDT Journal* 19:19-31.
2000. Cotter, D.J., T.E. Michaels, J.E. Michaels, D. Kass, M.E. Stanton, I.V. Kosenko & F.H.C. Hotchkiss. Low-frequency ultrasonic imaging of composite structures with squirter-based water coupled and air coupled transducers. Presented at 45th International SAMPE Symposium, May 21-25, Long Beach, CA [The Society for the Advancement of Material and Process Engineering]
- Cotter, D.J., T.E. Michaels, J.E. Michaels, D.Kass, M.E. Stanton, I.V. Kosenko & F.H.C. Hotchkiss. Squirter, roller probe, and air-coupled ultrasonic transducer techniques for low frequency inspection of advanced composite materials. 15th World Conference on Non-Destructive Testing, Roma 15-21 October 2000. ISSN 1435-4934 The e-Journal of Nondestructive Testing and Ultrasonics.
<http://www.ndt.net/article/wcndt00/papers/idn215/idn215.htm>
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