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## **LIST OF PUBLICATIONS - FULL**

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### **Books**

- Likens, G.E., and F.H. Bormann. 1995. Biogeochemistry of a forested ecosystem. Springer-Verlag, N.Y. 162 pp. Second Edition 2001.
- Bormann, F. H., Diana Balmori, and Gordon Geballe. 1993. Redesigning the American lawn, a search for environmental harmony. Yale University Press, New Haven, CT. 166 pp. Reprinted in paperback, 1995. Second Edition 2001.
- Bormann, F. H., and S. R. Kellert. 1991. Ecology, economics and ethics: the broken circle. Yale University Press, New Haven, CT. 233 pp. Reprinted in paperback, 1994.
- Bormann, F. H., and G. P. Berlyn, Coordinators. 1981. Age and Growth rate of Tropical Trees: New Directions for Research. Yale University, School of Forestry and Environmental Studies Bulletin 94, New Haven, Connecticut. 137 pp. (Translated into Spanish by Carmen Alicia de la Parra, Instituto Nacional de Investigaciones, Sobre Recursos Bioticos, Apartado Postal 63, Xalapa, Ver., Mexico, November, 1983).
- Bormann, F. H., and G. E. Likens. 1979. Pattern and Process of a Forested System. Springer-Verlag, New York. 253 pp. (Translated into Chinese).
- Likens, G.E., F.H. Bormann, R.S. Pierce, J. S. Eaton, and N. M. Johnson. 1977. The Biogeochemistry of a Northern Hardwood Forest Ecosystem. Springer-Verlag, New York. 146 pp.
- Burch, W.R., Jr., and F.H. Bormann, Editors. 1976. Beyond Growth, Essays on Alternative Futures. Yale University, School of Forestry and Environmental Studies Bulletin 88, New Haven, Connecticut. 228 pp.

### **Publications**

- Likens, G E., and F.H. Bormann. 2008. Environmental challenges in the Twenty-First Century and our respect for nature. 2003 Blue Planet Prize Commemorative Lecture. pp. 78-95. In: A Better Future for the Planet Earth, Vol. III -- Commemorative Book for Blue Planet Prize Winners. Asahi Glass Foundation, Tokyo, Japan.
- Bormann, F.H. 2006. Gas Prices and Land Abandonment. *Frontiers in Ecology and the Environment*. 4(3):122-123.
- Bormann, F.H. 2005. The End of Reductionism? *Frontiers in Ecology and the Environment*. 3(9):472.
- Bormann, B.T., C.K. Keller, D. Wang and F.H. Bormann. 2002. Lessons from the Sandbox: Is Unexplained Nitrogen Real? *Ecosystems*. 5(8):727-733.

- Bormann, B.T., D. Wang, M.C. Snyder, F.H. Bormann, G. Benoit and R. April. 1998. Rapid, plant-induced weathering in an aggrading experimental ecosystem. *Biogeochemistry*. 43(2):129-155.
- Gill, D.S., J.S. Amthor, and F.H. Bormann. 1998. Leaf phenology, photosynthesis, and the persistence of saplings and shrubs in a mature northern hardwood forest. *Tree Physiology*. 18(5):281-289.
- Bormann, F.H. 1995. Confronting the environmental debt. A guest essay in *Living in the Environment* by G. Tyler Miller. Wadsworth Publishing. Belmont, CA.
- Wang, E.X., F.H. Bormann, and G. Benoit. 1995. Evidence of complete retention of atmospheric lead in northern hardwood ecosystems. *Environment, Science and Technology*. 29:735-39.
- Bormann, F.H. 1994. Earth threatened by environmental debt. *New Haven Register*, April 22, 1994.
- Siccama, T.G., S.P. Hamburg, M.A. Arthur, R.D. Yanai, F. H. Bormann, and G.E. Likens. 1994. Corrections of allometric equations and plant tissue chemistry for Hubbard Brook. *Experimental Forest Ecology* 75(1):246-248.
- Bormann, F.H. 1993. Foreword to the dictionary of ecology and environmental science edited by H.A. Art. Henry Holt and Co.
- Wang, D., M.C. Snyder and F.H. Bormann. 1993. Potential errors in measuring nitrogen content of soils low in nitrogen. *Soil Sci. Soc. Am. J.* 57:1533-1536.
- Bormann, B.T., F.H. Bormann, W.B. Bowden, S.P. Hamburg, D. Wang, M.C. Snyder, C.Y. Lee, and R.C. Ingersoll. 1992. Rapid N<sub>2</sub> fixation in pines, alder, and locust: evidence from the sandbox ecosystem study. *Ecology* 74:583-598.
- Bormann, F. H. 1991. Air pollution and temperate forests: creeping degradation? *In: G.W. Woodwell (ed). Earth in Transition: Patterns and Processes of Biotic Impoverishment*. Cambridge University Press, New York. pp. 25-44.
- Bormann, F.H. and S.R. Kellert. 1991. Preface: The global environmental deficit. *In: Ecology, Economics, Ethics: The Broken Circle*. F.H. Bormann and S.R. Kellert. Eds. Yale University Press.
- Bormann, F.H., K.R. Smith and B.T. Bormann. 1991. Earth to Hearth: a microcomputer model for comparing biofuel systems. *Biomass and Energy*. 1:17-34.
- Bormann., F.H. 1991. Contributions to five radio lectures. CJRT. FM. Open College, Toronto.
- Duggin, J.A., G.K. Voigt and F.H. Bormann. 1991. The response of autotrophic and heterotrophic nitrification to clear cutting northern hardwood forest. *Soil Biology and Biochemistry*. 23:779-787.
- Kellert, S.R. and F.H. Bormann. 1991. Closing the circle: weaving strands among ecology, economics, and ethics. *In: Ecology, Economics, Ethics: The Broken Circle*. F.H. Bormann and S. R. Kellert (eds). Yale University Press.
- Wang, D., F.H. Bormann, A. Lugo and R. Bowden. 1991. Comparison of nutrient-use efficiency in five tropical tree taxa. *Forest Ecology and Management*. 46:1-21.
- Amthor, J.S., D.S. Gill, and F.H. Bormann. 1990. Autumnal leaf conductance and apparent photosynthesis by saplings and sprouts in a recently disturbed northern hardwood forest. *Oecologia* 84:93-98.

- Bormann, F.H. 1990. The global environmental deficit. *Viewpoint. BioScience* 40 (2): 74.
- Likens, G.E., F.H. Bormann, C.T. Driscoll, L.O. Hedin and J.S. Eaton. 1990. Dry deposition of sulfur in the Hubbard Brook Experimental Forest. *Tellus*. 42B, 319-329.
- Lugo, A.E., D. Wang, and F.H. Bormann. 1990. A comparative analysis of biomass production in five tropical tree species. *J. Ecology and Forest Management* 31: 153-166.
- Pierce, R.S., F.H. Bormann and G.E. Likens. 1990. Ed. P.F. Folliet and D.P. Guertin. Proceedings of the Workshop, Forest Hydrological Resources in China and Analytical Assessment. Harbin, People's Republic of China. August, 1987.
- Bormann, F.H. 1989. Research and educational goals for the Duke University School of Forestry and Environmental Studies. In: M.L. Matthews (ed.). *Education and Research in natural resources: The next 50 years, Proceedings of the 50th Anniversary Symposium, School of Forestry & Environmental Studies, Duke University, Durham, NC. October 28, 1989.*
- Driscoll, C.T., G.E. Likens, L.O. Hedin and F.H. Bormann. 1989. A reply to C.W. Chen and L.E. Gomez, letter to the Editor, 'Surface Water Chemistry'. *Environ. Sci. Tech.* 23(7):754-755.
- Driscoll, C.T., G.E. Likens, L.O. Hedin, J.S. Eaton, and F.H. Bormann. 1989. Changes in the chemistry of surface waters: twenty-five-year results at the Hubbard Brook Experimental Forest, NH. *Environmental Science & Technology* 23(2):137-143.
- Pletscher, D. H., F. H. Bormann, and R. S. Miller. 1989. Importance of deer compared to other vertebrates in nutrient cycling and energy flow in a northern hardwood ecosystem. *American Midland Naturalist* 121:302-311.
- Hughes, J.W., T.J. Fahey and F.H. Bormann. 1988. Population persistence and demographics of a woodland herb: *Aster acuminatus*, Michx. *Amer. Jour. Bot.* 75:1057-1064.
- Weathers, K. C., G. E. Likens, F. H. Bormann, S. H. Bicknell, B. T. Bormann, B. C. Daube, Jr., J. S. Eaton, J. N. Galloway, W. C. Keene, K. D. Kimball, W. H. McDowell, T.G. Siccamo, D. Smiley, R. A. Tarrant. 1988. Cloud water chemistry from ten sites in North America. *Environmental Science and Technology* 22(9):1018-1026.
- Weathers, K. C., G. E. Likens, F. H. Bormann, J. S. Eaton, K. D. Kimball, J. N. Galloway, T. G. Siccamo, and D. Smiley. 1988. Chemical concentrations in cloud water from four sites in the eastern U.S. *In: Acid Deposition at High Elevation Sites.* M. H. Unsworth and D. Fowler (eds.). Kluwer Academic Publishers, pp. 345-357.
- Bormann, F.H. 1987. Landscape ecology and air pollution. *In: M.G. Turner (ed). Landscape Heterogeneity and Disturbance.* Springer-Verlag, New York, pp. 37-57.
- Bormann, F.H. and G.E. Likens. 1987. Changing perspectives on air-pollution stress. *BioScience* 37(6):370.
- Bormann, F.H., W.B. Bowden, R.S. Pierce, S.P. Hamburg, R.C. Ingersoll, G.E. Likens, and G.K. Voigt. 1987. The Hubbard Brook sandbox experiment. *In: W.R. Jordan III, M.E. Gilpin and J.D. Aber (eds.). Restoration Ecology: A Synthetic Approach to Ecological Research.* Cambridge University Press. New York.

- Hedin, L.O., G.E. Likens and F.H. Bormann. 1987. Decrease in precipitation acidity resulting from decreased SO<sub>4</sub><sup>2-</sup> deposition. *Nature* 325:244-246.
- Hornbeck, J.W., C.W. Martin, R.S. Pierce, F.H. Bormann, G.E. Likens, and J.S. Eaton. 1987. The northern hardwood forest ecosystem: ten years of recovery from clearcutting. U.S.D.A. Forest Service, Northeastern Forest Experiment Station, NE-RP-596. 30 pp.
- Wang, D., and F.H. Bormann. 1987. Letter to the Editor. *Environment, Science and Technology* 21:607.
- Bormann, F.H. 1986. Lessons from Hubbard Brook. *In*: E. Keller, S Cooper and J. De Vries (eds). Proc. of the Chaparral Ecosystems Research Meeting. Santa Barbara, California. California Water Resources Center, Univ. of California, Davis. Report #62. 7 pp.
- Bowden, W.B. and F.H. Bormann. 1986. Transport and loss of nitrous oxide in soil water after forest clear-cutting. *Science* 233:867-869.
- Hornbeck, J.W., C.W. Martin, R.S. Pierce, F.H. Bormann, G.E. Likens and J.S. Eaton. 1986. Clearcutting northern hardwoods: effects on hydrologic and nutrient ion budgets. *Forest Science* 32(3):667-686.
- Martin, C. Wayne, R.S. Pierce, G.E. Likens, F.H. Bormann. 1986. Clearcutting affects stream chemistry in the White Mountains of New Hampshire. USDA Forest Service, Northeastern Forest Experiment Station Research Paper NE-579, Durham, N.H. 12 pp.
- Wang, Deane, D.F. Karnosky and F.H. Bormann. 1986. Effects of ambient ozone on the productivity of *Populus tremuloides* Michx. grown under field conditions. *Can. J. For. Res.* 16:47-55.
- Wang, Deane, F.H. Bormann and D.F. Karnosky. 1986. Regional tree growth reductions due to ambient ozone: evidence from field experiments. *Environ. Sci. Technol.* 20(11):1122-1125.
- Weathers, K.C., G.E. Likens, F.H. Bormann, J.S. Eaton, W.B. Bowden, J.L. Andersen, D.A. Cass, J.N. Galloway, W.C. Keene, K.D. Kimball, P. Huth and D. Smiley. 1986. A regional acidic cloud/fog water event in the eastern United States. *Nature* 319(6055):657-658.
- Bormann, F.H. 1985. Testimony to the Subcommittee on General Oversight, Northwest Power, and Forest Management; Committee on Interior and Insular Affairs; U.S. House of Representatives. Washington, DC. 4 pp. July 16, 1985.
- Bormann, F.H. 1985. Air pollution and forests: an ecosystem perspective. *BioScience* 35(7):434-441.
- Bormann, F.H. 1985. A last walk in Princeton. *Princeton Alumni Weekly*. p. 56.
- Bormann, F.H. and G.E. Likens. 1985. Air and watershed management and the aquatic ecosystem. pp. 436-444. *In*: G.E. Likens (ed.). *An Ecosystem Approach to Aquatic Ecology: Mirror Lake and Its Environment*. Springer-Verlag New York Inc.
- Bormann, R.E., F.H. Bormann, and G.E. Likens. 1985. Catastrophic disturbance and regional land use. pp. 65-72. *In*: G.E. Likens (ed.). *An Ecosystem Approach to Aquatic Ecology: Mirror Lake and Its Environment*. Springer-Verlag New York Inc.

- Likens, G.E. and F.H. Bormann. 1985. An ecosystem approach. pp. 1-8. *In*: G.E. Likens (ed.) *An Ecosystem Approach to Aquatic Ecology: Mirror Lake and Its Environment*. Springer-Verlag, NY Inc.
- Likens, G.E., F.H. Bormann, R.S. Pierce, and J.S. Eaton. 1985. The Hubbard Brook Valley. pp. 9-39. *In*: G.E. Likens (ed.) *An Ecosystem Approach to Aquatic Ecology: Mirror Lake and Its Environment*. Springer-Verlag New York Inc.
- Bormann, F.H. 1984. Factors confounding evaluation of air pollution stress on forests: pollution input and ecosystem complexity. *In*: Symp. by Commission of the European Communities, "Acid Deposition, a Challenge for Europe." Karlsruhe, FRG. September 1983.
- Likens, G.E., F.H. Bormann, R.S. Pierce, J.S. Eaton, and R.E. Munn. 1984. Long-term trends in precipitation chemistry at Hubbard Brook, New Hampshire. *Atmos. Environ.* 18(12):2641-2647.
- Munn, R.E., G.E. Likens, B. Weisman, J.W. Hornbeck, C.W. Martin, and F.H. Bormann. 1984. A meteorological analysis of the precipitation chemistry event samples at Hubbard Brook, New Hampshire. *Atmos. Environ.* 18(12):2775-2779.
- Wood, T., F.H. Bormann, and G.K. Voigt. 1984. Phosphorus cycling in a northern hardwood forest: biological and chemical control. *Science* 223:391-393.
- Amthor, J.S. and F.H. Bormann. 1983. Productivity of perennial ryegrass as a function of precipitation acidity. *Env. Pollution* 32: 137-145.
- Bormann, F.H. 1983. The landscape: air pollution stress and energy policy. *ESPER Journal* No. I:37-40.
- Bormann, F.H. 1982. Air pollution stress and energy policy. *In*: *New England Prospects: Critical Choices in a Time of Change*. C. Reidel (ed.). Univ. Press of New England. Hanover, N.H. pp. 85-140.
- Bormann, F.H. 1982. The vulnerable landscape: the threat to New England. *Yale Alumni Magazine and Journal* XLV(6):10-16.
- Bormann, F.H. 1982. The effects of air pollution on the New England landscape, Part I. *AMBIO* 11(4):188-194.
- Bormann, F.H. 1982. The effects of air pollution on the New England landscape, Part II. *AMBIO* 11(6):338-346.
- Ryan, D.F. and F.H. Bormann. 1982. Nutrient resorption with ecosystem development in northern hardwood forests. *BioScience*. 32:29-32.
- Bormann, F.H. 1981. Ecological implications. *In*: Mergen, F. (ed.). *Tropical forests: Utilization and Conservation*. Yale School of Forestry and Environmental Studies, New Haven, CT. 199 pp.
- Bormann, F.H. and W.H. Smith. 1981. Effects of air pollution on forest ecosystems. pp. 308-318. *In*: *Energy and the Fate of Ecosystems*. Supporting paper No. 8. Report of Resource Information, Impacts Resource Group Risk and Impact Panel of Community Study of

Nuclear and Alternative Energy Systems. National Research Council, National Academy Press, Washington, D.C.

- Bormann, F.H. 1981. Introduction. *In*: H.A. Mooney, T.M. Bonnicksen, N.L. Christensen, J.E. Lotan and W.A. Reiners (eds.). Fire Regimes and Ecosystem Properties. U.S.D.A. Forest Service General Technical Report WO-26.
- Bormann, F.H. 1981. An earth day call for responsibility. Yale Daily News. New Haven, CT. April 22.
- Bormann, F.H. 1981. A review of "Gaia: a new look at life on earth" by J.E. Lovelock. Ecology 62:502.
- Likens, G.E., F.H. Bormann and N.M. Johnson. 1981. Interactions between major biogeochemical cycles in terrestrial ecosystems. pp. 93-112. *In*: G.E. Likens (ed.). Some Perspectives of the Major Biogeochemical Cycles. SCOPE 17. John Wiley & Sons, Ltd., Chichester.
- Sprugel, D.G. and F.H. Bormann. 1981. Natural disturbance and the steady state in high-altitude balsam fir forests. Science 211(4479): 390-393.
- Eaton, J.S., G.E. Likens and F.H. Bormann. 1980. Wet and dry deposition of sulfur at Hubbard Brook. pp. 69-75. *In*: T.C. Hutchinson and M. Havas (eds.). Effect of Acid Precipitation on Terrestrial Ecosystems. NATO Conf. Series 1: Ecology 4. Plenum Publishing Corp.
- Likens, G.E., F.H. Bormann and J.S. Eaton. 1980. Variations in precipitation and streamwater chemistry at the Hubbard Brook Experimental Forest during 1964 to 1977. pp. 443-464. *In*: T.C. Hutchinson and M. Havas. (eds.). Effects of Acid Precipitation on Terrestrial Ecosystems. NATO Conference Series 1: Ecology 4. Plenum Publishing Corp.
- Likens, G.E., F.H. Bormann and N.M. Johnson. 1980. Interactions between major biogeochemical cycles: terrestrial cycles. *In*: G.E. Likens (ed.). Interactions Between Major Biogeochemical Cycles. SCOPE IVth General Assembly, Stockholm, Sweden. John Wiley & Sons Ltd.
- Melillo, J.M. and F.H. Bormann. 1980. Reorganization of a terrestrial ecosystem following a perturbation. pp. 28-32. *In*: O.L. Loucks (ed.). The Study of Species Transients, Their Characteristics and Significance for Natural Resource Systems. Report from the Workshop "Analysis of Transient Events in Ecosystems." The Institute of Ecology, Indianapolis, Indiana.
- Bormann, F.H. and G.E. Likens. 1979. Catastrophic disturbance and the steady state in northern hardwood forests. Amer. Sci. 67(6):660-669.
- Likens, G.E. and F.H. Bormann. 1979. The role of watershed and airshed in lake metabolism. pp. 95-211. *In*: W. Rodhe, G.E. Likens and C. Serruya (eds.). Lake Metabolism and Management. Papers Emanating from the Jubilee Symposium of Uppsala University, Sweden. Arch. Hydrobiol. Beih. Ergebn. Limnol. 13.
- Whittaker, R.H., G.E. Likens, F.H. Bormann, J.S. Eaton and T.G. Siccama. 1979. The Hubbard Brook Ecosystem Study: forest nutrient cycling and element behavior. Ecology 60(1):203-220.
- Bormann, F.H. 1978. Earthcare and temperate forests. *In*: Earthcare: Global Protection of Natural

Areas. Ed. by E.A. Schofield. Westview Press.

- Eaton, J.S., G.E. Likens and F.H. Bormann. 1978. The input of gaseous and particulate sulfur to a forest ecosystem. *Tellus* 30:546-551.
- Gosz, J.R., R.T. Holmes, G.E. Likens and F.H. Bormann. 1978. The flow of energy in a forest ecosystem. *Sci. Amer.* 238(3):92-102.
- Likens, G.E., F.H. Bormann, R.S. Pierce and W.A. Reiners. 1978. Recovery of a deforested ecosystem. *Science* 199(4328):492-496.
- Mahall, B.E. and F.H. Bormann. 1978. A quantitative description of the vegetative phenology of herbs in a northern hardwood forest. *Bot. Gaz.* 139:467-481.
- Bormann, F.H., G.E. Likens and J. Melillo. 1977. Nitrogen budget for an aggrading northern hardwood ecosystem. *Science* 196:981-983.
- Bormann, F.H. and G.E. Likens. 1977. The fresh air - clean water exchange. *Natural History* 86(9):62-71.
- Likens, G.E., F.H. Bormann, R.S. Pierce, J.S. Eaton and N.M. Johnson. 1977. *Biogeochemistry of a Forested Ecosystem*. Springer-Verlag New York Inc. 146 pp.
- Bormann, F.H. 1976. An inseparable linkage: conservation of natural ecosystems and the conservation of fossil energy. *BioScience* 26:754-760.
- Gosz, J.R., G.E. Likens and F.H. Bormann. 1976. Organic matter and nutrient dynamics of the forest floor in the Hubbard Brook forest. *Oecologia* 22:305-320.
- Muller, R.N. and F.H. Bormann. 1976. Role of *Erythroconium americanum* ker. by energy flow and nutrient dynamics of a northern hardwood forest ecosystem. *Science* 193:1126-1128.
- Wood, T. and F.H. Bormann. 1976. Short-term effects of a simulated acid rain upon the growth and nutrient relations of *Pinus strobus* L. pp. 815-825. *In*: L.S. Dochinger and T.A. Seliga (eds.). *Proc. The First Internat. Symp. on Acid Precipitation and the Forest Ecosystem*. U.S.D.A. Forest Service General Tech. Report NE-23; ALSO *Water, Air and Soil Pollution* 7:479-488 (1977).
- Bormann, F.H. and G.E. Likens. 1975. The role of nature in the urbanized landscape. *Natural History*.
- Hornbeck, J.W., G.E. Likens, R.S. Pierce and F.H. Bormann. 1975. Strip cutting as a means of protecting site streamflow quality when clearcutting northern hardwoods. pp. 209-229. *In*: B. Bernier and C.H. Winget (eds.). *Proc. 4th No. Amer. Forest Soils Conf. on Forest Soils and Forest Land Management*, August 1973. Quebec, Canada.
- Likens, G.E. and F.H. Bormann. 1975. Acidity in rainwater: Has an explanation been presented? *Science* 188:957-958.
- Likens, G.E. and F.H. Bormann. 1975. An experimental approach in New England landscapes. pp. 7-29. *In*: A.D. Hasler (ed.). *Proc. INTECOL Symp. on Coupling of Land Water Systems*, 1971. Leningrad. Springer-Verlag, New York.

- Likens, G.E., F.H. Bormann, J.S. Eaton, R.S. Pierce and N.M. Johnson. 1975. Hydrogen ion input to the Hubbard Brook Experimental Forest, New Hampshire during the last decade. *In: Proc. First. Internat. Symp. on Acid Precipitation and the Forest Ecosystem*, May 1975; U.S.D.A. Forest Service. Columbus, Ohio.
- Likens, G.E., N.M. Johnson, J.N. Galloway and F.H. Bormann. 1975. Acid precipitation: strong and weak acids. *Science* 194:643-645.
- Wood, T. and F.H. Bormann. 1975. Increases in foliar leaching caused by acidification of an artificial mist. *Ambio* 4(4):169-171.
- Art, H.W., F.H. Bormann, G.K. Voigt and G.M. Woodwell. 1974. Barrier Island Forest ecosystem: role of meteorologic nutrient inputs. *Science* 184:60-62.
- Bormann, F.H. 1974. Acid rain and the environment future. *Environ. Conser.*, p. 270.
- Bormann, F.H., G.E. Likens, T.G. Siccama, R.S. Pierce and J.S. Eaton. 1974. The export of nutrients and recovery of stable conditions following deforestation at Hubbard Brook. *Ecol. Monogr.* 44(3):255-277.
- Likens, G.E. and F.H. Bormann. 1974. Acid rain: a serious regional environmental problem. *Science* 184(4142):1176-1179.
- Likens, G.E. and F.H. Bormann. 1974. Effects of forest clearing on the northern hardwood forest ecosystem and its biogeochemistry. pp. 330-335. *In: Proc. First Internat. Congr. Ecology*, Sept. 1974, Centre Agric. Publ. Doc. Wageningen, The Hague.
- Likens, G.E. and F.H. Bormann. 1974. Linkages between terrestrial and aquatic ecosystems. *BioScience* 24(8):447-456.
- Whittaker, R.H., F.H. Bormann, G.E. Likens and T.G. Siccama. 1974. The Hubbard Brook Ecosystem Study: forest biomass and production. *Ecol. Monogr.* 44(2):233-254.
- Wood, T. and F.H. Bormann. 1974. The effects of an artificial acid mist upon the growth of *Betula alleghaniensis*. *Britt. Environ. Pollut.* 7:259-268.
- Bormann, F.H. 1973. The far environment and its impact on the family. In: *Proc. Colloquium on the Family and the Environment*, Univ. of Connecticut, Storrs.
- Bormann, F.H., G.E. Likens. 1973. Report for the Site Visit by the National Science Foundation to the Hubbard Brook Ecosystem Study.
- Eaton, J.S., G.E. Likens and F.H. Bormann. 1973. Throughfall and stemflow chemistry in a northern hardwood forest. *J. Ecol.* 61(2):495-508.
- Gosz, J.R., G.E. Likens and F.H. Bormann. 1973. Nutrient release from decomposing leaf and branch litter in the Hubbard Brook Forest, New Hampshire. *Ecol. Monogr.* 43(2):173-191.
- Bormann, F.H. 1972. The American dream: can it evolve? pp. 105-117. *In: J.G. Holway and J.G. New (eds.). Search for a Quality of Life, Challenge of the 1970's*. State Univ. College of Oneonta, New York.



- Bormann, F.H., P. Sears, G.M. Woodwell. 1970. Yale Reports. Sunday, April 12, 1970-#550.
- Bormann, F.H. 1972. Unlimited growth: growing, growing, gone? *BioScience* 22(12):706-709.
- Bormann, F.H. 1972. Urgently needed: A nationwide appraisal of the growth problem. *In:* Environmental Affairs 2(2), The Environmental Law Center, Boston College Law School, Brighton, Massachusetts.
- Gosz, J.R., G.E. Likens and F.H. Bormann. 1972. Nutrient content of litterfall on the Hubbard Brook Experimental Forest, New Hampshire. *Ecology* 53(5):769-784.
- Likens, G.E. and F.H. Bormann. 1972. Biogeochemical cycles. *The Science Teacher* 39(4):15-20.
- Likens, G.E. and F.H. Bormann. 1972. Nutrient cycling in ecosystems. pp. 25-67. *In:* J. Wiens (ed.). Ecosystem Structure and Function. Oregon State Univ. Press, Corvallis.
- Likens, G.E., F.H. Bormann and N.M. Johnson. 1972. Acid rain. *Environment* 14(2):33-40.
- Marks, P.L. and F.H. Bormann. 1972. Revegetation following forest cutting: mechanisms for return to steady state nutrient cycling. *Science* 176:914-915.
- Pierce, R.S., C.W. Martin, C.C. Reeves, G.E. Likens and F.H. Bormann. 1972. Nutrient loss from clearcuttings in New Hampshire. pp. 285-295. *In:* Symp. on Watersheds in Trans., Ft. Collins, Colorado.
- Bormann, F.H. 1971. Comments on the National Environmental Laboratory Bill S. 3410. pp. 335-339. *In:* National Environmental Laboratories, Serial No. 92-3. U.S. Govt. Printing Office.
- Bormann, F.H. 1971. U.S. Senate, Subcommittee on Air and Water Pollution on the Committee on Public Works. National Environmental Laboratories. pp. 309-321.
- Bormann, F.H., M.F. Cushman, T. Dominski, T.G. Siccama and D.G. Sprugel. 1971. The Ecological Register for the New England States. *Ecol. Soc. Amer.*
- Bormann, F.H. and G.E. Likens. 1971. The ecosystem concept and the rational management of natural resources. *Yale Sci. Mag.* 45(7):2-8.
- Bormann, F.H. 1971. Diminishing Man. *Ecology Today* pp. 11-16.
- Likens, G.E., F.H. Bormann, R.S. Pierce and D.W. Fisher. 1971. Nutrient-hydrologic cycle interaction in small forested watershed-ecosystems. pp. 553-563. *In:* P. Duvigneaud (ed.). Proc. Brussels Symp. on Productivity of Forest Ecosystems (1969). UNESCO, Paris.
- Bormann, F.H., T.G. Siccama, G.E. Likens and R.H. Whittaker. 1970. The Hubbard Brook Ecosystem Study: composition and dynamics of the tree stratum. *Ecol. Monogr.* 40(4):373-388.
- Ledig, F.T., F.H. Bormann and K. Wenger. 1970. Distribution of dry matter growth between shoot and root in loblolly pine seedlings. *Botanical Gazette* 131:349-459.

- Likens, G.E. and F.H. Bormann. 1970. Chemical analyses of plant tissues from the Hubbard Brook Ecosystem in New Hampshire. Yale Univ. School of Forestry Bull. 79, 25 pp.
- Likens, G.E., F.H. Bormann, N.M. Johnson, D.W. Fisher and R.S. Pierce. 1970. Effects of forest cutting and herbicide treatment on nutrient budgets in the Hubbard Brook watershed-ecosystem. Ecol. Monogr. 40(1):23-47.
- Pierce, R.S., J.W. Hornbeck, G.E. Likens and F.H. Bormann. 1970. Effects of elimination of vegetation on stream water quantity and quality. pp. 311-328. *In: Internat. Symp. on Results of Research on Representative and Experimental Basins.* Wellington, New Zealand. Internat. Assoc. Sci. Hydrol.
- Siccama, T.G., F.H. Bormann and G.E. Likens. 1970. The Hubbard Brook Ecosystem Study: productivity, nutrients and phytosociology of the herbaceous layer. Ecol. Monogr. 40(4):389-402.
- Bormann, F.H. 1970. The ecosystem concept-necessary basis for land use. SAF New England section. March 12, 1970.
- Bormann, F.H. 1970. Subtraction by multiplication: population, technology and the diminished man. Yale Alumni Magazine, May:38-42.
- Bormann, F.H. 1970. Testimony on Water Quality Legislation, U.S. Senate. May 26, 1970 Congressional Record.
- Bormann, F.H., and G.K. Voigt. 1970. Introduction. *In: H.W. Helfrich, Jr. (ed.). The Environmental Crisis.* Yale U. Press, New Haven, CT. pp. ix-x.
- Bormann, F.H. and G.E. Likens. 1970. The nutrient cycles of an ecosystem. Sci. Amer. 223(4):92-101.
- Bormann, F.H. 1969. A holistic approach to nutrient cycling problems in plant communities. Symp. in Terrestrial Plant Ecology, Antigonish, Nova Scotia (1966). Nova Scotia Museum Publ., Halifax. pp. 149-165.
- Bormann, F.H. 1969. The ecosystem concept-the necessary basis for multiple use. pp. 21-26. *In: Proc. Conf. on Multiple - Use of Southern Forests.* Pine Mountain, Georgia.
- Bormann, F.H. 1969. Testimony on H.R. 6750 "To amend the Fish and Wildlife Coordination Act. to provide for the establishment of a Council on Environmental Quality and for other purposes." June 26, 1969 Congressional Record.
- Bormann, F.H. and G.E. Likens. 1969. A watershed approach to problems of nutrient cycling in forest ecosystems. pp. 2303-2306. *In: Proc. 6th World Forestry Congress, Vol. 2, Tech. Comm. III.* Madrid, Spain.
- Bormann, F.H. and G.E. Likens. 1969. The watershed-ecosystem concept and studies of nutrient cycles. pp. 49-79. *In: G.M. VanDyne (ed.). The Ecosystems Concept in Natural Resource Management.* Chapter IV, Academic Press, Inc., New York.
- Bormann, F.H., G.E. Likens and J.S. Eaton. 1969. Biotic regulation of particulate and solution losses from a forest ecosystem. BioScience 19(7):600-610.

- Eaton, J.S., G.E. Likens and F.H. Bormann. 1969. Use of membrane filters in gravimetric analyses of particulate matter in natural waters. *Water Resour. Res.* 5(5):1151-1156.
- Johnson, N.M., G.E. Likens, F.H. Bormann, D.W. Fisher and R.S. Pierce. 1969. A working model for the variation in stream water chemistry at the Hubbard Brook Experimental Forest, New Hampshire. *Water Resour. Res.* 5(6):1353-1363.
- Likens, G.E., F.H. Bormann and N.M. Johnson. 1969. Nitrification: importance to nutrient losses from a cutover forested ecosystem. *Science* 163(3872):1205-1206.
- Bormann, F.H., G.E. Likens, D.W. Fisher and R.S. Pierce. 1968. Nutrient loss accelerated by clear-cutting of a forest ecosystem. *Science* 159(3817):882-884; Also, pp. 187-195. *In: Proc. Symp. on Primary Productivity and Mineral Cycling in Natural Ecosystems.*
- Bormann, F.H. and G.K. Voigt. 1968. The School of Forestry and the environment crisis. *Yale Forest School News* 56(2):36.
- Fisher, D.W., A.W. Gambell, G.E. Likens and F.H. Bormann. 1968. Atmospheric contributions to water quality of streams in the Hubbard Brook Experimental Forest, New Hampshire. *Water Resour. Res.* 4(5):1115-1126.
- Johnson, N.M., G.E. Likens, F.H. Bormann and R.S. Pierce. 1968. Rate of chemical weathering of silicate minerals in New Hampshire. *Geochem. Cosmoch. Acta* 32:531-545.
- Smith, W.H., F.H. Bormann and G.E. Likens. 1968. Response of chemoautotrophic nitrifiers to forest cutting. *Soil Science* 106(6):471- 473.
- Bormann, F.H. and G.E. Likens. 1967. Nutrient cycling. *Science* 155(3761):424-429.
- Likens, G.E., F.H. Bormann, N.M. Johnson and R.S. Pierce. 1967. The calcium magnesium, potassium and sodium budgets for a small forested ecosystem. *Ecology* 48(5):772-785.
- Bormann, F.H. 1966. The need for a federal system of natural areas for scientific research. *BioScience* 16:585-586. (editorial)
- Bormann, F.H. 1966. The structure, function, and ecological significance of root grafts in *Pinus strobus* L. *Ecol. Monogr.* 36:1-26.
- Bormann, F.H. 1966. Testimony before the committee on interior and insular affairs, U.S. Senate, 89th Congress, 2nd Session on S.2282. pp. 72-76.
- Graham, B.F., Jr. and F.H. Bormann. 1966. Natural root grafts. *Bot. Rev.* 32(3):255-292.
- Bormann, F.H. 1965. Changes in the growth pattern of white pine trees undergoing suppression. *Ecology* 46(3):269-277.
- Bormann, F.H. and M.F. Buell. 1964. Old-age stand of hemlock-northern hardwood forest in central Vermont. *Bull. Torrey Bot. Club* 91(6):451-465.
- Bormann, F.H. 1963. Ontogenetic relationships of the primary leaf on *Pinus taeda* L. and *P. echinata* Mill. *Bull. Torrey Bot. Club* 90(5):320-332.

- Myers, O., Jr. and F.H. Bormann. 1963. Phenotypic variation in *Abies balsamea* in response to altitudinal and geographic gradients. *Ecology* 44(3):429-436.
- Bormann, F.H. 1962. Intraspecific root grafting and noncompetitive relationships between forest trees. pp. 237-246. *In: Proc. Symp. on Tree Growth, Tucson, Arizona.* Ronald Press.
- Bormann, F.H. and T.T. Koslowski. 1962. Measurements of tree ring growth with dial-gauge dendrometers and vernier tree ring bands. *Ecology* 43(2):289-294.
- Lyon, C.J. and F.H. Bormann (eds.). 1962. Natural areas of New Hampshire suitable for ecological research. Dept. of Biol. Sci. Publ. No. 2.
- Bormann, F.H. 1961. Intraspecific root grafting and the survival of eastern white pine stumps. *For. Sci.* 7(3):247-256.
- Bormann, F.H. 1961. Intraspecific root grafts and transport. *Rec. Adv. Bot.* 2:1309-1311.
- Bormann, F.H. and B.F. Graham. 1961. A study of intraspecific root grafts in white pine, *Pinus strobus* L., by means of radioisotopes and dyes. *Rec. Adv. Bot. Sec.* 12:1375-1377.
- Bormann, F.H. 1960. Individuality in forest trees. *Dartmouth Alumni Mag.* Feb:43-45.
- Bormann, F.H. and B.F. Graham, Jr. 1960. Translocation of silvicides through root grafts. *J. For.* 58(5):402-403.
- Bormann, F.H. and B.F. Graham, Jr. 1959. The occurrence of natural root grafting in eastern white pine, *Pinus strobus* L., and its ecological implications. *Ecology* 40(4):677-691.
- Bormann, F.H. 1958. The relationships of ontogenic development and environmental modification to photosynthesis in *Pinus taeda* seedlings. pp. 197-215. *In: K. Thimann (ed.). Tree Physiology* 10.
- Bormann, F.H. and R.B. Platt. 1958. A disjunct stand of hemlock in the Georgia Piedmont. *Ecology* 39(1):16-23.
- Bormann, F.H., P.R. Shafer and D. Mulcahy. 1958. Fallout on the vegetation of New England during the 1957 atom bomb test series. *Ecology* 39(2):376-378.
- Bormann, F. H. 1958. The statistical efficiency of sample plot size and shape in forest ecology. *Ecology* 43(3):474-487.
- Bormann, F.H. 1957. Moisture transfer between plants through intertwined root systems. *Plant Physiol.* 32(1):48-55.
- Bormann, F.H. 1956. Ecological implications of changes in the photosynthetic response of *Pinus taeda* seedlings during ontogeny. *Ecology* 37(1):70-75.
- Bormann, F.H. 1956. Percentage light readings, their intensity-duration aspects, and their significance in estimating photosynthesis. *Ecology* 37(3):473-476.
- Bormann, F.H. 1955. The primary leaf as an indicator of physiologic condition in shortleaf pine. *For.*

Sci. 1(3):189-192.

Bormann, F.H. and A.V. Beatty. 1955. Chromosome studies of plants from the Arctic slope of Alaska. I. Ranunculaceae. Bull. Torrey Bot. Club 82(2):118-120.

Buell, M.F. and F.H. Bormann. 1955. Deciduous forests of Ponemah Point, Red Lake Indian Reservation, Minnesota. Ecology 36(4):646-658.

Bormann, F.H. 1953. Factors determining the role of loblolly pine and sweetgum in early old-field succession in the Piedmont of North Carolina. Ecol. Monogr. 23:339-358. George Mercer Award, ESA.

Bormann, F.H. 1953. The statistical efficiency of sample plot size and shape in forest ecology. Ecology 34(3):474-487.

