

CURRICULUM VITAE

of

John Cairns, Jr.

as of

January 2012

Home Address: 1060 Showalter Drive, Apt. 202, Warm Hearth Village
Blacksburg, Virginia 24060-6298 USA

Office Address: Department of Biological Sciences
Virginia Polytechnic Institute and State University
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Birth: May 8, 1923—Conshohocken, Pennsylvania

Marital Data: Married—August 5, 1944, to Jean Barbara Ogden
Children—Karen Jean
Stefan Hugh
Duncan Jay
Heather

Education: Conshohocken High School, Pennsylvania, 1940
Swarthmore College—A.B., 1947—biology/chemistry/physics
University of Pennsylvania—M.S., 1949—zoology
University of Pennsylvania—Ph.D., 1953—zoology
Hahnemann Medical College—1-year postdoctoral course in isotope methodology, 1955

Positions Held: Academy of Natural Sciences of Philadelphia
Assistant Curator of Limnology, 1948-54
Associate Curator of Limnology, 1954-61
Curator of Limnology, 1961-66
Acting Chairman of Limnology Department 1 year
(Dr. Patrick's leave of absence for Diatom Manual)
Assistant Chairman, 1963-66
University of Kansas, Lawrence, Kansas
Professor of Zoology, 1966-68
Associate Chairman, Department of Zoology, 1967-68
Virginia Polytechnic Institute and State University
Research Professor of Zoology, 1968-72
University Center for Environmental and Hazardous Materials Studies
Director, 1970-95
Emeritus, 1995-present
University Distinguished Professor of Environmental Biology, 1972-95
Emeritus, 1995-present

Temporary Teaching Positions:

Rocky Mountain Biological Laboratory, Crested Butte, Colorado
Summer 1961-63, 1971, 1984-1987, 1989-94 (research only in 1984 and 1988)
Temple University, Philadelphia, Pennsylvania—1962-63
Director—NSF Institute, Dr. H. Kranzer, Department of Education, Temple University
University of Michigan Biological Station, Pellston, Michigan
Summer 1964-70, 1972-83

Military Service: U. S. Navy, 1942-46

Honors:

Research Associate, Academy of Natural Sciences of Philadelphia, 1967
Fellow, American Association for the Advancement of Science, 1969
Presidential Commendation, 1971
University Distinguished Professor of Environmental Biology, Virginia Polytechnic Institute and State University, 1972
Honorary Member, Phi Sigma Society, 1974
Charles B. Dudley Award for outstanding publication, American Society for Testing and Materials, 1978
Superior Achievement Award, U.S. Environmental Protection Agency, 1980
Nieuwland Lecturer, University of Notre Dame, 1980
President, American Microscopic Society, 1980-81
Founders' Award, Society for Environmental Toxicology and Chemistry, 1982
Icko Iben Award for Interdisciplinary Research, American Water Resources Association, 1984
Morrison Medal for Outstanding Accomplishments in the Environmental Sciences (Awarded at American Chemical Society Pacific Rim Conference), 1984
United Nations Environmental Programme Medal for unique and significant contributions to Environmental Restoration and Sustainability, 1988
Fellow, American Academy of Arts and Sciences, 1988
Award of Excellence, American Fisheries Society, 1989
Life Achievement Award in Science from the Commonwealth of Virginia and the Science Museum of Virginia, 1991
Member, National Academy of Sciences, 1991
Foreign Member,* Linnean Society of London, 1993
Festschrift, Arranged by present and former students in honor of my 70th birthday, May 1993
Abel Wolman Distinguished Lecture, U.S. National Academy of Science, December 1994
Honorary Member, Phi Beta Kappa, May 1994
Doctor of Science, State University of New York at Binghamton, May 1994
Distinguished Scientist Award, American Institute of Biological Sciences, August 6, 1995
Literati Club (England) Award for Outstanding Paper in Environmental Management and Health (Professor Rose Award), 1995
Fellow, Association for Women in Science, February 9, 1996
Member, International Ecology Institute, Oldendorf/Luhe, Germany, 1998
Fellow, Virginia Academy of Sciences, March 1998
Fellow and Founding Member, Eco-Ethics International Union, 1998
Member, American Philosophical Society, 1999
Twentieth Century Distinguished Service Award, International Statistical Institute, 1999
Presented at the Ninth Lukas Symposium, Bowling Green State University, OH
Member, Organizing Committee for the International Symposium "The Future of Life and the Future of Our Civilization," Hiroshima, Japan, August 2001
Ruth Patrick Award, American Society for Limnology and Oceanography, February 2001
Sustained Achievement Award, Renewable Natural Resources Foundation, November 2001
Morrill Chapter, Alpha Zeta, Class of 1944 as of 13 March 2002
Special Session "Putting the Eco in Ecotoxicology," November 18, 2008, dedicated to John Cairns, Jr., Society of Environmental Toxicology and Chemistry, Annual Meeting, Tampa, Florida
Founding Member, Center for Research of the Future, 2009-present
Society for Environmental Chemistry and Toxicology named my 1988 paper, "Putting the Eco in Ecotoxicology," as one of nine papers to "read before you die"
Staff Member, International Center for Research of the Future, 2011

*Approximately 50 since the Society was founded

Professional Certifications:

Certified Environmental Professional 02232, Academy of Board Certified Environmental Professionals,
June 15, 1991-present
Qualified Fisheries Administrator, American Fisheries Society, April 8, 1977-present
Senior Ecologist, Ecological Society of America, May 1, 1992-98

Gordon Research Conferences:

Discussion Leader, Gordon Research Conference, Stream Sanitation—1956
Discussion Leader, Gordon Research Conference, Environmental Sciences: Water—1964
Session Chairman, Gordon Research Conference, Environmental Sciences: Water—1966
Discussion Leader, Gordon Research Conference, Hazardous Material—1973

Society Memberships:

American Association of University Professors
American College of Toxicology
American Fisheries Society (Certified Fisheries Scientist)
American Institute of Biological Sciences—Member-at-large, Governing Board, 1976-79
American Microscopical Society—Vice-President, 1968-69; President-elect, 1979; President, 1980
American Water Resources Association—Research Committee, 1981
Association of Southeastern Biologists Aquatic Ecosystem Health and Management Society, Founding
Member
Ecological Society of America, Program Chairman, Aquatic Ecology Section, 1978-79
Institute of Ecology—Founder
International Association for Ecology
Rocky Mountain Biological Laboratory—Trustee, 1962-73; Vice-President, 1971-72
Society for Ecological Restoration and Management, Charter Member, 1988
Society of Environmental Toxicology and Chemistry
Society of Sigma Xi
Virginia Academy of Science
Water Pollution Control Federation—Chairman, Committee on Toxic Chemicals, 1978-80

Biographical Summaries:

Marquis—Who's Who in America, 31-54th editions
Marquis—Who's Who in the East
Marquis—Who's Who in Frontier Science and Technology
Marquis—Who's Who in the Midwest
Marquis—Who's Who in Science
Marquis—Who's Who in Science and Engineering, 1st-5th editions
Marquis—Who's Who in the South and Southwest, 10-26th editions
American Men and Women of Science, 7-18th editions
The Biographical Roll of Honor
Biography of the Year, First Presidential Edition, 1987
Biological Science—Who's Who in Ecology, 1973
Community Leaders in America
Community Leaders and Noteworthy Americans, 10th edition-present
Dictionary of International Biography
The Directory of Distinguished Americans
Directory of North American Fisheries & Aquatic Scientists
Guide to Specialists in Toxic Substances
International Book of Honor
International Dictionary of Distinguished Leadership
International Scholars Directory
International Who's Who in Community Service
International Who's Who of Contemporary Achievement
Men of Achievement, 4-13th editions
Outstanding Educators of America
Personalities of America, 1-4th editions
Personalities of the Americas—First Commemorative Edition
Personalities of the South, 8-13th editions
Research Programs in Medical Sciences—1st edition
Strathmore's Who's Who
Two Thousand Notable Americans, 1-3rd editions

Who's Who in American Education, 3rd-4th editions
Who's Who in Education (Leaders in American Science Edition)
Who's Who in Health Care, 1-2nd editions
Who's Who in Society, 1988
Who's Who in Technology, 1-6th editions
Who's Who in the World, 1-13th editions
Who's Who Registry of Global Business Leaders
World Environmental Directory, 1-6th editions
World Who's Who in Science 1700 BC-1968 AD
World Who is Who and Does What in Environment & Conservation, 1997
2000 Outstanding Scientists, 2008/2009

Courses Taught:

Ethics and Science
Protozoology
Limnology
Microbial Population and Community Dynamics
Ecology
General Biology
Stressed Ecosystems
Aquatic Ecology
Environmental Science—Water
Comparative Aquatic Ecology
Ecology of Polluted Waters
General Physiology
Environmental Science—Management
Extrachromosomal Inheritance
Generating a Scientific Data Base for Societal Decisions
Biological Testing of Hazardous Chemicals
Hazard Evaluation and Ecosystem Risk Analysis
Winning the Games Scientists Play
Politics, Economics, Science—Going Beyond Disciplinary Boundaries to Protect Natural Ecosystems
Restoration Ecology

Major Non-Departmental Activities, University of Kansas:

Graduate Council (Elected)
University Senate Committee on Scholarly Publications (Appointed)
Chairman, Graduate Council Subcommittee on Student Admission Fees

Major Non-Departmental Activities, Virginia Polytechnic Institute and State University:

Research Council
President's Special Committee on Research
Committee on Graduate Programs
Cunningham Graduate Fellowship Committee
Advisory Board, Center for Public Choice
National Speakers Forum Committee
Rufner Award Committee
Committee on Center for Excellence in Undergraduate Teaching

Representative organizations with which I have been associated as consultant or to carry out research:

American Electric Power Company
American Petroleum Institute
Appalachian Power Company
Atomic Energy Commission
Bio-Test, Incorporated
Brandywine Valley Association
British Petroleum, Ltd.
Brookings Institute
Buckeye Cellulose Corporation
Campbell Soup Company
Center for Ecological Health Research

City of Philadelphia
Committee on Scholarly Communication with the People's Republic of China, National Academy of Sciences
Congressional Committee on Environmental Quality
Council for Scientific and Industrial Research, South Africa
Conservation, Air, and Water Europe
Diamond Match Company
E. I. duPont de Nemours and Company
Environmental Defense Fund
Environmental Information Institute
Environmental Protection Agency
FMC Corporation
French Creek Watershed Association
General Motors
General Reilly Group, Incorporated
Hamilton Paper Company
Hercules Incorporated
International Joint Commission (U.S.A. and Canada)
International Paper Company
Koppers Company, Incorporated
Man and the Biosphere Program – U.S. National Commission for UNESCO
Manufacturing Chemists Association
Martin Marietta
Merck Company, Incorporated
National Academy of Engineering
National Academy of Sciences
National Association of State Universities and Land-Grant Colleges
National Planning Association
National Research Council
National Wildlife Federation
New Jersey Zinc Company
NATO (North Atlantic Treaty Organization)
Office of Technology Assessment, U.S. Congress
Olin Chemical
Potomac Electric Power Company
Program Committee, International Water Pollution Research and Control, United Kingdom, September, 1984
Procter & Gamble
Scientific Group on Methodologies for the Safety Evaluation of Chemicals (68, National Academy of Sciences)
Scientists' Institute for Public Information
Senior Scholar Exchange Program, United Nations
Standard Oil of Indiana
The Soap and Detergent Association
State of California
State of Pennsylvania
State of Virginia
Statens Naturvardsverk (The National Swedish Environmental Protection Board)
Swedish Agency for Research—Cooperation with Developing Countries
Teledyne, Brown Engineering
Texas Gulf Sulfur Company
Third World Science Advisory Board
Time-Life Incorporated
TVA
U.S. Army Corps of Engineering—Waterways Experiment Station
U.S. Army Medical Research and Development Command
United Nations
University of Kalyani
University of Louisville
University of Mississippi
Virginia Farm Bureau Federation, Advisor
Wetlands Fund, Inc.
The Wilderness Conservancy at Mountain Lake, Board Member through March 2000

Service on National Research Council (the operating arm of the National Academy of Sciences and National Academy of Engineering) Committees:

Panel on Freshwater Aquatic Life and Wildlife, Water Quality Criteria 1972, 594 pp.
Committee for the Working Conference on Principles of Protocols for Evaluating Chemicals in the Environment, Principles for Evaluating Chemicals in the Environment, 1975, 454 pp.
Committee for Study of Environmental Manpower, Commission on Human Resources, Manpower for Environmental Pollution Control, 1977, 427 pp.
Military Environmental Research Committee (Installation Renovation Subcommittee), 1977-78
Geophysics Study Committee, Geophysics Research Council Board (to produce report Scientific Basis of Water Resource Management), 1979
Five-Year Research Outlook (Chapter 8—Water Resources)
Committee for Water Supply Reviews
Committee on Ecotoxicology (Chairman), Testing for Effects of Chemicals on Ecosystems, 1981, 98 pp;
Working Documents for Testing for Effects of Chemicals on Ecosystems, 1981
Committee on Application of Ecological Theory to Applied Problems, 1982
Environmental Studies Board (September 1980-October 1982)
Task Force on the Ecological Classification System for Implementing Environmental Quality Evaluation Procedures, 1981
Water Science and Technology Board (Founding Member), 1982-85
Chair, Committee on Restoration of Aquatic Ecosystems: Science, Technology and Public Policy, 1989-92
Committee on U.S. Geological Services Water Resources Research, 1991-93
Committee on Waste Disposal Options, 1992-93
Board of Environmental Studies and Toxicology (BEST), 1992-93
Correspondent, National Academy of Sciences Committee on Human Rights, 1991-present
Report Review Committee (Final approval of all National Academy Press publications), 1993-98

Service on Other Committees of National Importance:

Advisor, Division of Forestry, Fisheries, and Wildlife, TVA
Advisor, Laboratory Reorganization Committee, Office of the Administrator, U.S. Environmental Protection Agency
American Institute of Biological Sciences, Task Force for the '90s, 1990-2000
Biological Assessment Methods, American Society for Testing and Materials
Biological Water Quality Committee, Ohio River Valley Water Sanitation Commission, 1969-88
Board Member, International Union of Biological Sciences
Board Member, Ohio River Basin Consortium for Research and Education, 1985-90
Board of Scientific Advisors, The Wetlands Fund
Carey Arboretum Review Committee, New York Botanical Gardens
Committee on Certification, Ecological Society of America
Ecological Society of America Study Committee
Effluent Standards and Water Quality Information Advisory Committee (Consultant), U.S. Environmental Protection Agency
International Joint Commission (US/Canada), Science Advisory Board, 1988-90
International Statistical Ecology Program, Board of Directors and Executive Committee
Man and the Biosphere, United Nations (through State Department), 1974-88
Member, Certification Review Board of the Academy of Board Certified Environmental Professionals, 1995-97
Member, Environmental Concerns Committee, American Fisheries Society, 1989-90
Member, Senior Scientists and Engineers, American Association for the Advancement of Science, 1998-present
Membership Committee, American Academy of Arts and Sciences, 1997-98
National Wetlands Technical Council
Panel Member, Court Appointed Scientific Experts, American Association for the Advancement of Science, 2000-01
Science Advisor, Academy of Natural Sciences, Philadelphia, 2000-present
Science Advisor, SAREC, Swedish Agency for Research Cooperation with Developing Countries, 1988-94
Science Advisor, Third World Academy of Sciences, 1995-present
Scientific Advisory Board, Society for Restoring the Earth, University of California, Berkeley, 1989-92
Society for Environmental Toxicology and Chemistry, Awards Committee, 1980-83
U.S. Army Research and Development Command (Munitions Water Quality Standards Development Program), 1971-86

U.S. Environmental Protection Agency Science Advisory Board – Ecology Committee, Water Quality Committee, Biological Monitoring Committee, 1978-81; Chairman, Environmental Effects, Transport and Fate Committee, 1982-83
U.S. Environmental Protection Agency Environmental Biology Review Panel, 1987-91

Service on Editorial Boards:

Board of Consulting Editors, Encyclopedia of Life Support Systems, EOLSS Publishers, Surrey, United Kingdom
Board of Associate Editors, Environmental Health Perspectives, 1993-97; Editorial Board, 1997-2001
Series Editor (co-editor was Professor R. M. Harrison), Environmental Management Series, 1991-93, Elsevier Science Publishers Ltd.; transferred to Chapman & Hall Publishers, 1993-97
Associate Editor, Aquatic Toxicology, Toxicology and Industrial Health, 1983-2005
Section Editor, Aquatic Toxicology, Journal of Environmental Pathology, Toxicology and Oncology, 1983-2005
Editor (one of several), Journal of Clean Technology and Environmental Sciences, 1990-96
Editorial Board, Aquatic Toxicology, 1989-2005
Advisory Board, Environmental Professional (currently Environmental Practice) 1988-2002
Editorial Board, Hydrobiologia, 1979-2002
Editorial Board, Environmental Toxicology and Water Quality, 1987-95
Editorial Board, Ecotoxicology, 1991-2005
Editorial Board, Issues in Environmental Science and Technology, 1992-2002
Editorial Board, Ecological Engineering, 1992-95
Editorial Board, Speculations in Science and Technology, 1989-93
Editorial Board, Ecofables/Ecoscience, 1997-99
Board Member, Editorial Advisory Board, Lewis Publishers, Inc., 1986-94
Board of Advisors, Journal of Aquatic Ecosystem Health and Management Society, 1991-present
Consulting Editor, Journal of Aquatic Ecosystem Stress and Recovery, 1997-2005
Board of Reviewers, Journal of Protozoology, 1988-91
Regional Cooperating Editor, Current Practices in Environmental Science & Engineering, 1983-90
American Water Resources Association—Editorial Board, Water Resources Bulletin, 1975-81
Associate Editor, Water Resources Bulletin, 1985-88
Associate Editor, Ecosystem Health and Medicine, 1993-2005
International Editor, Journal of Environmental Sciences China, 1995-present
Board of Editors, Ecosystem Health, 1995-2002
Editorial Board, Sustainable Communities Review, 1997-2005
Advisory Board, Journal of Frontier Sciences, 1998-2005
Editorial Board, The International Journal of Sustainable Development and World Ecology, 1998-present
Editor, Ethics in Science and Environmental Politics, 2000-2005
Contributing Editor, Common Ground, 1999-2005
Advisor, Asian Journal of Experimental Sciences, 2004-present

Representative Keynote Addresses and Visiting Scholar Activities Since 1980:

Keynote Address, Third International Congress on Industrial Wastewater and Wastes, Stockholm, Sweden, February 1980
Keynote Address, Warmwater Streams Symposium, American Fisheries Society, March 1980
Shared Keynote Address (with F. Herbert Bormann), XIII Argonne National Laboratory Symposium, "Biological Aspects of Ecosystem Restoration," 1980
Keynote Address, Symposium on Biological Monitoring of Fish, American Fisheries Society, September 1980
Nieuwland Lecturer in Biology, Notre Dame University, 1980
Keynote Address, 2nd Annual Meeting of the Society of Environmental Toxicology and Chemistry, November 1981
Landsdowne Visitor, University of Victoria, British Columbia, Canada, 1981
Past President's Address, Annual Meeting of the American Microscopical Society, December 1981
Keynote Address, 43rd Annual Meeting, Association of Southeastern Biologists, April 1982
Keynote Address, Symposium on Reclamation and the Phosphate Industry, Tampa, Florida, February 1983
Keynote Address, Symposium on Biological Monitoring, International Association of Water Pollution Research and Control, Cardiff, Wales, September 1984
Morrison Lecture, International Chemical Congress of Pacific Basin Societies, Honolulu, Hawaii, December 1984

"Using Endangered Ecosystems to Preserve Rare, Endangered, and Threatened Species" Seminar, National Communications Council, March 1985

Keynote Address, Symposium on Persistent Toxic Substances and the Health of Aquatic Communities, sponsored by the International Joint Commission on the Great Lakes and the American Society for Limnology and Oceanography, Minneapolis, Minnesota, June 1985

Keynote Address, Symposium on Wetlands and Water Management on Mined Lands, Pennsylvania State University, October 1985

Keynote Address, "Why Isn't There More Integrated Resource Management?" Ohio River Basin Consortium for Research and Education, Cincinnati, Ohio, November 1985

Keynote Speaker, Natural Resources Leaders Seminar, Charleston, South Carolina, Department of the Army, Natural Resource Management Branch, December 1985

Keynote Address, West Chester University, Science/Technology Lecture Series, 1986

Keynote Address, Symposium "Aquatic Field Testing: Experimental Mesocosms and Field Techniques," Duluth, Minnesota, 1987

Keynote Address, Minerals and Management Services Gulf of Mexico OCS Region, 8th Annual Information Transfer Meeting, New Orleans, Louisiana, 1987

Keynote Address, First International Conference on Environmental Bioassay Techniques and Their Application, University of Lancaster, England, 1988

Keynote Address, Section on Biological Health of Streams, 50th Midwest Fish and Wildlife Conference, Columbus, Ohio, 1988

Keynote Address, Symposium on Recovery of Lotic Communities and Ecosystems Following Disturbance: Theory and Application, USEPA, Duluth, Minnesota, 1988

Wallace Lecturer in Conservation Biology, University of Louisville, Kentucky, 1988

Distinguished Ecologist Lecture Series, Bowling Green State University, Ohio, 1988

Lead Speaker, Initiation of University Program in Environmental Systems, University of Kentucky, February 1989

Brunch Speaker, 14th Annual Colorado Water Workshop, Gunnison, Colorado, July 1989

One of the Keynote Speakers, Workshop on Restoration Ecology, International Resources Group, Yale School of Forestry, 1989

Banquet Speaker, Virginia's Endangered Species Symposium, U.S. Department of Game and Inland Fisheries, 1989

Principal Speaker, Symposium "Tropical Deforestation: Global Effects," Sweet Briar College, 1989

Banquet Speaker, International Symposium on Water Quality, Colorado State University, 1989

Visiting Scholar Program, Penn State University, 1989 Opening Address, Restoring Biodiversity in the Southern Appalachians: A Strategy for Survival, University of North Carolina at Asheville, 1989

Silvey Lecture, University of North Texas, 1989

Opening Address, Integrated Environmental Management, University of South Carolina at Aiken, 1989

All Academy Lecture, 99th Annual Meeting of the Ohio Academy of Science, April 1990

Lead Speaker, Aquatic Ecosystems Section, Canadian Water Resources Association Conference, Penticton, British Columbia, May 1990

Keynote Address, International Symposium on Aquatic Ecosystem Health, Waterloo, Ontario, July 1990

Banquet Address, Ohio River Basin Consortium for Research and Education (ORBCRE), December 1990

Keynote Address, Engineering Foundation Conference on Urban Runoff, Mount Crested Butte, Colorado, August 1991

Keynote Address, Workshop: Principles of Reconstruction for Fragmented Ecosystems, Tammin, Australia, October 1991

Banquet Address, Phi Sigma Society, Blacksburg, March 1992

Keynote Address, Academic Excellence Conference, Virginia Tech, February 1992

Keynote Address, Second European Conference on Ecotoxicology, Amsterdam, The Netherlands, May 1992

Keynote Address, Opening of the Exhibit "Why Waste a Good Planet," Virginia Museum of Natural History, May 1992

Distinguished Ecologist Lecture, North Carolina State University, September 1992

Keynote Address, Center for Talented Youth, The Johns Hopkins University, November 1992

Keynote Address, Annual Meeting of the Society for Environmental Toxicology and Chemistry, Cincinnati, Ohio, November 1992

Keynote Address, International Symposium on Land Reclamation: Advances in Research and Technology, Nashville, Tennessee, December 1992

Keynote Address, 3rd International Conference: Aquatic Ecosystem Health & the Ecological Significance of Bioassay Techniques, Blacksburg, Virginia, May 1993

Keynote Address, Annual Meeting of the Association of Southeastern Biologists, Richmond, Virginia, May 1993

Keynote Address, Annual Meeting of Carolinas Society of Environmental Toxicology and Chemistry, Duke University, May 1994

Keynote Address, Symposium on Sustaining the Ecological Integrity of Large Floodplain Rivers, La Crosse, Wisconsin, July 1994

Keynote Address, Workshop on Mid-Atlantic Highlands, Mountain Lake, Virginia, September 1994

The Dean's Lecture Series, Virginia Polytechnic Institute and State University, October 20, 1994

Keynote Address, Individual Rights vs the Rights of Future Generations: Ecological Resource Distribution Over Large Temporal and Spatial Scales, Symposium on An Aging Population, An Aging Planet, and a Sustainable Future, University of North Texas, Denton, February 1995

Keynote Address, Design with Water: A Symposium on Design, Planning & Restoration of Land Water Interface, VA Tech, March 1995

Keynote Address, Mid-Atlantic Region Workshop for the National Environmental Monitoring and Research Framework, University of Maryland, April 1996

Keynote Address, 10th Annual Virginia Sustainable Agriculture Conference, Nelson County, Virginia, November 1996

Luncheon Address, Virginia Phi Beta Kappa Meeting, February 1997

Convocation Address, Roanoke College, April 3, 1997

Banquet Address, Society of Sigma Xi, April 17, 1997

Regional High School Lecture, Society of Sigma Xi, April 17, 1997

Plenary Session Address, 5th International Conference on Ecosystem Health, Aquatic Ecosystem Health and Management Society, Guadalajara, Mexico, October 26, 1997

Keynote Address, Central Appalachian Ecological Integrity Conference, Elkins, West Virginia, June 27, 1998

Keynote Address (by videotape), Annual Meeting, Aquatic Ecosystem Health and Management Society, Dublin, Ireland, August 1998

Keynote Address (by videotape), First Asian Conference on Ecotoxicology and Environmental Safety, Wuhan, China, September 1998

Convocation Address, Roanoke College, March 1999

Invited Plenary Session Address, International Symposium on The Future of the Universe and the Future of Our Civilization; United Nations Educational, Scientific and Cultural Organization (UNESCO), International Council of Scientific Unions in conjunction with the World Science Conference, Budapest, Hungary, July 1999

Keynote Address, 12th Annual Conference of Concerned Philosophers for Peace, Radford University, October 1999

Plenary Lecturer, 6th Brazilian Meeting of Ecotoxicology and SETAC-Latin America 3rd Meeting, Sao Carlos, Brazil, September 2000

Keynote Address, Virginia Water Research Symposium '2000, Advances in Water and Land Monitoring Technologies and Research for the Management of Water Resources, Roanoke, VA, November 2000

After the September 1998 keynote address, I decided to call a halt to keynote addresses. Two major factors influenced this decision: (1) my increased sensitivity to second-hand cigarette smoke, which causes asthma attacks and (2) dramatically decreased civility in air and automobile travel. This curtailment of keynote addresses provided more time for Jean and me to enjoy the outdoors and for reading, writing manuscripts, and correspondence when indoors.

On June 19, 2001, it became clear that I could no longer care for Jean (Alzheimer's), and she entered a health care center. I ceased travel to be with her while she could still recognize me.

Miscellaneous:

Honors Examiner in Zoology, Swarthmore College, 1959, 1965

Visiting Lecturer, Junto Adult School, Philadelphia, Pennsylvania, 1964

Consultant, Water Pollution Control Traineeship Program, North Texas State University, 1968

Consultant, Research and Training Programs of the Limnology Department, Academy of Natural Sciences Committee on Water, Subcommittee on Saline Water Bioassays, American Society for Testing and Materials Ecology Committee, Water Pollution Control Federation

Scientific Advisor, Congressional Committee on Environmental Quality

Professional Fisheries Scientist Certification by American Fisheries Society

National Academy of Sciences Panel on Freshwater Aquatic Life and Wildlife

National Academy of Sciences Committee on Human Rights, 1991-93

International Biological Program (international scientific areas study)

Member, Technical Advisory Committee, Virginia Chapter for Coal and Energy Research, 1978-95

75th Anniversary Committee, University of Michigan Biological Station, 1981-83

Chief Rapporteur, Symposium on Effects of Oil Refineries on the Environment, University Louvanne, August, 1981; Sponsored by International Union of Pure and Applied Chemistry and Conservation Air and Water Europe
Curriculum Committee, Rocky Mountain Biological Laboratory, 1986
Water Committee, Rocky Mountain Biological Laboratory, 1984-94
Chair, Science Advisory Board, Rocky Mountain Biological Laboratory, 1986
Chair, Environmental Affairs Committee, Rocky Mountain Biological Laboratory, 1986
External Examiner, Australian Research Grants Committee, 1987
Host, Colorado Wildlife Association, 1988
Board Member, Society for Ecological Restoration and Management, 1988-2000
Western Virginia Regional Science Fair, Judge, 1989, 1990
Founding Board of Directors, Milestone Learning Center, Highlands, North Carolina, 1997-99
Member, Advisory Panel, "How on Earth: The Challenge of Nature," television series, 2003-present
Biographical sketch at <http://www.carins.narod.ru>

Grants:

Although most faculty members list each grant on their curriculum vitae, I have never done so since the money is merely the means to an end—research and publication. The publication listing indicates that the necessary resources, including money, were obtained. In lieu of a detailed list, I offer the following information. My salary from 1948 to 1966 came entirely from outside grants and contracts. During this period, I was fortunate to have Ruth Patrick as a mentor—no one could have wished for more. Now well past the customary retirement age for scientists, she is still acquiring substantial funding. Grant funding for me has been continuous from 1948 to the present, although my salary has not been based on outside funding since 1966. Thirty-seven years of grants and contracts would cover many pages, and the use of this information is not clear to me. I tried to determine the total sum of all the grants and contracts on which I was principal investigator or co-principal investigator, but I lost interest when the list reached \$10 million and was far from finished. The peak year was 1978 at \$1.78 million in active grants and contracts. This total was the culmination of the period of large interdisciplinary grants. Obtaining this much money was beneficial for the institution and many colleagues and graduate students, but not for me professionally. The largest grant I ever had (approximately \$1 million) benefited me professionally very little (I was third author on a single small paper), although others benefited greatly. My best publication (personal opinion) was produced on a very small grant.

Graduate Degrees
Chaired or Co-Chaired

1968

Sparks, R. E. M.S. Some Effects of Neutral Mixture of Calcium Oxide and Sulfuric Acid on Channel Catfish Ictalurus punctatus (Rafinesque)

1970

Dickson, K. L. Ph.D. Development and Evaluation of Methodology for the Instream Assessment of the Effects of Water Pollution Upon Macroinvertebrate Organisms

1971

Lorton, E. U. M.S. The Effects of Thermal Stress on Protozoan Community Structure

Sparks, R. E. Ph.D. Using the Respiratory and Cardiac Responses of Bluegill Sunfish (Lepomis macrochirus) to Monitor Zinc Concentrations in Water (Sigma Xi Research Award at Ph.D. level)

Waller, W. T. Ph.D. The Use of Fish Movement Patterns to Monitor Zinc Continuously in Water (Sigma Xi Research Award at Ph.D. level)

1972

Lanza, G. R. Ph.D. Effects of Thermal Stress on Microorganisms

Ruthven, J. A. Ph.D. The Response of Freshwater Protozoan Communities to Concentrations of Various Toxicants, Particularly the Heavy Metals Zinc and Copper

Yongue, W. H., Jr. Ph.D. The Structure of Fresh-water Protozoan Communities

1973

Crossman, J. S. Ph.D. Recovery and Restoration of Damaged Ecosystems

Hales, V. M. M.S. Biological and Chemical Monitoring of Three Streams in the Area of Blacksburg, Virginia (Co-Chair E. F. Benfield)

Herricks, E. E. Ph.D. The Recovery of Stream Macrobenthic Communities from the Effects of Acid Mine Drainage

Morgan, E. Ph.D. The Effects of Stress on Fish Behavior

Sullivan, G. M.S. Acute Bioassays for Assessing the Toxicity of Six Heavy Metals and Factors Affecting Zinc Toxicity to the Rotifer, Philodina (near acuticornis) (Co-Chair A. L. Buikema, Jr.)

1974

Camp, F. A. Ph.D. The Application of Algal Growth Potential Techniques to Surfactant and Zinc Toxicity Studies (Co-Chair A. C. Hendricks)

Dolan, J. M., III. Ph.D. Comparative Studies of the Toxic Effects of Three Surfactants on a Fish (Lepomis macrochirus Rafinesque) and a Snail (Goniobasis Lea sp.)

Hocutt, C. Ph.D. The Effects of Celanese Inc., Narrows, Virginia, on Chemical and Biological Water Quality in the New River (Co-Chair K. L. Dickson)

Smrcek, J. C. Ph.D. The Effects of Various Tertiary Treatment Nutrient Removal Schemes Upon the Productivity of Autotrophic (Periphyton) Communities in Model Laboratory Stream Ecosystems

1975

- Gregg, B. C. Ph.D. Effects of Chlorine and Heat on Selected Stream Invertebrates (Co-Chair E. F. Benfield)
- Maciorowski, A. F. Ph.D. Heavy Metal Toxicity to Aquatic Insects (Co-Chair E. F. Benfield)
- Prather, I. M.S. Computer Interfacing with Biological Systems
- Slocumb, J. M.S. Laser Holography as a Pollution Monitor (Co-Chair K. L. Dickson)
- Stauffer, J. Ph.D. The Distribution of Fish in Relation to Thermal Outfalls (Co-Chair K. L. Dickson)
- Wrenn, W. B. Ph.D. Remote Monitoring of Fish in a Thermally Enriched Zone (Co-Chair K. L. Dickson)

1976

- Lee, D. R. Ph.D. Development of an Invertebrate Bioassay to Screen Petroleum Refinery Effluents Discharged into Freshwater (Co-Chair A. L. Buikema, Jr.)
- Messenger, D. U. M.S. Variability in Sensitivity in Invertebrates to Various Toxicants
- See, C. Ph.D. Effects of Heavy Metals on the Behavior of the Planarian Dugesia tigrina (Co-Chair A. L. Buikema, Jr.)
- Trotter, D. M. Ph.D. The Development of an Algal Bioassay Procedure using Stigeoclonium subsecundum and the Demonstration of the Effect of Intermittent Chlorination on an Attached Filamentous Alga (Co-Chair A. C. Hendricks)
- Wright, J. R., Jr. Ph.D. Chemical Limnology, Algal Growth Potential, and Nutrient Limitation Factors of the Upper New River, Virginia, and Predictions Concerning Trophic Status for the Proposed Blue Ridge Reservoirs (Co-Chair E. F. Benfield)

1977

- Clark, J. M.S. Evaluation of Methods to Estimate Aufwuchs Biomass (Co-Chair K. L. Dickson)
- Klarberg, D. P. Ph.D. Investigations of the Macrobenthos and Physiochemistry of the Upper New River Basin
- Larrick, S. R. M.S. Behavioral Avoidance by Fish of Residual Chlorine in Power Plant Discharges (Co-Chair D. S. Cherry) (Sigma Xi Research Award at M.S. level, 1978)
- McGinniss, M. M.S. Interactions of Acute Thermal Shock and Simulated Effluents to Daphnia pulex (Co-Chair A. L. Buikema, Jr.)
- Paul, R. W. Ph.D. Leaf Processing and the Effects of Thermal Perturbation on Leaf Degradation in the New River, Virginia (Co-Chair E. F. Benfield)
- Rodgers, J. H., Jr. Ph.D. Aufwuchs Communities of Lotic Systems: Nontaxonomic Structure and Function (Co-Chair K. L. Dickson)
- van der Schalie, W. Ph.D. Use of Minicomputers in Biological Monitoring (National Science Foundation Predoctoral Fellowship, 1974)

1978

- King, C. L. M.S. The Development of a System using the Ventilatory Activity of the Fathead Minnow Pimephales promelas to Detect and Predict the Presence of Toxicants (Co-Chair K. L. Dickson)

1979

- Giattina, J. D. M.S. Response of Fish to Chlorinated Effluents under Field and Laboratory Conditions as Determined by Behavioral and Electrophoretic Procedures (Co-Chair D. S. Cherry)
- Honig, R. A. M.S. Effects of a Simulated Refinery Effluent on Periphyton Communities in Laboratory Streams (Co-Chair A. L. Buikema, Jr.)
- Kuhn, D. Ph.D. A Biological Characterization of Environmental Conditions (Sigma Xi Research Award at Ph.D. level)
- Leslie, M. M.S. The Use of Biotic Value Allocation in the Assessment of Heated Discharges
- Lubinski, K. S. Ph.D. Monitoring Bluegill Swimming Behavior and the Effects of Sublethal Ammonium Gradients
- Plafkin, J. Ph.D. The Colonization of Artificial Islands by Protozoa in Differing Habitats and Systems (Sigma Xi Research Award at Ph.D. level, 1980)

1980

- Boatin, H., Jr. Ph.D. Factors Affecting the Endogenous Regulation of Fresh-water Protozoan Communities (Co-Chair W. H. Yongue, Jr.) (Presidential Award for Excellence in Science and Mathematics Teaching, 1990)
- Clark, J. R. Ph.D. Effects of Selected Pollutants on Grazer Utilization of Aufwuchs (Co-Chair D. S. Cherry)

1981

- Abbott, T. Ph.D. The Role of Macrobenthos Drifts in the Energetics of Rainbow Trout (Co-Chair A. L. Buikema, Jr.)
- Henebry, M. S. Ph.D. Protozoan Communities, Macrophyte Vegetation and Trophic Status of Northern Michigan Wetland Lakes (Co-Chair W. H. Yongue, Jr.) (Phi Sigma Research Award at Ph.D. level)

1982

- Hart, K. M.S. Effects of Toxicants upon Microbial Colonization Processes
- Lechleitner, R. M.S. The Resistance of Three Aquatic Insect Detritivores to Fly Ash Constituents (Co-Chair D. S. Cherry)

1984

- Doane, T. R. Ph.D. Comparison of Biomonitoring Techniques for Evaluating Effects of Jet Fuel on Bluegill Sunfish (Lepomis macrochirus) (Co-Chair A. L. Buikema, Jr.)
- Peters, G. T. M.S. Response of Isonychia bicolor to Alkaline pH (Co-Chair D. S. Cherry)
- Pratt, J. R. Ph.D. Export of Species from Sources of Differing Maturity and Complexity (Cunningham Research Fellowship, 1983)

1985

- Belanger, S. E. Ph.D. Functional and Pathological Responses of Selected Aquatic Organisms to Chrysotile Asbestos (Co-Chair D. S. Cherry) (Cunningham Research Fellowship, 1984)
- Hartwell, S. I. Ph.D. Validation of Laboratory Versus Field Avoidance Behavior of Schooling Fathead Minnows to Heavy Metal Blends Relative to Acute Toxicity During Long Term Exposure (Co-Chair D. S. Cherry)
- Stewart, P. M. Ph.D. Diatom and Protozoan Community Analysis and Colonization on Artificial Substrates in Lentic Habitats

1986

Doherty, F. G. Ph.D. Aquatic Ecology (Co-Chair D. S. Cherry) (Cunningham Research Fellowship, 1985)

Farris, J. Ph.D. Assimilative Capacity (Co-Chair D. S. Cherry)

1987

Genter, R. B. Ph.D. Species Interactions in Microbial Communities

McCormick, P. V. M.S. Patterns of Microbial Community Development in Isolated Aquatic Systems (Sigma Xi Research Award at M.S. level, 1988)

1988

Clements, W. H. Ph.D. Community Responses of Aquatic Macroinvertebrates to Heavy Metals in Laboratory and Outdoor Experimental Streams (Co-Chair D. S. Cherry) (Cunningham Research Fellowship, 1987)

Pontasch, K. W. Ph.D. Multispecies Toxicity Tests Using Indigenous Organisms: Predicting the Effects of Hazardous Materials in Streams (Sigma Xi Research Award at Ph.D. level, 1989)

1989

Orvos, D. Ph.D. Environmental Risk Assessment of Genetically-Engineered Microorganisms (Sigma Xi Research Award at Ph.D. level, 1990; SETAC/Procter & Gamble Pre-Doctoral Fellowship, 1987; Cunningham Research Fellowship, 1988)

1990

Comeaux, J. M.S. Transfer of Genetic Information from GEMs to Indigenous Organisms

Rifici, L. M. M.S. Investigation into Three Potential Modifying Factors in Larval Fathead Minnow (Pimephales promelas) Growth and Survival (Co-Chair D. S. Cherry)

Scanferlato, V. S. Ph.D. Environmental Risk Assessment for Toxic Chemicals and Genetically-Engineered Microorganisms: A Microcosm Approach (Sigma Xi Research Award at Ph.D. level, 1991)

1991

Atkinson, R. Ph.D. Rehabilitation of Damaged Ecosystems (Outstanding Performance as a Graduate Teaching Assistant, 1989; Maly Research Fellowship, 1990)

Palmer, S. M.S. Application of Molecular Biology Techniques of the Assessment of Microbial Community Responses to Environmental Perturbations (Phi Sigma National Award at the M.S. level, 1992)

1993

Hill, S. M.S. Evaluation of Seed and Seedling Response to Aid Revegetation of Hazardous Chemical Waste Sites

Arnegard, M. M.S. Functional Toxicity Tests in Microcosms (Fulbright Fellowship, 1989-1990; Sigma Xi Research Award at M.S. level, 1995)

1994

Dobbs, M. P. Ph.D. Ecotoxicology (Co-chair D. S. Cherry)

Holl, K. Ph.D. Restoration Ecology (National Science Foundation Predoctoral Fellowship, 1990; Best Paper of the Year Award, Environmental Conservation, 1991; Emily Stuart YMCA Award for Leadership on Environmental Problems, 1992; Phi Kappa Phi, 1992; Sigma Xi Research Award at Ph.D. level, 1995)

Sabre, M. M.S. Restoration of Disturbed Ecosystems Using Wildflowers (Phi Sigma Award at the M.S. level, 1996)

1995

Jones, D. M.S. Macroinvertebrate Richness and Abundance of Accidental Wetlands on Surface Mines

1996

Comeaux J. Ph.D. Effects of Copper on Benthic Communities in Artificial Microcosms (Presidential Fellowship, 1990)

1997

Heckman, J. Ph.D. Restoring Functional Attributes of Damaged Ecosystems (Cunningham Fellow, Three-Year Scholarship, 1993-1996; Phi Sigma Research Award at Ph.D. level, March 1997; Sigma Xi Research Award at Ph.D. level, 1998)

Post-Doctoral Fellows and Research Associates

E. Fred Benfield
Dennis T. Burton
S. K. Case*
Donald S. Cherry
J. K. T. Eu*
J. M. Fournier*
H. Fujii*
David Gruber

P. F. Lai*
Kenneth W. Thompson
G. F. Westlake
J. R. Pratt
Kay H. Austin
David R. Orvos
Paul V. McCormick
Robert B. Atkinson

*On NSF grant on which S. P. Almeida was co-principal investigator

Sabbaticals

Rodger H. Green, University of Western Ontario
Roger L. Kaesler, University of Kansas
Rex L. Lowe, Bowling Green State University
Shen Yun-fen, National Academy of Sciences, People's Republic of China
Jin Hongjun, Nanjing University, People's Republic of China

Journals in Which I Have Published

Academy of Natural Sciences
Acta Scientia Circumstantiae
Advances in Water Pollution Research
American Association for the Advancement of Science
American Chemical Society
American Malacological Bulletin
American Midland Naturalist
American Naturalist
American Philosophical Society Yearbook
Annals of Earth
Applied and Environmental Microbiology
Aquatic Ecology Newsletter
Aquatic Toxicology
Archiv fuer Hydrobiologie
Archiv fuer Protistenkunde
Archives of Environmental Contamination and Toxicology
Archives of Microbiology
Asian Journal of Experimental Sciences
Association of Systematic Collections
Association of the Southeastern Biologists Bulletin
Aware
Biodiversity Conservation
Biologist
Biometrics
BioScience
Boston College Environmental Affairs and Law Review
Bulletin of Environmental Contamination and Toxicology
Bulletin of Ecological Society of America
Bulletin Torrey Botanical Club
Canadian Journal of Fisheries and Aquatic Sciences
CHEM TECH
Chesapeake Scientist
Chinese Journal of Oceanography and Limnology
Comments on Toxicology
Common Ground
Computer Design
Conservation Biology
Context
Convergence
Corporate Environmental Strategy
Current Practices in Environmental Science and Engineering
Ecological Applications
Ecological Engineering
Ecological Risk Assessment
Ecosystem Health
Ecotoxicology
Ecotoxicology and Environmental Safety
Empiricist
Environment International
Environmental Auditor
Environmental Health
Environmental Health Perspectives
Environmental Management
Environmental Management and Health
Environmental Monitoring and Assessment
Environmental Pollution
Environmental Practice
Environmental Professional

Environmental Science and Technology
Environmental Toxicology and Chemistry
EPA Series
Ethics in Science and Environmental Politics
Federal Water Quality Control Agency
Fire Engineering
Fisheries
Forum
Freshwater Biology
Frontiers
Global Village
Globe
Governor's Conference on Thermal Pollution
Horticultural Technology
Hydrobiologia
Interdisciplinary Science Reviews
Industrial Wastes
Industrial Water and Engineering
Integrated Environmental Assessment and Management
International Journal of Environmental Studies
International Journal of Sustainable Development and World Ecology
Journal of the American Water Works Association
Journal of Anti-Aging Medicine
Journal of Applied Photography and Engineering
Journal of Applied Phycology
Journal of Aquatic Ecosystem Health
Journal of Aquatic Ecosystem Health and Management
Journal of Clean Technology and Environmental Sciences
Journal of Cosmology
Journal Environmental Pathology Toxicology and Oncology
Journal of Environmental Sciences (China)
Journal of Fish Biology
Journal of Freshwater Ecology
Journal of Interdisciplinary Cycle Research
Journal of Protozoology
Journal of Pure and Applied Chemistry
Journal of Social, Political and Economic Studies
Journal of Testing and Evaluation
Journal of Water, Air, and Soil Pollution
Journal of the Elisha Mitchell Scientific Society
Journal of the Fisheries Research Board of Canada
Journal of the Hydraulic Division of the American Society of Chemical Engineering
Journal of the Water Pollution Control Federation
Letters in Applied Microbiology
Limnology and Oceanography
Mankind Quarterly
Microbial Ecology
Minerals and the Environment
Mosquito News
National Academy of Sciences Press
Natulae Naturae, Academy of Natural Sciences of Philadelphia
Naturwissenschaften
Nautilus
Oikos
ORSANCO
Philippine Journal of Biology
Physics and Biology
Polish Archives of Hydrobiologie
Politics and the Life Sciences
Population and Environment
Proceedings of the Academy of Natural Sciences

Proceedings of the American Fisheries Society
Proceedings of the American Philosophical Society
Proceedings of the Fourth Annual Symposium of Industrial Waste Conference
Proceedings of the National Academy of Sciences, People's Republic of China
Proceedings of the Second Aquatic Toxicology Workshop
Proceedings of the U.S. Office of Education
Process Design in Water Pollution Control
Progress in Environmental Science and Technology
Progress in Protozoology
Progress in Water Technology
Progressive Fish-Culturist
Purdue University Engineering Bulletin
Quality Assurance
Regulatory Toxicology and Pharmacology
Renewable Resources Journal
Research and Development
Restoration Ecology
Restoration and Management Notes
Reviews of Environmental Contamination and Toxicology
Revista de la Sociedad Mexicana de Historia Natural
Revista de Biología
Science and Society
Science of the Total Environment
Scientist and Citizen
The Social Contract
Society of Photo-Optical and Instrumentation Engineering
Speculations in Science and Technology
Standard Methods
Standardization News
Sustain
Sustainable Communities Review
Toxicity Assessment
Toxicology and Industrial Health
Transactions of the American Fisheries Society
Transactions of the American Microscopical Society
Transactions of the Kansas Academy of Sciences
Transactions of the Northeastern Wildlife Conference
University of Kansas Science Bulletin
University of Massachusetts Technology Guidance Center Bulletin
U.S. Army Corps of Engineers
U.S. Department of Agriculture
U.S. Public Health Service
Vanderbilt University Press
Verh. Internat. Verein. Limnol
Virginia Cooperative Extension Service
Virginia Issues and Answers
Virginia Journal of Science
Virginia Mining Journal
Virginia Tech Magazine
Virginia Tech Research Magazine
Water (Australia)
Water Air and Soil Pollution
Water Quality Bulletin
Water Research
Water Resources Bulletin
Water Resources Research Center Bulletin
Water Science and Technology
Water Spectrum
Wetlands
Wetlands Ecology and Management

TOTAL ACADEMIC PUBLICATIONS

Published	In press	Submitted	
65	0	0	Books and Monographs
28	0	0	Bulletins
368	1	2	Chapters in Books
687	4	2	Scientific Articles*
310	0	0	Abstracts Only
142	0	0	Editorials, Book Reviews, and Congressional Testimony
110	0	3	Electronic Publications
1710	5	7	TOTAL = 1722

*Scientific articles appearing in 179 different journals

Sole Author and/or Editor

Books	Bulletins	Chapters	Journal Articles	Abstracts	Editorials	Electronic
19	1	204	296	28	123	109

Senior Author

Books	Bulletins	Chapters	Journal Articles	Abstracts	Editorials	Electronic
27	13	77	139	13	13	1

Other Publications

Books	Bulletins	Chapters	Journal Articles	Abstracts	Editorials
19	14	87	252	269	6

Non-Reviewed Limited Distribution Reports: 298

Science Citation Index

(excluding self citations and those of J. Cairns who was at Cold Spring Harbor)

<u>Year</u>	<u>Number of Citations</u>	<u>Year</u>	<u>Number of Citations</u>
1977	98	1978	101
1979	105	1980	159
1981	147	1982	154
1983	149	1984	131
1985	152	1986	157
1987	145	1988	149
1989	156	1990	153
1991	158	1992	147
1993	128	1994	131
1995	190	1996	189
1997	143	1998	157

Social Sciences Citation Index

<u>Year</u>	<u>Number of Citations</u>	<u>Year</u>	<u>Number of Citations</u>
1976-1980	15	1981-1988	2
1989	6	1990	16
1991	14	1992	6
1993	12	1994	9
1995	12	1996	9
1997	23	1998	32

Theses and Dissertations Chaired or Co-Chaired

M.S.: 25
Ph.D.: 49

PRIMARY RESEARCH AREAS

The following letter of nomination for the Ruth Patrick Sustained Achievement Award 2001 is used here to give a description of my research areas. I am indebted to Professor Rex L. Lowe and the American Society of Limnology and Oceanography for permission to do so.

November 5, 2000

I am extremely pleased to nominate John Cairns, Jr., University Distinguished Professor of Environmental Biology at Virginia Polytechnic Institute and State University for ASLO's 2001 Ruth Patrick Award. I can think of no one who better exemplifies the award criteria "to honor outstanding research by a scientist in the application of basic aquatic science principles to the identification, analysis and/or solution of important environmental problems." Cairns has spent his career developing and applying the best science to environmental problem solving. His accomplishments are diverse, cumulative, and form the basis for many of the ways we approach environmental problems. His influence has been sweeping in several difficult but important areas, representing work over the past 50 years and including books, articles, chapters, and reviews totaling several hundred publications.

Cairns is held in high esteem for many different reasons. In the United States, he is one of the few environmental biologists elected to the National Academy of Sciences for his sustained contributions to environmental protection. Internationally, he is revered for his contributions to ecotoxicology, for his seminal work in ecological restoration, and for his renowned work in protozoology and microbial ecology and their application to environmental problems.

Ecotoxicology. As one of the early practitioners of ecotoxicology, Cairns' work on thermal stress in fishes not only identified heat as a major environmental pollutant but as a stressor that could be detected and avoided by natural fish populations. This work, begun in the 1950s, continued for over 20 years, and had a profound influence on the management of waste heat. At the beginning of the post-World War II era of scientific management, Cairns helped develop and standardize methods for single species testing of toxicants and effluents.

The rigor of modern test methods, including the selection of laboratory tolerant but widely distributed species, began with Cairns' collaboration with Arthur Scheier and other colleagues. The work rapidly progressed from acute bioassays to sublethal testing of such diverse pollutants as sewage, toxic metals, surfactants, and pesticides. Realizing that environmental decision making required real-time data, Cairns and colleagues such as Ken Thompson, Bill van der Schalie, Rip Sparks, Tom Waller, and Dave Gruber developed automated biomonitoring systems based on computer detection and analysis of fish ventilatory behavior. Systems like these continue to be used to monitor and alert managers to potentially adverse ecological effects of high variable waste streams.

By the late 1970s, Cairns realized that preventing environmental problems required more than just single species testing. As the chair of a National Research Council review of chemical testing methods, he determined that multispecies approaches were needed to characterize pollutant effects on emergent community and ecosystem properties. Working closely with numerous colleagues, research approaches on community ecotoxicology led to critical understanding of the effects of pollutants on interspecific interactions, productivity, and community composition. His work was a principal factor in the development of small and large artificial streams for testing trace levels of hazardous materials. By the mid-1980s, the USEPA proposed simulated ecosystem testing for pesticides, based largely on Cairns' work, which stimulated research agendas at USEPA, the US Air Force, and the US Army research centers. Research aimed at understanding the complexity of pollutant effects on multispecies systems continues today, focusing on such diverse test systems as periphyton, macrobenthos, and plankton.

Restoration and Recovery. By the early 1970s, several large-scale ecoaccidents had demonstrated the severe effects of chemicals on the environment. Cairns turned his attention to the restoration and recovery of damaged ecosystems, convening two international conferences to study the complexities of damage and recovery. He coined terminology still in use to describe the kinds of ecological responses to damage – restoration, rehabilitation, enhancement – to differentiate between the kinds of ecosystem recovery, respectively, to original condition, comparable condition, and a completely different ecological system. Clearly, this work was informed by his earliest positions on river survey teams, but his expertise and insight were critical to understanding not only recovery in aquatic ecosystems but in ecosystems of all kinds. By the early 1990s, he was called upon to lead another National Research Council study focusing on the recovery process in aquatic systems.

As part of his work to understand ecological damage and recovery, Cairns drew on his early work on biological integrity. That work formed much of the basis for current research defining ecological integrity on a regional, biogeographical basis. Additionally, Cairns' work on recovery identified critical ecosystem processes as key to recovery strategies; he was among the first to denote these processes as "ecosystem services."

Microbial Ecology. Throughout his career as a research scientist, Cairns paid special attention to his first scientific passion, protozoa. His work with protozoan communities formed the basis of much of his influential body of writing, and many of the details of his ideas were worked out first with these simple, rapidly reproducing communities. Based on his many years of collaboration with Ruth Patrick, he always took care to include algae, especially diatoms, in his research. For example, with S. Almeida, he took the first steps toward automated

identification of diatoms using laser holography. In the mid-1980s, Cairns and colleagues began some of the earliest studies of the effects on genetically engineered microorganisms in the environment.

His earliest publication was a survey of Protozoa in the Conestoga Basin. From there, he progressed to community level studies of protozoa in wide-ranging river surveys, including the Catherwood Foundation expedition to the Peruvian Amazon. He developed, with Bill Yongue, the most widely used artificial substrate for collecting protozoa and other periphyton. This work led to his international recognition as the expert on artificial substrata for collecting all manner of aquatic biota. He performed one of the earliest tests of the MacArthur-Wilson island biogeography models using protozoan colonization of polyurethane foam artificial substrata, working concurrently with Ruth Patrick who had studied diatom colonization of glass slides. This work on artificial substrata became key to developing multispecies toxicity tests and to continued work on biological impact assessment in running waters. The so-called "Cairns school" of studying protozoan communities is internationally recognized, and by the late 1980s colleagues in the People's Republic of China had systematized the method for widespread study of pollution effects in that country's rivers.

In summary, Cairns' research spurred the development of many facets of ecotoxicology as a science, regularized the methods used to study toxic chemicals, effected the systematic study of ecological recovery, and extended the understanding of protozoa and other microbes as models for use in studying complex systems. He set much of the direction of these aspects of environmental science with basic study, applied research, and futuristic thinking, often leading to new models of studying and solving environmental problems. His fundamental work has formed the basis of many fields of study ranging from biological indicators to the basic study of Protozoa in the environment. His work is sweeping, often seminal, and influential. He has typified the engaged scientist ready to think broadly and differently about solving environmental problems.

Addendum. The above kind letter does not mention my more recent work with sustainable use of the planet. In 1948, my mentor Ruth Patrick called the concept "use without abuse" of natural systems. All my previous research was essential to my developing the concept of sustainability. For the last two decades, my attention to this synthesis has steadily increased so that over half my time is spent on it. Two books, Goals and Conditions for a Sustainable World and Eco-Ethics and Sustainability Ethics, summarize this area. The quality of life for our descendants will be markedly affected by the degree to which sustainable use of the planet is implemented. It will also have a dramatic effect upon the survival and well being of the millions of species with which we share the planet.

BOOKS AND MONOGRAPHS

1. Patrick, R., F. A. Aldrich, J. Cairns, Jr., F. Drouet, M. H. Hohn, S. S. Roback, H. Skuja, P. J. Spangler, Y. H. Swabey, and L. A. Whitford. 1966. The Catherwood Foundation Peruvian - Amazon Expedition: Limnological and Systematic Studies. Monographs of the Academy of Natural Sciences, No. 14, Philadelphia, PA. 495 pp.
2. Patrick, R., J. Cairns, Jr. and S. S. Roback. 1967. An Ecosystematic Study of the Fauna and Flora of the Savannah River. Proc. Acad. Nat. Sci. Phila. 118(5):109-407.
3. Cairns, J., Jr., ed. 1971. The Structure and Function of Freshwater Microbial Communities. University Press of Virginia, Charlottesville. 301 pp.
4. Cairns, J., Jr. and K. L. Dickson, ed. 1973. Biological Methods for the Assessment of Water Quality, Spec. Tech. Publ. 528. American Society for Testing and Materials, Philadelphia, PA. 262 pp.
5. Cairns, J., Jr. and K. L. Dickson, ed. 1974. The Environment: Cost, Conflicts, Action. Marcel Dekker, Inc., New York. 156 pp.
6. Cairns, J., Jr., and K. L. Dickson, ed. 1974. Preliminary Environmental Analysis of the Burnsville, Leading Creek, and West Fork Lakes Project. Spec. Publ. U. S. Army Corps of Eng. Three volumes: Vol. I, 800 pp.; Vol. II, 2300 pp.; Vol. III, maps, 49 pp.
7. Cairns, J., Jr., ed. 1977. Aquatic Microbial Communities. Garland Publishing, Inc., New York. 695 pp.
8. Cairns, J., Jr., K. L. Dickson and E. E. Herricks, ed. 1977. Recovery and Restoration of Damaged Ecosystems. University Press of Virginia, Charlottesville. 531 pp.
9. Cairns, J., Jr., K. L. Dickson and G. F. Westlake, ed. 1977. Biological Monitoring of Water and Effluent Quality, Spec. Tech. Publ. 607. American Society for Testing and Materials, Philadelphia, PA. 246 pp.
10. Gloyna, E. F., R. McGinnis, L. Abron-Robinson, P. R. Atkins, M. S. Baran, J. Cairns, Jr., C. W. Cook, H. H. Folk, J. H. Ludwig, M. T. Morgan, J. D. Parkhurst, E. T. Smerdon and G. W. Thomas. 1977. Manpower for Environmental Pollution Control, Vol. V. National Academy Press, Washington, DC. 427 pp.
11. Cairns, J., Jr., K. L. Dickson, and A. Maki, ed. 1978. Estimating the Hazard of Chemical Substances to Aquatic Life, Spec. Tech. Publ. 657. American Society for Testing and Materials, Philadelphia, PA. 278 pp.
12. Dickson, K. L., J. Cairns, Jr. and R. J. Livingston, ed. 1978. Biological Data in Water Pollution Assessment: Quantitative and Statistical Analysis, Spec. Tech. Publ. 652. American Society for Testing and Materials, Philadelphia, PA. 193 pp.
13. Cairns, J., Jr., G. P. Patil and W. E. Waters, ed. 1979. Environmental Biomonitoring, Assessment, Prediction, and Management - Certain Case Studies and Related Quantitative Issues. Statistical Ecology Volume S11. International Co-operative Publishing House, Fairland, MD. 438 pp.
14. Dickson, K. L., J. Cairns, Jr. and A. Maki, ed. 1979. Analyzing the Hazard Evaluation Process. American Fisheries Society, Washington, DC. 159 pp.
15. Buikema, A. L., Jr. and J. Cairns, Jr., ed. 1980. Aquatic Invertebrate Bioassays, Spec. Tech. Publ. 715. American Society for Testing and Materials, Philadelphia, PA. 209 pp.
16. Cairns, J., Jr., ed. 1980. The Recovery Process in Damaged Ecosystems. Ann Arbor Science Publishers, Inc., Ann Arbor, MI. 167 pp.
17. Maki, A. W., K. L. Dickson and J. Cairns, Jr., ed. 1980. Biotransformation and Fate of Chemicals in the Aquatic Environment. American Society for Microbiology, Washington, DC. 150 pp.
18. Cairns, J., Jr., Chairman; M. Alexander, K. W. Cummins, W. T. Edmondson, C. R. Goldman, J. Harte, R. Hartung, A. R. Isensee, R. Levins, J. F. McCormick, T. J. Peterle and J. H. Zar. 1981. Testing for Effects of Chemicals on Ecosystems. National Academy Press, Washington, DC, 103 pp.; Working Papers Prepared as Background for Testing for Effects of Chemicals on Ecosystems, 257 pp.

19. Cairns, J., Jr., ed. 1982. Artificial Substrates. Ann Arbor Science Publishers, Inc., Ann Arbor, MI. 278 pp.
20. Cairns, J., Jr., and collaborators A. L. Buikema, Jr., D. S. Cherry, E. E. Herricks, W. H. van der Schalie, R. Matthews, B. R. Niederlehner and J. H. Rodgers, Jr. 1982. Biological Monitoring. Pergamon Press, London. 150 pp.
21. Dickson, K. L., A. Maki and J. Cairns, Jr., ed. 1982. Modeling the Fate of Chemicals in the Aquatic Environment. Ann Arbor Science Publishers, Inc., Ann Arbor, MI. 413 pp.
22. Cairns, J., Jr. and A. L. Buikema, Jr., ed. 1984. Restoration of Habitats Impacted by Oil Spills. Butterworth Publishers, Woburn, MA. 192 pp.
23. Lynn, W., and nine co-authors including J. Cairns, Jr. 1984. Washington Area Water Supply. National Academy Press, Washington, DC. 824 pp.
24. Cairns, J., Jr., ed. 1985. Multispecies Toxicity Testing. Sponsored by Ecological Society of America and Society for Environmental Toxicology and Chemistry. Pergamon Press, New York. 253 pp.
25. Cairns, J., Jr., ed. 1985. NATO Conference Series I: Ecology, Volume II Ecoaccidents. NATO Scientific Branch, Plenum Press, New York. 164 pp.
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27. Cairns, J., Jr. and R. Patrick, ed. 1986. Environmental Regeneration II: Managing Water Resources. Sponsored by the Rene Dubos Foundation, Inc. Published by Praeger Scientific, Philadelphia, PA. 128 pp.
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