PROPOSAL TO MONSANTO COMPANY

TITLE: The Degradation of Polychlorinated Biphenyls by Fungi and Anaerobic Bacteria

PRINCIPAL INVESTIGATOR: Dr. Chun C. Lee (SSN 521-52-6704)

INSTITUTION: New York University Medical Center
Institute of Environmental Medicine
Laboratory for Environmental Studies
550 First Avenue
New York, New York 10016

DURATION OF PROPOSED WORK: June 1, 1979 through May 31, 1982

TOTAL AMOUNT REQUESTED: $154,931

Chun C. Lee
Research Assistant Professor
Institute of Environmental Medicine
New York University Medical Center
Tuxedo, New York 10987

Merril Eisenbud
Associate Director
Institute of Environmental Medicine
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Tuxedo, New York 10987

Norton Nelson, Director
Institute of Environmental Medicine
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New York, New York 10016

Thomas A. Fitzgerald, Director
Office of Grants Administration and Institutional Studies
550 First Avenue
New York, New York 10016

OBJECTIVES

This research will seek to isolate and cultivate fungi and anaerobic bacteria from a variety of aquatic environments, which are able to grow in the presence of polychlorinated biphenyls and degrade the polychlorinated biphenyls. After such cultures have been established, the rate and mode of polychlorinated biphenyl degradation by these cultures will be examined, both in vitro and in situ.

INTRODUCTION

This study is proposed to investigate the role of fungi and anaerobic bacteria in polychlorinated biphenyl (PCB) degradation. Because of their low solubility in water, high specific gravity, and high adsorbability, PCBs in aquatic environments tend to accumulate in reducing or anaerobic sediments of lakes, rivers, estuaries and coastal zones (3,4,9).

Evidence available to date indicates that microbial degradation may be a mechanism by which PCBs are eliminated from the environment (1,5,7,8,10,11,13). PCB resistant or degrading bacteria have been found to be ubiquitously distributed in the natural environment (11).

Thus far, degradation studies have centered on aerobic bacterial activity, and are not applicable, directly, to PCBs found in reducing or anaerobic sediments. Little information is available on the role of fungi.

SPECIFIC AIMS

1. To isolate and cultivate fungi and anaerobic bacteria from a variety of freshwater, estuarine and marine environments which are able to grow in the presence of PCBs (Aroclor 1016 and Aroclor 1254) and to investigate their ability to degrade the PCBs. Initially, this will be done with mixed cultures; studies will be done with pure cultures as they are purified.
2. To determine the rate and mode of PCB degradation by the fungi and by the anaerobic bacteria in vitro; first with PCBs serving as the sole carbon source, and second with PCBs amended with alternate carbon sources and alternate inorganic energy sources.
3. To determine the rate and mode of PCB degradation by the fungi and by the anaerobic bacteria in situ: natural deposits (with or without added PCBs) will subsequently be inoculated with a specific fungal or anaerobic bacterial culture, and the change in PCB content examined after incubation over pre-determined time intervals. Fungi and anaerobic bacteria will be added to sterilized sediments and non-sterilized sediments in order to investigate the ability of the inoculated organisms to degrade PCBs under as natural conditions as possible.

METHODS

1. Procedures for Specific Aim 1: Sediments for the isolation of fungi and anaerobic bacteria will be collected from

representative sites in freshwater, estuarine and marine environments. These samples will be collected by the principal investigator or by requests of colleagues at other institutions. Physical and chemical aspects of the environment at the time of sampling (e.g., salinity, depth, pH, Eh, water temperature) will be recorded when possible. Immediately upon collection, the sediment will be transferred to duplicate sets of glass bottles which will be almost filled with filtered water and sealed with serum caps. One set will be gassed with nitrogen to maintain or to establish reducing conditions necessary for anaerobes; the other will be maintained aerobic for fungal isolation. Both sets of samples will be used for subsequent isolation of PCB degraders by enrichment culture.

Enrichment cultures for anaerobic bacteria will be set up by adding 1-2 g of sediment to a 250 mℓ flask containing 100 mℓ of an organic medium (thioglycollate medium) made with distilled water or water of appropriate salinity and pH for estuarine and marine samples. Techniques for anaerobic cultures as described by Bryant (2) will be strictly followed. Cultures will be incubated for three days to two weeks at 26°C; intermittently, culture flasks will be shaken by hand. Isolation will be carried out in a second flask which contains 100 mℓ of a mineral salt solution adjusted to the desired salinity: $(NH_4)_2SO_4$, 1 g; KH_2PO_4, 0.2 g; K_2HPO_4, 1.6 g; $MgSO_4 \cdot 7H_2O$, 0.2 g; NaCl, 01. g; $FeSO_4 \cdot 7H_2O$, 0.01 g; $CaCl_2 \cdot 2H_2O$, 0.02 g (pH 7.5) containing 0.05% of the appropriate PCB. Following standard anaerobic techniques, 1 mℓ of the enrich-

ment culture will be transferred to this second medium and incubated as before until substantial growth is observed. Such cultures will be maintained in duplicate or triplicate. One series will be incubated in the light and one in the dark to enable the growth of phototrophic bacteria as well as strict chemotrophs and heterotrophs.

Enrichment cultures for fungi will be started in Sabouraud dextrose agar (Difco) made to the desired salinity and incubated under aerobic conditions. After initial growth, 1 mℓ of the enrichment culture will be transferred to the PCB-mineral salts medium (described above) but amended with 1 mℓ of a trace elements solution per liter. The trace elements solution contains 0.1 g H_3BO_3, 0.05 g each of $CuSO_4 \cdot 5\ H_2O$, $MnSO_4 \cdot H_2O$, $ZnSO_4 \cdot 7\ H_2O$, Na_2MoO_4, and $CoCl_2 \cdot 6\ H_2O$ per liter.

After incubation for predetermined time intervals (4 days to 1 month), aliquots of the incubated samples will be examined by high performance liquid chromatographic techniques, or they will be transferred to separatory funnels and extracted with hexane for gas chromatographic analysis. Gas chromatograms will be run with 1-5 μℓ aliquots of the hexane extracts. Initially, only the disappearance of certain PCB homologs from the mixed culture systems will be measured. If the PCBs disappear or decrease in quantity, degradation products will be looked for, perhaps using thin-layer chromatographic techniques and with ^{14}C-labelled PCBs. Mixed cultures will be purified by plating onto mineral salts agar plates containing 0.05% PCBs; degradation studies will be conducted with the resultant pure cultures.

2. Procedures for Specific Aim 2: Once the respective microbial systems capable of growth on PCBs are obtained, the kinetics of PCB degradation will be followed by analyzing the PCBs in the growth medium at different time intervals. The cells will be harvested by centrifugation and washed twice with 0.5 M phosphate buffer (pH 7.0). The washed cells will be injected into culture tubes containing the mineral salts medium and PCB. The procedures employed will be similar to those described by Halvorson et al. (6), who used resting suspensions of bacteria harvested from a sewage lagoon to examine the degradation of mixtures of pesticides. Comparisons will be made of gas chromatograms of PCBs before and after incubation with test organisms and with non-inoculated PCB controls over the pre-determined time interval. Metabolites and residual PCBs will be characterized by the use of column and thin-layer chromatographic techniques of Stalling and Huckins (12), and Furukawa and Matsumura (5).

3. Procedures for Specific Aim 3: In situ studies will be conducted with natural sediments whose PCB content will have been determined previously. Sediments will be autoclaved to kill indigenous microbial flora. Depending on the test organisms to be used in the test (fungi or anaerobic bacteria), the test conditions of the sediment will either be made anaerobic or left aerobic. The specific organism for the PCB degradation experiments will be inoculated into the sediments, and the rest of the experiment will be run as in Procedure for Specific Aim 2 to determine PCB degradation. A second variation of the

in situ study involves the inoculation of the test isolates into non-sterilized sediment of known PCB content along with all of its indigenous flora and fauna; this is designed to test the ability of the isolated PCB degraders to function and compete with other organisms under natural conditions. PCB degradation will be assessed as per Procedure for Specific Aim 2.

4. The research tasks will be performed in the following sequence, assuming a beginning date of June 1, 1979:

June 1, 1979 - May 31, 1980: Specific Aim 1.

June 1, 1980 - May 31, 1981: Specific Aim 2.

June 1, 1981 - May 31, 1982: Specific Aim 3.

LITERATURE REFERENCES

1. Ahmed, M. and D.D. Focht. (1973). "Degradation of polychlorinated biphenyls by two species of Achromobacter," Can. J. Microbiol. 19: 47.

2. Bryant, M.P. (1972). "Commentary on the Hungate technique for culture of anaerobic bacteria," Amer. J. Clin. Nutrition 25: 1324.

3. Duke, T.W., J.I. Lowe, and A.I. Wilson. (1970). "PCB (Aroclor 1254) in the water, sediment, and biota in Escambia Bay, Florida," Bull. Environ. Contamin. Toxicol. 5: 171.

4. Fulk, R., D. Gruber, and R. Wullschleger. (1976). "Laboratory study of the release of pesticide and PCB materials to the water column during dredging and disposal operations," Final Rept. of U.S. Army Engineer Contract No. DACW39-74-C0142.

5. Furukawa, K. and F. Matsumura. (1976). "Microbial metabolism of polychlorinated biphenyl components by Alkaligenes sp.," J. Agri. Food Chem. 24: 251.

6. Halvorson, H., M. Ishaque, J. Solomon, and O.W. Grussendorf. (1971). "A biodegradability test for insecticides," Can. J. Microbiol. 17: 585.

7. Kaiser, K. and P. Wong. (1974). "Bacterial degradation of polychlorinated biphenyls. Identification of some metabolic products from Aroclor 1242," Bull. Environ. Contamin. Toxicol. 11: 291.

8. Liu, D. (1976). "PCB degradation," Mar. Pollut. Bull. 7: 83.

9. Munson, T.O., H.D. Palmer, and S.M. Forns. (1976). "Transport of chlorinated hydrocarbons in the Upper Chesapeake Bay," Nat'l Conf. on Polychlorinated Biphenyls, Chicago, Ill., p. 218.

10. Sayler, G.S., M. Shon and R.R. Colwell. (1977). "Growth of an estuarine Pseudomonas sp. on polychlorinated biphenyl," J. Microbial Ecol. 3: 241.

11. Sayler, G.S., R. Thomas and R.R. Colwell. (1978). "Polychlorinated biphenyl (PCB) degrading bacteria and PCB in estuarine and marine environments," Estuarine and Coastal Marine Science 6: 553.

12. Stalling, D. and J. Huckins. (1973). "Reverse phase thin layer chromatography of some Aroclors, Halowaxes, and pesticides," J.A.O.A.C. 56: 367.

13. Wong, P. and K. Kaiser. (1975). "Bacterial degradation of polychlorinated biphenyls II. Rate studies," Bull. Environ. Contamin. and Toxicol. 13: 249.

FACILITIES AVAILABLE

The proposed research will be carried out using the facilities of the analytical chemistry and aquatic ecology sections of the Laboratory for Environmental Studies. The proposed research will be carried out in the culture and analytical facilities at the A.J. Lanza Laboratory, Tuxedo, New York, and at the Hudson River field station maintained by the Medical Center at Buchanan, N.Y. NYU boats equipped for collection of samples and certain field analytical procedures are berthed at Stony Point, N.Y. and operate throughout the open-water months. Dock facilities are available at the Buchanan wet-lab, but only on a temporary basis.

Equipment available for this project includes apparatus for:

Extraction/concentration of organics

Freeze-dry techniques

Scintillation spectrometry (low level - beta)

Gel electrophoresis

Thin-layer chromatography

Gas-liquid chromatography

Respiration studies

Water quality analysis

Autoradiography

Culture facilities and equipment for aerobic and anaerobic microorganisms

Culture of aquatic organisms

Maintenance of aquatic organisms

Computer data analysis

PRINCIPAL INVESTIGATOR ASSURANCE

The undersigned agrees to accept responsibility for the scientific and technical conduct of the research project and for provision of required progress reports if a contract is awarded as a result of this application.

5/18/79
Date

C. C. Lee
Principal Investigator

PROPOSED BUDGET

DEGRADATION OF POLYCHLORINATED BIPHENYLS
BY FUNGI AND ANAEROBIC BACTERIA

1. Personnel		Year 1979-80		1980-1981		1981-82	
Name	Title	% Time	Salary	% Time	Salary	% Time	Salary
C.C. Lee	Prin. Invest.	20	4,592	20	4,821	20	5,159
Theo. J. Kneip	Tech. Advisor	10	N.C.	10	N.C.	10	N.C.
J.M. O'Connor	Tech. Advisor	10	N.C.	10	N.C.	10	N.C.
Research Technician		100	12,500	100	13,125	100	14,044
Laboratory Aide		50	5,071	50	5,325	50	5,698
Clerical Assistance		10	1,200	10	1,260	10	1,348
	Total		$23,363		$24,531		$26,249
	Fringe benefits		4,731		5,029		5,447
	Overhead		12,559		12,879		13,780
	Total salaries/benefits		$40,653		$42,439		$45,476

2. Equipment			
a. High performance liquid chromatograph (partial)	$12,000	-	-
b. Shaker table	500	-	-
c. Incubator	-	600	-
d. Spectrophotometer	-	1,150	-
Totals	$12,500	$1,750	-

	1979-80	1980-81	1981-82
3. Supplies			
a. Glassware	$500	$500	-
b. Chemicals	500	500	$300
c. Gases (N_2; CO_2)	200	200	200
d. Chromatographic equipment (gases, columns, etc.)	600	600	400
	$1,800	$1,800	$900
4. Miscellaneous Expenses			
a. Travel to scientific meeting	$500	$500	$500
b. Personal travel (collection, etc.)	500	200	100
c. Publication costs	-	300	300
d. Other costs (Xerox, inter-library loan, service, etc.)	500	500	300
	$1,500	$1,500	$1,200
Totals 1. Salaries	$40,653	$42,439	$45,476
2. Equipment	12,500	1,750	-
3. Supplies	1,800	1,800	900
4. Miscellaneous	1,500	1,500	1,200
Total amount requested	$56,453	$47,489	$47,576

CURRICULUM VITAE

May 1979

Chun Chi Lee
(Formerly Known as King Mon Tsue)

Date and Place of Birth:	August 31, 1939 - Hong Kong
Marital Status:	Married, Two children
Residence:	R.D. #2, Felter Hill Rd. Monroe, New York 10950
Professional Address:	New York University Medical Center Institute of Environmental Medicine 550 First Avenue New York, New York 10016 Telephone: (212) 679-3200, Ext. 5276
Title:	Research Assistant Professor Laboratory for Environmental Studies
Education:	1962 - B.S. in Zoology Colorado State University 1969 - Doctor of Philosophy in Marine Science University of Miami (Florida)
Dissertation Title:	The decomposition of organic matter in some shallow water calcareous sediments of Little Black Water Sound, Florida Bay
Positions Held:	New York University Medical Center Department of Environmental Medicine 1975 - Present
Course Offering: (Department of Environmental Medicine and Department of Biology)	Aquatic and Estuarine Microbiology

University of Miami (Florida)
Rosenstiel School of Marine and Atmospheric Science, 1969-1975

Research Scientist, Functional Biology 1969 - 1973

Research Assistant Professor Biology and Living Resources 1973 - 1975

Positions Held:

University of Miami (Florida)
Institute of Marine Science
1962 - 1969

NDEA Fellow, Marine Biology
1962 - 1965

Graduate Assistant
1965 - 1967

Senior Field Biologist
McMurdo Sound, Antarctica
1967 - 1968

Senior Field Biologist
First International Weddell Sea
Oceanographic Expedition
1968 - 1969

Colorado State University
Department of Botany and Plant Pathology
1958 - 1962

Research Assistant, 1958 - 1962

Professional Societies:

American Association for the
Advancement of Science

American Society of Limnology
and Oceanography

Research Interests:

Microbiology
Algal and Protozoan Physiology and
Ecology
Biochemistry of Organic Matter in
Aquatic Sediments

Awards and Grants:

Achievement Award in Biological Science
Colorado State University, 1962

National Defense and Educational Act
Predoctoral Fellowship, 1962 - 1965

National Science Foundation Grant
University of Miami, $44,000
1973 - 1975

National Science Foundation Grant
New York University Medical Center,
$3,900
1976

PUBLICATIONS

C. C. LEE

1. Meyers, S. P., W. A. Feder and King Tsue. Nutritional relationships among certain filamentous fungi and a marine nematode. Science, 141, 520-522 (1963).

2. Meyers, S. P., W. A. Feder and King Tsue. Studies of relationships among nematodes and filamentous fungi in the marine environment. Dev. Indus. Microbiol., 5, 354-364 (1964).

3. Altman, J. and King Tsue. Changes in plant growth with chemicals used as soil fumigants. Plant Disease Reporter, 49, 600-602 (1965).

4. Bunt, J. S. and C. C. Lee. Observations within and beneath antarctic sea ice in McMurdo Sound and the Weddell Sea. Methods and Data. IMAS Special Publ., Univ. of Miami, 69-1 (1969).

5. Bunt, J. S. and C. C. Lee. Seasonal primary production within and beneath antarctic sea ice. J. Mar. Res., 28(3), 304-320 (1970).

6. Bunt, J. S., K. E. Cooksey, M. Heeb, C. C. Lee and B. F. Taylor. Algal nitrogen fixation in the marine subtropics: Assay by acetylene reduction. Nature, 227, 1163 (1970).

7. Corcoran, E. F. and C. C. Lee. The distribution of chlorinated hydrocarbon pesticides in the Mississippi River Delta and the adjacent Gulf of Mexico. Joint Southeast and Southwest ACS Meeting, New Orleans (Abst.). Dec. 2-4, 1970. p. 88.

8. Taylor, D. L. and C. C. Lee. A new Cryptomonad from Antarctica: Cryptomonas cryophila sp. Nov. Archiv fur Mikrobiol., 75, 269-280 (1971).

9. Bunt, J. S., C. C. Lee and E. L. Lee. Primary productivity and related data from tropical and subtropical marine sediments. Mar. Biol., 16, 28-36 (1972).

10. Bunt, J. S. and C. C. Lee. Data on the composition and dark survival of four marine microalgae. Limnology and Oceanogr., 17, 458-461 (1972).

11. Fenchel, T. and C. C. Lee. Studies on ciliates associated with sea ice from Antarctica. I. The nature of the fauna. Archiv fur Protistenk., 114, 231-236 (1972).

12. Lee, C.C. and T. Fenchel. Studies on ciliates associated with sea ice from Antarctica. II. Temperature responses and tolerances in comparison with ciliates from temperate and tropical habitats. Archiv fur Protistenk., 114, 237-244 (1972).

PUBLICATIONS CONT'D.

13. Bunt, J. S., C. C. Lee and M. A. Heeb. The site off Freeport intended for Hydro-Lab. Hydro Lab J., 1:3-6 (1972).

14. Bunt, J. S., C. C. Lee. An exploratory study of benthic primary production. Hydro Lab J., 1:7-10 (1972).

15. Taylor, B. F., C. C. Lee and J. S. Bunt. Nitrogen-fixation associated with the blue-green alga, Trichodesmium, as measured by the acetylene-reduction technique. Archiv fur Mikrobiologie, 88:205-212 (1973).

16. Lee, C.C., E. L. Lee and J. S. Bunt. Distribution of biomass in a coral reef transect. In: Results of the Tektite Program, coral reef invertebrates and plants (Sylvia Earle and Robert Lavenberg, editors), Natural History Museum, Los Angeles County, Science Bull., 20:69-75 (1975).

17. Steinhausler, F., S. Schaffer, N. Cohen, C. C. Lee, J. M. O'Connor and McDonald E. Wrenn. Effect of high LET radiation on intracellular ATP content of prokaryotic and eukaryotic algae. Radiation Research Society , 26th Meeting, Toronto, Canada (Abst.). May 14-18, 1978, pp. 591-592.

18. O'Connor, J. M., C. C. Lee and M. Eisenbud. Environmental Health. MESA New York Bight Atlas Monograph 32. (In press).

19. Lee, C. C., R. Califano and R. Sansur. The degradation of polychlorinated biphenyls (Aroclor 1254) by anaerobic bacteria and fungi from the Hudson River. Atlantic Estuarine Research Society, 61st Annual Meeting, Rehoboth, Del. April 26-28, 1979.

CURRICULUM VITAE

Theodore J. Kneip

April, 1979

Date and Place of Birth:	December 20, 1926; St. Paul, Minnesota
Marital Status:	Married, Six children
Residence:	20 Stonefield Road Glen Rock, New Jersey 07452
Professional Address:	New York University Medical Center Institute of Environmental Medicine 550 First Avenue New York, New York 10016 Telephone: (212) 679-3200, Ext. 5232
Title:	Research Professor, Deputy Director Laboratory for Environmental Studies
Education:	1950 - Bachelor of Chemistry (with distinction) University of Minnesota 1952 - Master of Science University of Illinois 1954 - Doctor of Philosophy University of Illinois
Positions Held:	New York University Medical Center Department of Environmental Medicine 1967 - present Senior Research Scientist 1967-1975 Adjunct Associate Professor 1969-1971 Adjunct Professor 1971-1975 Research Professor 1975 - present Acting Director, Laboratory for Environmental Studies 1968-1970 Deputy Director, Laboratory for Environmental Studies 1970 - present

Course Offerings:
(Department of Environmental Medicine) Analytical Chemistry of Environmental Contaminants

Positions Held:
(continued)

Mallinckrodt Chemical Works
St. Louis, Missouri
1954-1966

Research Chemist - Uranium Division
1957-1959

Group Leader, Uranium Division
1957-1959

Asst. Manager, Analytical Laboratory
Uranium Division
1961-1963

Manager, Laboratory Products Research
1963-1966

Honor Societies:

Phi Lambda Upsilon, 1950
Sigma Xi, 1954

Professional Societies:

American Chemical Society

American Association for the Advancement of Science

American Industrial Hygiene Association

American Conference of Governmental Industrial Hygienists

The New York Academy of Sciences

Vice Chair - Environmental Sciences Section 1976

Chair - Environmental Sciences Section 1977-1978

Elected Fellow - 1977

Committees:

Chairman of Subcommittee #6 - Metals I Intersociety Committee on Manual of Methods for Ambient Air Sampling and Analysis 1971-1977; Member 1971-present

Member of International Meeting on Effects and Dose-Response Relationships of Toxic Metals, Tokyo, November 18-23, 1974.

Organized by: The Subcommittee on Toxicology of Metals of the Permanent Commission and International Association on Occupational Health.

Committees:
(continued)

Member of American Society for Testing and Materials Committee D-22: Methods of Sampling and Analysis of Atmospheres, Subcommittees D-22.04, 1973-present.
D-22.09, 1975-present.

New York State Governor's ad hoc committee on PCB's, 1975.

Secretariat, International Standards Organization/Technical Committee 146 (Air Quality)/Working Group 3 - Nitrogen Compounds, 1975-1976.

Secretariat, International Standards Organization/Technical Committee 2 - Workplace Atmospheres, 1976-present.

Consulting:

Various corporate organizations including Consolidated Edison, RSR Corporation, Equitable Environmental Health.

United States Department of Commerce, National Oceanic and Atmospheric Administration, Marine Ecosystems Analysis Project, New York Bight Contaminants Panel.

Cornell University, New York State College of Agriculture and Life Sciences and New York State College of Human Ecology, Cooperative Extension, New York City Urban Gardening Program.

List of Published Works:

1. Laitinen, H. A. and T. J. Kneip. "Polarographic and Coulometric Study of p-Dimethylaminobenzene," Journal of the American Chemical Society, 78:736-740 (1956).

2. King, P., E. Bretz and T. J. Kneip. "Determination of Iodine in Mineral Premixes," Analytical Chemistry, 34:565-567 (1962).

3. Kneip, T. J., T. H. Beasly, P. King and W. K. Dean. "Programmed Temperature Gas Chromatography with Dual Electron Capture Detector for Pesticide Residue Analysis," Analytical Chemistry, 39:1510-1512 (1967).

4. Cohen, N. and T. J. Kneip. "A Method for the Analysis of ^{210}Pb in Urine of Uranium Miners," Journal Health Physics, 17:125-130 (1969).

5. Strehlow, C. D. and T. J. Kneip. "The Distribution of Lead and Zinc in the Human Skeleton," Journal American Industrial Hygiene Association, 30:372-378 (1969).

6. Kneip, T. J., G. P. Howells and M. E. Wrenn. "Trace Metals, Radionuclides and Pesticides in the Hudson River," Symposium on Hudson River Ecology, October 1969, Proceedings of the Symposium, New York State Department of Environmental Conservation, Albany, New York.

7. Furtado, V. C., T. J. Kneip and M. Eisenbud. "Measurement of Low Levels of ^{131}I in Reactor Atmospheres," Nuclear Applications and Technology, 9:268-273 (1970).

8. Kneip, T. J., M. Eisenbud, C. D. Strehlow and P. C. Freudenthal. "Airborne Particulates in New York City," Journal Air Pollution Control Association, 20:144-149 (1970).

9. Howells, G. P., T. J. Kneip and M. Eisenbud. "Water Quality in Industrial Areas: Profile of a River," Environmental Science and Technology, 4:26-35 (1970).

10. Kneip, T. J. "Atomic Absorption Spectrophotometry," AIHA Conference on Advances in Instrumental Method of Analyses, Environmental Trace Substances Center, University of Missouri, Columbia, Missouri (May, 1970).

11. Laurer, G. R., T. J. Kneip, R. E. Albert and F. S. Kent. "In Situ Determination of Lead on Painted Surfaces for the Prevention of Childhood Lead Poisoning," Proceedings of the Third Symposium on Low Energy X- and Gamma Ray Sources and Applications, Boston, Gordon and Breach Science Publishers, New York, pp. 289-301 (1971).

12. Lentsch, J. W., M. E. Wrenn, T. J. Kneip and M. Eisenbud. "Manmade Radionuclides in the Hudson River Estuary," Proc. 5th Annual Midyear Topical Symposium, Health Physics Society, Idaho Falls, Idaho, p. 499 (1970).

13. Howells, G. P., M. Eisenbud and T. J. Kneip, "Ecology of the Estuary of the Lower Hudson River," Proc. FAO Tech. Conf. on Marine Pollution and its Effects on Living Resources and Fishing, Publ. FIR:MP/70/E-20, Food and Agriculture Organization of the United Nations, New York (1970).

14. Kneip, T. J. "Concentration Factors, Environmental Complexity and the Analytical Chemist," American Chemical Society, Analytical Division--National Bureau of Standards Summer Symposium: Key to Progress in National Problem Areas, Washington, D. C. June 1971, Proceedings of the Symposium

15. Kneip, T. J., G. P. Howells and M. E. Wrenn. "Trace Elements, Radionuclides and Pesticide Residues in the Hudson River," Proc. FAO Tech. Conf. on Marine Pollution and its Effects on Living Resources and Fishing, Publ. FIR:MP/70/E-20, Food and Agriculture Organization of the United Nations, New York (1970).

16. Laurer, G. R., T. J. Kneip, R. E. Albert and F. S. Kent. "X-ray Flourescence: Detection of Lead in Wall Paint," Science, 172: 466-468 (1971).

17. Kneip, T. J., N. Cohen, D. H. Goldstein and E. A. S. Muchmore, "Experimental Studies of Lead Toxicity in Trace Substances in Environmental Health - V," Proceedings of University of Missouri's 5th Annual Conference on Trace Substances in Environmental Health (ed. by D. D. Hemphill), pp. 349-361, (June 1971).

18. Eisenbud, M. and T. J. Kneip. "Trace Metals in the Atmosphere," Tech. Paper #16, New York State Department of Environmental Conservation, Environmental Quality Research and Development Unit (July, 1971).

19. Lentsch, J. W., T. J. Kneip, M. E. Wrenn, G. P. Howells and M. Eisenbud. "Stable Manganese and Manganese-54 Distributions in The Physical and Biological Components of the Hudson River Estuary," Proc. Third National Symposium on Radioecology, Oak Ridge (1971).

20. Kneip, T. J. "Sampling and Analytical Problems in a Complex Natural System: The Hudson River Estuary," American Laboratory 3:47-52 (1971).

21. Cohen, N., T. J. Kneip, D. Goldstein and E.A.S. Muchmore, "The Juvenile Baboon as a Model for Studies of Lead Poisoning in Children," Journal of Medical Primatology 1: 142-155 (1972).

22. Kneip, T. J. and G. R. Laurer. "Isotope Excited X-ray Fluorescence," Analytical Chemistry, 44:57A-66A (1972).

23. Laurer, G., M. Eisenbud, R. E. Albert, T. J. Kneip and N. Nelson. "New York City Health Research Council X-ray Fluorescence Analyzer for Lead," Isotopes and Radiation Technology 9:275-277 (1972).

*24. Kneip, T. J., et al., "Tentative Method of Analysis for Inorganic Lead Content of the Atmosphere," Health Laboratory Science 9(1):79-83 (1972).

25. Laurer, G. R., R. E. Albert, T. J. Kneip, B. Pasternack, C. Strehlow, N. Nelson and F. S. Kent, "The Distribution of Lead Paint in New York City Tenement Buildings, AJPH 63: 163-168 (1973).

26. Kneip, T. J. and G. J. Lauer. "Trace Metal Concentration Factors in Aquatic Ecosystems," in Vol. 5, Progress in Analytical Chemistry, Plenum Press, New York, New York (1973).

27. Ahuja, S., E. M. Cohen, T. J. Kneip, J. L. Lambert, G. Ziweig, eds. Chemical Analysis of the Environment and Other Modern Techniques, Plenum Press, New York, New York (1973).

28. Kleinman, M. T., T. J. Kneip and M. Eisenbud, "Meteorological Influences on Airborne Trace Metals and Suspended Particulates," Proceedings, 7th Annual Conference on Trace Substances in Environmental Health, University of Missouri, Columbia, Missouri, June 12-14 (1973).

*29. Kneip, T. J., et al., "Tentative Method of Analysis for Cadmium Content of Atmospheric Particulate Matter," Health Laboratory Science 10(3):214-217 (1973).

*30. Kneip, T. J., et al., "Tentative Method of Analysis for Molybdenum Content of Atmospheric Particulate Matter by Atomic Absorption Spectrophotometry," Health Laboratory Science 10(3):218-220 (1973).

*Reprinted in Methods of Air Sampling and Analysis, Second edition, Katz, M., ed. American Public Health Association, Washington, D.C. (1977).

*31. Kneip, T. J., et al., "Tentative Method of Analysis for Nickel Content of Atmospheric Particulate Matter by Atomic Absorption Spectroscopy," Health Laboratory Science 10(3):221-225 (1973).

*32. Kneip, T. J., et al., "Tentative Method of Analysis for Copper Content of Atmospheric Particulate Matter by Atomic Absorption Spectroscopy," Health Laboratory Science 10(3):226-230 (1973).

*33. Kneip, T. J., et al., "Tentative Method of Analysis for Chromium Content of Atmospheric Particulate Matter by Atomic Absorption Spectroscopy," Health Laboratory Science 10(4):358-361 (1973).

34. Kneip, T. J., G. P. Howells, M. E. Wrenn, "Trace Elements, Radionuclides and Pesticide Residues in the Hudson River," In: Marine Pollution and Sea Life. Fishing News (Books) Ltd., Surrey, England, p. 169 (1973). (Reprinted from Ref. 15)

35. Kneip, T. J., M. T. Kleinman and M. Eisenbud, "Relative Contributions of Emission Sources to the Total Airborne Particulates in New York City," Proceedings, Third International Clean Air Congress, October 8-12, 1973 (1974).

36. Cohen, N., T. J. Kneip, V. Rulon and D. Goldstein, "Biological and Toxicological Response of Infant Baboons to Lead Driers in Paint," Env. Hlth. Perspectives, Experimental Issue #7, DHEW Pub. # NIH 74-218, U.S. Gov't Printing Office, Washington, D.C., p. 161 (1974).

37. Kneip, T. J., N. Cohen and V. Rulon, "Potential Sources of Analytical Error in the Erythrocytic δ-Aminolevulinic Acid Dehydratase Test for Lead Exposure," Analytical Chemistry, 46:1863-1866, (1974).

38. Bernstein, D. M., T. J. Kneip, M. T. Kleinman, R. Riddick and M. Eisenbud, "Uptake and Distribution of Airborne Trace Metals in Man," Proceedings of the 8th Annual Conference of Trace Substances in Environmental Health, University of Missouri, Columbia, Missouri, June (1974).

39. Kneip, T. J., G. Rê and T. Hernandez, "Cadmium in an Aquatic Ecosystem: Distribution and Effects," Trace Substances in Environmental Health - VIII, 1974. A Symposium. D. D. Hemphill, ed., University of Missouri, Columbia (1974).

40. Bondietti, E. A., F. H. Sweeton, T. Tamura, R. M. Perhac, L. D. Nulett, and T. J. Kneip, "Characterization of Cadmium and Nickel Contaminated Sediments from Foundry Cove, New York," In: Proceedings of the First Annual NSF-RANN Trace Contaminants Conference, Oak Ridge, Tennessee, August, 1973. pp. 211-224. CONF-730802, ORNL, Oak Ridge, Tennessee (1974).

*41. Kneip, T. J., et al., "Tentative Method of Analysis for Cadmium Content of Atmospheric Particulate Matter by Atomic Absorption Spectroscopy," Health Laboratory Science 11(2):112-116 (1974).

*42. Kneip, T. J., et al., "Tentative Method of Analysis for Iron Content of Atmospheric Particulate Matter by Atomic Absorption Spectroscopy," Health Laboratory Science 11(2): 118-121 (1974).

*43. Kneip, T. J., et al., "Tentative Method of Analysis for Lead Content of Atmospheric Particulate Matter by Atomic Absorption Spectroscopy," Health Laboratory Science 11(2): 122-127 (1974).

*44. Kneip, T. J., et al., "Tentative Method of Analysis for Manganese Content of Atmospheric Particulate Matter by Atomic Absorption Spectroscopy," Health Laboratory Science 11(2):128-133 (1974).

*45. Kneip, T. J., et al., "Tentative Method of Analysis for Zinc Content of Atmospheric Particulate Matter by Atomic Absorption Spectroscopy," Health Laboratory Science 11(2): 134-139 (1974).

*46. Kneip, T. J., et al., "Tentative Method of Analysis for Vanadium Content of Atmospheric Particulate Matter by Atomic Absorption Spectroscopy," Health Laboratory Science 11(3):240-245 (1974).

*47. Kneip, T. J., et al. Tentative Method of Analysis for Elemental Mercury in Ambient Air by Collection on Silver Wool and Atomic Absorption Spectroscopy," Health Laboratory Science 11(4):342-346 (1974).

48. Kneip, T. J., M. Eisenbud, M. T. Kleinman and D. M. Bernstein, "Studies of Trace Substances in an Urban Atmosphere," Proceedings of the International Symposium of Recent Advances in the Assessment of the Health Effects of Environmental Pollution, Paris, June 24-28, 1974. Commission of European Communities, Luxembourg. p.431-450. NTIS EUR5360 (1975).

*49. Goldstein, D. H., T. J. Kneip, V. Rulon and N. Cohen, "Erythrocytic δ-Aminolevulinic Acid Dehydratase (δ-ALAD) Activity as a Biological Parameter for Determining Exposures to Lead," Journal of Occupational Medicine, 17:157-162 (1975).

50. Kneip, T. J., "Potential Applications of X-ray Analytical Method in Paint Analysis," Journal of Paint Technology, 47:71-76 (1975).

51. Kneip, T. J., T. Hernandez and Gary Ré, "Cadmium in an Aquatic Ecosystem: Transport and Distribution," In: Trace Contaminants in the Environment," Proceedings of the Second Annual NSF-RANN Trace Contaminants Conference, Asilomar, Pacific Grove, California, 29-31 August, 1974 (1975).

52. Kneip, T. J., et al., "Tentative Method of Analysis for Elemental Mercury in the Working Environment by Collection on Silver Wool and Atomic Absorption Spectroscopy," Health Laboratory Science 12(2):158-162 (1975).

53. Kneip, T. J., et al., "Lead in Blood and Urine," Health Laboratory Science 12(4):375-378 (1975).

54. Kneip, T. J., et al., "Mercury in Urine," Health Laboratory Science 12(4):379-382 (1975).

55. Kneip, T. J., et al., "General Atomic Absorption Procedure for Trace Metals in Airborne Material Collected on Membrane Filters," Health Laboratory Science 12(4):383-393 (1975).

56. Kneip, T.J., N. Cohen, V. Rulon, David Goldstein and N. Nelson, "Factors Influencing Dose-Response Relationships for Toxic Metals," In: Effects and Dose-Response Relationships of Toxic Metals, G.F. Nordberg, ed., Associated Scientific Publishers, Amsterdam (1976).

57. Eisenbud, M., T. J. Kneip, M. T. Kleinman, D. M. Bernstein, "Trace Metals in Urban Aerosols," Final Report to Electric Power Research Institute, October, 1975. NTIS # Pb-248-324 (1976).

58. Bernstein, D. M., M. T. Kleinman, T. J. Kneip, T. L. Chan and M. Lippmann, "A High-Volume Sampler for the Determination of Particle Size Distributions in Ambient Air," Journal of the American Air Pollution Control Association 26(11), 1069-1072 (1976).

59. Kleinman, M. T., T. J. Kneip and M. Eisenbud, "Seasonal Patterns of Airborne Particulate Concentrations in New York City," Atmospheric Environment 10:9-11 (1976).

60. Kleinman, M. T., D. M. Bernstein and T. J. Kneip, "An Apparent Effect of the Oil Embargo on Total Suspended Particulate Matter and Vanadium of New York City Air," J. Air Poll. Con. Assoc. 27:65-67 (1977).

61. Kneip, T.J., R. Peter Mallon and Virginia P. Rulon, "The Effects of Anemia on Heme Synthesis Parameters During Lead Exposure," American Industrial Hygiene Association Journal 37, 578 -585 (1977).

62. Kneip, T. J., et al., "Analytical Method for Antimony in Air and Urine," In: Methods of Air Sampling and Analysis, Second edition, Katz, M., ed. American Public Health Association, Washington, D. C., pp. 765-769 (1977).

63. Kneip, T. J., et al., "Analytical Method for Arsenic in Urine and Air," In: Methods of Air Sampling and Analysis, Second edition, Katz, M., ed. American Public Health Association, Washington, D. C., pp. 769-773 (1977).

64. Kneip, T. J., et al., "Analytical Method for Arsenic, Selenium and Antimony in Urine and Air by Hydride Generation and Atomic Absorption Spectroscopy," In: Methods of Air Sampling and Analysis, Second edition, Katz, M., ed. American Public Health Association, Washington, D. C., pp. 774-780 (1977).

65. Kneip, T. J., et al., "Analytical Method for Chromic Acid Mist in Air," In: Methods of Air Sampling and Analysis, Second edition, Katz, M., ed. American Public Health Association, Washington, D. C., pp. 785-788 (1977).

66. Kneip, T. J., et al., "Analytical Method for Lead in Air," In: Methods of Air Sampling and Analysis, Second edition, Katz, M., ed. American Public Health Association, Washington, D. C., pp. 808-818 (1977).

67. Hazen, R. E. and T. J. Kneip, "The Distribution of Cadmium in the Sediments of Foundry Cove," In: Hudson River Ecology, Proceeding of a Symposium, Hudson River Environmental Society, ed. March 28-30, 1976 (1977).

68. Kneip, T. J., M. T. Kleinman, R. Riddick and D. M. Bernstein, "Trace Elements in Human Tissues," Proceedings of the International Workshop on Biological Specimen Collections, April 18-22, 1977, Luxembourg, (In press, 1977).

69. Kneip, T. J., "Effects of Cadmium in an Aquatic Environment," In: Cadmium 77, Edited Proceedings First International Cadmium Conference, San Francisco, 31 Jan.-2 Feb., 1977. Metal Bulletin Limited, London, pp. 120-124, (1978).

70. Daisey, J. M., I. Hawryluk, T. J. Kneip and F. Mukai, "Mutagenic Activity in Organic Fractions of Airborne Particulate Matter," Presented at the Carbonaceous Particles in the Atmosphere Conference, March 20-24, 1978, Berkeley, California.

71. Kneip, T. J., M. A. Leyko, M. T. Kleinman, M. Lippmann and J. M. Daisey, "Organic Matter in New York City TSP: Comparisons of Seasonal Variations and Relationships to Source Tracers," Presented at the Carbonaceous Particles in the Atmosphere Conference, March 20-24, 1978, Berkeley, California.

72. Lioy, P. J., G. T. Wolff and T. J. Kneip, "Toxic Airborne Elements in the New York Metropolitan Area," J. Air Poll. Con. Assn., 28(5):510-512 (1978).

73. Leaderer, B. P., D. M. Bernstein, J. M. Daisey, M. T, Kleinman, T. J. Kneip, E. O. Knutson, M. Lippmann, P. J. Lioy, K. A. Rahn, D. Sinclair, R. L. Tanner, and G. T. Wolff, "Summary of the New York Summer Aerosol Study (NYSAS)," J. Air Poll. Con. Assn., 28(4):321-327 (1978).

74. Fennikoh, K. B., H. I. Hirshfield and T. J. Kneip, "Cadmium Toxicity in Planktonic Organisms of a Freshwater Web," Environ. Res. June (1978).

75. Kneip, T. J. and M. T. Kleinman, "Sampling and Multielement Analysis of Ambient Aerosols," In: Special Environmental Report No. 10, Air Pollution Measurement Techniques, Proceedings of the WMO Air Pollution Measurement Techniques Conference (APOMET), Gothenburg, 11-15 October, 1976. World Meteorological Organization, Geneva, Switzerland, pp.132-139, (1977).

76. Laurer, G. R. and T. J. Kneip, "Portable X-ray Units for Analyzing Lead in Paint," In: A Report of the Committee on Environmental Improvement: Assessing the Problem of Lead-Based Paint Hazards, pp. 13-17, American Chemical Society, Washington, D.C. (August, 1978).

77. Kneip, T. J. and R. E. Hazen, "Deposit and Mobility of Cadmium in a Marsh-Cove Ecosystem and the Relation to Cadmium Concentration in Biota." Environ. Health Persp. Feb. (1979).

78. Lowenberg, R. and T. J. Kneip, "Dietary intakes of lead and cadmium in vegetables grown in New York City." Environ. Health Persp. (In press, 1979).

79. Kneip, T. J. "Concentrations of lead and cadmium in garden vegetables grown in New York City." Environ. Health Persp. (In press, 1979).

80. Hazen, R. E. and T. J. Kneip. "Biogeochemical cycling of cadmium in Marsh Ecosystem." In: Biogeochemistry of Cadmium, Wiley and Sons, New York. J. O. Nriagu, Ed. (In press, 1979).

81. Daisey, J. M., M. A. Leyko and T. J. Kneip, "Source identification and allocation of PAH compounds in the New York City aerosol: Methods and applications." In: Polynuclear Aromatic Hydrocarbons, P. W. Jones and P. Lever, eds. Ann Arbor Science Publishers, Inc. Ann Arbor, Michigan (In press, 1979) pp. 201-215.

82. Kneip, T. J., M. Lippmann, F. Mukai and J. M. Daisey, Trace Organic Compounds in the New York City Atmosphere. Part I. Preliminary Studies. Report to Electric Power Research Institute. (In press, 1979).

83. Kneip, T. J. and M. Lippmann, Eds. New York Summer Aerosol Study. Annals of the New York Academy of Sciences. (In press, 1979).

84. Kneip, T. J. and P. J. Lioy, Eds. Aerosols: Anthropogenic and Natural--Sources and Transport. Annals of the New York Academy of Sciences. (In press, 1979).

85. Kneip, T. J., Reviews on 1) Haloethers and Haloalkylethers; 2) Phthlalate Esters; 3) Nitrosamines; 4) Dichlorobenzidine. In: Chemical Pollutants of New York Bight: Priorities, J. S. O'Conner and H. M. Stanford, eds. NOAA/MESA Report (In press, 1979).

CURRICULUM VITAE

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EDUCATION

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Photoperiodic control of pituitary gonadotropin release in trout (Salmo gairdneri Richardson and Salvelinus fontinalis (Mitchell) and in the leopard frog (Rana pipiens Shreber)

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AWARDS

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SOCIETIES

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1970-73	Research Associate University of Maryland Natural Resources Institute Hallowing Point Field Station Prince Frederick, Maryland
1967-70	Graduate Research Fellow Dept. of Biological Sciences State University of New York at Albany
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PROFESSIONAL ACTIVITIES

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Inst. of Mar. and Atmos. Sciences
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1972-1974

Visiting Investigator
University of Delaware
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RESEARCH INTERESTS

Population dynamics
Community dynamics
Respiratory physiology of fishes
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Chemical-biological interrelationships in ecology
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Physiological ecology
General physiology
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PUBLICATIONS

O'Connor, J.M. 1969. The effects of melatonin on in vitro ovulation of frog ovarian oocytes. Amer. Zool. 9:549.

O'Connor, J.M. and R.G. Stross. 1970. Photoperiodic control of the pituitary gonadotropin release patter of the frog, Rana pipiens Shreber. Abstr. Proc. N.E. Division Comp. Physiology section, Amer. Soc. Zool.

O'Connor, J.M. 1970. The effects of thermal shock on the tidal activity patterns of the hogchoker, Trinectes maculatus. Abstr. Amer. Society of Ichthyologists and Herpetologists, Ann. Mtg., New Orleans, La.

O'Connor, J.M. 1971. Photoperiodic control of the pituitary gonadotropin release patterns in the rainbow trout (Salmo gairdneri (Rich.,)), the brook trout (Salvelinus fontinalis Mitchell) and in the leopard frog (Rana pipiens Shreber). Ph.D. Thesis. Library, State University of New York at Albany, and University Microfilms, Ann Arbor, Mich.

O'Connor, J.M. 1972. Pituitary gonadotropin release patterns in rainbow trout (Salmo gairdneri) brook trout (Salvelinus fontinalis) and in the leopard frog (Rana pipiens). Comp. Biochem. Physiol. 43(A):739-746.

O'Connor, J.M. 1972. Tidal rhythm in the activity patterns of the hogchoker, Trinectes maculatus (Bloch and Schneider). Exp. Mar. Biol. Ecol. 9:173-178.

Sherk, J.A., J.M. O'Connor and D.A. Neumann. 1972. The effects of suspended and deposited sediments on estuarine organisms. Univ. Md. N.R.I. ref. 72-9.

Sherk, J.A., J.M. O'Connor and D.A. Neumann. 1973. The effects of suspended and deposited sediments on estuarine organisms. Univ. Md. N.R.I. ref. no. 73-4.

O'Connor, J.M., R.W. Williams and J. Converse. 1974. Studies of fish impingement at the Nine Mile Point Nuclear Station, Lake Ontario. Abstr. 17th Conference on Great Lakes Research. Int'l Assn. for Great Lakes Research.

O'Connor, J.M. and J.A. Sherk. 1974. The responses of some estuarine organisms to concentrations of suspended solids. Proc. of the Seventh Dredging Seminar, Ctr. for Dredging Studies, Texas A&M University.

Sherk, J.A., J.M. O'Connor and D. Neumann. 1975. The effects of suspended sediments on estuarine environments. IN: L.E. Cronin (Ed.). Estuarine Research, Vol. II. Geology and Engineering, Academic Press, N.Y. pp. 541-557.

Neumann, D.A., J.M. O'Connor and J.A. Sherk. 1975. Respiratory and hematological responses of the oyster toadfish (Opsanus tau) to suspended sediments. Trans. Amer. Fish. Soc. 104:775-781.

Sherk, J.A. and J.M. O'Connor. 1976. Effects of sedimentation on coastal zone organisms. Proc. III Federal Inter-Agency Sedimentation Conference.

O'Connor, J.M. and S. Schaffer. 1977. Effects of sampling gear on striped bass ichthyoplankton. Chesapeake Science 18:312-315.

Sherk, J.A., J.M. O'Connor and D.A. Neumann. 1976. Effects of suspended solids on selected estuarine plankton. U.S. Army Corps of Engineers Coastal Engineering Research Center. Misc. Rept. 76-1. 50 pp. Jan. 1976.

O'Connor, J.M., D.A. Neumann, and J.A. Sherk, Jr. 1976. Lethal effects of suspended sediments on estuarine fish. Technical Paper No. 76-20, U.S. Army, Coastal Engineering Research Center, 38 pp.

O'Connor, J.M., D.A. Neumann, and J.A. Sherk. 1977. Sublethal effects of suspended sediments on estuarine fish. Technical Paper No. 77-3, U.S. Army, Coastal Engineering Research Center, 90 pp.

Rachlin, J., A.P. Beck, and J.M. O'Connor. 1978. Karyotypic analysis of Hudson River striped bass, Morone saxatilis (Walbaum). Copeia 1978(2):334-336.

Ginn, T.C. and J.M. O'Connor. 1978. Responses of the estuarine amphipod Gammarus daiberi to chlorinated power plant effluent. Estuarine Coastal Mar. Sci. 6:459-469.

Poje, G.V., T.C. Ginn, and J.M. O'Connor. 1978. An operational system for simulating the physical and chemical environment of the condenser tubes of a power plant. IN: Thorp, J. and J.W. Gibbons, eds. Energy and Environmental Stress in Aquatic Systems (in press).

Zubarik, L.S., and J.M. O'Connor. 1978. A radioisotopic study of mercury uptake by Hudson River biota. IN: Thorp, J. and J.W. Gibbons, eds. Energy and Environmental Stress in Aquatic Systems (in press).

O'Connor, J.M., C.C. Lee, and M. Eisenbud. Environmental Health. M.E.S.A. New York Bight Atlas Monograph 32 (in press).

Ginn, T.C., G.V. Poje, and J.M. O'Connor. 1978. Survival of planktonic organisms following passage through a simulated power plant condenser tube. Proc. Fourth Nat'l Workshop on Entrainment and Impingement. pp. 91-101.

PUBLICATIONS IN REVIEW

O'Connor, J.M., D.A. Neumann and J.A. Sherk. The responses of estuarine fishes to highly turbid environments. Water Res.

O'Connor, J.M. and J.A. Sherk. The effects of suspended mineral solids on the white perch, Morone americana. Trans. Amer. Fish. Soc.

O'Connor, J.M. and J.A. Mihursky. The effects of thermal shock on the activity patterns of the hogchoker, Trinectes maculatus. Ches. Sci.

MANUSCRIPTS IN PREPARATION

Eichorn, K.L., T.C. Ginn and J.M. O'Connor. Response of striped bass (Morone saxatilis) to chlorinated cooling water.

O'Connor, J.M., G.V. Poje, and S. Rigdon. Respiration of striped bass (Morone saxatilis) eggs and larvae.

Becker, A.J. and J.M. O'Connor. Aerobic shutdown in the green crab (Carcinus maenas) in response to temperature, salinity and sulfide.

Steinhausler, F., S. Schaffer, N. Cohen, C. Lee, J. O'Connor and M. Wrenn. Effect of high LET radiation on intracellular ATP content of prokaryotic and eukaryotic algae.

Hendrick, E., J.M. O'Connor, and G.R. Laurer. A method for analysis of trace mineral content of fish otoliths using X-ray fluorescence spectroscopy.

PRESENTATIONS

O'Connor, J.M. 1969. The effects of melatonin on in vitro ovulation of ovarian oocytes in the frog, Rana pipiens. Amer. Soc. Zool.

O'Connor, J.M. and R.G. Stross. 1969. Photoperiodic control of the pattern of pituitary gonadotropin release in the frog Rana pipiens Shreber. Amer. Soc. Zool.

O'Connor, J.M. 1966. Alterations in the tidal activity rhythm in the hogchoker after exposure to thermal shock. Atlantic Estuarine Research Society, Cambridge, Md. October, 1966.

O'Connor, J.M. and J.A. Sherk. 1971. The lethal effects of suspended solids on estuarine fishes. Joint Mtg. Atlantic Estuarine Research Society and the Estuarine Research Federation. Pleasantville, N.Y. October, 1971.

Neumann, D.A., J.M. O'Connor and J. Sherk. 1972. Studies of the respiration of the striped bass and the white perch exposed to suspended sediments. Atlantic Estuarine Research Soc. Ocean City, Md. April, 1972.

O'Connor, J.M., J.A. Sherk and D. Neumann. 1973. "Inert" mineral compounds as potential factors in mortality and toxin transport in estuarine organisms. E.P.A. Workshop on Chemical Pathogens in the Environment. Pensacola, Fla., May, 1973.

Sherk, J.A., J.M. O'Connor and D. Neumann. 1973. The effects of suspended solids on estuarine environments. Symp. on Recent Advances in Estuarine Research. II Int'l. Conference of the Estuarine Research Federation. Myrtle Beach, S.C. October, 1973.

O'Connor, J.M., and J.A. Sherk. 1974. The responses of some estuarine organisms to concentrations of suspended solids. Seventh Dredging Seminar. Sp. by the Center for Dredging Studies, Texas A&M University, New Orleans, La. November, 1974.

O'Connor, J.M., R. Williams and J. Converse. 1974. Impingement studies at the nine mile point nuclear power station, Lake Ontario. 17th Conference on Great Lakes Research, August, 1974. Hamilton, Ontario, Canada.

O'Connor, J.M., and S.G. O'Connor. 1975. Seasonal Compartmentalization of primary productivity in the New York Bight, 1973-74. Am. Soc. of Limnology and Oceanography, Halifax, N.S., Canada, June, 1975.

O'Connor, J.M. 1976. Assessment of entrainment impact at the Indian Point Nuclear Station. Third National Workshop on Entrainment and Impingement, New York City.

Poje, G.V. and J.M. O'Connor. 1976. Gammarus tigrinus: an estuarine predatory carnivore. Presented to the Atlantic Estuarine Research Society. May 1976.

Ginn, T.C., K.L. Eichorn and J.M. O'Connor. 1976. Response of the striped bass Morone saxatilis and the amphipod Gammarus to chlorinated power plant effluent. Northeast Fish and Wildlife Conference. April 26-29, Hershey, Pennsylvania.

Poje, G.V., T.C. Ginn and J.M. O'Connor. 1977. Use of a condenser tube simulator for evaluating power plant entrainment effects. Northeast Fish and Wildlife Conference, Boston, Massachusetts. April 3-6, 1977.

Poje, G.V., T.C. Ginn, and J.M. O'Connor. 1977. An operational system for simulating the physical and chemical environment of the condenser tubes of a power plant. Symposium on Energy and Environmental Stress in Aquatic Systems, Augusta, Georgia, November, 1977.

Zubarik, L.S., and J.M. O'Connor. 1977. A radioisotopic study of mercury uptake by Hudson River biota. Symposium on Energy and Environmental Stress in Aquatic Systems, Augusta, Georgia, November, 1977.

O'Connor, J.M.,C.C. Coutant, and J.P. Lawler. 1977. Environmental impact assessment as ecological research. Symposium on Energy and Environmental Stress in Aquatic Systems, Augusta, Georgia, November, 1977.

O'Connor, J.M., T.C. Ginn, and G.V. Poje. 1978. Survival of planktonic organisms following passage through a simulated power plant condenser tube. Fourth Nat'l Workshop on Entrainment and Impingement. Chicago, Illinois.

Steinhausler, F., S. Schaffer, N. Cohen, C. Lee, J. O'Connor, and M. Wrenn. 1978. Effect of high LET radiation on intracellular ATP content of prokaryotic and eukaryotic algae. Radiation Research Society. Toronto, Ontario, Canada.