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W. Lawrence Gates

The Dynamics of Climate

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Thomas T. Sugihara, Dean
John D. Lattin, Associate Dean
Eva M. Millemann, Editor

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Cover

A view of the earth taken from a geostationary satellite. Photo shows large-scale distribution of clouds associated with weather systems.

Climate, the average structure and behavior of the earth's atmosphere, is the result of a complex interaction among many processes. The radiation from the sun, the distribution of snow, ice and clouds, the temperature of the ocean and the nature of the earth's surface—all play a part in determining the climate. Lately, some of man's activities have added other new and important influences.

Some of the sun's radiation is reflected back to space by the earth's surface and by clouds, with most of the remaining radiation being absorbed by the earth. The earth in turn exchanges infrared radiation with the atmosphere and with space. The resulting radiation balance is basic to the global circulation of the atmosphere and hence to the climate.

While the weather is expected to vary from month to month and from year to year, climate is generally viewed as unchanging. Oregonians, for example, expect rain in the winter, while southern Californians expect sunshine and inhabitants of Alaska, northern Canada, and most of the USSR brace for snow and ice.

Over a period of ten, twenty, or thirty years, climate changes are too slow to be readily noticed, but over longer time spans such changes have been drastic. For example, the climate of Europe between about 1300 and 1500 A.D. was much colder than it is today, while in the last century it was among the warmest ever observed. Perhaps the most drastic recorded climatic changes occurred during the last Ice Age, some 18,000 years ago when the earth as a whole was several degrees colder than it is now.

Although it may never be possible to control the climate, it is increasingly important that scientists have a better understanding of the processes that cause the atmosphere and its climate to change. Such information would be of great value, for example, in many agricultural or industrial activities that require a lead time of a year or a decade. The problem is not whether the climate will change, but when and how rapidly. Will it be warmer or colder, and will the average rainfall be noticeably different?

Some of these questions are being addressed by a group of scientists led by Professor W. Lawrence Gates, chairman of the Department of Atmospheric Sciences and director of the OSU Climatic

Research Institute—a center that he established upon his arrival at Oregon State University in 1976.

"Climate was emerging as an important new problem in the mid-seventies," explains Professor Gates, "and a conjunction of several events gave impetus to climate research on a national and international scale. Record cold weather in the eastern part of our own country, a disastrous drought in the Sahel of West Africa, and persistent crop failures in the Ukraine served to call the world's attention to the fact that it could not count on climate to remain constant."

Other conditions were also right at that time to support a vigorous thrust in climate research. For over a decade, scientists had been experimenting with mathematical models of the atmosphere, and by the mid-seventies they had achieved some success in numerically simulating the global distribution of the present climate.

Newer, faster computers, observations from weather satellites, and special observing programs also combined to accelerate climate research.

As a professor in the Department of Meteorology at the University of California at Los Angeles in the sixties and later as director of a climate project at the Rand Corporation in the early seventies, Professor Gates was in a position to contribute to this revolution in climate research.

This would be the second revolution in atmospheric sciences for Professor Gates. He had been involved in an earlier one during the fifties while working for his doctorate at the Massachusetts Institute of Technology. At that time, he helped pioneer the application of mathematical and physical models to the problem of daily weather forecasting.

"This soon became known as NWP (numerical weather prediction)," explains Professor Gates. "NWP is today a routine procedure in weather offices around the world." Professor Gates' interest in applying mathematics and physics to the atmosphere has also extended to the oceans. He developed some of the first numerical models of the large-scale ocean circulation.

"I was probably in the right position at the right time to recognize both the necessity and opportunity for a concerted effort in climate research," notes Professor Gates in discussing his active role in this field. During 1973 and 1974, he was chairman of an influential panel of the National



W. Lawrence Gates, chairman of the Department of Atmospheric Sciences and director of the Climatic Research Institute.

Academy of Sciences, whose report—*Understanding Climatic Change: A Program for Action*—served as the basic planning document for both national and international programs on climate research. The U.S. National Climate Program, which coordinates the research of many agencies, and the World Climate Research Programme of the United Nations' World Meteorological Organization are the result of this and related efforts.

The chance to organize a young department and the support by the OSU administration of his desire to establish a center for climatic research brought Professor Gates to Oregon State University. Today, the OSU Department of Atmospheric Sciences is probably ranked among the top

ten of about forty such departments in the country, and the Climatic Research Institute (CRI) is known by climate researchers throughout the world.

Professor Gates reports to the College of Science as department chairman but to the Research Office as CRI director. He is quick to acknowledge that Science, Research, the University Administration, and the OSU Foundation have helped him make the Climatic Research Institute into the thriving center that it is today.

Research at the Climatic Research Institute is normally performed under contracts and grants from outside agencies—principally, the National Science Foundation, the Department of Energy, and the

National Aeronautics and Space Administration. The major CRI projects are currently concerned with the numerical simulation of the large-scale processes and events that are believed to control the climate. By these investigations, researchers hope to understand better future climate changes.

CRI scientists carry out their studies by constructing elaborate mathematical models of the global atmosphere and ocean, and then comparing the models' solutions obtained on high-speed computers with the observed climate.

Professor Gates and faculty colleagues Michael Schlesinger, Young-June Han, Steven Esbensen, and Hua-Lu Pan collaborate on these projects with CRI programmers Robert Mobley, William McKie, and Steven Schwartz. They use a sophisticated computer terminal to communicate directly with the CRAY-1 computer at the National Center for Atmospheric Research in Colorado. "It would be impossible," notes Professor Gates, "to run models of such complexity without access to a very fast computer."

The climate models calculate the three-dimensional structure of the wind, temperature, pressure, and humidity on a global network of several thousand points several times an hour. The models also calculate the occurrence of clouds and precipitation, as well as the effects of friction and heating near the surface. By running the models over months and years of simulated time, researchers can obtain a detailed picture of the climate and its evolution.

"When the boundary conditions, such as the amount of radiation coming from the sun, the amount of land- and sea-ice, and the sea-surface temperature, are realistic," explains Professor Gates, "the result is a fairly realistic climate. And once the model's ability to simulate the present climate has been established, we can begin to conduct numerical experiments on the climate's sensitivity to changes in individual factors, such as the amount of carbon dioxide in the atmosphere."

One of the first experiments carried out at CRI by Professor Gates involved changing the conditions at the earth's surface to resemble those present during the ice age of approximately 18,000 years ago. Working with geologists and oceanographers, Professor Gates assembled data on the ice-age ocean temperature, ice distribution,

and the land's elevation and albedo. When these conditions were introduced into the model, the resulting simulation provided a unique verification of ice-age climate, and it demonstrated that the model could work under widely different conditions. Professor Gates hopes to continue such work in the future in collaboration with paleoclimatologists.

A major, current project at CRI is concerned with the possible climatic effects of increasing carbon dioxide (CO₂) in the atmosphere. Scientists believe that the large future increase of atmospheric CO₂ projected from the burning of fossil fuels may upset the heat balance between the earth and the atmosphere through the well-known "greenhouse effect." This phenomenon would make the earth generally warmer than it is today and might reduce the amount of polar sea ice. Scientists estimate that the current CO₂ concentration in the atmosphere is already 15 percent higher than it was in pre-industrial times, and they expect this figure to reach 100 percent sometime in the next century.

To find out more about the details of such a possible future climate, Professor Gates and his colleague Michael Schlesinger have performed experiments in which the CO₂ amount has been increased to twice its present value. "In general, we find that the climate indeed becomes warmer— about 2° C on the global average," says Professor Gates. "But the change of climate depends very much on geographical location, on the season of the year, and on the treatment of the ocean. This latter aspect is of particular concern in the CO₂ problem, since the ocean has the ability to absorb large amounts of heat without changing its temperature very much."

Important aspects of this and other experiments with climate models are the analysis of the simulated balances of heat, momentum, moisture and energy, and the determination of the statistical significance of simulated climatic changes. Researchers at CRI are currently studying these and other problems in an effort to increase the realism and usefulness of their models.

Professor Gates and his collaborators are currently involved in combining the atmosphere and oceans into one model, so that the sea-surface temperature may be freely determined as a result of atmosphere-ocean interactions, rather than prescribed as in most previous climate models.



The climatic Research Institute is located at 811 S.W. Jefferson Street. Eight full-time scientists and support staff work in this center, in addition to 12 part-time faculty, staff, and graduate students from the Department of Atmospheric Sciences. The center was purchased and remodeled by the OSU Foundation. It was occupied by the Climatic Research Institute in 1979.

Since there is mounting evidence that the oceans may provide important clues about the next season's climate, CRI scientists are planning new experiments to explore the role of the ocean in the possible prediction of climate on seasonal and annual time scales.

Another new CRI project is related to local climate. Directed by Professor Allan Murphy of the Department of Atmospheric Sciences, this work has great potential usefulness for Oregon agriculture and forestry. After collecting and placing in a computer all available climate data for Oregon, researchers will try to make climate information readily available to users of such data, including local industries and government agencies. Professors Gates and Murphy hope that this work will serve as a bridge between the model studies of large-scale climate and the practical application of climate information on a local scale.

Professor Gates is clearly the driving force behind climate research at OSU, but he points out that this work is a collaborative effort among many faculty members, computer programmers, research associates, research assistants, and graduate students. The Climatic Research Institute

has presently about 20 full- or part-time staff who work on projects with annual budgets totaling more than half a million dollars. Many of these persons are also affiliated with the Department of Atmospheric Sciences, whose own research budget now exceeds 1.5 million dollars annually.

Since his arrival at OSU, Professor Gates has been busy guiding a new department, teaching courses on atmospheric dynamics, assisting graduate students, establishing and directing the Climatic Research Institute, conducting research projects, writing research reports for publication, and securing funds and space for new staff and equipment. In addition to all this, he continues to be actively involved with national and international activities related to climate research. He is a member of committees of the National Academy of Sciences, the National Science Foundation, and the World Meteorological Organization of the United Nations.

"In spite of my commitments," says Professor Gates, "I enjoy my work enormously. I also find the frequent traveling around the world to be of great benefit. But then, climate is a global affair!"

Student Profile

John D. Williamson

John Williamson, a doctoral student in the Department of Botany and Plant Pathology, is working with Dr. Ralph Quatrano in recombinant DNA research.

Williamson came to Oregon State University through some unusual circumstances. In the late seventies, he was stationed in Antarctica as part of a Navy support group for Operation Deepfreeze—a scientific research project. An announcement soliciting postdoctoral applicants for a position in Quatrano's laboratory appeared on the bulletin board of that remote Antarctica station. Although Williamson could not qualify for a postdoctoral position at the time, he later applied for and received a graduate research assistantship with Dr. Quatrano.

Williamson graduated in botany at the University of Oklahoma in 1971 and received a commission in the U.S. Navy at the same time. He later earned a master's degree in oceanography at the Naval Postgraduate School in Monterey, California. He also became a helicopter pilot and completed tours of duty in Japan and Antarctica. He had reached the rank of Lieutenant Commander, when he decided after nine years to leave active duty in the Navy. His decision was prompted by his desire to conduct basic scientific research.

Recombinant DNA offers almost unlimited research possibilities to John Williamson. He sees recombinant DNA technol-



ogy as one of the most powerful tools in biology today.

"Most people have heard only about genetic engineering being used to produce specific products like interferon and insulin," says Williamson, "but recombinant DNA techniques can be used to answer many fundamental biological questions. Quatrano is using these techniques to study the molecular controls of plant development. One of the basic questions in the developmental biology of higher organisms remains: How does a single cell, the fertilized egg, become numerous differentiated, specialized tissues in the mature plant or animal?"

Williamson's research focuses on germination and embryogenesis in wheat. He is cloning cDNA's to messenger RNA's for proteins that are specific for different developmental pathways in wheat. Later, he will try to determine how environmental signals trigger the specific internal signals that cause wheat to germinate.

"Recombinant DNA techniques have several advantages," notes Williamson. "While the techniques may be quite involved, they tend to produce clear 'yes or no' answers that do not require complex statistical interpretation." He hopes to complete his project in another year. After that, he anticipates additional postdoctoral training and then the opportunity to conduct basic research in industry.

Murdock Trust Awards Grant for Gene Research

Scientists at Oregon State University have received a grant of \$545,000 from the M. J. Murdock Charitable Trust of Vancouver, Washington, for the establishment of a coordinated and expanded program in gene research.

Christopher K. Mathews, chairman of the Department of Biochemistry and Biophysics, and Ralph S. Quatrano, professor in the Department of Botany and Plant Pathology, are co-directors of this expanded effort.

Oregon State University has made a commitment to enlarge its research capabilities in molecular genetics to provide better understanding of the structure, organization, and expression of genes in higher organisms. OSU scientists hope to apply knowledge resulting from their investigations to solve practical problems, especially in the fields of agriculture and forestry. The Murdock grant recognizes the value of such

research at Oregon State University and offers valuable assistance to the coordinated effort of several investigators.

Fourteen faculty members, 11 in the College of Science and three in the College of Agricultural Sciences, are already engaged in some 30 projects in molecular genetics, or related areas, with outside grants totaling \$1.8 million annually. They are involved in molecular genetics, recombinant DNA, and nucleic acid biochemistry research.

The investigators listed in the proposal to the Murdock trust are: George S. Beaudreau, agricultural chemistry; Lyle R. Brown, microbiology; Harold J. Evans, laboratory for nitrogen fixation research; Adolph J. Ferro, microbiology; Jo-Ann C. Leong, microbiology; Christopher K. Mathews, biochemistry and

biophysics; Dallice Mills, botany and plant pathology; Roy O. Morris, agricultural chemistry; George D. Pearson, biochemistry and biophysics; Ralph S. Quatrano, botany and plant pathology; George F. Rohrmann, agricultural chemistry; Henry W. Schaub, biochemistry and biophysics; Paul D. Shirk, zoology; and Kensal E. van Holde, biochemistry and biophysics.

Co-directors Mathews and Quatrano are especially appreciative of the Murdock grant because the proposal included a request for additional faculty rather than just equipment. Funds granted by the Murdock Trust will enable Oregon State University to hire two tenure-track faculty members who will complement the University's existing strengths in areas such as, molecular virology, chromatin biochemistry, nitrogen fixation, and molecular biology of plants.

FACULTY PUBLICATIONS 1982

Atmospheric Sciences

DEARDORFF, JAMES W.

DEARDORFF, J. W. 1982. Simulation of terrain effects using a mesoscale mixed-layer model. Pages 195-196A in Proc. Tenth IMACS World Congress on Systems Simulation and Scientific Computation, Montreal, August 8-13.

DEARDORFF, J. W., and L. MAHRT. 1982. On the dichotomy in theoretical treatments of the atmospheric boundary layer. *J. Atmos. Sci.* 39:2096-2098.

DEARDORFF, J. W., and G. E. WILLIS. 1982. Ground-level concentrations due to fumigation into an entraining mixed layer. *Atmos. Environ.* 16:1159-1170.

DEARDORFF, J. W., and G. E. WILLIS. 1982. Dependence of mixed-layer entrainment on shear stress and velocity jump. *J. Fluid Mech.* 115:123-149.

DEARDORFF, J. W., and G. E. WILLIS. 1982. Investigation of the frozen-turbulence hypothesis for temperature spectra in a convectively mixed layer. *Phys. Fluids* 25:21-28.

See HAN, Y. -J., K. UEYOSHI, and J. W. DEARDORFF.

RUSCHER, P. H., and J. W. DEARDORFF. 1982. A numerical simulation of an atmospheric vortex street. *Tellus* 34:555-566.

ESBENSEN, STEVEN K.

ESBENSEN, S. K., E. I. TOLLERUD, and J.-H. CHU. 1982. Cloud-cluster-scale circulations and the vorticity budget of synoptic scale waves over the eastern Atlantic intertropical convergence zone. *Mon. Wea. Rev.* 110:1677-1692.

GATES, W. LAWRENCE

GATES, W. L. 1982. Paleoclimatic modeling — A review with reference to problems and prospects for the pre-Pleistocene. Pages 26-42 in *Climate in Earth History*. Studies in Geophysics, National Academy Press, Washington, DC.

GATES, W. L. 1982. The role of atmospheric models in the detection of the first climatic effects of increased CO₂. Pages 57-77 in Proc. Workshop on First Detection of Carbon Dioxide Effects, Harpers Ferry, WV, 8-10 June 1981, DOE/CONF-8106214, U.S. Dept. Energy, Washington, DC.

HAN, YOUNG-J.

HAN, Y. -J., K. UEYOSHI, and J. W. DEARDORFF. 1982. Numerical study of terrain-induced mesoscale motions in a mixed layer. *J. Atmos. Sci.* 39:2464-2476.

KATZ, RICHARD W.

KATZ, R. W. 1982. Statistical evaluation of climate experiments with general circulation models: a parametric time series modeling approach. *J. Atmos. Sci.* 39:1446-1455.

KATZ, R. W., A. H. MURPHY, and R. L. WINKLER. 1982. Assessing the value of frost forecasts to orchardists: a dynamic decision-making approach. *J. Appl. Meteorol.* 21:518-531.

See MURPHY, A. H., and R. W. KATZ.

MAHRT, LARRY J.

ANDRÉ, J. -C., and L. MAHRT. 1982. The nocturnal surface inversion and influence of clear air radiative cooling. *J. Atmos. Sci.* 39:864-878. See DEARDORFF, J. W., and L. MAHRT.

MAHRT, L. 1982. Entrainment above a continental cold-air outbreak over a warmer oceanic surface. First Int. Conf. Meteorol. and Air/Sea Interaction of the Coastal Zone. The Hague, the Netherlands. *Am. Meteorol. Soc.*

MAHRT, L., and S. LARSEN. 1982. Small scale drainage front. *Tellus* 34:579-587.

MAHRT, L., and J. PAUMIER. 1982. Cloud-top entrainment instability observed in AMTEX. *J. Atmos. Sci.* 39:622-634.

MAHRT, L. 1982. Momentum balance of gravity flows. *J. Atmos. Sci.* 39:2701-2711.

MAULE, PETER A.

MAULE, P., J. E. WADE, and C. L. ROSENFELD. 1982. Wind power assessments and remote sensing. Pages 335-342 in *Technical Papers Am. Soc. Photogramm. ACSM-ASD Convention*, Denver, CO.

MURPHY, ALLAN H.

BROWN, B. G., and A. H. MURPHY. 1982. Worded forecasts: message composition and interpretation. Pages 188-195 in Proc. Ninth Conf. Weather Forecasting and Analysis. *Am. Meteorol. Soc.*, Seattle, WA.

DAAN, H., and A. H. MURPHY. 1982. Subjective probability forecasting in the Netherlands: some operational and experimental results. *Meteorologische Rundschau* 35:99-112.

See KATZ, R. W., A. H. MURPHY, and R. L. WINKLER.

MURPHY, A. H., and R. W. KATZ. 1982. Statistical methodology for first detection of carbon dioxide effects in the atmosphere. Pages 165-174 in Proc. Workshop on First Detection of Carbon Dioxide Effects, Harpers Ferry, WV, 8-10 June 1981, U.S. Dept. Energy, Washington, DC.

MURPHY, A. H., S. LICHTENSTEIN, B. FISCHHOFF, and R. L. WINKLER. 1982. Reply to comments on misinterpretations of precipitation probability forecasts. *Bull. Am. Meteorol. Soc.* 63:326.

MURPHY, A. H., and R. L. WINKLER. 1982. Subjective probabilistic tornado forecasts: some experimental results. *Mon. Wea. Rev.* 110:1288-1297.

MURPHY, A. H., and B. G. BROWN. 1982. User requirements for very-short-range weather forecasts. Pages 3-15 in K. A. Browning, ed. *Nowcasting*. Academic Press, London.

MURPHY, A. H., W. -R. HSU, and R. L. WINKLER. 1982. Subjective probabilistic quantitative precipitation forecasts: some experimental results. Pages 94-100 in Proc. Ninth Conf. Weather Forecasting and Analysis. *Am. Meteorol. Soc.*, Seattle, WA.

PERSSON, OLA P. G.

HOBBS, P. V., and O. P. G. PERSSON. 1982. The mesoscale and microscale structure and organization of clouds and precipitation in mid-latitude cyclones. Part V: The substructure of narrow cold-frontal rainbands. *J. Atmos. Sci.* 39:280-295.

SCHLESINGER, MICHAEL E.

HALL, M. C. G., D. G. CAUCUCI, and M. E. SCHLESINGER. 1982. Sensitivity analysis of a radiative-convective model by the adjoint method. *J. Atmos. Sci.* 39:2038-2050.

SCHLESINGER, M. E. 1982. A review of climate models and their simulation of CO₂-induced warming. *Int. J. Environ. Stud.* 20, in press.

SCHLESINGER, M. E. 1982. The climatic change induced by increased atmospheric carbon dioxide. Carbon dioxide proliferation: will the icecaps melt? Pages 9-18 in *Special Publication No. 21, IEEE Power Engr. Soc.*

WADE, JOHN E.

See MAULE, P., J. E. WADE, and C. L. ROSENFELD.

WILLIS, GLEN E.

See DEARDORFF, J. W., and G. E. WILLIS. (First entry)

See DEARDORFF, J. W., and G. E. WILLIS. (Second entry)

See DEARDORFF, J. W., and G. E. WILLIS. (Third entry)

Biochemistry and Biophysics

ANDERSON, SONIA R.

See BOHNERT, J. L., D. A. MALENCIK, S. R. ANDERSON, D. TELLER, and E. H. FISCHER. (Under MALENCIK, D. A.)

See BOHNERT, J. L., D. A. MALENCIK, S. R. ANDERSON, D. TELLER, and E. H. FISCHER. (Second entry, under MALENCIK, D. A.)

See MALENCIK, D. A., and S. R. ANDERSON. See MALENCIK, D. A., T. S. HUANG, and S. R. ANDERSON.

See MALENCIK, D. A., S. R. ANDERSON, J. L. BOHNERT, and Y. SHALITIN.

See SCHIMERLIK, M. I., D. A. MALENCIK, S. R. ANDERSON, and Y. SHALITIN.

BAISTED, DEREK J.

BAISTED, D. J., and F. STROUD. 1982. Soluble and particulate lysophospholipase in the aleurone and endosperm of germinating barley. *Photochemistry* 21:29-31.

BAISTED, D. J., and F. STROUD. 1982. Enhancement by gibberellic acid and asymmetric distribution of lysophospholipase in germinating barley. *Phytochemistry* 21:2619-2623.

BECKER, ROBERT R.

K. PUROHIT, R. R. BECKER, and H. J. EVANS. 1982. D-ribulose-1,5-bisphosphate carboxylase/oxygenase from chemolithotrophically grown *Rhizobium japonicum*. *Biochim. Biophys. Acta* 715:240-259.

BRODIE, ANN E.

BRODIE, A. E., J. POTTER, and D. J. REED. 1982. Unique characteristics of rat spleen lymphocyte L1210 lymphoma and HeLa cells in glutathione biosynthesis from sulfur-containing amino acids. *Eur. J. Biochem.* 123:159-164.

DAVIE, JAMES R.

DAVIE, J. R. 1982. Two-dimensional gel system for rapid histone analysis for use in minislabs polyacrylamide gel electrophoresis. *Anal. Biochem.* 120:276-281.

RATTNER, J. B., C. A. SAUNDERS, J. R. DAVIE, and B. A. HAMKALO. 1982. Ultrastructural analysis of yeast chromatin. *J. Cell Biol.* 93:217-222.

GAMBLE, WILBERT

KRUTH, H. S., J. BLANCHETTE-MACKIE, J. AVIGAN, W. GAMBLE, and M. VAUGHAN. 1982. Subcellular localization and quantification of cholesterol in cultured human fibroblasts exposed to human low density lipoprotein. *J. Lipid Res.* 23:1128-1135.

ISENBERG, IRVIN

DICKINSON, P., and I. ISENBERG. 1982. Preparation of spheroplasts of *Schizosaccharomyces pombe*. *J. Gen. Microbiol.* 128:651-654.

ISENBERG, I., and E. W. SMALL. 1982. Exponential depression as a test of estimated decay parameters. *J. Chem. Phys.* 77:2799-2805.

SPIKER, S., and I. ISENBERG. 1982. Preparative polyacrylamide gel electrophoresis. *Methods Enzymol.* 91:214-228.

JOHNSON, W. CURTIS, JR.

CAUSLEY, G. C., and W. C. JOHNSON, JR. 1982. Polynucleotide conformation from low dichroism. *Biopolymers* 21:1763-1780.

HENNESSEY, J. P., JR., W. C. JOHNSON, JR., C. BAHLER, and H. G. WOOD. 1982. Subunit interactions of transcarboxylase as studied by circular dichroism. *Biochemistry* 21:642-646.

HENNESSEY, J. P., JR., and W. C. JOHNSON, JR. 1982. Experimental errors and their effect on analysis of circular dichroism spectra of proteins. *Anal. Biochem.* 125:177-188.

SPRECHER, C. A., and W. C. JOHNSON, JR. 1982. Change in conformation of various DNAs on melting as followed by circular dichroism. *Biopolymers* 21:321-329.

LIBERTINI, LOUIS J.

See SMALL, E. W., and L. J. LIBERTINI.

MALENCIK, DEAN A.

BOHNERT, J. L., D. A. MALENCIK, S. R. ANDERSON, D. TELLER, and E. H. FISCHER. 1982. Reconstitution of types I and II cAMP-dependent protein kinase using 1,N6-etheno-cAMP. *Biochemistry* 21:5563-5570.

BOHNERT, J. L., D. A. MALENCIK, S. R. ANDERSON, D. TELLER, and E. H. FISCHER. 1982. Binding of 4,4'-bis-1-phenylamino-8-naphthalene-sulfonate by the regulatory sub-

units of types I and II cAMP-dependent protein kinase. *Biochemistry* 21:5570-5576.

MALENCIK, D. A., and S. R. ANDERSON. 1982. Binding of simple peptides, hormones, and neurotransmitters by calmodulin. *Biochemistry* 21:3480-3486.

MALENCIK, D. A., T. S. HUANG, and S. R. ANDERSON. 1982. Binding of protein kinase substrates by fluorescently labeled calmodulin. *Biochem. Biophys. Res. Commun.* 108:266-272.

MALENCIK, D. A., S. R. ANDERSON, J. L. BOHNERT, and Y. SHALITIN. 1982. Functional interactions between smooth muscle myosin light chain kinase and calmodulin. *Biochemistry* 21:4031-4039.

See SCHIMERLIK, M. I., D. A. MALENCIK, S. R. ANDERSON, and Y. SHALITIN.

MATHEWS, CHRISTOPHER K.

ALLEN, J. R., J. W. BOOTH, D. A. GOLDMAN, G. W. LASSER, S. PUROHIT, R. G. SARGENT, and C. K. MATHEWS. 1982. Interactions of folate-dependent enzymes of DNA precursor metabolism in T4 phage-infected bacteria. *In* J. H. Blair, ed. *Chemistry and Biology of Pteridines*. Walter de Gruyter, Berlin.

BESTWICK, R. K., G. L. MOFFETT, and C. K. MATHEWS. 1982. Selective expansion of mitochondrial nucleoside triphosphate pools in antimetabolite-treated HeLa cells. *J. Biol. Chem.* 257:9300-9304.

BESTWICK, R. K., and C. K. MATHEWS. 1982. Unusual compartmentation of precursors for nuclear and mitochondrial DNA in mouse L cells. *J. Biol. Chem.* 257:9305-9308.

BESTWICK, R. K., G. L. MOFFETT, C. SPIRO, and C. K. MATHEWS. 1982. Differential effects of methotrexate on fluorodeoxyuridine upon mitochondrial and cellular nucleotide pools. *In* J. H. Blair, ed. *Chemistry and Biology of Pteridines*. Walter de Gruyter, Berlin.

MATHEWS, C. K., and N. K. SINHA. 1982. Are DNA precursors concentrated at replication sites? *Proc. Nat. Acad. Sci. USA* 79:302-306.

PEARSON, GEORGE D.

GALINSKI, M. S., K.-C. CHOW, G. F. ROHRMANN, G. D. PEARSON, and G. S. BEAUDREAU. 1982. Size determination of *Orgyia pseudotsugata* cytoplasmic polyhedrosis virus genomic RNA. *Virology* 123:328-335.

ROHRMANN, G. F., D. L. LEISY, K.-C. CHOW, G. D. PEARSON, and G. S. BEAUDREAU. 1982. Identification, cloning, and R-loop mapping of the polyhedrin gene from the multicapsid nuclear polyhedrosis virus of *Orgyia pseudotsugata*. *Virology* 121:51-60.

PETERSON, GARY L.

PETERSON, G. L., and M. I. SCHIMERLIK. 1982. Preparation and characterization of muscarinic acetylcholine receptor enriched membranes from porcine atria. *Biochem. J.* 202:475-481.

REED, DONALD J.

See BRODIE, A. E., J. POTTER, and D. J. REED.

JERNSTRÖM, B., J. R. BABSON, P. MOLDEUS, and D. J. REED. 1982. Glutathione conjugation DNA-binding of (\pm)-transdihydroxy 7,8,9,10-dihydrobenzo (a) pyrene and (\pm)-7 β ,8 α -dihydroxy-9 α ,10 α -epoxy-7,8,9,10-tetrahydrobenzo (a) pyrene in isolated rat hepatocytes. *Carcinogenesis* 3:861-866.

MEREDITH, M. J., and D. J. REED. 1982. Status of the mitochondrial pool of glutathione in the isolated hepatocyte. *J. Biol. Chem.* 257:3747-3753.

POTTER, D. W., and D. J. REED. 1982. Denitrosation of carcinostatic nitroso-ureas by purified NADPH cytochrome P-450 reductase and rat liver microsomes to yield nitric oxide under anaerobic conditions. *Arch. Biochem. Biophys.* 216:158-169.

SCHIMERLIK MICHAEL I.

HERRON, G. S., S. MILLER, W.-L. MANLEY, and M. I. SCHIMERLIK. 1982. Ligand interactions with the solubilized porcine atrial muscarinic receptor. *Biochemistry* 21:515-520.

See PETERSON, G. L., and M. I. SCHIMERLIK.

SCHIMERLIK, M. I., D. A. MALENCIK, S. R. ANDERSON, and Y. SHALITIN. 1982. Rapid kinetic studies of calmodulin interactions with calcium and troponin I as monitored by anthracycline fluorescence. *Biochem. Biophys. Res. Commun.* 106:1331-1339.

SMALL, ENOCH W.

See ISENBERG, I., and E. W. SMALL.

SMALL, E. W., and L. J. LIBERTINI. 1982. Effects of pH on the low salt transition of chromatin core particles. *Biochemistry* 21:3327-3334.

VAN HOLDE, KENSAL E.

MILLER, K. I., and K. E. VAN HOLDE. 1982. The structure of *Octopus dofleini* hemocyanin. *Comp. Biochem. Physiol.* 73B:1013-1018.

VAN HOLDE, K. E., and K. I. MILLER. 1982. Haemocyanins. *Q. Rev. Biophys.* 15:1-129.

YAGER, T. D., N. B. TERWILLIGER, R. C. TERWILLIGER, E. SCHABTACH, and K. E. VAN HOLDE. 1982. Organization and physical properties of the giant extracellular hemoglobin of the clam, *Astarte castanea*. *Biochim. Biophys. Acta* 709:194-205.

Botany and Plant Pathology

ALLEN, THOMAS C.

ALLEN, T. C. 1982. Virus diseases in ornamentals. *South. Florists and Nurserymen* 94:16-18.

ALLEN, T. C., and J. R. DAVIS. 1982. Distribution of tobacco rattle virus and potato virus X in leaves, roots, and fruits and/or seeds in naturally infected weeds. *Am. Pot. J.* 59:149-153.

See GOODELL, J. J., M. L. POWELSON, and T. C. ALLEN. (Under POWELSON, M. L.)

- ARMSTRONG, DONALD J.**
MOK, M. C., D. W. S. MOK, D. J. ARMSTRONG, K. SHUDO, Y. ISOGAI, and T. OKAMOTO. 1982. Cytokinin activity of N-phenyl-N'-thiadiazol-5-ylurea (Thidiazuron). *Phytochemistry* 21:1509-1511.
- MOK, M. C., D. W. S. MOK, S. C. DIXON, D. J. ARMSTRONG, and G. SHAW. 1982. Cytokinin structure-activity relationships and the metabolism of N⁶-(Δ^2 -isopentenyl)adenosine-8-14C in *Phaseolus* callus tissues. *Plant Physiol.* 70:173-178.
- BAKER, KENNETH F.**
BAKER, K. F. 1982. Meditations on fifty years as an apolitical plant pathologist. *Ann. Rev. Phytopathol.* 20:1-25.
- BAKER, K. F. 1982. Biological Control. Pages 523-561 in M. E. Mace, A. A. Bell, and C. H. Beckman, eds. *Fungal Wilt Diseases of Plants*. Academic Press, New York.
- CAMERON, H. RONALD**
CAMERON, H. R. 1982. Tomato ringspot infection of "Mark" apple rootstock. In: *News about Nursery Production of Ornamental and Landscape Plants*. *Plant Dis.* 66:439.
- CHAMBERS, KENTON L.**
MAUTHE, S., K. BACHMANN, K. L. CHAMBERS, and H. J. PRICE. 1982. Variation of the inflorescence among populations of *Microseris laciniata* (Asteraceae). *Beitr. Biol. Pflanzen* 56:25-52.
- CONVERSE, RICHARD H.**
CONVERSE, R. H. 1982. Occurrence of tomato and tobacco ringspot viruses and dagger and other nematodes associated with cultivated highbush blueberries in Oregon. *Plant Dis.* 66:710-712.
- CONVERSE, R. H. 1982. Witches' broom disease of black raspberry in Oregon. *Plant Dis.* 66:949-951.
- CONVERSE, R. H. 1982. Survey of blueberry virus diseases in Oregon. *Proc. Oregon Hort. Soc.* 73:152-153.
- COYIER, DUANE L.**
COYIER, D. L., and J. J. GALLIAN. 1982. Control of powdery mildew on greenhouse-grown roses by volatilization of fungicides. *Plant Dis.* 66:842-844.
- DOOLEY, HARRISON L.**
DOOLEY, H. L. 1982. Three major foliar pathogens of poplar. *Ornament. Northwest* 6:6.
- HAMPTON, RICHARD O.**
HAMPTON, R. O. 1982. Incidence of the lentil strain of pea seedborne mosaic virus as a contaminant of *Lens culinaris* germplasm. *Phytopathology* 72:695-698.
- HAMPTON, R. O., H. WATERWORTH, R. M. GOODMAN, and R. LEE. 1982. Importance of seedborne viruses in crop germplasm. *Plant Dis.* 66:977-978.
- WEBER, K., V. VEERISSETTY, and R. O. HAMPTON. 1982. Particle diversity and RNA duality in red clover vein mosaic virus isolates. *Phytopath.* Z. 102:1-8.
- HANSEN, EVERETT M.**
HUNGER, R. M., P. B. HAMM, C. E. HORNER, and E. M. HANSEN. 1982. Tolerance of *Phytophthora megasperma* isolates to metalaxyl. *Plant Dis.* 66:645-649.
- KLEPPER, ELIZABETH L.**
KLEPPER, E. L., R. W. RICKMAN, and C. M. PETERSON. 1982. Quantitative characterization of seedling development in small cereal grains. *Agron. J.* 74:789-792.
- PETERSON, C. M., E. L. KLEPPER, and R. W. RICKMAN. 1982. Tiller development at the coleoptilar node in winter wheat (*Triticum aestivum* L.). *Agron. J.* 74:781-784.
- LEACH, CHARLES M.**
LEACH, C. M., and A. J. ANDERSON. 1982. Radiation quality and plant diseases. Pages 267-306 in J. Hatfield, ed. *Biometeorology in Integrated Pest Management*. Academic Press, New York.
- LEACH, C. M. 1982. Active sporangium discharge by *Peronospora destructor*, the downy mildew of onions. *Phytopathology* 72:881-885.
- LEACH, C. M., P. D. HILDEBRAND, and J. C. SUTTON. 1982. Sporangium discharge in *Peronospora destructor*: influence of humidity, red-infrared radiation, and vibration. *Phytopathology* 72:1052-1056.
- LINDERMAN, ROBERT G.**
GRAHAM, J. H., R. G. LINDERMAN, and J. A. MENGE. 1982. Development of external hyphae by different isolates of mycorrhizal *Glomus* spp. in relation to root colonization and growth of Troyer citrange. *New Phytol.* 91:183-189.
- LINDERMAN, R. G., and J. W. HENDRIX. 1982. Evaluation of plant response to colonization by vesicular-arbuscular mycorrhizal fungi: A. Host variables. Pages 69-78 in N. E. Schenck, ed. *Methods and Principles of Mycorrhizal Research*. American Phytopathol. Soc. Press.
- McINTIRE, C. DAVID**
McINTIRE, C. D. 1982. A conceptual framework for process studies in lotic ecosystems. Pages 43-68 in T. D. Fontaine, ed. *Dynamics of Lotic Ecosystems*. Symposium Volume, Savannah River Ecology Laboratory, Aiken, South Carolina. Ann Arbor Science, MI.
- SUMNER, W. T., and C. D. McINTIRE. 1982. Grazer-periphyton interactions in laboratory streams. *Arch. Hydrobiol.* 93:135-157.
- MILLS, DALLICE I.**
CURIALE, M. S., and D. MILLS. 1982. Integration and partial excision of a cryptic plasmid in *Pseudomonas syringae* pv. *phaseolicola*. *J. Bacteriol.* 152:797-802.
- MILLS, D., and C. GONZALES. 1982. Evolution of pathogenesis and race specificity. Pages 77-119 in M. Mount and G. Lacy, eds. *Phytopathogenic Prokaryotes*. Academic Press, New York.
- MOORE, LARRY W.**
COOKSEY, D. A., and L. W. MOORE. 1982. High frequency spontaneous mutation to agrocin $\alpha 4$ resistance in *Agrobacterium tumefaciens* and *A. rhizogenes*. *Physiol. Plant Pathol.* 20:129-135.
- COOKSEY, D. A., and L. W. MOORE. 1982. Biological control of crown gall with an agrocin mutant of *Agrobacterium radiobacter*. *Phytopathology* 72:919-921.
- NELSON, EARL E.**
NELSON, E. E. 1982. Occurrence of *Trichoderma* in Douglas-fir soil. *Mycologia* 74:280-284.
- POWELSON, MARY L.**
GOODELL, J. J., M. L. POWELSON, and T. C. ALLEN. 1982. Interrelationships between potato virus X, *Verticillium dahliae*, and *Colletotrichum atramentarium* in potato. *Phytopathology* 72:631-634.
- QUATRANO, RALPH S.**
QUATRANO, R. S. 1982. Cell wall formation in *Fucus* zygotes: a model system to study the assembly and localization of wall polymers. Pages 45-59 in R. M. Brown, ed. *Cellulose and Other Natural Polymers Systems: Biogenesis, Structure and Degradation*. Plenum Press, New York.
- QUATRANO, R. S. 1982. Botany for Beginners (A review). *Nature* 295:471.
- TRIPLETT, B. A., and R. S. QUATRANO. 1982. Timing, localization, and control of wheat agglutinin synthesis in developing wheat embryos. *Dev. Biol.* 91:491-496.
- TINGEY, DAVID T.**
GUMPERTZ, M. L., D. T. TINGEY, and W. E. HOGSETT. 1982. Precision and accuracy of visual foliar injury assessments. *J. Environ. Qual.* 11:549-553.
- TAYLOR, G. E., JR., D. T. TINGEY, and H. C. RATSCH. 1982. Ozone flux in *Glycine max* (L.) Merr.: sites of regulation and relationship to leaf injury. *Oecologia* 53:179-186.
- TINGEY, D. T., S. RABA, K. D. RODECAP, and J. J. WAGNER. 1982. Vermiculite, a source of metals for *Arabidopsis thaliana*. *J. Am. Soc. Hort. Sci.* 107:465-468.
- WICKLIFF, C., V. V. VOLK, D. T. TINGEY, W. L. GRIFFIS, M. Y. TRUNK, and J. L. WITHEROW. 1982. Reactions of chrome tannery sludge with organic and mineral soils. *Water, Air, Soil Pollut.* 17:61-74.
- TRAPPE, JAMES M.**
CARPENTER, S. E., G. A. HUNT, and J. M. TRAPPE. 1982. Observations on fungal succession on recent volcanic deposits of Mount St. Helens. *Proc. Oregon Acad. Sci.* 18:36-44.

- CHRISTY, J., P. SOLLINS, and J. M. TRAPPE. 1982. First year survival of *Tsuga heterophylla* without mycorrhizae on decaying logs and subsequent mycorrhizal development. *Can. J. For. Res.* 60:1601-1605.
- JANOS, D. P., and J. M. TRAPPE. 1982. Two new *Acaulospora* species from tropical America. *Mycotaxon* 15:515-522.
- KROPP, B., and J. M. TRAPPE. 1982. Ectomycorrhizal fungi of *Tsuga heterophylla*. *Mycologia* 74:479-488.
- MALAJCZUK, N., R. MOLINA, and J. M. TRAPPE. 1982. Ectomycorrhiza formation in *Eucalyptus*. I. Pure culture synthesis, host specificity, and mycorrhizal compatibility with *Pinus radiata*. *N. Phytol.* 91:467-482.
- MOLINA, R., and J. M. TRAPPE. 1982. Patterns of ectomycorrhizal potential and specificity among Pacific Northwest conifers and fungi. *For. Sci.* 28:423-458.
- MOLINA, R., and J. M. TRAPPE. 1982. Lack of mycorrhizal specificity by the ericaceous hosts *Arbutus menziesii* and *Arctostaphylos uva-ursi*. *N. Phytol.* 90:495-509.
- MOLINA, R., and J. M. TRAPPE. 1982. Applied aspects of ectomycorrhizae. Pages 305-324 in N. S. Subba Rao, ed. *Advances in Agricultural Microbiology*. Oxford and IBH Publ. Co., New Delhi.
- TABER, R. M., and J. M. TRAPPE. 1982. Vesicular-arbuscular mycorrhizae in rhizomes, scale-like leaves, roots, and xylem of ginger. *Mycologia* 74:156-161.
- TRAPPE, J. M. 1982. Synoptic keys to the genera and species of zygomycetous (vesicular-arbuscular) mycorrhizal fungi. *Phytopathology* 72:1102-1108.
- TRAPPE, J. M., and N. C. SCHENCK. 1982. Taxonomy of the fungi forming endomycorrhizae. A. Vesicular-arbuscular mycorrhizal fungi (Endogonales). Pages 1-9 in N. C. Schenck, ed. *Principles and Methods of Mycorrhizal Research*. Am. Phytopathol. Soc., St. Paul.
- TRIONE, EDWARD J.
- LIU, Y. G., E. J. TRIONE, J. C. LAUL, and R. A. SCHMITT. 1982. Instrumental neutron activation analysis of wheat bunt spores. *J. Radioanal. Chem.* 69:427-439.
- TRIONE, E. J. 1982. Dwarf bunt of wheat and its importance in international wheat trade. *Plant Dis.* 66:1083-1088.
- WELTY, RONALD E.
- WELTY, R. E., R. Y. GURGIS, and D. E. ROWE. 1982. Occurrence of Race 2 of *Colletotrichum trifolii* in North Carolina and evaluation of alfalfa cultivars and breeding lines for resistance to Race 1 and 2. *Plant Dis.* 66:48-51.
- WELTY, R. E., C. G. VAN DYKE, and W. A. COPE. 1982. *Uromyces trifolii-repentis* var. *trifolii-repentis* on *Trifolium repens* in North Carolina. *Mycologia* 74:265-270.
- WELTY, R. E. 1982. Forage legume hosts of Race 1 and 2 of *Colletotrichum trifolii*. *Plant Dis.* 66:653-655
- ZOBEL, DONALD B.
- ANTOS, J. A., and D. B. ZOBEL. 1982. Volcanic tephra-snow interactions affecting forest understory plants near Mount St. Helens. *Ecology* 63:1969-1972.
- ZOBEL, D. B., and J. A. ANTOS. 1982. Adventitious rooting of eight conifers into a volcanic tephra deposit. *Can. J. For. Res.* 12:717-719.
-
- ## Chemistry
-
- DANIELS, MALCOLM
- BALLINI, J. -P., M. DANIELS, and P. VIGNY. 1982. Wavelength-resolved lifetime measurements of emissions from DNA component and poly γ A at room temperature excited with synchrotron radiation. *J. Lumin.*, in press.
- MORGAN, J. P., and M. DANIELS. 1982. Polarization excitation spectrum of thymine fluorescence. *J. Phys. Chem.* 86:4004-4007.
- DE KOCK, CARROLL W.
- DE KOCK, C. W. 1982. Thermodynamic properties of selected transition metal sulfates and their hydrates. U.S. Bureau of Mines Information Circular 8910. 45 pp.
- EVANS, GLENN T.
- EVANS, G. T., R. G. COLE, and D. K. HOFFMAN. 1982. A kinetic theory of the orientational correlation time of a rotor-like molecule in a dense fluid of spheres. *J. Chem. Phys.* 77:3209-3220.
- JAMES, C. J., and G. T. EVANS. 1982. Ring closure dynamics in alkane chains. *J. Chem. Phys.* 76:2680-2687.
- GOULD, STEVEN J.
- GOULD, S. J. 1982. Biosynthesis of natural products—an overview of current results and problems. II. Studies of nitrogen-containing metabolites. *J. Nat. Prod.* 45:38-49.
- GOULD, S. J., and D. E. CANE. 1982. Biosynthesis of streptonigrin from [U- $^{13}\text{C}_6$]-D-Glucose. Origin of the quinolin quinone. *J. Am. Chem. Soc.* 104:343-346.
- GOULD, S. J., and S. M. WEINREB. 1982. Streptonigrin. Pages 77-114 in W. Herz et al, ed. *Progress in the Chemistry of Organic Natural Products*, Vol. 41. Springer-Verlag, New York.
- ORR, G. R., and S. J. GOULD. 1982. Stereochemistry of the bacterial ornithine, lysine, and arginine decarboxylase reactions. *Tetrahedron Lett.* 23:3139-3142.
- HEDBERG, KENNETH W.
- See HAGEN, K., M. M. GILBERT, L. HEDBERG, and K. HEDBERG. (Under HEDBERG, L.).
- See HAGEN, K., L. HEDBERG, and K. HEDBERG. See HEDBERG, L., and K. HEDBERG.
- See HEDBERG, L., K. HEDBERG, and J. E. BOGGS.
- See MARSDEN, C. J., L. HEDBERG, and K. HEDBERG.
- See PAGE, E. M., D. A. RICE, K. HAGEN, L. HEDBERG, and K. HEDBERG.
- HEDBERG, LISE
- HAGEN, K., M. M. GILBERT, L. HEDBERG, and K. HEDBERG. 1982. Molecular structure of gaseous vanadium pentafluoride, VF_5 . *Inorg. Chem.* 21:2690-2693.
- HAGEN, K., L. HEDBERG, and K. HEDBERG. 1982. Molecular structure and conformation of *cis,cis*-1,5-Cyclooctadiene. *J. Phys. Chem.* 86:117-121.
- HEDBERG, L. 1982. Quadratic force fields for phosphorus pentafluoride and thionyl tetrafluoride. *J. Phys. Chem.* 86:593-598.
- HEDBERG, L., and K. HEDBERG. 1982. Thionyl tetrafluoride. Reanalysis of the molecular structure and resolution of the multiple model problem. *J. Phys. Chem.* 86:598-602.
- HEDBERG, L., K. HEDBERG, and J. E. BOGGS. 1982. The molecular structure of 1,1-dichlorocyclopropane by gaseous electron diffraction using rotational constants as constraints and by *ab initio* gradient computation. *J. Chem. Phys.* 77(6):2996-3002.
- MARSDEN, C. J., L. HEDBERG, and K. HEDBERG. 1982. Molecular structure and quadratic force field of chromyl chloride, CrO_2Cl_2 . *Inorg. Chem.* 21:1115-1118.
- PAGE, E. M., D. A. RICE, K. HAGEN, L. HEDBERG, and K. HEDBERG. 1982. Gas-phase electron-diffraction studies of the molecular structures of tetrachlorosulfidotungsten (VI), WSeCl_4 , and tetrachloroselenotungsten (VI), WSeCl_4 . *Inorg. Chem.* 21:3280-3283.
- LOVELAND, WALTER D.
- DZATA, F. K. A., and W. LOVELAND. 1982. Development of stable x-ray fluorescent tracers for use in small water systems. *Nucl. Instrum. Methods* 193:319-322.
- GROENING, H., K. ALEKLETT, K. J. MOODY, P. L. MCGAUGHEY, W. LOVELAND, and G. T. SEABORG. 1982. Isomer ratio measurements for the reaction $^{28}\text{Si}(^{18}\text{O}, p2n)^{44\text{m}}\text{Sc}$. *Nucl. Phys.* A389:80-92.
- KEASLER, K. M., and W. LOVELAND. 1982. Rare earth elemental concentrations in some Pacific Northwest rivers. *Earth Planet. Sci. Lett.* 61:68-72.
- LOVELAND, W. 1982. Use of nuclear techniques to study environmentally significant organic molecules. *Trans. Am. Nucl. Soc.* 40:202-203.
- LOVELAND, W. 1982. Lecture notes for general chemistry. Part 2. Burgess Publishing Co., Minneapolis. 160 pp.
- LOVELAND, W. 1982. The use of stable activable tracers in environmental science. Pages 523-534 in J. W. Root and K. A. Krohn, eds. *Advances in Chemistry Series No. 197. Short-lived Radionuclides in Chemistry and Biology*. Am. Chem. Soc., Washington, DC.
- MORITA, Y., W. LOVELAND, P. L. MCGAUGHEY, and G. T. SEABORG. 1982. Target fragment angular distributions from the interaction of 3.0 GeV and 12.0 GeV ^{12}C with ^{197}Au and ^{238}U . *Phys. Rev.* C26:511-518.

- SEABORG, G. T., and W. LOVELAND, eds. 1982. Nuclear Chemistry. Hutchinson-Ross, Stroudsburg, PA. 488 pp.
- PIEPMEIER, EDWARD H.**
PIEPMEIER, E. H., and G. J. BEENEN. 1982. Saturation and prefilter distortions of observed excitation spectral profiles. *Appl. Spectrosc.* 36:235-240.
- PIEPMEIER, E. H. 1982. Book review of *Lasers in Chemical Analysis* edited by G. M. Hieftje, et al. *Anal. Chem.* 54:949A.
- SCHMITT, ROMAN A.**
AMIRE, O. A., E. J. TRIONE, and R. A. SCHMITT. 1982. Characterization of pathogenic races of the sugarcane smut fungus by neutron activation analysis. *J. Radioanal. Chem.*, in press.
- DELANO, J. W., D. H. LINDSLEY, M.-S. MA, and R. A. SCHMITT. 1982. The Apollo 15 yellow impact glasses: chemistry, petrology and exotic origin. *J. Geophys. Res.* 87:A159-A170.
- LIU, Y. -G., E. J. TRONE, J. C. LAUL, and R. A. SCHMITT. 1982. Instrumental neutron activation analysis of wheat bunt spores. *Radioanal. Chem.* 69:427-439.
- SMITH, M. R., and R. A. SCHMITT. 1982. Chemical composition of the howardite parent body deduced from Kapoeta primary 'mafic' magmas. *J. Geophys. Res.* 87:A331-A338.
- SUGIHARA, THOMAS T.**
HAENNI, D. R., T. T. SUGIHARA, R. P. SCHMITT, G. MOUCHATY, and U. GARG. 1982. In-beam spectroscopy of neutron-rich nuclei: New application of massive transfer reactions. *Phys. Rev. C* 25:1699-1701.
- JOHNSON, N. R., I. Y. LEE, F. K. MCGOWAN, and T. T. SUGIHARA. 1982. Lifetimes of states in the transitional nucleus ^{152}Gd . *Phys. Rev. C* 26:1004-1009.
- THIES, RICHARD W.**
THIES, R. W., and S. T. YUE. 1982. Synthesis of (\pm)-8, 9:13, 14-Diseco-18-norestradiol and related large-ring hormone analogues. *J. Org. Chem.* 47(14):2685-2690.
- THIES, R. W., and J. R. PIERCE. 1982. Synthesis of large-ring analogues of estrone by a ring-expansion route. *J. Org. Chem.* 47(5):798-803.
- THIES, R. W., and S. T. YUE. 1982. Synthesis of (\pm)-2-acetyl-8-methoxy-5,6,7,8,9,10,11,12-oc-tahydrobenzocyclodecene: a medium-sized ring, ring-c aromatic hormone analogue. *J. Chem. Soc., Chem. Commun.* 174-175.
- THOMAS, LAWRENCE C.**
THOMAS, L. C., and A. K. ADAMS. 1982. Detection of fluorescent compounds by modified flame photometric gas chromatography detectors. *Anal. Chem.* 54:2597-2599.
- THOMAS, T. DARRAH**
BOMBEN, K. D., T. D. THOMAS, K. G. DYALL, and F. P. LARKINS. 1981. Satellite structure in the argon 2p x-ray photoelectron spectrum. *J. Phys. B* 14:2551-2558.
- THOMAS, T. D. 1981. Extra-atomic relaxation energies from the Auger parameter and the Manne-Åberg sum rule. Pages 509-512 in D. J. Fabian, et al., eds. *Inner-Shell and X-Ray Physics of Atoms and Solids*. Plenum Press, New York.
- THOMAS, T. D., and P. WEIGHTMAN. 1981. Localized states in molecular Auger spectra. *Chem. Phys. Lett.* 81:325-329.
- WELLER, DWIGHT D.**
WELLER, D. D., G. R. LUELLEN, and D. L. WELLER. 1982. The synthesis of 4-arylpyridines. *J. Org. Chem.* 47:4803-4806.
- WELLER, D. D., and D. L. WELLER. 1982. Synthesis of 3-methyl-2,3,4,4a,5,6-hexahydro-1H-benzofuro[3,2-e]isoquinoline -7(7aH)-ones. *Tetrahedron Lett.* 23:5239-5242.
- WHITE, JAMES D.**
KIATGRAJAI, P., J. D. WELLONS, L. GOLLOB, and J. D. WHITE. 1982. Kinetics of polymerization of (+)-catechin and its rearrangement to catechinic acid. *J. Org. Chem.* 47:2910-2912.
- KIATGRAJAI, P., J. D. WELLONS, L. GOLLOB, and J. D. WHITE. 1982. Kinetics of polymerization of (+)-catechin with formaldehyde. *J. Org. Chem.* 47:2913-2917.
- WHITE, J. D., J. P. CARTER, and H. S. KEZAR, III. 1982. Stereoselective synthesis of the macrocycle segment of verrucaric acid. *J. Org. Chem.* 47:929-932.
- WHITE, J. D., T. NISHIGUCHI, and R. W. SKEEAN. Stereoselective, biogenetically patterned synthesis of (\pm)-aplysinin. *J. Am. Chem. Soc.* 104:3923-3928.
- WHITE, J. D., M. A. AVERY, and J. P. CARTER. Synthesis of (\pm)-lineatin, an aggregation pheromone of *Trypodendron lineatum*. *J. Am. Chem. Soc.* 104:5486-5489.
- WHITE, J. D. 1982. The intramolecular Diels-Alder reaction: mechanistic and synthetic implications. Pages 119-123 in *Proc. Sino-American Symposium on the Chemistry of Natural Products*. Science Press, Beijing, P.R.C.
- WHITE, J. D. 1982. An approach to the synthesis of insect antifeedants related to warburganal. Pages 146-149 in *Proc. Sino-American Symposium on the Chemistry of Natural Products*. Science Press, Beijing, P.R.C.
- CULL, PAUL**
CULL, P., and E. F. ECKLUND, JR. 1982. On the towers of Hanoi and generalized towers of Hanoi problems. Pages 125-135 in *Proc. 13th S. E. Conf. Combinatorics, Graph Theory, and Computing*. Utilitas Mathematica, Winnipeg.
- ECKLUND, EARL F., JR.**
See CULL, P., and E. F. ECKLUND.
- FREILING, MICHAEL J.**
FREILING, MICHAEL J. 1982. *Understanding Database Management*. Alfred Publishing Co., Sherman Oaks, CA. 63 pp.
- MINOURA, TOSHIMI**
MINOURA, T., and G. WIEDERHOLD. 1982. Resilient extended true-copy token scheme for a distributed database system. *IEEE Trans. Software Eng.* 3:173-189.
- MINOURA, T. 1982. Deadlock avoidance revisited. *J. ACM* 4:1023-1048.
- MINOURA, T. 1982. Ranking scheme and control token scheme. Pages 40-45 in *Second Symposium Reliability in Distributed Software and Database Systems*. IEEE, Pittsburgh, PA.
- MORAN, DOUGLAS B.**
MORAN, D. B. The representation of inconsistent information in a dynamic model-theoretic semantics. Pages 16-18 in *Proc. 20th Annual Meeting Assoc. Comput. Linguistics*. Toronto, Canada.
- SANDBERG, DAVID W.**
SANDBERG, D. W. 1982. *Lithe: a language combining a flexible syntax and classes*. Pages 142-145 in *ACM Symposium Principles of Programming Languages*.
- LEWIS, THEODORE G.**
LEWIS, T. G. 1982. *Software Engineering: Verification and Analysis*. Reston Publishing Co., Reston, VA. 470 pp.
- LEWIS, T. G. 1982. *MICROBOOK: Database Management for the Apple II*. Dilithium Press, Beaverton, OR. 302 pp.
- LEWIS, T. G. 1982. *The TRS-80 Means Business*. John Wiley and Sons, New York. 194 pp.
- LEWIS, T. G., and M. Z. SMITH. 1982. *Applying Data Structures (2nd Edition)*. Houghton-Mifflin Co., Boston, MA. 355 pp.

Computer Science

BOSE, BELLA

BOSE, B., and T. R. N. RAO. 1982. Theory and design of unidirectional error codes. *IEEE Trans. Computers* C-31:520-530.

BOSE, B., and K. K. PRADHAN. 1982. Optimal unidirectional error correcting/detecting codes. *IEEE Trans. Computers* C-31:564-568.

COOK, CURTIS R.

COOK, C. R., and R. R. OLDEHOEFT. 1982. A letter oriented minimal perfect hashing function. *ACM SIGPLAN Notices* 17:18-27.

Entomology

ALINIAZEE, M. T.

ALINIAZEE, M. T. 1982. The oblique banded leafrollers in Oregon filberts. *Proc. Oregon, Washington and British Columbia Nut Growers Soc.* 66:74-78.

ALINIAZEE, M. T. 1982. Monitoring the filbert-worm, *Melissopop latiferreanus* with sex attractant traps. Effect of trap design, elevation and placement on moth catches. *Environ. Entomol.*, in press.

- ALINIAZEE, M. T. 1982. Effect of two synthetic pyrethroids on a predatory mite, *Typhlodromus arboreus* in apple orchards of western Oregon. Proc. VI Int. Congress Acarology, Edinburgh, Scotland, September 1982, in press.
- STARK, S. B., and M. T. ALINIAZEE. 1982. Evaluation of 2 thermal summation models for predicting time of emergence of western cherry fly adults. Z. Ang. Entomol. 94:401-407.
- VAN KIRK, J. R., and M. T. ALINIAZEE. 1982. Diapause development in the western cherry fruit fly *Rhagoletis indifferens* (Diptera: Tephritidae). Z. Ang. Ent. 93:440-445.
- ANDERSON, NORMAN H.
- ANDERSON, N. H., G. M. COOPER, and D. C. DENNING. 1982. Invertebrates of the H. J. Andrews Experimental Forest, Western Cascades, Oregon. II. An annotated checklist of caddisflies (Trichoptera). Res. Note PNW-402, Pacific Northwest Forest and Range Experiment Station, Portland, OR. USDA, Forest Service. 16 pp.
- DUDLEY, T. L., and N. H. ANDERSON. 1982. A survey of invertebrates associated with wood debris in aquatic habitats. Melanderia 39:1-21.
- HAWKINS, C. P., M. L. MURPHY, and N. H. ANDERSON. 1982. Effects of canopy, substrate composition, and gradient on the structure of macro-invertebrate communities in Cascade Range streams of Oregon. Ecology 63:1840-1855.
- PEREIRA, C. R. D., N. H. ANDERSON, and T. L. DUDLEY. 1982. Gut content analysis of aquatic insects from wood substrates. Melanderia 39:23-33.
- PEREIRA, C. R. D., and N. H. ANDERSON. 1982. Observations on the life histories and feeding of *Cinygma integrum* Eaton and *Ironodes nitidus* (Eaton) (Ephemeroptera: Heptageniidae). Melanderia 39:35-45.
- BERRY, RALPH E.
- ANNIS, B., R. E. BERRY, and G. TAMAKI. 1982. Host preferences of the green peach aphid, *Myzus persicae* (Hemiptera: Aphididae). Environ. Entomol. 11:824-827.
- DEANGELIS, J. D., K. C. LARSON, R. E. BERRY, and G. W. KRANTZ. 1982. Effects of spider mite injury on transpiration and leaf water status in peppermint. Environ. Entomol. 11:975-978.
- DEANGELIS, J. D., R. E. BERRY, and G. W. KRANTZ. 1982. Evidence for spider mite (Acari:Tetranychidae) injury-induced leaf water deficits and osmotic adjustment in peppermint. Environ. Entomol., in press.
- DEANGELIS, J. D., R. E. BERRY, A. MARIN, and G. W. KRANTZ. 1982. Influence of spider mite-induced plant stress on monoterpene metabolism in peppermint. Environ. Entomol., in press.
- DEANGELIS, J. D., R. E. BERRY, and G. W. KRANTZ. 1982. Photosynthesis, leaf conductance, and leaf chlorophyll content in spider mite-injured peppermint leaves. Environ. Entomol., in press.
- HOLLINGSWORTH, C. S., and R. E. BERRY. 1982. Regression sampling plan for twospotted spider mite (Acari: Tetranychidae) in Oregon peppermint. J. Econ. Entomol. 75:497-500.
- HOLLINGSWORTH, C. S., and R. E. BERRY. 1982. Twospotted spider mite (Acari: Tetranychidae) in peppermint: population dynamics and influence of cultural practices. Environ. Entomol. 11:1280-1284.
- See MOLDENKE, A. F., R. E. BERRY, and L. C. TERRIERE.
- BURGETT, D. MICHAEL
- YOUNGS, L. C., and D. M. BURGETT. 1982. Effects of synthetic 9-oxodec-trans-2-enoic acid on the foraging activities of honey bees. Am. Bee J. 122:773-775.
- CAPIZZI, JOSEPH
- CAPIZZI, J., J. C. MILLER, and J. GREEN. 1982. Flatheaded apple tree borer and Pacific flathead borer: live larvae-dead trees. Ornament. Northwest 6:3-5.
- CROFT, BRIAN A.
- CROFT, B. A. 1982. Management of apple orchard weeds to improve biological control of spider mites. Page 7 in Proc. 22nd Ann. Meeting Weed Soc. Am., February 1982, Boston.
- CROFT, B. A. 1982. Developed resistance to insecticides in apple arthropods: a key to pest control failures and successes in North America. Entomol. Exper. Appl. 31:88-110.
- CROFT, B. A., and H. T. REYNOLDS. 1982. Design of more selective pyrethroid insecticides for apple and cotton IPM in North America. Proc. Pacific Br. Entomol. Soc. Am. 29:14.
- CROFT, B. A., and S. W. WAGNER. 1982. Selectivity of acaricidal pyrethroids to permethrin-resistant strains of *Amblyseius fallacis* (Acarina: Phytoseiidae). J. Econ. Entomol. 74:703-706.
- CROFT, B. A., S. W. WAGNER, and J. SCOTT. 1982. Multiple and cross resistances to insecticides in pyrethroid-resistant strains of the predatory mite, *Amblyseius fallacis*. Environ. Entomol. 11:161-164.
- CROFT, B. A., and M. E. WHALON. 1982. Selective toxicity of pyrethroid insecticides to arthropod natural enemies and pests of agricultural crops. Entomophaga 27:3-21.
- JONES, A. L., P. D. FISHER, and B. A. CROFT. 1982. Implementing pest management models using real time weather data. Pages 266-271 in Computer Techniques and Meteorological Data Applied to Problems of Agriculture and Forestry. Am. Meteorol. Soc., Boston.
- MULLIN, C. A., B. A. CROFT, K. STRICKLER, F. MATSUMURA, and J. R. MILLER. 1982. Detoxification enzyme dissimilarities in a herbivorous and predatory mite. Science 217:1270-1272.
- RICHARDSON, J. C., C. D. JORGENSEN, and B. A. CROFT. 1982. Embryogenesis of the codling moth, *Laspeyresia pomonella* (L.): use in validating phenology models. Ann. Entomol. Soc. Am. 75:261-269.
- STRICKLER, K., and B. A. CROFT. 1982. Selection for permethrin resistance in the predatory mite, *Amblyseius fallacis* Garman (Acarina: Phytoseiidae). Entomol. Exp. Appl. 31:339-345.
- WARNER, L. A., and B. A. CROFT. 1982. Selective toxicities of azinphosmethyl and selected orchard pesticides to the aphid predator, *Aphidoletes aphidimyza*. J. Econ. Entomol. 75:410-415.
- WHALON, M. E., B. A. CROFT, and T. M. MOWRY. 1982. Establishment of a permethrin-resistant predatory mite, *Amblyseius fallacis* in a Michigan apple orchard. Environ. Entomol. 11:1096-1099.
- ELDRIDGE, BRUCE F.
- ELDRIDGE, B. F., and J. CALLICRATE. 1982. Efficacy of *Bacillus thuringiensis* var. *israelensis* de Barjac for mosquito control in a western Oregon log pond. Mosq. News 42: 102-105.
- FERGUSON, GEORGE R.
- FERGUSON, G. R. 1982. Descriptions, synonymy and sex associations in the genus *Eucerceris* (Hymenoptera: Philanthidae). J. New York Entomol. Soc. 90:147-160.
- FEYEREISEN, RENÉ
- ROTIN, D., R. FEYEREISEN, J. KOENER, and S. S. TOBE. 1982. Haemolymph juvenile hormone esterase activity during the reproductive cycle of the viviparous cockroach *Diploptera punctata*. Insect Biochem. 12:263-268.
- SZIBBO, C. M., D. ROTIN, R. FEYEREISEN, and S. S. TOBE. 1982. Synthesis and degradation of C_{18} juvenile hormone (JH III) during the final two stadia of the cockroach, *Diploptera punctata*. Gen. Comp. Endocrinol. 48:25-32.
- FISHER, GLENN C.
- FISHER, G. C. 1982. The strawberry crop moth—an update. Proc. Oregon Hortic. Soc. 73:126-131.
- KAMM, JAMES A.
- BUTTERY, R. G., J. A. KAMM, and L. C. LING. 1982. Volatile components of alfalfa flowers and pods. J. Agric. Food Chem. 30:739-742.
- KAMM, J. A., L. M. McDONOUGH, and C. L. SMITHHISLER. 1982. Sex attractant for *Protogrotis obscura*, a pest of grass grown for seed. Environ. Entomol. 11:118-120.
- McDONOUGH, L. M., J. A. KAMM, D. A. GEORGE, C. L. SMITHHISLER, and S. VOERMAN. 1982. A sex attractant for the western lawn moth, *Tehama bonifatella* Hulst. Environ. Entomol. 11:711-714.
- KAMM, J. A., L. M. McDONOUGH, and R. D. GUSTIN. 1982. Armyworm (Lepidoptera: Noctuidae) sex pheromone: field tests. Environ. Entomol. 11:917-919.
- KAMM, J. A., and L. M. McDONOUGH. 1982. Seasonal flight of the cranberry girdler determined with pheromone traps. J. New York Entomol. Soc. 90:94-98.

KRANTZ, GERALD W.

See DEANGELIS, J. D., K. C. LARSON, R. E. BERRY, and G. W. KRANTZ. (Under BERRY, R. E.)

See DEANGELIS, J. D., R. E. BERRY, and G. W. KRANTZ.

See DEANGELIS, J. D., R. E. BERRY, A. MARIN, and G. W. KRANTZ.

See DEANGELIS, J. D., R. E. BERRY, and G. W. KRANTZ.

KRANTZ, G. W. 1982. A new species of *Copidognathus* Trouessart (Acari: Actinedida: Halaridae) from the Galapagos Rift. *Can. J. Zool.* 60:1728-1731.

KRANTZ, G. W., and G. T. BAKER. 1982. Observations on the plastron mechanism of *Hydrozetes* sp. (Acari: Oribatida: Hydrozetidae). *Acarologia* 23:273-277.

LATTIN, JOHN D.

STONEDAHL, G.M., and J. D. LATTIN. 1982. The water striders, or Gerridae, of Oregon and Washington. Oregon State Univ. Ag. Exp. Sta. Tech. Bull. 144. 36 pp.

MILLER, JEFFREY C.

BIRCH, M. C., J. C. MILLER, and T. D. PAINE. 1982. Evaluation of two attempts to trap-out defined populations of *Scolytus multistriatus*. *J. Chem. Ecol.* 8:125-136.

See CAPIZZI, J., J. C. MILLER, and J. GREEN.

MILLER, J. C., and J. E. CRONHARDT. 1982. Life history and seasonal development of the western winter moth, *Operophtera occidentalis* in western Oregon. *Can. Entomol.* 114: 629-636.

MILLER, J. C. 1982. Life history of insect parasitoids involved in successful multiparasitism. *Oecologia* 54:8-9.

MILLER, J. C. 1982. Sampling for larvae of *Operophtera occidentalis* on cherry. *J. Econ. Entomol.* 75:1021-1024.

MOLDENKE, ALISON F.

MOLDENKE, A. F., R. E. BERRY, and L. C. TERRIERE. 1982. Cytochrome P-450 in insects. 5. Monoterpene induction of cytochrome P-450 and associated monooxygenase activities in the larvae of the variegated cutworm *Peridroma saucia* (Hubner). *Comp. Biochem. Physiol.*, in press.

OMAN, PAUL W.

CONVERSE, R. H., R. G. CLARKE, P. W. OMAN, and G. M. MILBRATH. 1982. 'Witches' broom disease of black raspberry in Oregon. *Plant Dis.* 66:949-951.

GILL, R. J., and P. W. OMAN. 1982. A new species and new distributional records for megophthalmine leafhoppers, genus *Tiaja* (Homoptera: Cicadellidae). *Entomography* 1:281-288.

RYKER, LEE C.

RYKER, L. C., and L. M. LIBBEY. 1982. Frontalin in the male mountain pine beetle. *J. Chem. Ecol.* 8:1399-1409.

RYKER, L. C., and J. A. RUDINSKY. 1982. Field bioassay of *exo-* and *endo-*Brevicomin with *Dendroctonus ponderosae* in lodgepole pine. *J. Chem. Ecol.* 8:701-707.

RYKER, L. C., and P. T. OESTER. 1982. *Pseudohylesinus nebulosus* (LeConte) (Col., Scolytidae): aggregation by primary attraction. *Z. Angew. Entomol.* 94:377-382.

SCHOWALTER, TIMOTHY D.

FARGO, W. S., T. L. WAGNER, R. N. COULSON, J. D. COVER, T. MCAUDLE, and T. D. SCHOWALTER. 1982. Probability functions for components of the *Dendroctonus frontalis*-host tree population system and their potential use with population models. *Res. Popul. Ecol.* 24:123-131.

SCHOWALTER, T. D., and D. A. CROSSLEY, JR. 1982. Bioelimination of ⁵¹Cr and ⁸⁶Sr by cockroaches, *Gromphadorhina portentosa* (Orthoptera: Blaberidae), as affected by mites, *Gromphadorholaelaps schaeferi* (Parasitiformes: Laelapidae). *Ann. Entomol. Soc. Am.* 75:158-160.

STEPHEN, WILLIAM P.

STEPHEN, W. P., J. D. VANDENBERG, and B. L. FICHTER. 1982. Efficacy of surface sterilants for the control of *Ascospaera* spores on adult *Megachile rotundata*. Pages 108-112 in *Proc. Int. Symp. Leafcutting Bees*, University of Saskatchewan Press.

STEPHEN, W. P., and B. L. FICHTER. 1982. Temperature tolerance of newly emerged leafcutting bee adults, *Megachile rotundata* Fabr. Pages 54-56 in *Proc. Int. Symp. Leafcutting Bees*.

STEPHEN, W. P. Chalkbrood control in the leafcutting bee *Megachile rotundata*. Pages 98-107 in *Proc. Int. Symp. Leafcutting Bees*, University of Saskatchewan Press.

VANDENBERG, J. D., and W. P. STEPHEN. 1982. Etiology and symptomatology of chalkbrood in the alfalfa leafcutting bee, *Megachile rotundata*. *J. Invert. Pathol.* 39:133-137.

VANDENBERG, J. D., and W. P. STEPHEN. 1982. Pathogenicity of *Ascospaera* species for larvae of *Megachile rotundata*. *J. Apic. Res.*, in press.

TERRIERE, LEON C.

See MOLDENKE, A. F., R. E. BERRY, and L. C. TERRIERE.

General Science

FARBER, PAUL LAWRENCE

FARBER, P. L. 1982. The transformation of natural history in the nineteenth century. *J. Hist. Biol.* 15(1):145-152.

FARBER, P. L. 1982. The Emergence of Ornithology as a Scientific Discipline: 1760-1850. D. Reidel Publishing Co., Dordrecht, Holland. 216 pp.

FARBER, P. L. 1982. Book review of Manuscripts in the Royal Scottish Museum - Edinburgh by Joy Pitman. *Ann. Sci.* 39(1): 97-98.

FARBER, P. L. 1982. Book review of Birds in Medieval Manuscripts by Brunsdon Yapp. *Ann. Sci.* 39(6):624.

JOHNSON, ARTHUR G.

DODD, B., J. C. RINGLE, A. G. JOHNSON, and T. V. ANDERSON. 1982. Operational experience using the OSTR FLIP fuel self-protection program. Pages 5.9-5.20 in *Proc. Eighth TRIGA Users' Conf.*, March 8-10, 1982, Idaho Falls, ID. GA Technologies, San Diego, CA.

GAO, Y. C., A. H. ROBINSON, A. G. JOHNSON, and J. C. RINGLE. 1982. Neutron and gamma radiography of TRIGA fuel elements. Pages 2.57-2.65 in *Proc. Eighth TRIGA Users' Conf.*

JOHNSON, A. G., T. V. ANDERSON, B. DODD, and W. T. CARPENTER. 1982. Argon-41 ALARA, or reduction of argon-41 released from the OSTR by the use of a nitrogen purging system for the rotating rack facility. Pages 5.1-5.8 in *Proc. Eighth TRIGA Users' Conf.*

PICKETT, B., and A. G. JOHNSON. 1982. Independent determination of the accuracy of the OSTR stack gas monitor. Pages 1.48-1.58 in *Proc. Eighth TRIGA Users' Conf.*

LA TOUCHE, Y. DAVID

LA TOUCHE, Y. D., and M. C. MIX. 1982. Seasonal variations of arsenic and other trace elements in bay mussels (*Mytilus edulis*). *Bull. Environ. Contam. Toxicol.* 29:665-671.

LYFORD, JOHN H., JR.

CHRISTY, J. A., J. H. LYFORD, and D. H. WAGNER. 1982. Checklist of Oregon mosses. *Bryologist* 85:22-36.

MIX, MICHAEL C.

See LA TOUCHE, Y. D., and M. C. MIX.
MIX, M. C., S. J. HEMINGWAY, and R. L. SCHAFER. 1982. Benzo(a)pyrene concentrations in somatic and gonad tissues of bay mussels, *Mytilus edulis*. *Bull. Environ. Contam. Toxicol.* 28:46-51.

MIX, M. C. 1982. Polynuclear aromatic hydrocarbons and cellular proliferative disorders in bivalve molluscs from Oregon estuaries. U.S. EPA Ecol. Res. Series EPA-600/154-82-026. 49 pp.

WORREST, ROBERT C.

BAUER, H., M. M. CALDWELL, M. TEVINI, and R. C. WORREST, eds. 1982. Biological Effects of UV-B Radiation. Gesellschaft für Strahlen und Umweltforschung mbH, Munich. 224 pp.

CALKINS, J. A., E. S. GREEN, G. KULLENBERG, R. C. SMITH, R. C. WORREST, and C. S. YELTSCH, eds. 1982. The Role of Solar Ultraviolet Radiation in Marine Ecosystems. Plenum Press, New York. 724 pp.

WORREST, R. C. 1982. Impact of enhanced solar UV-B radiation on the marine ecosystem. Pages 204-210 in H. Bauer et al., eds. *Biologi-*

cal Effects of UV-B Radiation. Gesellschaft für Strahlen und Umweltforschung mbH, Munich.

WORREST, R. C. 1982. Review of literature concerning the impact of UV-B radiation upon marine organisms. Pages 429-458 in J. Calkins, ed. *The Role of Solar Ultraviolet Radiation in Marine Ecosystems*. Plenum Press, New York.

Geography

KALE, STEVEN R.

KALE, S. R. 1982. Economic impacts from solar development in Nebraska. *Great Plains-Rocky Mount. Geogr. J.* 10(1):52-59.

KALE, S. R. 1982. Book review of *Nonmetropolitan America in Transition*, edited by A. Hawley and S. Mills Mazie. *Ann. Assoc. Am. Geogr.* 72(4):575-577.

PEASE, JAMES R.

PEASE, J. R. 1982. Commercial agricultural land preservation in Oregon. *Geojournal* (Dec.), 6:547-555.

ROSENFELD, CHARLES L.

ROSENFELD, C. L., and R. C. COOKE. 1982. *Earthfire: The 1980 Eruptions of Mt. St. Helens*. MIT Press, Cambridge, MA. 179 pp.

ROSENFELD, C. L. 1981. Dampf-Eruption in Mt. St. Helens. *Naturwissenschaftliche Rundschau* 12:489-494.

ROSENFELD, C. L. 1982. Observations on the Mt. St. Helens eruption. Pages 128-143 in B. K. Skinner, ed. *Earth's History, Structure and Materials*. Kaufmann Publishers, Los Altos, CA.

ROSENFELD, C. L. 1982. Book review of *Volcanoes of the World* by T. Sikin et al., in *American Scientist*, May 1982.

Geology

BOUCOT, ARTHUR J.

BOUCOT, A. J., and W. F. KOCH, II. 1982. Temperature fluctuations in the Devonian Eastern Americas Realm. *J. Paleontol.* 56:240-243.

BOUCOT, A. J. 1982. Ecostratigraphic framework for the Lower Devonian of the North American Appohimchi Subprovince. *N. Jahrb. Geol. Palaont., Abh.* 163:81-121.

BOUCOT, A. J. 1982. Rates of behavioral evolution, community evolution, biogeographic history and the constraints of the evolution of species imposed by these classes of data obtained from the fossil record. Pages 19-28 in J. Chaline, ed., *Modalités, Rythmes, Mécanismes de l'Évolution, Gradualisme Phylétique ou Équilibres Ponctuels? Colloque Int. Centre Nat. Rech. Scien.*, Dijon, France.

BOUCOT, A. J., J. GRAY, and D. MASSA. 1982. Caradocian land plant microfossils from Libya. *Geology* 10:197-201.

BOUCOT, A. J. 1982. Ecophenotypic or genotypic? *Nature* 296: 609-610.

BOUCOT, A. J., D. RUMBLE, III, J. M. FERRY, and T. C. HOERING. 1982. Fluid flow during metamorphism at the Beaver Brook fossil locality, New Hampshire. *Am. J. Sci.* 282:886-919.

BOUCOT, A. J., and J. GRAY. 1982. Geologic correlates of early plant evolution. Pages 1: 61-66 in *Proc. Third North American Paleontological Convention*, Montreal.

BOUCOT, A. J., J. GRAY, R. FANG, X. YANG, Z. LI, and N. ZHANG. 1982. Devonian calcrete from China: its significance as the first Devonian calcrete from Asia. *Can. J. Earth Sci.* 19:1532-1534.

BOUCOT, A. J., G. LAUBACHER, and J. GRAY. 1982. Additions to Silurian stratigraphy, lithofacies, biogeography and paleontology of Bolivia and southern Peru. *J. Paleontol.* 56: 1138-1170.

BOUCOT, A. J., N. ELDREDGE, and J. A. HOPSON. 1982. Sources and comments on scientific creationism. *J. Paleontol.* 56:1320-1321.

BOUCOT, A. J. 1982. Brachiopoda. Pages 132-135 in *McGraw-Hill Yearbook of Science and Technology*, New York.

BOUCOT, A. J., and J. GRAY. 1982. Paleozoic data of climatological significance and their use for interpreting Silurian-Devonian climate. Pages 189-198 in *Climate in Earth History*. *Studies in Geophysics*. National Academy Press.

BOUCOT, A. J., D. MASSA, and D. G. PERRY. 1982. Stratigraphy, biogeography and taxonomy of some Lower and Middle Devonian brachiopod-bearing beds of Libya and Northern Niger. *Palaentographica*, Abt. A, Bd. Stuttgart.

DASCH, E. JULIUS

DASCH, E. J., K. F. SCHEIDEGGER, et al. 1982. Ocean-land transitions. Pages 105-133 in D. M. Hussong, et al., eds. *The Ocean Crustal Dynamics Plan for the 1980's*. Joint Oceanographic Institutions.

JOHNSON, J. GRANVILLE

JOHNSON, J. G. 1982. Chronozones and other misapplications of chronostratigraphic concept. *Lethaia* 14:285-286.

JOHNSON, J. G. 1982. *Davidsonia* and Davidsoniaceae, Devonian strophomenid brachiopods. *J. Paleontol.* 56:973-976, 1 pl.

JOHNSON, J. G. 1982. Occurrence of phyletic gradualism and punctuated equilibria through geologic time. *J. Paleontol.* 56:1329-1331.

JOHNSON, J. G., and P. H. HECKEL. 1982. Devonian. Pages 147-151 in *Encyclopedia Science and Technology*, 5th edition. McGraw-Hill, New York.

JOHNSON, J. G., and W. R. TROJAN. 1982. The *Tecnocrytina* brachiopod fauna (?Upper Devonian) of central Nevada. *Geol. et Palaentol.* 16:119-150, 8 pls.

SANDBERG, C. A., R. C. GUTSCHICK, J. G. JOHNSON, F. G. POOLE, and W. J. SANDO. 1982. Middle Devonian to late Mississippian geologic history of the Utah hingeline and overthrust belt region, western United States—a summary. Pages 117-118 in D. L. Nielson, ed. *Overthrust Belt of Utah*. Utah Geol. Assoc., Publ. 10. Salt Lake City.

NIEM, ALAN R.

MURPHY, T. M., and A. R. NIEM. 1982. Tectonic and paleoenvironmental significance and magnetic-geochemical stratigraphy of the Columbia River basalt at the middle Miocene shoreline, northwestern Oregon Coast Range. *EOS (Trans. Am. Geophys. Union)* 63(8):173.

SENECHAL, RONALD G.

RATCLIFFE, N. M., R. L. ARMSTRONG, D. G. MOSE, R. G. SENECHAL, N. WILLIAMS, and M. J. BAIAMONTE. 1982. Emplacement history and tectonic significance of the Cortlandt Complex, related plutons, and dike swarms in the Taconide Zone of southeastern New York based on K-Ar and Rb-Sr investigations. *Am. J. Sci.* 282:358-390.

YEATS, ROBERT S.

JACKSON, P. A., and R. S. YEATS. 1982. Structural evolution of the Carpinteria basin, western Transverse Ranges, California. *Am. Assoc. Petr. Geol. Bull.* 66:805-829.

TABOR, R. W., V. A. FRIZZELL, R. S. YEATS, and J. T. WHETTEN. 1982. Geologic map of the Eagle Rock and Glacier Peak roadless areas, Snohomish and King Counties, Washington. *U. S. Geol. Surv. Misc. Field Studies Map MF-1380-A*, 1:100,000.

YEATS, R. S. 1982. Low-shake faults of the Ventura basin, California. Pages 3-15 in *Guidebook, Neotectonics in Southern California*, Field Trip Numbers 3, 4, 14. 78th Annual Meeting of the Cordilleran Section of the Geological Society of America, Anaheim, CA, April 19-21, 1982.

YEATS, R. S. 1982. Reply to comment on "Low-shake faults of the Ventura basin, California" by A. M. Sarna-Wojcicki and R. F. Yerkes. Pages 21-23 in *Guidebook, Neotectonics in Southern California*, Field Trip Numbers 3, 4, 14 (see above).

YEATS, R. S. 1982. Book review of *Geology of Oregon* (third edition) by E. M. Baldwin. *Geology* 10:55-56.

YEATS, R. S., E. A. KELLER, T. K. ROCKWELL, K. R. LAJOIE, A. M. SARNA-WOJCICKI, and R. F. YERKES. 1982. Field trip Number 3, Neotectonics of the Ventura basin-road log. Pages 61-76 in *Guidebook, Neotectonics in Southern California* (see above).

Laboratory for Nitrogen Fixation

EVANS, HAROLD J.

- CANTRELL, M. A., R. E. HICKOK, and H. J. EVANS. 1982. Identification and characterization of plasmids in hydrogen uptake positive and hydrogen uptake negative strains of *Rhizobium japonicum*. Arch. Microbiol. 131:102-106.
- CANTRELL, M. A., R. A. HAUGLAND, and H. J. EVANS. 1982. Hydrogen uptake gene cosmid and process of constructing same. U.S. Patent Office, Serial No. 433,503. Application filed October 8, 1982.
- DREVON, J. J., L. FRAZIER, S. A. RUSSELL, and H. J. EVANS. 1982. Respiratory and nitrogenase activities of soybean nodules formed by hydrogen uptake negative (Hup⁻) and revertant strains of *Rhizobium japonicum* characterized by protein patterns. Plant Physiol. 70: 1341-1346.
- EISBRENNER, G., and H. J. EVANS. 1982. Carriers in the electron transport from molecular hydrogen to oxygen in *Rhizobium japonicum* bacteroids. J. Bacteriol. 149:1005-1012.
- EISBRENNER, G., R. E. HICKOK, and H. J. EVANS. 1982. Cytochrome patterns in *Rhizobium japonicum* cells grown under chemolithotrophic conditions. Arch. Microbiol. 132:230-235.
- PUROHIT, K., R. R. BECKER, and H. J. EVANS. 1982. D-ribulose-1,5-bisphosphate carboxylase/oxygenase from chemolithotrophically grown *Rhizobium japonicum* and inhibition by D-4-phosphoerythronate. Biochim. Biophys. Acta 715:230-239.

Mathematics

BURGER, WILLIAM F.

- BURGER, W. F. 1982. Graph paper geometry. Pages 102-117 in L. Silvey, ed. Mathematics for the Middle Grades. National Council of Teachers of Mathematics, Reston, VA.

CALDERER, M. CARME

- CALDERER, M. C. 1982. Dynamical behavior of nonlinear elastic spherical shells. J. Elastic. 12(4):384-402.

CARLSON, DAVID H.

- CARLSON, D. H., B. N. DATTA, and C. R. JOHNSON. 1982. A semi-definite Lyapunov theorem and the characterization of tridiagonal D-stable matrices. SIAM J. Alg. Disc. Meth. 3:293-304.
- CARLSON, D. H., and R. LOEWY. 1982. On equality of traps induced by alternate products. Lin. Alg. Appl. 47:89-110.

FEIN, BURTON I.

- FEIN, B. I., and M. SCHACHER. 1982. Relative Brauer groups III. J. reine angew. Math. 335:37-39.

FLAHERTY, FRANCIS J.

- FLAHERTY, F. J. 1982. Integration (Math II), Hewlett-Packard Corporation, Corvallis, OR. 75 pp.
- FLAHERTY, F. J. 1982. Fast Fourier methods (Math III). Hewlett-Packard Corporation, Corvallis, OR. 81 pp.

GARITY, DENNIS J.

- GARITY, D. J. 1982. A classification scheme for cellular decompositions of manifolds. Topol. Applic. 14:43-58.

LEE, JOHN W.

- LEE, J. W. 1982. The lambda invariance test: a characterization of exponential decays. J. Chem. Phys. 77(b).

MURPHY, LEA F.

- MURPHY, L. F. 1982. Density-dependent cellular growth in an age structured colony. Int. J. Computer Appl. Math., in press.

MUSSER, GARY L.

- MUSSER, G. L. 1982. Let's teach mental algorithms for addition and subtraction. The Arithmetic Teacher, April 1982:40-42.

NARASIMHAN, M.N.L.

- NARASIMHAN, M.N.L. 1982. Taylor stability of a thermovisco-elastic fluid in Couette flow. Int. J. Eng. Sci. 20(2):303-309.

WAYMIRE, EDWARD C.

- WAYMIRE, E. C. 1982. A probabilistic look at mixing and cooling processes. Soc. Industr. Appl. Math (SIAM Review) 24(1):73-75.

Microbiology

BROWN, LYLE R.

- BEATY, J. S., C. A. MCLEAN-BOWEN, and L. R. BROWN. 1982. *BVul*: a site-specific endonuclease from *Bacillus subtilis*. Gene 18:61-67.
- FITZGERALD, G. F., C. DALY, L. R. BROWN, and T. R. GINERAS. 1982. *ScrFI*: a new sequence specific endonuclease from *Streptococcus cremoris*. Nucleic Acid Res. 10, in press.
- LIBBY, R. T., and L. R. BROWN. 1982. RNA polymerase subunit biosynthesis in *Bacillus subtilis*. Mol. Gen. Genet. 185:339-343.

FERRO, ADOLPH J.

- CONE, M. C., K. S. MARCHITTO, B. ZEHFUS, and A. J. FERRO. 1982. The utilization of 5'-methylthioadenosine as source of both purine and methionine in *Saccharomyces cerevisiae*. J. Bacteriol. 151:510-515.
- KUSHAD, M. M., D. G. RICHARDSON, and A. J. FERRO. 1982. 5-methylthioribose kinase activity in plants. Biochem. Biophys. Res. Commun. 108:167-173.
- FERRO, A. J., M. K. RISCOE, M. W. WHITE, and M. R. MACDONALD. 1982. Regulation of cell growth by 5'-methylthioadenosine. Pages 693-700 in E. Usdin et al., eds. Biochemistry of S-adenosylmethionine and Related Compounds. MacMillan Press, London.

- WHITE, M. W., A. A. VANDENBARK, C. L. BARNEY, and A. J. FERRO. 1982. Structural analogs of 5'-methylthioadenosine as substrates and inhibitors of 5'-methylthioadenosine phosphorylase and as inhibitors of human lymphocyte transformation. Biochem. Pharmacol. 31:503-507.

FRYER, JOHN L.

- See AMANDI, S., S.F. HIU, J. S. ROHOVEC, and J. L. FRYER. (Listed under J. S. Rohovec)
- See BANNER, C. R., J. S. ROHOVEC, and J. L. FRYER.

- BUCHANAN, D. V., J. L. FRYER, and J. L. ZINN. 1982. Relative susceptibility of four stocks of summer steelhead (*Salmo gairdneri*) to infections of ceratomyxosis and bacterial diseases found in the Willamette River. Fish Division, Oregon Department of Fish and Wildlife Information Report No. 82-7. 15 pp.

- GROBERG, W. J., JR., R. P. HEDRICK, and J. L. FRYER. 1982. Viral diseases of salmonid fish in Oregon. Pages 345-357 in Proc. North Pacific Aquaculture Symposium, 1980.

- HEDRICK, R. P., and J. L. FRYER. 1982. Persistent infections of salmonid cell lines with infectious pancreatic necrosis virus (IPNV): a model for the carrier state in trout. Fish Pathol. 16(4):163-172.

- KOU, G-H, J. L. FRYER, and M. L. LANDOLT, editors. Proc. Republic of China-United States Coop. Sci. Seminar Fish Disease, NSC Symposium Series No. 3. Published by National Science Council, Taipei, Taiwan, Republic of China.

- See O'LEARY, P. J., J. S. ROHOVEC, J. E. SANDERS, and J. L. FRYER. (Under ROHOVEC, J. S.)

- See WINTON, J. R., C. N. LANNAN, J. L. FRYER, and T. KIMURA.

GRIFFITHS, ROBERT P.

- GRIFFITHS, R. P., B. A. CALDWELL, W. A. BROICH, and R. Y. MORITA. 1982. The long-term effects of crude oil on microbial processes in subarctic marine sediments. Estuarine, Coastal Shelf Sci. 15:183-198.

- GRIFFITHS, R. P., B. A. CALDWELL, W. A. BROICH, and R. Y. MORITA. 1982. The long-term effect of crude oil on microbial processes in subarctic sediments: studies on sediment amended with organic nutrients. Mar. Pollut. Bull. 13:273-278.

- GRIFFITHS, R. P., B. A. CALDWELL, J. D. CLINE, W. A. BROICH, and R. Y. MORITA. Field observations of methane concentrations and methane oxidation rates in southeastern Bering Sea waters. Appl. Environ. Microbiol. 44:435-446.

- GRIFFITHS, R. P., B. A. CALDWELL, and R. Y. MORITA. 1982. Seasonal changes in microbial heterotrophic activity in subarctic waters as related to phytoplankton production. Mar. Biol. 71:121-127.

KAATTARI, STEPHEN L.

KAATTARI, S. L., and B. RITTENBERG. 1982. Concanavalin A supernatant recruits antigen-insensitive IgG memory B lymphocyte precursors into an antigen-sensitive precursor pool. *J. Immunol.* 128(2):720-725.

LEONG, JO-ANN C.

FENDRICK, J. L., W. J. GROBERG, and J. C. LEONG. 1982. Comparison of five piscine cell lines to the isolation of infectious hematopoietic necrosis virus from naturally infected salmonid fishes. *J. Fish Dis.* 5:87-95.

LEVY, J., P. VOLBERDING, H. OPPERMANN, and J. C. LEONG. 1982. Retroviruses and Differentiation. Pages 451-469 in R. F. Revotella, et al., eds. *Symp. Expression of Differentiated Functions in Cancer Cells.* Ravens Press, New York.

MORITA, RICHARD Y.

See Griffiths, R. P., B. A. CALDWELL, W. A. BROICH, and R. Y. MORITA. (First entry)

See Griffiths, R. P., B. A. CALDWELL, W. A. BROICH, and R. Y. MORITA. (Second entry)

See GRIFFITHS, R. P., B. A. CALDWELL, J. D. CLINE, W. A. BROICH, and R. Y. MORITA.

See GRIFFITHS, R. P., B. A. CALDWELL, and R. Y. MORITA.

MORITA, R. Y. 1982. Starvation-survival of heterotrophs in the marine environment. *Adv. Microb. Ecol.* 6:171-198.

MORITA, R. Y., and R. D. JONES. Microbial methane production. U.S. Patent Office Serial No. 435,058. Application filed October 18, 1982.

PETERS, S., J. A. BAROSS, and R. Y. MORITA. 1982. Partial purification and characterization of hemolysin from a psychrotrophic Kanagawa positive marine vibrio. *Appl. Environ. Microbiol.* 43:39-49.

TORRELLA, F., and R. Y. MORITA. 1982. Starvation-induced morphological changes, motility, and chemotaxis patterns in a psychrophilic marine vibrio. *Deuxieme Colloque de Microbiologie, Marseille.* Publication Centre National pour l'Exploitation des Oceans 13: 45-60.

REICHARDT, W., and R. Y. MORITA. 1982. Temperature characteristics of psychrotrophic and psychrophilic bacteria. *J. Gen. Microbiol.* 128:565-568.

REICHARDT, W., and R. Y. MORITA. 1982. Survival stages of a psychrotrophic *Cytophaga johnsonae* strain. *Can. J. Microbiol.* 28:841-850.

REICHARDT, W., and R. Y. MORITA. 1982. Influence of temperature adaptation on glucose metabolism in a psychrotrophic strain of *Cytophaga johnsonae*. *Appl. Environ. Microbiol.* 44:1282-1288.

PARKS, LEO W.

McCAMMON, M. T., C. A. McLEAN-BOWEN, and L. W. PARKS. 1982. Genetic, cellular and biochemical analyses of the yeast Δ^2 -sterol methyltransferase. Pages 499-507 in E. Usdin

et al., eds. *Biochemistry of S-adenosyl-methionine and Related Compounds.* MacMillan Press, London.

McCAMMON, M. T., and L. W. PARKS. 1982. Enrichment of auxotrophic mutants in *Saccharomyces cerevisiae* using the cell wall inhibitor, echinocandin B. *Mol. Gen. Genet.* 186:295-297.

McCAMMON, M. T., and L. W. PARKS. 1982. Lipid synthesis in inositol-starved *Saccharomyces cerevisiae*. *Biochim. Biophys. Acta* 713: 86-93.

McLEAN-BOWEN, C. A., and L. W. PARKS. 1982. Effect of altered sterol composition on the osmotic behavior of sphaeroplasts and mitochondria of *Saccharomyces cerevisiae*. *Lipids* 17:662-665.

PARKS, L. W., K. BROOKS, and R. LAWRENCE. 1982. An instructional experiment in non-mediated useage of computerized information retrieval systems. *Inform. Services Use* 1:271-277.

PARKS, L. W., C. A. McLEAN-BOWEN, and M. T. McCAMMON. 1981. Correlation of sterol structural changes with membrane fluidity and enzymatic activities. Pages 325-329 in G. G. Stewart and I. Russell, eds. *Advanced Biotechnology: Current Developments in Yeast Research.* Pergamon Press, New York.

PARKS, L. W., C. A. McLEAN-BOWEN, C. K. BOTTEMA, F. R. TAYLOR, R. GONZALES, B. W. JENSEN, and J. L. RAMP. 1982. Aspects of sterol metabolism in yeast and *Phytophthora*. *Lipids* 17:187-196.

RODRIGUEZ, R. J., and L. W. PARKS. Application of high performance liquid chromatographic separation of free sterols to the screening of yeast sterol mutants. *J. Analyt. Biochem.* 119:200-204.

RODRIGUEZ, R. J., F. R. TAYLOR, and L. W. PARKS. 1982. A requirement for ergosterol to permit growth of yeast sterol auxotrophs on cholesterol. *Biochem. Biophys. Res. Commun.* 106: 435-441.

ROHOVEC, JOHN S.

AMANDI, A., S. F. HIU, J. S. ROHOVEC, and J. L. FRYER. 1982. Isolation and characterization of *Edwardsiella tarda* from fall chinook salmon (*Oncorhynchus tshawytscha*). *Appl. Environ. Microbiol.* 43(6):1380-1384.

BANNER, C. R., J. S. ROHOVEC, and J. L. FRYER. 1982. A rapid method for labeling rabbit immunoglobulin with fluorescein for use in detection of fish pathogens. *Bull. Europ. Assoc. Fish Pathol.* 2:35-37.

O'LEARY, P. J., J. S. ROHOVEC, J. E. SANDERS, and J. L. FRYER. 1982. Serotypes of *Yersinia ruckeri* and their immunogenic properties. Sea Grant College Program Publication No. ORESU-T-82-001. 15 pp.

SANDINE, WILLIAM E.

SANDINE, W. E. 1982. Book review of *Cheese-making Practice* by R. Scott. *Food Technol.* 36(11):140.

WILLRETT, D. L., W. E. SANDINE, and J. W. AYRES. 1982. Evaluation of pH-controlled starter media including a new product for Italian and Swiss-type cheeses. *Cult. Dairy Prod. J.* 17(3):5-9.

SEIDLER, RAMON J.

ARMSTRONG, J. L., J. J. CALOMIRIS, D. S. SHIGENO, and R. J. SEIDLER. 1982. Drug resistant bacteria in drinking water. Pages 263-276 in *Proc. Am. Water Works Assoc. Water Quality Technol. Conf. Advances in Laboratory Techniques for Quality Control*, Am. Water Works Publication, Denver.

ARMSTRONG, J. L., J. J. CALOMIRIS, and R. J. SEIDLER. 1982. The selection of antibiotic resistant standard plate count bacteria during water treatment. *Appl. Environ. Microbiol.* 44:308-316.

BAUER, N. J., R. J. SEIDLER, and M. D. KNITTEL. 1981. A simple, rapid bioassay for detecting effects of pollutants on bacteria. *Bull. Environ. Contam. Toxicol.* 27:577-582.

SEIDLER, R. J., and T. M. EVANS. 1982. Persistence and detection of coliforms in turbid finished drinking water. *Nat. Tech. Information Service EPA-60S2-82-054.*

TISON, D. L., and R. J. SEIDLER. 1982. Preliminary assessment of *Legionella* occurrences in water treatment procedures and distribution systems. Pages 117-124 in *Proc. Water Works Assoc. Water Quality Tech. Conf. Advances in Laboratory Techniques for Quality Control*, Am. Water Works Assoc., Denver.

TISON, D. L., M. NISHIBUCHI, J. D. GREENWOOD, and R. J. SEIDLER. 1982. *Vibrio vulnificus* biogroup 2: a new biogroup pathogenic for eels. *Appl. Environ. Microbiol.* 44: 640-646.

WINTON, JAMES R.

WINTON, J. R., C. N. LANNAN, J. L. FRYER, and T. KIMURA. 1982. Isolation and characterization of a new reovirus from chum salmon. Pages 359-367 in *Proc. North Pacific Aquaculture Symposium*, 1980.

Physics

FONTANA, PETER R.

FONTANA, P. R. 1982. *Atomic Radiative Processes.* Academic Press, New York. 283 pp.

FONTANA, P. R. 1982. Optical spectrum of strongly coupled dressed atomic states. *J. Phys.* B15:2859.

KIRBY, DAVID J.

DUPREE, R., D. J. KIRBY, and W. FREYLAND. 1982. A ^{133}Cs -NMR study of the chemical bonding of the solid compound semiconductor Cs_3Sb . *Z. Naturforsch.* 37a:15.

DUPREE, R., D. J. KIRBY, and W. FREYLAND. 1982. NMR study of charges in bonding and the metal-non-metal transition in liquid cesium-antimony alloys. *Philos. Mag.* B46:595.

KRANE, KENNETH S.

- ALLSOP, A. L., S. HORNUNG, K. S. KRANE, and N. J. STONE. 1982. The nuclear magnetic moment of ^{190}Ir . *J. Phys. G* 8:857.
- KRANE, K. S. 1982. *Modern Physics*. John Wiley and Sons, New York. 511 pp.
- KRANE, K. S., and L. SCHECTER. 1982. Regression line analysis. *Am. J. Phys.* 50:82.
- KRANE, K. S. 1982. Nuclear orientation of ^{160}Tb in Tb metal. *Nucl. Phys. A* 377:176.
- KRANE, K. S. 1982. Iterative solutions of transcendental equations of mathematical physics with the programmable pocket calculator. *Am. J. Phys.* 50:521.

LANDAU, RUBIN H.

- YOO, K. B., and R. H. LANDAU. 1982. A model for the spin, isospin and energy dependence of pion-nucleus annihilation. *Phys. Rev. C* 25:489.

MADSEN, VICTOR A.

- DERMAWAN, H., F. OSTERFELD, and V. A. MADSEN. 1982. Nuclear structure approach to the Coulomb correction of the imaginary optical potential. *Phys. Rev. C* 24:180.
- HANSEN, L. F., I. D. PROCTER, D. W. HEIKKINEN, and V. A. MADSEN. 1982. Nuclear deformation in the actinide region by proton inelastic scattering. *Phys. Rev. C* 24:189.
- WONG, C., S. M. GRIMES, C. H. POPPE, V. R. BROWN, and V. A. MADSEN. 1982. Excitation of the O^+ , 2^+ , O^{+1} , 2^{+1} , 4^+ analog states in the even selenium isotopes with 19-25 MeV protons; coupled-channel analysis. *Phys. Rev. C* 26:889.

STETZ, ALBERT W.

- ABEGG, R., J. M. CAMERON, D. A. HUTCHEON, P. KITCHING, W. J. McDONALD, C. A. MILLER, J. W. PASOS, J. SOUKUP, J. THEKKUMTHALA, H. S. WILSON, A. W. STETZ, and I. J. VAN HEERDEN. 1982. A study of the reaction $\text{pd} \rightarrow ^3\text{He} \gamma$. *Phys. Lett.* 118B:55.
- MARGAZIOTIS, P. J., M. B. EPSTEIN, W. T. H. VAN OERS, D. K. HASELL, R. ABEGG, G. A. MOSS, L. A. GREENIAUS, J. M. CAMERON, and A. W. STETZ. 1982. Asymmetries from the $^4\text{He}(\bar{p}, 2p)^3\text{H}$ reaction at 250 and 500 MeV using polarized protons. *Phys. Rev. C* 25:2873.
- VAN OERS, W. T. H., B. T. MURDOCH, B. K. S. KOENE, D. K. HASELL, R. ABEGG, D. J. MARGAZIOTIS, E. B. EPSTEIN, G. A. MOSS, L. G. GREENIAUS, J. M. GREBEN, J. M. CAMERON, J. G. ROGERS, and A. W. STETZ. 1982. $^4\text{He}(\bar{p}, 2p)^3\text{H}$ reaction at intermediate energies. *Phys. Rev. C* 25:390.

SWENSON, L. WAYNE

- ARNOLD, L. G., B. C. CLARK, E. D. COOPER, H. S. SHERIF, D. A. HUTCHEON, P. KITCHING, J. M. CAMERON, R. P. LILJESTRAND, R. N. McDONALD, W. J. McDONALD, C. A. MILLER, G. C. NIELSON, W. C. OLSEN, D. M. SHEPPARD, G. M. STINSON, D. K. MCDANIELS, J. R. TINSLEY, R. L. MERCER, L. W. SWENSON, P. SCHWANDT, and C. E. STRO-

- NACH. 1982. Energy dependence of the p - ^{40}Ca optical potential—a Dirac equation perspective. *Phys. Rev. C* 25:396.

- BAKER, F. T., C. GLASHAUSSE, A. SCOTT, M. A. GRIMM, G. S. ADAMS, G. HOFFMAN, G. IGO, W. G. LOVE, J. M. MOSS, S. NANDA, V. PENUMETCHA, W. SWENSON, and B. E. WOOD. 1982. Test of data-to-data relations for the reaction $^{90-92}\text{Zr}(\bar{p}, p')$ at 800 MeV. *Phys. Rev. Lett.* 47:1823.
- GLASHAUSSE, C., R. DESWINIARSKI, K. JONES, S. NANDA, F. T. BAKER, M. GRIMM, V. PENUMETCHA, A. SCOTT, G. ADAMS, G. IGO, G. W. HOFFMANN, J. MOSS, W. SWENSON, and B. E. WOOD. 1982. Coupled-channels analysis of 800-MeV polarized proton inelastic scattering from ^{16}O . *Phys. Lett.* 116B:215.

TAYLOR, TIMOTHY

- TAYLOR, T. 1982. The imploding beer can. *The Physics Teacher* 20:458.

WASSERMAN, ALLEN

- WASSERMAN, A., N. KUMAR, and N. H. MARCH. 1982. Critical point properties of liquids. *J. Phys. Chem. Liquids* 11:271.

Statistics

ARTHUR, JEFFREY L.

- ARTHUR, J. L., and K. D. LAWRENCE. Multiple goal production and logistics planning in a chemical and pharmaceutical company. *Comput. Operat. Res.* 9(2):127-137.
- ARTHUR, J. L. 1982. Book review of *Applied Cybernetics: Its Relevance to Operations Research* by A. Ghosal. *J. Am. Stat. Assoc.* 77(377):217.

BUTLER, DAVID A.

- BUTLER, D. A. 1982. Bounding the reliability of multi-state systems. *Operat. Res.* 30(3):530-544.
- LEDOUX, C. B., and D. A. BUTLER. 1982. Prebunching? Results from simulation. *J. For.* 80(2):79-82.

CALVIN, LYLE D.

- CALVIN, L. D. 1982. Experience with a student consulting service. Pages 311-326 in *Proc. Conf. Teaching Statistics and Statistical Consulting*, Ohio State Univ., November 1980. Academic Press, New York.
- CONNOR, S. L., W. E. CONNOR, G. SEXTON, L. D. CALVIN, and S. BACON. 1982. The effects of age, body weight and family relationships on plasma lipoproteins and lipids in men, women, and children of randomly selected families. *Circulation* 65(7):1289-1298.

FAULKENBERRY, G. DAVID

- ROBBINS, R. G., and G. D. FAULKENBERRY. 1982. A population model for fleas of the graytailed vole, *Microtus canicaudus* Miller. *Entomol. News* 93(3):70-74.

- LEJEUNE, M., and G. D. FAULKENBERRY. 1982. A simple predictive density function. *J. Am. Stat. Assoc.* 77(379):654-659.

PETERSEN, ROGER G.

- ADERBIGBE, A. D., D. C. CHURCH, R. V. FRAKES, and R. G. PETERSEN. 1982. Factors determining palatability of ryegrass to cattle. *J. Anim. Sci.* 54:164-172.

PIERCE, DONALD A.

- PIERCE, D. A., and R. J. GRAY. 1982. Testing normality of errors in regression models. *Biometrika* 69(1):233-236.
- PIERCE, D. A. 1982. The asymptotic effect of substituting estimators for parameters in certain types of statistics. *Ann. Stat.* 10(2):475-478.
- STEWART, W. H., and D. A. PIERCE. 1982. Efficiency of distribution free regression analysis for grouped survival data. *Biometrika* 69(3), in press.

ROWE, KENNETH E.

- LAMBERSON, W. R., D. L. THOMAS, and KENNETH E. ROWE. The effects of inbreeding in a flock of Hampshire sheep. *J. Anim. Sci.* 55(4):780-786.

SEELY, JUSTUS F.

- SEELY, J. F., and R. V. HOGG. 1982. Unbiased estimation in linear models. *Commun. Stat. Theory and Methods* 11(7):721-729.

Zoology

BAYNE, CHRISTOPHER J.

- BAYNE, C. J. 1982. Recognition and killing of metazoan parasites, particularly in molluscan hosts. Pages 109-114 in E. L. Cooper and M. A. B. Brazier, eds. *Developmental Immunology: Clinical Problems and Aging*. Academic Press, New York.
- BAYNE, C. J. 1982. Lectin-induced mitogenesis of cytotoxic amebae (*Nuclearia*) isolated from *Biomphalaria glabrata* (Mollusca: Gastropoda). *Dev. Comp. Immunol.* 6:369-373.
- BAYNE, C. J. 1982. Molluscan immunobiology: isolation of an *Aeromonas formicans* which escapes the internal defense system of *Helix pomatia*. *Dev. Comp. Immunol.* 6, in press.
- LOKEIR, E. S., C. J. BAYNE, P. M. BUCKLEY, and K. T. KRUSE. 1982. Ultrastructure of encapsulation of *Schistosoma mansoni* mother sporocysts by hemocytes of juveniles of the 10-R2 strain of *Biomphalaria glabrata*. *J. Parasitol.* 68:84-94.
- LOKER, E. S., and C. J. BAYNE. 1982. *In vitro* encounters between *Schistosoma mansoni* primary sporocysts and hemolymph components of susceptible and resistant strains of *Biomphalaria glabrata*. *Am. J. Trop. Med. Hyg.* 31:999-1005.

Student Profile

R. Scott Doubet

Scott Doubet has recently completed research and a doctoral thesis in developmental biology under the guidance of Dr. Ralph Quatrano. Doubet majored in biology at Bradley University, Illinois, although he was just as interested in physics as he was in biology. He earned a master's degree in biology at the University of Puget Sound.

Doubet has investigated the structure of the cell wall in the fertilized eggs (zygotes) of brown algae (*Fucus distichus*). *Fucus* is an excellent system for studying the mechanisms of differentiation in embryogenesis. *Fucus* zygotes are single cells, and up to 100 million of them can be grown in a single dish in the laboratory. The study of *Fucus* can help detect common mechanisms and principles that might apply to higher organisms.

"To study the cell wall," says Doubet, "you must take small pieces out of the wall, determine what they are, and then find out how they fit together to comprise the whole wall. The wall composition must be determined at various stages of wall development to complement other developmental aspects."



Doubet had to isolate different enzymes from organisms that live naturally with the algae to degrade selectively parts of the cell wall. Confirming previous investigations, Doubet showed that the cell wall is composed of four or five major classes of polymers, whose individual characteristics, structure, and behavior are very different.

Some of these polymers are structurally well known, while others are very complex and need further investigation. One of the polymers, alginate, is very similar to another polymer found in bacteria that infect cystic fibrosis patients. One of the enzymes isolated by Doubet in the course of his research degrades this polymer. It is possible that this enzyme might be used as a therapeutic agent.

Doubet will work with Dr. Quatrano for a few more months. After that, he will continue his work in basic research, probably in industry. An avid hiker, mid-westerner Doubet has adopted the Pacific Northwest and firmly states that he "would not consider living where the Douglas-fir does not grow."

BLAUSTEIN, ANDREW R.

BLAUSTEIN, A. R., and R. K. O'HARA. 1982. Kin recognition in *Rana cascadae* tadpoles: maternal and paternal effects. *Anim. Behav.* 30:1151-1157.

BLAUSTEIN, A. R., and R. K. O'HARA. 1982. Kin recognition cues in *Rana cascadae* tadpoles. *Behav. Neur. Biol.* 36:77-87.

O'HARA, R. K., and A. R. BLAUSTEIN. 1982. Kin preference behavior in *Bufo boreas* tadpoles. *Behav. Ecol. Sociobiol.* 11:43-49.

DORNFELD, ERNST J.

MATLOCK, D. B., and E. J. DORNFELD. 1982. The effects of crustecdysone on DNA synthesis in polyploid somatic cells of an isopod. *Comp. Biochem. Physiol.* 73B:603-605.

KING, CHARLES E.

KING, C. E. 1982. The evolution of lifespan. Pages 121-138 in H. Dingle and J. Hegman, eds. *Genetics of Life Histories*. Springer-Verlag, New York.

LUBCHENCO, JANE

GAINES, S. D., and J. LUBCHENCO. 1982. A unified approach to marine plant-herbivore interactions. II. *Biogeography. Ann. Rev. Ecol. System.* 13:111-138.

LUBCHENCO, J. 1982. Effects of grazers and algal competitors on fucoid colonization in tide pools. *J. Phycol.* 18:544-550.

MENGE, BRUCE A.

MENGE, B. A. 1982. Reply to comment by Edwards, Conover, and Suter. *Ecology* 63: 1180-1184.

MENGE, B. A. 1982. Effect of feeding on the environment: asteroidea. Ch. 24 in M. Jangoux and J. Lawrence, eds. *Echinoderm Nutrition*. A. A. Balkema, Rotterdam, The Netherlands, in press.

MORRIS, JOHN E.

MORRIS, J. E., S. W. POTTER, and P. M. BUCKLEY. 1982. Mouse embryos and uterine epithelia show adhesive interactions in culture. *J. Exp. Zool.* 222:195-198.

ROBERTS, PAULA.

D. J. BRODERICK, and P. A. ROBERTS. 1982. Localization of minutes to specific polytene chromosome bands by means of overlapping duplications. *Genetics* 102:71-74.

P. A. ROBERTS, and D. J. BRODERICK. 1982. Properties and evolutionary potential of newly induced tandem duplications in *D. melanogaster*. *Genetics* 102:75-89.

NEWS AND NOTES

ATMOSPHERIC SCIENCES

James W. Deardorff served on a committee for the National Center for Atmospheric Research in Colorado that reviewed research and future plans of the Center's Atmospheric Analysis and Prediction Division. In February, Dr. Deardorff participated in an ONR Workshop on Air-Sea Interaction designed to determine which problems relating to marine and ocean mixed layers deserve basic-science support from the Office of Naval Research.

W. Lawrence Gates attended a conference on long-range forecasting sponsored by the World Meteorological Organization in Princeton, NJ, in early December 1982. Following that conference, he participated in a meeting of the Working Group on Numerical Experimentation of the World Climate Research Programme, also held in Princeton. In late January, Dr. Gates attended a meeting in Washington, DC, of the project leaders of the US-USSR Bi-Lateral Agreement on Environmental Protection concerned with climate research. He also attended a meeting of the Climate Research Committee of the U.S. National Academy of Sciences. In early February, Dr. Gates participated in a review of research on atmospheric analysis and prediction at the National Center for Atmospheric Research (NCAR) in Boulder, Colorado.

Richard W. Katz was a visitor at NCAR during July-December 1982. In October, he presented an invited paper at the joint national meeting of the Operations Research Society of America and the Institute of Management Sciences in San Diego.

Larry Mahrt presented an invited survey paper, "Marine boundary layers," at a Workshop on Air-Sea Interaction at NCAR in mid-February.

Allan H. Murphy, a member of the Precipitation Committee of the Hydrology Section of the American Geophysical Union (AGU), participated in the first committee meeting at the AGU fall session in San Francisco in early December. In mid-January, he presented an invited paper on the economic value of climate forecasts at the American Meteorological Society Second Conference on Climate Variations held in New Orleans. Later in the month, Dr. Murphy was an invited expert at a meeting of the Working Group on Short and Medium Range Weather Prediction Research for the WMO in Geneva. While in Europe, Dr. Murphy visited the Royal Netherlands Meteorological Institute in De Bilt and the National Institute of Meteorology and Geophysics in Lisbon, Portugal.

Michael E. Schlesinger presented an invited lecture, "Comparison of 3-D simulations of CO₂-induced climate changes," at the General Motors Research Laboratories in Warren, MI, in late November 1982. In January, he was an invited speaker and participant in the AMS Conference on Climate/Energy Interactions and the AMS Second Conference on Cli-

mate Variations, both in New Orleans. He presented papers: "Comparison of the GCM simulations of CO₂-induced climatic changes" and "The climatic response to doubled CO₂ simulated by the OSU atmospheric GCM with a coupled swamp ocean." In late January, Dr. Schlesinger was an invited speaker at the Department of Atmospheric Sciences and the Quaternary Research Center, University of Washington, Seattle.

BIOCHEMISTRY AND BIOPHYSICS

Several members of the department participated in the annual meeting of the Biophysical Society in San Diego in mid-February. Those presenting research papers included **Kensal E. van Holde**, who also served as session chairman, **W. Curtis Johnson**, **Parthasarathy Manavalan**, and graduate student **Ralph Francis. Irving Eisenberg** also attended this meeting.

Derek J. Baisted attended the Sixth Annual Symposium in Botany and Plant Pathology at the University of California, Riverside, in mid-January.

W. David Loomis attended the annual meeting of the Mint Industry Research Council in Phoenix, in mid-November 1982.

Dean A. Malencik has been elected to membership in the American Society of Biological Chemists.

Donald J. Reed was an invited participant at the International Symposium on Isolated Hepatocytes, Indiana University, in late October 1982. He later presented a research seminar in the Department of Biochemistry at Michigan State University.

Kensal E. van Holde, research associate **James Davie**, and graduate student **Tom Yager** attended the December West Coast Chromatin Meeting in Asilomar, CA. On December 17-18, Dr. van Holde participated in a site visit for the National Institutes of Health at the University of Texas Southwest Medical Center in Dallas.

BOTANY AND PLANT PATHOLOGY

Norman I. Bishop presented a Sigma Xi Research Award Lecture entitled "Mutational analysis as an experimental approach to mechanisms of photosynthesis" and a seminar entitled "Mutational analysis of photosynthesis: mechanisms of photosystem II function" at Portland State University on October 19 and November 4, 1982, respectively. Dr. Bishop also presented two papers in a Gordon Research Conference on Physicochemical Aspects of Photosynthesis in Ventura, CA, in mid-February: "Authentication of the identity of PS-II membrane polypeptides" and "Isolation and preliminary characterization of PS-II polypeptides of spinach and *scenedesmus*."

Mark E. Halsey attended the Interdisciplinary Biological Control Conference in Las Vegas, NV, in mid-February.

Richard O. Hampton met with hop growers and hop industry personnel in January and presented research results to the Hop Research Council in San Diego. He made conjunctive field trips for plant virus research to El Centro, CA, and Yuma, AZ.

Iain C. MacSwan joined a People-to-People group of plant pathologists and entomologists in a three-week tour of China in October 1982.

Dallice I. Mills attended a panel meeting of the USDA Competitive Research Grants Office, Biological Stress on Plants Program, in Arlington, VA, in late February.

Thomas C. Moore served on a review panel for the teaching and research programs of the Department of Botany at North Carolina State University, Raleigh.

Jennifer I. Parke, postdoctoral research associate, has been awarded a Fulbright Postdoctoral Fellowship to conduct research on root surface microbiology at the CSIRO Division of Soils near Adelaide, Australia, for one year beginning in March 1983. She will work with A. D. Rovira and G. D. Bowen. During her stay, she will attend the Fourth International Congress of Plant Pathology in Melbourne in August 1983.

Ralph S. Quatrano attended the annual research meeting of the Agrigenetics Research Corporation in Phoenix in December. In early February, he presented an invited seminar in the Department of Biology, University of Pennsylvania, Philadelphia. Dr. Quatrano is a member of the advisory panel of the National Science Foundation on the newly initiated Postdoctoral Fellowships Program in Plant Biology. He attended the panel's first meeting in Washington, DC, in February.

CHEMISTRY

Glenn T. Evans was selected to receive a Dreyfus Teacher-Scholar award for 1983-1988. These awards are given by the Camille and Henry Dreyfus Foundation to young faculty members in chemistry and related fields who show exceptional promise. Dr. Evans was one of 15 award winners selected from a group of 56 nominees from academic institutions throughout the country.

Steven J. Gould attended Research NMR Workshops at Varian Associates in Palo Alto, CA, in mid-January.

Kenneth W. Hedberg spoke on electron diffraction from gas molecules at the University of California at Davis.

Walter D. Loveland gave an invited seminar, "Tracers for organic molecules," at Portland State University in October and one on "Target fragmentation at intermediate energies" at the University of Washington in January.

Richard W. Thies is on sabbatical leave from January 1983 to July 1984. He is working for the National Science Foundation in Washington, DC.

Lawrence C. Thomas presented a paper, "New spectrometric detectors for gas chromatography," at a February meeting of the Society of Western Analytical Professors in Riverside, CA.

T. Darrah Thomas served as chairman of the Chemistry Review Panel for the Associateship Programs of the National Research Council in late February.

Phi Lambda Upsilon, the chemistry honorary society, initiated 24 new members at a banquet at Nendel's Inn in December 1982. The guest speaker, Professor J. T. Yoke, III, spoke on "Anti-intellectualism—or what's in a name?"

ENTOMOLOGY

Joseph Capizzi, Brian A. Croft, Bruce Eldridge, René Feyereisen, and John D. Latin attended the annual meeting of the Entomological Society of America in Toronto, Canada, in late November 1982.

Gerald W. Krantz visited the Biosystematics Research Institute and Carleton University in Ottawa and the Museum of Comparative Zoology at Harvard University in December to conduct research on macrochelid mites.

Brian A. Croft traveled to Bogota and Cali, Colombia, in late October and early November 1982 to participate in the Kellogg Foundation National Fellowship program.

GENERAL SCIENCE

Michael C. Mix completed an NSF Chautauqua short course for college teachers on "Toxic Substances in the Environment" at the Oregon Graduate Center in Portland in early November 1982.

David L. Willis visited the Environmental Contaminants Laboratory of Health and Welfare Canada in Ottawa last November to discuss with Canadian scientists mutual research interests in uranium toxicology and analytical techniques for uranium.

Robert C. Worrest was an invited participant at the Indo-U.S. Workshop on Global Ozone Problems in New Delhi in mid-January. He chaired a session on UV measurements and effects on plants. He also presented a paper: "Ecological and non-human biological effects of solar UV-B radiation."

GEOGRAPHY

Robert E. Frenkel, in collaboration with E. F. Heinitz and S. N. Wickramaratne, presented a report to the Oregon Department of Fish and Wildlife: "Vegetational changes in the Willamette River Greenway in Benton and Linn Counties: 1972-1981."

A. Jon Kimerling conducted a workshop in map production and reproduction for the American Society of Photogrammetry in Seattle, in mid-December.

Mary Lee Nolan presented a seminar on Latin America to honor students of George Fox College at Newport, OR, in early November.

James R. Pease presented a paper, "Regional characteristics of commercial agriculture in Oregon," at the annual conference of the Western Regional Science Association in Honolulu in February. He also chaired a session and acted as a respondent.

Graduate student **Anne Yeaple** has received a National Geographic Society Internship Award. She will be working with the Society in Washington, DC, for three months during fall term 1983.

GEOLOGY

The Department of Geology was well represented at the fall meeting of the American Geophysical Union in San Francisco in early December 1982. **Robert D. Lawrence** presented poster sessions summarizing results of his work on the tectonics of the Himalaya Mountains and surrounding areas in Pakistan. In another poster session, **Scott Hughes** and **Edward Taylor** reported on the genesis of magma in the Three Sisters region of the Oregon Cascades. **Gary Smith** gave an oral presentation proposing a tectonic model for the Columbia plateau.

Cyrus W. Field was invited to participate in a field trip to the gold and nickel mines of the Dominican Republic in October 1982. The trip was sponsored by the Society of Economic Geologists.

J. Granville Johnson has been reappointed to another three-year term on the Editorial Board of *Geology*.

Robert S. Yeats was elected to the Executive Board of the Structure and Tectonic Division of the Geological Society of America at its October meeting in New Orleans. He presented a paper on the tectonics of northern Pakistan at that meeting and a similar one in November when he served as an American delegate to a US-Pakistan workshop on oceanography in Karachi, Pakistan. In December, Dr. Yeats lectured at MacQuarie University in Sydney, Australia.

MATHEMATICS

William Burger is chairman of the Oregon Mathematics Education Council working group on College and University Mathematics Placement. This group, which includes colleague **Howard Wilson** and several representatives from Oregon community colleges, state colleges and universities, is coordinating efforts to improve the preparation of high school students for college mathematics.

David H. Carlson is visiting professor of mathematics at San Diego State University for the 1982-83 academic year. In mid-January, he gave a series of ten lectures on Applications of Matrix Theory in Economics, Biology and Statistics at the Fifth Biannual Central American Mathematics Conference in Tegucigalpa, Honduras.

Francis J. Flaherty was an invited speaker at the First International Mathematics Conference of the Arab Gulf States in mid-October, 1982. Topic of his presentation was gravitational instantons. Later in the month, Dr. Flaherty gave a series of lectures on hot instantons and problems in general relativity in Japan, at the Universities of Tsukuba, Tokyo, Hiroshima, and Karazawa.

MICROBIOLOGY

John L. Fryer presented an invited talk on bacterial and viral diseases of cultured salmonids in the Pacific Northwest in the Department of Microbiology and Immunology, Oregon Health Sciences University, Portland, in early January.

Viola M. Griego attended the annual meeting of West Coast Bacterial Physiologists at Azilomar, CA, in late December 1982.

Warren J. Groberg and **John S. Rohovec** presented papers at the Aquaculture '83 meeting in Washington, DC, in mid-January.

Jo-Ann C. Leong was an invited speaker at the Department of Microbiology and Immunology, Oregon Health Sciences University, in late October 1982. Her topic was "Molecular characterization of a fish Rhabdovirus."

Ramon J. Seidler spent two months at the University of Maryland Medical School in Baltimore during fall term 1982. He worked in the Center for Vaccine Development, where he was cloning genes coding for virulence factors produced by bacterial intestinal pathogens.

PHYSICS

Peter R. Fontana exchanged positions for fall term 1982 with Professor Erich Schmid of the Theoretical Physics Institute of the University of Tübingen, West Germany.

Kenneth S. Krane, Larry Schechter, and Victor A. Madsen spoke, in January, at an Honor Seminar entitled "A Look at Nuclear Arms: Questions and Issues." The seminar was part of the OSU Honors Program's "Spectacular Seminars" series.

Rubin H. Landau presented a seminar at the University of Pittsburgh in mid-November: "Exotic atoms or hypernuclei?"

Albert W. Stetz has been appointed to serve on the long-range planning committee of the Tri-University Meson Physics Facility in Vancouver, BC, for 1983-1986.

STATISTICS

During winter term 1983, the Department of Statistics offered for the first time a joint series of weekly seminars with the Hewlett-Packard Corporation on statistical methods used in industry. The following statisticians from the Corvallis branch of Hewlett-Packard were guest lecturers: **Norbert Hartmann, Paula Kanarek, and Patrick Pointer**.

Paula Kanarek (courtesy appointment) has been re-elected secretary-treasurer of The Biometric Society (western north American region). **Roger Petersen** is president of this branch of the society for 1983.

Justus F. Seely, as District 6 Representative, attended the February meeting of the Board of Directors of the American Statistical Association in Washington, DC.

ZOOLOGY

The following members of the department presented papers at the annual meeting of the American Society of Zoologists in Louisville, KY, in late December. **Christopher J. Bayne** presented a poster session on *Biomphalaria glabrata-Schistosoma mansoni* interactions (**E. S. Loker, J. A. Stephens, M. A. Yui, and C. A. Boswell**, coauthors). **Frank L. Moore** also presented a paper and was elected Program Officer for the Division of Comparative Endocrinology. **Thomas Zoeller** won the "Best Student Paper" award in the Division of Comparative Endocrinology for his paper entitled "Changes in LHRH content of infundibulum preoptic and septal areas following castration of male newts."

Robert Hard presented an invited lecture sponsored by the Center of Bioengineering, Department of Biological Structure, University of Washington, Seattle. Title of his presentation: "Newt lung mucociliary models: do cilia have gears?"

New Chairman in Statistics

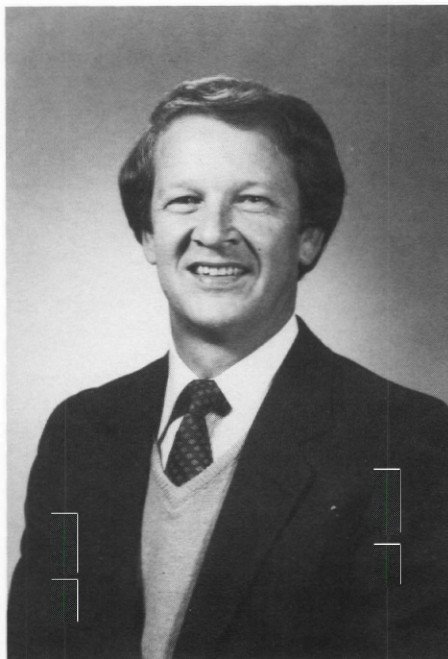
G. David Faulkenberry

G. David Faulkenberry was appointed chairman of the Department of Statistics by Dean Thomas T. Sugihara on January 1, 1983. He was acting chairman during 1982.

Dr. Faulkenberry joined the OSU Department of Statistics in 1965 after receiving a master's degree in mathematics and a doctorate in statistics from Oklahoma State University. He has been a faculty member of the OSU department ever since, with the exception of a two-year period (1969-71) when he held a supervisory position with Litton Industries in California.

Dr. Faulkenberry's current research interests are statistical methods of prediction, sampling theory, and sampling design. He also participates in the development of research methodologies for projects at the OSU Survey Research Center—an independent, self-supporting unit that provides statistical services to private and government agencies.

In 1977, Dr. Faulkenberry was awarded an American Statistical Association Faculty Fellowship, and he was assigned for a year to a statistical research section of the U.S. Department of Agriculture in Washington, DC. The purpose of the award was to stimulate collaboration between government and academic statisticians. In 1980,



he was invited to lecture on survey sampling at the University of Cairo. He is a member of the American Statistical Association and the International Association of Survey Statisticians.

During his tenure at OSU, Dr. Faulkenberry has been actively involved in departmental and university affairs. He is presently a member of the Executive Committee of the OSU Faculty Senate.

The OSU Department of Statistics is the only department of statistics in the state. It has approximately 40 graduate students enrolled in master's and doctoral programs. The department also collaborates with mathematics and computer science in offering an undergraduate degree in mathematical sciences with emphasis in statistics. The department has a unique role in the University. For many years, its faculty and graduate students have collaborated extensively with researchers from almost all other departments on campus providing consulting services for modeling, statistical design, and analysis.

Dr. Faulkenberry succeeds Dr. Lyle D. Calvin, who was department chairman from 1962 through 1981 and who is now dean of the Graduate School.

1983 Biology Colloquium

"Mechanisms in Cellular Toxicology" is the topic of the 44th OSU Biology Colloquium to be held May 23 and 24 at the OSU Foundation Center. Dr. Donald J. Reed, professor of biochemistry and director of the Environmental Health Sciences Center, is chairman of the Colloquium.

Ten scientists will examine aspects of the consequences of exposure to man-made chemicals at the cellular level, including bioactivation of chemicals, DNA modification, alterations in DNA expression, DNA repair, calcium homeostasis, and teratogenesis.

The following scientists will participate in the Colloquium: Marion W. Anders,

Department of Pharmacology, School of Medicine and Dentistry, University of Rochester; Anne P. Autor, Department of Pharmacology, University of Iowa; Alma L. Burlingame, Director, Mass Spectrometer Facility, Department of Pharmaceutical Chemistry, University of California, San Francisco; F. Peter Guengerich, Director, Center in Toxicology, Department of Biochemistry, Vanderbilt University School of Medicine; Philip S. Guzelian, Department of Medicine, Medical College of Virginia, Richmond; Curtis C. Harris, Chief, Laboratory of Human Carcinogenesis, National Cancer Institute; Jeanne M. Marison, Department of Obstetrics and Gynecology,

University of Cincinnati Medical School; Sten Orrenius, Department of Forensic Medicine, Karolinska Institute, Stockholm, Sweden; Anthony E. Pegg, Department of Physiology, College of Medicine, Pennsylvania State University; Alan Poland, McArdle Laboratory for Cancer Research, University of Wisconsin Medical Center.

The Biology Colloquium, an established tradition in the Pacific Northwest, attracts a wide audience. It is open to all who wish to attend. The 1983 Colloquium has been modified to include topical poster sessions. Participation in this phase of the meeting is encouraged.