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Washington, D.C.  
(David Pawson, Maureen E. Downey, Cynthia Ahearn,  
Linda Cole, Tim Coffey)

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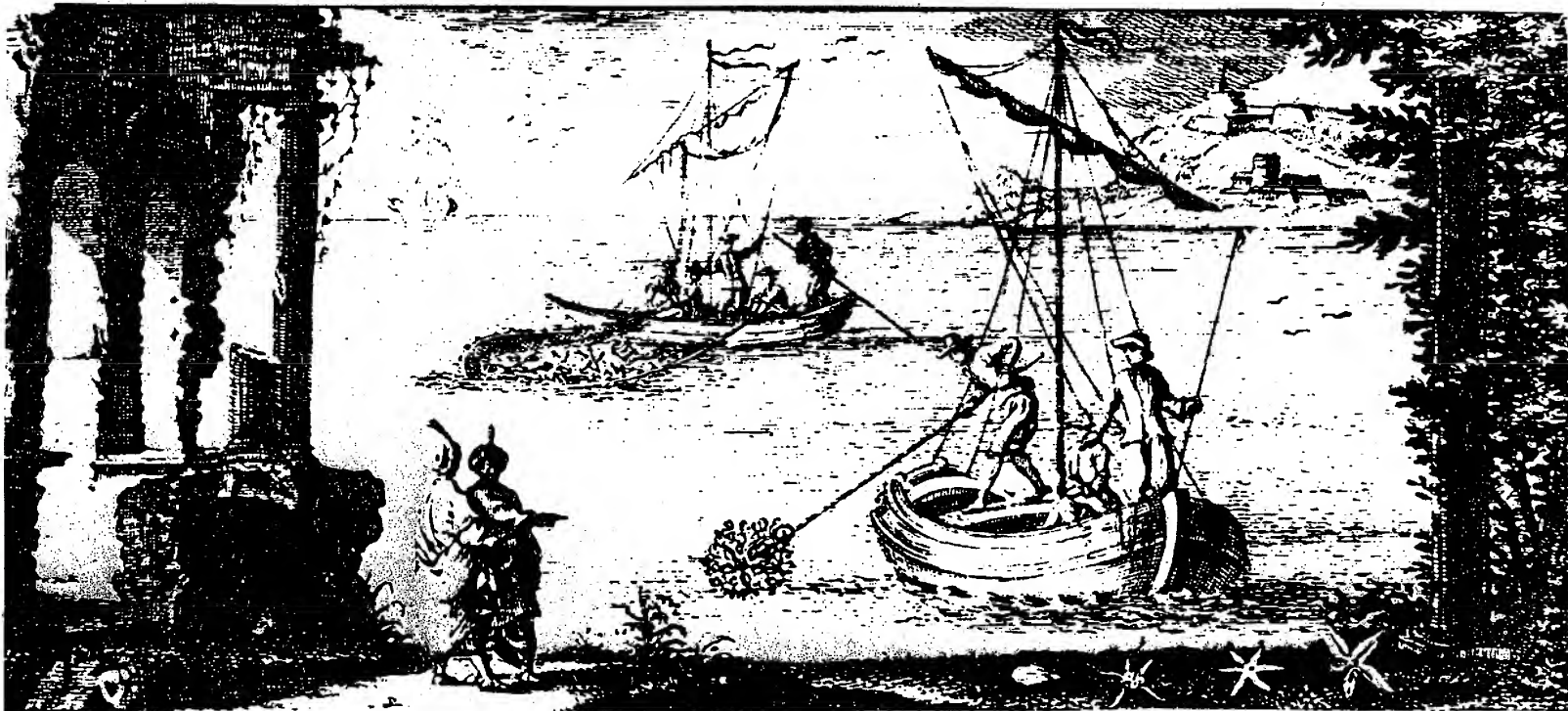
The newsletter generally contains information concerning meetings and conferences and publications of interest to echinoderm biologists, titles of theses and dissertations on echinoderms, and research interests and addresses of echinoderm biologists.

The newsletter is not intended to be a part of the scientific literature, and should not be cited, abstracted, or reprinted as a published document.

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International Echinoderms Conference--Galway (1984)

The organizing chairman is Brendan Keegan (Zoology Department, University College, Galway, Ireland). The conference is scheduled for September 24-29, 1984.



J.H. Linck. 1733. De Stellis Marinis.

Dennis M. Devaney

On August 13, 1983, Dr. Dennis M. Devaney disappeared while scuba diving off the coast of Hawai'i near Mahukona. He was 45 years old. He is survived by his wife Gail, and his daughter Denise and son, Leon.

Dennis was born in Los Angeles, California. He received a A.B. degree from Occidental College, California in 1960, an M.A. from the University of California at Los Angeles in 1962 and a Ph.D. from the University of Hawaii in 1968. He spent a year as a Postdoctoral Fellow at the Smithsonian Institution in 1968-69. In 1967 he became an Invertebrate Zoologist at the Bernice P. Bishop Museum in Hawaii, and from 1979 onwards he was Chairman of the Department of Invertebrate Zoology at the Bishop Museum. He was also a member of the Affiliate Graduate Faculty at the University of Hawaii.

His main scientific interest was the systematics and zoogeography of ophiuroids, particularly shallow-water tropical Indo-Pacific forms, and he was a highly respected leader in this area of research. His long-term research objectives included a monographic study of these brittle-stars, and to this end he published several major papers on systematics of Indo-Pacific ophiuroids. Many other topics attracted his attention, including surveys and inventories of benthic faunas of Pacific islands, coral reef ecology, environmental assessment studies, and, most recently, studies of bathyal echinoderms using research submersibles.

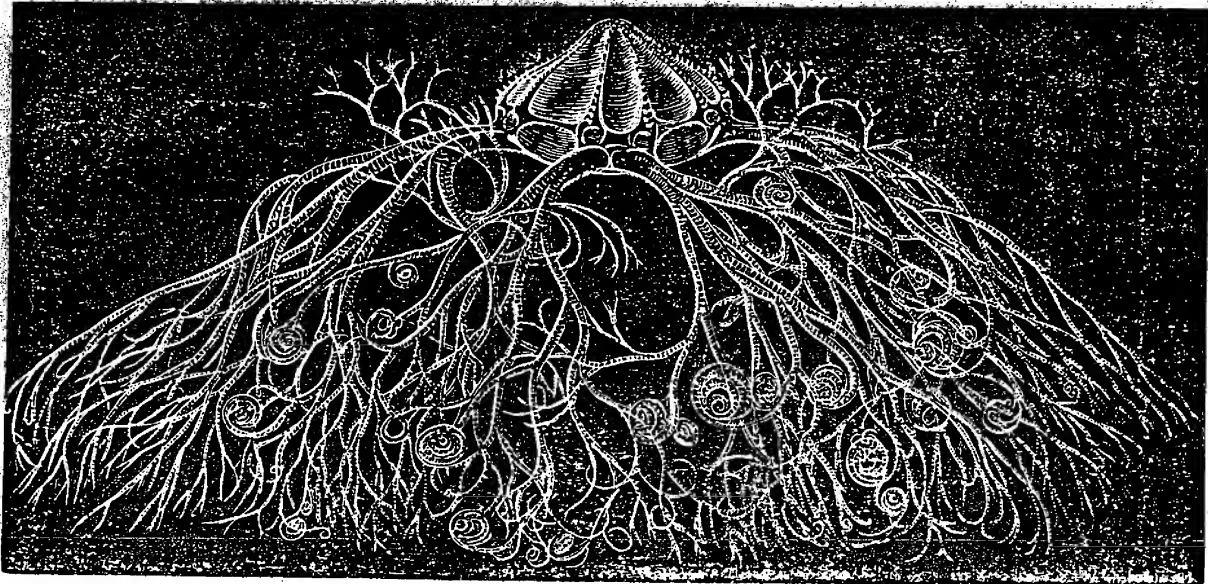
His laboratory research was mixed with an active field research program; he cast his net widely, visiting, among other places, Easter Island, New Zealand, Western Australia, Bermuda, Guam, Yap, Truk, Samoa, Enewetak and Belize. He was an avid and thoughtful collector, and many of us with an interest in Indo-Pacific marine animals are grateful to Dennis for sending us rare and interesting material.

His dedication to research in the field and in the laboratory was great, but in addition he worked hard to improve the invertebrate collections at the Bishop Museum. The combination of his zealous field activities and the support he attracted from the National Science Foundation has transformed these collections, and they now comprise one of the best regional collections in the world.

Dennis was a charming man; his infectious good humor and his dedication to his beloved echinoderms endeared him to all. He was always anxious to make the best possible job of whatever he attempted,

and this enviable striving for perfection is reflected in his publications. His research was gaining great momentum when it all ended so abruptly. His loss to marine biology and to his numerous friends is deeply felt. A brass plaque in the Classroom at the Waikiki Aquarium, Hawaii reads as follows: "This classroom is dedicated to the memory of Dennis M. Devaney, who studied and taught here. May all who enter this room share his joy, wonder, and love of the sea."

David L. Pawson



E.C. Agassiz and A. Agassiz. 1865. Seaside studies in natural history.



## Publications of Dennis M. Devaney

1962. Intraspecific phenotypic and physiological variations in the purple sea urchin Strongylocentrotus purpuratus Stimpson. AIBS Bulletin 12(4):166.
1966. Post-larval skeletal changes and speciation in ophiocomid brittle stars. AAAS Miscellaneous Publication 66-15:161.
1967. An ectocommusal polynoid associated with Indo-Pacific echinoderms, primarily ophiuroids. Occasional Papers Bernice P. Bishop Museum 23(13):287-304, 5 figs.
1970. Studies on ophiocomid brittlestars. I. A new genus (Clarkcoma) of Ophiocominae with a reevaluation of the genus Ophiocoma. Smithsonian Contributions to Zoology 51: 1-41, 50 figs.
1972. Ophiuroids. In: G.A. Green (Ed.) Fifth Abrolhos Expedition, 1970. Aquinas College, Manning, Western Australia. Pp.58-60.
1973. Zoogeography and faunal composition of south-eastern Polynesian asterozoan echinoderms. Oceanography of the South Pacific 1972. UNESCO, Wellington. Pp. 357-366, 1 fig.
1973. (J.E. Randall, junior author). Investigations of Acanthaster planci in southeastern Polynesia during 1970-71. Atoll Research Bulletin No. 169, 23 pp, 3 pls., 13 figs.
1974. Shallow-water echinoderms from British Honduras, with a description of a new species of Ophiocoma (Ophiuroidea). Bulletin of Marine Science 24(1): 122-164, 16 figs.
1974. Shallow-water asterozoans of southeastern Polynesia. II. Ophiuroidea. Micronesica 10(1): 105-204, 25 figures.
1976. (with M. Kelly and others) Kaneohe: A history of change. Published for U.S. Army Corps of Engineers Pacific Ocean Division Honolulu, by Bernice P. Bishop Museum Department of Anthropology. 271 pp, 137 figs.
1977. Ophiomastix koehleri, a new ophiocomid brittlestar (Echinodermata:Ophiuroidea) from the western Indian Ocean. Proceedings of the Biological Society of Washington 90(2): 274-283, 4 figs.
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1977. Ctenophora. Ibidem, p. 262-269, 5 figs.
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1977. (L.G. Eldredge, senior author). Other hydrozoans. Ibidem, p. 105-107, 2 figs.
1978. A review of the genus Ophiomastix (Ophiuroidea: Ophiocomidae). Micronesica 14(2): 273-359.
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1980. (J.W. Goy, senior author). *Stenopus pyrsonotus*, a new species of stenopodidean shrimp from the Indo-west Pacific region (Crustacea: Decapoda). *Proceedings of the Biological Society of Washington* 93(3): 781-796, 6 figs.
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1981. (A.N. Baker, senior author). New records of Ophiuroidea (Echinodermata) from Southern Australia, including new species of *Ophiacantha* and *Ophonereis*. *Transactions of the Royal Society of South Australia* 105(4): 155-178, 98 figs.
1982. Recent aspects of echinoderm systematics at Enewetak. *Western Society of Naturalists 63rd Annual Meetings*. p. 60.

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Echinoderms. Ibidem 64(6).

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(D.L. Pawson, senior author). The echinoderm fauna of Bermuda. *Smithsonian Contributions to the Marine Sciences*.

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- 1972 (With A. Whistler). Preliminary biological survey at Kaalualu Bay, Hawaii. U.S. Army Corps of Engineers Contract No. DACW84-72-C-1103. 59 pp, 35 figs.
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1975. (With G.S. Losey and J.E. Maragos). A marine biological survey of proposed construction sites for the Truk Runway. Report to Ralph Parsons Co. 69 pp.
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(Prepared by D.L. Pawson, with gracious help from A.N. Baker, A. Guille, G.C. Hendler, L. Marsh, P. Mladenov and A. Suzumoto).

JORGE ALBERTO PETERSEN (1932-1983)

Victim of an accident while working on the coast near the laboratory of the Centro de Biologia Marinha of the University of São Paulo, Brazil, Dr. Jorge Alberto Petersen died last year, on the 11th of February. Dr. Petersen graduated in biology in the University of Rio Grande do Sul (1960) and received his D.Sc. degree at the University of São Paulo (1965). His first works, some of them in collaboration with Burdon-Jones, of Menai Bridge, Wales, dealt with the enteropneust *Balanoglossus gigas*. In 1964, he started his close association with W.A. Martin and K. Johansen, of the University of Washington, which led him to stay twice in the Friday Harbor Laboratories, first as a student (1965) and then as a teacher (1970,1971) of Environmental Marine Physiology, with J. Kanwisher and K. Johansen. In 1967, he participated of the "Alpha Helix" expedition to the Amazon and Negro rivers, in Brazil, working with K. Schmidt-Nielsen and D. Bellamy. In 1975, Petersen joined the group at the Marine Laboratory of Duke University, Beaufort, organized the International Training Program in Marine Sciences and Marine Biology. He became closely associated with J.D. Costlow and John Sutherland, focusing his attention in the study of fouling. It was while he was inspecting his field works on the coast that, probably hit by an electrical shock, Petersen fell into the sea and drowned. Besides the enteropneusts, Petersen worked on problems of circulation and respiration in crustaceans and echinoderms, specially with the Johansen's group. The work he had initiated with Sutherland on Brazilian coasts about fouling and boring was very promising. His death means a severe loss to Brazil, for he was important both as a scientist and a professor at the University of São Paulo.

Prof. Dr. Erasmo G. Mendes, Director  
Centro de Biologia Marinha  
Sao Sebastiao, Brasil



SEA-CUCUMBERS (*Holothuridae*).

P.H. Gosse. 1851. The ocean.

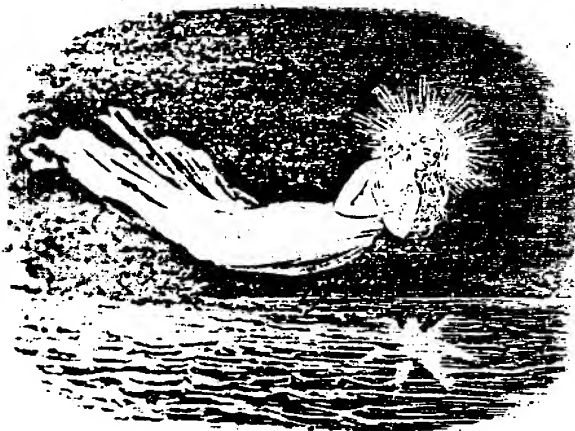
## HARUO KANATANI

1930-1984

The world's scientific community recently lost one of its most respected and creative colleagues. Haruo Kanatani, Director of the National Institute for Basic Biology (Okazaki, Japan) died in February of 1984, after a valient and extended struggle with intestinal and pancreatic cancer. The interruption of Professor Kanatani's career after only 20 years and at the height of national and international recognition of his efforts is tragic.

The remarkable insight evident throughout Professor Kanatani's experimental studies is exemplified by his early recognition of the potential value of the rapid spawning response of the starfish and by his brilliant development and use of this experimental system to ask simple, elegantly stated questions about regulation of the meiotic process at the cellular and subcellular levels. His purification of gonad-stimulating substance (GSS) from the radial nerve, of maturation-inducing substance or 1-methyladenine (MIS) from follicle cells, and of maturation-promoting factor (MPF) from the ooplasm of starfish are each extraordinary accomplishments in themselves. Furthermore, they are pivotally important steps in the development of our understanding of the cascading cellular mechanisms widely involved in oocyte maturation in the animal world.

Professor Kanatani initially developed his interest in the exactness of scientific enquiry and in the experimental approach while a student in high school near Kobe, Japan under the direction of his beloved teacher, Professor Takaya. In graduate school at the University of Tokyo, Professor Kanatani worked toward his Ph.D degree under the direction of Professor Fujii; he later completed his early work on determination of polarity in planarian regeneration during his first academic position at Misaki Marine Biological Station. It was also at Misaki Marine Biological Station that Professor Kanatani first recognized the fundamental significance of the rapid and decisive spawning response of starfishes after injection with extracts of radial nerves (GSS). On this phenomenon he based the fascinating series of experimental studies carried out in his laboratory for the next 20 years. Subsequently as Associate Professor at the Ocean Research Institute and as Professor at the National Institute for Basic Biology, efforts in his laboratory systematically demonstrated the proximate mechanisms and specific chemical messengers involved in oocyte maturation and spawning. He and others have pointed out the striking similarity between the mechanisms (not the chemicals) involved in oocyte maturation in starfishes and vertebrates.



E. Forbes. 1841. A history of British starfishes.



Professor Kanatani will be greatly missed as a scientific colleague and as a warm friend. His remarkable talents at working effectively with collaborators throughout Japan and the world are truly heroic. His fascination with science and his love for intense and friendly discussion about biology in any forum and until the early hours of the morning, have made his passing a particularly difficult experience for students and friends who have known him intimately. He was a warm and compassionate human being whose international stature in one of the primary areas of modern developmental biology and comparative endocrinology is a singular accomplishment for one so young and an inspiration to us all. He was a broadly cultured individual who loved French literature and classical music, and who enthusiastically passed these interests along to his students and gracious wife, daughter and son.

In his comparatively short scientific career, Professor Kanatani received many national and international honors. He served as a professor at the University of Tokyo before assuming his position at the National Institute for Basic Biology. He served as science advisor to the Japanese Ministry of Education. He was a research fellow at Naples, at Woods Hole, and at Bodega Bay Marine Laboratories and at Berkeley. He was a member of the organizing committee for international symposia on comparative endocrinology and developmental biology and an associate editor of several journals. He was awarded the Gold Medal by the Italian Pontifical Academy of Science in 1970, the Japan Society of Zoology prize in 1971, and the Matsunaga Prize in 1974; he was elected a foreign member of the French Academy of Science in 1981. Shortly before his death, he was recognized by his country as a Person of Cultural Merit. He was one of the youngest persons to have been thus honored by Japan.

Despite the significant productivity in his laboratory over the last 20 years, his recent appointment as Director of one of the premier research facilities in Japan, the National Institute for Basic Biology, demonstrated that he was just beginning his influence over the direction of Japanese and international thought in the subjects of reproductive and developmental biology, physiology and endocrinology. His past efforts pointed out fundamental cellular and biochemical mechanisms involved in oocyte maturation in the animal world. Recently, studies in Professor Kanatani's laboratory have helped to demonstrate that MPF is clearly involved not only in meiotic phenomena, but also universally in mitotic cell division in mammals, amphibians, fishes and starfishes. It is most unfortunate that we must proceed into the next 20 years without the guidance of his sentient scientific mind. Because of the remarkable example of his life in science, he leaves his students and colleagues with a great challenge.

Yoshitaka Nagahama

Hiroko Shirai, National Institute for Basic Biology, Okazaki

Charles W. Walker, University of New Hampshire, Durham

ICSEB - IIITHIRD INTERNATIONAL CONGRESS OF SYSTEMATIC AND EVOLUTIONARY BIOLOGY, 1985

The Congress will be held on 4-10 July 1985 at the University of Sussex, near Brighton, England. It is sponsored by the Royal Society, British Ecological Society, Linnean Society, Palaeontological Association and Systematics Association.

The major aims of this Congress are to encourage and facilitate the integration of the work of biologists in adjacent or over-lapping fields in the general area of systematic and evolutionary biology.

The programme will include a number of symposia devoted to specially-selected broad interdisciplinary themes, with invited speakers. The proposed subjects include:

Symbiosis in Evolution; Biogeographic Evolution of the Malay Archipelago; Adaptation Aspects of Physiological Processes; Co-evolution in Ecosystems and the Red Queen Hypothesis; The Measurement of Rates of Evolution; Molecular Biology and Evolutionary Theory; Co-Evolution and Systematics; Molecules vs. Morphology in Phylogeny: Conflict or Compromise? Random and Directed Events in Evolution.

Accommodation and meals will be available on the campus of the University of Sussex. In addition, hotels are available in nearby Brighton, an attractive historic resort town on the South Coast.

Anyone wishing to be placed on the mailing list, or to suggest topics for Special Interest Symposia, or to contribute to any of the Congress Symposia listed above, should write to:

Professor Barry Cox,  
c/o ICSEB Congress Office,  
130 Queen's Road,  
Brighton, Sussex BN1 3WE

MASS MORTALITY OF ECHINOIDS IN THE MEDITERRANEAN SEA

In 1978, the presence of diseased individuals and abnormal accumulations of tests of the echinoid, Paracentrotus lividus (Cam.) were pointed out by divers along the coast of the French Riviera coast and the island of Corsica. In 1979, this pathology was observed with two others species, Arbacia lixula (L.) and Sphaerechinus granularis (L.). Answers to a questionnaire indicate that the disease has spread at least along the European coasts of the western Mediterranean.

The diseased sea urchins show lesions on the test with areas denuded of epidermis, spines, pedicellariae and podia. The visible calcareous skeleton is bordered by a zone of green organic material and a wall of raised red tissue. Lesions which start developing are totally covered with green material. The unprotected calcareous tests are sometimes used as a substratum by small foreign vagile (ciliates, flatworms, polychaetes, copepods) and/or sessile organisms (algae, sponges, polychaetes, bryozoans, monoascidians). Contaminations are induced when normal sea urchins with scratched epidermis are in contact. Infectuous agents are still unindentified.

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DIADEMA ANTILLARUM MASS MORTALITY IN THE CARIBBEAN

Mass mortalities of Diadema antillarum were first observed at Galeta Point, Panama in mid-January 1983. Subsequent mortalities were subsequently reported throughout the Caribbean (Barbados, Jamaica, Cayman Islands, Costa Rica, Columbia, the Bahamas, the Florida Keys); by February 1984, all known localities had suffered population reductions ranging from 95 to 100%. The causative agent seemed to spread with major surface currents, but some outbreaks, such as the one in Barbados in late September 1983, do not fit this pattern. Infections only occurred once in each locality, and were limited to Diadema antillarum; no other species was affected. Because of the rapidity with which each population was decimated, and because of the difficulty of finding uninfected individuals, it proved impossible to identify the infectious agent.

Bak, R.P.M., M.J.E. Carpay, E.D. de Ruyter van Steveninck (1984).  
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T.P. Hughes, B.D. Keller, J.B.C. Jackson, M.J. Boyle (in press). Mass mortality of the echinoid Diadema antillarum Philippi in Jamaica. Bull. Mar. Sci.

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Disease-related mortality of the asteroid Heliaster kbulinjii

Dungan, M.L., T.E. Miller, & D.A. Thompson. 1982. Catastrophic decline of a top carnivore in the Gulf of California rocky intertidal zone. Science. 216, 989-991.



## ECHINODERM DISEASE IN NORTH SAN DIEGO COUNTY, CALIFORNIA

Beginning in 1978, diseased asteroids, holothuroids, and echinoids have been noted at a number of shallow subtidal sites in the southern California Bight. The disease was most pronounced in the asteroid, Patiria miniata. Since 1980, we have noted a degenerative disease in 7 species of asteroids (Patiria miniata, Pisaster giganteus, Dermasterias imbricata, Astrometis sertulifera, Henricia leviuscula, Astropecten armatus, and Linckia columbiae), and the holothuroid, Parastichopus parvimensis, in three kelp beds in northern San Diego county, California (33°22.5'N; 117°32.5'W). The initial symptoms of the disease are small, white epithelial lesions which often first occur on the aboral surfaces of the holothuroids. In as little as three days from the onset of these symptoms, the lesions can enlarge to encompass the entire body, and result in complete disintegration of the individual. The disease has been most marked in populations of Patiria miniata, and has fluctuated in severity within and between years. Since 1980, the frequency of the disease has been correlated with water temperature, being highest in Fall and lowest in Winter. The most severe outbreak of disease occurred in the Fall of 1983, when the frequency of diseased stars in the population was 60%. This outbreak coincided with the unusually warm water associated with the El Nino conditions then prevailing in the Southern California Bight, and reduced the population by half. While these field observations suggest a causal relationship between the disease and temperature, field and laboratory experiments indicate that the relationship is indirect. Highly elevated temperature (22°C) has no effect on healthy individuals, but greatly accelerates the disintegration of those stars exhibiting initial symptoms. Field experiments indicate that for Patiria miniata, cannibalism of diseased by healthy individuals is a major mechanism spreading the disease.

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Disease-related mortality of Strongylocentrotus in California

- Pearse, J.S., M.E. Clark, D.L. Leighton, C.T. Mitchell, & W.J. North. 1970. Marine waste-disposal and sea urchin ecology. In: Kelp habitat improvement project, Ann. Rept. 1969-1970. Calif. Inst. Tech., Pasadena. Appendix 1-87.
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MASS MORTALITIES OF ECHINOIDS (STRONGYLOCENTROTUS DROEBACHIENSIS)  
OFF NOVA SCOTIA, CANADA

Mass mortalities of Strongylocentrotus droebachiensis have occurred along the Atlantic Coast of Nova Scotia between 1980 and 1983. Mortality has been virtually complete (>99%) over an area spanning ~ 400 km of coastline and to a depth of at least 15 m; partial mortalities have occurred over another ~ 150 km. The estimated loss of biomass has been 240,000 tons fresh weight.

These mass mortalities of echinoids are attributed to recurrent outbreaks of disease. Temperature appears to be important in triggering these outbreaks and mediating the degree of mortality. Mass mortalities occur in late summer or fall during the period of peak sea water temperatures. The spread and progression of the disease is most rapid at this time. As temperature drops in early winter, the disease is arrested and affected echinoids may recover. Echinoids in permanently cold waters below ~ 25 m appear to be unaffected by the disease. Laboratory studies have shown a critical temperature threshold at 10-12°C for transmission and/or progression of the disease; recovery occurs at temperatures <8°C. Long-term temperature records indicate that mass mortalities of S. droebachiensis in 1980-83 were associated with unusually warm summer/fall seawater temperatures. The extent of echinoid mortality each year was directly related to the magnitude and duration of the period of peak seawater temperatures.

The disease of S. droebachiensis is characterized by a progressive breakdown of muscle tissue, particularly of the body wall and water vascular system. Diseased echinoids become immobilized and unable to feed or adhere to the substratum. Many fall prey to scavengers or are washed ashore. At peak temperatures (16-18°C) mortality occurs within 8-10 days after exposure to the disease. The disease appears to be highly species-specific: morbidity/mortality has not been observed in co-occurring species, including the echinoid Echinarachnius parma.

An amoeba (Paramoeba sp.) found in tissues of diseased (but not healthy) S. droebachiensis may be the pathogenic agent. In the laboratory, the disease has been transmitted by exposing echinoids to sea water flowing past diseased individuals or by intracoelomic injection of amoebae that have been isolated in culture.

Mass mortalities of S. droebachiensis have enabled the extensive colonization of the rocky subtidal zone by fleshy macroalgae. Kelp beds have regenerated in areas where they were destructively grazed by echinoids over a decade before. These events indicate the importance of disease in regulating echinoid abundance and thereby the structure and dynamics of the subtidal system off Nova Scotia.

Miller, R.J., and A.G. Colodey. 1983. Widespread mass mortalities of the green sea urchin in Nova Scotia, Canada. *Mar. Biol.* 73, 263-267.

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### Fixation of echinoderm tissues for histopathology

Several recent studies have documented mass mortalities in echinoderms with major ecological effects, but often the causative agent(s) has not been investigated. Well-fixed tissue samples can give considerable information about the possible causes of mortality and, since relatively little is known about disease in the marine environment, any reference material that can be preserved is valuable.

Many fixatives are available for light microscopy (e.g., Bouin's, Helly's, Zenker, Susa) and all are suitable for echinoderms. However, one of the simplest is 4% formaldehyde - 1% glutaraldehyde:

40% formaldehyde solution 10 ml  
25% glutaraldehyde solution 4 ml (or 2 ml of 50%)  
filtered 70% (approx.) seawater to 100 ml

Fix a wide range of tissues from fresh (not dead) animals, preferably 5-10 specimens from each stage of disease (early, late, intermediate if recognisable) plus healthy animals for comparison. The whole animal, if small, can be cut into several pieces and fixed. For large animals, sample everything - gut (all regions), gonad, body wall and water vascular system, axial gland, lantern/peristomium, etc. Of course, sample any obvious lesions, as these are the likeliest areas for infection. Fix thin pieces of tissue (< 3 mm thick) overnight or longer at room temperature. Tissues can be stored or shipped in this fixative or in 4% formalin. The fixative is suitable for both light and electron microscopy.

We would welcome any fixed tissues of diseases echinoderms for histopathological analysis. Please feel free to contact us for further information.

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B3H 4J1

### Natural Parthenogenesis in Echinoderms

Parthenogenesis of echinoderm eggs in the laboratory is well known. Although natural parthenogenesis in the field has been postulated in the past, M. Yamaguchi (Dept. of Marine Science, Univ. of the Ryukyus Senharu, Nishihara, Okinawa 903-01 Japan) and J.S. Lucas (School of Biological Sciences, James Cook Univ. of North Queensland, Townsville, Qld, 4811, Australia) have pointed out that there has been no rigorous demonstration that functional parthenogenesis occurs in echinoderms in situ. Yamaguchi and Lucas have documented the occurrence of populations of the small coral-reef asteroid Ophidiaster granifer in the Indo-Pacific which consists of females only (Marine Biology, in press). They have proposed that this is another example of alternate modes of reproduction which functions in the same way as other forms of asexual reproduction (fission and autotomy).

W.B. Gladfelter (West Indies Laboratory, P.O. Annex No. 4010, St. Croix, USVI 00820, U.S.A.) reported that embryos developed from eggs spawned by females isolated in aquaria from males (General ecology of the cassiduloid urchin Cassidulus caribbearum. Marine Biology. 47, 149-160, 1978). Gladfelter suggested that parthenogenesis might have occurred, but pointed out that internal fertilization could not be excluded. Although males were smaller than females, Gladfelter found no direct evidence for protandry.

R.R. Strathmann, M.F. Strathmann (Friday Harbor Laboratories, Friday Harbor, Washington 98250, U.S.A.), and R.H. Emson (King's College, London WC2R 2LS, England) have reported development within the ovary of the simultaneously hermaphroditic asteroid Asterina phylactica even to metamorphosing larvae (American Naturalist, 123, 796-818. 1984). They suggested that self-fertilization was a more likely explanation than parthenogenesis in this case. They found that few of the eggs of the protandric Asterina gibbosa developed when spawned in isolation. Those eggs which did develop were from four small, presumed females. Those eggs which did not develop were from nine large individuals. They concluded that individuals in transition from male to female can have self-fertilization.

R.P.M. Bak, M.J.E. Carpey, E.D. de Ruyter van Stevenick (Caribbean Marine Biological Institute, Piscaderabaai, Curacao, Netherlands Antilles) have reported numerous blastulae in the gonads of two individuals of Diadema antillarum (Densities of the sea urchin Diadema antillarum before and after mass mortalities on the coral reefs at Curacao. Marine Biology. 17, 105-108. 1984). They suggested that parthenogenesis might be important in repopulation.

JML



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- WATTS, S.A., L. WEAKLAND, J. LAWRENCE. THE EFFECTS OF TEMPERATURE ON THE ACTIVITY AND KINETICS OF PYRUVATE KINASE IN THE PYLORIC CAECA OF LUIDIA CLATHRATA. p. 16.
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Carpenter, R.C. Effect of herbivore grazing on coral reef algal communities: Biomass and productivity.

Dixon, J. and S. Schroeter. Affects of temperature and cannibalism on the spread of starfish disease in a southern California kelp bed.

Harms, C.A. and R.B. Aronson. Behavioral ecology of a Caribbean brittlestar.

Hay, M.E. and P.R. Taylor. Competition between herbivorous fish and urchins on Caribbean reefs.

Kaplan, S. Metridium senile inhibits sea star predation.

Lessios, H.A. Mass mortalities of Diadema antillarum.

Levitan, D.R. Density dependent size plasticity and negative growth in Diadema antillarum (Philippi).

Morrison, D. Mass mortality of Diadema antillarum on a Jamaican coral reef: effect on the algal community.

Reidenauer, J.A. An infaunal community regulated by sand dollar burrowing.

Robbins, R.E. Functional morphology of the arms of Ophiotrix angulata (Say) and Ophioderma brevispinum (Say) (Echinodermata:Ophiuroidea).

Schroeter, S. and J. Dixon. Sea urchins, kelp, and commercial urchin harvesting: Differential effects of sea urchin grazing and commercial harvesting in dispersed and aggregated subpopulations.

Slocum, C.J. When urchins die: the rise and change of a benthic marine plant community.

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#### REQUESTS

Laurie Hammond (South Pacific Commission, Post Box D5, Moumea Cedex, New Caledonia) desires information on holothuroids associated with sponges.

Judith Winston (Department of Invertebrates, American Museum of Natural History, Central Park West at 79th Street, New York, New York 10024) is preparing a biography of Libbie Hyman. She seeks material which could be used in the biography.

Mary Bai (Marine Biological Station, Zoological Survey of India, 12, Leithcastle Street, Madras 28, India). requests reprints of papers concerning echinoderm respiration.

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"Not a sound, not a living creature. Here lay a hollow starfish, there the shell of a hermit crab. Near by a fragment of a fisherman's net, or a broken teacup, or the splinter of a broken mast. It was the world of the corroded, the world of the dead." Frederic Prokosch. 1943. The Conspirators.

"Once a fortnight or so I was taken to visit my mother in Weinsiedl. I was led down a long green corridor to her small, stuffy room where starfish and sea-horses danced about on the wallpaper". Frederic Prokosch. A ballad of love.

"Their room had palm trees painted on the walls and the handles on the faucets were modeled on starfish"....."He clung to the wheel like a starfish while he carved a widening spiral of foam around the larger load...". Thomas Palmer. 1983. The Transfer.

"Selwyn yawned, and spread himself like a starfish". Liza Cody. 1981. Dupe.

"A few yards of shallows; Bond swam as near the water's edge as he could to avoid the sea-urchins. He pulled himself upright; he was ashore. Robert Markham. 1958. Colonel Sun.

"He was asleep, but even in repose his face was as subtly distorted and burnished as that of a giant crown of thorns starfish predator." Richard Condon. Prizzi's Honor. 1982.

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