

THE ECHINODERM NEWSLETTER

Number 20. 1995

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The newsletter contains information concerning meetings and conferences, publications of interest to echinoderm biologists, titles of theses on echinoderms, and research interests, and addresses of echinoderm biologists. Individuals who desire to receive the newsletter should send their name, address and research interests to the editor.

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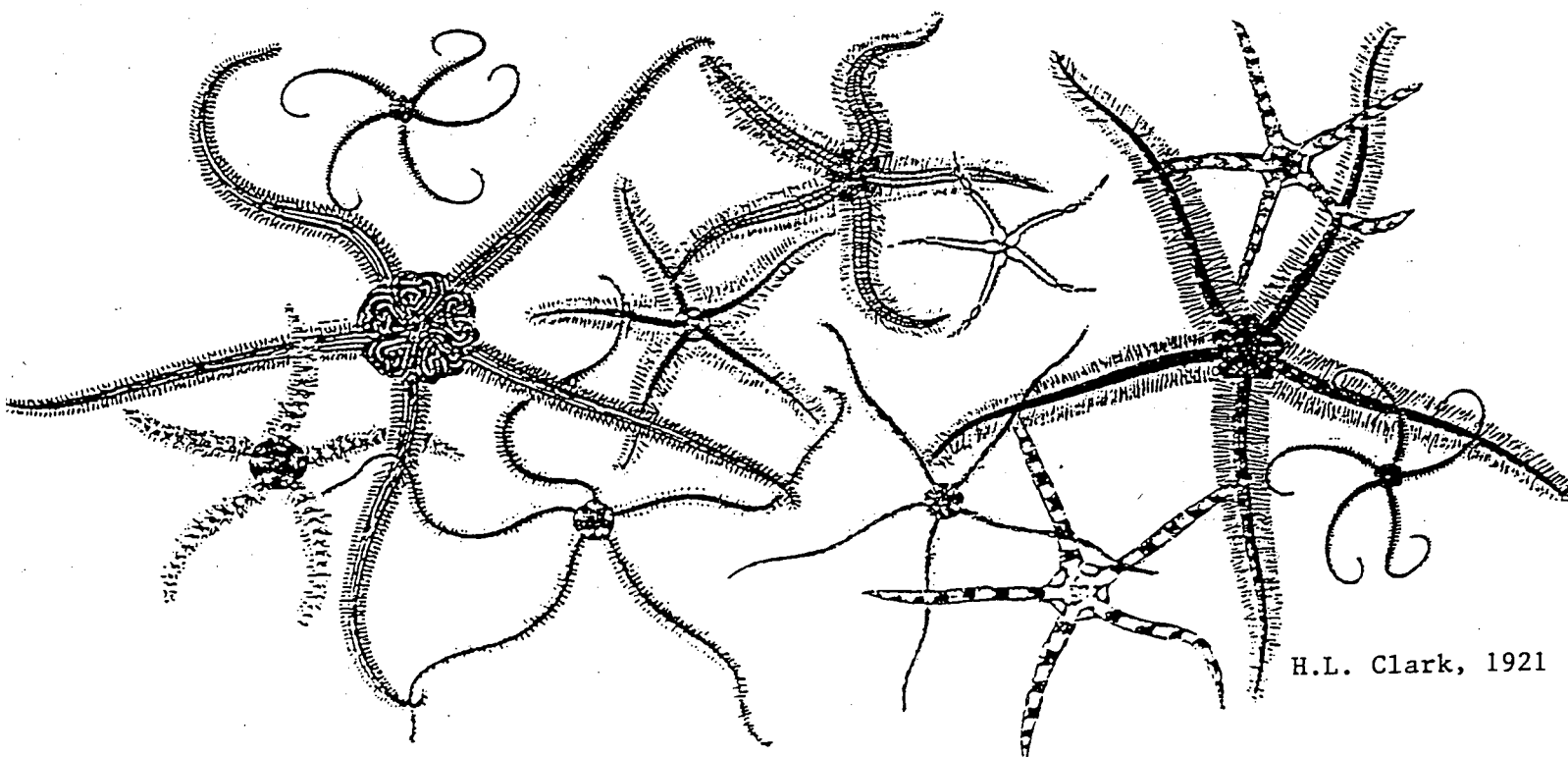


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***** CURRENT RESEARCH *****

- ALI, M.S. - study of some Jurassic and Cretaceous echinoids of Sinai, Egypt
- ALVA, V. - trophic ecology of benthonic suspension organisms
- ANDACHT, T. - studying the mechanism of dorsoventral polarity disruption by nickel chloride in the sea urchin embryo, *Lytechinus variegatus*
- AUSICH, W.L. - Paleozoic crinoids
- BALSER, E.J. - development of the gonad in holothuroid echinoderms; function of the larval kidney in hemichordates and echinoderms
- BARTSCH, I. - ophiuroid associates, endo- and ectoparasites
- BAUMILLER, T.K. - ecology and functional morphology of recent isocrinids; taphonomy of arms and stalks of articulates and advanced cladids vs. other Paleozoic taxa; diversity of Permian and Triassic crinoids and effects of the P/T extinction; patterns of turnover and extinction of Paleozoic crinoids; ecology of *Seirocrinus*; borings in Paleozoic pelmatozoans
- BECKER, J. - survey of the invertebrate marine faunas, esp. echinoderms of Brazilian oceanic islands
- BEGBIE, K.M. - studies on the hyponeural nervous system of the brittlestar, *Ophiura ophiura*
- BENTLEY, A.C. - biology of the sand dollar, *Echinodiscus bisperforatus* along the southeastern coast of South Africa, encompassing growth, reproduction, genetics, larval biology etc.
- BERENTS, P.B. - collection manager of marine invertebrates at the Australian Museum
- BIRENHEIDE, R. - morphology, physiology and biomechanics of crinoids
- BLAKE, D.B. - Cretaceous asteroids of Texas; Ordovician stelleroids; stelleroids of Seymour Island
- BOCKELIE, J.F. - Heliocrinitids (cystoids) from Scandanavia and the Bathic; taxonomy, functional morphology and palaeoecology
- BORZONE, C.A. - bioecological study of *Mellita quinquiesperforata* and *Encope emarginata* in beaches of Parana's state; relation between morphodynamics and benthic macrofaunal distribution in sandy beaches of Parana's state; program management for the oceanic islands of Parana's state
- BOUDOURESQUE, C.F. - feeding behaviour of Mediterranean sea urchins; population dynamics and structure of Mediterranean echinoderms
- BOURGOIN, A. - studying the possibility of commercializing the green sea urchin *Strongylocentrotus*

- drobachiensis* on the northeastern coast of New Brunswick
- BREGMAN, Y. - bioproductional properties (size-age structure, growth, recruitment, elimination, individual energy metabolism, energy balance, etc) and culture methods of local concentrations of commercial invertebrates (echinoderms and molluscs) inhabiting far-eastern coastal waters of Russia
- BRETON, G. - Mesozoic asteroids evolution, biostratigraphy and taxonomy; heterochronic trends; extension to Cenozoic; description of a few Cretaceous new taxa of Astropectinidae
- BROWER, J.C. - taxonomy, paleoautecology, paleosynecology, ontogeny and phylogeny of Ordovician crinoids from the northern part of the midcontinent; comparative ontogeny of Ordovician and Mississippian crinoids
- BUITRON-SANCHEZ, B.E. - Cenozoic echinoderms (Stelleroidea and Echinoidea) from Baja California, Mexico
- BUSSARAWIT, S. - taxonomic study of echinoderms from the Andaman Sea, west coast of Thailand
- BYRNE, M. - evolution of (modified) direct development in the seastar genus *Patriella* (with A. Cerra); development of the nervous system in the larvae of *Patriella* species (with F. Chee); latitudinal trends in reproduction of the sea urchin *Centrostephanus rodgersii* (with N. Andrew); energetics of development in *Patriella* (with O. Hoegh-Guldberg; lecithotrophic development in the ophiuroid *Ophionereis schayeri* (with P. Selvakumaraswamy); functional morphology and phylogeny in ophiuroids (with G. Hendler)
- CALTAGIRONE, A. - sea urchin aquaculture
- CAMERON, R.A. - cell lineage relationships in sea urchin development; microsatellite population genetics of the purple sea urchin *Strongylocentrotus purpuratus*; analysis of an inbred line of sea urchins
- CAMPBELL, ALAN - population dynamics of red sea urchins in British Columbia
- CAMPBELL, ANDREW - structure and function of pedicellaria in asteroids and echinoids; zoogeography of Indian Ocean echinoderms
- CAMPBELL, D.B. - prey selection of sea stars
- CANDIA-CARNEVALI, M.D. - crinoid arm regeneration; structure, physiology and biomechanics of complex musculo-skeletal systems (echinoid lantern, ophiuroid masticatory apparatus)
- CHAO, S.M. - population dynamics of the shallow-water holothurians of Taiwan; systematics of the echinoderms from Taiwan
- CHEN, C.P. - ontogenesis of skeletal plate patterns, gonad, and gonapores in the progenerative *Sinaechinocyamus mai*
- COLON-JONES, D.E. - rearing *Diadema* larvae; rearing coral larvae; studying the sediment regime on Biscayne National Park reefs; examining calcification rates of corals
- CONAND, C. - sea cucumber fisheries; bioerosion by sea urchins; influences of echinoderm populations on

reef functioning

CREASER, E.P. - research on commercial populations of green sea urchins (*Strongylocentrotus drobachiensis*) along the Maine coast

CRUMP, R.G. - asteroid development and ecology

CUTRESS, B.M. - deep sea Holothuroidea (Echinodermata) of Puerto Rico

DAFNI, J. - echinoid growth

DAYTON, P.K. - benthic ecology

DE RIDDER, C. - symbioses between bacteria (mainly sulfur-oxidizing bacteria) and spatangoids; reproductive biology

DE WIT, W.M.J. - fossil echinoderms in fluviatile and ice-age deposits of Holland

DEBENHAM, P. - population genetics of the red sea urchin *Strongylocentrotus franciscanus*

DIEHL, W.J. - effects of environmental stress on multilocus heterozygosity-growth relationships in invertebrates

DOBSON, W.E. - population biology of *Ophiura sarsi* on continental slope off North Carolina; use of skeletal growth bands in ophiuroid ossicles as biological markers for sublethal predation and population ecology experiments

DOLMATOV, I.Y. - regeneration mechanisms and their changes during individual development of echinoderms

DONOVAN, S.K. - functional morphology of the column in extant, non-isocrinid crinoids (with David Pawson); British Silurian crinoids (with Chris Paul); Jamaican fossil echinoderms

ELISEIKINA, M.G. - physiological and reparative regeneration of echinoderm internal organs

ELLERS, O.W. - sea urchin growth mechanisms

EMLET, R.B. - functional morphology of echinoderm larval evolution of echinoid life histories and development

ETNIER, S. - comatulid crinoids

ETTENSohn, F.R. - systematics, paleoecology and functional morphology of the pelagic crinoid *Saccocoma*; paleoecology of an Ordovician *Ectenocrinus* garden

FAY, R.O. - Ovachita Belt bibliography

FEDER, H.M. - Alaskan benthic systems (southeastern Chukchi Sea where sea stars are very common); the deep benthic system in Prince William Sound at sites within and outside the oil spill trajectory of the

Exxon Valdez oil spill

- FERGUSON, J.C. - madreporite function and water volume balance in sea urchins
- FERNANDEZ, C. - growth, nutrition and biochemical composition of sea urchin *Paracentrotus lividus* in rearing fed with different types of artificial food
- FLAMMANG, P. - adhesive systems of echinoderm podia; ultrastructure, biochemistry of the adhesive and deadhesive substances, and adhesive force measurements
- FOSTER, M.W. - Ordovician echinoderms from western Virginia; Atlantic Ocean brachiopods; Antarctic and subAntarctic brachiopods; paleobiology of Pennsylvanian invertebrates in Illinois
- FOX, D.J. - can genetic algorithms be used to position a mechanical brittlestar arm?
- FUKUYAMA, A.K. - looking at recovery of intertidal invertebrates in Prince William Sound, Alaska following the 1989 Exxon Valdez oil spill and am particularly interested in molluscan and echinoderm assemblages and the contrast in recovery patterns between areas that were treated with hot-water, high pressure treatment with areas that were oiled and untreated
- GAGNON, J.-M. - Arctic *Strongylocentrotus* spp.
- GALLEMI, J. - Cretaceous echinoids (Tethyan - worldwide); systematics, biostratigraphy and palaeoecology
- GENTIL, F.A. - population dynamics of ophiuroid species in soft-bottom community of the English Channel
- GIUDICE, G.I. - heat shock proteins in sea urchin embryos
- GLUCHOWSKI, E.L. - Genus *Haplocrinites* (Inadunata) from the Devonian of Poland
- GOLDBERG, A.S. - investigating antiarthritic properties of echinoderms
- GOODING, R.U. - animals associated with Caribbean diadematids; animals associated with diadematid echinoids, worldwide
- GRABOWSKY, G.L. - examining the population genetics of sea urchins in the genus *Echinometra* throughout the tropical Pacific (sequencing mtDNA, actin and bindin genes for all individuals)- with S. Palumbi at Univ. of Hawaii
- GREENSTEIN, B.J. - taphonomy of crown-of-thorns starfish; comparative taphonomy of Caribbean reefs; mode of formation of Pliocene shell beds
- GUERRAZZI, M.C. - natural history and the feeding behavior of the starfish *Echinaster brasiliensis*
- GUILLOU, M. - morphological and physiological responses of sea- urchins to the environmental changes; adaptive capacity; ecological successions in echinoderm populations

- GURREA, I. - Mesozoic and Cenozoic echinoids (Tethyan and Boreal)
- HADEL, V. - respiratory metabolism of *Chiridota rotifera* (small holothuroid found in beaches of coarse sand)
- HAMZA HASSAN, M. - ecology and biology of echinoderms from Gulf of Suez - Red Sea
- HAY, M. - (1995-2000) National Oceanic and Atmospheric Administration/ Coastal Ocean Program. "Human Environmental Linkages in the South Florida Coastal Ecosystem: Effects of Natural and Anthropogenic Stressors" (M. Harwell and 26 Co-Principal Investigators) (\$7,183,463 Total; \$285,001 to Hay).
 (1994-1996) National Undersea Research Center (NOAA). (M. E. Hay and P. Levin). "Seaweed Beds as Critical Habitats for Recruiting Fishes on Temperate Reefs: Field Manipulations to Determine Patterns and Processes" (\$35,000).
 (1992-1994) National Undersea Research Center (NOAA). (M. E. Hay and N. L. Lindquist). "Fish-Seaweed-Urchin Interaction on Temperate Reefs of the Continental Shelf" (\$43,000)
- HARTSOCK, F.B. - *Asterias amurensis* in the northeast Pacific; ecological relationships of *Asterias amurensis* with other animals
- HEINZELLER, T.E. - comparative, mainly neuroanatomical, morphology (TEM, histochem.) of crinoids with special attention to milleri-, bourgeti- and cyrtocrinids; entoparasitic myzostomids of crinoids, mutual effects on host and parasite on an ultrastructural basis
- HERDENDORF, C.E. - abyssal sea stars of the North Atlantic Ocean, particularly family Brisingidae; also other echinoderms at depths of 2000-3000 m on continental slope off SE United States
- HESS, H. - new astropectinid from the Lower Cretaceous of Morocco (with D. Blake)
- HILL, R.B. - holothurian muscle physiology, local degeneration
- HODGSON, A.N. - reproduction of southern African echinoderms; feeding biology of south African holothurians
- HOLTERHOFF, P.F. - paleoautecology and paleocommunity ecology of Late Paleozoic crinoids; paleoecology and systematics of the Catacrinidae; paleoecology and systematics of the Ampelocrinacea; dynamics of the Late Permian crinoid extinctions and origin of the earliest Triassic articulates
- HOOPER, R.G. - *Strongylocentrotus drobachiensis* ecology, aquaculture and interactions with seaweed communities
- HOROWITZ, A.S. - bibliography of the Blastoidea and database of blastoid taxa (with J. Waters)
- HOSHI, M. - molecular mechanism of sperm-egg interactions in starfish and sea urchins; structure and function of glycosphingo-lipids in starfish and sea urchins; 1-methyladenine signal transduction in starfish oocytes
- HOTCHKISS, F.H.C. - larval homeomorphism, Loven's law and adult ray homologies in echinoids, ophiuroids and edrioasteroids; isolated ophiuroid vertebrae and ossicles from Devonian, Bohemia (with

- Petr & Prokop); Paleozoic ophiuroid morphology & evolution; teratology of sea stars; tetramerism/hexamerism in echinoids and stelleroidea; relation of larval axis to adult axis symmetry
- HOTTENROTT, S.I. - identification of Indo-Pacific and Caribbean brittle stars for the USNM collections
- IRIMURA, S. - taxonomic studies of Japanese ophiurans
- IVY, W.G. - seed production and sea ranching of sea cucumbers
- JABLONSKI, D. - onshore-offshore and latitudinal patterns in the origins of higher taxa, and their subsequent shifts in environmental and latitudinal distribution; studying post-Paleozoic echinoids and stalked crinoids; studying mainly molluscan but some echinoid mass extinction and recovery patterns, especially at the Cretaceous- Tertiary boundary
- JACOBSEN, N. - classification and distribution of Asteroidea in the deep-sea region of Monterey Bay
- JAECKLE, W.B. - functional morphology of somatocoels in planktotrophic echinoderm larvae; levels of nutritional integration in echinoderm larvae
- JAMES, D.B. - seed production and sea ranching of sea cucumbers
- JAMIESON, G.S. - sea urchin abundance surveys; near-shore community population dynamics
- JELL, P.A. - Australian fossil echinoderms - Cambrian to Tertiary (excluding Tertiary echinoids) particularly, 1. Silurian & Devonian crinoids & asteroids, 2. Permian crinoids, 3. Carboniferous crinoids
- JOHNSON, S. - further investigation of the nature and mechanism of the extraocular sensitivity to polarized light in the ophiuroid *Ophioderma brevispinum*; biochemical, molecular and immunohisto-chemical study of the nature and distribution of the visual pigment in *Asterias forbesi* and *Ophioderma brevispinum*
- KLINGER, T.S. - growth of echinoids on prepared artificial feeds; feeding and ecological relationships of *Aspidochirotida* on coral reefs; digestive enzymes of echinoids and holothuroids
- KOBAYASHI, N. - marine pollution bioassay by using sea urchin eggs; spawning periodicity of sea urchins
- KOGO, I. - crinoidea (living); its classification and distribution in western Pacific
- KRISTAN-TOLLMAN, E.M.K. - Triassic crinoids
- KURIHARA, T. - spatial pattern of starfishes, especially zonation of *Asterina pectinifera* (Mueller + Troschel) in subtidal region
- LAMBERT, P. - systematics of northeast Pacific holothuroids
- LAWRENCE, J.M. - characteristics of arm regeneration in starfish; comparative nutrition of sea urchins
- LE MENN, J. - crinoid calices and disarticulated stem parts from the Ordovician and Devonian of North-Africa

- LeCLAIR, E.E. - ophiuroid arm skeletal morphology and biomechanics
- LESSER, M.P. - urchin aquaculture - use of photoperiod to manipulate gametogenesis in *Strongylocentrotus drobachiensis*
- LESSIOS, H.A. - phylogeny of *Diadema*
- LEVERONE, J.R. - reproductive cycles of *Astropecten* and *Luidia* in lower Tampa Bay
- LEVITAN, D.R. - ecological and evolutionary consequences of sperm limitation in echinoderms; echinoid grazing pressure in the Caribbean
- LIAO, Y. - dendrochirote holothurians of China with descriptions of nine new species (in collaboration with Dr. David Pawson); echinoderms of Haian Island
- LITVINOVA, N.M. - revision of the genus *Ophiomyces* (Ophiacanthidae); new species and genus *Ophiuraster* (Ophiuridae); ophiuroids of New Caledonia
- LORDSON, J. - seed production and sea ranching of sea cucumbers
- LOVELY, E.C. - coexistence of hydroid predators in *Tubularia larynx* colonies
- LUCAS, J.S. - *Acanthaster planci* larvae and juvenile biology
- MACZYNSKA, S.S. - Cretaceous and Tertiary echinoids particularly from Poland
- MAH, C.L. - a revision and phylogeny of the Brisingida, a group of unusual deep-sea asteroids; describing a new species of *Brisingella* from the Monterey Bay; visited the Smithsonian (June 1995) and found many lots of brisingids that may show different growth stages; a Pleistocene *Ctenodiscus crispatus* Retzius from Humboldt County, California (in prep)
- MAIER, M. - studying asterosaponins
- MAKRA, A. - population dynamics of *Acrocnida brachiata* (Montagu) in Little Killary (west coast of Ireland); microdistribution of *Acrocnida brachiata*
- MALLEFET, J.C. - luminescent ophiuroids; morphological, physiological, ecological aspects
- MARCOS-DIEGO, C. - study of benthic fauna and flora from the southern of the Livingston Island (South Shetland, Antarctica).
- MARSH, L.M. - revision of *Nardoa* and *Gomophia* (Asteroidea: Ophidiasteridae) - with F.W.E. Rowe; echinoderms of the northwest shelf of Western Australia
- MASCARENHAS, B.J. DE A. - pattern of distribution of asteroidea from Guanabara Bay, Rio de Janeiro, Brazil
- MATERIA, C.J. - distribution and abundance of asteroids in Tasmania (funded through Australian Heritage Commission); investigation into the endemic Tasmanian seastar *Marginaster littoralis* (funded through

Australian Nature Conservation Agency).

MATTOS-SEGOVIA, E. - the assessment of bioinducers of the settlement in larvae of sea urchin *Loxechinus albus*

McKENZIE, J.D. - subcuticular bacteria in echinoderms; antifouling mechanisms of echinoderms

McNAMARA, K.J.- Neogene species of the clypeasteroid *Peronella* from Western Australia; Paleocene spatangoids from the Carnarvon Basin, Western Australia; Miocene echinoids from the Carnarvon Basin, Western Australia; Eocene echinoids from the Bremer Basin, Western Australia; fauna of Australia - spatangoids, holasteroids, clypeasteroids, cassiduloids (with Rich Mooi); general echinoid morphology, physiology and biogeography

MEDEIROS-BERGEN, D.E. - molecular identification of echinoderm larvae transport, dispersal and small scale hydrodynamics of sea cucumber larvae

MEIJER, L. - cell division cycle control using starfish oocytes and sea urchin eggs; anti-mitotic drugs discovery using purified kinase from starfish oocytes

MESSING, C.G. - ecology and taphonomy of Bahamian stalked crinoids (Isocrinida), including growth rates, behavior and distributional controls; ecology, zoogeography and systematics of tropical Indo-West Pacific comatulids

MEYER, C.A. - paleoecology of starfishbeds in the Tertiary of the Vienna Basin (Austria); taxonomy and paleoecology of Upper Jurassic echinoderms from the Swiss Jura mountains

MIRONOV, A. - taxonomy and biogeographic history of recent holasteroid echinoids

MLADENOV, P.V. - parthenogenesis in brittle stars; reproductive biology of echinoderms in New Zealand fiords; reproductive biology of Fijian echinoderms; environmental factors influencing asexual reproductive processes in echinoderms; population genetics of asexual echinoderms; morphological and genetic variation in *Amphipholis squamata*

MORRILL, J.B. - correlative microscopical analysis of sea urchin gastrulation

MOTOKAWA, T. - catch connective tissue (mechanics, morphology, physiology); biology of stalked crinoids; neuropeptides of echinoderms

MUKAI, H. - ecosystem study in tropical and boreal seagrass beds; bioturbation and restructuring effects on material flow at interface of sea floor

MUNK, E.J. - green urchin growth

NAIDENKO, T.K. - cryopreservation of sea urchin embryos and larvae bioassay by using sea urchin eggs and embryos

NAKAMURA, R.K.- hydrodynamics and morphometric variation in the Pacific sand dollar *Dendraster excentricus*

- NAKANO, E. - extracellular matrix in the sea urchin embryo
- NEBELSICK, J.H. - taphonomy of Red Sea echinoids; paleobiogeography of Miocene echinoids
- NEILL, B.J. - biogeography, systematics and population biology of echinometrids
- NESTLER, H. - Cretaceous echinoids
- NISHIHARA, M. - population studies on *Echinometra mathaei* and *Archaster typicus*
- O'CONNOR, B.D. - bioturbation rates of infaunal echinoderms; connection between hydrographic features and high density ophiuroid populations
- O'HARA, T.D. - echinoderms of Macquarie Island (final stages); patterns of diversity for faunal assemblages on subtidal reefs off central Victoria (Ph.D. thesis, University of Melbourne)
- OJEDA, F.P. - abundance and distribution patterns of subtidal macroinvertebrates of South Bay, Doumer Island, Antarctica
- OJI, T. - paleobiology of the stalked crinoids; regeneration of the stalked crinoids and its evolutionary implications; systematics and evolutionary history of the Isocrinidae; deep-sea biogeography of echinoderms
- OLSZEWSKA-NEJBE, D. - irregular echinoids (particularly the genera *Micraster* and *Echinocorys*) from the Poland and western Kazakhstan, comparison of the Turonian-Coniacian irregular echinoids in the North European Province; paleobiogeography of irregular echinoids during the Late Cretaceous
- PABIAN, R.K. - Late Pennsylvanian crinoids, systematics, paleoecology, biostratigraphy
- PAGETT, R.M. - Caspian Sea ecology
- PARDO, R.A. - ecology and population dynamics of echinoderms (particularly echinoids and ophiuroids) - currently, population dynamics of sand dollars
- PARMA, G. - fossil echinoids
- PAULS, S.M. - inventory of species and bibliography of the echinoderms from Venezuela, South America
- PENCHASZADEH, P.E. - ecology of sand dollars (*Mellita* spp); trophic ecology of asteroids
- PENNINGTON, J.T. - upwelling systems; phytoplankton ecology; invertebrate larval ecology
- PEREZ-RUZAFÁ, A. - wetlands and coastal lagoons of Galapagos Islands (Ecuador) - basis for its protection and management; Iberic fauna; study of benthic fauna and flora from the southern of Livingston Island (South Shetland, Antarctica); design of new algorithms for the primary productivity and water quality prediction in coastal zones using remote sensing techniques
- PETR, V. - an internal grant award from the Grant Agency of Charles University, n. 134/94 (years 1994-1996): "Trace elements in crinoid skeletal remains (Echinodermata) from the weathered limestones

of the Bohemian Lower Devonian (Barrandian area)" with co-authors: M. Mihaljevic, O. Sebek, R.J. Prokop. The crinoid ossicles studied come from the so-called "white beds" of the Barrandian area (highly weathered limestones) which originated, probably by ground water solution, from fine grained Upper Silurian and Lower to Middle Devonian limestones along zones of tectonic faulting. In the "white beds", the original limestone cement is highly weathered, disintegrated and decalcified. On the contrary, all the echinodermal skeletal elements are invariably low-magnesian calcite. It is important to point out that in the true "white beds" the echinodermal ossicles are always present, typically well-preserved and frequently show the original stereom. The preservation of stereom is of great importance for palaeobiology because its microstructure reflects particular kinds of original soft tissue in these plates. Although such a natural developing of ancient stereom is very probably a world-wide phenomenon, practically no attention was given to it outside Bohemia and was partly unknown or supposed to be extremely exceptional. This project includes studies in geochemistry, biogeochemistry, biomineralization and isotope geology

PHILIPPE, M. - Miocene echinoids in the Mediterranean domain

PIEPENBURG, D. - SFB 313: environmental change in the northern North Atlantic; modern and past geosystem Laptev Sea

PRESTEDGE, G.K. - study of Pittwater, S.E. Tasmania, re: the regrowth of *Zostera* sp., also *Codium* sp. beds now that nutrient levels in the water have decreased with upgrading of local sewerage treatment plants, and to see if several species of echinoderms return if the above species of algae recover sufficiently

PROKOP, R.J. - new implications for palaeobiology of float-bearing crinoids from the Bohemian Upper Silurian - Lower Devonian; genus *Pygmaeocrinus* Bouska (Crinoidea) in the Devonian of Barrandian (Czech Republic) with Dr. V. Petr

RAJAKUMAR, C.P. - ecology, seasonal variation, population dynamics and distribution pattern of echinoderms of South-west coast of India

REGIS, M.-B. - population dynamics of regular echinoids in the Mediterranean; enzyme study of the nutrition of *Paracentrotus lividus* (Echinodermata: Echinoidea)

REICH, M. - fossil holothurians, especially on Campanian/ Maastrichtian holothurian sclerites from Northern Germany, Denmark and England, and furthermore on Jurassic holothurians from Thuringia and Harz Mts. (Germany)

REY, D. - Cretaceous and Tertiary echinoids of Spain

ROCCATAGLIATA, A.J. - chemistry of physiologically active saponins of starfishes and sea cucumbers in the South Atlantic Ocean

ROGERS-BENNETT, L. - larval red sea urchin research; red abalone enhancement studies

ROSE, E.P.F. - Jurassic irregular echinoids; Cenozoic holoctypoid echinoid *Echinoneus*

ROUX, M. - stalked crinoids: Jurassic to Recent; ontogeny; taxonomy of modern bathyal and abyssal stalked crinoids; bathyal ecology

- ROWE, F. - Indo-west-Pacific echinoderms and their systematics and zoogeography
- SANFORD, E. - foraging behavior, recruitment and growth of *Pisaster ochraceus*
- SCALLY, K. - tooth form function and evolution of invertebrate dental systems, especially tooth sharpening behaviour (thegosis)
- SHELTEMA, R.S. - long distance dispersal of teleplanic larvae and the relevance of such transport to gene flow and biogeography of tropical invertebrate species
- SCHUETZ, A.W. - development of a new model for multiparameter analyses of perturbations of gametic and embryonic processes
- SERAFY, D.K. - zoogeography of Atlantic echinoids
- SHEPHERD, S.A. - management of echinoderm fisheries
- SHIRLEY, T.C. - predator-prey and competitive interactions between sea otters, crabs and sea stars in Glacier Bay, Alaska; distribution of sea cucumbers by depth and habitat in an Alaskan fjord using a manned submersible
- SIBUET, M. - taxonomy and ecology of deep sea echinoderms
- SKOLD, M. - production, dynamics and demography of infaunal brittle stars (*Amphiura filiformis* and *A. chiajei*); regeneration and gonad development under different environmental conditions as hypoxia, contaminants and organic enrichment
- SLOAN, N.A. - sea cucumber fisheries
- SMIRNOV, A.V. - deep-water holothurians from New Caledonia; Arctic and North Pacific echinoderms fauna; taxonomy of apodid holothurians
- SMIRNOV, I.S. - taxonomic studies of arctic and antarctic ophiuroids, creation of illustrated computer key for arctic brittle-stars and data bases on ophiuroids of Arctic and Southern Oceans
- SMITH, A.C. - pathology; phylogenetic connections to protochordates and vertebrates; immunology; hematology; body fluids as possible diagnostic reagents
- SMITH, A.B. - morphological and molecular phylogenies for echinoderms; post-Palaeozoic echinoid systematics and evolution
- SOLIS-MARIN, F.A. - evolution of echinoids; taxonomy of the phylum
- SOLOVJEV, A.N. - Holasteroid and spatangoid echinoids (evolution, classification, paleoecology); echinoids on the Cretaceous/Paleogene boundary
- SONNENHOLZNER, J.I. - population study of sand dollars (Echinoidea) in shallow waters from El Guayas, Ecuador

- STAMPANATO, S. - Antarctic starfish
- STANCYK, S.E. - population biology, predation and regeneration of *Ophiura sarsi*; sublethal predation of echinoderms; use of markers and growth rings of ophiuroid ossicles for age/growth studies
- STEWART, B.G. - biology of the euryalinid snake star *Astrobrachion constrictum*
- STICKLE JR., W.B. - the systematic status, zoogeographical distribution, and environmental physiology of sea stars belonging to the *Leptasterias* species complex; focusing on species differences in the adaptation to a freshwater lens system that develops annually at Little Port Walter, southern tip of Baranoff Island, southeastern Alaska (with Jeff Tamplin, Ph.D. Student)
- STRATHMANN, R.R. - developmental plasticity of echinoderm larvae in response to food; effects of maternal nutrition or maternal investment per offspring on development of echinoderm larvae; sea urchin embryos used to construct model egg masses to test hypotheses on constraints on egg masses
- STUMP, R.J.W. - age determination, life history characteristics and population dynamics of *Acanthaster planci* (L.)
- SUMIDA, P.Y.G. - ecology and ontogeny of the post-larval development in deep-sea ophiuroids
- TABLADO, A. - systematics of Asteroidea for southwestern Atlantic
- TAHERA, Q. - echinoderm fauna of Karachi (Sindh Coast) PSF Project SKU/Bio (183)
- TAKAHASHI, K. - physiology of the madreporite; physiology of echinoid spine muscle; motile mechanism of echinoderm sperm flagella
- TAVARES, Y.A.G. - ecology, histology, morphology studies of *Mellita quinquiesperforata* in beaches of Parana's State, relation between morphodynamics and spatial distribution
- TELFORD, M. - collagen in tooth support mechanism of clypeasteroids; podial forces in *Asterias*; computer simulation of *Dendraster* distribution
- THANDAR, A.S. - monographic revision of the southern African Holothuroidea; new records of holothurians from the east coast of South Africa
- THIERRY, J. - systematics, taxonomy, evolution, palaeoecology and biostratigraphy of Jurassic echinoids, especially irregular ones; possible extension to Cretaceous but only in collaboration to compare biodiversity between the two systems
- THORSEN, M.S. - ecophysiology of irregular echinoids (spatangoids)
- TRONCOSO, J.F. - identifying collections of Antarctic echinoderms in the Natural History Museum of Concepcion, Chile; studying several species of echinoderms from the Pacific coast Eight Region; the conservation problems of the echinoderms of Chile and their future projection
- UBAGHS, G.J. - Upper Cambrian echinoderms (Stylophora, Edrioasteroides, Eocrinoidea) from the Montagne Noire (southern France)

- v.JUTERZENKA, K. - ecology of Arctic ophiuroids; ecology of the marginal sea of the eurasian Arctic (German -Russian investigators; GRIEMSEN)
- VADET, A. - Jurassic echinoids
- VALENTINE, J. - role of sea urchins in structuring seagrass productivity
- VAN DER HAM, R. - Upper Cretaceous and Danian, SE Netherlands and NE Belgium (Maastrichtian area)
- VISTISEN, B. - studying the two brittle stars *Ophiura albida* and *Amphiura filiformis* concerning their tolerance towards hypoxia with and without the presence of hydrogen sulphide
- WAREN, A.H. - gastropods parasitizing echinoderms
- WATTS, S.A. - role of steroids in growth and reproduction
- WEBSTER, G.D. - Mississippian crinoid faunas of Nevada and Montana
- WELSCH, U. - functional cytology and histology of the crinoid juxtaligamental cells, nervous system and connective tissue
- WILKIE, I.C. - functional morphology and mechanics of the echinoid lantern; functional morphology and mechanics of the ophiuroid mouth-frame; organisation, mechanics and physiology of echinoderm connective tissues; autotomy mechanisms of echinoderms and other invertebrates
- WILLCOX, M.S. - molecular phylogeny of asteroids; genetic basis to salinity adaptation in asteroids
- WORHEIDE, G. - actinopaleontology and ecology of *Astrosclera willeyana* Lister 1900 (Demospongiae) (for Ph.D. thesis); taphonomy of coral reef echinoids
- WRAY, G.A. - developmental bases for major life history transformations in echinoderms; evolution of echinoderm larvae; origin and diversification of echinoderm body plans; phylogeny of camarodont sea urchins
- YANAGISAWA, T. - larval development from plutei to metamorphosis of the sea urchins in the Ogasawara (Bonin) Islands
- ZAVODNIK, D.V. - fauna and flora of the Adriatic Sea - Echinoderm distributional patterns

***** INFORMATION REQUESTS *****

- David, J. - would appreciate publications on Articulate (stalked crinoids).
- Feder, H.M. - would like to make contact with anyone working with asteroid ecology in arctic and subarctic waters.
- Heinzeller, Th. - would be grateful for any representative of milleri-, bourgeti- or cyrtocrinid species which are fixed for histological purposes. Fixation in buffered (or seawater), 3.5% glutaraldehyde would be the best (TEM!), but normal 4% formalin or even ethanol fixed material could also be helpful.
- Herdendorf, C.E. - would like information on abyssal brisingids; particularly any evidence of sexual dimorphism or mating behavior.
- Hottenrott, S. - would appreciate any publications relating to ophiuroid systematics and biogeography; recent keys (to family, genus or species) are also desired, especially for the Indo-Pacific region; also interested in obtaining specimens from this area; also looking for any information on (or reports of) troglobitic echinoderms.
- James, D.B. - publications on hatchery and culture of sea cucumbers and taxonomic papers on Echinoderms. Please send to: Dr. D.B. James, Senior Scientist, TRC of CMFRI, 90 North Beach Road, Tuticorin- 628 001.
- Mah, C.L. - would be grateful for any brisingid asteroids from dredges etc. that anyone can supply. Also, I'd be delighted to make international exchanges of material where possible or an exchange of identifications for specimens. Please contact me at the California Academy of Sciences, San Francisco, California.
- Makra, A. - would like to be on reprint mailing lists, and in particular, receive new reprints on *Acrocnida brachiata*: its population dynamics, distribution, behaviour, regeneration rates, etc.
- Mallefet, J.C. - would appreciate any information concerning production of light by echinoderms with following precisions: where, when & how was observed the phenomenon. Address of biological station facilities where these bright echinoderms can be collected.
- *** Would propose to organize a session on echinoderm bioluminescence in a future conference. ***
- Mladenov, P.V. - would like to receive small collections (20-25 specimens) of *Amphipholis squamata* (dried or in alcohol) from anywhere in the world.
- Olszewska-Nejbert, D. - would appreciate information about *Micraster* and *Echinocorys*, relation to the ancestor forms, taxonomic, paleobiogeography of Cretaceous irregular echinoids, information about recent *Pericosmus*.
- Rajakumar, C.P. - is currently engaged in the ecology, seasonal variation, population dynamics and distribution pattern of echinoderms of southwest coast of India (for my Ph.D. degree); and is also interested in the separation of bioactive compounds from echinoderms (especially sea cucumbers and sea urchins). He would be grateful to receive reports/reprints/books related to these topics.

Reich, M. - working on a Data Bank System [hierarchical relational data bank system HDB 1.3 and PaleoTax1.1 (see Kullmann & Löser 1993, Paläontologische Zeitschrift, 67 (3/4): 397 pp.)] on fossil holothurians.

- Also preparing : The Fossil Holothurians: bibliography 1829-1995, planned for publication in 1996 (CPress Verlag - Hannes Löser, Dresden, Germany) with an accompanying diskette in form of a data bank as well as a menu-driven search program for IBM-compatible computers. - I would be grateful if an American colleague could participate in this project making additions and corrections to the bibliography (especially American publications on fossil holothurians).

Schoppe, S. - working in Leyte, Philippines in biodiversity of coral reefs, coral reef protection and rehabilitation, and human impact on coralreefs; would appreciate recent publications about Indo-West Pacific echinoderms, especially brittle stars.

Smirnov, A.V. - I would be grateful to receive for determination:

- 1.) Arctic and North Pacific echinoderms.
- 2.) Apodid holothurians.

Solovjev, A.N. - Five scientists work in the Echinoderm laboratory of the Paleontological Institute of the Russian Academy of Sciences. We investigate echinoids, crinoids, eocrinoids and small Paleozoic echinoderm groups. Our scientific libraries have been receiving little necessary scientific literature for the last few years. We would be grateful to the specialists and institutions, if they would send us reprints of the papers and books on systematics, evolution, ecology and paleobiology of the echinoderms and Transactions of the International Echinoderm conferences. Please send to: A.N. Solovjev

Chief, Echinoderm Laboratory
Paleont. Inst.
Profsoyusnaya ul. 123
117647 Moscow, Russia

Stump, R.J. - Location and dates visited where persistent populations of *Acanthaster planci* have been observed; Looking for position of post-doc. to work on echinoderms, preferably tropical.

Tahera, Q. - any news pertaining to reproduction and larval distribution especially of echinoid and holothuroid; also, information on echinoderm larvae; especially interested in reprints on systematics, reproduction and larvae which would be helpful in my Ph.D. dissertation titled, "Systematics, reproduction and larval distribution of holothuroids and echinoids inhabiting the Arabian Sea".

Zavodnik, D. - By the end of March 1995 at Valetta, Malta, 34th ICSEM Congress and Plenary Assembly will take place. Some papers on echinoderms surely will be presented - contact French colleagues (Prof. Guille and others).

- I am in great need of a copy of; 'Ophiuroids found in artificial culture of Mytilidae' by A. Guzman (Chile?) (issued by or after 1978). If anyone can provide a photocopy, please respond.

***** ANNOUNCEMENTS *****

Turner, R.L. - I have a large collection of *Echinaster* spp. from the Atlantic coast of Florida. They are available for study by anyone willing to take a serious plunge into the mire of this genus.

***** 9th INTERNATIONAL ECHINODERM CONFERENCE *****

The 9th International Echinoderm Conference will be hosted by the California Academy of Sciences from Aug. 5 to 9 (inclusive), 1996 at the conference facilities of San Francisco State University, San Francisco, California.

For further information, please contact:

Rich Mooi
Department of Invertebrate Zoology & Geology
California Academy of Sciences
Golden Gate Park
San Francisco, California, USA 94118-4599

Ph: 415-750-7086
Fax: 415-750-7090
e-mail: rmooi@cas.calacademy.org

The IV International Temperate Reef Symposium will be held in Santiago, Chile - probably by the middle of 1997. Anyone interested, please contact:

F. Patricio Ojeda (organizer)
Universidad Catolica
Departamento de Ecologia
Casilla 114-D
Santiago, Chile

Ph: 56-2-686-2729
Fax: 56-2-222-5515
e-mail: pojeda@axon.bio.puc.cl

***** BOOK ANNOUNCEMENTS *****

Dunand, M., H. Godet, R. Maubon (eds.). 1994. Echinodermes: Inventaire des collections du Museum d'Histoire Naturelle de Grenoble. Grenoble: Museum d'Histoire Naturelle. Copies may be obtained by writing:

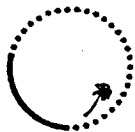
Museum d'Histoire Naturelle de Grenoble
Departement Paleontologie
1, rue Dolomieu
38000 Grenoble, France

cost: 100 F + 21 F shipping

check payable to: Association des Amis du Museum

ECHINOCHRONIQUES: published by: Association Europeenne et Francophone pour le Developpement et la Sauvegarde des Recherches Echinologiques. Bulletin No. 5, 1994. Museum d'Histoire Naturelle. 1, rue Dolomieu, 38000 Grenoble, France.

Conand, C. - short contributions on fishery or biology of commercial sea cucumbers will be published in the Beche-de-mer Bulletin. S.P.C. Bêche-de-mer information Bulletin No.7 (1995).



FISHERIES PROGRAMME
INFORMATION SECTION
FISHERIES INFORMATION PROJECT
SOUTH PACIFIC COMMISSION
PO BOX D5 - NOUMEA CEDEX
NEW CALEDONIA



BECHE-DE-MER

INFORMATION BULLETIN

Number 6 — April 1994

Editor: Chantal Conand, Université de la Réunion, Lab. de Biologie Marine, 97715 Saint-Denis Messag. Cedex 9, La Réunion .F.
Production: Jean-Paul Gaudechoux, Fisheries Information Officer, SPC, P.O. Box D5, 98848 Noumea Cedex, New Caledonia
(Printed with financial assistance from the Government of France)

NOTE FROM THE EDITOR

This issue of the bulletin contains original contributions on the various aspects of sea cucumber exploitation: fishing and marketing, research in ecology and biology, general information on publications and, as usual, questions by members.

Several contributions point out the difficulties encountered in trying to establish a rational management of these fisheries. Depletion of the natural stocks or indices of overfishing are shown in many western Pacific and Indian Ocean fisheries: Solomon Islands (see p. 2), Madagascar (p.10), Maldives (p.11).

The management of some temperate fisheries is also difficult according to biological as well as economic or social standpoints (Washington State p.15). The recent 'scandal' of the Galapagos has shown that sea cucumber fishing is so attractive that a clandestine, illegal fishery started up in 1992 in the Marine Reserve created in 1986 (pp. 14 and 21).

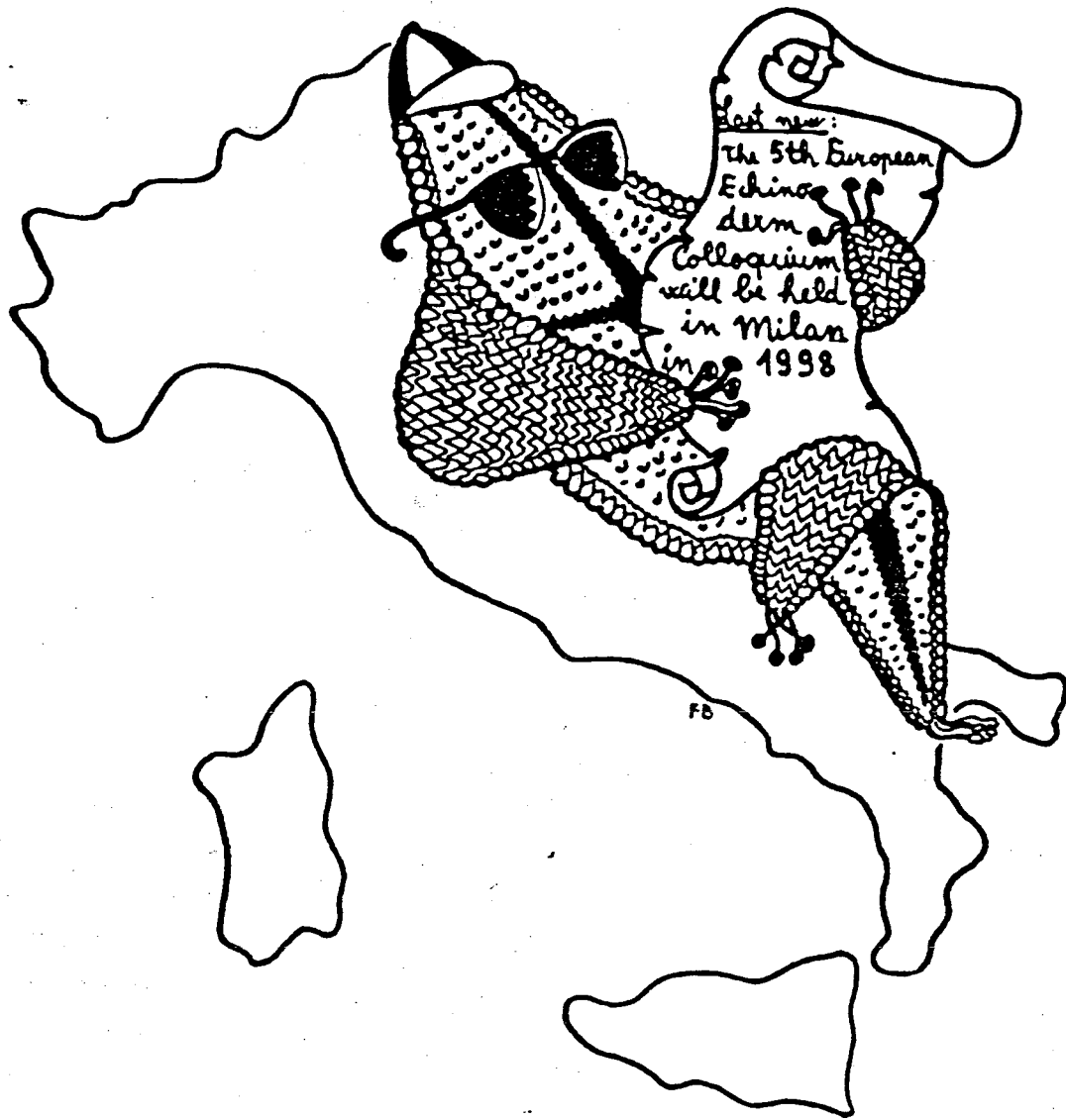
In the different countries concerned, the sea cucumbers are the goal of small-scale fisheries which do not attract enough attention or funding for them to be properly managed.

It is hoped that this issue will serve to circulate information and that members will give their comments and share their experiences to provide up-to-date information for the next issue.

Chantal Conand

Inside this Issue

The beche-de-mer industry in the Solomon Islands: recent trends and suggestions for management by Alexandra Holmboe	Page 2
Fishing beche-de-mer in Madagascar by Mark A. Hirth	Page 10
Lamu Atoll Mariculture Project: mariculture of sea cucumbers - project summary by R. Reichenbach, G. Holmboe and A. Shanon	Page 11
Spawning observations	Page 12
Sea cucumber dive fishery in Washington State by Alex Fradette	Page 15
Beche-de-mer correspondence	Page 17
Beche-de-mer abstracts, publications, workshops and meetings	Page 19
Welcome to new members	Page 21



***First announcement:
the 5th European Echinoderm Colloquium
will be held in Milan (Italy)
Organizer: M. Daniela Candia Carnevali***

Sea Stars, Sea Urchins, and Allies

Echinoderms of Florida and the
Caribbean

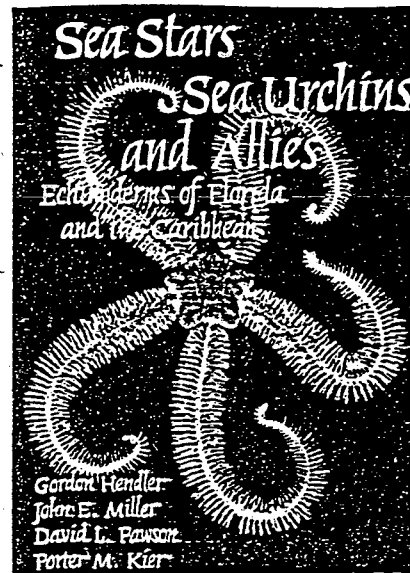
Gordon Hendler, John E. Miller, David L. Pawson, and
Porter M. Kier

Fascinating, ancient in origin, and among the most abundant creatures in the ocean, echinoderms (from the Greek for "spiny skins") are often brilliantly colored and intricately ornamented, with a five-part symmetry that is unique in the animal kingdom. Readily collected along the seashore, the skeletons of sea stars (starfish), sand dollars, and sea urchins have graced curio collections for centuries. Echinoderms are critical components of the marine environment worldwide, but are most diverse in tropical regions, particularly coral reefs.

This is the first comprehensive guide to the identification and natural history of the five classes of echinoderms (sea stars, brittle stars, sea urchins, feather stars, and sea cucumbers) of the Florida Keys, Bahama Islands, and Caribbean. For more than 150 species of echinoderms found at scuba depths (less than 100 feet) detailed information is provided about appearance and identification, life history, habitat, and distribution. Within each class of echinoderms the species are organized by family, then alphabetically according to genus and species.

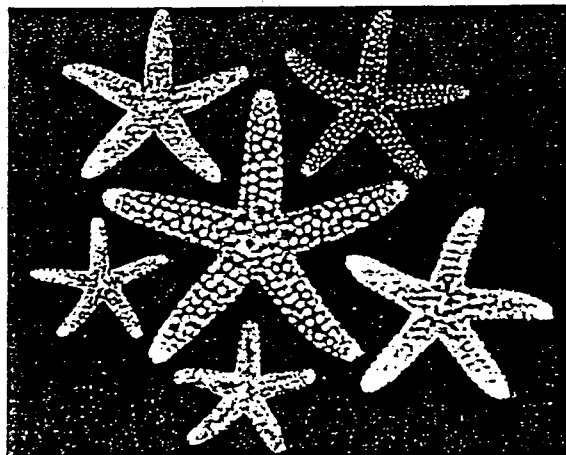
Written by four internationally recognized experts in the field, this indispensable reference includes more than 130 exquisite color photographs, most depicting living echinoderms in their natural habitats, as well as helpful black-and-white photographs and detailed drawings. The authors provide tips on finding, handling, preserving, and photographing echinoderms, as well as a glossary for the nonspecialist reader.

While primary coverage is limited to the Florida-Bahamas platform, eighty percent of the echinoderm species that inhabit shallow, subtropical, or tropical waters of the western Atlantic north of Brazil are treated in detail, making this guide useful throughout the Caribbean region and the Gulf of Mexico. *Sea Stars, Sea Urchins, and Allies* is a valuable reference for scientists in a variety of fields, as well as divers, beachcombers, and amateur naturalists.



Gordon Hendler is curator of echinoderms and head of the Invertebrate Zoology Section at the Los Angeles County Museum of Natural History. An expert scientific photographer, John E. Miller is the former chief curator of the Division of Marine Sciences, Harbor Branch Oceanographic Institution, Inc., in Fort Pierce, Florida. David L. Pawson is a senior research scientist in the Department of Invertebrate Zoology at the Smithsonian Institution's National Museum of Natural History. Porter M. Kier is director emeritus of the Smithsonian Institution's National Museum of Natural History. All have logged extensive time in scuba and manned submersible investigations of marine animals.

Natural History - Marine Biology
146 color, 36 b&w photographs, 17 line drawings
7 x 10 (178 x 254mm) 392 pp.
LC to be announced
Cloth: ISBN 1-56098-450-3 \$39.95
September 1995
Sales Area: World



"This extraordinary work should become a popular and extremely useful text for a wide variety of people, from the casual Sunday beach stroller to environmentalists, ecologists, and serious students of echinoderms. Although it deals with a regional fauna, it should be applauded worldwide."—

John H. Dearborn,
University of Maine

General Description of the Program's Initial Activities

A field house has been provided at the pilot site (Apid) to serve as the central point of the project's activities. Motorized banca will be provided to be used in the monitoring and protecting the marine resources through the fishermen's organization.

Adopting a participatory approach, the fishermen's organization shall provide the manpower to operate and maintain the boat. The maintenance and operating cost of the boat shall come from the income raised through occasional transport of goods and people to and from the islands.

Likewise, the fishermen's organizations of the islands and some affected coastal barangays will be federated to come up with strong environmental protection stand.

Simultaneously, the culture of marine organisms will be started at selected areas. Community organizing, informal education and scientific backstopping will be provided through the Tropical Ecology Program at ViSCA.



Small Islands Environmental Rehabilitation & Livelihood Program

OUTREACH PROJECT NO. 2

OF

VISCA-GTZ ECOLOGY PROGRAM

Visayas State College of Agriculture
Baybay, Leyte

For more information contact:

DR. PACIENCIA P. MILAN

Program Director

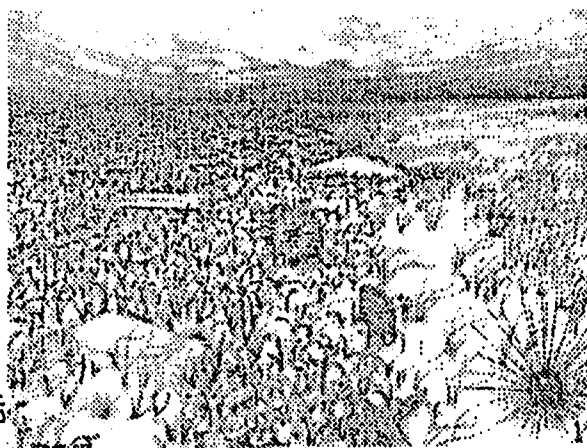
VISCA-GTZ TROPICAL ECOLOGY PROGRAM

VISCA, Baybay, Leyte 6521-A

Philippines

In cooperation with:

- Local Government Unit (LGU) - Inopacan, Leyte
- Local Government Unit (LGU) - Apid, Inopacan, Leyte
- Local Government Unit (LGU) - Hindang, Leyte
- Local Government Unit (LGU) - Himokilan, Hindang, Leyte
- Non-Government Organization - Inopacan, Leyte
- Non-Government Organization - Hindang, Leyte
- Fishery Sector, Department of Agriculture (DA), Reg. 8
- Department of Environment and Natural Resources (DENR), Reg. 8
- DED (German Development Service)



Rationale

The "Small Islands Environmental Rehabilitation and Livelihood Program" is one of the environmental outreach projects of the ViSCA-GTZ Ecology Program funded by the German Government. It aims to rehabilitate the environmental conditions of the "Cuatro Islas" which comprise Apid, Mahaba, Didjo and Himokilan Islands and to protect the marine resources from overfishing and destruction.

The islands of Apid, Mahaba and Didjo are islands off the shore of Inopacan, Leyte while the island of Himokilan, which is the biggest of all the four islands, belongs to the municipality of Hindang, Leyte. These islands are surrounded by beautiful coral gardens. Their marine life forms are the main source of food and income for the islanders whose surplus catch is sold to the Leyte mainland.

Commercial fishing by large vessels from other parts of the Philippines is increasingly intruding the local fishing grounds of the inhabitants. Additionally, the marine environment and its natural resources are endangered or even destroyed due to destructive fishing methods (such as dynamite and cyanide fishing), the lack of alternative sources of income, and the constantly increasing population.

In order to solve the problem of continuous depletion of the resources in the marine ecosystem, it is necessary for us to preserve the ecosystem now. Evidently, people need more information about the cause of the destruction of our aquatic resources as well as the serious

consequences and the possible corrective measures to preserve and protect nature.

This project is envisioned to come up with sustainable management strategies to assist the islanders to be self-reliant and for them to be able to protect their environment.

Program Objectives

- To establish a marine sanctuary in Apid, Mahaba, Didjo and Himokilan.
- To establish environmental protection and rehabilitation measures in order to protect and rehabilitate the endangered marine and coastal environment of the islands.
- To establish a sustainable livelihood program for the fisherfolk in the islands.
- To establish linkages with the policy-makers and other government and non-government agencies for an effective implementation of the project as well as a sustainable environmental protection and rehabilitation program.
- To increase environmental awareness of fisher families for ecological sound management of resources.

Key Projects

- Coral Reef Protection for Sustainable Livelihood of Fisherfolk
- Establishment of Coastal Forest as Source of Livelihood, Timber and Fuelwood

- Establishment of Permanent Crops as Source of Livelihood and for Environmental Rehabilitation.
- Establishment of Solar Power as Source of Energy
- Culture of Algae and Other Marine Organisms by Households
- Ecotourism for Environmental Education and as a Source of Income.

Expected Benefits

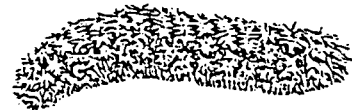
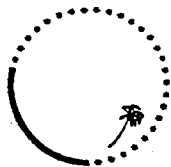
- The islands will be protected from overfishing and destruction.
- The islands' ecosystem will be rehabilitated.
- The islanders will have a sustainable source of livelihood.

Project Cooperators

The project cooperators are the residents of the pilot sites. To focus the support services that will be extended to the island, a fishermen's association has been organized.

Project Site

The pilot site of the project is the Apid Island of Inopacan. The first two marine sanctuaries have been established in Apid and Mahaba and expansion thereof to the other islands will depend on the success of the project in the pilot site.



BECHE-DE-MER

INFORMATION BULLETIN

Number 7 — June 1995

Editor: Chantal Conand, Université de la Réunion, Laboratoire de Biologie Marine, 97715 Saint-Denis Cedex, La Réunion;
Fax: 262 93 81 66; E-mail: conand@univ-reunion.fr — Production: Information Section, Fisheries Programme, SPC, P.O. Box D5,
98848 Noumea Cedex, New Caledonia — Printed with financial assistance from the Government of France

NOTE FROM THE EDITOR

This issue contains original contributions in various fields of sea cucumber biology and fishery. As in previous issues, they are arranged in three major sections: new information, correspondence and publications. The number and quality of your contributions show your interest and provide recent information that could be discussed in the next issue.

Articles on 'Spawning observations' (see p.11 and 12) provide helpful information on the reproductive biology of several species. We hope that the request for 'fission and regeneration observations' (p. 9) will provide interesting replies.

New fisheries in North-East Russia (p. 18) and Baja California (p.20) are presented here. The disquieting problem of the fishery in the Galapagos (see last issue, Apr. 1994) is discussed (pp. 21-23).

Several aquacultural experiments on sea cucumbers are being carried out. The results from the work done at ICLARM, Solomon Islands (p. 2) and in Hawaii (p. 25) show that it is possible to induce spawning and rear larvae, but there are still difficulties in obtaining settlement and growth of juveniles.

However some publications, particularly those of the Central Marine Fisheries Research Institute of Cochin (India), indicate that one species at least, *H. scabra*, can be grown to the juvenile stage and offers good prospects (p. 28).

Chantal Conand

Inside this issue

Spawning and early larval rearing of *Holothuria atra*

by C. Ramoelila, M. Gervis and J. Bell

Page 2

Asexual reproduction in *Holothuria atra* on a reef of Reunion Island in the Indian Ocean

by C. Boyer, S. Callsson and K. Malraux

Page 7

Request for information on fission and regeneration of tropical holothurians

by Chantal Conand

Page 9

Spawning observations

Page 11

Spawning of the sea cucumber *Cucumaria frondosa* in the St. Lawrence Estuary, eastern Canada

by J.F. Hamel and A. Mercier

Page 12

Problems of the Galapagos sea cucumber fishery

Page 21

Beche de mer correspondence

Page 24

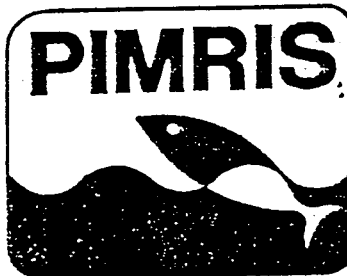
Beche de mer abstracts, publications, workshops and meetings

Page 27

Welcome to new members

Page 39

PIMRIS is a joint project of 4 international organisations concerned with fisheries and marine resource development in the Pacific Islands region. The project is executed by the South Pacific Commission (SPC), the South Pacific Forum Fisheries Agency (FFA), the University of the South Pacific's Pacific Information Centre (USP-PIC), and the South Pacific Applied Geoscience Commission (SOPAC). Funding is provided by the International Centre for Ocean Development (ICOD) and the Government of France. This bulletin is produced by SPC as part of its



Pacific Islands Marine Resources Information System

commitment to PIMRIS. The aim of PIMRIS is to improve the availability of information on marine resources to users in the region, so as to support their rational development and management. PIMRIS activities include: the active collection, cataloguing and archiving of technical documents, especially ephemera ("grey literature"); evaluation, repackaging and dissemination of information; provision of literature searches, question-and-answer services and bibliographic support; and assistance with the development of in-country reference collections and databases on marine resources.

AUSTRALIA

Ph.D. Dissertation

STUMP, R.J. April, 1995. Age determination and life history characteristics of *Acanthaster planci* (L.). James Cook University of North Queensland, Zoology Dept.

BELGIUM

Masters Theses

(conducted by J. Mallefet)

AJUZIE, C.C. 1994. Physiological approach of the light emission in the ophiuroid *Amphipholis squamata* (Echinodermata): calcium requirement. Université catholique de Louvain.

DE BREMAEKER, N. 1992. Caractérisation des récepteurs cholinergiques impliquées dans le contrôle de la photogénèse d'*Amphipholis squamata* (Echinodermata, Ophiuroidea). Université catholique de Louvain.

DEHEYN, D. 1992. Approche morphologique et physiologique de la bioluminescence chez l'ophiure *Amphipholis squamata* (Delle Chiaje, 1828) (Echinodermata). Co-conducted with Pr. M. Jangoux; Université libre de Bruxelles. Diplôme Etude Approfondie.

VANHOUTTE, P. 1990. Etude du contrôle nerveux de la luminescence d'*Amphipholis squamata* (Echinodermata). Université catholique de Louvain.

BRAZIL

B.Sc. Thesis

MACHADO, A.P. 1994. O uso de Microscopia Eletrônica de Varredura na análise de morfologia externa de *Hemipholis elongata* (Echinodermata, Ophiuroidea). 30 pp. Pontificia Universidade Católica do Paraná.

M.Sc. Thesis

TAVARES, Y.A.G. 1995. Bioecologia de *Mellita quinquesperforata* (Leske, 1778) em ambientes praias do litoral do Paraná, BR. (temporary title, in press).

CHILE

B.Sc. Thesis

GONZALEZ, S. 1995. Selectividad alimentaria en estadios juvenil y adulto de *Loxechinus albus* (Molina, 1782), basados en los componentes troficos de su dieta natural. Universidad Arturo Prat, Iquique.

Masters Thesis

GUISADO ARANGUIZ, C.B. 1995. Estrategias de desarrollo larval y ciclo de vida en dos especies de

echinoideos regulares del sur de Chile. Universidad Austral de Chile, Valdivia.

ENGLAND

Ph.D. Dissertation

WILLCOX, M.S. 1993. Genetic and physiological variation in salinity tolerance of *Asterias rubens* (L.). Liverpool John Moores University.

FRANCE

Dr. Sci.

LUMINGAS, L.J.L. 1994. La plasticité chez l'oursin: cas de *Sphaerechinus granularis* en rade de Brest (Bretagne, France). l'Université de Bretagne Occidentale, Océanologie Biologique, Brest, France. 171 p.

MAHARAVO, J. 1993. Etude de l'oursin comestible *Tripneustes gratilla* (L., 1758) dans la région de Nosy-Be (Côte Nord-Ouest de Madagascar): Densité, morphométrie, nutrition, croissance, processus reproducteurs, impact de l'exploitation sur les populations. Université d'Aix-Marseille III.

Thesis

DAVID, J. (in progress). Comparison between recent and fossil stalked crinoids ontogeny. Reims Université, France.

D.E.A.

CHEVALLIER, B. 1993. Influence de l'environnement sur le cycle vital de l'oursin. Cas de *Sphaerechinus granularis* en rade de Brest. Rapport de DEA, Océanologie Biologique, Université de Bretagne Occidentale, Brest, France. 29 p.

JUDAS, A. 1994. Influence de l'environnement sur les phases de reproduction, fécondation et développement larvaire des oursins: cas de *Sphaerechinus granularis* en rade de Brest. Rapport de DESS, Université de Bretagne Occidentale, Brest, France. 45 p.

GERMANY

Ph.D. Dissertation

v.JUTERZENKA, K. Untersuchungen zur Bedeutung von Schlangensterne (Echinodermata: Ophiuroidea) in Schelf und Kontinental hang gebieten des Europäischen Nordmeeres - (study to assess) the role of brittle stars (Echinodermata: Ophiuroidea) on shelf and slopes of the Greenland-Iceland-Norwegian (GIN) Seas. Ber. Sonderforschungsbereid 313. Univ. Kiel, (submitted 1995). (in German).

Dr. rer. nat.

SCHOPPE, S. 1993. Die karpose um den felsbohrenden seeigel *Echinometra lucunter* (L.): Untersuchung der lebensraum-bedingungen und der biologie der assoziierten arten. - Dissertation, Justus-Liebig-University Giessen, Germany. 128 pp.

(The carposis of the rock boring sea urchin *Echinometra lucunter* (L.): Investigation of the habitat and the biology of the associated species).

Masters Thesis

NEUMANN, C. Functional morphology and mode of life of some Toxasteridae and Hemiasteridae from the Middle Cretaceous (Albian/Cenomanian) of southern Spain. Institut für Paläontologie der Freien Universität Berlin. (in progress).

IRELAND

Masters Thesis

FELDMAN, A.L. 1995. Aspects of the biology of Echinoderm larvae with particular reference to the Class Asterozoa and Echinozoa. University College, Galway.

JAPAN

Dr. Sci.

OKINAGA, T. Structures and functions of saccharide chains in the acrosome reaction-inducing substance. Tokyo Institute of Technology. March 1993.

AMANO, T. Sperm histone degradation induced by egg-jelly in starfish. Tokyo Institute of Technology. March 1994.

Ms. Sci.

SAITO, U. Studies on Gamete Gangliosides. Tokyo Institute of Technology. March 1994.

SHOGOMORI, H. Gangliosides in non-plasmalemmal membranes. Tokyo Institute of Technology. March 1994.

NISHIGAKI, T. Purification and structure determination of sperm activating peptides in the starfish, *Asterias amurensis*. Tokyo Institute of Technology. March 1994.

MEXICO

Ph.D. Thesis

HERRERO-PÉREZRUL, D. 1990. Pepinos de mar (Echinodermata: Holothurozoa) de "El Faro de bucerías", Michoacán, México. Univ. Mich. de San Nicolás de Hidalgo. Esc. de Biología. 70 pp.

SOLÍS-MARÍN, F.A. 1991. Composición y distribución espacio-temporal de los macroinvertebrados bentónicos del complejo lagunar Magdalena-Almejas de la costa occidental de B.C.S., México. Univ. Mich. de San Nicolás de Hidalgo. Esc. de Biología. 89 pp.

MARTÍNEZ LÓPEZ, R. 1994. Desarrollo larvario del erizo rojo *Strongylocentrotus franciscanus* (Echinodermata: Echinozoa), y diferentes densidades de cultivo. Fac. Ciencias Marinas, Univ. Autón., Baja California.

NEW ZEALAND

Ph.D. Dissertation

STEWART, B.G. Biology of *Astrobrachion constrictum*. University of Otago, Dunedin, New Zealand. (nearing completion)

Masters Theses

MSc (Marine Science)

BREWING, P. 1995. Effect of algal diet on gametogenic cycle, biochemical composition and size of gonads of feasibility of kina, *Evechinus chloroticus* at different times (sea urchin) culture. University of Otago.

GARRETT, K. 1995. Reproduction and population genetics of the brooding brittlestar, *Ophiomyxa brevirima*. University of Otago.

SEETO, J. 1995. Reproductive biology of the tropical sea cucumber, *Holothuria atra*, in Fiji. University of Otago.

PAKISTAN

Masters Thesis

TAHERA, Q. 1992. Taxonomic studies of northern Arabian Sea echinoderms. M. Phil. in Marine Sciences, University of Karachi.

POLAND

Ph.D. Dissertation

OLSZEWSKA-NEJBERT, D. 1996. Turonian-Coniacian irregular echinoids Mangyshlak (western Kazakhstan) and Opole through (southern Poland). Institute of Geology, Warsaw University. (final stage of preparation).

SPAIN

Ph.D. Dissertation

GALLEMÍ, J. 1992. Los yacimientos con equinidos del Cretacico Superior del Prepirineo de la Provincia de Lleida. Universitat Autònoma de Barcelona, 429 pp. (unpublished doctoral thesis)

UNITED STATES

Ph. D. Dissertations

BALSER, E.J. 1994. An echinoderm phylogeny based on the morphology of the larval and adult axial complex. Clemson University, South Carolina.

CRONIN, G. 1994. The complexity of Dictyota herbivore interactions: interactions of environment, variable seaweed chemical defenses, and resistance to herbivory. Marine Sciences Curriculum, University of North Carolina at Chapel Hill. (addresses seaweed chemical defenses against urchins and

other invertebrates)

MILLER, M.W. 1994. Ecology of a temperate coral. Ecology Curriculum, University of North Carolina at Chapel Hill. (addresses how grazing by urchins affects seaweed-coral interactions)

ROGERS-BENNETT, L. 1994. Spatial patterns in the life history characteristics of Red Sea urchins, *Strongylocentrotus franciscanus*: Implications for recruitment and the California fishery. University of California, Davis.

Masters Theses

BEDDINGFIELD, S.D. 1992. The feeding biology of *Astropecten articulatus* (Echinodermata: Asteroidea) from the Gulf of Mexico: an evaluation of optimal foraging theory in a soft-bottom predator. The University of Alabama at Birmingham. 46 pp.

COLÓN-JONES, D.E. 1993. Size (age) specific factors controlling the distribution and population size of the white-spined sea urchin, *Tripneustes ventricosus* (Lamarck, 1816). University of Puerto Rico, Mayaguez Campus.

KNOTT, K.E. 1995. a comparative study of the morphological and biochemical variation in two forms of *Luidia clathrata* (Echinodermata: Asteroidea) from the northeastern Gulf of Mexico. University of Alabama.

LARES, M.T. 1990. The effects of temperature on the survival, organismal activity, nutrition, growth and reproduction of the carnivorous, tropical sea urchin, *Eucidaris tribuloides*. The University of Alabama at Birmingham. 69 pp.

MAH, C.L. (in progress). Phylogeny of the Brisingida (Asteroidea) and revision of some Pacific genera. San Francisco State University, California.

NORRIS, D.R. 1994. Associations between three irregular urchins and cone-and-funnel topography in a tropical soft-bottom community. University of Guam. 32 p.

SHLEPR, M.G. 1994. Early ossicle growth in the regenerating disc integument of the brittlestar *Ophiophragmus filigraneus* (Echinodermata: Ophiuroidea). Melbourne, FL: Florida Institute of Technology; 110 pp.

VERNON, J.D. 1991. An investigation of gametogenesis, biochemical and energetic composition, population dynamics, and sediment grain-size selection in *Clypeaster raveneli* (Echinodermata: Clypeasteridae) from the northern Gulf of Mexico. The University of Alabama at Birmingham. 78 pp.

B.Sc. Thesis

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***** RECENT PUBLICATIONS *****

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"ECHINODERMS IN LITERATURE"

(contributed by John Lawrence)

John Barthe. *The last voyage of Somebody the Sailor.*

"Juliette duly instructed us in the pleasure of snorkeling the rocks and reefs, dispelling apprehensions about barracudas and morays, and pointed out sea urchins and fire corals, which were not The bottom was a hard gray rippled sand prowled by black spiny sea urchins and strewn here and there with dead and broken finger coral.... Shards of fungi coral cut his hands as he manhandled the plow to a new position, taking care not to step on urchin spines."

Clifford Irving. *Final Argument.*

"Jerry Lee Elroy sat upright on the carpet against one of the cashier's cages. His eyes were sightless. Blood leaked from his side, staining his white golf shirt. A thin blade had been slid between the ribs and into the left ventricle of his heart. A thick black object choked his mouth. It took me a minute or two to figure out what it was. Someone wearing gloves had taken the time to reach around Elroy's dead body, wrench open his jaws, and thrust a sea urchin into his mouth, so that its spines bit deep into the offending tongue.... Elroy is dead, Harvey. With a sea urchin shoved in his mouth. He can't talk."

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HOW I BEGAN TO STUDY ECHINODERMS ... Part 5.

Makra, Athena (Martin Ryan Institute, UCG, Ireland). I grew up in Greece and so I had the chance, since I was a child, to explore and admire the wonders of the sea. Even though I was snorkeling for years, my first really scientific view of the marine life was at the second year of the University (Athens University, Biology Department), when I attended the lectures and field trips of Hydrobiology and Invertebrate Zoology. I then started becoming interested on working with marine invertebrates, but it wasn't easy to choose what kind of animals I wanted to study!

Then, after the 3rd year, I had the chance (through an ERASMUS programme) to visit MRI and do my final year thesis there. Under the supervision of Prof. B.F. Keegan I worked on Echinoderms (*Amphiura filiformis*, in Galway Bay) for the first time and I was fascinated! Now, I am back in Ireland, doing my Ph.D. on another ophiuroid, *Acrocnida brachiata*. I can say now that those animals are really fascinating and it is so interesting working on them. At the moment, I have just started working on their population dynamics and their microdistribution in Killary, but I am interested in many aspects of their biology and ecology, like their burrowing and feeding behaviour, regeneration rates, effect on the sediment and many more. Furthermore, since they are not so much studied in Greece, I believe that I will have the chance to do some really genuine research on them when I return!

HOLOTHUROIDEA or HOLOTHURIOIDEA?

I'm sure you've all noticed that there is some variation in the spelling of the name of the Class to which the holothurians belong. For many years now, various students of the group have adopted a "preferred" spelling and they have stuck with it. About a year ago, I was writing some obituaries of H. Barraclough Fell and I was looking through some of his correspondence related to our contributions to the echinoderms volumes of the Treatise on Invertebrate Paleontology. I came across a copy of a letter (dated May 26, 1965) from Barry Fell to the Editor of the McGraw-Hill Encyclopedia of Science and Technology. In this long letter, Barry gave details of his arguments for spelling the Class name as Holothuroidea rather than Holothurioidea.

I sent a copy of the letter to Frank Rowe in England, thinking that it would be of some academic interest to him. Frank, who has always used Holothurioidea, was so impressed by Barry's arguments that he wrote and told me that he will now use Holothuroidea (and indeed he has done so in his latest *magnum opus*, *Zoological Catalogue of Australia: Echinodermata* - see below).

If Barry's arguments convinced Frank, then maybe they will convince others! If you're interested, write to me and I'll send you a photocopy of Barry's letter.

Dave Pawson

ZOOLOGICAL CATALOG OF AUSTRALIA 33: ECHINODERMATA, by F.W.E. Rowe and J. Gates.

Australia seems to be leading the world in many aspects of study of biodiversity. One of the Australian Nature Conservation Agency's more ambitious recent projects is the Zoological Catalog of Australia. Volume 33 is a 510-page hardcover book, Echinodermata, written by Frank Rowe and J. Gates. This an annotated list of the 1,154 species of echinoderms known from the Australian region.

For each species an extensive list of references is given, and name changes are documented; information is provided on type locality, location of type specimen(s), distribution, ecology. At the level of the genus, author, date, literature reference and synonyms are given. Families are defined, their representation in Australia is summarized, and a few useful references are provided. In the introductory section the authors discuss the composition, size, and relationships of the fauna, and they give a historical review. Numerous name changes have been made, and these are summarized in an appendix. There is a comprehensive taxonomic index.

This is a splendid piece of work. Endless taxonomic nightmares and gordian knots surely provided the authors with monumental headaches! They may not have solved all of the problems, but they have made the entire Australian echinoderm fauna accessible for further research. This book is an absolute necessity for anyone who is even remotely interested in Indo-Pacific echinoderms. The authors deserve our heartfelt thanks for a job magnificently done.

Elsewhere in this Newsletter you will find a brochure advertising this volume.

Dave Pawson

ALI, MOHAMED SAID
 AMEZIANE-COMINARDI, NADIA
 ARONSON, RICHARD
 AUSICH, WILLIAM
 BALSER, ELIZABETH
 BARTSCH, ILSE
 BAUMILLER, TOMASZ
 BECKER, JOHANN
 BEGBIE, KIRSTEN
 BELL, BRUCE
 BENTLEY, ANDREW
 BIRENHEIDE, RUDIGER
 BIRKELAND, CHARLES
 BLAKE, DANIEL
 BOCKELIE, JOHAN
 BOUDOURESQUE, CHARLES
 BREGMAN, YURIY
 BRETON, GERARD
 BREWIN, PAUL
 BROWER, JAMES
 BUITRON-SANCHEZ, BLANCA
 BUSSARAWIT, SOMCHAI
 BYRNE, MARIA
 CALTAGIRONE, ANGELA
 CAMERON, R. ANDREW
 CAMPBELL, ALAN
 CAMPBELL, DAVID
 CANDIA-CARNEVALI, M. DANIELA
 CANNON, LESTER
 CARDER, NANCY
 CHAO, SHYH-MIN
 COLON-JONES, D. ELIZABETH
 CONAND, CHANTAL
 CREASER, EDWIN
 CRUMP, ROBIN
 CUTRESS, BERTHA
 DAFNI, JACOB
 DAVID, JEROME
 DAYTON, PAUL
 DE RIDDER, CHANTAL
 DE WIT, WALTER
 DEBENHAM, PATTY
 DIEHL, WALTER
 DOBSON, WILLIAM
 DOLMATOV, IGOR
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 DRUMMOND, ANNE
 EMLET, RICHARD
 ETNIER, SHELLEY
 ETTENSOHN, FRANK
 FEDER, HOWARD
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 FERNANDEZ, CATHERINE
 FOSTER, MERRILL
 FOX, DAVID
 FUJITA, TOSHIHIKO
 GAGNON, JEAN-MARC
 GALLEMI, JAUME
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 GOODING, RICHARD
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 GUERRAZZI, MARIA
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 HAMEL, JEAN-FRANCOIS
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 HEINZELLER, THOMAS
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 ACANTHASTER-PLANCY RESOURCE-MANAGEMENT
 METAMORPHOSIS ECHINOIDEA DEVELOPMENT
 COLLAGEN METAMORPHOSIS GENE-EXPRESSION EXTRACELLULAR-MATRIX COLLAGENASE
 TAXONOMY ECOLOGY DISTRIBUTION ADRIATIC-SEA
 ASTEROIDEA PREDATION

MARIA ELENA CASO MUÑOZ
(December 18, 1915 - October 23, 1991)

The daughter of Dr. Antonio Caso Andrade and Josefina Muñoz de Caso, parents whom she worshipped, Maria Elena grew up in a warm environment, full of moral and spiritual values. When she was born on December 18, 1915, her father, Dr. Antonio Caso, was already a valuable and prominent personality in Mexico's intellectual life; therefore, since her early childhood, Maria Elena was brought up fed by the ideology of Mexico's most important intellectuals such as Jose Vasconcelos, Alfonso Reyes, Pedro Henriquez Ureña, et al., whose ideas became her spiritual nourishment. Dr. Caso attended the School of Science at the National University of Mexico (1937-1940) where she obtained her Master's Degree in Biological Science. Her professional thesis "Contribución al conocimiento de los asteroideos de México", is an authentic contribution to science and marks the beginning of a new stage in the study of starfishes in our country.

In 1939, Dr. Caso participated in establishing the Hydrobiology Laboratory at National University of Mexico's Institute of Biology, invited by Dr. Enrique Rioja Lobianco, (1895-1963) a Spanish refugee who lost Spain but won Mexico. Throughout the years, this Laboratory became the Department of Ocean Science and Limnology at the National University of Mexico's Institute of Biology; later on it became the Ocean Science and Limnology Center and finally (1973-1981), it turned into the Institute of Ocean Sciences and Limnology.

Dr. Caso published her first study in 1941 and her professional thesis in 1943.

On February 16, 1961, she obtained her Doctor's degree in Biological Sciences. Her Doctorate's thesis, "Equinodermos de México" is a real monograph, a treatise; a document to be consulted by any investigator who wishes to specialize on the subject.

Her great academic prestige and human qualities led her to perform several activities such as: President of Research School at the National University of Mexico's Institute of Biology, (1967-1973); responsible of the Echinoderm's Laboratory at the National University of Mexico's Center of Ocean Science and Limnology (1973-1981) and, later on, at the Institute of same name (1981-1991); Representing Professor at the Ocean Science Academic Project Internal Council of the Academic Unit for Professional and Postgraduate cycles at the Science and Humanities School (1985); Representing Counsellor for the Ocean Science and Limnology Institute at the Technical Council for Scientific Investigation (1985); Zoology Professor at the Biology Department of National University of Mexico's Science School (1957-1963); and Hydrobiology Department at the Doctorate Section of same department at Science School (1966), among other activities.

Following her major field of studies, she worked in the four most important Institutes in the United States of America: Smithsonian Institute in Washington, D.C. in 1972; Allan Hancock Insitute, South California University in 1975; Museum of Paleontology, Berkeley University in 1980. At these Institutes, Dr. Caso examined the most important collections of echinoderms in the work and specialists in charge were greatly impressed by her remarks which showed her profound taxonomic, bio-geographic and ecological knowledge of the species.

Dr. Maria Elena Caso's scientific work consists of over sixty different studies, including seven monographs on the four fundamental echinoderm Classes. It represents the most important and most complete study on this specialty in our country and worldwide. Dr. Caso has discovered new echinoderm subfamilies, genus and sub-genus, species and variations. Her impecable descriptions include drawings and pictures of the finest precision and quality. Her scientific work is greatly appreciated by most famous specialist all over the world.

Scientists like Doctor Maria Elena Caso honor our University and we are honored to emphasize her work.

Dr. Caso's works:

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