

THE ECHINODERM NEWSLETTER

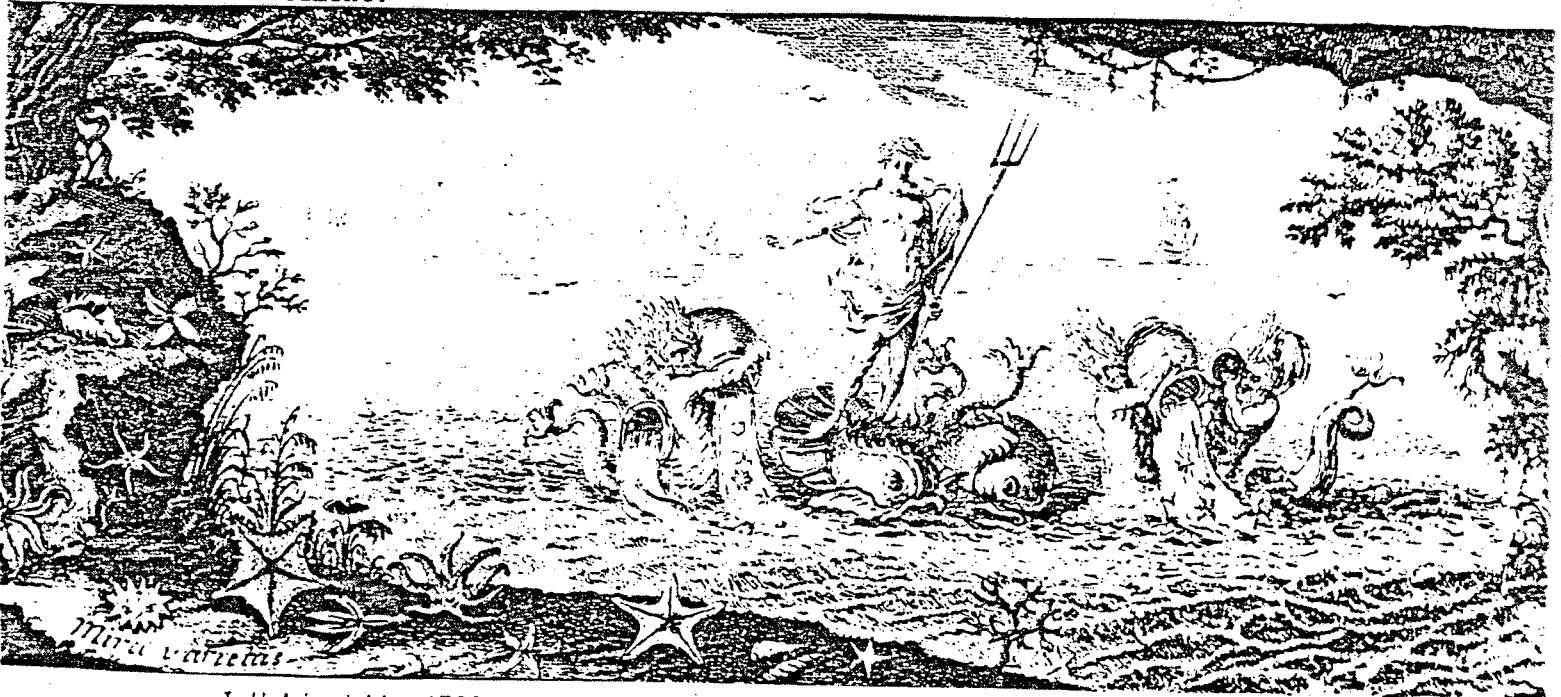
Number 14. June 1985

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University of South Florida  
Tampa, FL 33620 U.S.A.

Distributed by the Department of Invertebrate Zoology  
National Museum of Natural History  
Smithsonian Institution  
Washington, D.C. 20560 U.S.A.  
(David Pawson, Maureen E. Downey)

The newsletter generally contains information concerning meetings and conferences and publications of interest to echinoderm biologists, titles of theses on echinoderms, and research interests and addresses of echinoderm biologists. The last page of this newsletter is a form which can be sent to the editor by individuals who desire to be added to the list of echinoderm specialists published in this newsletter.

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.



I.H.Linckii. 1733. De Stellis Marinis.

Site: University of Victoria  
Date: Sunday, 23 August to Friday, 28 August 1987  
Organizer: Robert D. Burke  
Department of Biology  
University of Victoria  
PO Box 1700  
Victoria, British Columbia  
Canada V8W 2Y2

telephone (604) 721-7094, TELEX 049-7222

Previous conferences:  
1972 Washington, D.C., U.S.A.  
1975 Rovinj, Yugoslavia  
1978 Sydney, Australia  
1981 Tampa Bay, U.S.A.  
1984 Galway, Ireland

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#### SECOND INTERNATIONAL SYMPOSIUM ON INDO-PACIFIC MARINE BIOLOGY

Site: Guam  
Date: 22 June to 9 July 1986  
Information: David Montgomery  
Biological Sciences Department  
California Polytechnic State University  
San Luis Obispo, California 93407 U.S.A.

Symposium: Recent findings in Acanthaster biology and implications for reef management

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#### ECHINODERM PHYLOGENY AND EVOLUTIONARY BIOLOGY

Site: British Museum (Natural History), London  
Date: 15 and 16 December 1986  
Organizer: A.B. Smith \*  
Department of Palaeontology  
British Museum (Natural History)  
Cromwell Road  
London SW7 5BD  
United Kingdom

C.R.C. Paul  
Department of Geology  
University of Liverpool  
PO Box 147  
Liverpool, Merseyside  
United Kingdom

\*Local secretary, for details

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New Journal

Diseases of aquatic organisms. Editor-in-chief: O. Kinne.

## Contents:

critical intensities of environmental factors, including pollutants  
co-existing organisms (microorganisms, unicellular and multi-  
cellular parasites)  
nutritional disorders  
innate, idiopathic or genetic diseases  
proliferative disorders (tumors)  
stress and physical injuries

Editor for echinoderm diseases:

Michel Jangoux  
Laboratoire Biologie marine (160)  
Universite Libre de Bruxelles  
B-1050, Belgium

FELLOWSHIPS AT THE AUSTRALIAN MUSEUM

## Australian Museum Visiting Fellowships

Two or more fellowships are available each year (1 July to 30 June) from the Australian Museum Trust. They are designed to promote research in the Museum's area of interest, particularly but not exclusively relating to significant collections held by the Museum for which there is not resident staff specialist. The primary aim is to promote collection-based research, but ecologically-oriented projects are encouraged, especially where these supplement or complement on-going research by the resident ecologists. Application deadline: 31 January, each year.

Interested individuals should contact Dr. F.W.E. Rowe, The Australian Museum, P.O. Box A285, Sydney South NSW 2000, Australia.

CURATORIAL ASSISTANT (INVERTEBRATES) - LOS ANGELES COUNTY MUSEUM

Gordon Hendler is seeking an assistant, preferably with a BS or MS level degree, and as much relevant systematics and curatorial experience as possible, to work with a growing collection of ECHINODERMS (including the Allan Hancock Foundation collection) at the Los Angeles County Museum. Starting salary is \$1,540 per month plus benefits. If interested, please send your resume to Dr. Gordon Hendler, Department of Invertebrates (Life Sciences), Natural History Museum, 900 Exposition Boulevard, Los Angeles, CA 90007.

RECENT SUBMISSIONS TO AND OPINIONS OF THE INTERNATIONAL COMMISSION ON ZOOLOGICAL  
NOMENCLATURE

1981. Opinion 1187. Ophiolepis Müller & Troschel, 1840 (Ophiuroidea) designation of type species. Bull. zool. Nom. 38(4):191-193.

This ruled that Ophiolepis superba H. L. Clark, 1915 be designated as type species and previous designations set aside. Both Ophiolepis and O. superba were added to the appropriate Official Lists.

1982. Clark, A. M. & Rowe, F. W. E. Revised proposals for stabilization of the names of certain genera and species of Holothurioidea. Bull. zool. Nom. 39(1):29-35.

Since the earlier submission (1967) did achieve stability of some generic names by designation of type species and the likelihood of some others giving trouble is remote, this note was limited to asking for suppression of Trepang Jaeger, 1833 as a generic name so as to remove a threat to the well-used Halodeima Pearson, 1914; also for rejection of two obscure subgeneric names of Brandt and for specific names of various nineteenth century authors. Unfortunately, the more significant problem of Thyonidium and Duasmodactyla proved to have further complications and was shelved for lack of time.

1982. Williams, R. B., Cornelius, P. F. S. & Clark, A. M. Proposed conservation of Actinia Linnaeus, 1767 and Actiniidae Goldfuss, 1820 (Coelenterata, Actiniaria) and Pentacta Goldfuss, 1820 (Echinodermata, Holothurioidea). Bull. zool. Nom. 39(4):288-292.

Since Actinia Pallas, 1766 was based only on A. doliolum, currently recognised as a holothurian, not an anemone, under the rules it invalidates both Pentacta Goldfuss as a senior synonym and Actinia Linnaeus, 1767 as a senior homonym. This proposal was intended to try and stabilise both the last names in their current wide usage by suppressing Actinia Pallas. Pentacta and its type species Actinia doliolum Pallas are proposed for inclusion on the appropriate Lists.

Feb., 1985. Ride, W. D. L. et al. International Code of Zoological Nomenclature: adopted by the XX general assembly of the International Union of Biological Sciences.

This third edition of the 'Code' is considerably expanded from previous ones.

Opinion 1295. Actinia Linnaeus, 1767 and Actiniidae Rafinesque, 1815 (Coelenterata, Actiniaria) and Pentacta Goldfuss, 1820 (Echinodermata, Holothurioidea): conserved. Bull. zool. Nom. 42(1): 34-36, 1985. (As a result of this, Pentacta Goldfuss, 1820 and doliolum Pallas, 1766, were placed on the Official Lists of Generic and Specific Names in Zoology respectively.)

Contributed by Ailsa M. Clark

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## RESEARCH: SOLITARY OR JOINT EFFORT?

The last two decades have shown an explosive increase of the number of papers on echinoderms. Moreover, also the number of investigators working on echinoderms and that of topics studied have increased. This expansion of echinoderm research, resulting in a great increase of data, has caused loss of overview for most investigators. However, a number of them, particularly those studying typically molecular aspects do not need or want this overview. This is true also for a second category of investigators, who are primarily process-interested: they study basic processes (such as oocyte maturation or spermatogenesis) and use echinoderms only as well-suited test objects. These cell biologists fit their results into the data known from other species and can arrive at a good integration of knowledge. There is a third category of scientists who are interested in echinoderms per se. They, for example, do not study the process of reproduction as such, but reproduction of echinoderms; more generally processes in which the whole individual is involved. This organismal physiology requires an integration of knowledge on several levels as morphology, metabolism, interorgan transport, and regulation by external or internal factors.

However, this integration gradually has become nearly impossible, which is clearly illustrated by the fact that twenty years ago the larger part of our knowledge on echinoderm physiology could be collected in one book ("The Physiology of Echinodermata", Boolootian, R.A., ed.). An update of this book would yield now a multivolume work, each volume dealing with one topic as has been done for nutrition in "Echinoderm Nutrition", edited by M. Jangoux and J.M. Lawrence.

This development has made scientists increasingly dependent on reviews and summarizing lectures during conferences. In this respect the International Echinoderm Conferences have provided for clearly existing needs.

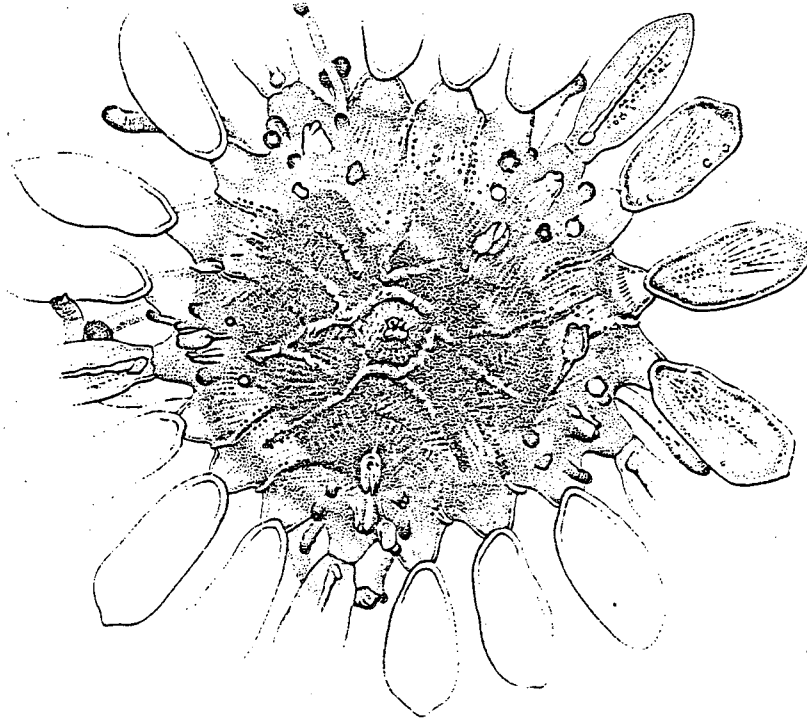
Further, scientists are more and more conscious of the "tight junction" between morphology and physiology. Morphology should extrapolate towards function, and explanations of observed phenomena in physiology should be based also on morphological features. However, most scientists are trained in only one of the two approaches. Therefore they prefer to present their work to a forum of colleagues with expertise in the same, adjacent, or complementary fields of research. The International Echinoderm Conferences have fulfilled this informing and also accounting function. The increasing number of attendants clearly shows the need for information and consultation, but unfortunately makes parallel sessions necessary. Yet it remains a pity that only work that already has been done is presented, so that criticism of the work or valuable advice are too late.

Only by forming bipartite or tripartite collaboration groups can such a hypothesis be tested. Of course this is only one example, but it clearly illustrates the present state of research.

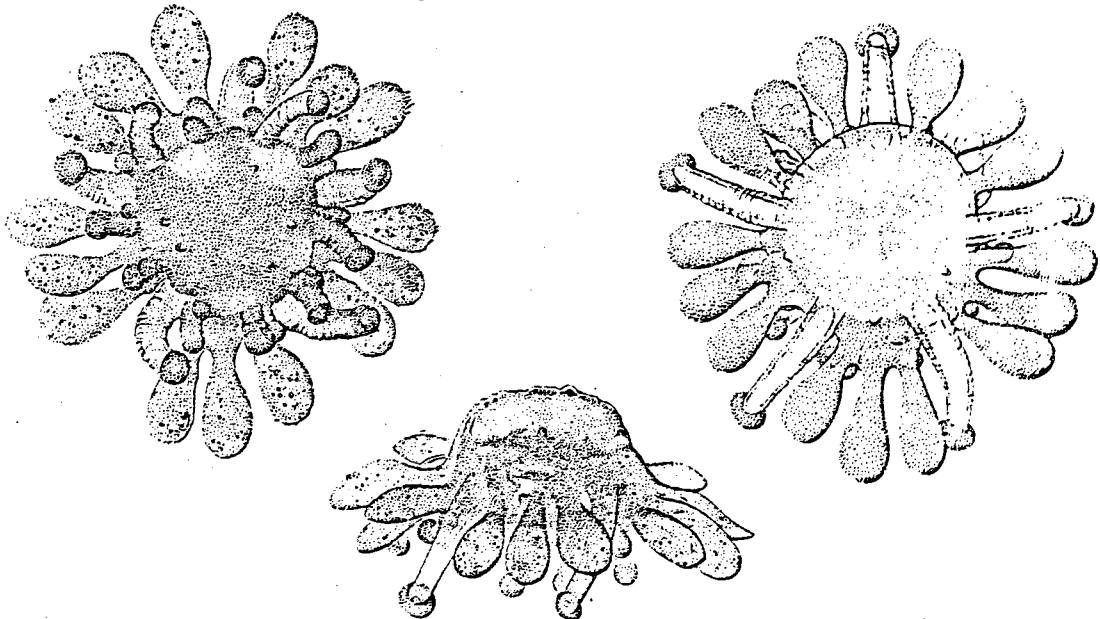
Perhaps a coordinating function on behalf of the "International Echinoderms Conferences" (which is not a society) will be very helpful to reach to what is my conclusion: Research today will be effective only by a joint effort!

Dr. Peter A. Voogt  
Utrecht  
The Netherlands

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young *Arbacia punctulata*  
A. Agassiz. 1904.  
Albatross expedition.



Echinoderm books in print

- Broadhead, T. W. & J. A. Waters (eds.). Echinoderms: notes for a short course (Univ. of Tennessee Studies in Geology) 235 pp. 1980. Univ. of Tennessee, Geology, Knoxville.
- Clark, A. M., & J. Courtman-Stock. The Echinoderms of Southern Africa. 1976. Pub. by Brit. Mus. (Nat. Hist.). Sabbot-Natural History Bks.
- Clark, Ailsa M. & Francis W. Rowe. Monograph of the Shallow-Water Indo-West Pacific Echinoderms. 238 p. 1971. Pub. by British Mus. (Nat. Hist.). Sabbot-Natural History Bks.
- \* Jangoux, Michel, & John M. Lawrence (eds.). Echinoderm Studies I. 1982. Balkema.
- Jangoux, Michel. Echinoderms: Past and Present. 1980, Balkema.
- Lawrence, J. M. Echinoderms: Proceedings of the International Conference, Tampa Bay. 1982. Balkema.
- Moore, Raymond C. (ed). Treatise on Invertebrate Paleontology. Pt. U. Echinodermata 3. 2 vols. 1966. Geol. Soc.
- Moore, Raymond C. (ed). Treatise on Invertebrate Paleontology. Pt. S. Echinodermata 1. 2 vols. 1968. Geol. Soc.
- Millott, N. (ed). Echinoderm Biology. 1968. Academic Pr.
- Chamberlain, John B. et al. The Sea Urchin: Molecular Biology. Vol. 2. 1973. Irvington.
- Czihak, G. & R. Peter (eds.). The Sea Urchin Embryo: Biochemistry & Morphogenesis. 1975. Springer-Verlag.
- Giudice, Giovanni, Developmental Biology of the Sea Urchin Embryo. 1975. Academic Pr.
- Stearns, Louis W. Sea Urchin Development, Cellular and Molecular Aspects. 1974. Van Nos Reinhold.
- Terman, S.A. et al. Sea Urchin: Molecular Biology. Vol. 3. 1973. Irvington.
- Clark, Ailsa M. Starfishes (new ed., original title: The Starfish and their Relations). 1977. TFH Pubs.
- Smith, A.B. Echinoid palaeobiology. 1984. George Allen & Unwin, London.
- Keegan, B. (Proceedings of the International Conference on Echinoderms, Galway). In press. Balkema.

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\* ESI: Sprinkle: Echinoderm evolution, Marcus: Phenotypic variability, Craig: Genomic variability, Shick: Respiratory gas exchange, Valentinčić: Innate and learned responses, Campbell: Pedicellariae, Ebert: Recruitment.

ESII: Stickle & Diehl: Effect of salinity, Harrold & Pearse: Kelp-forest echinoderms, Emler, McEdward & Strathmann: Reproductive strategies, Roux: Stalked crinoids.

\* Subscription to Echinoderm Studies. Each volume will contain review articles on all aspects of echinoderm biology. Volume I appeared in 1983. Volume II is currently in production and anticipated to appear in late 1985 or early 1986. Volume III has been planned and is scheduled to appear in 1987.

Balkema Publishers (Lisplein 11, PO Box 1675, NL-3000 BR Rotterdam, The Netherlands) offers a 20% discount to individuals who subscribe to the series. This reduces the price from US\$25.00 to US\$20.00. The reduction also applies to volume one if the subscription is placed from volume one onwards.

REQUESTS (addresses in list of echinoderm specialists )

SERAFY: Duplicate echinoderm papers (mostly systematics and ecology of echinoids, asteroids, and ophiuroids) to sell or trade.

HOTCHKISS: Desires to purchase a copy of Mortensen's Monograph on the Echinoidea.

BOOTHE: Would like to receive any new range extension records or new species descriptions (especially any new or future publications) of any echinoderm group from the Gulf of Mexico, Caribbean, or Northwest Atlantic) for use in a data base.

BERGER: Would like to learn of the presence of ciliates in the guts of regular echinoids (especially from Australia, New Zealand, Argentina, Chile, deep-water).

MLADENOV: Desires specimens of fissiparous brittle stars from the Indo-Pacific (e.g. *Ophiactis savignyi*, *Ophiocomella* spp.). Dried or alcohol preserved.

WEBSTER: Would appreciate receiving reprints of articles illustrating or systematically discussing Paleozoic crinoids for a bibliography and index.

CAMPBELL: Current research projects include aggregation behaviour in *Asterias rubens*; and ultrastructure, physiology, and evolution of echinoid pedicellariae.

MALUF: Requests unpublished distribution records for living echinoderms between Pt. Conception, California and central Peru. Especially interested in records from Central America north of Costa Rica and any records from Colombia.

DERSTLER: Is interested in learning of any fossil psolid holothuroids, either in the literature or unpublished records.

YANAGISAWA: Requests data on the breeding season and the size of mature gametes of echinoids.

YAMAGUCHI: Requests information about low-temperature tolerance of tropical echinoderms.

NOJIMA: Desires color slides of *Astropecten* spp. Is willing to provide specimens of Japanese asteroids if possible.

MAHFOUZ: Is interested in information on population and reproductive ecology of asteroids.

IMAOKA: Requests reprints of papers concerning systematics of holothuroids.

WOSS: Requests reprints of papers on antarctic asteroids.

VALENTINE: Would like information on *Ophiactis quinquieradiata*. Desires specimens of *Ophiactis muelleri*.

PARSLEY: Is interested in collections of echinoderms from Ordovician of Burma, China, and North Africa.

FISCHELSON: Desires information on the genus *Choriaster*.

KRISHNAN: Requests reprints of articles on echinoderm respiration.

MUNAR: Requests reprints of articles on fossil echinoids; on palaeoecology; on *Echinocardium cordatum* and *E. fenauxi*.



ALVAREZ, L R: is studying the effects of petrogenic hydrocarbons on coral-reef holothuroids and echinoids.

ALVAREZ, M de S: is studying Diadema and would like to receive reprints of papers on the ecology, sexuality, and larvae of tropical echinoids.

BIRTLES: desires information on reproduction and population dynamics of epizoic ophiuroids, particularly those on other echinoderms and especially if dwarf males are involved.

ALBUQUERQUE: is working on ophiuroids of the north and northeast continental shelf of Brazil.

DIX: is interested in echinoderm fisheries

DUBOIS: is studying calcification

ARENDR: is studying the evolution of extinct classes. He is interested in extinct and recent echinoderms in museums.

BLACK: is interested in echinoderm genetics.

BRANSTRATOR: is interested in stenurid stelleroids.

BRETON: is studying Roveacrinida, Astropectinidae, Stauranderasteridae, Goniasteridae

BUCKLAND-NICKS: is studying sperm specificity

BROADHEAD: is studying "blastozoans"

BRUNEL: is studying the echinoderm biogeography of the shelf and slope of the eastern Canadian coast.

CASTER: is studying carpoids.

CHAUVEL: is interested in Cystoids (Rhombifera, Diploporita)

CONSTANBLE: is interested in the Echinoida, Diadematoida, Echinometridae Strongylocentrotidae, Diadematidae.

DAVID: is studying deep-sea biology of echinoderms.

DONOVAN: is interested in extinct pelmatozoans

DRAVAGE: is studying the role of echinoderms in community structure.

DURHAM: is interested in Helicoplacoidea and Eocrinoidea

ESCOUBET: is studying Mediterranean echinoderms

FOELL: is interested in deep-sea echinoderms, particularly in the Clipperton-Clavion Fracture Zone

FRANZEN-BENGTSON: is studying biostratigraphy

GUILLOU: would like to know of studies on the ecology of Anseropoda placenta and Marthasterias glacialis.

GALE: is interested in "somasteroids"

GIUSEFFI: would like to know of recent literature on fossils of the Okalahoma paleozoics and Muldran (L. Miss.) of Indiana; also Cincinnati and Waldron representatives.

GLUCHOWSKI: is interested in paleobiogeography and stratigraphy

GREEN: is studying Paracrinoidea, Rhombifera, Diploporita. Interested in paleoecology of cystoids, edrioasteroids, paracrinoids, crinoids.

HERRING: is interested in bioluminescence of echinoderms

HILL: is interested in body-wall stability

HOGGINS: is interested in diseases, viviparity

HOTCHKISS: is interested in ray homology, growth gradients, skeletal systems, teratology

HULBERT: is studying Stephanasterias, Asterias, Leptasterias

JAMES: would like to know the present status of Acanthaster planci on the coral-reefs of the Indian Ocean

HAEDRICH: is interested in deep-sea echinoderms

JANGOUX: is interested in pathology/parasitism of echinoderms

KELLY: is interested in ontogeny, Rhombiferans

MACZYNSKA: is interested in Spatangoida, Holasteridae

MEIJER: is studying oocyte maturation, fertilization

MARTIN: is studying asterinids

PAWSON: is interested in compiling a list of postage stamps with echinoderms

SMIRNOV: would like to exchange material and reprints concerning asteroids and holothuroids.

LE GALL: is interested in mariculture of echinoderms

LEELING-WERDER: Would like to receive information about papers concerning the echinoderms of the Republica de Cabo Verde.

LUCAS & BIRKELAND: are preparing a resource book on Acanthaster planci

LEWIS: is interested in diseases and pathogens of echinoderms

MAHFOUZ: is studying the population and reproductive ecology of asteroids

MARKEL: is studying calcification

MATURO: says that some of his best friends are echinoderm freaks. and that echinoderms are his next favorite phylum.

HENDLER: hopes that the new list of echinoderm literature will be alphabetized. Was not able to figure out if the last listing was haphazard or truly random. Suggested alibi : "My android dropped it in a hyperimprobability field and it time warped." What, me worry???

MUKAI: suggests a journal on echinoderm biology.

WEBB: is studying settlement, post-larval ecology and morphology

WEBER: is interested in Diadematidae

WITMAN: is studying recruitment of echinoids, suspension feeding inophiurids.

YAMAGUCHI: reports that *Acanthaster planci* occurred in abundance along the southern coasts of Japan where coral-reefs occurred during the period of *A. planci* infestation in the Ryukyus. The infestation in the Ryukyus is about to end after degrading most reefs there. Warm current (the Kuroshio) may be responsible for this.

WILKIE: is interested in connective tissues of echinoderms

PARSLEY: is interested in Homostelea, Paracrinoidea, Eocrinoids, Rhombiera, Diploprida ; paleoecology

Paul: is interested in cystoids s.l.

PETR: is studying biostratigraphy

PHILIPPE: is studying the miocene echinoids of the Rhone basin

PODDUBIUK: is particularly interested in Clypeasteroidea, Cassiduloidea, Spatangoida

PROFANT: Is interested in ciliated protozoa parasites of echinoderms

PROKOP: is interested in cystoids and in biostratigraphy

REGNELL: is interested in cystoids

ROZHNOV: is studying Rhombifera, Diploporita, Disparida, Pisocrinacea. is interested in symmetry

SCHELTEMA: is interested in larval ecology and settlement

SCHINNER: is studying spatangoidea, particularly the Loveniidae (e.g. Echinocardium) and Schiza steridae

SILVER: is interested in the cell biology of echinoids and asteroids

SOLOVJEV: is studying the Holasteroidea and Spatangoida

STANCYK: is interested in echinoderm life-history patterns

STRATHMANN: is interested in echinoderm life-history patterns

THIERRY: is studying irregular Jurassic groups (Disasteroidea). is interested in biostratigraphy.

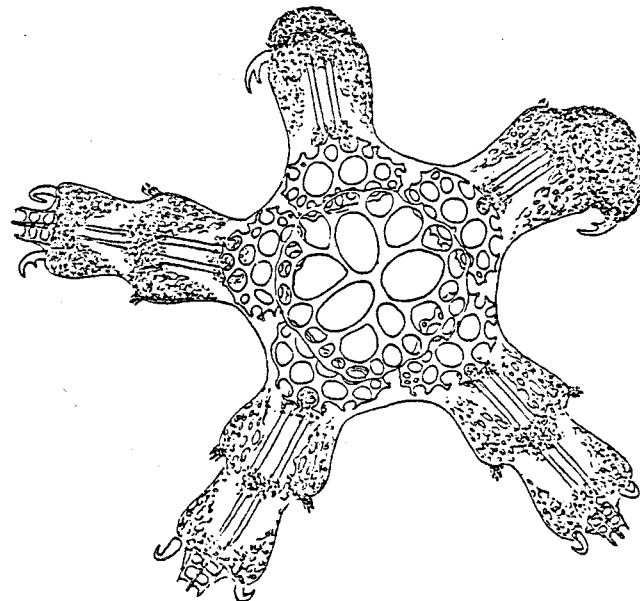
THOMASSIN: is interested in coral reef and tropical benthic assemblages of echinoderms

TWERSKY: is interested in histochemical studies of echinoderms (including ultrastructural aspects, e.g. x-ray microanalysis.

TYLER: is studying deep-sea echinoderms.

UBAGHS: is studying carroids and blastozoans.

MCEUEN: needs English translations of early German works on holothuroid embryology/development. Has an extensive bibliography of holothuroid studies.



*Ophiothrix savignyi*

Th. Mortensen. 1938. Development and larval forms of echinoderms. IV.

AILSAS SECTION: Ailsa Clark gently chided me that the last echinoderm newsletter was rather stodgy, with not even a recipe for sea-urchin roes. She was quite right, as usual. This issue of the newsletter initiates a section to remedy the problem. Contributions to the section for future issues are invited. JL

THOUGHTS ON THE TERMINOLOGY OF ECHINODERMS (un cri de coeur) \*

by Ailsa M. Clark

Lovely animals though they are, echinoderms raise many problems of terminology for those trying to describe them. Thanks to their metamorphosis from tidy bilaterally symmetrical larvae with 'fore' and 'aft' and 'top' and 'bottom', involving as it does a twist in orientation, radial adults lend themselves uneasily to 'dorsal' and 'ventral' and only the horizontally-stretched holothurians and irregular echinoids have 'anterior' and 'posterior'. Of the five extant classes, crinoids are 'upside down' and comatulids have the ridiculous anomaly of a centrodorsal plate in the middle of the underside. The merging of upper and lower surfaces without demarcation by marginal plates or abrupt change in contour makes reasonable the use of 'aboral' and 'oral' for upper and lower sides of sea urchins. However, asteroids do have marginals or differentiated 'abactinal' and 'actinal' plating which usually corresponds in extent with similarly named sides, although in some species the abactinal plates may wrap round the ambitus on to the outer part of the lower side, while specialists on ophiuroids and crinoids for many years used 'dorsal' and 'ventral' in describing them. Libbie Hyman tried to make all consistent in her classic textbook by extending the terms aboral and oral from echinoids to the other four classes. This may have its merits but, to one reared in the pre-Hyman era, there's something ludicrous about 'oral arm plates' for animals which already have 'oral' tagged on to structures really to do with the mouth and I can't retire from the scene without expressing one small squeak of protest as to the need to carry consistency so far. With so many readers of the newsletter engaged on physiological, reproductive or biochemical studies to do with echinoderms and fewer systematists in regular employment, maybe there's only a minority of us who are really concerned about how best to describe morphological features and this plea may seem like making mountains out of molehills, nevertheless here it is.

When it comes to nomenclature, however, even fewer of you are directly involved in making changes but many could be provoked into calling down curses on the heads of the taxonomists concerned when it all seems unnecessary. As an employee of a national museum, I felt obliged to try and stabilize familiar widely-used names which were threatened by strict application of the rules of nomenclature (maybe as some sort of compensation for juggling around with other names into different combinations or synonymy). This meant drafting very time-consuming proposals addressed to the International Commission on Zoological Nomenclature (ICZN) in the 'legalese' it requires, to ask for 'exertion of its plenary powers' to suspend the rules in certain cases. After spending so long in drafting and rehashing the rules, some commissioners seem extremely reluctant to allow them to be bent in any way, though the ones personally connected with echinoderm work, notably Professor Tortonese, have always been very supportive.

Back in the 1960s, Frank Rowe and I rashly embarked on a proposal to try

\*Included in this section without the knowledge or consent of the author. JL

and ensure that some well-known old holothurian names were saved from possible relegation, only to find a Pandora's box of 'nomina oblita' lurking in the work of Brandt (1835) and others of similar antiquity. A glutton for punishment, I turned then to ophiuroids, finding that Ophiura itself, thanks to an illegal type-species, as well as three of the best-known European brittle-star specific names: Ophiura texturata, Ophiothrix fragilis and Ophiocomina nigra are all strictly untenable under the rules. (Horrorified, I stopped at that point only to find later that the equally well-known and worldwide versatile species, featuring in numerous fauna lists as Amphipholis squamata should really be A. elegans, or even Axiognathus elegans if Lowell Thomas's division of Amphipholis is adopted and combined with the rule of priority.) Unfortunately, as the slow mills of the Commission ground on, the case for retaining Ophiura texturata proved to be stymied by my namesake Hubert Lyman Clark, a stickler for the rules, who revived Ophiura ophiura (Linnaeus) for it in 1915 and although Mortensen's protests resulted in other specialists joining him in ignoring the rules in this case, this was unsanctioned by the ICZN (unlike his successful attempt to save Diadema in place of H.L.C.'s revived Centrechinus). Giving in to Ophiura ophiura going on the Official List of Specific Names blighted my faith in the Commission as a reasonable body, while advancing years provoked the thought that life's too short to spend much time on similar ploys, however altruistic one's intentions. Now it seems to me sufficient to just publicize that a potential problem exists (as with Amphipholis squamata in 1970) and hope that common sense will prevail.

During the recent crisis in funding for continuation of the ICZN and its secretariat, I submitted an idea that the cumbersome set-up could be simplified and speeded up by the individual commissioners - as specialists each on a particular group of animals - coopting several other specialists concerned with that group to deal informally with problems of nomenclature brought to their attention, which could be publicised to others likely to care in newsletters such as this. The Bulletin of Zoological Nomenclature could then be restricted to brief announcements of decisions on names. Predictably I suppose, this idea for economy in expense and time with limitation of problems to those who really care about them, was unacceptable. It is inevitable that classifications and names must change to some extent as our knowledge of animal relationships progresses with new techniques and characters for evaluation but surely avoidable changes should be kept to a minimum.

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"In my notebook of 1861, I see "Euryale exigium, Lamk., original of Peron and Lesueur, 1803; young." This prosaic line is poetical for me. It takes me back to the Jardin des Plantes as it was twenty years ago; and I can see the laboratories of the "Mollusques et Zoophytes," where I studied under the kindly direction of old Valenciennes. He has gone, and so has his successor, Deshayes, and their place is now worthily held by Professor Perrier, who was a very young man when I first knew him. But still that poor little broken Astrophyton exiguum lies on its shelf, the survivor of professors and emperors."  
 Theodore Lyman. 1882. Report on the OPHIUROIDEA dredged by H.M.S. Challenger during the years 1873-1876. p. 257. JL

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# GORDON HENDLER'S RECIPE FOR MOCK BRITTLESTAR SOUP

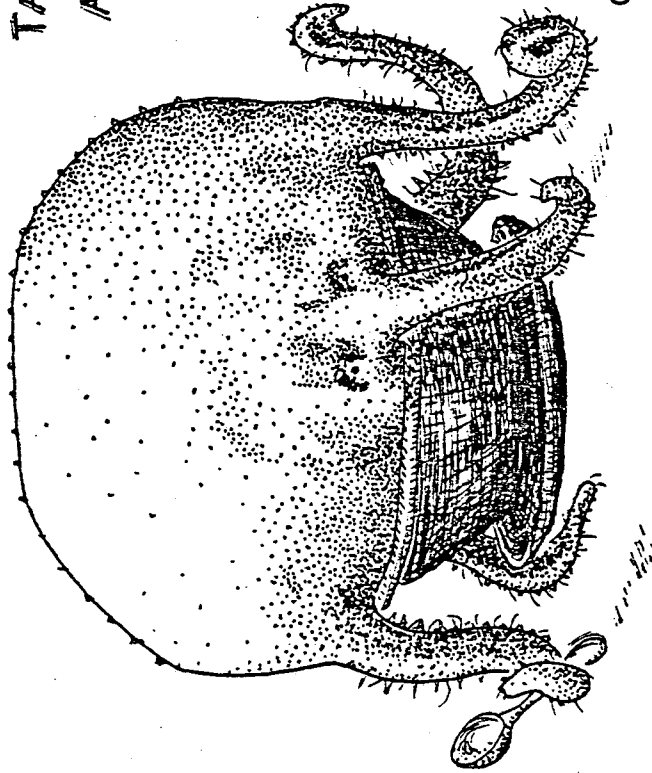
TAKE A BIG GULLIBLE BRITTLESTAR  
AND GENTLY TAUNT IT:

("Where were you when the  
pedicellariae were handed out?"),  
THEN LIBERALLY INSULT IT:

("Your sister group is  
the Echinoidea!").

WHEN THE BRITTLESTAR BEGINS  
TO SULK, TOSS IT UNCEMEMONIOUSLY  
INTO A BOWL OF TEPID SEAWATER.

SEASON TO TASTE WITH CHIDES  
OR ASSAULT. IF LEFTOVERS ARE  
SET ASIDE TO REGENERATE, THE  
BRITTLESTAR CAN BE MOCKED AGAIN  
AND AGAIN.



The "uselessness" of echinoderms. (contributed by R.L. Turner)

"The production of animal material on the sea-floor can be regarded as 'useful' or 'wasteful' according to whether it contributes to the formation of commercially-valuable species of fish or other creatures of no value to man. For example, starfish and brittle-stars are not used as human food and are relatively unimportant as fish food; but they are carnivores and compete with fish for the same sort of prey, especially molluscs. The growth of these predatory echinoderms is a wasteful type of production". IN: Tait & DeSanto. Elements of Marine Ecology. Springer-Verlag.

All the way to Bailey's Bay  
Fish and taters every day.

Old couplet from Bermuda.

"SEA EGGS OR URCHINS. These are not cherished as a delicacy in Bermuda, but there is a plentiful supply for those who are enterprising enough to extract the succulent meat with a small spoon, touching it up with condiments and sauces to taste.

SEA PUDDINGS. These creatures, called Trepang in the Orient, are, of course, an important Chinese dish, and in the past seamen have risked their lives in the Pacific Islands to obtain a cargo of the valuable Beche de Mer or Trepang for the Chinese market. Members of the Historical Society will remember Captain Lusher's famous yarn about his experiences on such a quest. This fish, if considered at all in Bermuda nowadays, is regarded with contempt, but it was once eaten here, as a recipe of 1846 (which I give with the reservation that the soup would be excellent without any sea pudding whatsoever), clearly shows:

SEA PUDDING SOUP (1846): Let the Trepang lie in a dish for an hour to drain off the salt water. Put 2 quarts water to 06 trepangs and boil for 10 minutes. Throw the water away, and add 2 more quarts of fresh water together with 3 lb veal or beef, some onion and spice, but no salt. Bring the whole to a boil, then simmer for 6 hours. Strain through a collander, add one tablespoon of Catchup or Worcestershire sauce, and a tumbler of white wine."

from: Zuill, Kitty. A Bermuda Kettle of Fish. The Bermuda Book Stores, Hamilton (no date given).

JL



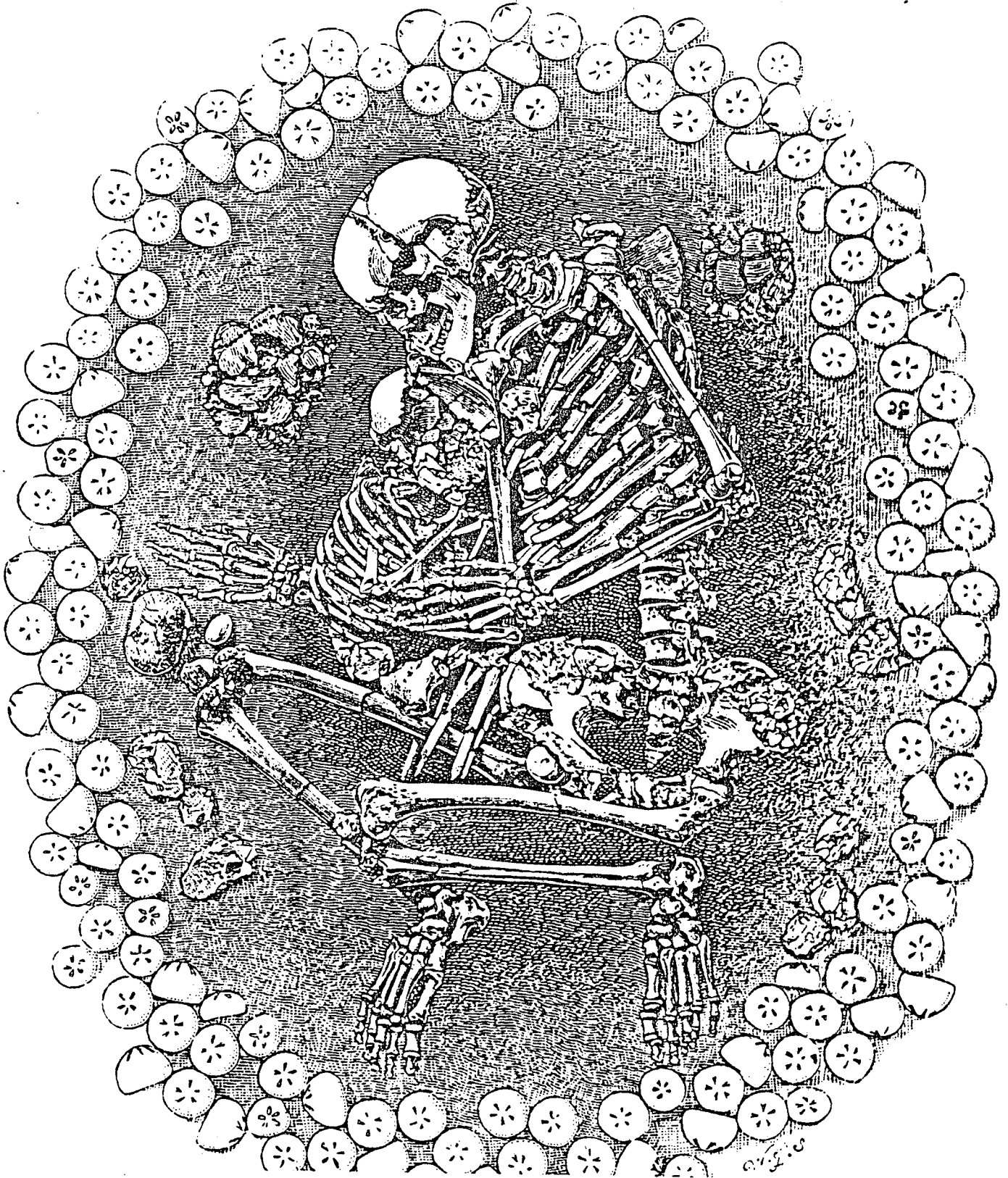
BINKEY AND THE URCHINS

by N.A. Sloan Esq.

I wish to recount an incident between myself, awesome Dave Pawson, Binkey the basset hound and Lytechinus variegatus against the lush tropical background of Mullet Bay, Bermuda. Let me say from the outset that it was Pawson's fault. We all know this certain person of dubious golf skills and innumerable bad jokes. At any rate, I was on a mission of mercy to lead Dr. Possum to rare and precious specimens of the Bermudian L. variegatus. Mine was the thankless task of single-handedly rescuing his foundering collection efforts. Thus, our story finds us proceeding to the Bay on wretched motorized bicycles, casting ourselves manfully into the briny deeps containing any number of dire perils and gleaning from nature's treasurehouse the finest specimens of L. variegatus in Christendom. I must at this point in time, however, take one step back and mention that before we defiled the azure waters of Mullet Bay, we requested access to said waters from the good folk who resided on the shore. They possessed a basset hound who was called by the fatuous name 'Binkey'. This was a creature of singular ugliness who bore altogether too much body on too few cm of limbs. Binkey found our presence trying and despised us from the outset. It was after we looted the Bay and loaded up the carrier bags of our pathetic mopeds with heavy jars that Binkey made his move. Out he charged, baying most unpleasantly, and a thrill of terror rushed through two of the finest minds what have ever grappled with your Phylum Echinodermata. There was a regrettable lapse of composure as we frantically started our moped. The object was total escape from the wanton bloodlust of that mutant hound. Pawson set off first, of course, and I was left as shark-bait to protect the retreating figure of one of the Smithsonian's finest. Binkey was really a filthy coward for the more we retreated, the more he approached in canine fury. Binkey selected me for death and I selected the highest ground. The fully loaded moped stalled, of course, and I decided to become a Christian to aid my chances with St. Peter in the afterlife. I must report that my tender limbs were not laid open by those gleaming fangs as dear Binkey preferred the fantasy of the chase to the reality of a carcass. I still remember Dr. Pawson's maniacal laughter, from a safe distance, and I must further report that I received not even a hearty cash bonus for my pivotal role in the L. variegatus research. Thus endeth another towering epic in personkinds' search for higher echinoderm knowledge.

This learned essay is dedicated to Ailsa McGowan Clark, the doyenne of British Echinodermata. All for you, Ailsa.

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from Worthington G. Smith. 1894. Man, the primeval savage. Edward Stanford, London.  
 Skeletons of a young woman and child from Paleolithic grave at Dunstable Downs.  
 Echinoid species: *Ananchytes ovatus* Leske and *Micraster coranguinum* Leske.

Papers presented at the 5th International Echinoderms Conference, Galway, Ireland. 24-29 September 1984.

Lahaye. Spawning and early development in the comatulid crinoid, Antedon bifida (Pennant): an SEM-study.

Roman and Fishelson. Comparison of reproduction in three Red Sea feather-stars Lamprometra klunzingeri, Heterometra savignii and Capillaster multiradiatus.

Tyler, Gage and Billet. Gametogenic strategies in deep-sea echinoids and holothuroids from the N.E. Atlantic.

Lessios. Reproductive periodicity of nine Caribbean species of echinoids in Panama.

Barker. Reproduction and larval development in the brooding echinoid Goniocidaris umbraculum.

Schatt. The development of the oral surface in the embryo of Abatus cordatus, an antarctic brooding sea urchin.

Burke. Pheromonal control of metamorphosis in the Pacific Sand Dollar, Dendraster excentricus.

Rumrill and Chia. Differential mortality during the embryonic and larval lives of two northeast Pacific echinoids, Strongylocentrotus purpuratus and Dendraster excentricus.

Bookbinder and Shick. A respirometric and direct calorimetric study of ovary energy metabolism in Strongylocentrotus droebachiensis.

Moore. Neurophysiological studies on chemoreception in Ophiura ophiura (L) (Echinodermata, Ophiuroidea).

Basch. Interactions between a bioluminescent ophiuroid, Ophiopsila californica and several nocturnal benthic predators.

Emson and Herring. Bioluminescence in deep and shallow water brittlestars.

Clements. Post autotomy feeding behavior of Micropholis gracillima (Stimpson): implications for regeneration.

Smith and Keegan. Seasonal torpor in the dendrochirote Neopentadactyla mixta Ostergren.

McClintock. Size selectivity of prey in Luidia clathrata (Echinodermata: Asteroidea): effect of nutritive condition and age.

Moore. Plagues of starfish: some behavioural and ecological parallels with locusts.

- Valenticic and Ota. Comparison of chemical senses in the starfish Marthasterias glacialis (Asteroidea) and in some fishes.
- Cobb. Intracellular studies on the nervous system of an echinoderm.
- Franzen-Bengtson. Middle Cambrian echinoderms from Sweden.
- Donovan. Biostratigraphy and evolution of crinoid columnals from the Ordovician of Britain.
- Brower. Ontogeny and functional morphology of two Ordovician calceocrinids.
- Parsley and Prokop. Echinosphaerites (Rhombifera) and its community relationships from the Middle Ordovician of Bohemia, Czechoslovakia.
- Thierry. Settlement evolution of the Jurassic Paris basin (France). Collyritidae (Echinoidea, Disasteriidea).
- Waters and Sevastopulo. A review of the Lower Carboniferous blastoids (Echinodermata) of Ireland and Great Britain.
- Poddubiuk. Evolution and adaptation in Caribbean Oligo-Miocene clypeasters (Echinoidea).
- Paul and Smith. The early radiation of echinoderms.
- Blake. Stability and change in the history of sea stars.
- Splechtna and Hilgers. Pedicellariae as a specific character in sea urchin species.
- Aziz and Jangoux. Revision of the genus Calliaster Gray, 1840 (Asteroidea: Goniasteridae).
- Leeling. Comments on the genus Odonaster (Echinodermata: Asteroidea).
- Gage, Billett, Clark, Jensen, Paterson, Pearson and Tyler. Echinoderm distributions in the Rockall Trough (N.E. Atlantic).
- Billett and Hansen. Pelagic Holothuroidea of the North-East Atlantic.
- Haedrich and Maunder. The Echinoderm Fauna of the Newfoundland Continental Slope.
- Pawson and Foell. An annotated atlas of abyssal echinoderms from the Clipperton-Clarion Fracture Zone, equatorial eastern north Pacific.
- Sloan. World Echinoderm Fisheries.
- Bourseau. La zonation bathymetrique des pentacrines de la marge du Pacifique oriental.
- Rowe. Distributional patterns of Australia's tropical echinoderms: a matter of vicariance or dispersalism?

- Vadon and Guille. The Ophiuridae family in the bathyal zone of the occidental part of the Indian Ocean: origin and biogeography.
- Emsen. Bone Idle - a recipe for success?
- David. Significance of architectural patterns in the deep-sea echinoids Pourtalesiidae.
- Dafni. Test growth and calcification of the regular echinoid Tripneustes gratilla elatensis.
- Dubois and Jangoux. The microstructure of the asteroid skeleton (Asterias rubens).
- Telford. Structural analysis of the test of Echinocyamus pusillus.
- Jensen. Functional morphology of test, peristome, lantern and tube feet in flexible and rigid sea urchins (Echinoidea). A comparative study of feeding and respiratory organs with comments on their evolution.
- Lambert. Geographic and age variation of holothurian ossicles.
- De Vos. Ultrastructure of the tube feet of the ophiuroid, Amphipholis squamata (delle Chiaje).
- Mooi. Anatomy, function and diversity of Clypeasteroid non-respiratory podia.
- Regis and Thomassin. Microstructural peculiarities of Asthenosoma varium Grube spines (Echinoidea, Echinothuridae). Affinities with Diadematidae and Toxopneustidae.
- de Burg, Fontaine and Singla. Functional organization of the sea urchin spine.
- Dotan and Fishelson. Morphology of spines of Heterocentrotus mammillatus (Echinodermata; Echinoidea) and its ecological significance.
- Messing. Submersible observations of deep-water crinoid communities in the Straits of Florida.
- de Laubenfels. The brittle star, Ophiactis savignyi (Muller & Troschel), an inhabitant of a Pacific sponge, Damiriana hawaiiiana.
- Sides. Interference competition between brittle-stars?
- Hendler. A study of ophiuroid size, abundance and reproductive mode in relation to Coral Reef zones and substrata.
- Turner. Annual recruitment in the brackish-water ophiuroid Ophiophragmus filograneus.
- Witman. Predation influences the microhabitat distribution of ophiuroids and echinoids in the Rocky Subtidal Zone of the Gulf of Maine, USA.

- White, Keegan and Leahy. Growth retardation in the regular echinoid Echinus esculentus L.
- Hagen. Sea urchin outbreaks and nematode epizootics in Vestfjorden, northern Norway.
- Harris, Rowley and Witman. A comparison of sea urchin recruitment at sites on the Atlantic and Pacific coasts of North America.
- Tertschnig. Sea urchin grazing in sea grass communities: The significance of various plant parameters for the strategy of feeding.
- Keats, South and Steele. Ecology of juvenile green sea urchins (Strongylocentrotus droebachiensis) at an urchin dominated sublittoral site.
- Scheibling. Mass mortality of Strongylocentrotus droebachiensis (Echinoidea) and increased macroalgal abundance in the rocky subtidal off Nova Scotia, Canada.
- O'Connor, Keegan, Costelloe and Bowmer. The Irish Echinoderm Fauna.
- Johnson, O'Donoghue and Donlon. Soluble and membrane bound peptide hydrolases of Holothuria forskali digestive tract.
- Oudejans, Konings and Voogt. Histochemical localization of NADPH-producing enzymes by the tetrazolium salt method and of acetyl CoZ Carboxylase by a novel peroxydase-labelled avidin method in the storage organs and gonads of the sea star, Asterias rubens.
- Nichols and Barker. Role of the body-wall in the nutritional cycle of three English Channel starfish.
- Ferguson. Transport of nutrients by the hemal system of the ophiuroid, Ophioderma brevispinum.
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- Lawrence. The Energetic Echinoderm.
- Stickle. Patterns of nitrogen excretion in seven species of Asteroids.
- Watts and Lawrence. The effect of starvation on the level and content of nucleic acids in the pyloric caeca of Luidia clathrata (Say) (Echinodermata: Asteroidea).
- Féral. Caloric content of temperate and subantarctic holothuroids at critical stages of their life cycles.
- Jost and Rein. Refuges and migration: a stabilizing factor for a local sea star community?
- Chiu. Feeding biology of the short-spined sea urchin, Anthocidaris crassispira (Agassiz) in Hong Kong.

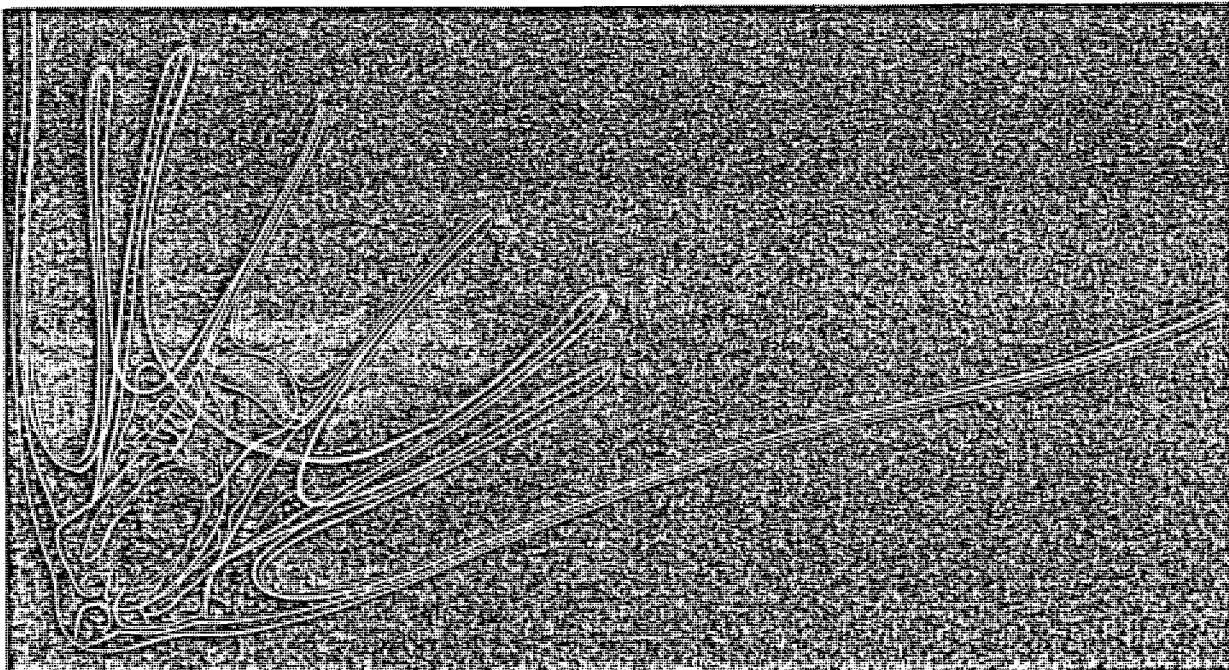
- Ellers. Oral surface podial feeding in the sand dollar Echinarachnius parma (Lamarck).
- De Ridder, Jandoux and Van Impe. Food selection, gut content and absorption rate in the spatangoid Echinocardium cordatum (Echinoidea).
- Chia. Selection, storage and elimination of heavy sand particles by the juveniles of the sand dollar, Dendraster excentricus (Eschscholtz).
- Ausich and Bottjer. Echinoderm role in the history of phanaerozoic tiering in suspension-feeding communities.
- Kalata. Life modes of cornute and mitrate carpoids.
- Rose and Olver. Slow evolution in the Holoctypidae, a family of primitive irregular echinoids.
- Roux. La formation des calcaires a Entroques: regard actualiste.
- Beijnink and Voogt. Pathways of nutrient translocation during vitellogenesis in the sea star Asterias rubens.
- Broertjes and Voogt. Isolation and characterization of vitellogenic substances in the sea star Asterias rubens (L).
- Voogt. Comparison of steroid levels in the gonads and pyloric caeca of male and female Asterias rubens: relation to reproduction.
- Caine and Burke. Immunohistochemical localization of gonad-stimulating substance in the sea star Pycnopodia helianthoides.
- Ferrand. Acid phosphatase during yolk formation and early development in Asterina gibbosa (Echinodermata - Asteroidea).
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- Guillou. The population dynamics of Echinocardium cordatum (Pennant) in the Bay of Douarnenez (Brittany).
- Muscat. An experimental evaluation of the effect of holothurian deposit feeding on infaunal communities.
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- Thomassin. The Acanthaster infestations: A step in the damaging-evolution of the Coral Reef Ecosystem.
- Conand. Crown-of-thorns starfish in New-Caledonia (South Pacific).

- Jangoux. Biotic Diseases of Echinoderms.
- Guillou and Guillaumin. Variations in the growth rate of Asterias rubens (L.) illustrated by two populations of west and south Brittany (France).
- Young. Consequences of predation by the asteroid Evasterias troschelli in a soft-sediment ascidian community.
- Ghiold. The African Sand Dollar, Rotula.
- Fenaux, Cellario and Etienne. Ingestion des cellules algales en fonction du developpement de la ciliature chez la larve de l'oursin Paracentrotus lividus.
- Mladenov. Development and metamorphosis of the West Indian brittle star Ophiocoma pumila: ecological and evolutionary implications.
- Walker and Smith. Use of dissolved organic matter during brooding in Amphipholis squamata; implications for editing the developmental program of the ophiopluteus.
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- Miller. Viviparity in a psolid holothurian from the tropical western Atlantic.
- Crump and Barker. Sexual and asexual reproduction in geographically separated populations of the fissiparous asteroid Coscinaster calamaria Gray.
- Franz. Adaptive aspects of the annual caeca/gonad reproductive cycle in Asterias forbesi.
- Larochelle and Walker. Changing properties of somatic accessory and germinal cells during the amitotic/mitotic and premeiotic/meiotic transitions of spermatogenesis in Asterias vulgaris.
- Smith. Regulation of spermatogenic proliferation in Asterias vulgaris by polyamines.
- Ebert. Regeneration and the significance of growth lines in spines of the slate-pencil sea urchin Heterocentrotus mammillatus.
- Ramsay and Campbell. An investigation of the distribution of pedicellariae in Echinus esculentus (L).
- Harold. Body-wall structure of Echinarachnius parma (Echinoidea: Clypeasteroidea).
- McKenzie. The tentacles of dendrochirote holothurians - an SEM study.
- Byrne. The fine structure of the autotomy tissues of the holothurian Eupentacta quinquesemita (Selenka) before, during and after evisceration.
- Silver. Histology of the anterior autotomy planes in the viscera of Holothuria scabra (Holothuroidea: Aspidochirotida).



- Maes. Ultrastructural study of the lesions caused by the bald-sea-urchin disease.
- Wilkie and Emson. The tendons of Ophiocomina nigra and their role in arm autotomy: evidence for variable tensility in a type IV collagenous structure.
- Motokawa. Catch connective tissues: the connective tissue with adjustable mechanical properties.
- Bouland. Activity throughout the year and transportation of the radial nerve gonad-stimulating-substance (GSS) in the asteroid, Asterias rubens L.
- Billett and Lampitt. Deep-Sea echinoderms.
- Bacallado, Moreno and Perex Ruzafa. Echinodermata (Canary Islands). Provisional Check-list.
- Bourgoin. Acrocnida brachiata (Montagu) - Intertidal, subtidal populations - Brittany.
- Bowmer. The use of an echinoderm as a substrate in ecotoxicological testing.
- Carson and Mladenov. Obligate asexuality in a population of the sea star Stephanasterias albula from the Bay of Fundy.
- Cuenca. Paracentrotus lividus (Lamarck) and Psammechinus miliaris (Gmelin) in the intertidal zone of the French Atlantic coast: Introduction to the study of their growth and of their boring activity in siliceous rocks.
- Donovan. Myelodactylid crinoids from the Upper Ordovician and Lower Silurian of Europe.
- Erber and Strenger. The larval coelom, significant for the characterisation of bipinnaria and brachiolaria in asteroid ontogeny.
- Ghiold. Geographic and bathymetric distribution of the clypeasteroids.
- De Greef and Jangoux. Ultrastructural aspects of the plutean arm of the echinoid Paracentrotus lividus (Lamarck).
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- Guille, Laboute, Menou, Cherbonnier, Feral, Jangoux, Meyer, De Ridder and Vadon. Presentation of the "Guide sour-marin des Echinodermes du recif de Nouvelle-Caledonie".
- López-Ibor. Echinoderms of the "Cantabrico 83" expedition off the north coast of Spain (November 1983).
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- Lahaye and Jangoux. SEM-study of the feeding structures of pentacrine larvae and adult individuals of the comatulid crinoid, Antedon bifida (Pennant).
- Lambert and Jangoux. Investigations on movement and excitability of the rosettes of crossed pedicellariae in the asteroid, Marthasterias glacialis (L.).
- Meyer. Palaeoecology of a Late Jurassic echinoderm community from the Swiss Jura mountains.
- Nagaoki. Comparative analyses of free amino-acid composition in eggs/ovaries of sea urchins (the subclass Regularia).
- De Ridder and De Vos. Bacterial pellets in the intestinal caecum of Echinocardium cordatum (Echinoidea): structure and X-ray analysis.
- Scheibling and Jones. Disease and mass mortality in Strongylocentrotus droebachiensis (Echinoidea) off Nova Scotia, Canada.
- Simms. The genus Balanocrinus in the British Lower Jurassic.
- Vandon, Ferrand, Féral and Guille. Preliminary reports on reproduction of Mediterranean echinoderms collected between 0 and 1000 metres, during the "ECOMARGE programme".
- Yanagisawa. Base sequence complexities of DNA prepared from spermatozoa of Clypeasteroid and Spatangoid urchins.
- Yourassowsky. Development of the larval coelom in the asteroid, Asterias rubens L.



~~Papers presented at the annual meeting of the American Society of Zoologists, Denver, 1984. Abstracts published in American Zoologist, 24 (3).~~

- Chen, CP, JM Lawrence. Localization of carbonic anhydrase in the plumula of the tooth of *Lytechinus variegatus* (Lamarck) (Echinodermata:Echinoidea). p.14A.
- Cavey, MJ. Organization of the coelomic lining in the tubefoot of a phanerozoian starfish. p. 15A.
- Thomas, LA, CO Hermans. Suction is not the answer: evidence for the duo-gland adhesive system in starfish tubefeet. p. 15A.
- Herrlinger, TJ. Kelp forest prey refugia: an interaction among gastropods, cnidarians, and sea stars. p. 24A.
- McEuen, FS. Chemical and morphological defenses of holothuroid eggs, larvae, and juveniles. p. 25A.
- Klinger, TS, JM Lawrence. Food and movement of *Lytechinus variegatus* (Lamarck) (Echinodermata:Echinoidea). p. 29A.
- Roller, RA, WB Stickle. Salinity effects on the tolerance and early developmental rates of four species of echinoderms. p.30A.
- Zmarzly, DL. Resource partitioning and coexistence of pontonine shrimps associated with crinoids at Enewetak Atoll, Marshall Islands p. 41A.
- Emlet, RB. Facultative planktotrophy in a tropical sea biscuit, *Clypeaster rosaceus*: advantages of larval feeding. p. 45 A.
- McEdward, LR. Some relationships between egg size and the allometry of larval growth in echinoid plutei. p. 46A.
- Rumrill, SS. Correlations between development rate and predator susceptibility in larvae of five temperate echinoderms. p46A.
- Cameron, RA. Response to temperature and salinity by embryos of four Caribbean sea urchins. p. 46A.
- Odum, MA, AC Dempsey, JR Moyer. Between-habitat food selection by regular sea urchins (Echinoidea). p.87A.
- Watts, SA, TT Arja, JM Lawrence. The effects of 17 $\beta$ -estradiol and feeding-level on growth of the pyloric caeca in *Luidia clathrata* (Echinodermata: Asteroidea). p.93A.
- Oppenheimer, SB, M Alikani, A Ransick, S Liang, K McCray, M Lemell, E Azzam, B Burgess. Fluorescence localization of sea urchin embryo extracellular components. p. 100A.
- Pennington, JT. The ecology of fertilization of echinoid eggs: the consequences of sperm dilution, adult aggregation and synchronous spawning. p.130A.
- Sinervo, BR, LR McEdward, RR Stratmann. The effect of experimental reduced egg size on form, function and rate of development of planktotrophic larval echinoids. p.131A.

Smiley, S. Metamorphosis in the holothurian *Stichopus californicus*. p.131A.

Bosch, T, KA Beauchamp, ME Steele, JS Pearse. Slow developing feeding larvae of a common Antarctic sea urchin reared through metamorphosis. P.131A.

Muscat, AM. An experimental evaluation of the effect of holothurian deposit feeding on infaunal communities. p. 139A.

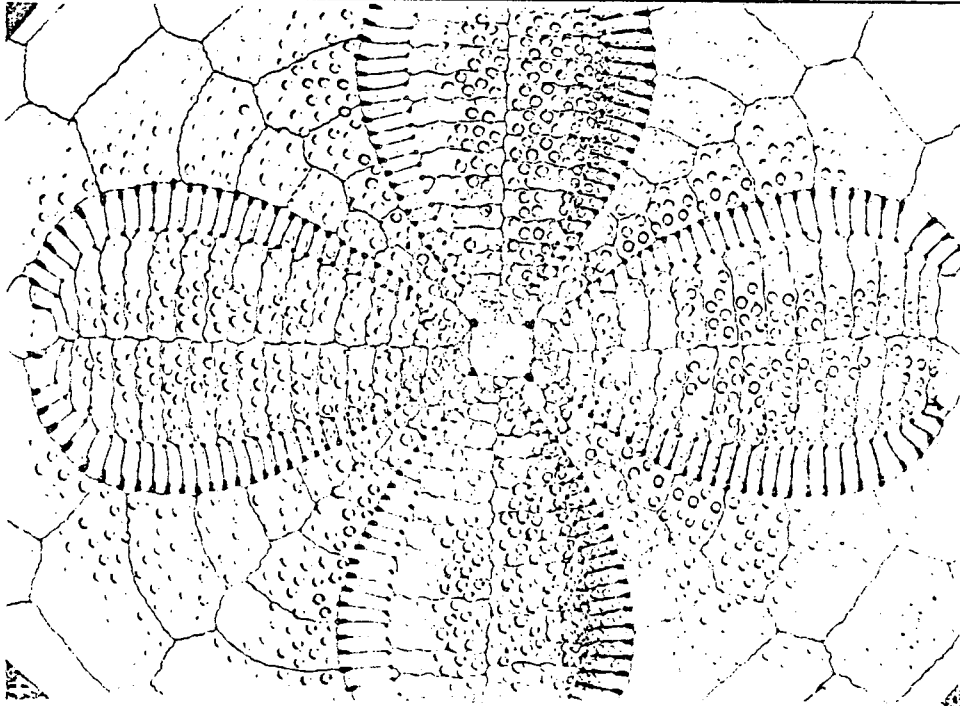
Dalby, JE. Significance of swimming in the sea anemone *Stomphia didemon* in response to contact with certain asteroids. p. 144A.

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Klinger, TS, HL Hsieh, RA Pangallo, CP Chen, JM Lawrence. The effect of temperature upon feeding, digestion, and absorption of *Lytechinus variegatus* (Lamarck)(Echinodermata:Echinoidea). p. 30.

Forcucci, D, JM Lawrence. The effects of salinity on the feeding rate, growth, and activity of *Luidia clathrata* (Echinodermata:Asteroidea). p. 30.

Estabrooks, WA, RL Turner. Ultrastructure of spermatozoa of four brackish-water echinoderms p. 31.



I. Taki (1929) *Clypeaster japonicus*

29  
THESES AND DISSERTATIONS

Many theses and dissertations are never published and many echinoderm specialists are consequently unaware of them. This is unfortunate because considerable effort is involved in their production and considerable worthwhile information is contained in them. In addition, few theses or dissertations are published in their entirety. The contents of theses and dissertations are often much more developed than published articles. There is a wealth of information concerning echinoderms found in these dissertations which could be used to great advantage by echinoderm specialists. The list is also of interest historically, because it shows very well the development of echinoderm biology.

Titles of dissertations and theses have appeared in issues 3, 4, 5, 7, 8, 11, 13, and 14 of the newsletter. By next summer it will be possible to obtain by request a listing of theses and dissertations according to taxonomic class, subject, and geographical region.

Relatively complete lists are available for Australia, Canada, France, Switzerland, and the United States. It is unfortunate that the list is incomplete, and sometimes completely lacking, for many countries. I invite echinoderm specialists to send me citations to theses and dissertations in their countries so that we will be aware of the contributions made there. JL

Australia (communicated by A.J. Butler, A. Constable, J.S. Lucas, A.J. Underwood)

B.Sc. theses

Keough, M.J. 1976. The role of asteroid predators in determining the structure of jetty pile communities. Univ. of Adelaide.

Masters theses

Aung, W. 1975. Observations on the reproductive biology of the tropical sand dollar *Arachnoides placenta* (L.). James Cook Univ. of North Queensland.

Dartnell, A.J. 1971. The taxonomy and biogeography of the sea star genus *Patiriella* in Tasmania. Univ. of Tasmania.

Davies, M.M. 1935. 1. Variation, 2. Holothuroidea. Univ. of Melbourne.

Duyverman, H. 1976. Factors influencing the local distribution of the seastar *Patiriella exigua*. Flinders Univ. of South Australia.

O'Connor, CP. 1976. Reproductive periodicities of the echinoids *Centrostephanus nodgersii*, *Phyllocanthus parvispina*, *Triploneustes gratilla* and *Heliocidaris tuberculata* in the light of some ecological variables among the Solitary Islands. Univ. of New England.

Penn, PE. 1978. Growth and structure of the sensory cushion in a marine asterozoan: The fine structure of the optic cushion in *Nepanthia belcheri*. James Cook Univ. of North Queensland.

Rainen, AG. 1975. Section one: Literature review - Hybrid inviability in the phyla Chordata, Echinodermata and Arthropoda. Section two: Research report - hybrid inviability in some members of the subfamily Monabinne (Orthoptera: Eumastacidae). Univ. of Melbourne.

Williams, DH. 1975. The reproductive cycle, the embryonic and larval development and the metamorphosis of *Heliocidaris erythrogramma* Echinoidea. Univ. of Sydney.

#### Ph.D. dissertations

Fletcher, WJ. 1985. Experimental population ecology of sublittoral grazers in New South Wales. Univ. of Sydney.

Franklin, SE. 1980. The reproductive biology and some aspects of the population ecology of the holothurians *Holothuria leucospilota* (Brandt) and *Stichopus chloronotus* (Brandt). Univ. of Sydney.

#### United States

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Basch, LV. 1985. Ecology, behavior, and functions of bioluminescence in the subtidal, sand dwelling ophiuroid *Ophiopsila californica*. Univ. of California, Los Angeles.

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Breitburg, DL. 1982. Development of a subtidal epibenthic community: effects of grazing, temporal variability and prion residency. Univ. of California, Santa Barbara.

Hanson, JL. 1985. Hydrodynamics of perivisceral fluid circulation in the sea urchin *Lytechinus variegatus* with special reference to material transport. Univ. of South Florida.

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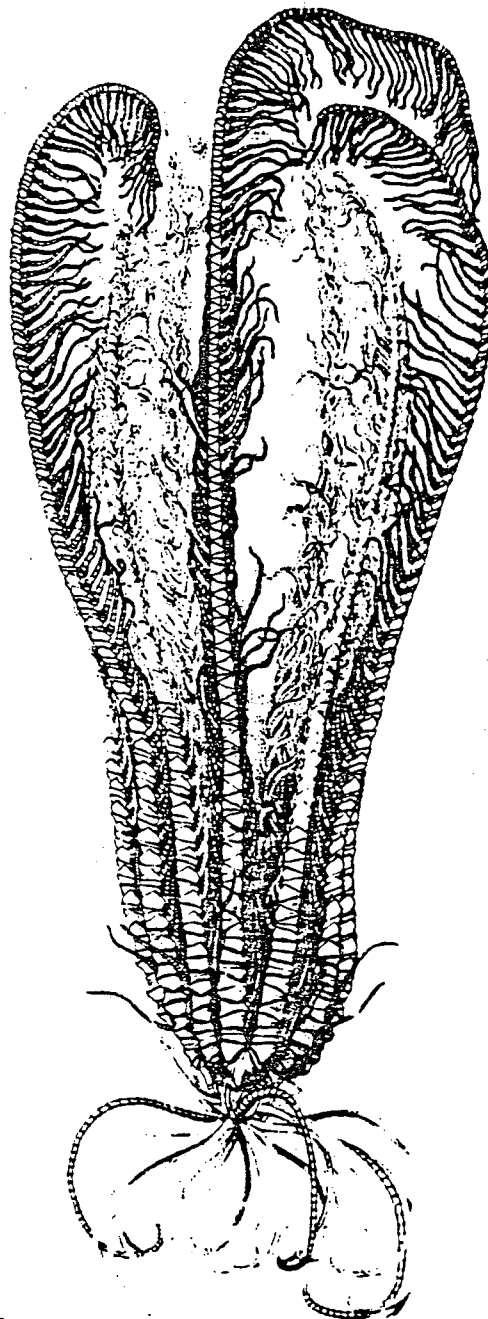
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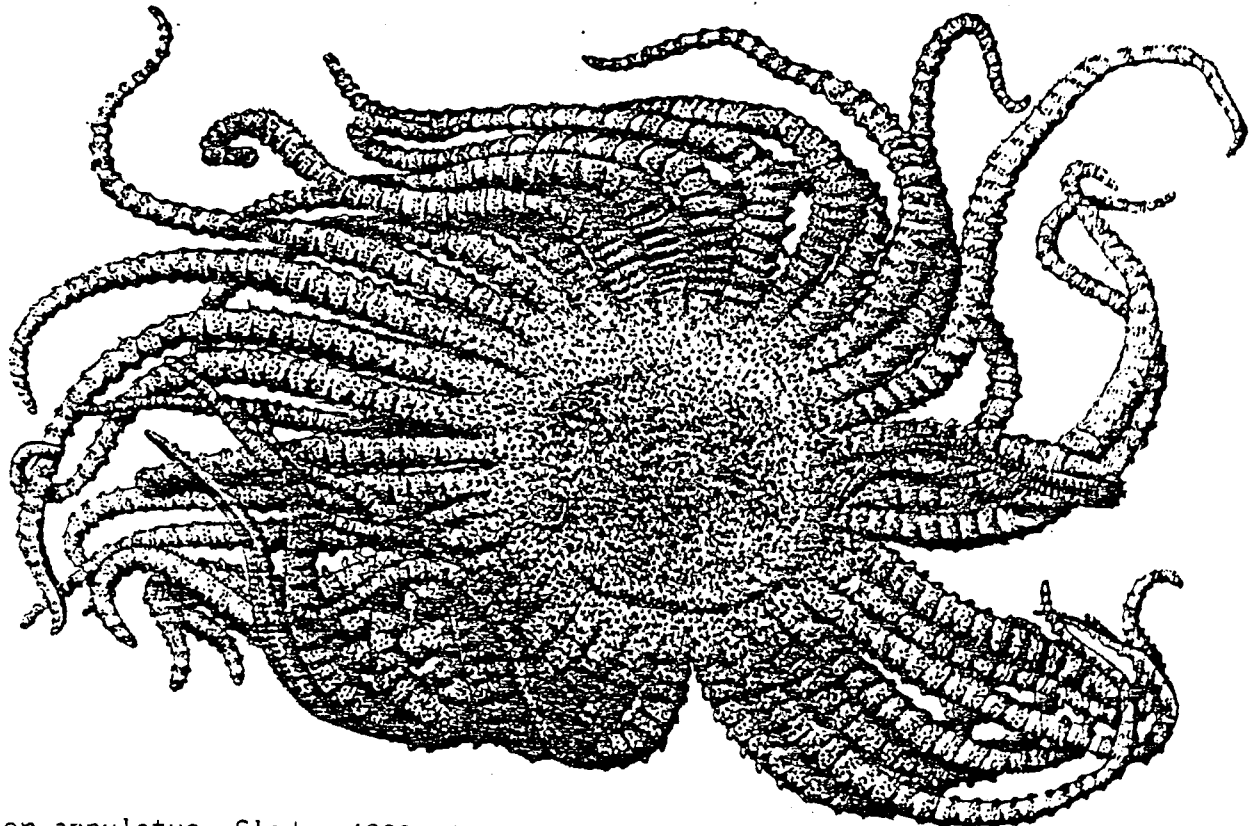
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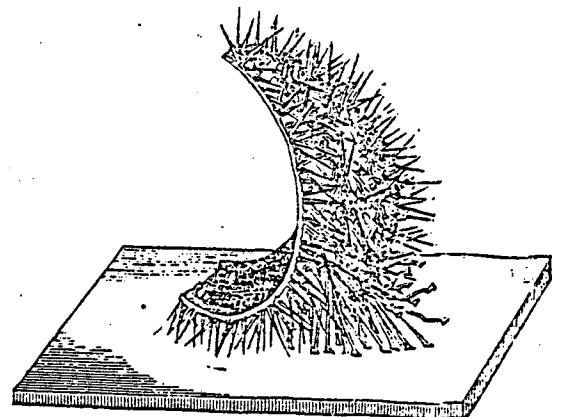
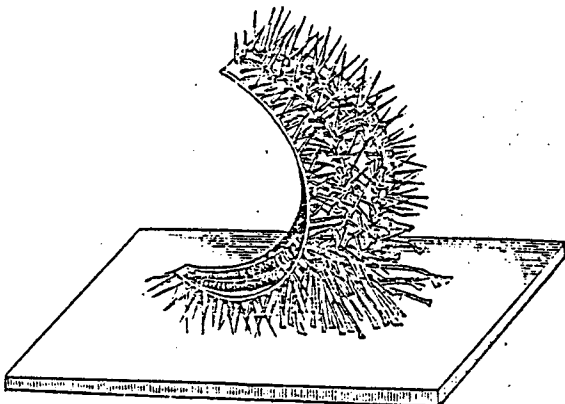
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JELLY-FISH, STAR-FISH, AND SEA-URCHINS.

Romanes. 1885.



Figs. 62 and 63.—Righting and ambulacral movements of severed arguments of Echinus.

## A LIST OF ECHINODERM SPECIALISTS

The list gives the names of those individuals who returned the information form. Numbers given after the name indicate the individual's area of interest.

A grouping of individuals by country and area of interest is given following the list.

Those whose names are not included here and those who have a change of address can use the last page of this newsletter to send the information to the editor.

The last page of the newsletter can also be used to submit requests, information about current research, meetings, publications, suggestions.

Material received will be published in the summer 1986 newsletter.

### Code (areas of interest):

- 1 asteroids
- 2 ophiuroids
- 3 echinoids
- 4 holothuroids
- 5 crinoids
- 6 blastoids
- 7 edrioasteroids
- 8 stylophorans
- 9 paleontology
- 10 ecology
- 11 behavior
- 12 physiology
- 13 biochemistry
- 14 embryology, developmental biology
- 15 systematics
- 16 anatomy
- 17 functional morphology
- 18 reproduction
- 19 larvae
- 20 evolution
- 21 biogeography

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#### DEATHS

Martinsson, Prof. Anders. Department of Palaeobiology, University of Uppsala,  
Sweden. 16 July 1983.

Lønning-Vader, Sunniva. Professor of Aquatic Biology, University of Tromsø,  
Norway. 11 July 1985. Prof. Lønning died of leukemia. Her early  
work on fertilization and early development, and the influence of  
various "alien substances" on these processes, used echinoid eggs.  
During recent years, Prof. Lønning was increasingly interested in  
The comparative biology of Strongylocentrotus species. Her husband,  
W. Vader, will finish the manuscripts of these works. Available reprints  
of Prof. Lønning's work may be obtained through him.



## 1 ASTEROIDS

Aldrich, Andrade, Arnaud, Arteché Irueta, Aziz, Barker, Basch, Beijnk, Belyaev, Birkeland, Birtles, Black, Blake, Booth, Jr., Branstrator, Breton, Broertjes, Burke, Bussarawich, Caine, Cameron, Cameron, Campbell, Campbell, Cannon, Carson, Caso, Chaet, Chen, Cherbonnier, Chiu, Clark, Cuenca, Davis, De Moura-Britto, De Vos, Dearborn, DeCelis, Diehl, Dobson, Downey, Dravage, Dubois, Ellers, Emler, Emson, Engle, Engstrom, Escoubet, Ferrand, Foell, Franz, Fujita, Gale, Giuseffi, Graham, Green, Guillou, Haedrich, Harris, Harrold, Hawkins, Hendler, Herring, Herrlinger, Hess, Himmelman, Hoggins, Hopkins, Hotchkiss, Hulbert, James, Jangoux, Jordan, Jost, Kasyanov, Komatsu, Kyte, Lambert, Larrain, Lawrence, Lee, Leeling-Werder, Lessios, Lewis, Liao, López-Ibor, Lubchenco, Lucas, Mahfouz, Maluf, Manchenko, Martin, Martin, Maturo, Jr., Meijer, Mein, Meyer, Miller, Mladenov, Morrill, Motokawa, Mukai, Nichols, Niesen, Nojima, O'Brien, Oguro, Oudejans, Paine, Penschaszadeh, Perry, Petr, Prestedge, Prokop, Rowe, Rumrill, Saft, Sato, Schatt, Schuetz, Shick, Shirley, Sibuet, Silver, Simpson, Sloan, Smirnov, Smith, Spiel, Stickle, Jr., Tablade, Tablade, Tegner, Thomassin, Thompson, Tommasi, Tortonese, Turner, Twersky, Tyler, Vadas, Valentinčić, Valentine, Velarde, Voogt, Voss, Watts, Webb, Yamaguchi, Yanagisawa, Yourassowsky

## 2 OPHIUROIDS

Albuquerque, Andrade, Arnaud, Arteché Irueta, Aziz, Barker, Basch, Beijnk, Birkeland, Birtles, Booth, Jr., Bray, Breton, Broom, Buckland-Nicks, Burke, Bussarawich, Byrne, Cameron, Campbell, Caso, Chen, Cherbonnier, Concepcion, Costelloe, De Moura-Britto, De Vos, Dearborn, DeCelis, Diehl, Dobson, Dravage, Emler, Emson, Engle, Fenaux, Ferrand, Fleeger, Foell, Graham, Green, Guille, Haedrich, Hendler, Herring, Herrlinger, Hess, Himmelman, Hopkins, Hotchkiss, Hulbert, Irimura, James, Jangoux, Kelley, Komatsu, Kyte, LaBarbara, Lee, Lewis, Liao, López-Ibor, Macurda, Jr., Mahfouz, Maluf, Manchenko, Markel, Marques, Martin, Maturo, Jr., Meyer, Miller, Mladenov, Motokawa, Muscat, Nichols, Oguro, Pabian, Pagett, Petr, Prokop, Regnell, Rowe, Rumrill, Sato, Schatt, Serafy, Shirley, Sides, Singletary, Sloan, Smirnov, Smirnov, Smith, Stancyk, Stickle, Jr., Thandar, Tommasi, Turner, Tyler, Vadon, Valentincic, Valentine, Velarde, Webb, Wilkie, Witman, Yamaguchi, Yanagisawa

## 3 ECHINOIDS

Alvarez, Alvarez, Andrade, Arnaud, Arteché Irueta, Aziz, Barker, Basch, Beijnk, Berger, Birkeland, Birtles, Black, Booth, Jr., Boudouresque, Burke, Bussarawich, Caldwell, Cameron, Campbell, Campbell, Cannon, Carpenter, Caso, Chen, Cherbonnier, Chiu, Concepcion, Constable, Couillard, Cuenca, Dafni, David, De Greef, De Ridder, De Vos, DeCelis, Demarge, Diehl, Dix, Dravage, Dube, Dufresne-Dube, Durham, Ellers, Emler, Emson, Endeiman, Engle, Engstrom, Escoubet, Fenaux, Ferrand, Fishelson, Foell, Gale, Ghiold, Ghyoot, Giudice, Graham, Haedrich, Harris, Harrold, Hawkins, Hendler, Herrlinger, Hess, Himmelman, Hotchkiss, Hulbert, James, Jangoux, Jensen, Jordan, Kasyanov, Katsura, Kawamura, Keller, Kier, Kobayashi, Kojima, Larrain, Lawrence, Lee, LeGall, Lessios, Lewis, Liao, López-Ibor, Lubchenco, Maczyńska, Mahfouz, Maluf, Manchenko, Märkel, Marques, Martin, Maturo, Jr., McKenzie, McNamara, Meijer, Meyer, Miller, Mironov, Mooi, Morrill, Motokawa, Mukai, Munar Bernat, Nagaoki, Nedelec,

## 3(cont)

Nestler, Nichols, Niesen, Nojima, Okada, Pabian, Paine, Parsley, Pawson, Penchaszadeh, Perry, Phelan, Philip, Philippe, Poddubiuk, Profant, Regis, Regnéll, Roman, Rose, Rowe, Rumrill, Saft, Sato, Schatt, Scheltema, Schinner, Serafy, Shepherd, Shick, Shirley, Sides 3, Silver, Simms, Singletary, Sloan, Smirnov, Solovjev, South, Stickle, Jr., Stokes, Szymanska, Takahashi, Tegner, Telford, Tertschnig, Thandar, Thierry, Thomassin, Thompson, Tommasi, Tyler, Vadas, Valentincic, Valentine, Velarde, Verlaque, Voogt, Webb, Weber, White, Witman, Yamaguchi, Yanagisawa, Young, Zimmer,

## 4 HOLOTHUROIDS

Aldrich, Alvarez, Arnaud, Arteché Irueta, Aziz, Barker, Beijnink, Belyaev, Bergen, Birkeland, Birtles, Booth, Jr., Burke, Bussarawich, Byrne, Caméron, Cameron, Campbell, Cannon, Carson, Caso, Chen, Cherbonnier, Conand, Concepcion, Cuenca, Cutress, De Vos, Derstler, Diehl, Dobson, Emler, Emson, Engle, Engstrom, Escoubet, Fankboner, Féral, Foell, Gebruk, Graham, Gutt, Haedrich, Hansen, Hendler, Herring, Herrlinger, Hetzel, Hill, Himmelman, Imaoka, James, Jangoux, Jeal, Jordan, Kasyanov, Katsura, Lambert, Larrain, Lawrence, Lee, Liao, López-Ibor, Mahfouz, Maluf, Martin, Massin, Maturo, Jr., McEuen, Meyer, Miller, Mladenov, Morrill, Motokawa, Mukai, Nateewathana, Nichols, Oguro, Pawson, Penchaszadeh, Perez-Ruzafa, Roberts, Rowe, Sato, Schatt, Simpson, Sloan, Smirnov, Stickle, Jr., Turner, Twersky, Tyler, Valentine, Velarde, Yamaguchi, Yanagisawa, Young

## 5 CRINOIDS

Arendt, Arteché Irueta, Ausich, Aziz, Barker, Beijnink, Birkeland, Birtles, Breton, Broadhead, Brower, Burke, Bussarawich, Byrne, Campbell, Chen, Cherbonnier, Clark, Costelloe, De Vos, Dearborn, Dobson, Donovan, Emler, Emson, Fishelson, Foell, Franzen-Bengtson, Gale, Giuseffi, Gluchowski, Graham, Green, Haedrich, Hawkins, Hendler, Herring, Hess, Horowitz, James, Jangoux, Jeal, Kelley, Kelly, Kolata, LaBarbara, Lane, Lee, Leonard, Lewis, Liao, Liddell, López-Ibor, Macurda, Jr., Maluf, McIntosh, McKemie, Messing, Meyer, Miller, Mladenov, Nichols, Pabian, Paul, Petr, Prokop, Regnéll, Rowe, Schatt, Sevastopulo, Simms, Smirnov, Spiel, Stickle, Jr., Stopulo, Tommasi, Ubaghs, Waters, Webster, Yamaguchi, Yanagisawa, Zimmer

## 6 BLASTOIDS

Arendt, Donovan, Giuseffi, Green, Horowitz, Kelley, Lewis, Macurda, Jr., McKemie, Paul, Sevastopulo, Stopulo, Ubaghs, Waters, Zimmer

## 7 EDRIOASTEROIDS

Arendt, Caster, Derstler, Dravage, Emler, Giuseffi, Green, Lewis, Regnell, Ubaghs

## 8 STYLOPHORANS

Arendt, Caster, Chauvel, Derstler, Donovan, Dravage, Green, Kolata, Lewis, Parsley, Regnéll, Ubaghs

## 9 PALEONTOLOGY

Ausich, Blake, Branstrator, Breton, Broadhead, Brower, Carpenter, Caster, Chauvel, Dafni, David, Demarge, Derstler, Donovan, Dravage, Durham, Emler, Endeiman, Franzen-Bengtson, Gale, Gebruk, Ghiold, Giuseffi, Gluchowski, Graham, Green, Hess, Horowitz, Hotchkiss, Jensen, Kelley, Kelly, Kier, Kolata, Lane, Larrain, Leeling-Werder, Lewis, Macurda, Jr., Maczynska, McIntosh, McKemie, McNamara, Meyer, Munar Bernat, Nestler, Pabian, Parsley, Paul, Petr, Phelan, Philip, Philippe, Poddubiuk, Prokop, Regnéll, Roman, Rose, Sevastopulo, Simms, Smirnov, Smith, Solovjev, Stokes Stopulo, Szymanska, Thierry, Ubaghs, Waters, Webster, Witman, Zimmer

## 10 ECOLOGY

Alvarez, Alvarez, Andrade, Arnaud, Ausich, Aziz, Barker, Basch, Belyaev, Bergen, Berger, Birkeland, Birtles, Black, Blake, Booth, Jr., Boudouresque, Branstrator, Broom, Brunel, Bussarawich, Byrne, Caldwell, Cameron, Cameron, Campbell, Campbell, Carpenter, Carson, Caso, Chen, Cherbonnier, Chiu, Conand, Concepcion, Constable, Costelloe, Couillard, Cuenca, Cutress, Dafni, David, De Moura-Britto, De Ridder, Dearborn, DeCelis, Demarge, Diehl, Dix, Dobson, Donovan, Dravage, Durham, Emler, Emson, Endeiman, Engle, Engstrom, Escoubet, Fankboner, Fenaux, Fishelson, Fleeger, Foell, Franz, Franzen-Bengtson, Fujita, Gale, Gebruk, Ghiold, Giuseffi, Graham, Green, Guille, Guillou, Gutt, Haedrich, Hansen, Harris, Harrold, Hawkins, Hendler, Herrlinger, Hetzel, Himmelman, Hoggins, Hopkins, Horowitz, Hulbert, Irimura, James, Jeal, Jensen, Jordan, Jost, Kasyanov, Kawamura, Keller, Kelley, Kelly, Kier, Kyte, LaBarbara, Lambert, Larrain, Lawrence, Lee, Leeling-Werder, LeGall, Leonard, Lessios, Lewis, Liddell, López-Ibor, Lubchenco, Lucas, Mahfouz, Maluf, Marques, Martin, Martin, Massin, Maturo, Jr., McEuen, McKemie, McKenzie, McNamara, Messing, Meyer, Mladenov, Mukai, Munar Bernat, Muscat, Nateewathana, Nedelec, Nestler, Nichols, Niesen, Nojima, O'Brien, Pabian, Pagett, Paine, Parsley, Pawson, Penschaszadeh, Perez-Ruzafa, Petr, Poddubiuk, Profant, Prokop, Regis, Roberts, Rose, Rumrill, Schinner, Serafy, Sevastopulo, Shepherd, Shick, Shirley, Sibuet, Sides, Simpson, Singletary, Sloan, Smirnov, Solovjev, South, Spiel, Stancyk, Stickle, Jr., Stopulo, Tablade, Tablade, Taki, Tegner, Telford, Tertschnig, Thandar, Thierry, Thomassin, Thompson, Tommasi, Turner, Tyler, Vadas, Valentincic, Valentine, Velarde, Verlaque, Voss, Webb, White, Witman, Yamaguchi, Young

## 11 BEHAVIOR

Arnaud, Barker, Basch, Beijnik, Birkeland, Birtles, Blake, Boudouresque, Bray, Broom, Byrne, Campbell, Campbell, Carpenter, Caso, Chen, Chiu, Constable, Cuenca, Dafni, De Moura-Britto, De Ridder, Dearborn, Donovan, Eilers, Emson, Engle, Engstrom, Escoubet, Fankboner, Fishelson, Fujita, Gebruk, Ghiold, Ghyoot, Giuseffi, Harris, Hawkins, Hendler, Herrlinger, Hetzel, Himmelman, Hoggins, Hopkins, Hulbert, Irimura, James, Jangoux, Jeal, Jensen, Jordan, Jost, Kelly, Kier, Kyte, Lambert, Lawrence, Lee, LeGall, Leonard, Lewis, Maturo, Jr., McEuen, McKenzie, McNamara, Meyer, Miller, Mooi, Mukai, Muscat, Nojima, Pagett, Perez-Ruzafa, Phelan, Poddubiuk, Prestedge, Regis, Schinner, Shepherd, Sides, Sloan, Stancyk, Stickle, Jr., Tablade, Tablade, Tegner, Telford, Tertschnig, Thandar,

## 11(cont)

Thomassin, Thompson, Turner, Vadas, Valentincic, Valentine, Velarde, Wilkie, Yamaguchi

## 12 PHYSIOLOGY

Alvarez, Barker, Beijnik, Berger, Broertjes, Broom, Burke, Byrne, Caine, Caldwell, Campbell, Campbell, Carpenter, Caso, Chaet, Chen, Chiu, Conand, Dafni, De Ridder, Diehl, Dobson, Dubois, Emson, Fankboner, Feral, Ferrand, Franz, Gebruk, Gutt, Hawkins, Hendler, Hill, Himmelman, Hoggins, Hopkins, Jensen, Katsura, Kelly, Lawrence, Lucas, McEuen, Motokawa, Muscat, Nichols, Oudejans, Pagett, Perez-Ruzafa, Prestedge, Sato, Schatt, Schuetz, Shick, Shirley, Silver, Singletary, Sloan, Smith, Stancyk, Stickle, Jr., Takahashi, Taki, Tegner, Tertschnig, Turner, Tyler, Vadon, Valentinčić, Voogt, Voss, Watts, Weber, Wilkie, Yourassowsky

## 13 BIOCHEMISTRY

Barker, Beijnik, Broertjes, Burke, Caine, Diehl, Dobson, Dubois, Fankboner, Gebruk, Giudice, Hawkins, Hopkins, Jensen, Katsura, Lawrence, Leonard, McEuen, Meijer, Nagaoki, Oudejans, Perry, Saft, Sato, Silver, Smith, Stickle, Jr., Taki, Turner, Valentinčić, Voogt, Watts, Yanagisawa

## 14 EMBRYOLOGY, DEVELOPMENTAL BIOLOGY

Andrade, Barker, Buckland-Nicks, Burke, Caine, Caldwell, Cameron, Cameron, Carpenter, Carson, Costelloe, Couillard, Cutress, Davis, De Greef, De Moura-Britto, De Vos, Emler, Emson, Escoubet, Fankboner, Ferrand, Gebruk, Giudice, Hendler, Hoggins, Jangoux, Jensen, Kasyanov, Katsura, Kawamura, Kelly, Kobayashi, Kojima, Komatsu, Larrain, Lee, Lewis, Lucas, Mahfouz, McEuen, McNamara, Meijer, Miller, Mladenov, Morrill, Nagaoki, Nichols, Oguro, Okada, Perez-Ruzafa, Perry, Prestedge, Rumrill, Saft, Sato, Schatt, Schuetz, Shick, Silver, Simpson, Smith, Stancyk, Stickle, Jr., Turner, Twersky, Tyler, Voogt, Voss, Yamaguchi, Yanagisawa, Young, Yourassowsky

## 15 SYSTEMATICS

Albuquerque, Arendt, Arteché Irueta, Ausich, Aziz, Barker, Basch, Belyaev, Bergen, Berger, Birtles, Blake, Booth, Jr., Branstrator, Brower, Bussarawich, Cameron, Campbell, Carpenter, Caso, Caster, Chen, Cherbonnier, Clark, Concepcion, Costelloe, Cuenca, De Moura-Britto, Dearborn, Demarge, Derstler, Downey, Dravage, Dube, Dufresne-Dube, Durham, Endeiman, Engle, Fankboner, Feral, Foell, Fujita, Gale, Gebruk, Giuseffi, Green, Guille, Hansen, Hendler, Herrlinger, Hopkins, Horowitz, Hotchkiss, Imaoka, Irimura, James, Jangoux, Jensen, Kelley, Kier, Kolata, Kyte, Lambert, Larrain, Leeling-Werder, Lessios, Lewis, Liao, López-Ibor, Maczynska, Maluf, Manchenko, Marques, Martin, Massin, Maturo, Jr., McIntosh, McKemie, McKenzie, McNamara, Meijer, Mein, Messing, Meyer, Miller, Mironov, Mooi, Munar Bernat, Muscat, Nagaoki, Natewathana, O'Brien, Oguro, Pabian, Pawson, Perez-Ruzafa, Petr, Phelan, Poddubiuk, Profant, Prokop, Rowe, Rumrill, Serafy, Sevastopulo, Shirley, Sibuet, Simms, Singletary, Sloan, Smirnov, Smirnov, Smith, Solovjev, Spiel, Stokes, Stopulo, Tablade, Tablade, Telford, Thandar, Thierry, Tommasi,

## 15(cont)

Tortonese, Turner, Vadon, Valentine, Velarde, Voss, Waters, Webster, Wilkie, Yanagisawa, Zimmer

## 16 ANATOMY

Aldrich, Arendt, Barker, Beijnik, Blake, Byrne, Caine, Campbell, Caso, Costelloe, Cuenca, De Ridder, De Vos, Durham, Emler, Emson, Fankboner, Ferrand, Gebruk, Hendler, Irimura, Jangoux, Jeal, Jensen, Kelley, Lambert, Leonard, Lewis, Markel, McKenzie, Nichols, Oudejans, Perez-Ruzafa, Poddubiuk, Prestedge, Silver, Sloan, Smirnov, Spiel, Stancyk, Tablade, Telford, Thandar, Turner, Twersky, Voss, Waters, Wilkie, Yourassowsky

## 17 FUNCTIONAL MORPHOLOGY

Aldrich, Arendt, Ausich, Barker, Beijnik, Black, Blake, Branstrator, Bray, Broadhead, Broertjes, Brower, Burke, Byrne, Cameron, Cameron, Campbell, Campbell, Carpenter, Caster, Chen, Clark, Costelloe, Cuenca, Dafni, David, De Greef, De Moura-Britto, De Ridder, De Vos, Dearborn, Derstler, Dobson, Donovan, Dravage, Durham, Eilers, Emler, Emson, Endeiman, Fankboner, Féral, Ferrand, Gale, Gebruk, Ghiold, Ghyoot, Green, Gutt, Hendler, Hill, Horowitz, Jangoux, Jeal, Jensen, Katsura, Keller, Kelley, Kelly, Kier, Kolata, Komatsu, LaBarbara, Lambert, Larrain, Lawrence, Lee, Lewis, Märkel, McIntosh, McKenzie, McNamara, Messing, Meyer, Mladenov, Mooi, Motokawa, Nichols, Oguro, Okada, Oudejans, Parsley, Paul, Perez-Ruzafa, Petr, Phelan, Poddubiuk, Prokop, Regis, Roberts, Sato, Schinner, Sevastopulo, Sides, Sloan, Smith, Solovjev, Stancyk, Stickle, Jr., Stopulo, Strathmann, Takahashi, Telford, Thandar, Thierry, Thomassin, Turner, Twersky, Voogt, Voss, Webb, Weber, White, Wilkie, Yamaguchi, Yourassowsky

## 18 REPRODUCTION

Bray, Buckland-Nicks, Byrne, Carson, Chiu, Davis, Emler, Emson, Fenaux, Ferrand, Franz, Hendler, Kasyanov, LeGall, Mahfouz, Martin, Mladenov, Nichols, Niesen, Penchaszadeh, Rumrill, Strathmann, Tegner, Tyler

## 19 LARVAE

Alvarez, Cameron, Emler, Fenaux, Leonard, Scheltema, Strathmann, Young

## 20 EVOLUTION

Arendt, Broadhead, Brower, David, Derstler, Durham, Gebruk, Jensen, Kiev, McNamara, Paul, Phelan, Rose, Smith, Szymanska

## 21 BIOGEOGRAPHY

Andrade, Arteché Irueta, Belyaev, Caso, Clark, David, Endeiman, Guille, Gutt, Haedrich, Hotchkiss, Leeling-Werder, Messing, Mironov, Pawson, Rowe, Smirnov, Stokes, Tortonese, Vadon, Waters, Yamaguchi

ARGENTINA  
Tablade

AUSTRALIA

Birtles, Black, Cannon, Constable, Dix, Hoggins, Lucas, Martin, McNamara,  
Philip, Prestedge, Rowe, Sheperd, Simpson, Thompson

AUSTRIA

Schinner, Tertschnig

BELGIUM

De Greef, De Ridder, De Vos, Dubois, Ghyoot, Jangoux, Lambert, Massin,  
Ubaghs, Yourassowsky, Voss

BRASIL

Albuquerque, De Moura-Britto, Tommasi

CANADA

Aldrich, Berger, Brunel, Buckland-Nicks, Burke, Caine, Carson, Couillard,  
Dube, Dufresne-Dube, Fankboner, Haedrich, Hawkins, Himmelman, Jordan,  
Lambert, McEuen, Mladenov, Mooi, Rumrill, Sloan, South, Spiel Telford

CANARY ISLANDS

Alvarez

CHILE

Andrade, Larrain

CZECHOSLOVAKIA

Petr, Prokop

DENMARK

Hansen, Jensen

FEDERAL REPUBLIC OF GERMANY

Gutt, Leeling-Werder, Märkel, Mein, Webe

FRANCE

Arnaud, Breton, Chauvel, Cherbonnier, Conand, Cuenca, David, Demarge,  
Escoubet, Fenaux, Féral, Ferrand, Guille, Guillot, LeGall, Meijer,  
Nedelec, Philippe, Regis, Roman, Schatt, Sibuet, Thierry, Thomassin,  
Vadon, Verlaque, Boudouresque

GERMAN DEMOCRATIC REPUBLIC  
Nestler

GUAM  
Birkeland

HONG KONG  
Chiu

INDIA  
James, Krishnan, McKenzie

IRELAND  
Costelloe, Donovan, Jeal, Leonard, Sevastopulo, Sides, Stopulo, White

ISRAEL  
Dafni, Fishelson

ITALY  
Giudice, Tortonese

JAPAN  
Fujita, Imaoka, Irimura, Katsura, Kawamura, Kobayashi, Kojima, Komatsu,  
Mahfouz, Motokawa, Mukai, Nagaoki, Nojima, Oguro, Okada, Sato, Takahashi,  
Taki, Yamaguchi, Yanagisawa

MEXICO  
Alvarez, Caso

NEW ZEALAND  
Barker, Graham

NORTHERN IRELAND  
Roberts

PEOPLE'S REPUBLIC OF CHINA  
Liao

PHILLIPPINES  
DeCelis

## POLAND

Gluchowski, Maczyńska, Szymanska

## PORTUGAL

Marques

## PUERTO RICO

Cameron, Cutress

## REPUBLIC OF SOUTH AFRICA

Thandar

## SCOTLAND

Wilkie

## SPAIN

Arteche Irueta, Concepcion, López-Ibor, Munar Bernat, Perez-Ruzafa

## SWEDEN

Franzen-Bengtson, Regnéll

## SWITZERLAND

Hess, Jost, Meyer

## REPUBLIC OF CHINA

Chen

## THAILAND

Bussarawich, Nateewathana

## THE NETHERLANDS

Beijnink, Oudejans, Voogt

## UNITED KINGDOM

Broom, Campbell, Clark, Emson, Gale, Herring, Hill, Nichols, Pagett,  
Paul, Poddubiuk, Rose, Simms, Smith, Stokes, Tyler, Webb

## USA

Ausich, Basch, Bergen, Blake, Booth, Jr., Branstrator, Bray, Broadhead,  
Brower, Byrne, Caldwell, Cameron, Campbell, Carpenter, Caster, Chaet,  
Davis, Dearborn, Derstler, Diehl, Dobson, Downey, Dravage, Durham,  
Ellers, Emlet, Engle, Engstrom, Fleeger, Foell, Franz, Ghiold, Giuseffi,



## USA (cont)

Green, Harris, Harrold, Hendler, Herrlinger, Hetzel, Hopkins, Horowitz, Hotchkiss, Hulbert, Keller, Kelley, Kelly, Kier, Kolata, Kyte, LaBarbara, Lane, Lawrence, Lee, Lessios, Lewis, Liddell, Lubchenco, Macurda, Jr., Maluf, Martin, Maturo, Jr., McIntosh, McKemie, Messing, Miller, Morrill, Muscat, Niesen, O'Brien, Pabian, Paine, Parsley, Pawson, Perry, Phelan, Profant, Saft, Scheltema, Schuetz, Serafy, Shick, Shirley, Silver, Singletary, Smith, Stancyk, Stickle, Jr., Strathmann, Tegner, Turner, Twersky, Vadas, Valentine, Velarde, Waters, Watts, Webster, Witman, Young, Zimmer

## USSR

Arendt, Belyaev, Endeiman, Gebruk, Kasyanov, Manchenko, Mironov, Rozhnov, Smirnov, Smirnov, Solovjev

## VENEZUELA

Penchaszadeh

## YUGOSLAVIA

Valentiñić



Return to:  
John Lawrence  
Dept. of Biology  
Univ. of South Florida  
Tampa, Florida 33620

(please print)

Name \_\_\_\_\_

(last name)

(first names)

Professional address \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Taxonomic group(s) of particular interest (please check)

- Asteroids
- Ophiuroids
- Echinoids
- Holothuroids
- Crinoids
- Blastoids
- Edrioasteroids
- Stylophorans
- other extinct classes (indicate) \_\_\_\_\_
- orders (indicate) \_\_\_\_\_
- families (indicate) \_\_\_\_\_

Research area(s) of particular interest (please check)

- paleontology
- ecology
- behavior
- physiology
- biochemistry
- embryology, developmental biology
- systematics
- anatomy
- functional morphology
- other (indicate) \_\_\_\_\_
- reproduction
- larvae
- evolution
- biogeography

Other items for newsletter (requests, notices, suggestions, etc.)

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