



No. 29, March 2000

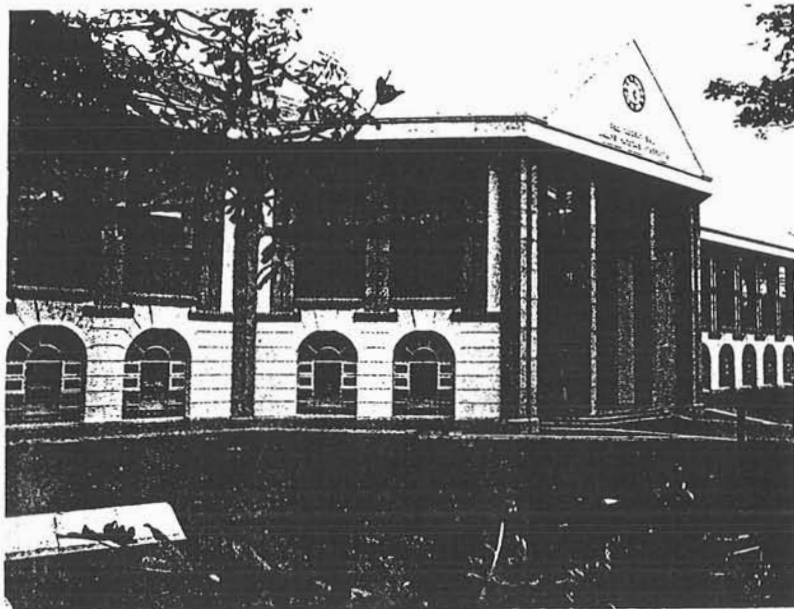
THE 9TH DEEP-SEA BIOLOGY SYMPOSIUM - GALWAY, IRELAND
The Deep Ocean Biosphere - Change and Sustainability
25-30th June 2000
Third Announcement

I would like to welcome old friends and new ones to The 9th Deep-Sea Biology Symposium. The theme for the symposium is "The Deep Ocean Biosphere – Change and Sustainability" and keynote speakers are being approached to address aspects of this topic. Several of you have also asked for a "crystal ball" session on deep-sea biology in the next millennium, and since the symposium falls on the 50th anniversary of the Galathea expedition (The Danish Deep-sea Expedition Round the World 1950-52) I am pleased to be able to invite one of the original participants to tell us all about it. As with previous symposia, however, papers and posters on any aspect of deep-sea organisms (from macro to micro) and ecosystems will be welcome. Please remember that "deep-sea" is not only the abyssal benthos but also deep waters and the deep sub-seafloor biosphere. Interdisciplinary papers are particularly encouraged.

Sponsors:

IMRI

Martin Ryan Marine Science Institute
National University of Ireland, Galway
Galway, Ireland



MARINE INSTITUTE
FORAS NA MARA

I am sure that those of you who have attended previous symposia will agree with me that some of the most interesting ideas have arisen outside the formal sessions. It is my intention to allow time for this, even if it proves necessary to limit the number of oral presentations. Many of you use these meetings to discuss progress on joint projects, future cruises etc. If you feel that a quiet corner of a bar would be unsuitable for this, please let me know and I will arrange more formal accommodation for you. There will, of course be the traditional programme of social events including an excursion, and a banquet with plenty of local food and drink.

I hope to see many of you in June – please don't leave it till the last minute to register and provide abstracts. A steady flow from now on will greatly ease the task of finalising the scientific and social programmes.

John Patching



CALL FOR PAPERS

Oral and poster presentations addressing any question concerning the biology of the deep sea are invited. The organisers will put together the final programme soon after the deadline for submitting abstracts. The author's preference will be considered but we will reserve the right to assign any paper to oral or poster sessions. Oral contributions may be limited to 20 minutes including questions and discussion. We can provide facilities for OHP, slides, video and Powerpoint presentations. Authors whose contributions are accepted for oral presentation will be asked to specify their requirements. Posters should be no more than 90 x 90 cm and attachment will be by velcro.

Abstracts should be prepared and submitted **before March 17th 2000**. The format, etc for abstracts is contained in the "call for papers and registration" file which was sent to all those who have expressed interest. Contact the organisers by email or letter if you require a copy.

SOCIAL PROGRAMME

Sunday evening There will be an informal "mixer", providing delegates with a chance to meet each other and also beat the Monday morning registration rush.

Monday Evening. A welcoming reception will be held in the University's Aula Maxima (The Great Hall - Part of the original Queen's College Galway buildings).

Wednesday after lunch till?? There will be an excursion to see some of the scenery of Western Ireland with maybe a refreshment stop or two.

Thursday evening is reserved for the conference banquet, featuring eating, drinking, and entertainment. Some of the latter will undoubtedly be provided by the delegates.

FEES & REGISTRATION

NB All fees are in Irish Pounds (£ -equivalent to 1.26974 Euros and approximately 1.25 US\$).

Registration: £200 (before March 17th 2000); £240 (after March 17th 2000)

Student Registration: £100 (before March 17th 2000); £120 (after March 17th 2000). Registration includes a book of abstracts, tea and coffee, mixer, reception, excursion and banquet.

Registration Deadline and Cancellation Refunds: The deadline for registration is **17th May 2000**. If you find it necessary to cancel your registration before this date we will refund you your registration fee less £40 administration costs. There will be NO refunds after May 17th.

Accompanying persons may attend all social activities. Costs are listed on the registration form.

How to Register

Payment for registration and accommodation may be made by credit card (Visa or MasterCard) or banker's draft in Irish Pounds made payable to Conference Office, NUI, Galway and enclosed with your registration form (NB we cannot accept payment in other forms without prior agreement).

Registration Form & Accommodation:

Deep-Sea Biology Symposium
c/o Ms Anne Duggan, Conference Manager
NUI, Galway, Galway, Ireland

Phone: +353 91 750 456
For payment by credit card:
Fax form to: +353 91 750 512
E-mail: a.duggan@mis.nuigalway.ie

Organizers and submission of abstracts:

Deep-Sea Biology Symposium
c/o J. W. Patching
Martin Ryan Marine Science Institute
NUI, Galway, Galway, Ireland

Phone: +353 91 750 456
Fax: +353 91 525 005
E-mail: John.Patching@nuigalway.ie

Students should also send a copy of their student identity card and a recommendation from their supervisor.

TRAVEL, ACCOMMODATION INFORMATION, ETC.

Rooms for delegates and those accompanying them have been reserved in Corrib Village, NUI, Galway's campus accommodation. It is situated along the banks of the River Corrib, about 5-10 minutes walk from the centre of the campus. There is also a complimentary shuttlebus service between Corrib Village and the city centre. Phone +353-91 527112 or Email corrib@iol.ie about times and pickup points. The cost of a room per night will be £27.50 single and £49.00 double. This price includes full Irish breakfast in the University Restaurant. Accommodation is of a higher quality (Irish Tourist Board rating **-***) than that usually associated with college "halls of residence". All rooms are en-suite and are equipped with TV and direct-dial telephone.

Should you decide to arrange your own accommodation, I would advise you to contact the Irish Tourist Board. Their website (<http://www.ireland.travel.ie/home/index.asp>) is extremely useful and also has lots of other tourist information.

Galway City and the National University of Ireland, Galway

Galway is one of the fastest growing cities in Europe with a young lively population, partly due to the presence of the National University of Ireland, Galway and the Galway/Mayo Institute of Technology. The city boasts a full range of cultural, sporting and entertainment facilities including a grand selection of pubs and restaurants etc. It is still small enough to avoid the disadvantages of city living and has its own personality and a centre which has strong echoes of its history. Walking is still a feasible method of getting around. It is possible to walk to the edges

TIGH NEACHTAIN/NAUGHTON'S

17 Cross Street

If this "pub of character" could talk it would surely tell some fascinating tales. The building was once the townhouse of Richard Martin M.P., founder of the Royal Society for the Prevention of Cruelty to Animals (nicknamed "Humanity Dick" by George IV). It is one of the last buildings still standing in Galway city that dates back to medieval times and is also one of the few buildings with a genuine, intact oriel window. The interior, I was told, has not been changed since the family of the present proprietor, T.I. Malbum, took over in 1894. The tiny snugs leading into the back room are just over a century old, and their very wood breathes atmosphere.

Entertainment every night with a strong emphasis on traditional music.



of the city and into the country from any point in town. The unspoilt countryside, mountains and seashores of the Burren and Connemara are less than an hour's drive away.

NUI, Galway is located on the banks of the River Corrib about 10 minutes walk from the city centre. Opened to students in 1845, the student population now exceeds 11,000 and there are some 1000 staff. Thanks to its location on the West coast of Ireland, with direct access to varied, pristine inshore environments and the Atlantic itself, the college has a long tradition of involvement with marine sciences. This commitment to marine science was given particular recognition in 1992 with the establishment of the Martin Ryan Marine Science Institute. Housed in purpose-built accommodation paid for by private donation and fully equipped, thanks to funding under the EC STRIDE programme, the Institute consists of sections specialising in marine botany, marine microbiology, physical and chemical oceanography, meteorology and marine zoology.

Climate and Clothing

May and June are typically the sunniest months in the year (average 5-7hrs sunshine per day), but Galway is next to the Atlantic! This means that things can be unpredictable with regards to rain. The climate is mild, but you might like to pack a pullover and raincoat for those grey wet days (which will not happen - I hope).

Access to Galway

By Air: There are no direct international connections to Galway Airport, but Aer Lingus run 3 connecting flights a day from Dublin airport. Galway Airport is about 18km from the city centre. There is a connecting bus service, or a taxi to the city centre would cost about £10. Car hire is available (best to pre-book through your travel agent).

Shannon Airport is the next nearest airport to Galway and has direct international connections with the USA and elsewhere. It is about 100 km from Galway (1.5 to 2 hr drive). The Shannon/Galway bus service is typically irregular. A taxi to Galway would cost about £65 (Big O Cabs +353 91 585858) but there are good car-hire facilities.

Dublin Airport has many international connections but is about 220km from Galway (about a three + hour drive). Good car hire facilities. Independent operators run coach services from the airport to Galway and there is also a train service which runs from the centre of Dublin (Heuston Station - allow one hour or more for bus or taxi from the airport to the station). The latest train timetables are to be found at <http://www.irishrail.ie>. Anyone relying on public transport and whose flight arrives at 17:00 or later should be prepared to spend the night in Dublin!

I will arrange transport to and from Shannon and Dublin airports (approx. £12 single) if there is sufficient interest. If you want to avail of this, Email me with your flight number(s), Airport and time of arrival (and/or departure), plus number in your party.

By Sea There are several car/passenger ferries from the UK and France (Cherbourg or Roscoff). Ask your travel agent.

KEEPING IN TOUCH

Our original intention of using electronic means to keep everyone up-to-date with conference matters still stands, though some aspects of this have given us a few headaches!

If you wish to be on the conference e-mailing list, email me at john.patching@nuigalway.ie. Those on the list are sent an expanded form of this notice and will be kept informed of developments, including updates of the conference website. Unfortunately a large influx of emails plus pressure of work resulted in delays in replying to those who emailed me in December and January. Hopefully this will be cleared by the time you read this – thank you for your patience.

The address for the conference website is <http://marinemicro.ucg.ie/deepsea.html>. Again, apologies for the length of time that this has only contained a short announcement of the meeting date etc. The site should have been updated by the time you read this.



John W. Patching
Martin Ryan Marine Science Institute
John.Patching@nuigalway.ie

Expressions of Interest

As of the end of 1999:

Australia

Alan Butler
Tony Costow
Carsten Wolff

Belgium

Jean-Francois Rees
Anne Vanreusel

Brasil

Carlos Carbonel
Pedro Martinez

Canada

Richard Haedrich
Francesco Santini
Anja Schultz

Denmark

Marie Nielsen
Ole Tendal
Torben Wolff

England

Trevor Baker
Dave Billett
AT Bull
Ron Douglas
Mary Fowler
Adrien Glover
Andy Gooday
Peter Herring
Alan Hughes
Rachel Ince
Magnus Johnson
Richard Lampitt
Julian Partridge
Tony Rice
Peter Shelton
Paul Tyler
George Wolff

France

Peter Beninger
Pierre Chevaldonné
Ana Colaco
Daniel Desbruyères

Laurence Guidi-
Guilvard
Christian Jeanthon
Miriam Sibuet
Jean Vacelet
Annick Vangriesheim

Germany

Hartmut Bluhm
Antje Boetius
Angelika Brandt
Berndt Christiansen
Dieter Fiege
KH George
Onno Gross
Rolf Koppelman
George Kai
Karin Lochte
Christien Pusch
Till Scherzinger
Igo Schewe
Horst Schminke
Thomas Soltwedel
Horst Weikert
Ursula Witte

Greece

Mary Labropoulou

India

Sivadas Ponathil

Ireland

Martine Brennan
Micheal Carton
Mark Costello
Donal Eardly
Joe Gallagher
Anthony Grehan
Brendan O'Connor
Geoffrey O'Sullivan
Dai Roberts

Italy

Luigi Tomassa

Japan

Hosam El-Saied
Toshihico Fujita
James Hunt
Dhugal Lindsay
Hsin-ming Yeh

New Zealand

Paul Brewin
Malcolm Clark
Kerstin Kroeger
Scott Nodder
Keith Probert

Norway

Torleiv Brattegard
Lene Mortensen
Paal Mortensen

Portugal

Filipe Portiero

Poland

Teresa Radziejewrka

Russia

Andrev Gebruk
Alexander Mironov
Alexander
Vereshchaka

Scotland

Susan Chambers
Martin Collins
John Gage
John Gordon
Sophie Mormede

Spain

Joan Cartes
Fransesc Maynou
Beatrice Morales-Nin

USA

James Barry
Stace Beaulieu
Joan Bernhard
Bill Biggin
Chuck Blend
Kurt Buck
Andrew Carey
Bruce Corliss
Jason Datuin
Jeff Drazen
Kevin Eckelbarger
James Eckman
Horst Felbeck
Scott France
Tamara Frank

Bob George
Shana Goffredi
Fred Grassle
Fergal Guilfoyle
Julie Haber
H Haddock
William Hamlett
Joseph Hanlin
Bob Hessler
Susan Hottenrott
Sonke Johnsen
Stacy Kim
Lisa Levin
Christopher Mah
Damhnait McHugh
Jan Moore
Lauren Mullineaux
John Norenburg
Karen Osborn
Gina Perovich
Kevin Raskoff
Bruce Robison
John Rummel
Amelie Scheltema
Craig Smith
Bradley Stevens
Carol Stuart
Tracy Sutton
Mario Tamburri
David Thistle
Cindy Van Dover
Michael Vecchione
Janet Voight
Les Watling
Jim Welsch
Byron White
Edith Widder
Gary Williams
Carl Wirsén
Karen Wishner
Paul Yancey
Craig Young
Marsh Youngbluth
John Zardus

Ukraine

Sergei Ignatiev



Registration Form

The 9th Deep-Sea Biology Symposium, Galway, Ireland June 25th-30th 2000

NB: All costs are in Irish Pounds

Surname		Title (Prof., Dr. Ms or Mr.)	
1st Name(s):			
Institution:			
Address:			
Country:			

Tel:		Fax:		Email:	
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If you wish to present a paper please fill in the following (please underline speaker/presenter):

Title:	
Authors :	

Oral or Poster? (Oral presentation not guaranteed - see call for papers)	
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(See elsewhere for details of abstract preparation and submission.)

Registration: No registrations accepted after **May 17th 2000** (please X relevant box):

Before March 17th	Non-Student £200		Student £100	
After March 17th	Non-Student £240		Student £120	

Guest (social events only). Contact us if you have more than one guest

Surname		1st Name(s)		Ms/Mr. etc.	
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(please X relevant boxes)

Mixer (free)		Recept. (free)		Excursion (£15)		Banquet (£35)		Total Cost:	£
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Accommodation (Corrib Village) Rates are per night and include Full Irish Breakfast

	Arrival Date	Departure Date	No. of Nights	Total Cost
Single (£27.50)				
Double (£49.00)				

Payment

Registration:	£	Guest:	£	Accom.:	£	TOTAL:	£
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Payment by bankers draft in Irish Pounds payable to "Conference Office, NUI, Galway" and accompanying this form, or by credit card:

Visa ☐ Mastercard ☐ Card Number:

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Exp Date:

Today's Date

Name as on Card:

Signature:

NEW DEEP-SEA NEWSLETTER CORRESPONDENTS

- MEXICO: Dr. Elva G. Escobar Briones, Unidad Académica Sistemas Oceanográficos y Costeros, Instituto de Ciencias del Mar y Limnología, Universidad Nacional Autónoma de México, A.P. 70-305 Ciudad Universitaria, Coyoacán 04510, México, D.F., Mexico – Tel +52 5622 5835, Fax at work +52 5616 0748, Fax at home +52 5271.3738, Email: escobri@mar.icmyl.unam.mx
- RUSSIA: Dr. Andrey Gebruk, P. P. Shirshov Institute of Oceanology, Russian Academy of Sciences, Nakhimovsky Pr. 36, Moscow 117851, Russia – Tel +7 095 129 2118, Fax +7 095 124 5983, Email: avgebruk@mtu-net.ru, also bottom@ecosys.sio.rssi.ru (Note that the zero before 95 must be dialed from outside Russia)

CONTACT UPDATES

- AUSTRALIA: Dr. Jean Just (new address and contact numbers, email presently unknown): Museum of Tropical Queensland, Flinders Street, Townsville, Queensland 4810, Australia. – Tel +61 (0)7 47 26 06 00, Fax +61 (0)7 47 21 20 93
- BELGIUM: Dr. Magda Vincx (tel and fax numbers): Tel: +32 (0)9 2645210, fax: +32 (0)9 2645344
- GERMANY: Dr. Thomas Soltwedel (new tel and fax numbers): Tel. +49 (0)471 4831 1 775, Fax. +49 (0)471 4831 1 776
- KOREA: Prof. Sung Yung Hong (new name and address for university, Email): Department of Marine Biology, Pukyong National University, Pusan 608-737, Korea – Fax +82 (0)51 625 9947, Email: syhong@dolphin.pknu.ac.kr
- SPAIN: Dr. Joan Cartes (tel. and fax numbers): Tel +34 932 21 64 16, Fax +34 932 21 73 40

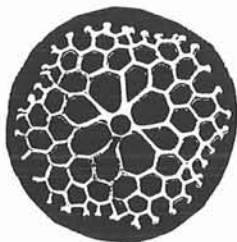
A DEEP-SEA BIOLOGIST'S INTRODUCTION TO THE INTERNET

This is just a reminder about two resources available to Deep-Sea biologists via the Internet. The DEEPSEA Research Newsgroup is an electronic forum for deep-sea and hydrothermal vent/seep biologists, oceanographers, and geologists. Postings to the newsgroup can be read using e-mail, newsreaders or via the World Wide Web. Recent postings include details of conferences, research cruises, funding for taxonomic posts and views on the existence of *Megalodon*.

There is also a website associated with the newsgroup. This includes links to a variety of home pages of oceanographic institutions and appropriate taxonomic groups, as well as details of how to subscribe to the newsgroup.

I am currently expanding the website and would appreciate details of deep-sea specialists, links to websites about taxonomic groups, deep-sea literature and anything else on the subject. The website is available at the following address: <http://www.le.ac.uk/biology/gat/deepsea/deepsea.html>

Ted Gatén, DEEPSEA Moderator
Department of Biology, University of Leicester
LE1 7RH, UK
gat@le.ac.uk



5TH UNDERWATER SCIENCE SYMPOSIUM

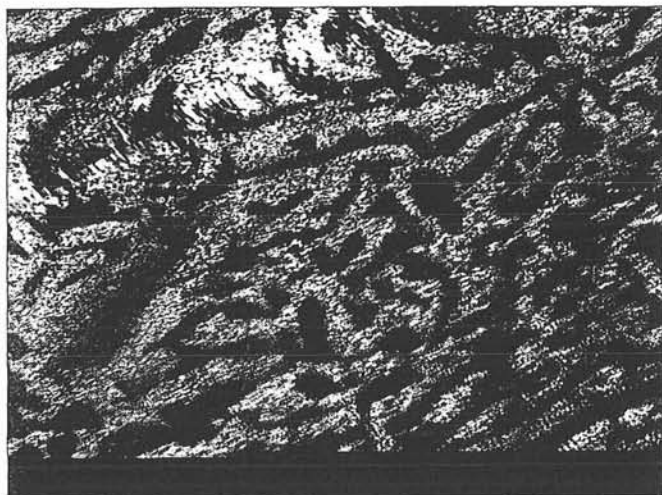
29 March to 1st April 2001 – Southampton Oceanography Centre

First Announcement

Visualizing the Underwater Environment – 2001 An Inner Space Odyssey

“Every picture speaks a thousand words”. We are all capable of absorbing large amount of information when presented visually. However, as divers will agree, our own visual systems are not suited to the underwater environment, and water itself is something of a barrier to conventional vision. These problems can be overcome – whether by using a glass-bottomed bucket, diving or the latest in laser or acoustic seabed remote-imaging technology. This symposium will bring together the diverse community (divers, archaeologists, research scientists and commercial operators) that has interest and expertise in visualizing the underwater environment, to share our experiences and find out what's new and who's doing what.

The 5th SUT Underwater Symposium will review the state of the art in visualizing the underwater environment. The programme seeks to blend diving operations in shallow water with the use of remote technologies in the deep sea, including Remotely Operated Vehicles (ROVs) and Autonomous Underwater Vehicles (AUVs). In particular, the symposium will focus on practical uses of methods, such as high-definition photography, acoustic cameras, laser technologies, holographic techniques, multi-frequency sonar mapping of pelagic communities and seabed environments, integrated seafloor visualization, optical pollution monitoring, “animations”, “living maps” and virtual dives and missions.



Iceberg ploughmarks West of Shetland

Sidescan sonar images of the seafloor west of Shetland show a characteristic pattern of iceberg ploughmarks on the seabed

at depths between 140 and 500 m. These features are believed to be of Pleistocene age. Similar features have been found at shallower depths around the British Isles and on the Norwegian continental slope. The black and white sonar image has a criss-cross pattern of light and dark bands. The dark bands correspond to regions of fine sediments while the lighter bands match areas of coarser sediments. Seabed photographs from the same area show two main ‘types’ of seafloor – ‘rough’ and ‘smooth’. They are readily distinguished, although there is some gradation between the two. ‘Rough’ appears to correspond with the light bands and ‘smooth’ areas with the dark bands. Variations in the benthic fauna appear to match the observed changes in seafloor type. Sponges are common on the rocks of the ‘rough’ ground, as are cidarid urchins and squat lobsters. On the ‘smooth’ ground, spatangoid urchins are often the dominant group. The work shows the advantages of combining different imaging systems to provide a combined biological and sedimentological characterisation of the seafloor.

Over three days the Symposium will bring together industry, academics, the media and the general public. The first two days will mix the latest international research and applications from commercial and academic circles, while the third day will be the focal point for presenting the science and technology to the media and reviewing the latest underwater images for broadcasting. The advances presented at the Symposium will be reported by the media through TV and radio programmes, such as Tomorrow’s World and Science in Action.

The Symposium aims to attract top young scientists to present their latest research, to learn about the newest techniques and to introduce them to industrial sponsors that might be interested in their future research and employment. There will be prizes for the best student presentations and posters. In addition, there will be an active social programme to allow the informal gathering of all those with a professional interest in, and fascination with, the underwater environment.

To make sure you receive further details of this event please register your interest in the symposium by contacting Jean Pritchard (jeanp@sstg.demon.co.uk), Tel + 44 1224 823637, Fax + 44 1224 820236.

Brian Bett & Magnus Axelsson
DEEPSEAS Benthic Biology Group, Southampton Oceanography Centre

ATACAMA TRENCH INTERNATIONAL EXPEDITION

The second report on the Atacama Trench International Expedition (ATIE) has been printed at the Genova University Press, at the end of 1999 and now is being distributed. The Report includes eighteen contributions, some of which were carried out by specialists of institutions not listed previously (Deep Sea-Newsletter 28: 14-15, 1999):

Crustacea Decapoda

Dr. R. Lemaitre, National Museum of Natural History, Smithsonian Institution, Washington, D.C.

Biochemistry and biology of Amphipoda

Dr. A. Dell'Anno, Dr. M. Serresi & Mr. F. M. Perrone, Istituto di Scienze del Mare, Via Breccie Bianche, Università di Ancona

Sediment composition and foraminiferal assemblages

Dr. R. Barbieri & Dr. N. Morandi, Dipartimento di Scienze della Terra e Geologico-Ambientali, Università di Bologna

Bathyal macrobenthos

Prof. G. Albertelli, Dr. A. H. Covazzi & Mr. N. Drago, Dipartimento per lo Studio del Territorio e delle sue Risorse, Università di Genova

Bathyal macrobenthos

Prof. J. I. Cañete, Dpto de Ciencias y Recursos Naturales, Universidad de Magallanes, P.Arenas

Prof. P. Bàez, Museo Nacional de Historia Natural, Santiago

Dr. C. Valdovinos, Centro EULA, Universidad de Concepcion

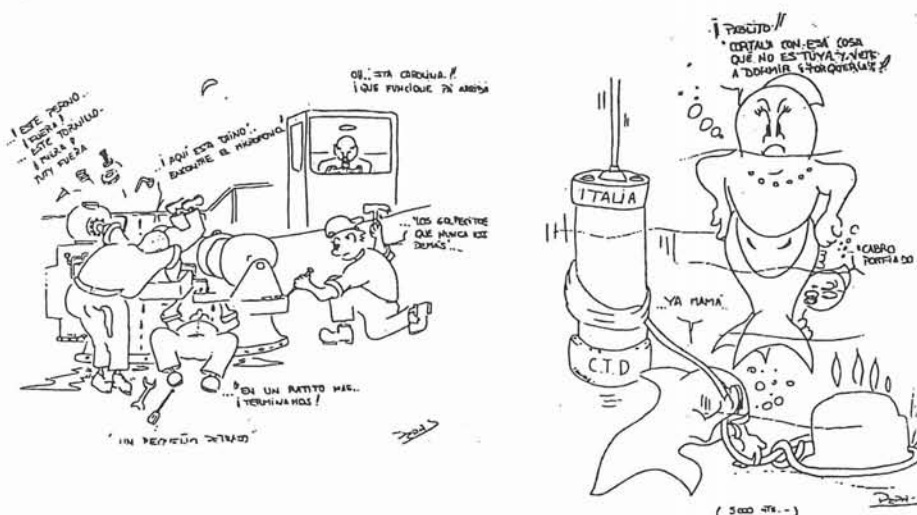
Oceanic thermal structure

Prof. H.A. Sievers, Instituto de Oceanologia – Universidad de Valparaiso

Dr. S. Ceradini, Centro Informazione Studi Esperienze, C.I.S.E., Segrate

From the taxonomic point of view, the most interesting results concern the Amphipoda (M. Thurston) with species diversity at least as high as any previously recorded at abyssal and hadal depths; the Isopoda (J.W. Wagele) with two new species, and Holothuroidea (D.S.M. Billet) with "*Elpidia atakama*", the only third specimen collected, as the other two were recorded at one station at almost the same locality and depth by the R/V Akademician Kurchatov. For the Polychaeta (M.E. Petersen), new depth records (7800 m) were made for the families Paraonidae and Spionidae, previously not reported from deeper than about 5000 m.

We take this occasion to remind you that we are still very interested in contacting micropaleontologists and specialists in Nematoda for the present and future research on trenches.



R. Danovaro
Dpto Scienze del Mare
Università - Via Breccie Bianche
60131 Ancona (AN) Italy
danovaro@popcsi.unian.it

N. Della Croce & M. Petrillo
Dpto del Territorio e delle sue
Risorse – Università - C. Rainusso
14 - C.P. 79
16038 S. Margherita Ligure
ligursea@unige.it

ATLANTIC CORAL ECOSYSTEM STUDY (ACES)

The discovery in the last 10 years of large reefs of the coral *Lophelia pertusa* (Linné, 1758) in deep water off Norway and of coral-topped carbonate mounds on the upper continental slope off Ireland has stimulated some new European projects on the formation and ecology of these mounds/reefs. The European Commission is funding a cluster of deep-sea projects, called GEOMOUND, ECOMOUND and ACES as part of its new research programme on "Sustainable Marine Ecosystems". The projects are expected to start in April 2000. Details of this summer's sampling cruises will appear in the next Deep-Sea Newsletter.

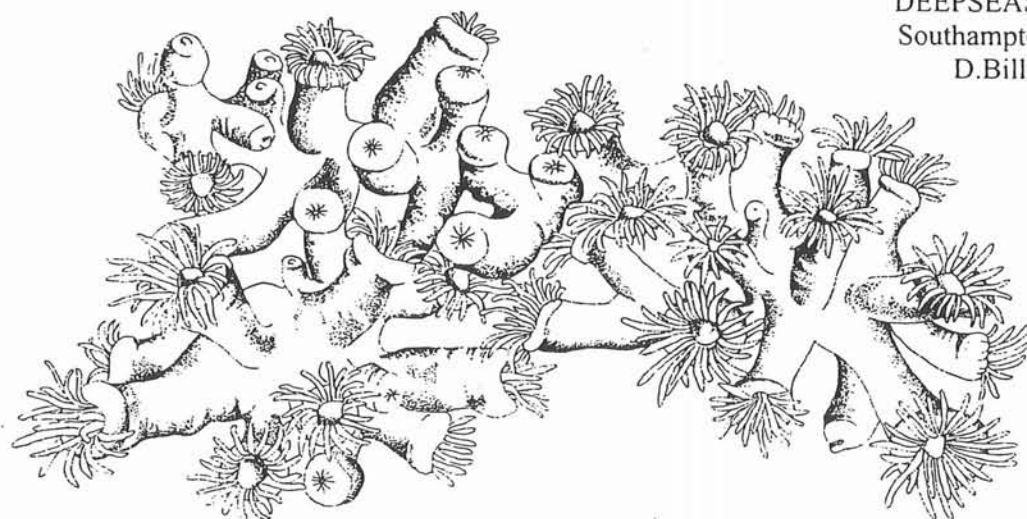
ACES (Atlantic Coral Ecosystem Study) will study coral ecosystems over a wide range of the European Atlantic Margin from the Galicia Bank off Spain to the Sula Ridge off Norway. It aims to determine the structural and genetic variability of the deep-water coral ecosystems, their biodiversity, dynamics, behaviour and sensitivity to stress, and the hydrographic and other local physical forcing factors affecting BBL particle dynamics and POC supply. Professor André Freiwald of the University of Tübingen will lead the project, which includes 10 other European institutions.

ECOMOUND (Environmental Controls on Mound Formation along the European Margin) sets out to characterize the environmental forcing factors that have promoted the development of the mounds into structures hundreds of metres high and, in some cases, several kilometres long. Growth rates for the mounds will be established. Four areas from the Porcupine Seabight (SW of Ireland) to the Sula Ridge (offshore Norway) will be studied. Dr Christian Dullo of GEOMAR, Christian-Albrechts-Universität zu Kiel leads the group, which includes 9 other European partners.

GEOMOUND concentrates on the geological setting of the numerous carbonate mounds that have been found on the European Atlantic continental slope. Of interest will be whether the mounds are associated with areas harbouring hydrocarbon resources. Professor Jean-Pierre Henriot, Renard Centre of Marine Geology, University of Gent, leads this project.

As part of these projects the DEEPSEAS Benthic Biology group at Southampton Oceanography Centre is organising a cruise to some shallow carbonate mounds (c. 5 m high and 100 m in diameter) in the northern part of the Rockall Trough in July 2000. Apart from coral communities on the tops of these mounds, some mounds have curious tail-like features down-current, as seen in sidescan sonar images, which are home to dense populations of the xenophyophore *Syringammina fragilissima*.

David Billett, Brian Bett & Andy Gooday
DEEPSEAS Benthic Biology Group
Southampton Oceanography Centre
D.Billett@soc.soton.ac.uk



Lophelia pertusa (Linné). Drawing of specimen from the Faeroes, by Astrid Andreassen (Árbok 1991-1992, Nordlandahúsid i Føroyum, Tórshavn 1992).

VICTOR "ON THE ROCKS"

FIRST DEPLOYMENT OF THE FRENCH ROV "VICTOR 6000" FROM ON BOARD THE GERMAN RESEARCH ICEBREAKER RV "POLARSTERN"

The German Alfred-Wegener-Institut for Polar and Marine Research (AWI) and the French Institut Français de Recherche pour l'Exploitation de la Mer (IFREMER) launched a common project based on the shared use of the French Remotely Operated Vehicle (ROV) "Victor 6000" (Fig. 1). In summer 1999, the deep-diving ROV was successfully deployed from board RV "Polarstern" during the polar expedition ARK XV/1 (23.06.-18.07.99) to Fram Strait and the Greenland Sea.

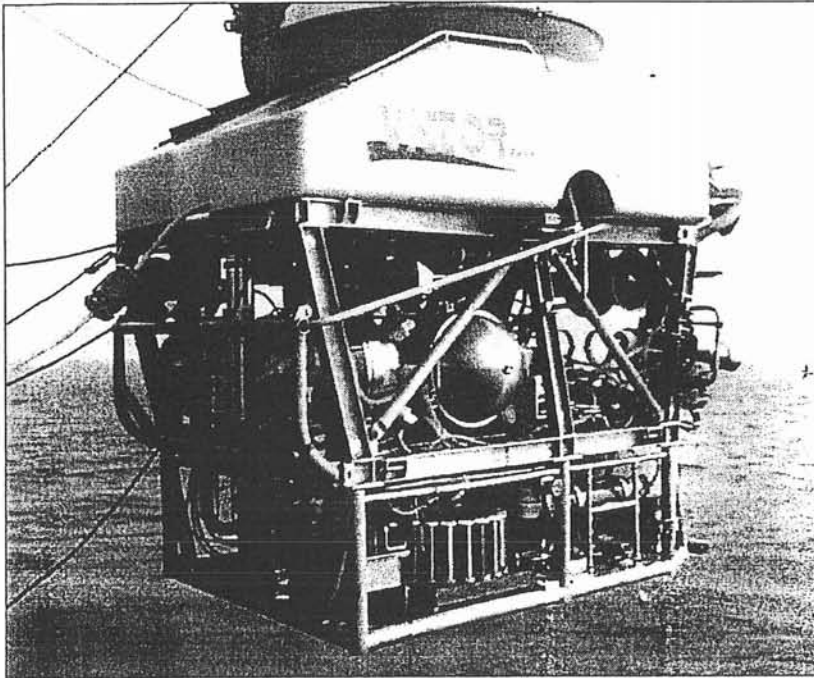


Fig. 1: The French deep-diving ROV "Victor 6000".

The ROV-System

Back in 1992, IFREMER decided to start the "Victor" project which aims to give to the scientific community a teleoperated system for optical surveys and manipulative tasks in the deep sea. The ROV's endurance on tasks far exceeds that of manned submersibles and subsequently increases the efficiency of the overall campaign. Moreover, the real-time transfer of data allows to optimize the dive by permitting quick interpretation and decision-making. Construction and assembly of the system were completed in March 1997.

Apart from the core unit, the vehicle is of a modular design, including a tool sled containing the instrumentation specific to each dive. The tool sled can quickly and easily be attached and electrically connected to the core vehicle. This concept provides the needed flexibility for the various missions en-

visaged by the scientific community. A special "biological" tool sled has been configured and used during RV "Polarstern" expedition ARK-XV/1. It holds a number of tools necessary to collect sediments, water samples and organisms, to carry out temperature measurements, and to release passive markers on the sea floor for future investigations. For technical specifications of the ROV-system see Table 1.

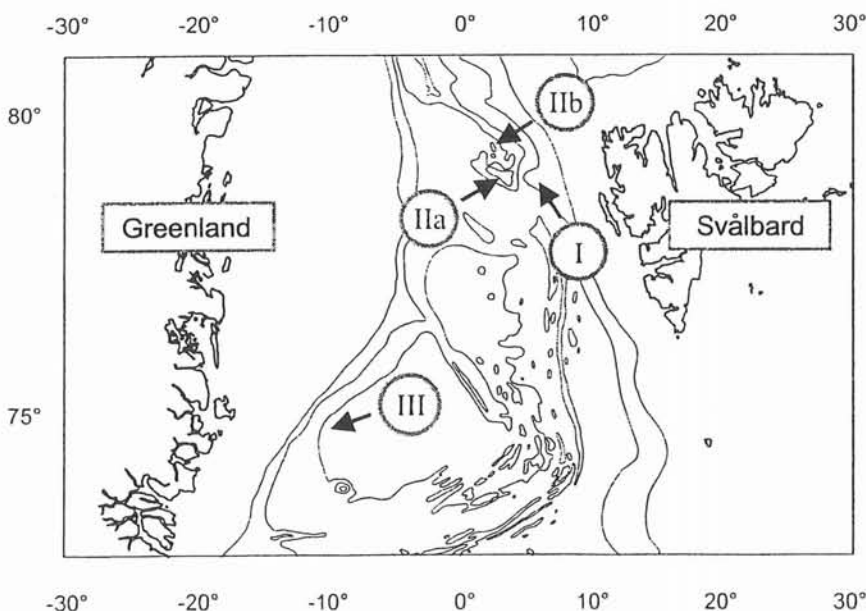


Fig. 2. ROV sites in Fram Strait and the eastern Greenland Sea during RV "Polarstern" Expedition ARK XV/1.

Total diving time of "Victor 6000" for scientific purposes was almost 111 h; the ROV remained at the seafloor for more than 86 h. Individual diving times ranged between 15 h and 26 h (between 11 h and 22 h at the bottom). Maximum water depth during the dives was 5552 m (Molloy Deep). The ROV deployment in the Molloy Deep was the longest dive (more than 19 h at the bottom) ever done so far by the system at such a great depth.

Among other things, the dives were used to carry out large scale optical surveys to assess seafloor topography (including biogenic sediment structures) and abundances of large epibenthic organisms (megafauna). During dives 1, 2 and 5 the ROV followed a pre-planned zig-zag course allowing extrapolations on areal distribution patterns. Each ROV deployment was extensively used to conduct a targeted sampling of organisms and sediments (on centimetre-scale!) with the help of coring devices, a suction system ("slurp gun") and the "pac-man" claw, all handled by the ROVs manipulator. During dive 2 the ROV was also used to work in the surroundings of a metal frame, which was lowered to the seafloor with the ships winch. The frame carried various hard substrates (i.e. wooden, plastic and stone plates) for colonization experiments, cages for exclusion experiments and packages of fish simulating large food-falls. The cages and the fish baits were distributed in the vicinity of the metal frame with the help of the ROV. It is intended to revisit this station in 1-2 years to control and/or terminate and evaluate the experiments.

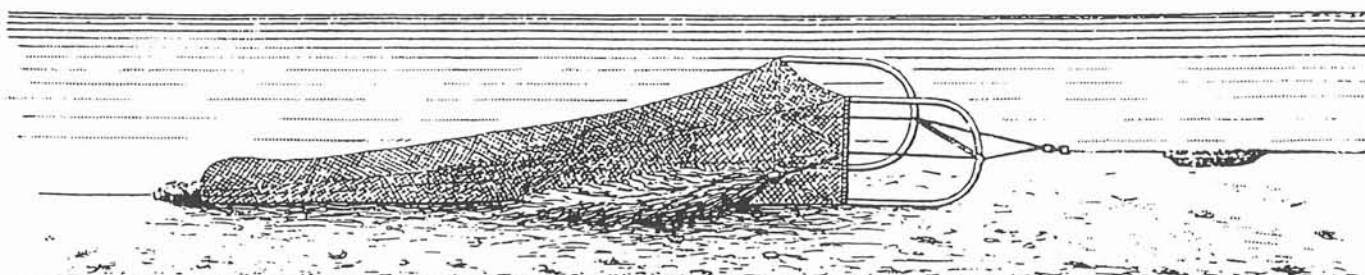
Table 1. ROV specifications.

Deep-sea cable	
Length and diameter	8500 m (L), 20 mm Ø
Tether	
Length and diameter	100-300 m (L), 35 mm Ø
Vehicle	
Depth rating	6000 m
Dimensions (m)	3.1 (L) x 1.8 (W) x 2 (H)
Mass in air	4000 kg
Thrust	200 kg in all directions
Main video camera	3CDD with zoom lens
Other cameras	5 additional cameras
Lights	5kW max, 8 units
Sensors	MRU, depth, altitude, OAS
Manipulator	7 fct M/C, 100 kg lift
Buoyancy system	701, 21/mn at 600 bars
Depressor	
Dimensions (m)	1.5 (L) x 0.8 (W) x 0.5 (H)
Weight in air	1200 kg
Sensors	Heading, depth
Tool sled	
Dimensions (m)	3.1 (L) x 1.8 (W) x 0.7 (H)
Weight (kg)	100 in water, 600 in air
Hydraulic power	3 kW, 210 bars
Electric power	5 kW, 240 VDC 200 W, 48 VDC
Data communication	2 RS232, 1 RS422, 1 video link

Résumé

The use of a deep-diving ROV represents a remarkable step in German benthic deep-sea research. Operations of "Victor 6000" during the expedition ARK XV/1 exhibited the great potential of a remotely operated system in deep-sea research. In contrast to traditional observation/sampling methods (e.g. moored time-lapse cameras, towed photo/video systems, box and multiple corers), the ROV allows controlled optical surveys, a targeted sampling as well as direct manipulation at the seafloor (e.g. the installation of experiments). A Remotely Operated Vehicle will not completely replace traditional observation and sampling methods, however, the use of a ROV in deep-sea research exposes new perspectives for innovative research projects. The excellent cooperation between IFREMER and AWI opened the way for future joint scientific missions in polar regions. The next deployment of "Victor" from board RV "Polarstern" is planned for summer 2001.

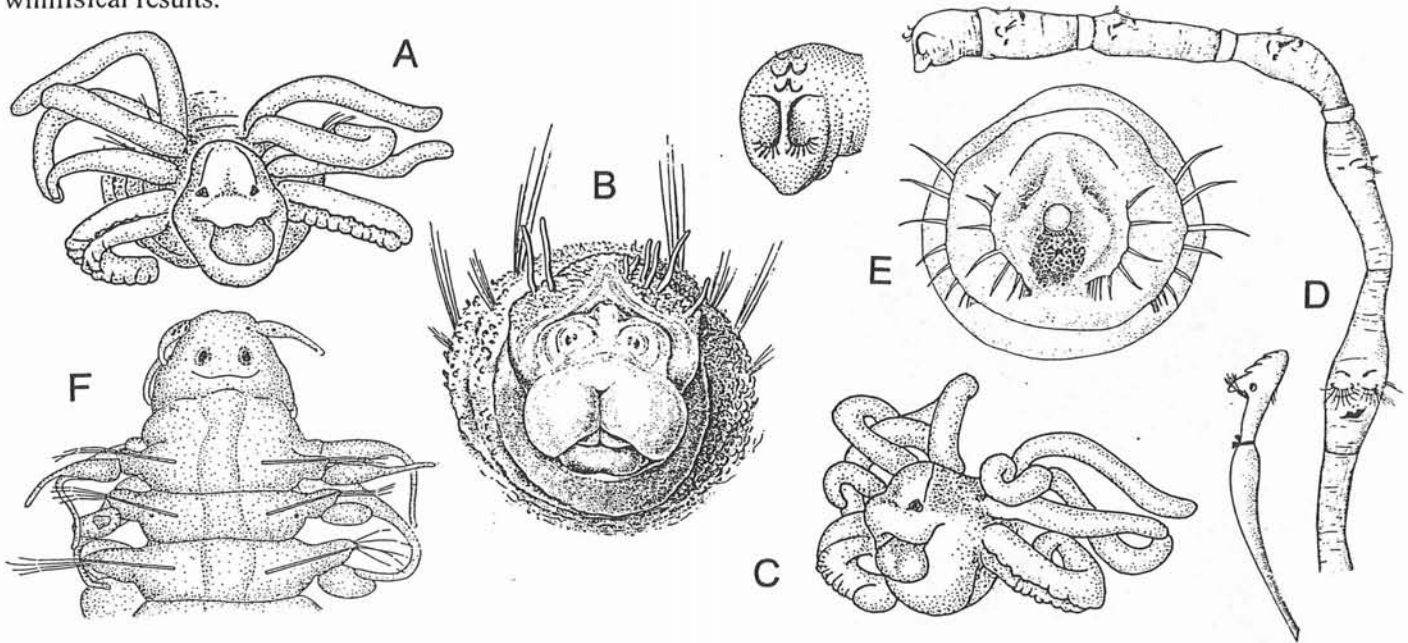
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Hirondelle

ANTHROPOMORPHIC POLYCHAETES

Although not yet published from the deep sea, we include here some shallow-water polychaetes, all drawn from specimens, but in one case (D) with the addition of a few human characteristics, which undeniably have given some whimsical results.



A and C, *Dodecaceria ater* (Quatrefages), red-eyed male with mature sperm, near Marseilles, France, USNM 49272 (Mary E. Petersen del., A from M. E. Petersen 1999: Hydrobiologia 402: 120). Lines above eyes are sensory organs; the species is parthenogenetic; this is the only known male. – B, *Brada villosa* Rathke, Iceland. E. Wesenberg-Lund's (1951) Zoology of Iceland. (Poul H. Winther del.). – D, *Lumbriclymene minor* Arwidsson, Arctic Canada (Ewa Krivanek del, Annie Vedelsby modified). – E, *Sternaspis fossor* Stimpson, off Deer Island, Maine, outer Bay of Fundy, extended anterior end (M. E. Petersen 2000, in press: Santa Barbara Taxonomic Atlas 7, Chapter 11, reproduced with permission). – F, *Mystides viridis* Webster & Benedict, Maine, ventral view of slide preparation of syntype, USNM, eyes visible by transparency (Mary E. Petersen del.)

SOME THINGS NEVER CHANGE...

The most often performed experiment throughout the history of deep-sea research is the one described below. Full of mistrust to the experimental design, technique, statistics, and judgement of their predecessors, every new generation repeated it. Those few individuals who did not, will, to the end of their days, be in doubt if the reports of others really tell the truth. The citation given is the oldest description of this experiment, so fundamental for our understanding of deep-sea conditions, that I am aware; however, my knowledge of deep-sea literature is regrettably restricted, so I am willing to learn from other readers of our Newsletter.

A. Alcock (1902: 100):

"We had sent down in the trawl-bag an untouched bottle of Bass's beer, and when it came up, though the capsule and wires were intact, the cork was so much compressed that it rattled in the neck of the bottle, and the bottle itself contained a mixture of beer and sea-water. The pressure at a depth of 1439 fathoms, amounting to nearly two tons on the square inch, had been sufficient to turn the cork into a pellet of hard wood and to force the sea-water under the capsule, and so between the mouth of the bottle and the shrunken cork."

Reference

Alcock, A., 1902: A Naturalist in Indian Seas or, Four Years with the Royal Indian Marine Survey Ship "Investigator". London, xxiv + 328 pp., 1 map, pl.

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CARLSBERG BEERS 10 KM DOWN!

Ole's note above calls to mind another story of beer bottles traveling to the bottom of the sea.



During the Galathea Expedition – the 50 years' anniversary of which will be celebrated later this year – one of the minor, but as it turned out, very time-consuming, tasks was measurements of terrestrial magnetism below the Earth's surface. Previous attempts in mine shafts had not been satisfactory because of the limited depth of the shafts and the more or less magnetic surrounding rocks.

Instead, Danish geophysicists found that measurements might be undertaken by lowering into the trenches especially designed apparatus inside spheres able to withstand the pressure. For the single and double spheres employed, a new, completely iron-free bronze/aluminium alloy was invented (Arley et al. 1953b).

There was much adversity in making particularly the single sphere (Fig. 1) completely watertight and protecting the extremely vulnerable apparatus against disorder caused by the inevitable bumping against the ship's side during launching. However, good results were eventually obtained (Arley et al. 1953a, Arley 1956).

The Carlsberg Foundation covered all the expenses for magnetic investigation. Someone therefore got the bright idea to show our gratitude by using the sphere to send two full bottles of beer 10 km down to the bottom of the Philippine Trench (Fig. 2). Later they were incorporated as highly esteemed items into the Carlsberg Museum next to the brewery in Copenhagen.

Fig. 1. Magnetic measurement apparatus suspended in the single sphere, watched by First Engineer C. A. Thegler-Jensen and Dr. Niels Arley.

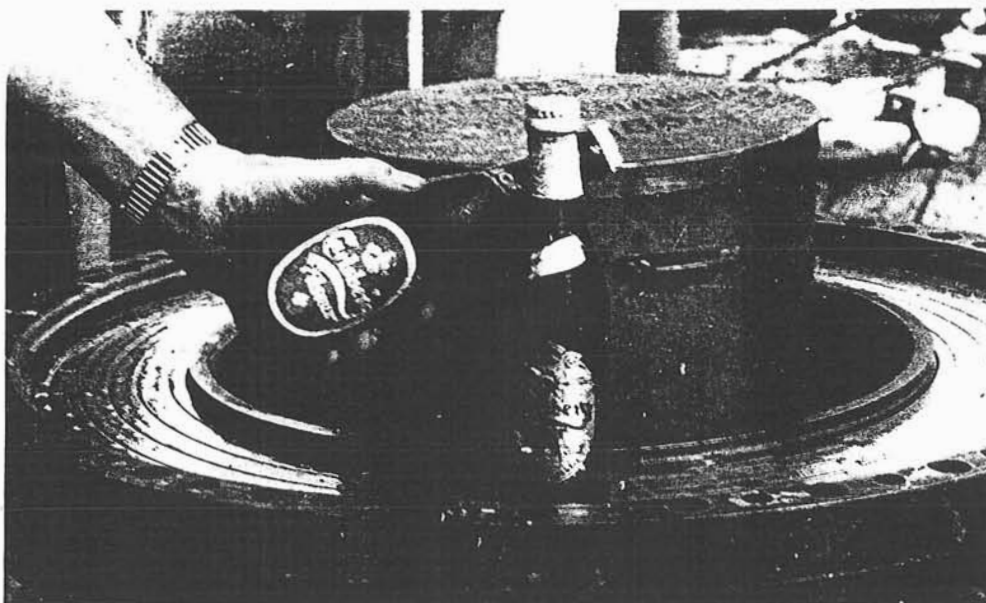


Fig. 2. Ordinary and export Carlsberg beers after safe return from 10 km – the then deepest known part of the oceans.

References

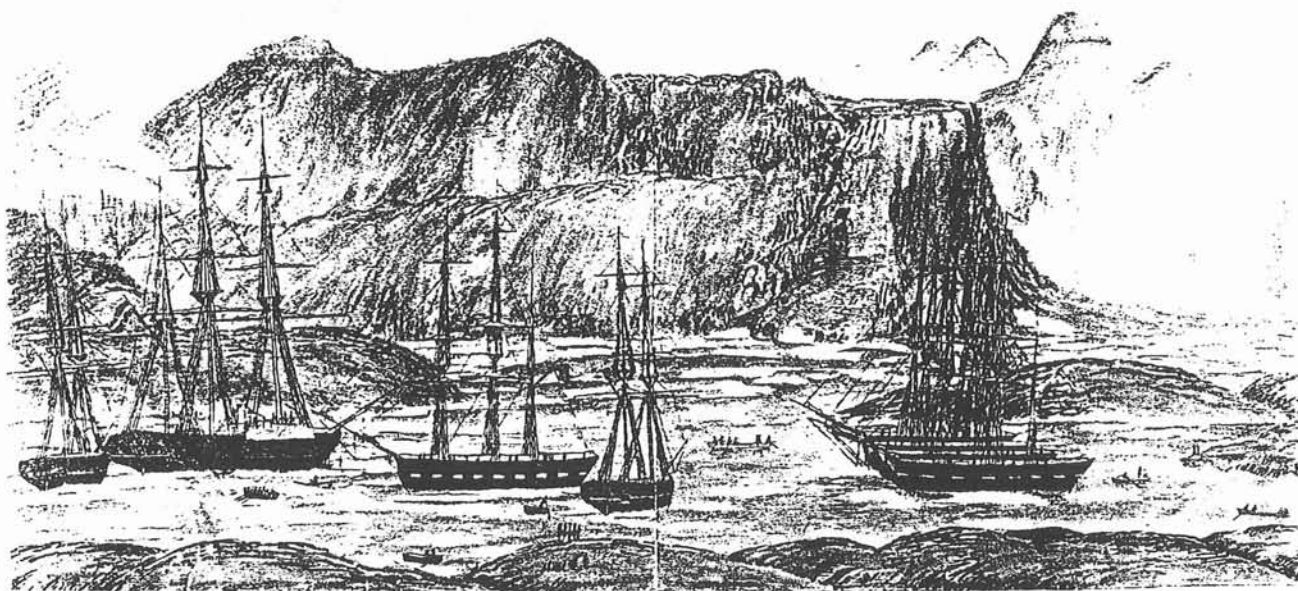
- Arley, N., 1956: Geomagnetic investigations. – Pp. 237-245 in *The Galathea Deep Sea Expedition*. George Allen and Unwin, London, 296 pp.
- Arley, N., P. Andreasen, J. Espersen & J. Olsen, 1953a: Magnetic investigations on the *Galathea* Expedition. – *Nature*, Lond. 171: 384-385.
- Arley, N., B. Lunn, M. Nielsen & C. Norgaard, 1953b: Magnetic measurements in deep-sea investigations. Construction of non-magnetic containers. – *Nature*, Lond. 171: 383-384.

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A LITTLE KNOWN PICTURE OF HMS “BULLDOG”, FULL OF HISTORICAL ATMOSPHERE

The British “Bulldog” was a paddle sloop, built in 1845 at Chatham Dockyard, and destroyed during fights at Haiti 1865 (Rice 1986). Deep-sea researchers may know it for a single expedition in 1860, led by the famous arctic explorer Captain Sir Leopold M’Clintock. The aim of the expedition was to investigate a possible route for a submarine cable between Europe and America via the Faroes, Iceland, southern Greenland and Labrador. The “Bulldog” left Stornoway on the 2nd of July, came to the Faroes on the 5th, stayed one day over in Vestmannaahavn because of fog, and arrived in Reykjavík on July 11. Finally, after three difficult weeks in storm and ice, the “Bulldog” reached, on August 7, the harbour of Godthaab, now Nuuk, the capital of Greenland, and anchored among some other vessels.

As an eye witness, the surgeon and naturalist on board, G. C. Wallich, described the scene: “The other vessels consist of a couple of Danish barks of about six hundred tons burden, come in here for shelter until the state of the ice admits of their going into a southern port to load with cryolite; a smart looking American schooner, carrying a living cargo of fifty students of Williams College, Massachusetts, bound to these parts on a scientific excursion, under the superintendence of Professor Chadbourne; and lastly our collier brig.” (Wallich 1862: 27). The collier brig was the “Cicerone”, bringing out coal for the “Bulldog” (Rice *et al.* 1976: 431).



A reduced representation of Aron of Kangeq's drawing showing the harbour of Nuuk in 1860. The “Bulldog” lies to the left (3 masts). In the detail below it is seen that the ship is a paddle sloop, which is very clear in the original painting (reproduced in colour in Kaalund 1980).

But there was still another eye witness: the eskimo artist Aron from Kangeq. Around 1860 he made a large number of drawings and water colour paintings of Greenlandic people, landscapes, myths and historical events. He happened to visit Godthaab that August, and painted the ships at anchor in the harbour. The contemporary description of the painting expressly says that the British "Bulldog" and the American "Nautilus" were among them.

In a deep-sea context the "Bulldog" Expedition is worth mentioning for two reasons:

One is that it was the soundings of that expedition which, together with soundings by the "Valorous" Expedition in 1875 (Jeffreys & Carpenter 1876), made it possible to draw the first chart of the contours of the Reykjanes Ridge southwest of Iceland. Much more detailed soundings of parts of the Reykjanes Ridge were later taken by the Danish "Ingolf" Expedition (Wandel 1899).

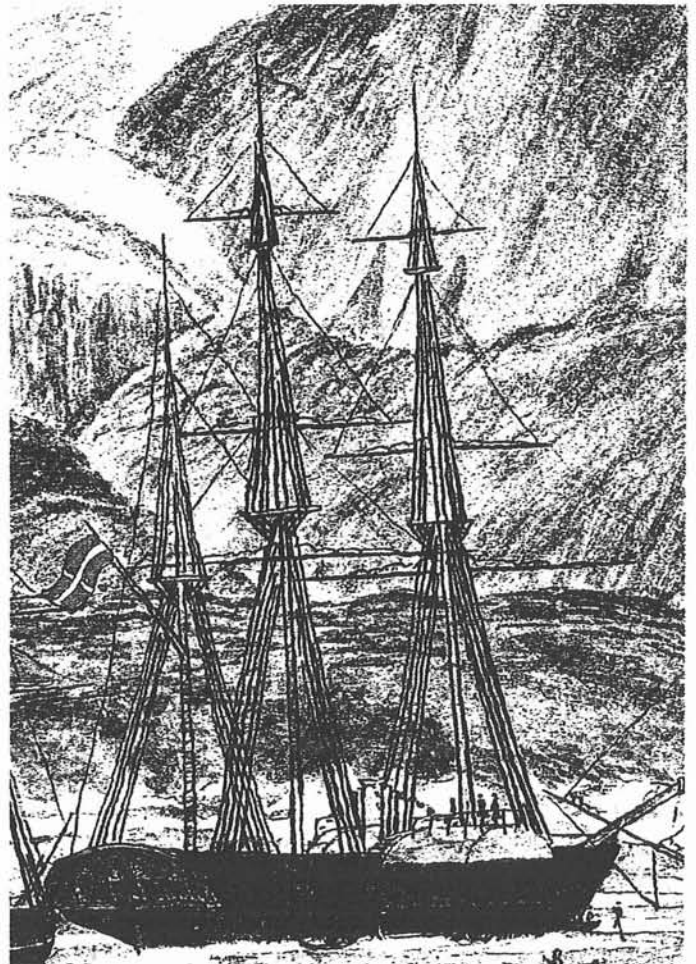
The other reason to remember this expedition is that Wallich found brittlestars clinging to the sounding line from a depth given as 1260 fathoms and claimed the merit of finally disproving the "Azoic theory" of Edward Forbes (Forbes & Godwin-Austen 1859). He published his finds, observations and opinions in a volume with a very long title (Wallich 1862). The work is in three parts, but ends abruptly on page 160 in the middle of a sentence, and the rest was never published! His conclusions were not accepted by all contemporary marine biologists, and a bitter conflict developed, probably making the rest of his life unhappy (Rice *et al.* 1976).

References

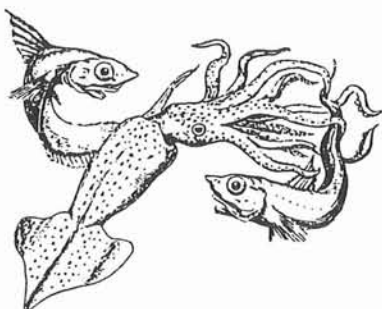
- Forbes, E. & R. Godwin-Austen, 1859: The Natural History of the European Seas. John Van Voorst, London, 360 pp.
- Jeffreys, G. & C. B. Carpenter, 1876: The "Valorous" Expedition. Reports. – Proc. Roy. Soc. London 25: 175-237.
- Kaalund, B., 1980: Prøver af Grønlandsk Tegning og Trykning. 1857-1861 [Samples of Greenlandic drawing and printing]. København, 107 pp.
- Rice, A. L., 1986: British Oceanographic Vessels 1800-1950. The Ray Society, London, 193 pp.
- Rice, A. L., H. L. Burstyn & A. G. E. Jones, 1976: G. C. Wallich M.D. – megalomaniac or misused oceanographic genius? – J. Soc. Bibliophy Nat. Hist. 7: 423-450.
- Wallich, G. C., 1862: The North-Atlantic Seabed: Comprising a diary of the voyage on board H.M.S. Bulldog, in 1860; and observations on the presence of animal life, and the formation and nature of organic deposits, at great depths in the ocean. John Van Voorst, London, 160 pp.
- Wandel, C. F., 1899: Report of the voyage. – Dan. Ingolf Exped. 1: 1-21.

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The "Bulldog" at Nuuk, West Greenland, in 1860.

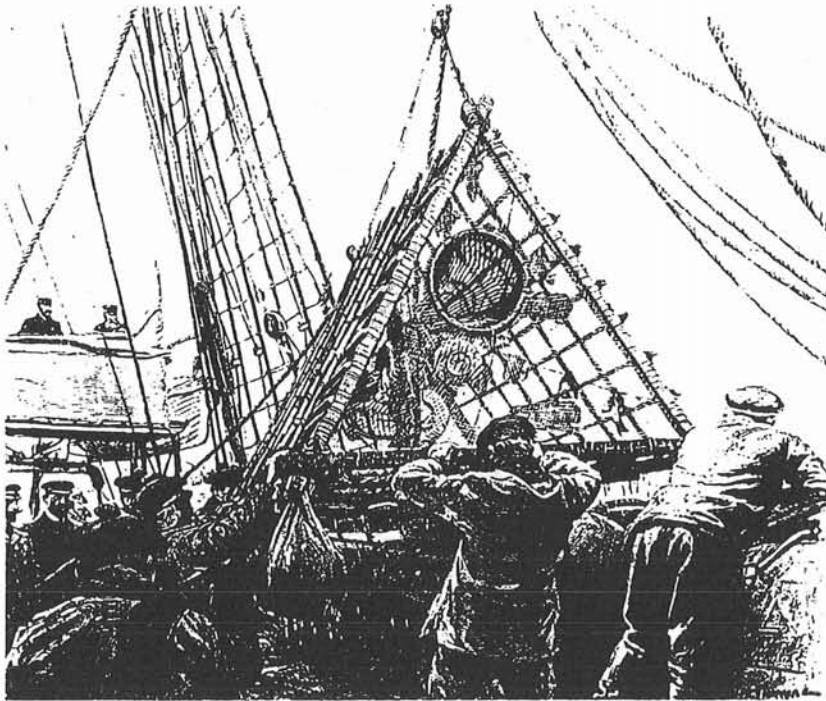


THE APPARATUS AND EQUIPMENT IN THE MONACO OCEANOGRAPHIC MUSEUM

All deep-sea biologists have heard of the magnificent Oceanographic Institute and Museum in Monaco, and many of us have been privileged to visit the beautiful building high on its rock facing the blue Mediterranean. We are also well aware of the investigations initiated by Prince Albert I and carried out between 1885 and 1915 in the North Atlantic and Mediterranean on board the well equipped *Princesse Alice I and II* and *Hirondelle I and II*.

Nowhere else in the world is oceanographic research and marine life exhibited in more pleasant surroundings than in Monaco. And nowhere else can be found a collection of scientists' tools nearly as comprehensive as that in this museum.

A complete survey by Christian Carpine of the Institute has, under the title "Catalogue des appareils d'océanographie en collection au Musée océanographique de Monaco", been published in installments since 1987 and has now been finished. Over a total of 1104 pages in the *Bulletin de l'Institut océanographique*, no less than 380 different items of apparatus and equipment have been described and illustrated. In addition to introductions for the various categories, each item covers a double page with a photo on the left side and on the right, a historical account, description, catalogue no. and references. An extensive bibliography and an index of cited names are given in each volume.



Recovery on board of the triangular trap. Drawing by L. Tinayre in Prince Albert I of Monaco: "La carrière d'un navigateur."

The work involved in preparing this extremely valuable catalogue seems incredible. The Monaco Museum and particularly Christian Carpine are to be congratulated for the his effort to record in detail so many of the tools which were invented, constructed and utilized in the earlier years of oceanographic research. These tools form the foundation on which the later generations have been able to build.

Contents of the Catalogue with number of apparatus in parentheses:

Vol. 73 (No. 1437), 1987: 1. Photometers (18), 2. Current meters (22).

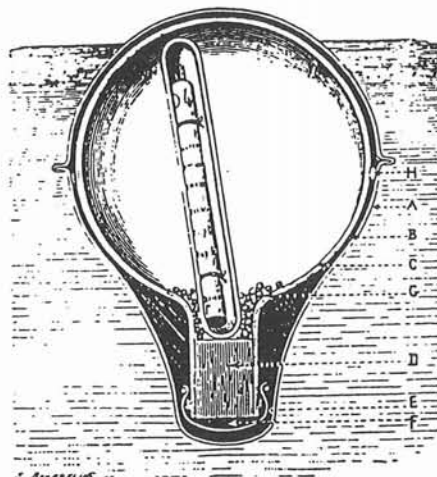
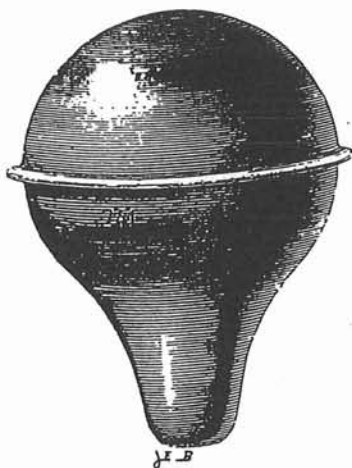
Vol. 74 (No. 1438), 1991: 3. Apparatus for biological collecting (57).

Vol. 75 (No. 1440), 1993: 4. Water samplers (72).

Vol. 75 (No. 1441), 1996: 5. Sounding apparatus (69).

Vol. 76 (No. 1442): 1997: 6. Thermometers and their mounting devices (68).

Vol. 76 (No. 1443), 1998: 7. Different instruments (16), equipment to be used on deck (24), and laboratory instruments (34).



Prince Albert I floating device (model 1887) for identification of ocean currents.

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Zoological Museum, University of Copenhagen

**THE COPENHAGEN BIOSYSTEMATICS CENTRE (COBICE)
NOW OFFERS SUPPORTED ACCESS TO ITS COLLECTIONS AND OTHER
FACILITIES**

Through the European Commission's programme for Improving the Human Research Potential and Socio-Economic Knowledge Base, funds have been made available to provide transnational access to researchers from *member and associated states of the European Community* to utilize the collections and other facilities of the Major Research Infrastructure **Copenhagen Biosystematics Centre (COBICE)**.

Access to COBICE will be provided free of charge for visits of up to three months. Travel and living costs for visiting researchers under the programme will be covered.

Applications for support for a visit to COBICE are herewith invited. Please obtain the application form and other documents from COBICE's website at <http://www.zmuc.dk/commonweb/COBICE.htm> or request the material from

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email henghoff@zmuc.ku.dk*

COBICE's contract with the European Commission runs for 3 years. During this period, six calls for application will be made. The first deadline is **15 April 2000** for applications for visits scheduled to take place during the second half of 2000 and the first half of 2001. The second deadline (to be determined) will be for visits scheduled to take place during all of 2001.

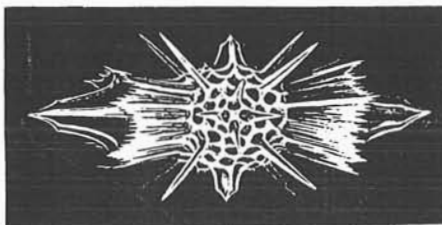
Please notice that this offer only applies to researchers from member and associated states of the European Community.

What is COBICE?

The Copenhagen Biosystematics Centre (COBICE) is a powerful centre of biosystematic research at the Faculty of Science, University of Copenhagen. COBICE comprises the Zoological Museum (ZM) the Geological Museum (GM), the Botanical Museum (BM), the Botanical Laboratory of Molecular Systematics (BLMS), the Department of Evolutionary Biology (DEB), and the Department of Zoomorphology (DZ).

The scientific collections at COBICE range among Europe's large and most well-organised. They comprise a total of about 20 million specimens, including among many others about 75,000 type specimens and particularly important collections of Arctic, especially Greenlandic, and Danish animals, deep-sea animals, whales, South American Quaternary mammal fossils, the World's largest databases on African terrestrial vertebrates, tissue collections for DNA analysis, esp. the World's largest collection of birds (15,000 samples representing 3,000 species), and 8,000 African mammal samples, fossils from Greenland, mo-clay Tertiary fossils, plants from Greenland and Denmark, flowering plants from Thailand and NE Africa, and seeds of Triticeae (wild relatives of wheat, rye and barley, more than 10,000 samples).

Equipment available at COBICE includes light, fluorescence, transmission electron and scanning electron microscopes, DNA sequencing facilities, X-ray apparatus, and image analysis system.



THE DEEP GULF OF MEXICO REVISITED

The Gulf of Mexico is a semi-enclosed basin that has been considered a regional sea interconnected to the western Atlantic and the Caribbean Sea. In the form of a circle, a large riverine inflow characterizes on one side its coastal areas where major rivers discharging are from north to south the Mississippi, the Grande and the Grijalva-Usumacinta. On the other hand its extended carbonate platforms define the northernmost extension of the tropical communities. The maximum depth in the Gulf is the Sigsbee abyssal plain at 3,800 m where warmer water is found (4.2°C) than at similar depths in the Atlantic. Due to its tropical condition the basin remains thermally stratified the year round with surface temperatures that fluctuate between 26° and 30°C. Hence, oceanic primary productivity is limited by nutrient accessibility more than light. Oligotrophic conditions prevail in the oceanic realm (Fig. 1).

Samples from the deep Gulf were first obtained in the 19th and early 20th century by large expeditions. The first program aimed at characterizing the deep Gulf of Mexico was carried out decades later by Texas A & M University in the early 60's. This program was led by Willys Pequegnat and provided the scientific community with the first scope of this regional sea shared by three countries: Mexico, Cuba and the US. Results from efforts of almost a decade included the deep Gulf as an impoverished basin; the benthic community was characterized by a low species richness, reduced abundance and biomass. The earlier papers have even compared its low benthic production to the one encountered in the Mediterranean Sea. Pequegnat's studies are considered the benchmark in studies to follow on the deep-sea Gulf.

Due to its oligotrophic condition and the high sediment input, an envisaged alternative use of the northern and central Gulf has been considered for the disposal of industrial waste in the deep sea. A few models have been proposed to visualize the potential use offered by this regional sea. Additionally, the need to recognize the occurrence of alternative energy reserves for future needs has led to consider the exploitation of oil reserves beyond the Gulf's continental shelf.

The program SIGSBEE started in 1997 devoted to the study of the deep benthos in the Mexican Exclusive Economic Zone of the Gulf and is led by the Institute of Marine Sciences and Limnology (ICML) from the National Autonomous University in Mexico (UNAM). The first cruise, interdisciplinary in nature, was carried out onboard the research vessel *Justo Sierra* from UNAM. Other efforts have been added since (Fig. 2). Preliminary results from these three years include different perspectives of the benthic biomass distribution and recognizing the factors that allow biogenic carbon export to deep parts of this tropical basin.

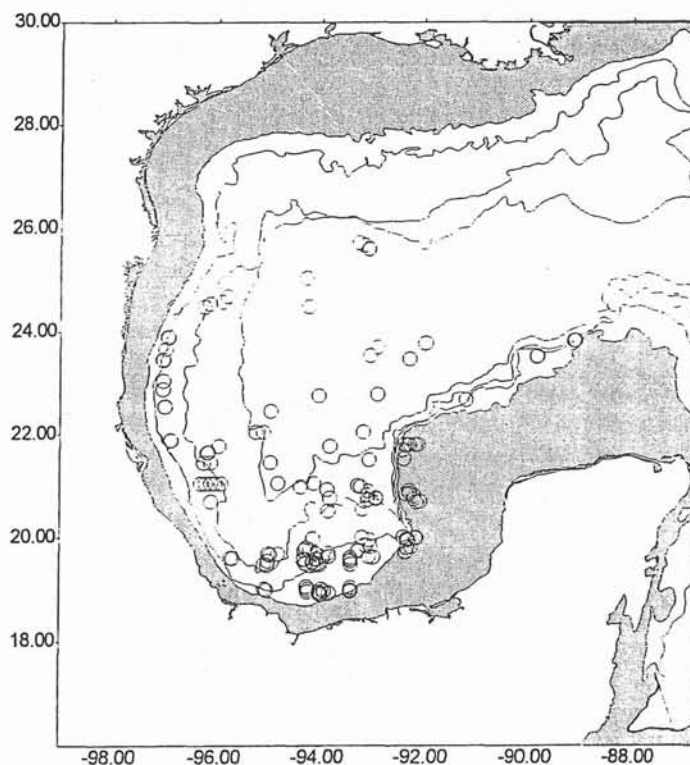


Fig. 2. Benthos samples of the Gulf of Mexico currently under study in the SIGSBEE program by UNAM.

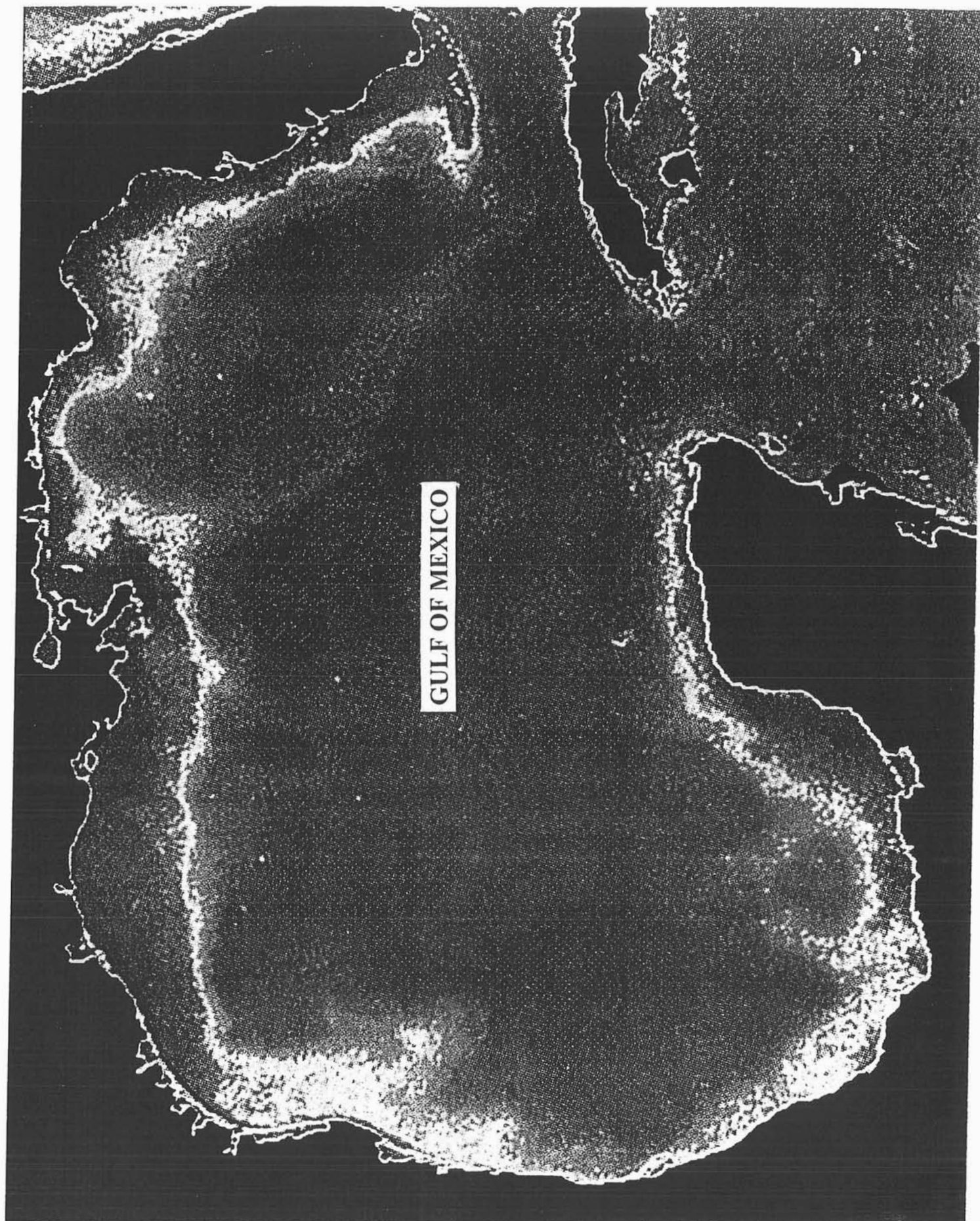


Fig. 1. Gulf of Mexico, satellite image of sea surface chlorophyll distribution. North is at left. Chlorophyll biomass in darker areas is low, in paler areas high; it is highest off Texas and Louisiana in the north and Campeche in the south.

Current knowledge shows that a highly diverse fauna, belonging to both the macrofauna and the meiofauna, is to be found in the Gulf of Mexico abyssal plain. This infauna attains variable patterns in the small and large spatial scales. Density values are notably larger than those previously recorded in the literature (Table 1). Polychaete annelids dominate the community structure with 45 to 60% of the abundance in the shelf break and upper slope.

Table 1. Macrofauna density values (ind. per m^{-2}) in the Gulf of Mexico. n.a. = not available

Regions	Depth zones I-V					References
	Shelf break/ Upper slope	Middle slope	Lower slope	Continental rise	Abyssal plain	
East	1989	722	548	n.a.	19	Rowe <i>et al.</i> 1974
South	680	417	282	59	20	Rowe & Menzel 1971
West	1933	1866	1553	1275	1286	Escobar <i>et al.</i> 1999
North west	n.a.	502	n.a.	n.a.	112	Rowe <i>et al.</i> 1974
North	1982	1787	1441	482	n.a.	Pequegnat <i>et al.</i> 1990
North central	2430	1600	n.a.	358	82	Blake & Doyle 1983
Central	n.a.	n.a.	n.a.	n.a.	113	Rowe & Menzel 1971

Beyond this depth the dominant fauna of the lower slope, the continental rise and the abyss is replaced by arthropods, mainly peracarid crustaceans, with values in the range of 16 to 63% of the total density (Fig. 3) and similar trends in biomass. It has been interesting to identify taxonomic groups that occur selectively in certain depth zones.

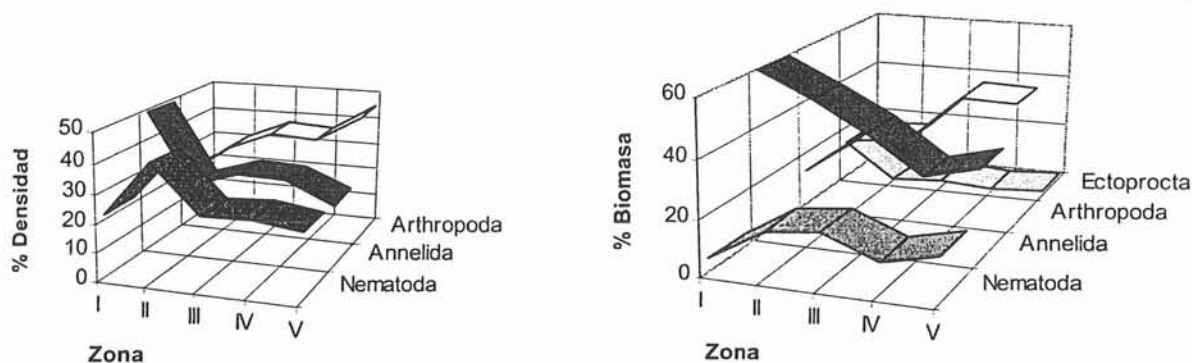


Fig. 3. Distribution of major benthic groups in western Gulf of Mexico, contributing with 90% of the abundance (left) and biomass (right) in a depth gradient from shelf break (zone I) to abyssal plain (zone V) (see also Table 1). (Hernandez 1999).

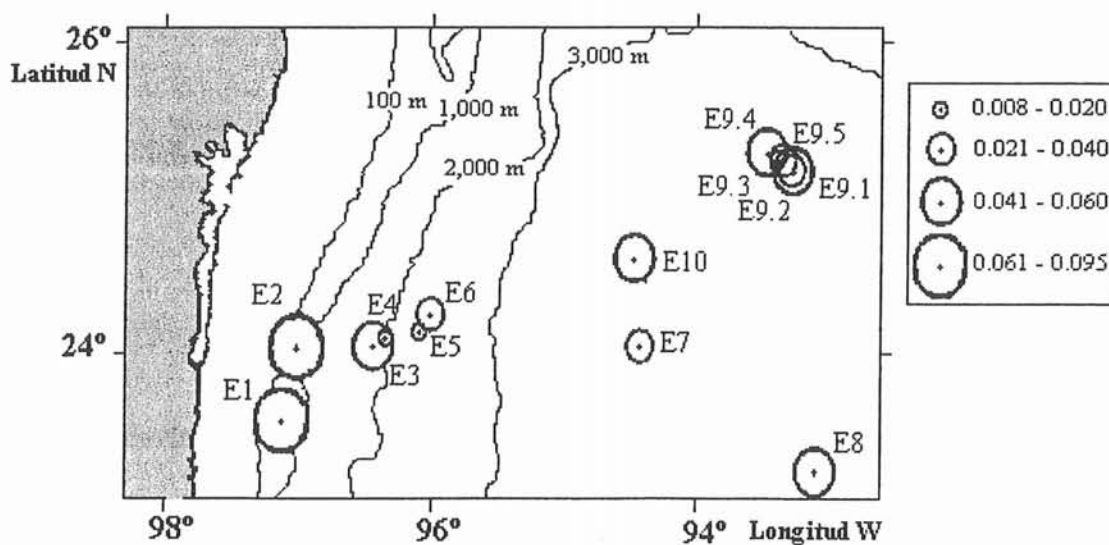


Fig. 4. Distribution of total benthic biomass in samples from Gulf of Mexico abyssal plain; data from SIGSBEE.1 cruise. Values are in g C per m^{-2} and are total biomass values.

Tanaids are such a group, and in spite of not being considered dominant components in the SW Gulf of Mexico (they represent only 1-25% of the arthropods identified), their largest abundance is found between 1000 and 1800 m (Fig. 5) below the oxygen minimum zone on the slope.

Regarding the biogenic carbon export to the deep sea, it has been recognized that the hydrographic conditions of the SW Gulf of Mexico promote seasonal biogenic carbon export to great depths. The frontal structures bordering the mesoscale features originated from the Loop Current in the Gulf of Mexico and have a large influence on the geographic variability of the benthic community structure in the center of the Basin (Fig. 4).

The information and materials are currently being processed by associated scientists and graduate students. A stronger collaboration with other deep-sea scientists and international groups is envisaged to occur in the near future that will enhance our knowledge of the tropical regions in a Large Marine Ecosystem view.

References

- Blake, J. N. & L. J. Doyle, 1983: Infaunal relationships at the shelf slope break. – SEPM Special Publication 33: 381-389.
- Escobar, E., M. Signoret & D. Hernández, 1999: Variación de la densidad de la infauna macrobentónica en un gradiente batimétrico: Oeste del Golfo de México. – *Ciencias Marinas* 25 (2): 118-126.
- Hernandez, D. R. 1999. Riqueza taxonomica, densidad y biomasa de la infauna macrobentónica a lo largo de un gradiente batimétrico en el sector Occidental del Golfo de México. Facultad de Ciencias UNAM. 43 pp. (Unpublished student report)
- Pequegnat, W. E., B. J. Gallaway & L. Pequegnat, 1990: Aspects of the ecology of the deep-water fauna of the Gulf of Mexico. – *American Zoologist* 30: 45-64.
- Rowe, G. T. & D. W. Menzel, 1971: Quantitative benthic samples from the deep Gulf of Mexico with some comments on the measurement of deep-sea biomass. – *Bulletin of Marine Science* 21: 556-566.
- Rowe, G. T., P. T. Polloni & S. G. Horner, 1974: Benthic biomass estimates from the NW Atlantic Ocean and the northern Gulf of Mexico. – *Deep-Sea Research* 21: 641-650.

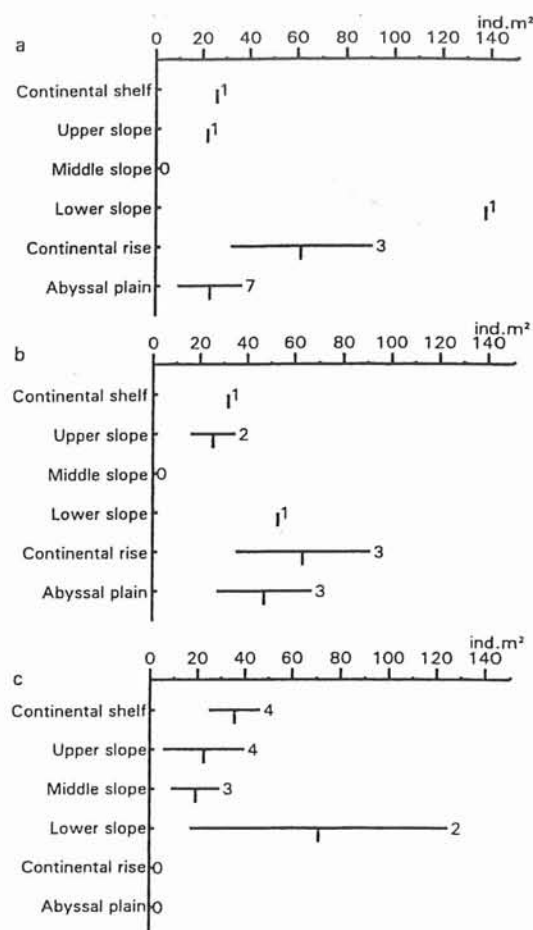


Fig. 5. Density distribution of the Tanaidacea in a depth gradient at transects located in: a. northwestern Gulf, b. western Gulf, and c. southwestern Gulf. Superscripts = number of core samples, each with three replicates.

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THE DEADLINE FOR THE NEXT ISSUE OF D-SN IS 1st OCTOBER 2000

Contributions may be sent as e-mail attachments in Word (any version), WordPerfect 5.x DOS to 6.0 (Windows) or ASCII to. Torben Wolff or Mary E. Petersen (mepetersen@zmuc.ku.dk)

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