Edited by
Andrey Bizuykin
& Peter Symes



***POINT & CLICK***
***ON BOLD LINKS***

*New & Interesting*

# Equipment

## Back to the Future

## FD-70 housing

The Fantasea FD-70 for the Nikon D-70 is a compact and lightweight polycarbonate housing with ergonomically designed handles, making it easy to hold and use. The FD-70 also protects against damage from rain, snow, dust, sand and dirt. It is a valuable tool for many commercial, industrial, and medical applications, because it is resistant to most liquids and sprays. The FD-70 housing is rated to a depth of 200 feet (60m). Suggested retail price: USD 999

**www.fantasea.com**

The new Mistral is a modern version of the original double hose regulator invented by Jacques Cousteau and Emille Gagnan in 1943, combined with the refinements of modern regulator technology. Incorporating a timeproven dry sealed first stage, a unique completely sealed second stage, the unique double hose design will appeal to underwater photographers, videographers and ice divers. Compatible with EAN 40 right out of the box.

**www.aqualung.com**

## Let there be Light!

Nocturnal Lights are now introducing a whole new series of dive lamps for the discerning user. The mid-range SL50, uses rechargeable NiMH batteries which have been overcharged to 14.4v , which increase light output to 30 – 40% more than standard 12v systems. The lamp comes with 20w, 35w, and 50w bulbs that are interchangeable. Burntimes are: 120min at 20w, 80min at 35w, and 45min at 50w respectively. The lantern style handle also doubles as a video arm or camera arm mount, which includes mounting hole. Priced at USD 330.

**www.nocturnallights.com**

## ScubaDoRag

Unlike cotton products, the original ScubaDoRag material dries fast, stretches to fit, and will maintain its color and shape. The ScubaDoRag is designed for divers to tame the hair, identify them underwater and provide sun protection on the surface. For longer hair, the Ragtails can be tied over and under the ponytail and stuffed into the Secret Compartment in the Stingray Pouch™ or use for storing cash, credit card/ID, key or a lucky charm. The limited edition prints, solids, and textures are highly visible above and below the sea.

**www.scubadorag.com**

## Poseidon: To BeSea or not to...

We make the best regulators in the world, says Yaniv Bertele, responsible for R&D at Poseidon. "*Now we are hoping to take the same leading position on BC´s as well.*"

The Harness is available in two different models, *Advanced* and *Sport*, developed to fit everyone from the smallest woman to the biggest guy. The ergonomic of the harness makes you carry the heavy tanks with your hips instead of around shoulders The HybroBack™ has a soft upper back and a hard lower back is hard connected via a size adjustment system. The length can be altered to fit from XXS to XXL. Lumbar Support placed where back meets the seat, without needing any tools. It distributes all weight absorbed by the lumbar support, spread around the waist instead of around the shoulders. Together with the ergonomically shaped shoulder straps, the lumbar support system and the anatomically correct HybroBack™, anyone from the smallest woman to the biggest guy can make BeSea fit perfectly.

**besea.poseidon.se**

*Interesting inventions*

## Thermocline Explorer

THERMAL PROTECTION HAS EVOLVED

The new Thermocline Explorer exposure suit for warm water diving from Fourth Element has been heralded as a revolution in scuba diving thermal protection. As it is neutrally buoyant and very lightweight, there is no, or very little, need for lead. Obviously, this means less strain on the lower back, and fluctuations in the buoyancy of the suit with depth are no longer a factor. The increased comfort and freedom of a neutrally buoyant suit is clear.

With the equivalent thermal protection to 2.5mm neoprene, the breathable, fleecelined material developed by Polartec, is perfect as a high performance successor to neoprene. Fast drying, lightweight and machine washable,

(cont´d next page)

## Dry Delta 4

"One hot new regulator ready to take on all challengers with improved performance," states Oceanics website. New features, improved styling, and the new FDX-10 First Stage, featuring the exclusive Dry Reg Technology, which prevents moisture and contaminants from entering your first stage, even if the dust cap is left off. No more corrosion of critical internal components, bacteria, hose deterioration, and damaged gauges and computers. When your dive is finished, before the regulator is even removed from the tank valve, the Dry Reg Technology system is already closed, sealing out moisture and any other contamination.

**www.oceanicworldwide.com**


## Seaspy

This underwater housing from Equinox Underwater Products, designed to fit a majority of today's popular cameras, provides an affordable solution to photographers wanting to expand to digital underwater photography. The SEASPY housing can also be custom-manufactured to individual needs and cameras at no additional cost on request. Priced at USD 325. Depth Rating: 50 meters.**www.diveequinox.com**


## Have a Blast!

The new Blast is designed so that divers can operate it easily with cold hands or gloves in an emergency. There are no tiny buttons to locate – you just grip the body of the unit and squeeze the spring-loaded halves together to activate. The Blast operates from a medium pressure hose and comes in three versions, each with a swivel connection so that the unit can be rotated to the ideal position. The new Blast is also useful as an air-gun for filling SMBs or liftbags underwater.

**www.apvalves.com**


## Kinesis

The new Kinesis fins from Sherwood Scuba utilizes its patented Optimal Pivot Blade (OPB) technology to increase kick efficiency, minimize fatigue and maximize acceleration. Effortless propulsion with optimum thrust.Offered in two models, the Kinesis, and the Kinesis EX, which is designed for advanced divers seeking higher performance. The KINESIS comes in blue and yellow colors with black accents, the EX model only in black in black. Suggested retail prices are USD129.95 and for the EX, USD149.95.

**www.sherwoodscuba.com**

*Full-featured from Amphibico*

**Amphibico** has launched its all-new, full-featured Phenom FXZ1 HDV marine housing for the Sony® HDR-FX1 & HVR-Z1U HDV camcorders. With its ergonomic functionality and high quality construction, the phenom fxz1 will once again afford its users the best possible underwater "images.....even better than the real thing", as Amphibico puts it. This full-featured housing provides access to all key camcorder functions to depths of 330 feet or 100 meters and, in addition to a long list of features, Amphibico's usual high quality, full zoom-through 94 degree optics will complement the package. **www.amphibico.com**

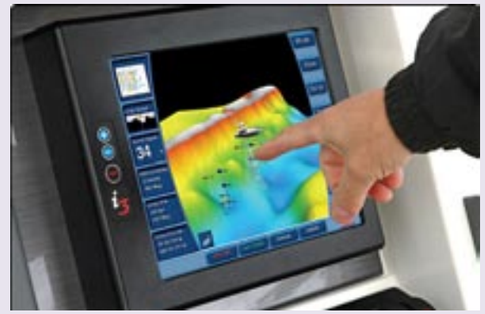
(from previous page)

the fabric is perfect for an exposure suit designed with travel in mind.

The Thermocline Explorer is a zipless suit giving exposure protection to the legs and body. When worn with a long or short-sleeved top, this combination ensures a double layer on the body core, maximising thermal protection and performance.

The Thermocline range also includes a short sleeved top, men's and women's vests and shorts and even a bikini. The garments can also be used to add comfort add warmth, worn underneath a wetsuit for extra protection without the associated buoyancy increases.

For more details visit
**www.fourthelement.com**
Also see the test review in this issue



## A fine touch!

Radar, echo-sounder, charter, GPS and what not - all in one. More than just another sophisticated chart plotter, Maptech i3 is an extraordinary, integrated nautical information system. All operated effortlessly by Touch Screen you can send and receive emails or send messages via fax or voice. You can even send a message showing your boat's location on a real chart. Request and receive weather reports based on your actual GPS position. And you can even automatically monitor vital onboard systems when you're away from your boat.

**www.maptech.com**

# It's springtime, says Beaver

Beaver's Easy Fin Springs not only make fitting your fins easier, but give you a more secure and rugged fitting than standard fin straps. No adjustment is necessary when you dive, and most types of fin will fit the Easy Spring Straps. The Easy Spring Straps retail at GBP 16.95, making them highly competitive and are available at all good dive stores. To find your local supplier or to order a free brochure: **www.beaversports.co.uk**

# Elegant Everywhere

Snorkel, ski, or a stunning wedding,This latest digital delivers both on land and in the sea with a faster .6 second start up, a quick .05 second shutter release, movie mode and a generous 2.0 inch monitor. A beautiful, petite JIS Class 8 waterproof-rated exterior promises you'll capture images proudly just under the water's surface or in the most formal settings. Finally, your wait is over for petite, durable, go everywhere digital. Priced at under USD 400.

**www.pentaximaging.com**



## How about a Great White Wine and a good Book?

# Great White Wine

Do you like good white wine and are you passionate about sharks? Well, if that is the case then you probably have a lot in common with the founders of Great White Wines, Melanie Marks, 33, and her husband, Mark Horton, 37, who founded their company partly out of interest for great wines and in an effort to protect the great white sharks.

These fascinating, widely misunderstood and threatened species have declined worldwide by 80 percent over the past 15 years. Great White Wines have pledged to work towards changing the image of the shark from a feared and hunted species to a respected and valued one. The two have pledged to donate 10 percent of Great White Wines' profits to shark research and educational institutions, such as the Monterey Bay Aquarium.

*Don't drink and dive*

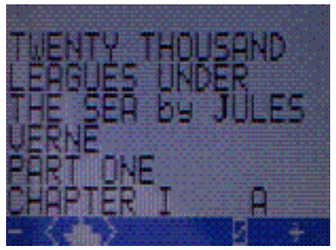
Marks came up with the idea of combining a wine-tasting hobby with marine conservation some years ago after returning from a scuba diving vacation to South Africa, where she dove with white sharks in what proved to be an life-altering experience.

After some initial research into the wine industry, the couple hired small-business consultants to help them lauch their new label. Marks and Horton put their custom label on bottles and import the wine from the Zidela winery in South Africa, whose government was the first to protect white sharks.

True to their label, they carry only varieties made from white grapes. They refuse to bottle red wine because it might evoke the kind of blood-thirsty image about sharks they want to erase.

**www.greatwhitewines.com**






# Read a book on your Dive Computer!!

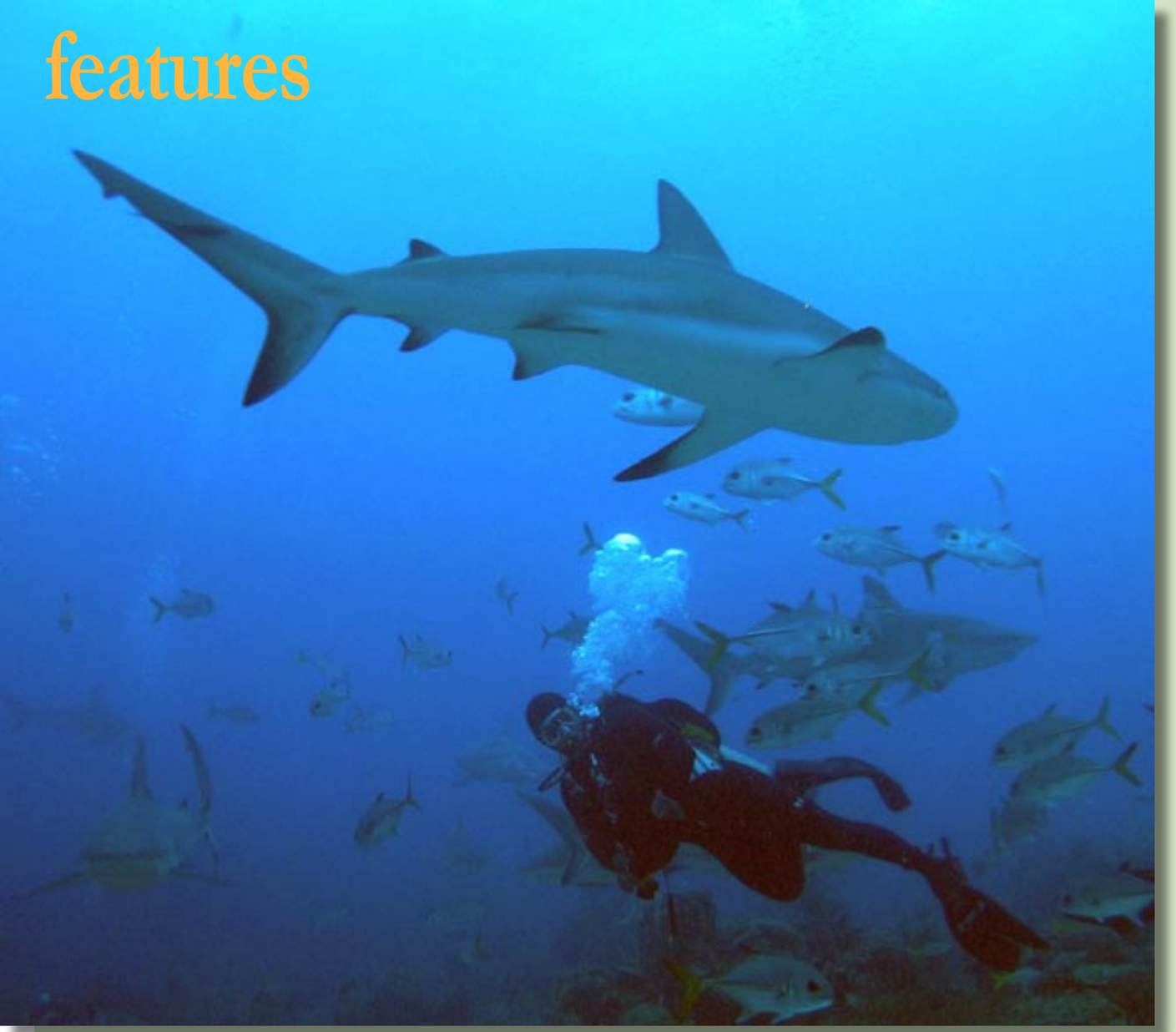
Delta P Technology UK have released a new optional feature for the VR2 and VR3. Deco Books allows a diver to download an electronic book or any text file from a PC into his dive computer to read during long shallow decompression stops or even on deck during surface intervals. 20,000 characters (around 40 pages in a paperback) can be stored at a time. The Deco Books feature is only accessible by a diver at a depth of 6 metres or shallower, just like the famous Octopus Game. And talking of Games, Deco Books comes bundled with two brand new games, Wreck Finder and Buddies, that divers can play on their VRs as they hang around. Full details at: **www.vr3.co.uk**

# Sharks of Honduras

Divers get an up close and personal encounter with sharks at Anthony´s Key Resort

Text and photos
by Bill Becher

**ROATAN ISLAND, Honduras --- The attorney strokes the white belly of an eight-foot-long reef shark. This is not a lawyer joke. I'm 70 feet (23 m) deep in the clear blue Caribbean water off Roatan Island with a half dozen scuba divers from Anthony's Key Resort. We're at a dive site called "Cara a cara," which in Spanish means "face-to-face."**



A diver swims with the sharks of Roatan

# Roatan Sharks

We're cara a cara with 20 gray reef sharks. The biggest are nine feet long. The sharks glide by silently, swimming slowly past schools of smaller fish that seem unafraid.

Remoras attach and reattach themselves to the sharks. They're not parasites — the remoras count on the sharks' sloppy eating habits and dine on scraps of fish the sharks miss.

Sergio Tritto, our dive master and a former lawyer from Italy, is the one petting the animals. It's a case of "Do as I say, not as I do," as he warned us before the dive not to touch the sharks. He also said, "Don't wave your hands." The sharks might mistake a hand for a fish and bite it.

## Shark to Shark Guide

Tritto said he had been unhappy in his job as a legale in Naples and was searching for a new career. A friend told him about the sharks that congregated at a spot off the windward coast of Roatan, an island in the western Caribbean popular with scuba divers. Tritto decided to make a business out of leading shark dives.

In the pre-dive briefing he told us to descend the anchor line and form up on at a sandy patch with our backs against a coral wall so the sharks can't sneak up on us. Like Spitfire pilots in a school of Messerschmitts we protect our six o'clock. If everything is right we will get to swim with the sharks before the feeding frenzy said Tritto.

Tritto has brought a white plastic pail full of fish to feed the sharks. He's wearing a pair of chain mail gloves as a shark did bite his hand once. So much for professional courtesy.

Tritto signals us that we can swim freely with the sharks. Seeing the reef sharks slowly circling around us is something none of us will soon forget.

## Feeding Frenzy

We line up again in front of the coral wall. Tritto opens the fish bucket and the feeding frenzy is on. The sharks are especially aroused by the sound of jaws snapping on fish and there is a lot of snapping going on.

One shark gets his head stuck in the bucket.

Tritto grabs the shark and tries to turn it on it's back to calm it, but the shark just shakes his head, bucket attached. The bucket comes off and the shark swims away.

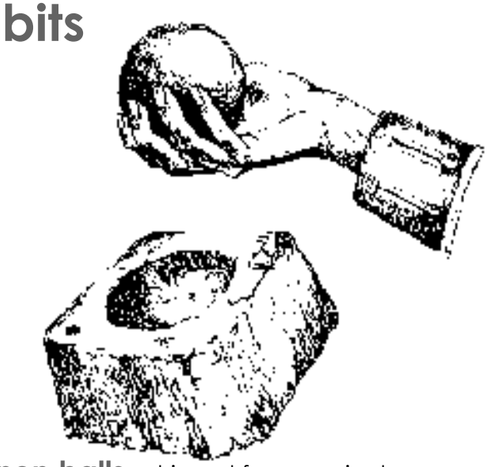
We head back up the anchor line. On the boat everyone is talking at once about their amazing experience with the sharks.

## Controversy

Feeding sharks is somewhat controversial. Opponents say it can be dangerous and that it alters wild creature behavior. Those who defend it say that

Maybe worth knowing

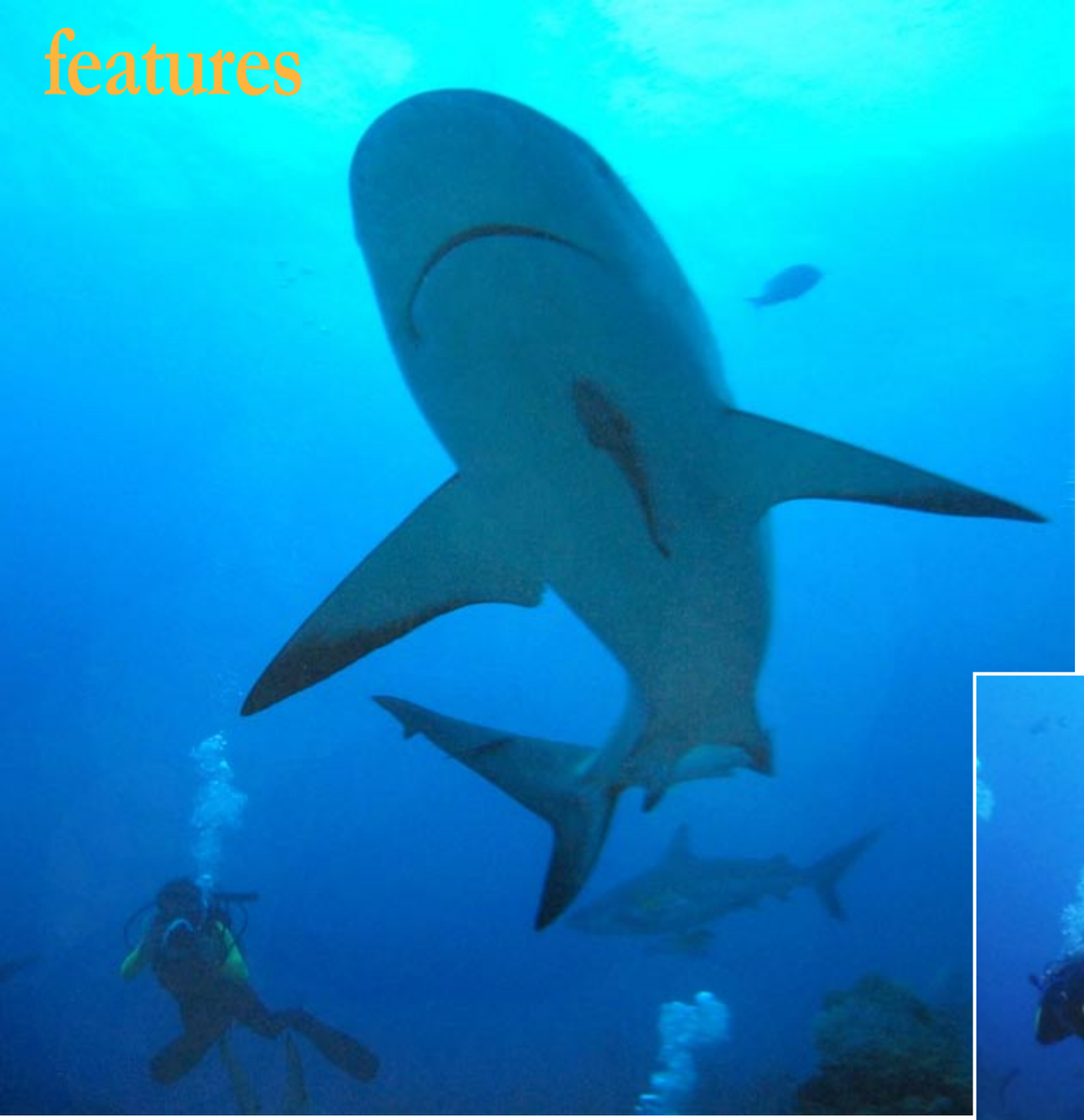
## Tidbits



**Cannon balls** retrieved from ancient shipwrecks should be handled with care, they may explode even centuries later. Marine archaeologists have recorded several occurrences of the rusted iron balls spontaneously heating up and exploding after exposure to the air. In one case, at the National Museums and Galleries of Wales in Cardiff, a cannonball retrieved from a 1691 wreck heated up to a few hundred degrees after several minutes in the open air, began to glow a dull red and started burning its way through a pine table top.

Others have split open by themselves many weeks after they were pulled from the sea.

It has been suggested that the iron develops a lattice-like porous structure over the hundreds of years spent underwater that reacts exothermically with the oxygen in the air to produce massive amounts of heat. The combination of oxygen and sea salt caused rapid oxidation resulting in the balls "exploding" open and crumbling into bits.



Remoras attach and reattach themselves to sharks so they can scavange on scraps left over by their hosts ▲

An adult gray reef shark can be about 3 meters in length ►

## Roatan Sharks

the shark encounters help educate people about sharks and create support for conservation programs.

Tritto says he's careful and only feeds the sharks a small amount of food so they won't become dependent on the handouts. His feeding spot is far from any beaches where swimmers might congregate.

### Anthony's Key Resort

The shark dive is one of the optional activities at Anthony's Key Resort.

There is also a Monday night beach party with crab races and a limbo contest. I divide my time between eating, diving, riding, paddling and thinking about sharks while swaying in a hammock watching the sunset.

*Bill Becher can be reached at* ***billbecher@yahoo.com*** ■



# fact file

## Honduras


Map of Honduras

**History**: Honduras became independent of Spain's vast empire in 1821. A freely elected civilian government came to power in 1982, after 25 years of military rule. However, Honduras became a haven for anti-Sandinista contras fighting the Marxist Nicaraguan Government and an ally to Salvadoran Government forces fighting against leftist guerrillas during the 1980s. In 1998, the country was devastated by Hurricane Mitch, which killed 5,600 people and caused $2 billion in damage.

**Government**:
democratic constitutional republic
**Capital**: Tegucigalpa
**Currency**: lempira (HNL) Exchange rates: lempiras per US dollar - 17.3453
**Languages**:
Spanish, Amerindian dialects
**Climate**: subtropical in lowlands, temperate in mountains

**Geography**: Central America, bordering the Caribbean Sea, between Guatemala and Nicaragua and bordering the Gulf of Fonseca (North Pacific Ocean), between El Salvador and Nicaragua; Terrain: mountains in the interior, narrow coastal plains, has a short Pacific coast but a long Caribbean shoreline, including the uninhabited eastern Mosquito Coast, Elevation extremes: lowest point: Caribbean Sea 0 m; highest point: Cerro Las Minas 2,870 m; Coastline: 820 km, Natural hazards: frequent but mild earthquakes; hurricanes and floods along the Caribbean coast; Agriculture: bananas, coffee, citrus; beef; timber; shrimp; Industries: sugar, coffee, textiles, clothing, wood products

**Environment issues:** urban spawl; deforestation from logging and clearing; land degradation, soil erosion, farming of marginal lands; mining activities cause heavy metal polluting of fresh water sources.

**Population**: 6,823,568
High mortality due to AIDS cause lower life expectancy, higher infant mortality, higher death rates, lower population and growth rates; Below poverty line: 53%; Ethnic groups: Mestizo 90%, Amerindian 7%, Black 2%, White 1%; Religions: Roman Catholic 97%, Protestant minority

**Medical/Deco chambers:**
Cornerstone Decompression Chambers and Clinic at Anthony's Key Resort in Sandy Bay tel. 455 1049 / 445 1003. Fantasy Island at French Key. Woods Medical Center 24 hour service Tel. (504) 445-1080.

**Dive Travel:**
Anthony's Key Resort
**www.anthonyskey.com**
Bahia Tours
**Email: akr@anthonyskey.com**
800-227-3483 or 954-929-0090 ■

# media

## Books Film DVDs CDs

Edited by Peter Symes
& Michael Symes

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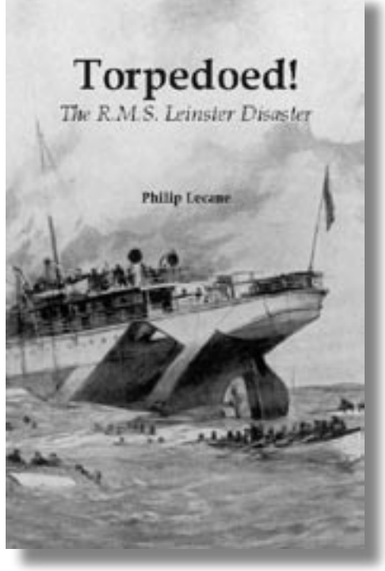
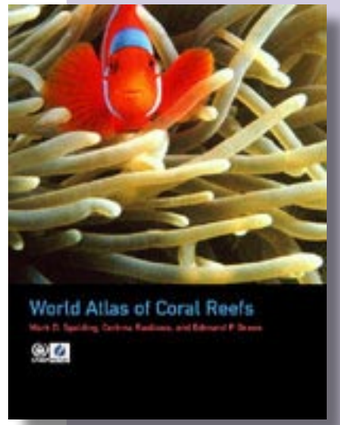



## Torpedoed!

The long forgotten story of the sinking of the R.M.S. Leinster in the dying days of the First World War is brought back to life in this intriguing tale of the disaster. Torpedoed by the German submarine UB-123, 501 of the 771 people on board were killed, marking the event as the worst maritime tragedy ever witnessed in the Irish Sea. The Leinster carried civilian passengers, postal workers and military personnel from Ireland, Britain, the United States, Canada, New Zealand and Australia, and as such its loss had an impact around the globe. This remarkable book tells the stories of those on board the Leinster and UB-123 and sympathetically examines not only the sinking but also its ramifications for those left behind. This well-researched work will appeal to any with an interest in the sea, as well as military and maritime historians and genealogists. Price: GBP 15.99

**periscopepublishing.com**

## Scientific stuff




WORLD ATLAS OF CORAL REEFS

This guide is an invaluable resource that can be appreciated and enjoyed by a broad audience — from scientists to world travellers, including individuals with an interest in the natural history of coral reefs, travel organisations, resource managers and college students. The book will also aid divers and boat owners with key information on reefs worldwide. ISBN 0 520 23255 0. Price: USD 55.00 or GBP 35.95. Buy the atlas from University of California Press, IUCN World Conservation Bookstore or Earthprint. **www.unep-wcmc.org**

# For the wreckies

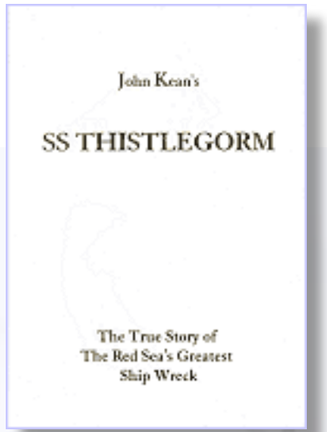

## Booom!

A New Focus for Divers and Scientists, writes the National Marine Aquarium in Plymouh, England. Scylla Reef is a tremendous local outreach project that provides a venue for leisure diving and a centre for education and research as the vessel becomes a reef.

Like all reefs, Scylla is a fragile environment. As she is colonised the anemones, sea squirts and other marine life will settle, and fish and other mobile animals will be attracted to the developing reef.


The Reef Guide includes an extensive plan of the superstructure and the decks of Scylla, dive and harbour information and a marine species guide. It is printed in full colour on waterproof paper and is not only a useful planning tool but also a great memento of this brilliant dive.

**www.national-aquarium.co.uk**




## SS Thistlegorm

Here for the first time the true story of the Red Sea's greatest ship wreck is now revealed in spectacular detail in John Kean's SS Thistlegorm. Spanning a period of over one hundred years, from the origins of Thistle Ships to present day diving on the wreck, this explosive new book silences, once and for all, the rumours and speculation surrounding this famous and mysterious dive site that has attracted nearly a quarter of a million visitors from all over the world.

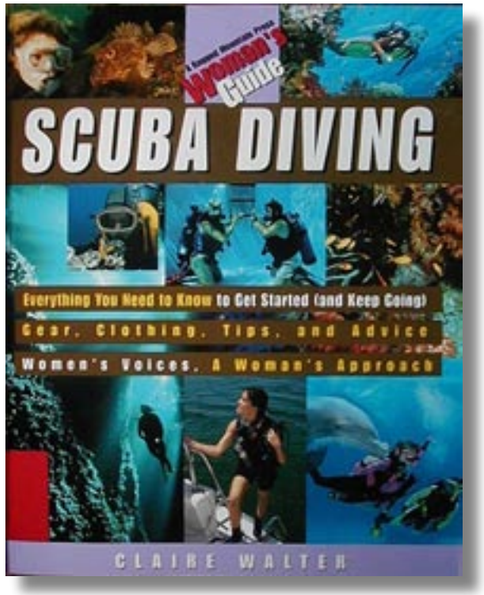
Packed full of never-seen-before photography, including the only two pictures known to exist of the Thistlegorm on the surface, the book gives living eye-witness accounts of the ship's final hours through a series of exclusive interviews.

GBP 21.95 plus P&P at BSAC's webshop

**www.bsac.org/shop/bookshop.html**

FIELD GUIDE TO ALASKAN CORALS

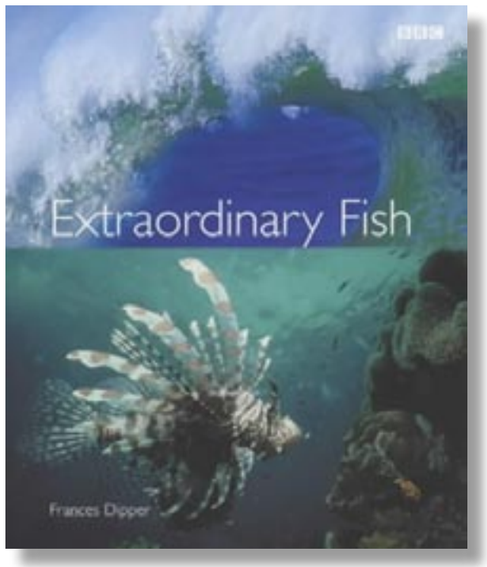
Two marine scientists, Dr. Bruce Wing of NOAA Fisheries in Juneau and Dr. David Barnard of the Alaska Department of Fish and Game in Kodiak, have released a photographic field guide to deep sea Alaskan corals. Wing and Barnard relied on their own observations, fisheries observer data, and specimens from as far back as 1905 in their five-year writing effort. The book's photos depict the corals after they've been pulled up on deck, the way fishermen and fisheries observers see them. **www.sitnews.us**




## Women's Guide to Scuba Diving

Snipped from Amazon's review: This edition to the successful Ragged Mountain Press Woman's Guides will introduce the rapidly-growing sport of scuba diving, the fastest growing segment of which is women. Claire Walter addresses women's issues in everything from getting started and diving basics to advanced diving. As with other titles in the series, she weaves women's voices into the narrative to provide a range of assuring experiences. Among topics covered are overcoming one's fears, choosing the right instructor, equipment, your first dive, and expanding your horizons. Price from USD 25.74

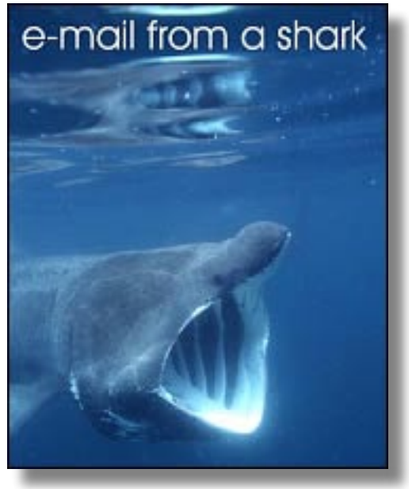
**www.amazon.com**




## Extraordinary Fish

Frances Dipper
Paperback: 99 pages
BBC Books
ISBN: 0563534095
Amazon price: GBP 6.39
**www.amazon.co.uk**

With some 25,000 species, there are many more kinds of fish than mammals alive today. To scan the whole of their world is a tall order but this book provides a beautifully illustrated overview of these remarkable creatures, who were around over 350 million years ago. Since they have been around for so long it is not surprising that they are so diverse and successful. Fish have occupied virtually all the corners of the aquatic world from the wonderful variety of cichlids which live far inland in the lakes of the East African Rift Valley to the rat-tails which haunt the wreck of the Titanic and the monstrous-looking angler fish of ocean depths. Packed with information, and with an illustration on practically every page, Extraordinary Fish shows how life, survival and reproduction are as difficult for a fish as for any other animal.

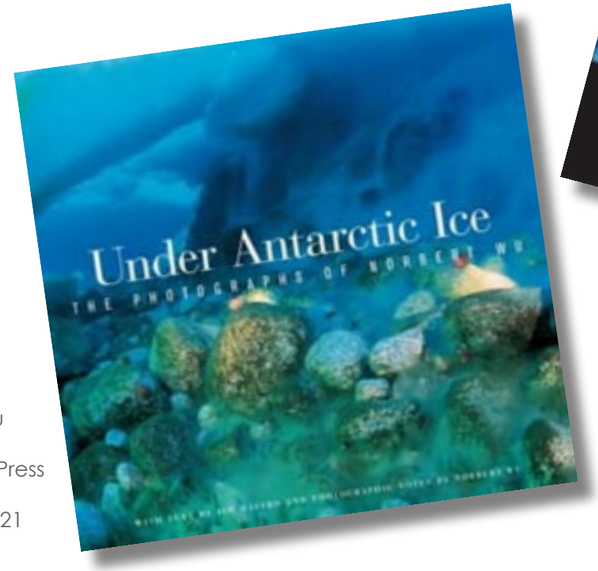



## Email from a shark

It's the second biggest shark in the world, yet very little is known about it - where it comes from, where it goes - until now. This is a story of the discovery of the secrets of one of the most ancient fish on the planet by a combination of modern technology and scientific detective work. One of wildlife's greatest mysteries unravelled... with a few surprises.

Format: Video. Seen at Fourth Element's webshop for GBP 15.00

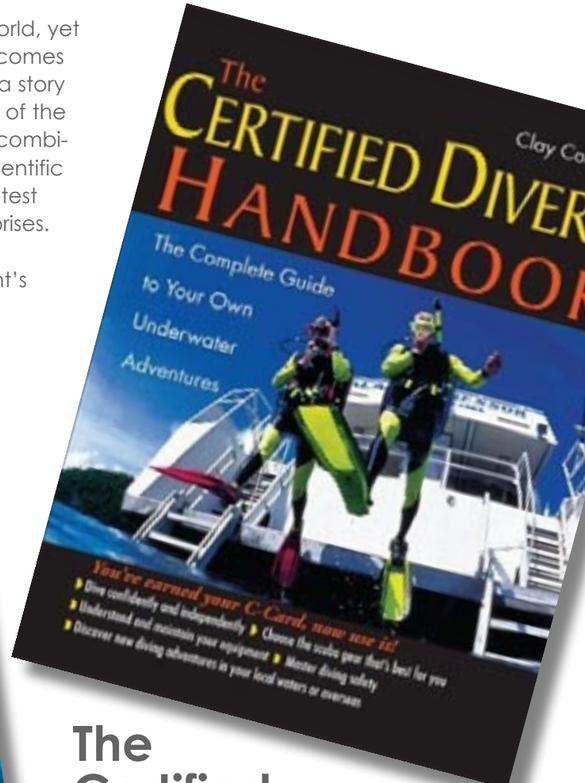
**www.fourthelement.com**




## Under Antarctic Ice

The Photographs of Norbert Wu
Jim Mastro, Norbert Wu
Hardcover: 198 pages
University of California Press
ISBN: 0520235045
Amazon price: GBP 19.21
**www.amazon.co.uk**

This is a collection of the finest photographs ever taken underwater in deep Antarctica, illuminating a world of strange and beautiful life forms. Internationally renowned photographer Norbert Wu was given access to the icy waters off Antarctica by the U.S. National Science Foundation to obtain these photographs. In the extreme conditions that prevail in these seas, invertebrates can grow to enormous sizes: sponges are as big as bears, jellyfish tentacles extend thirty feet, and giant sea spiders crawl through beds of soft coral. Wu has also focused his lens on the birds and mammals living at the edge of water and ice. Jim Mastro's introductory text condenses forty years of scientific research into a clear and concise natural history of this unique place.




## The Certified Diver's Handbook

Clay Coleman
Paperback: 384 pages
International Marine/Ragged Mountain Press
ISBN: 0071414606
Amazon price: USD 15.61
**www.amazon.co.uk**

Want to enjoy scuba diving to the fullest? This guide will help you create your own diving adventures on any budget, schedule, local destination or distant travel, without the restrictions of group travel. Author, Clay Coleman, offers insider's tips and advice for divers about how to organize dive travel plans, equipment and expeditions. Readers will learn how to buy or rent the best SCUBA equipment at the best prices; plan dives for their maximum enjoyment and safety; find great diving sites near home; learn underwater rescue procedures and shore- and night-diving techniques; explore wrecks, reefs and underwater caves.

Edited by
Michael Arvedlund




## *Coral reef fish larvae & Blooper Science*

# Marathon Fish larvae

**Coral reef fish ecology is a new research area, probably just about 40 years old, compared, for example, to research in temperate fish ecology, which has been studied extensively for more than 100 years. Therefore, coral reef fish ecologists often have to "borrow" knowledge from what we know about temperate fishes, simply in order to establish the first research in coral reef fish ecology.**

**However, this sometimes causes some big "bloopers". Such a blooper is the case regarding the swimming abilities of coral reef fish larvae.**

The life cycle of most coral reef fishes includes a larval planktonic stage, lasting from a few days up to several weeks, before settling to a benthic habitat. This phase has been considered the 'black box' by coral reef ecologist, because the coral reef fish larvae field is very difficult to examine. For example, they are quite difficult to sample in large numbers, because of the many more species in much lower numbers on a coral reef than in a temperate ecosystem, where there are a few species in very high numbers. Therefore, to establish important coral reef fish dispersal models for predicting the size of reef fish populations, ecologists assumed that coral reef fish larvae behave exactly as temperate fish larvae out there in the blue water. However, when finally the first swimming results with reef fish larvae turned up it caused a shock among coral reef fish ecologists. They swim fast and very long distances.

*When the first swimming results with reef fish larvae turned up it caused a shock among coral reef fish ecologists. They swim fast and very long distances.*

### Surprising results

The results of swimming tests with coral reef fish larvae showed that larvae of coral reef fishes are strong, effective swimmers, capable of sustained speeds higher than ambient ocean currents, and of swimming non-stop for tens of kilometers over tens of hours. Further, they are much faster than larvae of temperate species of similar size, particularly the well-studied herrings and cods. This surprising information on settlement-stage larvae is the result of laboratory swimming-chamber (or flume) measurements of swimming endurance in 51 species of 9 families, and speed measurements on the coral reef of free-swimming larvae for over 50 species of 15 families. Both sets of research were conducted by Australian researchers. Temperate fish larvae of 1–2 cm apparently swim at 1–5 body lengths per second, whereas similarly sized larvae of coral reef fishes swim at a mean speed of 13.7 body lengths per second, with some as fast as 34 body lengths per second. Put into perspective, a freestyle human swimmer capable of 13.7 body lengths per second would swim the 100-m race in 3.6 seconds; the Olympic record for 100-m freestyle is 48 seconds.


### The actual speeds

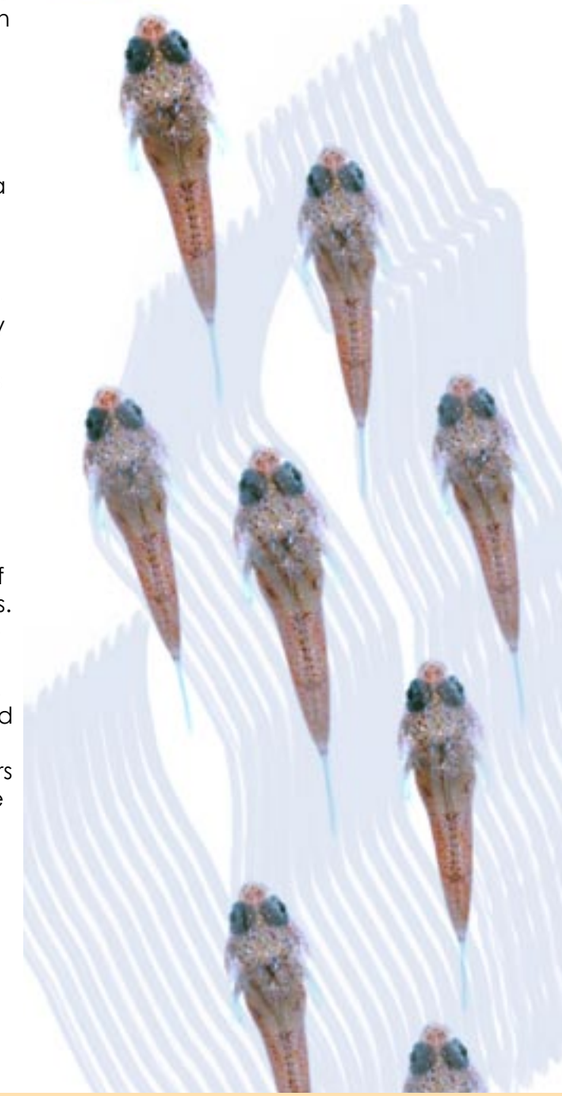
of reef fish larvae average 20.6 cm per second with some as fast as 65 cm per second. This is faster than the average ambient ocean current speed in the studied areas, so the average reef fish larva near the end of its pelagic stage is indeed an effective swimmer. Just as remarkable as their swimming speeds, these larvae have great endurance, being able to swim an average of 40.7 km (some up to 140 km) in laboratory experiments, unfed and without rest before exhaustion. The mean time to exhaustion was 83.7 hours (maximum 288.5 hours). On a persize basis, this is equivalent to a human swimming roughly 4000 km!

Swimming far and fast may simply increase the possibility of encountering a reef by chance alone, but pelagic reef fish larvae in blue water may be able to detect and orient to reefs. Orientation, combined with effective swimming abilities, would greatly increase the capacity of larvae to find a reef. In either case, this capacity would vary among species because swimming abilities vary among species.

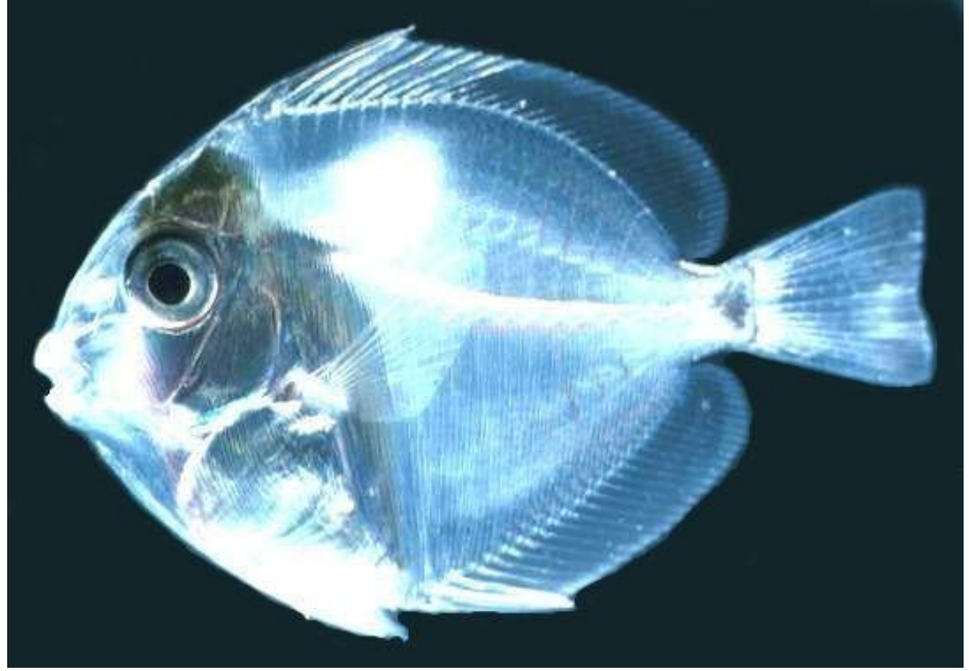
### Comparison and contrast

Why are temperate fish larvae so different from reef fish larvae?

Coral reef fishes are overwhelmingly of the order Perciformes, or perch-like fishes. In contrast, most research on temperate marine fish larvae has been on herrings, sardines, and anchovies, cods, flatfishes. These latter five types of fish are so-called non-perciform fishes. Most of the literature on fish larvae from temperate waters concerns species that are pelagic or live on soft bottoms (sand or mud) as adults rather than species from (rocky) reefs. This alone may confound temperate/coral reef comparisons. Adult pelagic fishes usually have habitat requirements that differ from those of their larvae, but



# Marathon Fish Larvae



they never make the abrupt changes entailed by settlement out of the pelagic environment and into the benthos. Except on oceanic islands, soft-bottom habitats are usually far more extensive and less discrete than reef habitats, so larvae of reef fishes have a much smaller target to find at the end of the pelagic phase than do fishes of soft bottoms. Further, it is thought that most reef fishes are relatively sedentary as adults, whereas adults of many pelagic and soft-bottom species undertake extensive migrations. A major difference between coral reef fishes and temperate marine fishes is the incubation period of their eggs. Pelagic eggs of most coral reef fish species hatch within 1 day, far more rapidly than pelagic eggs of temperate fishes, which commonly have incubation periods of 3–20 days. A second major difference between coral reef fish and most temperate fish larvae is that, at any given size, the reef fish larvae are more developed. This is particularly apparent if one compares the state of development of well-studied temperate larvae such as herring and cod at the sizes at which reef fish larvae commonly settle (1–2 cm). At all sizes, the reef fish larvae have more complete fins. They develop scales at a smaller size, seemingly have better developed sensory apparatus at any size, and are morphologically equipped for effective feeding within a few days of hatching, and at a smaller size than the herring and cod.

## Looking ahead

So what of the future in research of coral reef fish larvae?

Recent research on the pelagic stage of reef fishes has given coral reef fish ecologist an excellent look into the black box of larval biology. This look reveals that these pelagic stages are real fishes with capabilities in excess of the larvae of well-studied temperate fishes. This has changed thinking about the behavior and ecology of reef fish larvae. We now know that reef fish larvae and their behaviour have a major influence on the dynamics of reef fish populations In the foreseeable future, we should have a firm and defendable basis for design of marine reserves and of the geographical size of reef fish population units for management purposes, based on this increased understanding of reef fish larval biology.



## Litterature

This text has mainly been based on: Leis, J.M. & McCormick, M.I. 2002. The biology, behaviour, and ecology of the pelagic larval stage of coral reef fishes, *Coral reef fishes: Dynamics and diversity in a complex ecosystem* (P.F. Sale, ed.) Academic Press: San Diego & London, pp. 171−199. ■

Pictures of Fish Larvae, courtesy of Northwest Fisheries Science Center, National Atmospheric and Oceanographic Administration

Leigh Cunningham



*Redundancy ethic? Don't be dead – be a double bagger!*

# Double Bagging for Divers

Leigh Cunningham is the technical manager and TDI Instructor Trainer for Ocean College, Sharm El Sheikh.

Probably best known for his records - Leigh once held the record for the deepest dive in the Red Sea - and attempts of reaching extreme depths, he also has a wide range of teaching credentials to his curriculum:

TDI instructor trainer, DSAT Tech Trimix instructor, PADI MSDT IANTD Technical diver instructor CMAS 3 star instructor.

**In the world of technical diving, a direct ascent to the surface is not an option if you run into a problem or emergency. For this reason, technical divers are required to carry back-up systems to resolve problems associated with equipment malfunction during a dive.**

**But what about the rest of us?**

Text by Leigh Cunningham
Photos: Craig Nelson

**Better be safe than sorry.** This old adage certainly applies to diving too, and in this case redundancy pretty much translates into having a back-up for all important systems. After all, diving is supposed to be fun and a means of having adventures that enrich our lives, not something that will make us lose it.

Fortunately, there are a lot of good lessons and readily applicable techniques to be learned from the world of technical diving, that can make diving much safer, without being a real bother or overshadowing the experience. Using a seat-belt when driving a car has become second nature, as is carrying a spare tyre in the trunk. We will probably never, or rarely, actually have need of them, but when needed we surely appreciate these simple measures.

But here the similarities between driving and diving stops. Running out of gas when driving a car is mostly just an embarrassment and inconvenience, but for a diver it can obviously have dire consequences.

**The meaning of redundancy** In dive-speak, redundancy usually translates into having double tanks, double regulators, double this and double that. But what does redundancy really mean? The dictionary give us the following definition.

> **Redundancy**, in general terms, refers to the quality or state of being redundant, that is: exceeding what is necessary or normal, containing an excess. This can have a negative connotation, superfluous, but also positive, serving as a duplicate for preventing failure of an entire system.

The last sentence in the above definition is interesting, because it raises a very important question, also in terms of diving: When is something superfluous, and when is it an important safety measure 'preventing failure of an entire system'? Most of us will probably agree that using a heavy double tank rig for a shallow water dive is overkill, and we wouldn´t be bothered. But as we go gradually deeper and longer, we will also approach a point where a double rig becomes a very useful piece of equipment and a safety measure


**So where is this point?** Turning once more towards the above definition, *the entire system* refers not just to the mechanical equipment but also to the diver, along with his or her training and ability to cope with critical situations. For this reason, when to use then becomes a somewhat subjective and individual question. It is not, however, just a matter of what the diver can safely handle but also a question of mental comfort during a dive. Diving, we should not forget, is also about having a good time. Simply bringing the extra equipment - even on dives that do not venture into those depth zones where conventional wisdom would deem it absolutely necessary – means more than just additional safety. Just as importantly, the feeling of having that extra safety also translates directly into making the dives far more enjoyable. Because, while it doesn't lower any alertness, it does remove the latent stress-loading of *what if...*?. And this is certainly worth taking into consideration.

**Being more concrete** So, are there no absolute criteria as to when one should wear back-ups? Absolutely! For starters, with any kind of diving that carries a decompression obligation, and diving in overhead environment obviously qualifies, as set forth by various training agencies. But before it comes to that, why not make it a policy always to have a sensible margin of safety, and always use redundant systems for any diving close to the NDL limits or beyond, say, 30 meters?

**What is needed?** Regarding deeper dives, or dives with long bottom times, redundancy means diving with twin tanks and two sets of regulators. These tanks may either be independent or, which is more common, connected by a manifold. In either case, if there is a regulator malfunction on the bottom, there is a back-up system which can be switched to.

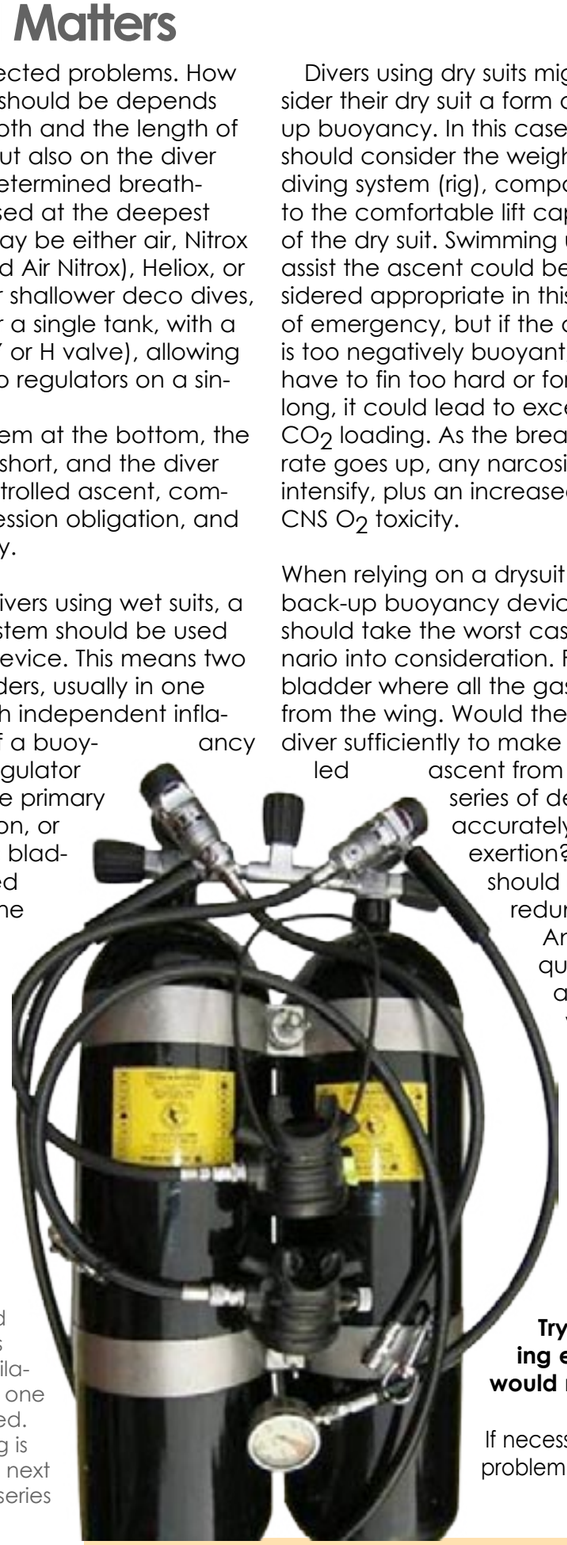
**Size matters** The tanks should also be big enough, not only to carry enough gas to complete the planned dive, but also to give an ample reserve supply to

# Technical Matters

handle any unexpected problems. How big this gas supply should be depends not only on the depth and the length of the bottom time, but also on the diver and a previously determined breathing rate. The gas used at the deepest parts of the dive may be either air, Nitrox (aka EANx, Enriched Air Nitrox), Heliox, or Trimix. For shorter or shallower deco dives, divers might opt for a single tank, with a redundant valve (Y or H valve), allowing the diver to use two regulators on a single tank.

If there is a problem at the bottom, the dive would be cut short, and the diver would make a controlled ascent, complete his decompression obligation, and finish the dive safely.

**Buoyancy**: For divers using wet suits, a redundant wing system should be used as the buoyancy device. This means two independent bladders, usually in one outer shell, and with independent inflators. In the event of a buoyancy problem, i.e. the regulator supplying gas to the primary bladder, malfunction, or a problem with the bladder itself, or ruptured inflator hose, etc, the diver would switch to his back-up bladder, make a safe ascent, complete the decompression obligation, and finish the dive.



Twin tanks, manifold and two regulators with hoses routed so that both lift and breathing gases are always available - even with one first stage closed. Hose routening is the subject of next article in the series

Divers using dry suits might consider their dry suit a form of back-up buoyancy. In this case, divers should consider the weight of the diving system (rig), compared to the comfortable lift capacity of the dry suit. Swimming up to assist the ascent could be considered appropriate in this type of emergency, but if the diver is too negatively buoyant, and have to fin too hard or for too long, it could lead to excessive $CO_2$ loading. As the breathing rate goes up, any narcosis would intensify, plus an increased risk of CNS $O_2$ toxicity.

When relying on a drysuit as a back-up buoyancy device, one should take the worst case scenario into consideration. For example, a split bladder where all the gas is abruptly lost from the wing. Would the dry suit support the diver sufficiently to make a safe and controlled ascent from depth, through a series of decompression stops, accurately and without over exertion? If not, the diver should consider using a redundant wing system. Another important question is, whether a well worn dry suit with weak seals will be able to retain a sufficient volume of gas for a safe controlled ascent. If the dry suit has sufficient lift, then having a redundant wing system seems pointless.

**Try to avoid carrying equipment, which would not be used.**

If necessary, simulate the problem in shallow water with near full tanks. Dump wing gas, and see if you can establish neutral buoyancy using the dry suit alone

Spare mask can easily be carried in a pocket

## Depth and time monitors

(Depth-timers): In this day and age of multi-gas Air/Nitrox, and mixed gas computers, divers have the luxury of having a continuously re-adjusted schedule with them on the dive, based on exactly what they are breathing,. When using Depth-timers, or computers in gauge mode, divers should carry back-up tables to have a schedule outside the primary plan, in order to handle any emergency causing a digression from the primary plan. Even those divers who use multi-gas computers, might opt for the additional security of back up tables and plans.

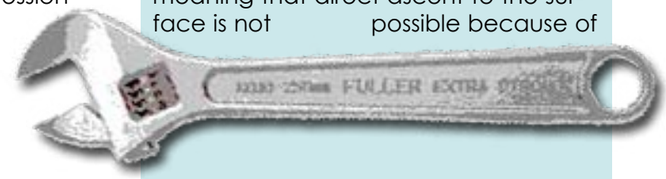
The down side of multi-gas computers is, they may encourage technical divers to rely on the ability to make new plans on the fly (during the dive), instead of making a structured depth and time plan before the dive. In spite of the risk of being considered old fashioned, I think it is safer to make a structured plan and do the required calculations using an appropriate decompression software before the dive, and consider the deco schedule, as generated by the multi-gas computer, as a bail out option.

Whichever system you chose, multi-gas computer, Depth-timer or computer in gauge mode, you need at least two to accurately finish the dive in the event one malfunctions.

Men in Black?

## What is technical diving?

Some people define technical diving as diving in "overhead environments" meaning that direct ascent to the surface is not possible because of



a decompression obligation requiring decompression stops and/or a being inside a cave or a wreck.

The late Robert Palmer, once one of the gurus of technical diving, defined it as "the use of advanced and specialised equipment and techniques to enable the diver to gain access to depth, dive time, and specific underwater environments more safely than might otherwise be possible"

**Mask:** This is probably the most unlikely item of equipment you will have a problem with. But for any kind of dive that takes you into deep waters or a decompression schedule, you should certainly bring two. I can talk from own experience, as I once lost a lens during a dive. This was due to a hairline crack in the frame of the mask, which went unnoticed at the surface before the dive. The back up mask came in most useful, enabling me to read gauges, whereby I could ascend at the correct rate, perform accurate stops and finish the dive safely.


These artistic expressions might seem funny to some people but it gets to the point when required. The boat crew know who the diver is below it, and the face's and colors are descriptive.

# Technical Matters


**Reel and SMB** (Surface Marker Bouy). These are very useful tools in all environments but let's talk open water. For open ocean drift decompression diving, deploying the SMB during the ascent, the diver creates a form of reference along which specific ascent rates and a complicated deco schedules are much easier to carry out accurately. The divers simply hangs under the SMB by being slightly negatively buoyant, and reeling up at the right time. The SMB also allows the boat and support team to track divers doing a decompression drifting under the buoy.

In an emergency, an SMB could also act as an emergency signalling device. For example, a red SMB could be a signal to the surface support team that everything is OK. If the diver suddenly has little or no gas, a differently coloured emergency SMB could be sent up as a signal for a support diver to bring additional gas in the water, or to see what the problem is.

The reel is also very useful on the bottom to ensure a safe return to a specific ascent point in low visibility. The diver simply ties the end of the line to the anchorline or downline.

**Minimum.** A minimum requirement would be at least one reel, and two SMBs. One SMB to let the support team know the dive is running according to plan, and one as an emergency signalling device. When doing drift decompression in the open ocean, it would be wise to take a back-up reel too.

**Lights:** In overhead environments, where dive-lights are necessary, back-up lights would fall under the redundancy ethic.

***In short, any item of equipment used to conduct the dive safely, and which could possibly malfunction, should be duplicated with a appropriate back-up system***

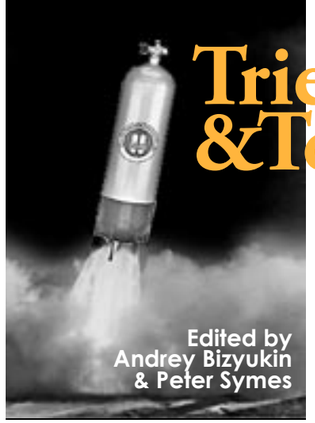
**Summing it all up** For the recreational community, where divers are staying within no-deco limits (NDL), the redundancy ethic does not apply with the same degree of necessity as it does for the technical or decompression diver. The non-deco diver can always, at any point during the dive, make a controlled ascent directly to the surface without stopping. *However,* while there are no clear-cut criteria as to when a diver should start to carry redundant systems, it is certainly something the advanced recreational scuba diver should look into as means of improving both safety and technique. In the event that a diver runs low, or out of gas, while his dive buddy is outside comfortable swimming range, an intermediary form of redundancy might be used in the form of a pony bottle, i.e. clamped to the side of the main tank, or a small spare air cylinder clipped to the BCD. However, a word of caution seems to be appropriate here. Divers are often seen to be putting more and more distance between buddy teams during a dive, or pushing past the accepted depth limit of 40 meters set forth by most recreational scuba agencies. They are, perhaps, relying on these stop-gap measures, which are of questionable value, if not outright inadequate, should any real emergency occur. In such situations, nothing can substitute the mental readiness stemming from having undergone some sort of advanced training and using redundant systems.

Think about it! ■

**Next issue:** *Kit configuration, streamlining and hose routing*

**Double bagging**

There are several explanations for where the expression *double bagger* comes from, but it is actually a piece of British Army slang. The idea is, that if a lady is hard on the eye, you need to put a paper bag over her head before you can get intimate with her. If she is really hard on the eye, you will want to have a second bag close at hand, in case the first one breaks. So, a double bagger will always have two bags ready – just in case. Not very PC, but it's history.



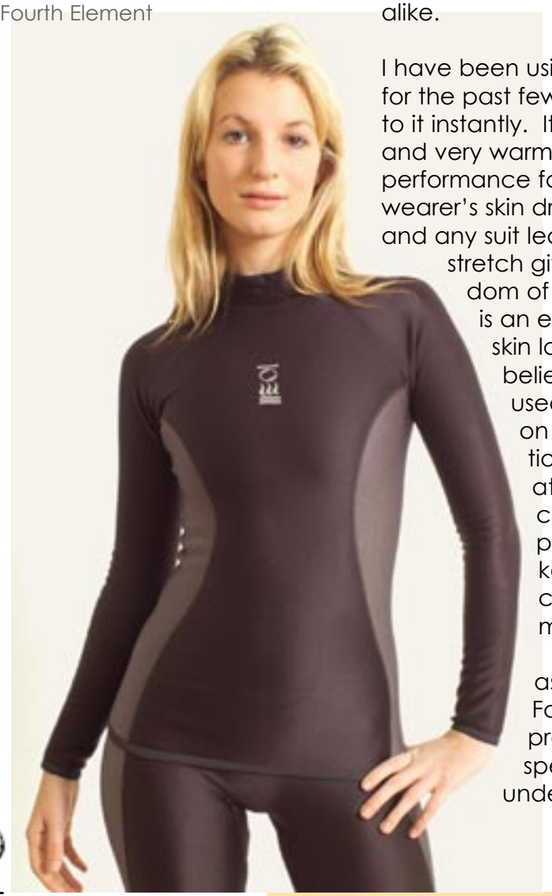

*underwear*

# Thermocline

By Kevin Gurr

**New undergarment from Fourth Element has been heralded as not less than a revolution. Well, is it?**

Productshots are supplied by Fourth Element



Fourth Element launched itself into the diving industry in 2001 with the intention of developing an innovative range of technical clothing designed to combat the problems of thermal regulation in scuba diving. After lengthy research and development, their first product was the Xerotherm, a drysuit base layer undergarment that was extremely well received by technical and sport divers alike.

I have been using the Xerotherm for the past few months and took to it instantly. It is well designed and very warm and uses high performance fabrics to keep the wearer's skin dry from perspiration and any suit leaks. It's four way stretch gives complete freedom of movement and it is an excellent next to the skin layer whose warmth belies its weight. I also used it under a wetsuit on a recent expedition; even in a situation where it was completely wet, it performed very well, keeping me significantly warmer and more comfortable.

So, when I was asked to review Fourth Element's products designed specifically for use underneath wetsuits, I was really interested to see how they would have modified their approach and keen to test them as part of my cave diving equipment.

On initial inspection, the Thermocline garments have a more glamorous look to them than the black Xerotherm. Shiny or rubbery, they look like something from a Bond movie. The designers at Fourth Element have obviously put some time into the design of these garments so that they look good, but it is in their use of the fabric that the innovation shows.

## Polartec fabric

Fourth Element has used another high performance fabric from Polartec, specially developed for water sports. Weight for weight, the fabric has the equivalent Thermal performance of 2.5mm neoprene, yet it is neutrally buoyant. This is significant for all divers looking to add some extra thermal protection without the need for additional lead. It has a fleece lining against the skin which has similar wicking properties to the Xerotherm fabric but this is bonded to a waterproof yet breathable membrane. This membrane makes the Thermocline fabric windproof and warm.

## Antimicrobial

The fabric has an antimicrobial treatment to resist the build up of odours, but the garments are machine washable, making them easy to keep clean and smelling fresh. The Thermocline garments have two different outer finishes on top of the membrane. The shell finish has a woven nylon outer face similar to that of double lined neoprene and the skin finish has a smooth surface rather like rubber, which Fourth Element says is ideal underneath a wetsuit or semidry as it gives a very good seal against the inside of a suit.

There are several garments in the Thermocline range including short sleeved tops, vests, shorts and even a ladies' bikini. I tested the short sleeved raglan top and the men's shorts.

The Thermocline garments were extremely comfortable and gave excellent freedom of movement. Most significantly, they were warm and I could imagine many tropical applications where diving in just the Thermocline would not only be possible, but also desirable from the point of view of comfort and neutral buoyancy. It would also make a very good pool suit for training situations, being breathable above the surface and warm in the water.

I tried the Thermocline in two caving stuations. The first was in the Red Sea on fairly long dives of up to ninety minutes. I wore the Thermocline underneath a knackered old Cressi semi-dry which has more holes than it should. Much of the insulation work was being done by Fourth Element's undergarments and I was extremely comfortable and warm. The neutral buoyancy of the fabric meant that I needed no extra lead and had no changes in buoyancy with changing depth due to changes in the fabric.

### Who's testing?

Kevin Gurr has been a leading figure in the technical diving community for more than a decade. He was the the first technical and cave instructor to be qualified in Europe and headed the IANTD in UK 1992-2004. Authored the acclaimed Technical Diver Student Workbook with Tom Mount as well as two workbooks for the Technical Diver and the Normoxic Trimix programs. Leader of numerous successful diving expeditions that include the Britannic and the Pilar Project, Kevin Gurr also heads up Delta P Technology, manufacturer of the successful VR3 and VR2 air and mixed gas dive computers. **www.vr3.co.uk**

After the dive, the speed at which the undergarments dried was fantastic. By the time I had got out of my wetsuit, the inside of the Thermocline had dried. The fleece is made using a hydrophobic polymer which does not hold water, which runs out under gravity. With so much less water next to the skin there was much less wind chill and the garments had dried within 15 minutes or so of wandering around the boat.

The breathablility of the fabric should not be underestimated when out of the water – it is much less sweaty wearing a Thermocline top than a neoprene vest or shorty wetsuit so you can keep it on between dives. It is also easier to keep clean. Simply rinsing in fresh water and hanging it up for a few minutes is all that is required during a dive trip and afterwards the Thermocline garments can be washed in the washing machine. The second test was a little more demanding of the thermal performance of the Thermocline garments. Caving in Swildons Hole in the Mendips, I used the same arrangement of the Fourth Element undergarments under my Cressi semi-dry. In air temperatures of 15ºC and water temperatures of about 5ºC, I was much warmer than I had anticipated, I did not feel the cold of the water and I have to put that down to the Thermocline as I know all too well that my old semi dry has lost its integrity.

## Criticism

My only criticism of the Thermocline range is perhaps in the sizing which is a little on the tight side particularly around the shoulders – anyone thinking about buying it would do well to get some good advice about sizing from the manufacturers or retailers before purchasing. I raised this with Jim Standing at Fourth Element and he said that they would be working on making the sizing more consistent for future products.

At the same time I also suggested to him developing a long sleeved and long legged product to give more protection to the arms and legs. A long sleeved top will be available soon, he assures me and full length legs will follow.

Until then, the Thermocline Raglan top and shorts are an excellent way to increase the thermal protection of the body core and the vest and shorts combinations would also provide core warmth with just a little more freedom of movement in the arms. I believe this would be an excellent addition to most divers thermal protection systems, from technical cave divers to those who prefer more tropical conditions and just want the best in comfort and performance.

**Sample prices**

M Thermocline long sleeve top £65.00
M Thermocline shorts £45.00
W Skin Thermocline vest £48.00
W Shell Thermocline short £35.00

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