

undercurrent

The Private, Exclusive Guide for Serious Divers

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MV Tempest, Red Sea, Egypt

great diving on a liveboard we'd never recommend

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Dear Fellow Diver:

Look at a map of the world, and Egypt's Red Sea coast looks closer to the trouble spots of the Middle East than Chicago is to Los Angeles. But I am not scared, and neither are other European scuba divers, who keep coming back. Why? Because it's incredibly inexpensive, the locals are friendly and welcoming to strangers, and it's got some of the best and most wide-ranging tropical diving anywhere in the world. Plus, thanks to huge numbers of unmarked reefs along its borders, the Red Sea is a diver's playground for finning around shipwrecks, dating from the 19th Century to present day, that offer lots to look at, including old toilets . . .

The wall dive at Ras Mohammed Marine Park, at the southern tip of the Sinai Peninsula, has unpredictable currents, so you never know which direction you're going to dive until you arrive there. For our 6 a.m. dive, we stepped, bleary-eyed, off the back deck of the *MV Tempest*, then the crew motored off to deeper water. Musa, our Egyptian divemaster in his mid-30s, announced we'd go in at Shark Reef and exit at Jolanda Reef. I stuck close to the reef wall at 80 feet and, pushed along by the flow, admired colorful soft corals waving gently in the current, Napoleon wrasse guarding their territory and massive moray eels poking out from crevices. Huge schools of batfish hovered close to the



MV Tempest

Ken Kurtis of Reef Seekers (Beverly Hills, CA) reports that an investigation into the fatality found that the diver's 19-cu ft. pony was empty, yet his 105-cu ft. main cylinder was untouched, indicating that he probably breathed from the regulator attached to the pony, thinking it was the regulator attached to his main supply.

Pony tanks are rarely fitted with an accessible gauge of their own. So had the diver checked his air gauge, he would he would have seen that it remained fixed as if his tank were full (e.g., 3000 psi), even though he had been diving for 10 minutes. We suspect that it was so early in the dive, he

assumed no need to do so. Lulled into a false sense of security, he lost his life.

What do we learn from this? If you use more than one regulator, you must have a positive way to identify which is which. Using more than one tank is the first step toward being a technical diver, but a trained technical diver is careful to mark each second-stage differently so that he can tell one from the other. His life depends on it.

A pony tank can give you added security, but only if you use it properly. Always be aware which regulator is in your mouth. Your life might depend on it.

-- John Bantin

A Single Drop of Sunscreen Can Kill Coral

yet Reef Safe's manufacturer continues to market the killer

At last, coral reefs are finally getting some significant protection. Hawaii and Bonaire have just banned sunscreens containing the sun-blocking chemical oxybenzone. Furthermore, 13 United Nations World Heritage sites have banned sunscreen use onsite.

While the toxic effect of oxybenzone has been known for some time, a 2016 study in the journal *Archives of Environmental Contamination and Toxicology* nailed it down. Researchers found solid evidence that the suspect chemical rapidly bleaches coral and slows new growth. They say a single drop in 4.3 million gallons of water is enough to be deadly, and that up to 14,000 tons of sunscreen enter the world's reefs each year. Most sunscreens, including ones you've probably bought in the past such as Aveeno, Coppertone, Hawaiian Tropic and Neutrogena, contains oxybenzone, also known as benzophenone-3.

One study found coral samples bleached completely within 96 hours after being subjected to water touched by hands with only a normal application of sunscreen.

The peer-reviewed study was conducted on reefs in the Virgin Islands and Hawaii by a scientific team from the University of Tel Aviv, University of Central Florida, Hereticus Environmental Lab,

University of Hawaii, the National Aquarium in Baltimore and the federal-run National Oceanic and Atmospheric Administration. Their results provided sufficient evidence to lead Hawaii and Bonaire to ban oxybenzone.

But the sunscreen-coral connection had been established long before this study. One published back in 2008 by *Environmental Health Perspectives* also found samples of coral bleached completely within 96 hours after being subjected to water touched by hands with only a normal application of sunscreen.

Yet Tropical Seas, a company with great inroads into the diving market, continues to produce an oxybenzone-based product called Reef Safe, and despite all the strong evidence mentioned above, it continues to claim its product is safe for reefs. Daniel Knorr, the founder of Tropical Seas, calls foul on the peer-reviewed studies finding oxybenzone to be a coral killer, and instead cites a simple laboratory test he paid for, which was performed by Dr. David Vaughn of Mote Marine Laboratory in 2016. That study was neither peer reviewed, nor published in any scientific journal, and it has no independent support, but Vaughn concluded, "All sunscreens are not alike, and to single one compound in the ingredients and make a blanket ruling is not proper. We found Reef Safe to be a coral safe product." Knorr has plastered that in all of his marketing material and on his website, using it to support his continued use of oxybenzone.

However, if the Knorr-sponsored results were valid and good, one would expect the study to

Quiet, Please! Marine Noise is Making Fish Deaf

Jacques Cousteau first sold us the idea of the “silent world,” but it patently isn’t. Use a closed-circuit rebreather and you’ll realize how noisy a busy coral reef can be. Yes, fish make noise (around 800 different species are thought to produce sound), and the noises they make are crucial to their way of life.

But civilization, as usual, gets in their way. You only have to be underwater near a busy shipping lane to understand that -- the noise a ship makes is a veritable din. It’s estimated that since the 1950s, the ambient noise level in the ocean has risen about three decibels per decade, making a four-fold increase.

It’s difficult to state the scale of the problem, because scientists have only begun exploring the ecological impact of such noise pollution. But now a systematic review of 42 research papers by scientists from 11 different countries reveals that human-generated noise has a significant negative effect on fish behavior and physiology.

In this summary, titled “A Meta-analysis of the Effects of Marine Noise on Fish,” researchers at Hakai Institute and the University of Victoria in British Columbia found that in the presence of increased

noise pollution, both volume and frequency, fish move faster, dive deeper and change direction more frequently. They are also less able to respond to predatory attacks. Foraging ability also takes a hit. In short, we’re deafening them.

It’s not only mechanical noises. A data analysis of sound signatures published in *Acoustics Australia* reveals that human activities like swimming, canoeing and scuba diving can even be heard underwater by marine life.

Steve Simpson, a marine biologist at the University of Exeter in the United Kingdom, agrees. “Recent studies have proved that even plankton are sensitive to noise,” he says. “Fortunately, marine noise can be controlled. There are technologically-driven ways to reduce human--produced noise in the ocean.”

Does this mean that we noisy air bubbling divers should avoid grouping together underwater, or should we opt to train to exclusively use close-circuit rebreathers for “silent diving”? As for the sounds of generators, compressors and engines from our dive boats, this might be a lost cause.

be used prominently by the giant pharmaceutical companies that lobbied against the Hawaiian bills banning oxybenzone, such as Bayer, Edgewell and Johnson & Johnson. They made no mention of the Mote study, evidence itself that it was invalid, did not meet scientific standards, and could not be used to support the notion that oxybenzone is safe for coral reefs.

To get a clearer understanding of the Mote study, we contacted Craig A. Downs, executive director of the Hereticus Environmental Laboratory, which led the 2016 study and learned from him that the scientific community rejected it as invalid and unreliable. Some scientists were angry that it even saw the light of day.

“Ecotoxicology is a serious discipline with formal and standard methods,” says Downs. “No scientific study is perfect, but there are measures of rigor that can be employed to provide a level of confidence in the results . . . We have done [ecotoxicological tests on] three different marine species over 60 commercial products to better understand the toxicity of formulations and their ingredients. We found contrary results to what Mote ‘saw.’ . . . Science paid for by industry is always suspect,

especially when there is an obvious financial co-interest relationship.”

Indeed, Reef Safe is an annual supporter of Mote Marine Laboratory, contributing an annual range between \$500 and \$5000 from 2011 to 2015 (the latest year that IRS tax returns were available).

To know more about the Mote study, we called and emailed Vaughan, the study’s author, who failed to respond. So instead, we contacted Richard Pierce, Mote’s associate vice-president of research, stating we had not been able to locate references to Mote’s work in any scientific journals or even on Mote’s own website. We asked Pierce, “Does Mote stand by its study and the results? Do you have any quarrel with its inclusion in Tropical Seas’ promotional material?”

Pierce responded by email, “We found Reef Safe products caused no visual signs of stress, bleaching or mortality for two key species of adult Florida corals -- mountainous star coral found offshore and branching finger coral found inshore -- through our 20-day, independent test. We look forward to advancing such research with other reef species at different life stages, using increasingly sophisticated

health diagnostics, to work toward a cutting-edge understanding of what it means to be reef-friendly.

“There remain uncertainties, and the need for more research, about how Reef Safe and other products will affect other coral species at different life stages, including the sensitive larval stage, over longer time periods. We have recently been in contact with Reef Safe/Tropical Seas staff to request updates to their statements on their website, to better convey the nuances of what has been tested/not tested so far in the short-term study described above.”

That is clearly not a full-throated endorsement of Reef Safe with oxybenzone. In fact, Pierce seems to say that Mote’s single laboratory experiment on two corals isn’t definitive, the researchers need to look into it further, so one must be careful not to extrapolate, and they will get in touch with Tropical Seas and have them modify the marketing claims on its website.

Still wanting to tie down Mote’s perceived endorsement of Reef Safe with oxybenzone, we wrote Pierce again, asking, “Reef Safe states on its website that ‘All Reef Safe SunCare formulas have been proven coral safe by Mote Marine Laboratories.’ Do you accept this as a fair and accurate characterization of your test results, considering that Reef Safe with oxybenzone was tested?”

We received no reply.

This is an important issue for divers, because Reef Safe with oxybenzone is marketed heavily in the scuba industry as safe for coral reefs. It’s touted at the Diving Equipment and Marketing Association

Show, and sold to shops by dive product distributors such as Trident, which trumpets Tropical Seas’ spurious claims on its homepage. With the evidence clear on oxybenzone’s harm, we would urge Trident to be a good citizen and drop sunscreens with oxybenzone from their sales to scuba stores.

So, read the label before you purchase a sunscreen. There are alternatives to oxybenzone, such as Stream2Sea with no oxybenzone (<https://stream2sea.com>). Even Tropical Seas offers oxybenzone-free sunscreens, though it continues to market its oxybenzone product. There are also sunscreens made by Coral Isles (www.coralisles.com), which contain no zinc oxide, titanium dioxide or oxybenzone whatsoever.

And note that even if you don’t enter the water after you slather yourself with oxybenzone, your evening shower will flush it down the drain and out into the ocean. The same goes for the toilet, because oxybenzone is detected in urine within 30 minutes of applying it to the skin.

Read a summary of the study that got the sunscreen bans started at www.haereticus-lab.org/sunscreen-chemical-threatens-coral-reefs

-- John Bantin

“Toxicopathological Effects of the Sunscreen UV Filter, Oxybenzone (Benzophenone-3), on Coral Planulae and Cultured Primary Cells and Its Environmental Contamination in Hawaii and the U.S. Virgin Islands,” by C.A. Downs et al., Archives of Environmental Contamination and Study, February 2016, vol. 70, pgs 265-288.

Extreme Courage -- and a Good Nose

cave divers’ amazing rescue of the Wild Boar soccer team

Can you imagine scuba diving in the narrow confines of an unfamiliar cave system with no clear surface and little or no visibility, while fighting a strong current? It’s not for the faint-hearted. And when you consider doing that while searching for children lost for many days who are low on food and air, there are few who are mentally equipped to do it.

It was John Volanthen, a 47-year-old amateur cave diver and IT technician from Bristol, England, who surfaced in Thailand’s Tham Luang Cave after running out of guide line, only to discover 12 scrawny boys and their 25-year-old soccer coach, staring

back at him by the light of his helmet-mounted flashlight. If his line had been 15 feet shorter, he would have turned back without ever seeing them.

An unlikely looking hero, the slightly built and normally bespectacled Volanthen had struggled through narrow constrictions in a maze of tunnels, and muddy water with visibility akin to pea soup, before chancing upon the boys far beyond “Pataya Beach,” where they were anticipated to be. By then, it had been 10 days since they had gone cave exploring after soccer practice and been trapped by floodwaters from which they had retreated.