



Text by Steve Lewis  
Photos by Ben Martinez

Have you ever had that odd experience when you hear a word you've never heard before—let's say "varietal"—or you've read a magazine article about a car you've never seen before—a Bugatti Veyron, for example—and you say to yourself, "Wow, that's unusual." Then in the following couple of weeks, you hear the word *varietal* used in every second conversation you have, or during your very next visit to the grocery store, you see two bloody Bugatti Veyrons parked side by side? A few of my mates tell me they sort of feel that way about sidemount divers lately.

Just a year or two ago, the appearance of a diver in sidemount kit was something to make a note of in your diary, or at least in your dive log, "Dear Diary, saw a couple of dudes at the quarry today dressed in the most peculiar rig."

But things have changed. It seems that sidemount has recently become *the* default kit configuration for a whole raft of divers—sport divers, technical divers, wreck divers, cave divers—well, at least here in North America. Why the last time I was diving my favorite dive site, there

were *only* sidemount divers in attendance—well, only sidemount open-circuit divers in attendance. The only divers in backmount were a couple of dudes wearing rebreathers, and come to think of it, they had their bailout bottles rigged for sidemount.

So, what gives? What happened to

that traditional North Florida Cave Diver's kit we all used to dive? You know, doubles, manifold, backplate and wing? Hogarthian, DIR, neo-Classical tech, whatever the heck it was called? Did it drop off the face of the earth?

Well, the simple answer is that it did not drop off anything, but a lot of divers

who used to stagger around with a set of twins on their back, have adopted, what a buddy of mine calls, "a gentler, friendlier way to dive doubles."

#### Why?

Some time back, a guy called Lamar Hires made a pretty astute observation

about divers who opted to use a sidemount configuration. He said they did it for one of two reasons. The first was mission specific. Sidemount was born in an overhead environment and the "mission specific" that Hires was talking about are those small, low passages in a cave or in a wreck that would be impassable in tra-



BEN MARTINEZ

# Sidemount

— *It's everywhere but who's to blame?*





BEN MARTINEZ

ditional doubles. For these tight confines, sidemount really is the better option.

The second reason to wear primary cylinders at one's side is what Hires calls a "lifestyle choice", and for the majority of folks using sidemount, this seems to be why.

In essence, with two single cylinders, one has the option to carry them to the water one at a time. Even on a dive boat, it's possible to wear one and throw the other into the water on an equipment line and pick it up when its apparent weight has dropped by a few kilos.

Also, with a cylinder at each side, there's no special yoga posture or daily stretching exercise necessary to stay flexible enough to reach the hand wheels on your valves since they are not behind your head but right there where you can

reach *and* see them.

Both mission specific and lifestyle are perfectly valid reasons to switch, but neither is the primary reason that, when I dive open-circuit, you'll find me in sidemount. The fact is that I switched because in my overall assessment, this configuration is "safer."

### Sidemount is safer

Let me explain the rationale behind my statement and the logic (and experience) that led me to that conclusion.

You'll recall that the first rule we teach new divers is DON'T HOLD YOUR BREATH and the simple extension to that piece of advice as soon as our dives get a little more advanced is: "And always have something appropriate to keep you breathing for the whole dive." All pretty

basic advice, correct.

But as basic as it sounds, it does speak to a couple of planning skills that careful and successful advanced divers use every dive: Gas Volume Management (RMV calculations, time over available volume, at least one third of starting volume as a reserve, dive planned on the gas volume carried by the team member with the "shortest" fill... you know, all that stuff); and using a mix that balances oxygen partial pressures and narcotic loading against inert gas uptake and decompression obligation (analysing and checking all gas mixes, clearly marking the maximum operating depth on each cylinder, verifying gas switches with team members, and all that stuff too).

The reality of these simple, basic aspects of gas management are essen-

tially no different regardless of whether a diver is wearing a set of twins or carrying sidemount. But there are a couple of other "skills" that make me believe that a sidemount configuration is safer than traditional backmount, and these are the skills used when preserving gas volume in the event of kit failure.

### Line of sight

In the simplest possible terms, this boils down to the position of the cylinder valves, hand wheels and regulator first stages, and the various hoses supplying gas. They are where the diver can see them. There is nothing important behind the diver's head.

The major components of her life-support system are right where she can see them, identify the issue and react to it appropriately in the timeliest fashion possible. Having spent around 20 years teaching people how and watching them execute valve shutdowns while wearing traditional backmounted twins, there is no doubt in my mind which is easier to manage—which is safest.

There are arguments made about the perceived advantages of a modern isolation manifold when things go pear-shaped: most commonly that with a tank valve turned off, the gas in the effected cylinder is still available to the diver. No question, that is correct. However, when the correct protocols are followed, in the event of an incident that requires the diver to bailout and shut off a tank, the dive is over, finished, done and dusted. And when the correct gas volume protocols are followed, the volume of gas available to a sidemount diver with one side compromised, is more than sufficient to get them out of the water.

## Sidemount

### Gas switching

I guess, I should explain something about gas switching, too. Actually, I believe the fact that a sidemount diver switches second stages during her dive is another advantage that sidemount has over traditional backmount breathing the long hose. There's probably a whole 1,000 words on the potential scenarios where this would show itself, but the short form is that our sidemount diver knows both her second stages are working—she always knows.

The argument made by stuck-fast doubles divers that breathing the longhose and having it ready to donate it in the event of an emergency out-of-air (OOA) situation, is largely spurious. Firstly, how

many emergency OOA situations have *you* experienced when diving with advanced or technical divers? When gas management guidelines are followed, these situations are rare: extremely rare.

(If you are diving with classically trained open water divers who have been taught to believe that gas volume management includes a Controlled Emergency Swimming Ascent as a viable option, your mileage may vary, but a straw poll of all the folks in the head office of TDI

in Maine a few years ago turned up just how rare this type of situation is. Between us, we had in excess of 14,000 dives on doubles and in sidemount, and we could only cite one example of an emergency OOA.)

At any rate, let's get back to that protocol for switching between regulators and how well this technique helps to preserve a nice cushion of spare gas for a buddy in the event that something *does* go wrong.

There are several methods but the one I use and teach to folks who are team

*Both mission specific and lifestyle are perfectly valid reasons to switch, but neither is the primary reason that, when I dive open-circuit, you'll find me in sidemount. The fact is that I switched because in my overall assessment, this configuration is "safer."*



Protocol for gas switching in sidemount. (View is overhead, looking down on diver from above)

diving is this. It requires only *three* regulator switches for the whole dive—well, at least until the decompression gas is reached.

The diver starts by breathing from the right-hand cylinder (the bottle at the diver's right side, which is usually fitted with a long hose) and ends with the diver breathing from the bottle at her left side.

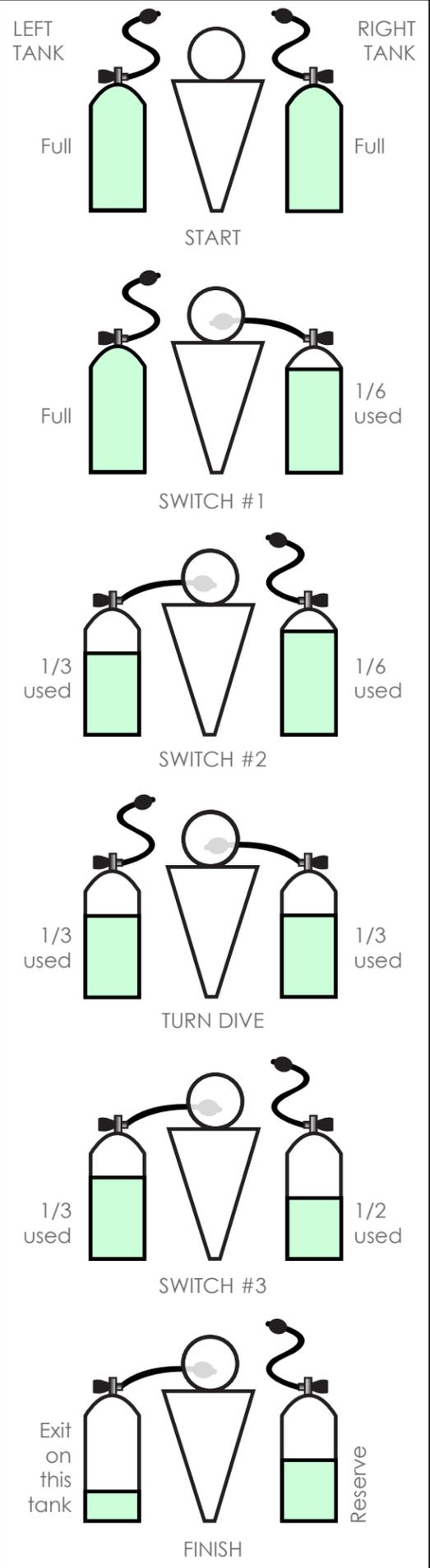
Okay. Take as given that the diver has worked out her gas volumes and knows how many bar represent thirds and how many bar represent one half of one of those thirds. To make this somewhat clearer, let's say that one third of our diver's available pressure is 60 bar, therefore, one sixth is 30 bar.

She begins her dive and breathes from her right cylinder until its pressure has dropped by 30 bar, and then she switches to her left cylinder.

She breathes from it until the pressure drops by 60 bar, and she switches back to her right tank. For the record, her left cylinder is now at thirds.

She breathes her right tank until its pressure has dropped by 30 bar, and at this point, she is at thirds in both tanks and signals to her buddies to turn the dive. However, she continues to breathe from that right-hand bottle until its pressure has dropped a further 30 bar. She is about to switch for the third and last time, but let's just recap a couple of things.

The bottle at her left side has two-thirds its starting pressure



## Sidemount

(plus a small reserve if she is in an overhead). The one on her right, which she has just finished breathing from, contains one-half of its starting pressure (one-sixth plus one-third is three-sixths, which equals a half).

Okay, so our diver has switched for the last time and is breathing gas from her left cylinder, and she and her buddies are on their way home. The tank she is breathing from has sufficient gas to get her there. She will, at the end of the dive, should everything go according to Hoyle, have at least one-third of her starting volume preserved in her tanks. The only difference is that more of that contingency gas is contained in the cylinder to her right—the one with a long hose—the one she would share with her buddy if something hits the fan.

There are a bunch of reasons to dive sidemount, but for me, especially in a virtual or real overhead environment, the most important one is that from the perspective of gas management, I believe it is the safest option.

Thanks for your attention, folks! ■

*Steve Lewis is an active technical diver and instructor based in North America. He is an author, blogger and workshop host with a special interest in diver education and the development of safe diving protocols. He first tried sidemount scuba as a young dry-caver in the United Kingdom, and now many decades later, carries a TDI sidemount cave instructor rating and is an open-water/overhead environment Sidemount Instructor for PSAI. So, you might say, he is as guilty as anyone for promoting sidemount diving! See [Techdivertraining.org](http://Techdivertraining.org)*

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# Opening Up Closed Circuit

*Is the sport rebreather dream a reality this time around?*



The Lt. Lund II Oxygen-rebreather produced by Dräger in 1954 was developed for the military but also saw some civilian use.

**Lt. Lund II**  
 Itapparat fra Drägerwerk 1954. Apparatet er blevet til i samarbejde med den norske søofficer Ove Lund, som var chef for den Norske Marines Føskermannsskole. Ove Lund omkom i 1956 under forsøgdykning med blandedingsgas. Apparatet er tidligere anvendt af blandedningsmandskorps.  
 Foto af Fremadskorpset

**It is a commercial holy grail: the dream of developing a product that will revolutionise the way that people interact with their world. The telephone; the automobile; the passenger jet; the vacuum cleaner; the telephone again (mobile this time); the list is endless. Today, scuba divers are being presented with machines that may revolutionise the way we dive – rebreathers.**

**If, at first, you don't succeed...**

Rebreathers are not new: the concept dates back several centuries and they have been used by military and commercial divers for over a hundred years.

The notion of sport divers using rebreathers is not new either. In the 1960s Italian and American companies developed rebreathers for public sale but a series of accidents and training agency bans ensured that these experiments were short-lived and dissuaded others from attempting similar ventures for 25 years or so.

Then, in the mid-1990s rebreathers appeared in the market once again, their arrival

coinciding with the growth of technical diving, and this time they stayed. Technical divers eagerly adopted the new machines mainly because, although they were expensive to buy, they were much cheaper than open circuit equipment to use for deep dives on helium based gas mixtures.

However, the mainstream dive industry was cautious, as were recreational divers in general who saw no benefit in the models of rebreather that were then available and decided to stick with open circuit scuba.

**...Try, try again**

Which brings us to today. In the last two years, industry

acceptance of the idea of the general population of divers using rebreathers has grown considerably. PADI, the world's largest training agency, has given the concept its support and this has encouraged some of the mainstream equipment manufacturers to develop new units especially designed for "recreational" divers, (as opposed to "technical" divers.)

The first of these was the Poseidon Mk V1 Discovery but lately Hollis (Oceanic) has stepped into the ring with its Explorer unit. Other companies are watching developments carefully from the wings to see if these pioneering units will conquer the recreational market.

**Key Questions**

There are two key questions that divers are asking. The first question is: What is so different about these units that the mainstream diving com-

munity has abandoned its previous reservations concerning rebreathers?

The new models are compact and relatively light compared to the rebreathers that technical divers use. Having said that, they are still as heavy as open circuit scuba and current training procedures require you to carry a small open circuit set up too if you want to dive on a rebreather below 20m.

More



Text by Simon Pridmore  
 Photos by Peter Symes



importantly, they have also been designed to reduce as far as possible the likelihood of the diver making the kind of errors that have led to rebreather accidents in the past. These rebreathers monitor themselves, know when they are functioning correctly or not and inform the diver immediately when there is a problem. The diver then deals with the problem according to his training.

The new models are also less expensive than technical rebreathers although, at around US\$5000, that does not mean they are cheap. International dealer networks are also in place to take care of maintenance requirements.

The second question divers are posing is: Why should I consider using a rebreather if I am not interested in getting into technical diving?

Rebreathers are incredibly quiet. The gas you breathe is warm and they give you much more dive time and no deco time than a single 12-litre cylinder of nitrox. The impact you make on your environment is also much reduced when you are not blowing clouds of exploding bubbles into the water with each breath.

Although it is difficult to assess how much differently marine life responds to you when you are on a rebreather, (after all, you are still a big strange animal in the water,) I can tell you



Hollis Explorer recreational rebreather

PRODUCT PHOTO COURTESY OF THE MANUFACTURER

that the only time I was ever approached by a wild dolphin underwater was when I was on closed circuit!

### Are they for me?

If you are a relatively new diver looking for a smaller, lighter, simpler and more convenient alternative to standard scuba equipment then the current generation of rebreathers will not meet your needs. They are still more complex, awkward and more time-consuming to set up and use than standard scuba and, even if the unit is doing much of the monitoring itself, a diver still needs to be extremely attentive to what is going on.

*Why should I consider using a rebreather if I am not interested in getting into technical diving?*

If, however, you are a relatively experienced diver, have been intrigued by rebreathers in the past but were put off by the cost and complexity and concerned about their safety record, then now might be a good time to give the technology a try.

You will find that in return for a little extra tender loving care and attention, the equipment will give you a lot more freedom underwa-

ter in terms of time and gas supply. And, who knows, they may well turn out to be the genuine harbingers of a new diving revolution? Perhaps in much the same way that the Walkman presaged the iPod! ■

A former Hong Kong police officer and assistant political adviser to the governor of Hong Kong, Simon Pridmore has over the past 15 years been on the cutting edge of scuba diving in Europe, Asia and the United States. He pioneered mixed-gas deep diving in the late 1990s and

managed IANTD operations in Micronesia through Professional Sports Divers, his dive centre on Guam. Pridmore then moved to the United Kingdom to operate the IANTD U.K. franchise while serving as sales and marketing manager for VR Technology. Now living on Bali, Pridmore is currently the regional training director for IANTD in South East Asia. He continues to be widely published in dive and travel magazines and has written a new book, Scuba Confidential—An Insider's Guide to Becoming a Better Diver, soon to be released in 2013.



FOURTH ELEMENT TEAM DIVER, Pete Mesley in Truk Lagoon, June 2010. Pete wears: PROTEUS wetsuit.



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Poseidon MKVI recreational rebreather

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# Innerspace 2013 recap

—Bubbles, fluro night diving and other memories from Inner Space

Text and photos courtesy of Rosemary E Lunn

**The fourth ‘Red Sea Silence’ week has recently wrapped up in Safaga, Egypt. I would not be at all surprised if this rebreather event probably came into being, partially because of the wild success of Divetech’s Inner Space. Once seen, who can forget that iconic photo of a circle of rebreather divers? I remember just how much that image intrigued and excited me—“I want to be part of that.” Though I must admit that I was somewhat astonished to realise it was taken a decade ago. Time has flown; Inner Space is ten years old.**

Every year rebreather divers of note from all over the globe flock to Grand Cayman and Divetech, for a week-long gathering of the ‘whose who of rebreather

diving’—manufacturers, training agencies, leading instructor trainers, personalities and divers.

Inner Space, the premier North American rebreather event, is the brainchild of Nancy Easterbrook. A grand dame and much respected industry stalwart who positively pushed the introduction of nitrox into the Cayman Islands when everyone else was uttering “voodoo gas”. In more recent years, Easterbrook was the major power behind the sinking of the USS *Kittiwake*, project managing the entire process. It would seem Easterbrook has the Midas Touch. (I suspect her secret is a lot of hard work, appointing and empowering top-notch staff, investing money and resources where they are needed, much prior preparation and planning, coupled with pretty decent diving a few fin kicks away.)

I caught up with Easterbrook, as she checked final details and asked her how Inner Space started.

“I wanted to bring people together to learn what was happening with rebreathers, because I could see the technology was constantly evolving and getting better,” said Easterbrook. “We attracted 19 divers in the first year who were keen to learn more and move the industry forward. The aim of Inner Space is to share

information, keep up with changes in the industry, and provide the ideal platform for people to meet like-minded divers and build relationships.”

## Like-minded

One like-minded diver who came to this year’s Inner Space was Randy Thornton, owner of Dive Addicts in Utah and the power behind TEK Dive USA.2014 ([www.tekdiveusa.com](http://www.tekdiveusa.com)). I asked him why he considered Inner Space such a key event, because this was the fifth year he attended it.

“The technology is still fairly young,” said Thornton. “We all are eager to interact and learn more from each other, and it is exciting to rub shoulders with newbies and old pros alike. I imagine rebreather divers are probably less than one percent of the diving population. But we are becoming a bigger piece of the pie all the time, hence the camaraderie in the rebreather community comes about because we are still relatively few in numbers.”

Personally, I think diving as a

whole engenders positive camaraderie, and it is of a similar quality that is found within the armed forces and the medical communities. Diving has the power and ability to create friendships that bind as strong as hoops of steel, no matter where either party lives in the world. Perhaps it is because we experience such an extreme range of emotions, truly discover what we are capable of, and certain experiences and dives end up deeply seared into our souls. I vividly remember one such dive from Inner Space 2012.

## Discovery

Part way through the week,

Warren Miller (North American sales manager for Fourth Element) and I quietly padded down the dock at Cobalt Coast to do an afternoon shore dive in the Caribbean Sea. Once submerged, we started gently bimbbling towards the North Wall when fellow Inner Space attendee Jean Anne Booth enthusiastically swam up to us.

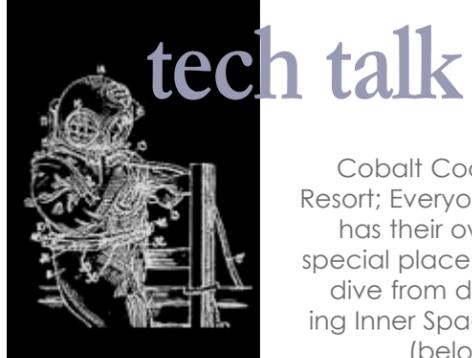
“Look,” she signaled. “I’m ok,” I replied. “No, LOOK!” She gestured wildly at the surrounding area. It took awhile, whilst I wondered what the heck it was, I wasn’t seeing. I eventually spotted a squid. Then a pair, then 20, before suddenly realising we

were completely surrounded by a large school of hunting squid. Their translucent bodies glistened and glittered in the afternoon sunshine, reminiscent of an Essex disco.

I was entranced. Along with half a dozen other rebreather divers we just sat, watched and wondered for several minutes. We would never have seen something quite as dramatic as this on open circuit scuba.

It is therefore no surprise that as the divers arrive into resort greetings, chatter and big fish stories ebb and flow. I bump into Booth. “Do you remember that squid dive?” I asked, as I gave





# tech talk

Cobalt Coast Resort; Everyone has their own special place to dive from during Inner Space (below)



## Cobalt Coast Resort

One of the reasons that a number of us swim at dawn during Inner Space is because of the resort setup. It is so easy that it would be rude not to, and in fact 'it is so easy' applies to everything here. All

Inner Space attendees stay onsite at Cobalt Coast. This resort has a mix of one and two bed-roomed en-suite rooms. Additional accommodation in the form of the Garden Cottages can be found a two-minute stroll away down a quiet lane. So if you need to, you can be from bed to breakfast, the dive centre or the private dock in about three minutes.

On land the divers naturally gravitate around two key areas. Firstly, there is the social heart of the resort—the bar and reception area. This part of Cobalt Coast is quite practical and used for many things. It is where you check in and check out. All the meals are served here, a set of cloakrooms are conveniently located a step away, and it is

the place at Cobalt Coast to sit to access the fast free WiFi.

Ari, the owner, sourced some high backed basket chairs that prove popular with many guests. The chairs are a great place to hide to check emails, make Skype calls or catch up with Facebook. During the day, you can eat at the bar, and if you are a solitary soul, you are soon welcomed to join a group, if you wish to be.

## Dive center

The other key area is the Divetech dive centre and the big wide benches. I'd heard about these long benches years before I attended Inner Space from cave explorer and CCR instructor trainer Phil Short. He had remarked this event was one of the most enjoyable weeks of his year. I asked him why. Short simply said "smooth logistics". He would arrive in resort, unpack and put his wallet away. And then get on with teaching and diving because everything is covered in the Inner Space package, bar alcohol.

Everything? Yes, 'everything'. You arrive into resort to find your diving home for the week has been allocated. Every diver has their own special place labelled on one of the benches. When you are ready, you toddle up to the dive centre



two competitively trained swimmers, I feel a more precise statement should be 'Boot Camp Power Snorkeling'. However, once you get your head around it not being a gentle bumble, it is perversely quite pleasurable vigorously finning with the fellowship for a couple of miles at 5.30AM every morning.



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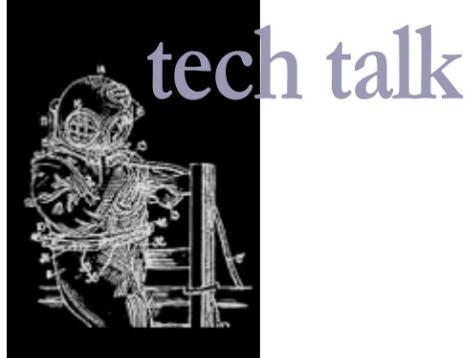
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# tech talk

The author underwater with Hollis rebreather; Freshwater hoses are pre-run along the benches, making breather care post-dive much simpler to manage (below)

window to collect your rebreather cylinders. It is pretty cool finding your tanks are labeled with your name and pre-filled with the requested correct mix, as indeed are your pre-rigged stage cylinders. All you need to do is analyse and label your gas, and screw a regulator or two in.

'Everything' also means things like gas fills, boat dives, night dives and all the consumables you need. Sorb, oxygen friendly lubri-

bility and dramatic drop-offs". 30 metre plus gin visibility is pretty much standard, and when that is coupled with the spectacular topography, the experience is exhilarating. Then throw in full tech capability for those that desire it, and the result is top drawer diving.

The effortlessness of being able to safely do interesting sub 100 metre fully supported expedition trimix diving is immensely appealing. It is little wonder that Inner

Space gets booked up so quickly.

### Unique speakers

I've talked about the diving and the logistics. What else makes Inner Space special? Nancy Easterbrook asks certain industry luminaires to do short talks every evening. Mike Young, the new CEO of Kiss Rebreathers, entertained us with his stories of cave diving. I came away with the impression that he is the USA version of Rick Stanton. If it is a nasty

squalid small cave in the back end of beyond, Mike is your man to explore it. And then Dr Douglas Ebersole, an Interventional Cardiology doctor, educated us on cardiac concerns specific to diving. Ebersole is a fluid speaker, and I learn something new from him every time I hear him.

### Diver safety

On a more serious note over the years Inner Space has positively contributed to diver safety. This is



the fourth year Dr Neal W Pollock and his team from Divers Alert Network have conducted extreme dive monitoring. This event is useful from both the divers (subjects) and the researchers point of view. Pollock gets access to at least 12 subjects pulling a plethora of profiles that fall way outside the normal recreational range.

The team looks for signs of decompression stress, (bubbles), by scanning the diver's heart using ultrasonic scanning technology—a transthoracic echocardiogram or TTE for short. They simply place a probe, similar to one used when doing ultrasound on pregnant women, on a specific area on the diver's thorax (chest wall) and the probe picks up the sound of the bubbles. The researcher and the subject are then able to observe a two dimensional scan of the heart. It is fascinating watching your heart and valves move on the monitor.

Each subject is scanned every 20 minutes for two hours post dive. I mentioned earlier that the divers find the research useful, too. There is often much discussion between

the divers and Pollock about what is seen on the screen. As a result, some of the subjects use these invaluable scanning sessions to play with the conservation factors on their computers.

As the week progresses the subjects tweak their conservation or gradient factors and see how it affects their bubbles scores. It is not only the divers who are interested in research Pollock is conducting. Shearwater Research, the manufacturer of the Predator and Petrel computer, has also been following the DAN study at Inner Space. As a result, the Petrel now comes preset with a gradient factor of 30 / 70.

### Afterthoughts

All too soon the week was over. Thousands of litres of gas had been pumped and breathed whilst 1,320 lbs of sorb had dived. Inner Space closed out with a celebratory graduation ceremony on the Friday night. During the week over 800 dives had been done by the 70 attendees, with 10 divers successfully completing and passing a variety of diver / instruc-

tor / instructor trainer rebreather courses.

And what did I leave with apart from a pocketful of memories, a handful of dives and more friends? Something I did not expect at the start of the week—an understanding of why the Hollis Explorer has a valid place in the rebreather community.

I could not get a handle on it before, but having completed a user course on this unit I can now see the Explorer fulfilling the need of 'my first rebreather'. It is a good unit to learn rebreather discipline on, and get to grips with the three C's. Checks, concentration, cleaning. I also already knew it is never daft to carry bailout gas, but that was gently reaffirmed on a dive.

And I finally got to play with a Light and Motion Solar Nightsea torch. My first ever fluro night dive, and one that will be forever seared into my soul for all the right reasons. But that is a tale I will tell you another time.

For more information, visit: [Divetech.com/files/Innerspace.htm](http://Divetech.com/files/Innerspace.htm) ■



cant, etc. You are allowed to use as much sorb as you like. In reality, depending on the diving being done, we all change our sorb at the end of every day. No one abuses the system, nor do people try and push their scrubbers unnecessarily.

### Diving

So what is the diving like? If you only gave me six words to describe Cayman diving, my response would be "stunning vis-

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## Baltimore/D.C. DIVE SHOW

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[BaltimoreDiveShow.com](http://BaltimoreDiveShow.com)

## TEXAS DIVE SHOW

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Edited by Don Silcock

Group of  
frogfish  
photo-  
graphed  
with Sigma  
30mm lens

Text and photos by Don Silcock

—In this series of articles on the mirrorless cameras, we are exploring the overall potential of this new technology for underwater photography. In this article, the fifth in the series, we will take a close look at how the Olympus OMD-EM5 mirrorless camera performs underwater, but first a quick refresher on the story so far and why the OMD.

As I embarked on these articles I did so with quite a strong personal interest as I was looking at accomplishing two objectives. Firstly, I wanted to buy a set of equipment to take with me on some motorcycle trips I was planning, where space was of a premium, but I needed better performance than a high-end compact could offer. Secondly, I wanted to investigate the possibility of using a mirrorless camera as a small back-up rig to my main underwater one—a Nikon D800 in a Nauticam housing.

The D800 is an incredible piece of photographic equipment and is literally the best camera I have ever owned. But it is big and expensive, and so are the



# Mirrorless Macro

— Close-up Underwater Photography with Mirrorless Cameras

lenses that are required to realize its full potential, which means that back-ups are a very costly exercise, and then it dawned on me that the cost of a second D800 body would provide enough working capital to consider a mirrorless rig as a back-up.

So, I began exploring the options and,

as detailed in the previous articles, while there is an ever increasing array of mirrorless cameras, when it comes to their suitability for underwater photography, and most importantly the ability to house them, the choices narrow down to two options—the Sony NEX mirrorless cameras and the Micro Four Thirds system from the

Panasonic and Olympus alliance.

I opted for the Micro Four Thirds technology because of one basic reason—lenses. Simply stated, there is a much better selection of glass available for the Four Thirds cameras than there is for the Sony NEX.

## The Olympus OMD

At the time I started the acquisition of my system in January 2013, the choice of which Micro Four Thirds camera to use was a “no-brainer” and I went for the Olympus OMD-EM5 and have been very pleased with that decision ever since. When it was released in 2012 the OMD



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Scenic view over Bali (left);  
Nauticam D800 and Olympus  
OMD-EM5 (below)

## Mirrorless Macro

for the OMD, I quickly realized that it was either the OEM housing from Olympus, or the Nauticam one, as there was literally nothing else available at that time.

Closer inspection of the functionality and, most importantly, the port options made the Nauticam the only choice.

The big advantage the Micro Four Thirds technology is the excellent selection of lenses available from Panasonic and Olympus, plus the third party manufacturers like Sigma who are joining the mirrorless party. To use some of those

lenses underwater, you need the necessary ports and Nauticam already had them.

### Underwater at last!

I moved to Bali at the end of 2012 and wanted to establish a "local" site, which was both productive and handy to use, so I can quickly and effectively test new equipment and techniques in a known environment. I chose Secret Bay at Gilimanuk on the north-west tip of the island as that site, as I knew it pretty well



went straight to the top of Micro Four Thirds "charts" in terms of both functionality and desirability, and was still there in January.

The other potential contender was the Panasonic GX1, which I decided against because of the lack of a dedicated viewfinder. However, Panasonic just released the GX7, which seems a worthy competitor to the OMD and is well worth checking out.

There is no housing available as yet for the GX7, but you can be pretty sure that it will be supported by Nauticam who have an excellent record of quickly releasing new housings for popular cameras.

Olympus has really done a tremendous job with the OMD and being able to use it both above and below the water alongside the D800 has been a very interesting experience. I tend to think of the D800 as that red Ferrari I have lusted after—an absolutely amazing piece of engineering, but you have to know how to drive it, and you have to have the very best glass that Nikon produces to get the most out of that drive.

The OMD, on the other hand, is a bit like the Nissan Z370, in that it does amazing things in a really neat package, and while it looks a bit like a Porsche, it isn't

one and is nowhere near as expensive either!

So, the real question is what do you really need? Hopefully, this article, and the ones to follow, will help you to answer that question.

### My mirrorless rig

Just as the OMD was a "no-brainer" at the time I was buying, so was the selection of a housing, which rapidly boiled down to one option—Nauticam. Hong Kong based Nauticam seems to have come from nowhere over the last few years and now appears to be everywhere. They have done some really smart things to achieve that position, not least of which are the adaptors that allow you to use your existing ports on their housings—probably the biggest impediment to changing housings. Combine that with good overall functionality, a sharp price point, some good marketing and it starts to become clear how they have achieved that position.

After 18 years as a Subal user, I went for a Nauticam housing for my D800, simply because the housing was available at Reef Photo in Florida while I was in the USA, and the Subal I had previously ordered had not turned up yet.

When it came down to which housing



Secret Bay at Gilimanuk on the island of Bali



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# photo & video



Nauticam OMD housing and 45 degree viewfinder

### Strobes and lighting

Like most housings these days, the Nauticam OMD housing uses the camera's "internal" flash to trigger strobes through fiber-optic cables. However, to keep the camera small, Olympus did not provide an in-camera flash, opting instead for a small external unit that connects to the hot shoe and is provided along with the camera when first purchased.

Lesson #1 when preparing the OMD rig is to remember to mount the external flash

before putting the camera in the housing! Luckily I always test that the strobe is firing after assembling a housing, otherwise that seven-hour round trip to Secret Bay would have been a very long day the first time I used the camera.

I normally only use one Inon Z240 for macro photography, usually mounted above the port and angled up to edge light the subject and minimize backscatter. Using the fiber-optic cables with the Z240 allowed me to try

real macro ones, the Panasonic DG 45mm f2.8 and the Olympus 60mm f2.8, plus two "pseudo" ones that allow close focusing but are not 1:1—the Panasonic 20mm f1.7 and the Sigma EX DN 30mm f2.8.

The Panasonic 20mm and the Sigma were late additions after I realized that their close focusing capability would allow a different perspective on my new best friends in the frogfish colony, and I was pleasantly surprised at the results.

## Mirrorless Macro

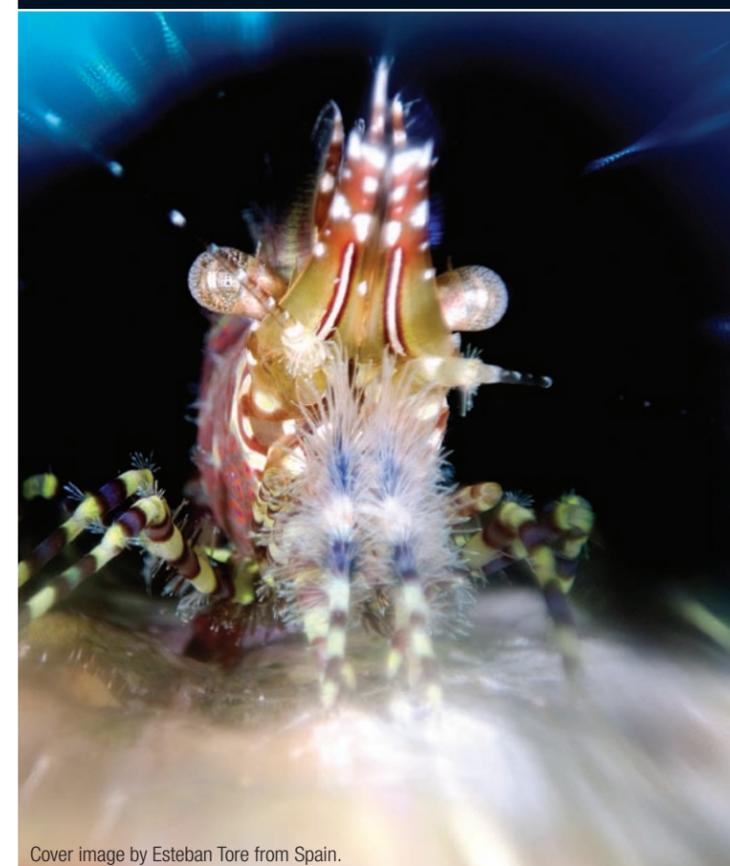
S-TTL for the first time, and overall, I was quite pleased with it, finding it quite accurate in general.

### Viewfinder

Straight out of the box, the OMD and Nauticam housing gives you two options to compose your images—the camera's electronic viewfinder (EVF) and the LCD. Having learned the value of an additional magnifying viewfinder to augment the camera's one a long time ago, using the standard one was just a non-starter for me. Time is very limited underwater as it is, and so many things work against you at the best of times. So, performing contortions to see through that little hole is something I can do without—thank you very much.

I was, however, very interested in seeing how the LCD performed, but hedged my bets and forked out for a dedicated 45 degree Nauticam viewfinder and was very glad that I did, as I found the LCD difficult to use. Quite possibly, it was me. But, I really was not happy using it and much preferred the external viewfinder, particularly for vertical compositions. The downside though is that an external viewfinder

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LEFT TO RIGHT: Olympus 60mm lens, Panasonic DG 45mm lens, Olympus OM-D camera, Sigma EX DN 30mm lens, Panasonic 20mm lens



photo & video

Olympus OMD and Nauticam housing with standard macro port



## Mirrorless Macro

I was very pleasantly surprised to find that both the Sigma 30mm and the Panasonic 20mm worked perfectly in the standard port, meaning that the 35mm equivalent of 40mm, 60mm, 90mm and 120mm prime lenses can be accommodated with one port and one extension ring!

### Lens performance

Overall, I was pleased with the performance of all four lenses underwater, but particularly impressed with that of the Panasonic 45mm and the Olympus 60mm, which were both incredibly sharp. Both the Panasonic 20mm and Sigma 30mm performed well, with the 20mm having the edge on the 30mm, which is not really surprising given the Sigma's budget price tag.

That said, I would have no hesitation using the Sigma, and for a certain size of creatures, it is just perfect. It focuses down to just under 12 inches (300mm) and is a good choice as a "hunting" lens for sites where you don't know what to expect.

The Panasonic 20mm was excellent for larger subjects, and I was really glad I had it once I learned that the frogfish liked to cuddle up together when the cold incoming tide at Secret Bay made its presence felt.

The Panasonic 45mm is co-developed with Leica, so given its lineage and price tag, it should perform, and it certainly did!

I really liked the Olympus 60mm, but given that its equivalent to a 120mm lens in 35mm format, you obviously need some small things to focus on, particularly given the visibility at Secret Bay, which can be challenging at times. However, I just did not find that much small stuff so never really got the chance to nail a killer shot, but I have every confidence that the Olympus would perform superbly in those circumstances.

does add considerably to the overall size and weight of the complete rig.

### Ports

Nauticam make a special line of small ports for their mirrorless housings, and

the "standard" flat port for the OMD is the one for the Panasonic 45mm macro lens. They also quickly provided a 20mm extension ring when Olympus released their 60mm macro lens so that the standard port can accommodate it.



Frogfish photographed with Olympus OMD camera with Panasonic 20mm lens



Frogfish taken with Olympus OMD with Panasonic 20mm lens





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Frogfish photographed with Olympus OMD camera with Panasonic 20mm lens



## Conclusion

Having used SLR's and DSLR's exclusively for the last 18 years, getting my head around the OMD was a bit challenging at first, but the more I used it underwater, the more it replicated the positive experience I had with the

camera on the first bike trip I had taken it on.

The camera's autofocus is quick and responsive; Nauticam's external viewfinder provides a really nice, large and bright

canvas to work with; their housing is a nice size; and all the controls are pretty easy to use, if a bit cramped because of the minimal size of the housing.

The RAW images out of the OMD have a decent amount of "headroom" to pull out details from the shadows and highlights, provided you expose optimally, and the overall image quality is very good.

I still have a lot of testing to do with the camera and housing to see how it performs when used for super-macro and wide-angle, but my opinion at this point in time is that it will do very well with the former and reasonably with the latter—but time will tell.

Overall, I am very pleased with my "investment" and looking forward to the four weeks I have coming up in Raja Ampat in October-November when I will use the OMD exclusively for

macro and my D800 for wide-angle.

As they say... watch this space. But my general opinion at this point in time is that the mirrorless technology represents an excellent option for anybody getting into underwater photography for the first time. It also represents a very logical upgrade from a compact camera and an excellent option for a DSLR user looking to "rightsize" down from the big and bulky cameras and housings they have probably tired of carrying.

The mirrorless cameras do not have the incredible resolution of the latest DSLR's, particularly the full-frame ones like the Nikon D800, but do you really need that capability underwater?

My one reservation about the mirrorless technology at this point in time is their dynamic range and capability to do wide-angle underwater photography, but my four weeks in Raja Ampat should allow me to answer that question.

More to follow... ■

*Don Silcock is a photo-journalist based in Bali, Indonesia, who specializes in underwater and travel photography. His articles and images can be seen on his websites [Indopacificimages.com](http://Indopacificimages.com) and [Nomadicpixel.com](http://Nomadicpixel.com)*



Seahorse, Olympus OMD with Panasonic 45mm lens



Frogfish taken with Olympus OMD with Panasonic 45mm lens





Edited by  
Don Silcock

PRODUCT SHOTS  
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## Garmin's VIRB Action Camera

Garmin, a major player in the GPS industry, has entered the action camera market with two new models—the VIRB and VIRB Elite. Both cameras feature 1080p video and image stabilized HD, plus a 1.4-inch built-in screen, 16MP stills and 3-hour HD recording battery life. The Elite version also features built-in wifi. Drawing on Garmin's extensive GPS knowledge, the Elite version can also capture and display heart rate, altitude, speed and other GPS related information. ■

## Sony a3000 Mirrorless Camera

Sony has added a completely new camera to their mirrorless range with the release of the a3000. The new a3000 features a very DSLR-styled body that contains a 20.1MP APS-C size CMOS sensor, which is capable of 1080p video. It also sports

a mode dial that allows for manual, aperture, and shutter priority exposure modes as well as 15 different scene modes. With the built-in flash and hotshoe mounts, the a3000 will offer a variety of flash photography options. The a3000 is very aggressively priced at US\$400, complete with an 18-55 kit lens and offers a great entry point for photographers interested in the mirrorless cameras. ■



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## Sony NEX-5T

Sony has released the latest iteration of its popular NEX series of mirrorless cameras with announcement of the NEX-5T. Technically, the new 5T is very similar to its predecessor, the NEX-5R, and features a 16.1MP APS-C sensor, 3-inch 921K-dot tiltable touchscreen LCD, ISO range from 100-3200, hybrid autofocus that combines phase and contrast detection plus the ability to shoot 1080/60p video. Where



made the changes are the addition of new software-based functionality such as Near Field Communication (NFC) capability, which allows such things as "tap to transfer" videos and photos. While not particularly useful to underwater photographers, the key thing about the introduction of the 5T and the completely new a3000 is that Sony is continuing to invest strongly in its mirrorless camera range. ■

## 10Bar OMD Housing

Hong Kong based manufacturer 10Bar has released its housing for the highly regarded Olympus OMD E-M5 mirrorless camera. The 10bar housing is machined from a solid block of aluminum with an acrylic rear plate to view the OMD's LCD, and the housing features buttons and levers that provide access to all the important camera functions. 10Bar has also released flat ports for the popular Olympus 12-50mm zoom lens, the Olympus 60mm macro lens along with a port that allows the 14mm and 20mm prime lenses to be used. It has also released dome ports that can be used with the Panasonic 8mm fisheye and 7-14 rectilinear zoom, plus the Olympus 9-18mm zoom. Strobes firing is triggered by the built in fiber optic bulkheads and all seals are double o-rings. ■



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Edited by Don Silcock

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## Panasonic GX7

Panasonic announced the release of its new micro 4/3 format mirrorless camera, the Lumix DMC-GX7. The GX7 is the successor to the well-thought of, but not hugely successful GX1, and is priced at US\$999—which places it head to head with the highly regarded Olympus OMD and shares the same micro 4/3 format. The GX7 features a new 16 megapixel Live MOS sensor with an ISO range of 125 to 25600, a new fast AF system and can record 1080P/60 video (1080P/50 in PAL countries) videos plus focus peaking to keep video sharp. The big news about the GX7 is the tiltable 2.764m dot high-speed refresh electronic view finder (EVF) at the far back left of the camera, which can rotate up to 90° plus a 3-inch 1.04m dot tiltable LCD display. ■



## Canon EOS 70D DSLR

Canon released their new 70D mid-level DSLR camera for enthusiast photographers, which features a new APS-C 'Dual Pixel CMOS AF' 20.2MP sensor with enhanced low-light performance and a native ISO range of 100-12800. The new sensor splits every single pixel into two photodiodes for on-chip phase detection, promising vastly improved autofocus performance in live view and movie mode. Also boasting the 19-point AF module from the EOS 7D for viewfinder shooting, touchscreen control via its fully articulated 3-inch LCD, plus built-in Wi-Fi for image sharing and remote camera control from a smartphone or tablet. For video, the 70D will shoot 1080p full HD video up to 30 fps in either ALL-I or IPB codecs. The 70D is priced at US\$1,199 for the body only. ■



## Recsea Sony RX100 MkII Housing

Japanese manufacturer Recsea has released their new housing for the Sony RX100 Mk II. Made from corrosion-resistant anodized aluminum alloy, key features of the WHS-RX100 housing are access to both the front and rear camera rings along with the capability to half-press the shutter release to obtain and lock the focus. ■



## Canon updates popular G15 and S120 compact cameras

Canon has released updated versions of their popular and highly regarded G and S series compact cameras. The G Series is the top-of-the-range compact cameras that provide much of the functionality of a DSLR but with a built-in zoom lens. While the S Series is Canon's top-of-the-range "pocket-size" compact that is much smaller than the G Series, but retains a lot of the capability. Both series are highly regarded for their overall capability and image quality, but have many competitors, and the update is a clear sign that Canon is trying to stay ahead of the pack!

The new G Series camera is the G16, which replaces the G15 and adds built-in wifi and some minor improvements to shutter lag and autofocus speed. The G16 also retains the dual control dials that allow manual exposure control like an SLR and, contrary to the general trend, it retains its optical viewfinder.

The S120 replaces the S110 and is very similar to its predecessor apart from improvements to shutter lag and autofocus speed. It also gains a faster F1.8 maximum aperture improving low light performance. ■



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# Sharon Brill



## P O R T F O L I O



PREVIOUS PAGE: *Conch 24*,  
by Sharon Brill. Porcelain  
sculpture, 16x35x16cm

## Sharon Brill

Text edited by Gunild Symes. Photos courtesy of Sharon Brill

**Artist Sharon Brill captures the sensual nature of the sea and the dynamic energy of water in motion in her series of ceramic sculptures that play with the forms and structures found in reefs and mullosks. Originally from Israel, Brill worked as a graphic designer there for many years. After a decade in the digital realm, she felt a need to work with her hands again and reconnect with the tactile feel of natural materials, which she did while residing in the United States. Now back in her homeland of Israel, Brill talks to X-RAY MAG about her work and life by the sea.**

*X-RAY MAG:* Tell us about your background and how you developed your artistic process in connection with themes of the sea or the underwater world.

SB: Ever since I can remember, the sea has been an integral part of my life. Born in Israel, in a northern coastal town by the sea, I often go to the beach for a swim or a stroll and take in its natural beauty. The composition of the light, the air, the water



*Conch 22*, by Sharon Brill. Porcelain sculpture, 15x10x14cm. RIGHT: *Conch 23*, by Sharon Brill. Porcelain sculpture, 15x10x9cm





LEFT: *Reef*, by Sharon Brill. Porcelain sculpture, 15x29x30cm

RIGHT: *Flow*, by Sharon Brill. Porcelain sculpture, 19x26x15cm

BELOW: *Core*, by Sharon Brill. Porcelain sculpture, 14x20x14cm



and the sand, the shapes, textures and colors, the softness and the intensity have always been a source of inspiration for the vision reflected in my work.

The sculptures I create in porcelain today are the result of an accident that happened to me in the past when I was working on another project. I was working for long hours on a new project that suddenly collapsed as I was working. Not following my normal habit of throwing the ruins away to the slurry bucket, I decided to put it off to the side covered in a plastic bag and place it on the shelf.

After few days, I opened the plastic bag and looked again at those ruins, and I was curious about what I saw there. So I began to turn it around, dig in, open the layers, and carve inside, and so

from this the whole series developed. At the end of this process when I looked at the first few works, they reminded me of the shells and parts of the reefs that are left on the sand after the tides that are so well known to me from my long walks on the beach everyday.

*X-RAY MAG: What about the ocean and its creatures inspires you?*

SB: My inspiration comes from many things that I absorb with all my senses: the changing light that creates different shades in the sand, water and vegetation, the unique textures and shapes of the reefs and shells, the sound and appearance of the waves that change by the day and hour, and the foam on the waves. By being on

the beach, swimming and strolling, I feel that my senses are all active and working together, which appears later in my works.

*X-RAY MAG: What is your artistic mission or vision?*

SB: My work is created out of an internal drive, as if emerging out of itself. What intrigues me is how I merge myself with the object, how I steep myself in the process to create spontaneously and intuitively, opening the layers, in search of what lies behind the overt, what is hidden within...

The concept of my works exists in the integration of two poles: aspiration for meticulous and restrained aesthetics on the one hand, and unrestricted spontaneous and intuitive search on the other.

*X-RAY MAG: Are you a scuba diver or*



Conch 25, by Sharon Brill  
Porcelain sculpture  
20x22.5x17.5cm

## Sharon Brill

waves crashing on the rocks and the large view of the sea that stretches far beyond the horizon. I love swimming in the small lagoons those rocky hills create.

*X-RAY MAG: Tell us about your ceramic sculptures. How are they made and how is your method unique?*

SB: The artworks created are abstract organic sculptural

shapes. Their scale varies, and some can be held in your hand and observed from any angle. The lines and movement lead the eye around the shape, into it and all through it.

The forms are wheel thrown or slab-constructed, altered porcelain, fired to 1,260°C (2,332°F). The porcelain remains bare. The works are sanded with various grades of sandpaper, from rough to smooth, before and after being fired.

*X-RAY MAG: How does your art work or artistic mission relate to conservation or environmental issues regarding our oceans and reefs?*

SB: The sea is very close to my heart. It is, and will always be, a part of me. My work comes from inside me and is intuitive. The town I live in is rapidly growing in construction and population, which is threatening to reach and ruin the shore. However, the



Conch 14, by Sharon Brill. Porcelain sculpture, 10x15x12.5cm

*if not, how do you interact with the underwater realm?*

SB: I am not a scuba diver but I live in a small coastal town, and so I start my day, year round, by swimming in the sea and walking along the shore. Even when I meet

with family or friends, it is almost always on the beach. The sea is where I will always go when I need some peace of mind.

*X-RAY MAG: What are your favorite locations and underwater subjects?*

SB: The shore that I live by is my favorite place to go. I like its natural look, which is for now still safe from urbanization. I enjoy sitting on top of the sand dunes that face the sea or on the rocky hills that go into the sea itself. I look at the textures the wind creates in the sand or the



*Conch 16*, by Sharon Brill. Porcelain sculpture, 11x21x17.5cm

building hasn't reached the shore yet or harmed it, and I am full of hope that it will remain this way.

*X-RAY MAG: Why art? Tell us why you think art is important?*

SB: Art is a strong passion that comes from within me, is stronger than me and needs to be expressed. I cannot see myself doing anything else. It took me many years of searching (within the art field) until I found the exact place for me to express myself in the arts. It comes with many difficulties, frustrations and challenges, but art for me feels like

home. Sculpting in porcelain is my desire, and I feel glad and fortunate that this is what I do in my life.

*X-RAY MAG: What are the challenges and benefits of being an artist today?*

SB: As I said before, art is a passion and a certain need that cannot be held back unexpressed, though it's not realistic financially most of the time. Being a mother and raising two kids (16 and 11) is another challenge, trying to be committed both to my family and my art, yet it is a challenge I would never give up on.

Even though my inspiration comes from the sea, its elements and its textures, I always enjoy seeing how different people react differently to the sculptures and how each one of the sculptures reflects the viewer's own inner world in different ways. I think this is one of the greatest things about art! I always feel great satisfaction from the responses. ■

*For more information and to view more of Sharon Brill's art works, you can find her on Facebook or go to her website at: [www.sharonbrill.com](http://www.sharonbrill.com)*



*Conch 21*, by Sharon Brill. Porcelain sculpture, 12.5x22.5x19cm