

**CCR Decompression**

**Getting to The Bottom of Zacatón**

**A Wedding With A Lot of Atmosphere**

**Cave Exploration in Cuba**

**Diving Pioneers & Innovators: A Series of  
In Depth Interviews (Paul Humann)**

**Issue 13 – December 2013**

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By Bret Gilliam

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# Editorial


Welcome to the 13<sup>th</sup> issue of Tech Diving Mag. It's our third anniversary! So let's celebrate it with an interesting story.

Almost one year after I published my inaugural editorial on accelerating no-fly time using surface oxygen in the first issue of Tech Diving Mag (December 2010), DAN started a flying after diving calibration study. One of their objectives was to investigate the possibility of decreasing the preflight surface interval by breathing oxygen at the surface.

Life is full of coincidence?

The contributors for this issue are world renowned industry professional Bret Gilliam, writer and technologist Michael Menduno, technical instructor (and deepest bride!) Sandra Yoshida and cave explorer and instructor trainer Thomas Feiden. Get to know more about them by reading their bio at [www.techdivingmag.com/contributors.html](http://www.techdivingmag.com/contributors.html).

Tech Diving Mag is based on contribution, so you're always welcome to volunteer a piece or some photos. The submission guidelines could be found at [www.techdivingmag.com/guidelines.html](http://www.techdivingmag.com/guidelines.html). This is very much your magazine, so if you want to share some views, just drop a line to [asser@techdivingmag.com](mailto:asser@techdivingmag.com). And please subscribe to the newsletter at [www.techdivingmag.com/communicate.html](http://www.techdivingmag.com/communicate.html) to be notified when new issues are available for download.



Asser Salama  
Editor, Tech Diving Mag

# CCR Decompression

By Asser Salama

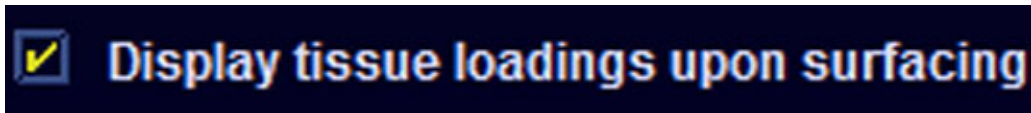


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A Closed Circuit Rebreather (CCR) is a breathing apparatus that filters out the carbon dioxide in the exhaled breath. The rest of the exhaled breath, containing some oxygen and some inert gas (probably a valuable amount of helium), gets recycled rather than discharged in the water.

Throughout the dive, the CCR injects oxygen to the breathing loop not only to compensate for the metabolized amount, but also to keep a constant ppO2 (called set point). It also adds bottom mix (called diluent) to the loop to hold the set point from shooting up, especially on the ascent.

Now let's compare a 20 minute dive to 100 meters (330 feet) using CCR and OC. On CCR, I'd use Trimix (10, 60) as diluent and a set point of 1.2 atm. On OC, I'd use Trimix (20, 25) as travel gas and lean deco mix, Trimix (12, 53) as bottom mix, EAN40 and EAN80 for accelerated decompression. Using Bühlmann's ZH-L16B model with gradient factors 30/85, the total run time of the CCR dive is 158 minutes and the CNS is 73.5%. The OC dive's total run time is 121 minutes and the CNS is 67.8%.



**New feature in Ultimate Planner version 1.44**

Using Ultimate Planner's [Display tissue loadings upon surfacing] option, the loadings directly after the dive would be as follows:

Cpt #	CCR			OC		
	N2 Load	He Load	Total	N2 Load	He Load	Total
1	1.096m	1.968m	3.064m	3.056m	0.0m	3.056m
2	1.128m	2.101m	3.229m	3.152m	0.0m	3.152m
3	1.204m	2.184m	3.388m	3.66m	0.0m	3.66m
4	1.481m	2.237m	3.718m	4.879m	0.004m	4.883m
5	2.159m	2.31m	4.469m	6.668m	0.072m	6.74m
6	3.159m	2.533m	5.692m	8.335m	0.398m	8.733m
7	4.304m	3.171m	7.475m	9.534m	1.219m	10.753m
8	5.349m	4.353m	9.702m	10.108m	2.44m	12.548m
9	6.149m	5.749m	11.898m	10.161m	3.6m	13.761m
10	6.625m	6.664m	13.289m	9.954m	4.217m	14.171m
11	6.908m	7.053m	13.96m	9.688m	4.406m	14.095m
12	7.104m	7.05m	14.154m	9.395m	4.322m	13.717m
13	7.239m	6.719m	13.957m	9.106m	4.039m	13.145m
14	7.33m	6.149m	13.479m	8.836m	3.631m	12.466m
15	7.39m	5.451m	12.841m	8.598m	3.169m	11.766m
16	7.43m	4.713m	12.143m	8.395m	2.704m	11.099m

**Using Ultimate Planner's [Display tissue loadings upon surfacing] option to compare OC to CCR**

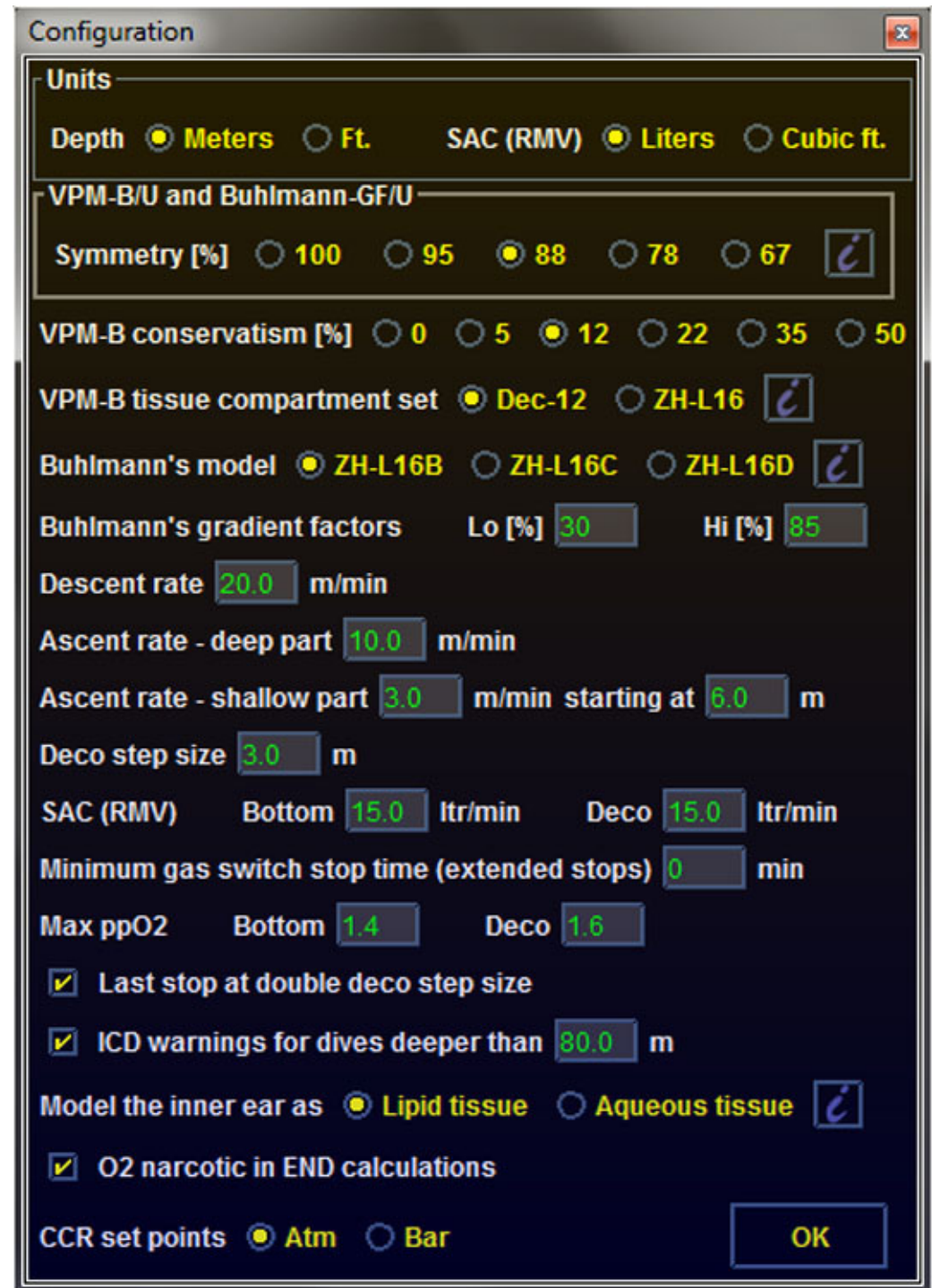
We see that, for the OC diver, the N2 loadings are always higher than the He loadings, and that's for all the compartments. This does not hold true for the CCR diver. That's not unusual, as the OC diver switched to EAN40 (zero percent helium mix) at 30 meters (100 feet), whereas the CCR diver continued breathing a mix containing helium up till surfacing. As the diluent the CCR diver was using is Trimix (10, 60), the ratio of nitrogen to helium was established at 30:60 (1:2) throughout the dive. The nitrogen loadings of the OC diver are always higher than those of the CCR diver, whereas the helium loadings of the CCR diver are always higher than those of the OC diver.

Moreover, although the total run time of the CCR dive is 37 minutes more than that of the OC dive, the total tissue loadings are not always less (higher values shaded). The good news is that on the surface interval, the compartments of the CCR diver will tend to off-gas faster than those of the OC diver, as the inspired helium content at the surface is practically zero. The helium gradient will be maximized at the surface and the higher helium loadings on the CCR diver will be eliminated faster than the higher nitrogen loadings on the OC diver. The fact that helium is a fast gas will only decrease its elimination time at the surface.

Concerning ICD, the problem persists on the OC dive. Switching from the bottom mix, which is Trimix (12, 53), to Trimix (20, 25) on the ascent holds some risk. The problem did not exist on CCR, as the CCR diver neither switched gases nor added OC segments to the dive.

In case a CCR problem occurs, the diver bails out. In this situation, the diver usually uses the diluent as an OC gas for the deeper part of the ascent, before switching to the OC bailout tanks. There's always an urge to end up this deeper part of the ascent as soon as possible, as the diluent's gas volume is pretty limited. In this particular situation, a lot of CCR divers prefer using raw Bühlmann ZH-L16 (without deep stops or gradient factors), as it produces shallower stops. In order not to push the model to the edge of its limits, a safety margin to this 'fast bailout' approach should be added. Asymmetric gas kinetics could be used here. This feature is implemented in Ultimate Planner (ZH-L16/U model variation), and it would extend the shallow stops advised by ZH-L16 without introducing deeper ones.

**Right: Ultimate Planner's [Configuration] window, showing the /U model variations.**



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Optional extended gas switch stops

Comes in four different themes  
(including high contrast)

U  
P  
D  
A  
T  
E  
D

No-Fly Time Accelerator

O2[%] in the surface rich mix (99 or 100 for pure O2) 0

Use only pure O2 or Nitrox mixes (not Trimix or Heliox)

Minutes of breathing the rich mix on the surface 0

Minutes of breathing normal air before applying the rich mix 0

Accelerate

Breathing Mix Calculator

Depth 90.0 m ppO2 1.4 EAD/END 40.0 m

O2 Narcotic

O2 [%] 14.0 He [%] 50.0

Calculate



Altitude Settings

Dive altitude 0.0 m

Hours at altitude 4.0

Diver acclimatized at altitude

Starting acclimatized altitude 300.0 m

Travel hours 8.0 OK

== Probably the most advanced / user  
friendly decompression software on  
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Instructor Trainer (TDI, SSI, PADI)



# Getting to The Bottom of Zacatón

Text by Michael Menduno

Photos & illustrations courtesy of Jim Bowden

In April 1994, Sheck Exley and Jim Bowden working under the auspices of Bowden's organization Proyecto de Buceo Espeleologico Mexico y America Central, made an attempt to bottom out Zacatón, a cenote located in Northeastern Mexico. The two decided to dive on independent descent lines so as not to interfere with each other's dive.

The attempt ended tragically when Exley failed to surface, see ZACATON: The Tragic Death of Sheck Exley, *Tech Diving Mag* Issue 12. A gas shortage forced Bowden to turn his dive at 925 ffw/276 mfw, making him the first diver to reach 900 feet using scuba, but denying him from glimpsing Zacatón's floor. Bowden suffered DCS upon surfacing and was treated onsite.

Here in this original interview reprinted from *aquaCORPS Journal* #11 XPLOERS, August, 1995, Bowden discusses his motivation to make another attempt to get to the bottom of Zacatón.

**People are going to read this story and think, oh my God, these people are crazy. I mean, Exley died doing this dive, Bowden got hurt, and now he's going to go back and try it again. How do you respond to them? Is this a suicide wish?**

There is no way you can explain it. So I don't try. What's the old saying: if you have to ask, you can't afford it. No, I don't have a death wish. I don't really feel there is a career in deep diving, either. But I want to do it, and I'm working day and night to insure my safety as much as I can, and to insure that I can have a bail-out so that I can abort if it doesn't work. I'm firmly convinced that if I had had the volumes [of gas] last time, then I would have done it. Because my dive went very, very well.

**All to bottom out Zacatón?**

I've spent a decade and a half exploring caves. That's my passion, all of every day. And a cave explorer wants to see the end of a cave. This one just happens to be vertical. And I think I can do it. If at any time I feel I can't, well then, I'll move on. You're only as good as your last

fight anyway. There are other systems I want to get into. But this is exciting, and I would not trade the experience.

I also don't feel that this is the most significant thing I've accomplished either. I'm very proud of the Belize project and that was two solid years of living there, and my deepest dive was 46 f/14 m. I think it had every bit the dangers and excitement and drama; a lot more cerebral stuff and not as much time at the computer.

**What aspect of the dive are you most afraid of, or that worries you most?**

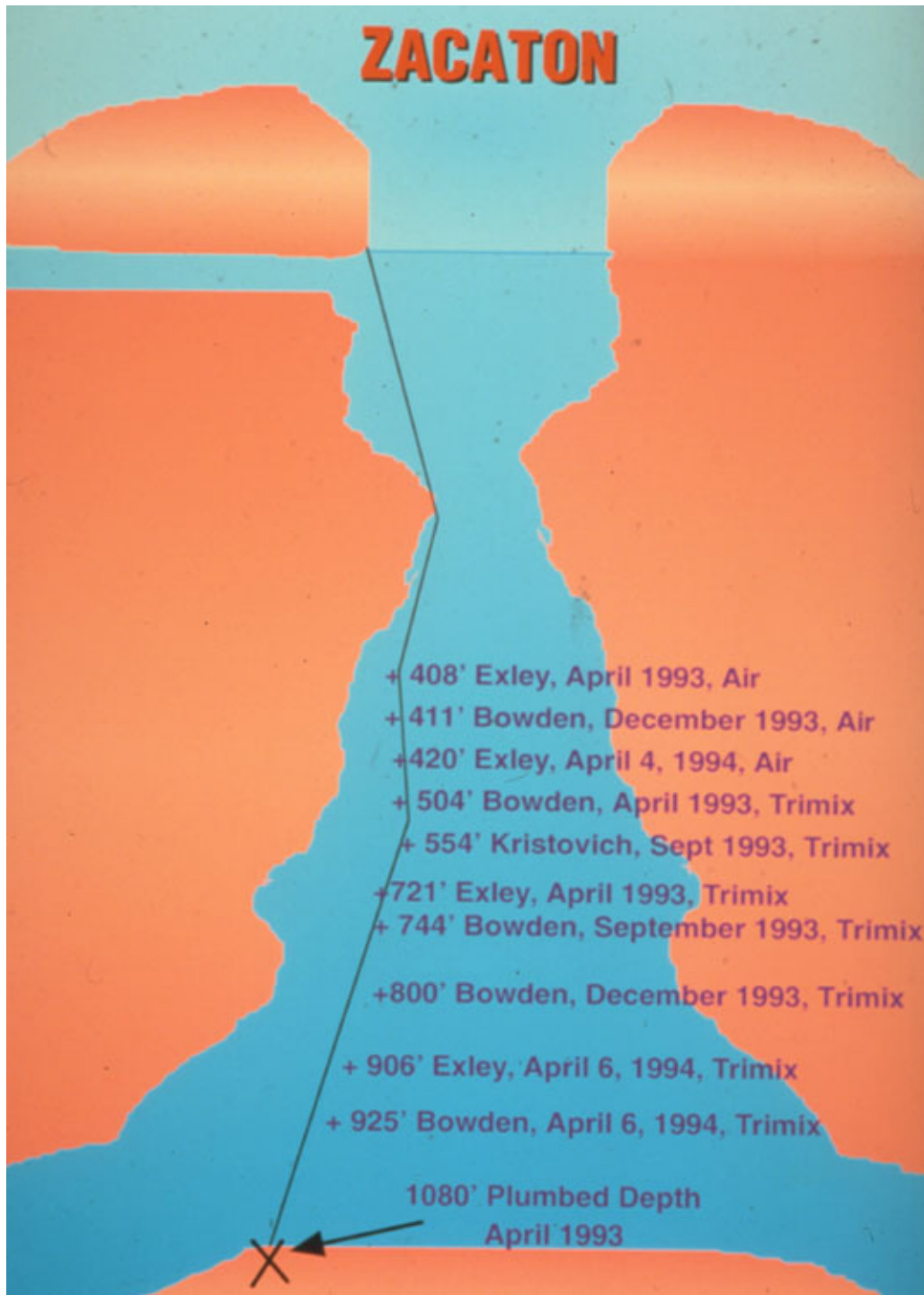
Having a bad day. Just having a bad day. I don't think you can afford a bad day. That was Sheck's reservation, too. When we first talked about doing this, and honestly, Sheck was the one who encouraged me to seek sponsorships 'cause he knew my financial situation. And to seek sponsorship you have to seek exposure. Sponsors don't do it out of the goodness of their hearts.

We also both agreed that we've seen the camera kill people. Sheck was too mature to fold to that, and that was not the case there. But, say, this next time, I'm really considering who I'm going to have there, or if I'm going to have anybody there. Like NBC; they want to be there next time from what I hear. Can you imagine going down there and having that little gut feeling. You've had that haven't you? Haven't you pulled a dive for just nothing specific, it just didn't seem right? It's better you do that with few media guys there.

**Sheck wrote about the pressure of media in his book "Caverns Measureless To Man". Do you think we reached the limits of scuba?**

I think we are approaching it. Though some people would say that it's already way passed. I don't know and I don't particularly care. When Sheck broke Hassenmayer's record (656 ffw/195 mfw), nobody gave him a rat's ass chance of succeeding. But he did, and then he went back and broke his own record.





Anything I would say in answer to your original question is subject to people wondering if that's what I really feel. But I've already got the record. I don't need to go break the record. And even if I break my own record, which I will with a successful dive—I'm confident will be successful—I really believe somebody will break it. And, yes, I think some people will die. Do I sound invincible. No, I'm not invincible, and no, I don't have a death wish. I'm going to start a family when I'm eighty.

If I do reach the bottom, it'll be the result of several months working on the perfect set, on correcting the mistakes I made last time. Then, if I don't feel that I can, I won't do it. I really don't have anything to prove. I would just like to see the bottom of Zacatón, like somebody would like to see, I don't know, the dark side of the moon or whatever. I would just like to see it. It's a personal thing. And if that's a shallow desire by other people's standards, well, so be it.

\*\*\*\*\*

Postscript: Bowden made two more sub 500 f/152 m dives in preparation for the 'big' dive and was forced to abort numerous attempts due to equipment problems with a decompression habitat and conditions at Zacatón.

Eventually, a friend, fellow cave explorer Dr. Bill Stone suggested to Bowden that, "Mother Nature was trying to tell him something". Bowden eventually gave up on Zacatón and turned his attention to other exploration projects notably the "Blue Hole Expeditionary Project" (2002) in Ples Masalai, Papua New Guinea (PNG) and the "Pozzo del Merro 2007, MS Project" near Rome, Italy.





# A Wedding With A Lot of Atmosphere

By Sandra Yoshida

Hiroyuki Yoshida and Sandra Smith united in marriage in one of the least decorated wedding venues on earth but still managed to have more atmosphere than the typical wedding – in fact they managed fourteen times the amount of an average wedding. Their way to achieve this was simple – marry at 130 meters (427 feet) underwater where the ambient pressure is fourteen times that as on the surface.

Getting this much “atmosphere” seems easy, yet in reality it was one of the hardest and most challenging wedding ceremonies a couple could expect to plan. Six hard months of training, brainstorming and teamwork went into making the wedding come off successfully. All details from finding a qualified minister to ring and vow exchanges underwater in a cave environment had to be considered carefully. The wedding couple also invested in top of the line equipment specialized for extreme depths and exposure.

With all the preparations fulfilled and endless hours of build-up dives and skill training behind Hiro and Sandy, the day of holy matrimony finally arrived (September 30, 2013). So just how did this wedding couple pull off such an incredible wedding despite all the pressure?

Firstly, this one of a kind wedding would have never happened without an experienced dive team and several supporters from the dive industry. After all, diving to 130 meters (427 feet) anywhere in the world is no small feat, not to mention doing it in a cave environment.

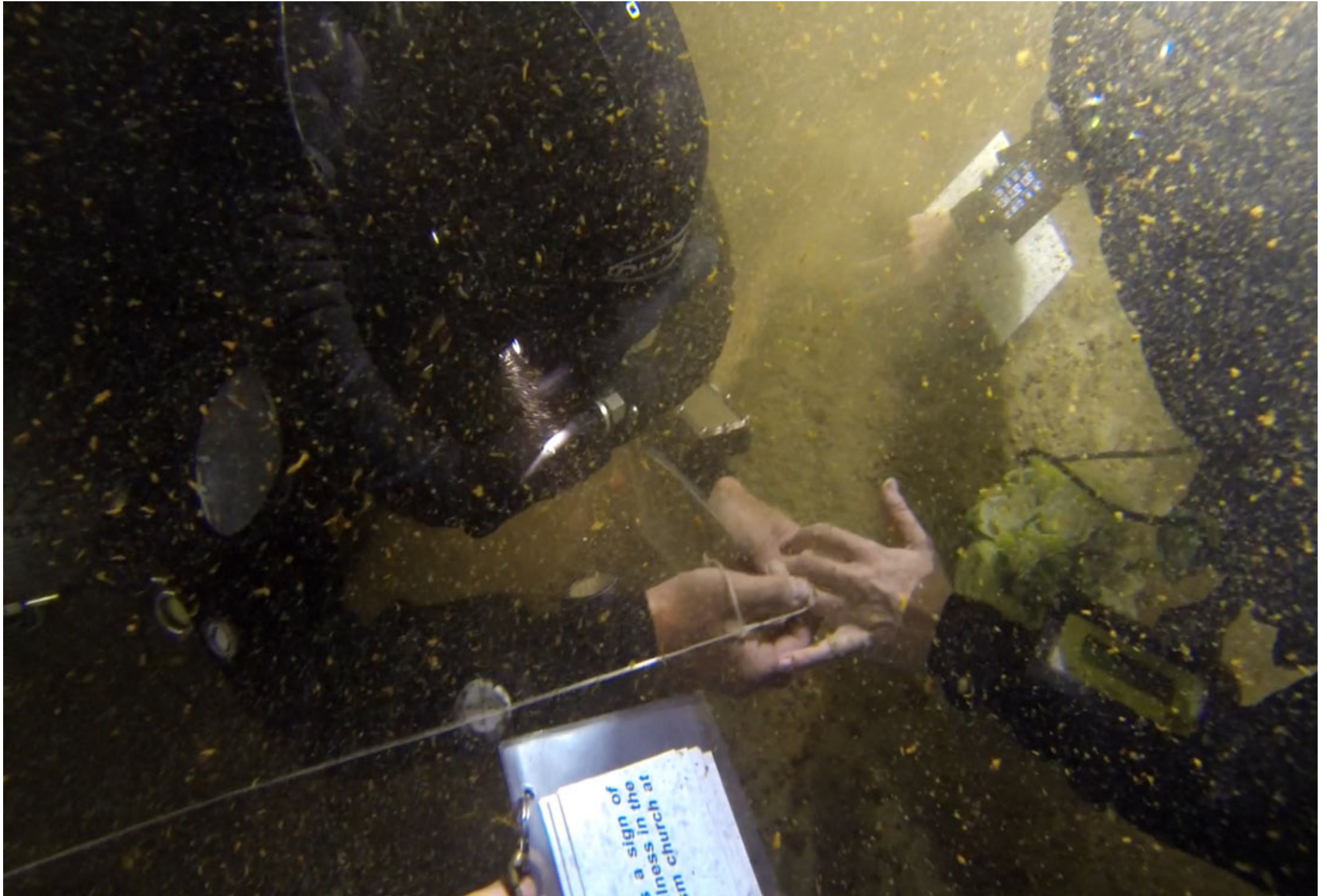
In order to ensure sound planning, Hiro and Sandy turned to Ben Reymenants of [Blue Label Diving](#) for dive logistics and training, and Pekka Hartikainen for support and help in planning. Additionally, Charlie Hosner, a full cave CCR diver from the USA, joined in to assist with filming and witnessing the marriage. The wedding party of five was complete and now ready to tackle other logistical obstacles.

One of the most difficult parts of the whole dive was actually making a wedding ceremony happen officially underwater. For all of the team members, diving came more naturally than knowing how to proceed during a wedding. Ben and the wedding couple researched extensively on the Internet on what to say and how to proceed during a ceremony. Hiro and Sandy wrote unique theme related vows to say underwater through their CCR loops in a very high-pitched voice due to all the helium. Ben led the ceremony as their priest making sure all the proper vows were recited and rings exchanged.

The ring exchange also required special consideration of its own. At 130 meters (427 feet) in the Song Hong cave there was not much bottom to speak of, and the parts of rock that existed were covered in inches of silt. One nervous handshake or a slip of the fingers and the real wedding rings would be lost for eternity.

The platinum wedding rings therefore needed extra security measures that Pekka assisted the couple in tying together. Both rings were knotted into a safety spool clipped onto Pekka for safe transportation down to 130 meters (427 feet). Once there, Pekka passed the end of the line off to Hiro, unwinding Sandy’s ring tied into it. The ring slid over her finger as she recited her vows to Hiro. She then pulled the line further out from the spool until Hiro’s ring appeared, placed it on his finger, and finally Pekka cut the line free from both rings.

The most exciting part at the bottom phase was the kiss. Every wedding ceremony requires the groom to kiss the bride, so there could be no exception even though Hiro and Sandy were 130 meters (427 feet) underwater in a cave breathing off closed circuit rebreathers. After reciting vows and exchanging rings, Ben directed Hiro to kiss the bride. Loops were closed and thrown upwards and the couple turned heads so their lips could meet. Although it was not the most elegant



looking kiss, it surely expressed the couple's love to each other and diving.

To finish things off, a laminated wedding certificate appeared and signatures from the wedding couple and the two witnesses were collected. Hiro and Sandy's marriage was now officially recorded and documented.

Another big challenge to the group was getting all these phases of the ceremony to happen within a very short time frame. Using [Ultimate Planner](#), the team could calculate the bottom time, decompression requirements and bailout gas needs for going to 130 meters (427 feet). They agreed upon a turn time of 17 minutes, which included the descent time. Team coordination and communication were key in getting to depth fast.

During the actual dive, the team took 8 minutes to descend upon the alter lying on the side of the cave at 130 meters (427 feet). All the components of the ceremony ended up taking just over 7 minutes and the team was able to leave the bottom ahead of schedule at 15 minutes. Off-gassing began at 108 meters (354 feet) and the first decompression stop happened at 99 meters (325 feet). The total time to surface came in at just under 190 minutes with about 300 OTUs and a whopping 92% CNS. The plan for the wedding dive could not have been executed better.

On the way up, the team of five found their support divers, Arndt Schmidt and Moto Orita, waiting at 60 meters (197 feet) armed with cameras and carrying additional gas for the team. Celebrations began again as high fives and handshakes went amongst the group. Arndt and Moto stayed with the deep team double-checking the dive was going according to plan as they continued through their stops into the

shallows.

About 100 minutes into the dive, Hiro and Sandy reached the bottom platform of the underwater habitat installed in Song Hong Lake at 12 meters (40 feet). By 9 meters (30 feet) the couple entered into the habitat, equipped with its own scrubber and pumped full of pure oxygen, and for the first time since saying "I do" could speak normally to each other. The rest of the dive team popped in one by one to offer congratulations to the newlyweds.

Finally, after 190 minutes underwater, Hiroyuki and Sandra broke the surface of Song Hong Lake as Mr. and Mrs. Yoshida and were greeted by cheers of family, friends and even the local Thai community. They climbed the banks of the lake as they were rained upon with rice. Hand in hand and smiling, not only because they accomplished such a dive, but knowing they entered into a new phase of their life together.







# Cave Exploration in Cuba

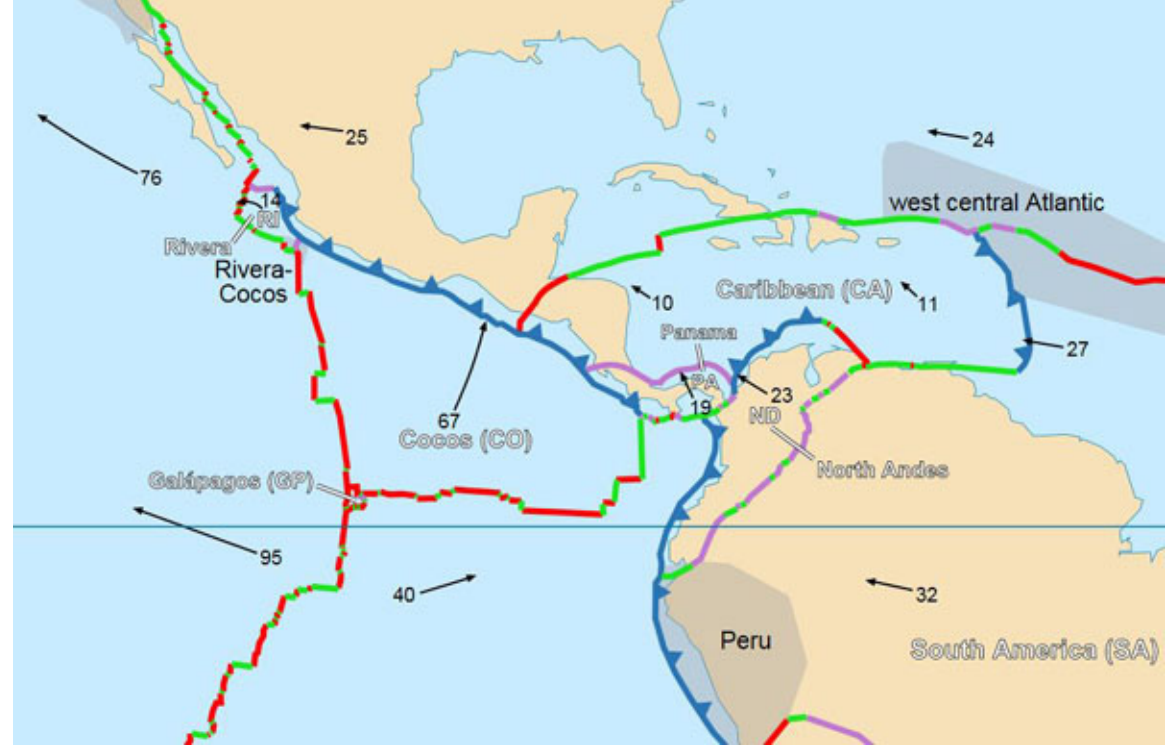
By Thomas Feiden



Similar to Florida, the coastal limestone plates of Cuba are only 30 million years old, pretty young compared to those of the Yucatan peninsula, which are more than 60 million years old.

Subdivisions of the Quaternary System			
System	Series	Stage	Age (Ma)
Quaternary	Holocene		0-0.0117
		Pleistocene	Tarantian
	Ionian		0.126-0.781
	Calabrian		0.781-1.806
	Gelasian		1.806-2.588
	Neogene	Pliocene	Piacenzian

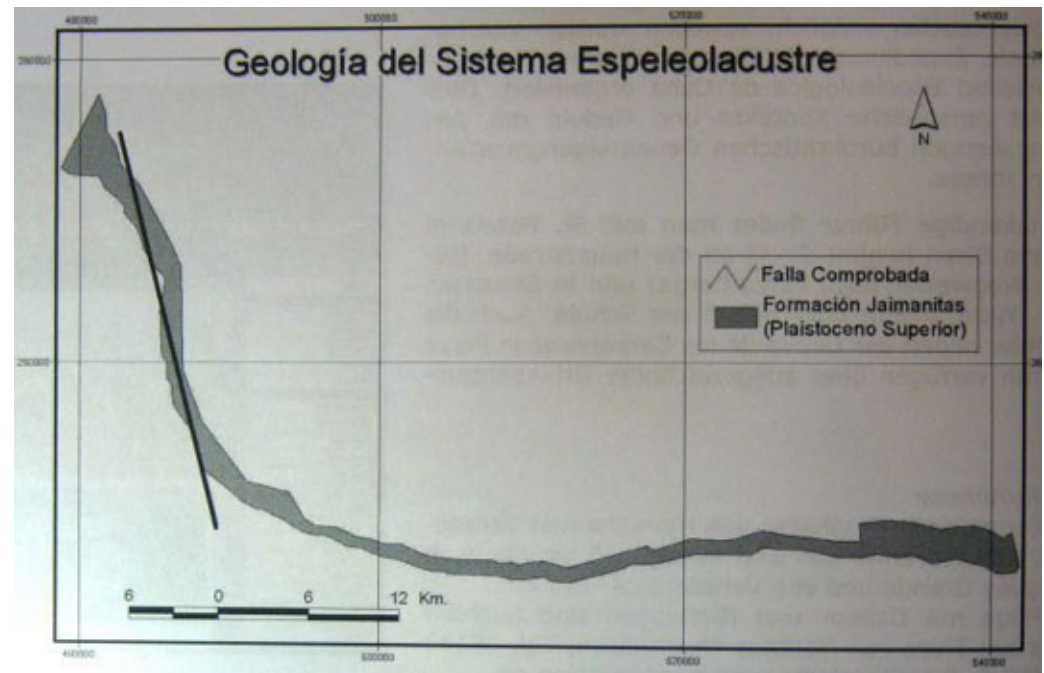
In the beginning of the Miocene (23-5Ma), six islands (Greater Antilles) began to form. In the Quaternary (2.5Ma-now), due to tectonic activity, large areas in Cuba arose. As a result of the drift of tectonic plates, which is still going on as the next picture shows, thousands of anchialine caves began to form. Anchialine denotes a subterranean connection to the ocean.



Some of them, like those in the Bay of Pigs area, are fracture cracks like those on Andros Island (Palmer and Williams 1984), while the caves in the west are Aston type collapses similar to the sinkholes of Florida or the Bahamas.

Access to the caves in the west, in the province of Pinar del Rio, is very difficult because of a lack of infrastructure. One cannot rent tanks or get them filled here. Also, back in 2000, four Cuban cave divers perished in Maria la Gorda leading to a diving ban, which is still in effect today. The ban is enforced by the military and police, so caves like Pozo Azul or Laguna Valle de San Juan are off limits.

In the province of Matanzas (Bay of Pigs) you find the Sistema Espeleolacustre de Zapata. As shown on the following map, it is a system about 75 km long, parallel to the coast from Playa Larga to Bahía de Cienfuegos.

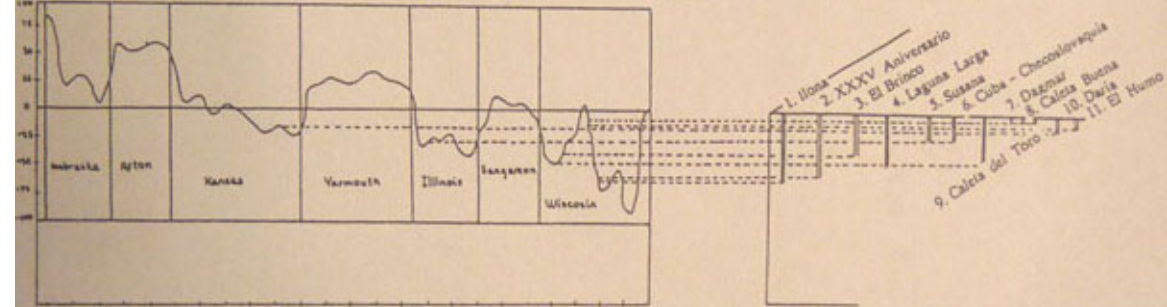


Like pearls on a string, you find more than 100 cenotes less than 2 km from the coastline. A lot of them are flooded and connected. Caused by the tectonic movement, huge cracks formed caves like Cuevas de los Carboneros, Ilona and 35 Aniversario, the deepest flooded caves in Cuba, up to 70 m deep. They are typically narrow cracks extending several hundred meters, sometimes in opposite directions from the entrance pool. All of them have at least one halocline; some of them a tannic layer. Water temperature ranges from 25°C to 28°C, and visibility usually exceeds 20 m. Like the limestone caves of the Bahamas or the peninsula of Yucatan, the caves in this system are anchialine.

The following tables show when those caves were formed in the different periods of the last ice ages.

Approximate Ending (years ago)	North American Stages	Northern European Stages	Central European Stages
10,000	Late Wisconsin	Weichselian	Wurm
<i>Interstadials</i>	Mid Wisconsin	Eemian	R-W
45,000	Early Wisconsin	Saalian	Riss
<i>Interglacial</i>	Sangomonian	Holsteinian	M-R
125,000	Illinoian	Elsterian	Mindel
<i>Interglacial</i>	Yarmouth	Cromerian	G-M
690,000	Kansan	Menapian	Gunz
<i>Interglacial</i>	Aftonian	Waalian	D-G
1,600,000	Nebraskan	Eburonian	Danube

(source - Grolier Encyclopedia, Grolier Electronic Publishing Inc. 1993)



In this region you can find most of the dive-able caves and the infrastructure is the best in Cuba, especially for cave divers. Also, from here it is easy to reach the caves of the Bolondron, which is only 80 km away, with highly decorated caves like Cenote del Cocodrilo or the Chicharrones, the longest water-filled cave in Cuba. Nevertheless it's not allowed to dive on your own in Cuba, even in the Ocean. Especially in caves, you need a Cuban instructor to accompany you. It would be very difficult to find the caves at all, even though they are sometimes less the 500 m from the main road.

There is one more region where caves can be found, the province Holguin. Here a different type of cave evolved. A good example is Tanque Azul. According to Echteringer et al, Tanque Azul, like other caves close to Gibara, is an extensive and ramified cave system located on the coastal plain, which shows intensive and widespread exo- and endo-karstification. The origins of Tanque Azul, El Baga, Los Cristalitos and others can be divided into three principal speleogenetic stages. First, the cave formed during the middle of the Quarternary as a result of tectonic activities, which led to the onset of underground drainage and then evolved under phreatic conditions as a solution cave. Subsequently the system became dry because of an eustatic regression (sea level change), which allowed the secondary dripstone formations to begin to grow, especially during the Illinoian and Wisconsin glaciation, when sea level dropped dozens of meters. Finally the cave was inundated again to its approximate present-day level during the global temperature and sea level rise at the beginning of the Holocene.



This process led to richly decorated caves with different kinds of speleothems. The cave is connected to the sea by a system of cracks and fissures, and the water level reflects the changing tidal levels of the sea.

Looking at the history of cave diving in Cuba, one soon finds out that it's almost all about research and exploration. Beginning in 1968, Cuban divers under Nunez Jimenez discovered the Laguna de Valle de San Juan and dove the cavern to the end of the daylight area. In 1973, other Cuban divers began to explore Casimba El Brinco, and in 1980, the first international expedition "Cuba 80" was conducted under the lead of the Czech Professor Vladimir Panos. At that time, the Czechs brought all the equipment, including military trucks, by ship to Cuba. They began to explore the Sistema Espeleolacustre de Zapata, and started mapping and collecting scientific data. Later the Cuban "Grupo Espeleologico Martel" continued this work and published the results in 1990. Jeff Bozanic and Jill Yager researched the hydrology and searched for cave critters in 1992 and 1994.

The Czech group "Hranicki Kras" began to explore caves in the province Holguin in 1982. They discovered Cristalito de Papaya and the Caverna de Tanque Azul. During the Expedition "Cubano-Checoslovaquia" in 1986 they began mapping Tanque Azul. From 1997 forward, the Austrian Professor Hannes Echteringer continued their work. He explored the plain of Gibara and, working with German divers of the HFGOK Kirchheim, added line out to 1040 m and completed the map in 2002.

In 2010, Peter Dietz contacted me and asked if I wanted to be a member of the new exploration team. At that time he had already visited Cuba a couple of times, had dived a lot of the known caves and found several new ones as well. On his last trip he happened

to make contact with some Cuban speleologists and they suggested planning a new expedition to the caves of Gibara, the "Expedición Cubano-Alemania-Caletones-2011." It took us more than a year to get all the necessary permits from the Sociedad Espeleológica de Cuba, the Comité Espeleológico de Holguin and, most important, the Ministerio de Ciencia, Tecnología y Medio Ambiente. But we finally made it.

Unfortunately the situation hadn't improved a lot since the Czechs were there decades ago. The speleologists did what they could, but the promised support from the government (like a 4-wheel truck and an on-site compressor) were not available. We had to reorganize a couple of things, solve some equipment problems, like getting tanks from a facility 800 km away, and spend a full day at the immigration office to get our working visa; but then we were ready to go.

Later in 2011, the "Grupo Cársico" was established; organized in the Seccion National de Espeleobuceo de la Sociedad Espeologica de Cuba (SNE-SEC), the only subdivision of the Cuban Speleological Society for cave diving (comparable to the NSS-CDS). We became members of the group and, since then, have organized three more expeditions together. Here is a short summary of what we did during the last three years:

On the first trip we had to share our equipment with our fellow Cuban cave divers because they had neither access nor money to get the necessary equipment. Although the circumstances were not perfect, we managed to add line in El Baga in both directions, but the cave was still going without an end in sight. From the data we collected we reprinted the old map of El Baga and added new sections.



In Tanque Azul we tried to find a connection to other small cenotes we saw in the jungle on the way from the cave to the ocean. Considering the tidal influence on the level of the water in the cave, its temporal distortion to the sea level and the current we noticed in the cave, we felt there must be a connection, possibly dive-able even to the ocean. But the cave is a maze and we couldn't find it. Here in Tanque Azul, as well as in El Baga, we collected stalagmites and, with the permission of the local authorities, took them to the university in Heidelberg to Professor Augusto Mangini for further examination and dating. In addition, we dived a couple of known caves, repaired old line and installed new line for further exploration.

Back home I thought about the situation of our friends in Cuba and their lack of necessary equipment. Therefore, I tried to get donations from friends here in Europe, as well as in the US. The first part of the donated equipment has already been shipped to Cuba, but more is still on its way. In Florida a very good friend of mine, Wayne Kinard, owner of Amigo's Dive Center, collected a lot of equipment which still needs to be taken to Cuba.

Our preparations for the next trip included a push dive in Chicharrones. There's a nicely decorated dry section you have to pass through before reaching the pool to the submerged section. From there you descend to the horizontal part of the cave at a depth of 30 m. You reach a restriction 600 m from the entrance and no one knows what's beyond it. To dive this distance at that depth requires a lot of gas (air) and oxygen for decompression, but it's really complicated to get oxygen at all and the price is high... To make it easier, we took Peter's Bonex scooter to Cuba but, unfortunately, he got really sick and was not able to dive the first week of our trip. I dove some cave in the Bay of Pigs; even managed to lay some line in Marivel, a new cave, but I had to leave for Holguin without Peter. In Holguin, the other members of the

Grupo Cársico had already finished their preparations for "Expedición Cumpleano y Salado."

Before the real fun of exploration began we collected water samples in a couple of caves, as a lot of villages in that region are still depending on trucks with tanks to bring them drinking water on a daily basis. So by examining water samples, the officials are trying to find drinking water in the caves, which would solve a lot of problems. We also shot cave pictures for an exhibition in a museum in Gibara, and after that we went for the real adventure.

Our first destination was Salado. Two farmers had shown a pool to Arturo, president of Grupo Cársico a couple of months prior to our expedition. There were two pools at the bottom of a dry cave. To reach them we had to take a 4-wheel Toyota to the farmer's place. From there we loaded the gear on horses to reach the cave. After more than three hours we reached the entrance of the cave, but had to carry the gear on our backs for the last 100 m. Now, the next task was to get the equipment down the dry part of the cave, about 40 m, nearly vertical, to the two pools. Previously, the team had tried to pass a major restriction right at the beginning of the cave, but failed. Now we were back for a second attempt. Arturo and I managed to get through the restriction and had to pass a narrow sidemount gallery for quite a distance before a big tunnel opened, no end in sight, shortly before we reached our planned gas limit.

The next push was Cumpleano. Members of the group had located this new cave in November 2011, but only dived it once. Cumpleano is a beautifully decorated jewel. After descending a shaft you reach a huge room with all kinds of speleothems: stalactites, columns, curtains, you name it, it's there. In the eastern part of this room you find a small passage to another, smaller but also highly decorated

room; maximum depth 45 m, visibility endless, temperature 26°C.

Another thing we were looking for here were troglobites, animals that live entirely in the dark. Three different types of troglobites can be found in Cuba:

-Remipedia, a class of blind crustaceans about 10 to 40mm long which feed primarily on detritus or on living organisms. They were first found in the Bahamas by Jill Yager in 1981; after that in the peninsula of Yucatan as well. In Cuba they can be found in two caves, Susanna and Cueva de los Carboneros (*Spelaeocia cubensis*).

-Anopsilana, achialine troglobitic, also crustaceans like shrimp or crabs. The two species found in Cuba are *Anopsilana magna* and *Anopsilana cubensis* and they only live in Casimba El Brinco.

-Lucifuga, a predator, though it's a blind cavefish, Viviparous brotulas. Only one genus can be found on the Bahamas and one on Galapagos. In Cuba there are: *Lucifuga subterraneous*, *L- dentatus*, *L-simile*, *L-teresinarum* and *L-n.sp.* We saw a couple, but on the dive after we left our friend and team member José, we found a new genus: *Lucifuga corella verona!*

Later back in Germany, a comparison with old Czech data revealed that *Cumpleanos* had been discovered by the Czechs back in 1989. They named it after their hometown: "Olomouc".

The following expeditions again were dedicated to taking water samples, photo-documenting and mapping the new systems; but our main focus, now, was on finding new caves in La Gegira and Al Hobal. We happened to find Cueva Del Macio, another beautiful cave. Again the Czechs were there before us in 1989, but what we saw was breathtaking; huge stalactites, columns and flowstones in different colors.

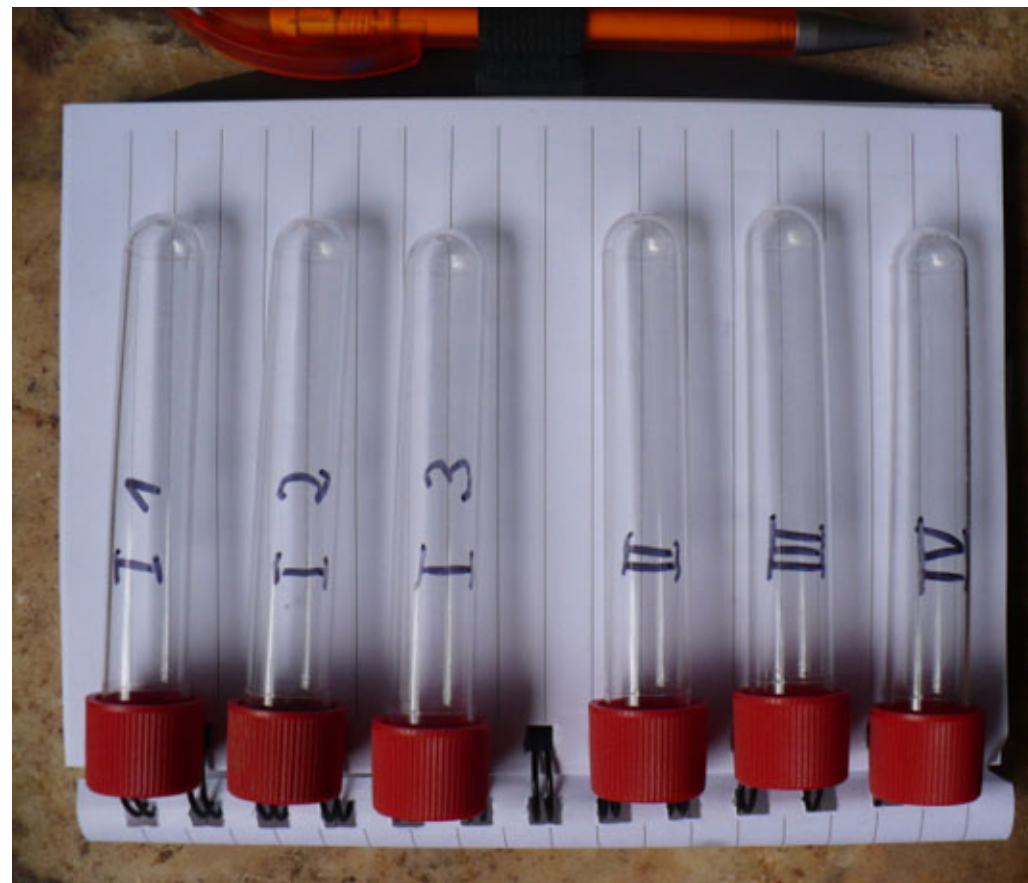




Lucifuga corella verona

We also saw a lot of peces ciegos, blind cavefish, maybe the next new genus for José. Our maximum depth was 54 m. The cave is going at the bottom of the shaft at the end of the cave, which opens up to a bedding plane. But for further exploration we need trimix, almost impossible to get in Cuba. Peter collected another stalactite, which is currently being examined in Heidelberg University.

Due to our good relationship with the local Speleologists, they took us to dry caves which had a pool, and farmers, who showed us different cave entrances they used as wells for the cattle or places where they almost broke through the roof of a sinkhole. It took us days to visit those spots far away in the woods; some of them looked promising, but didn't go. Others, like El Regao, El Fructuoso, Cueva de los Platos or Cueva sin Nombre did go - virgin cave and each of them worth the effort.



#### References:

- Bozanic, Jeff: Preliminary Investigations in Anchialine Caves
- Echteringer, Hannes: Caverna de Tanque Azul 2002
- Guarch, J. Corella, J. Echteringer, H.: Características espeleológicas del Karst de la región de Gibara
- Dietz, Peter: Höhlentauchführer Kuba 2013
- Felipe Poey Aloy: Peces ciegos







# Paul Humann

LIVEBOARD PIONEER,  
INNOVATIVE PUBLISHER  
AND FISH DETECTIVE

BY BRET GILLIAM

Paul Humann is the living embodiment of that old joke: “What do you call a thousand lawyers at the bottom of the ocean? – An awfully good start!” He had a perfectly normal and successful career going as an attorney in Kansas and chucked it all to – are you ready for this? – start the first liveboard dive vessel in the Caribbean. I can almost hear his poor mother wailing.

But the impetuous career switch led to even more success with the *Cayman Diver* and a long list of publishing projects that followed. His talent as an underwater photographer and his zeal for educating divers about the marine life species they encountered led to a nice anthology of articles and images printed in a slew of diving magazines from the 1970s forward. Eventually, he was serendipitously introduced to Ned Deloach through a period of co-editing *Ocean Realm* magazine. The two men had a vision for a specialized publishing company that would take the subject of fish and coral ID books to an entirely new level. They hocked their homes to finance the first book for New World Publications and now the company enjoys status as the premier publishers of the best marine guidebooks available worldwide. Recently, they expanded their scope to include Stan Waterman’s superb book of autobiographical essays called *Sea Salt*. And this book of interviews further widens the net they have cast over diving subjects.

Paul is not just a supremely talented photographer and writer. He’s also an unrestrained truth-teller when it comes to the diving industry’s foibles and often absurdly ill-advised track record of blunders championed by a segment of archconservatives. He was a vocal champion of divers’ rights and one of the first to advocate codifying the practice of solo diving for qualified divers. He also endorsed dive computers, nitrox, applications of technical diving, and enlightened practices for modern liveboards. At times, his opinions have brought

him criticism, condemnation, and harsher reviews from the lunatic conservative fringe. But his vision helped bring all these, initially controversial practices, to the forefront and they are now mainstream.

I like to think of him as a prophet and first-class raconteur who never flinched from speaking his mind and sticking to his principles in spite of the fact that his outspoken wisdom would almost surely have gotten him burned as a witch in an earlier era.

Although our paths had crossed many times over the years, the first chance I had to really spend time with Paul was in 1992 when we were both co-hosting a group of divers aboard a liveboard in the Bahamas. I taught an advanced diver program and he delivered nightly lectures on marine life. We didn’t get one day into the trip before there was an incident.

I surfaced from a dive to find the ship’s divemaster/instructor in a total melt-down... pacing the deck, muttering oaths, threatening reprisals. We were off to a good start. I could only imagine that some diver had committed the cardinal sin of not wearing a snorkel or, god forbid, putting his mask on his forehead while waiting to get out of the water. These were definitely capital offenses in the early 1990s mentality that mandated all divers be treated as manifest idiots... incapable of having a coherent thought about their own diving practices.

I gingerly approached the young man in an attempt to discern the source of his angst. He was fresh out of “instructor college” and had a whopping 50-60 dives under his weight belt. But, by god, the kid was a diving professional; it said so right on his fancy diploma framed on the bulkhead. And he knew what divers should be doing and would not tolerate deviations from the ironclad rules posted right next to his diploma.

Circling him from a safe distance, I managed to get him to gasp out the transgression that had him so upset. “Mr. Gilliam, I can’t put up with this. Do you know that Mr. Humann is diving without a buddy? He’s all alone down there. By himself. Solo!”

I was shocked and said so... without a trace of revealing sardonic perspective. What would the kid have me do to such a deviant diver?

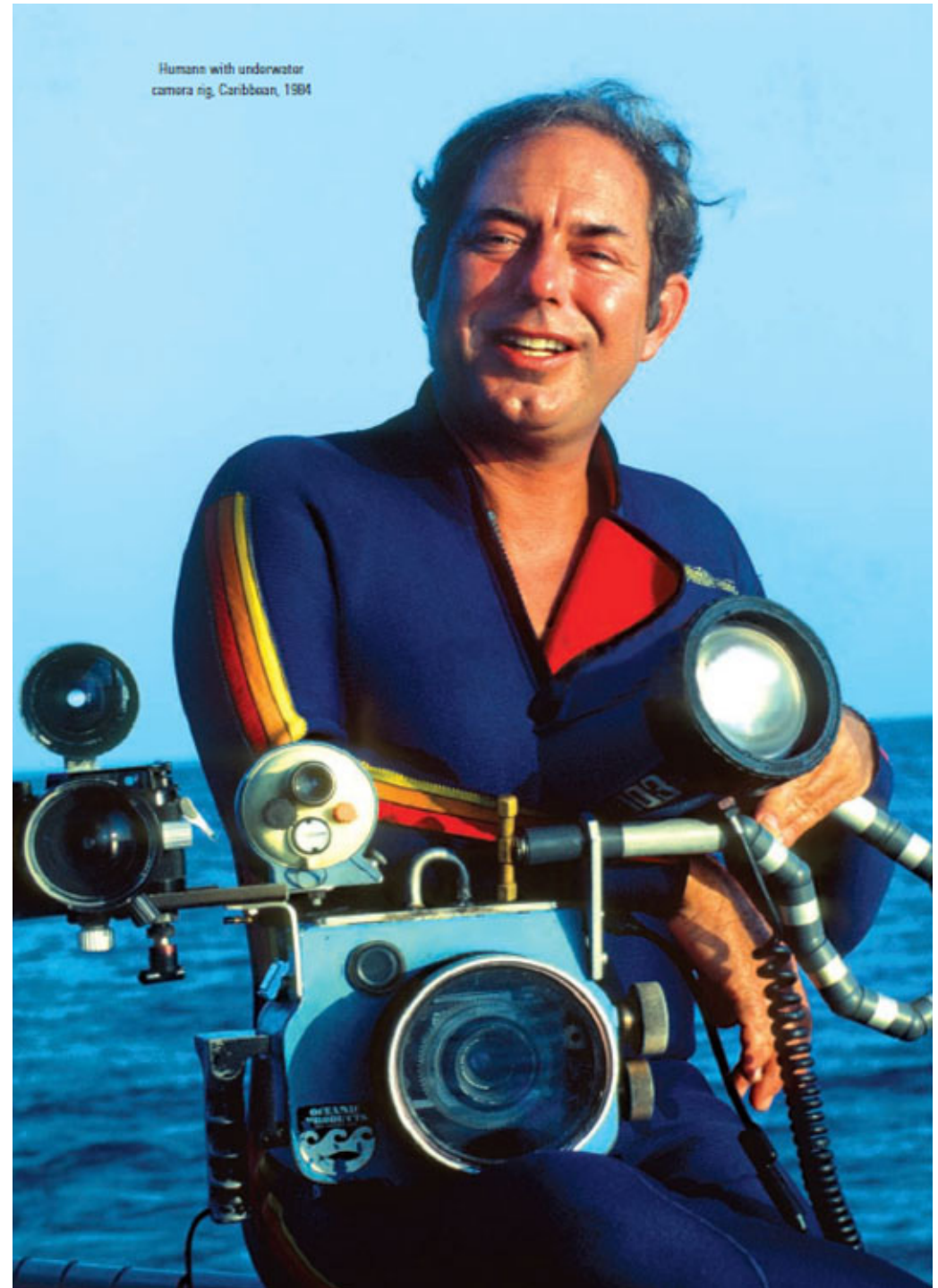
“Well, we just can’t have it. It’s against all safety rules. What happens if he runs out of air? Or has a problem? He’ll die!”

I gently explained that the likelihood of Mr. Humann experiencing a problem of any sort that he couldn’t stumble through somehow on his own was pretty unlikely. I mentioned that Mr. Humann had been doing this, professionally, for a while. Like about three decades. With over 8000 dives, most of them solo. And he’d be just fine.

“Oh, no! We can’t be responsible for such bad practices. I’ll have to suspend him from diving,” our hero trumpeted.

Meanwhile, the amused other divers and I could look over the rail and observe Paul blissfully absorbed with his camera at a coral head about 40 feet down. He was unaware of the furor he had created. I knew I had to act quickly to head off a scene when he finally surfaced and was confronted by diving’s equivalent of Dudley DoRight in a wet suit. (In all truth, I feared for the kid’s life. Paul was just as likely to snap his neck as listen to a reaming from a neophyte.)

I suggested a cunning plan. “Mr. Humann is an old curmudgeon who’s sort of set in his ways. How about if you be his buddy and don’t tell him? That way, you can look after him.”



The kid thought it over and decided that this was an intervention designed by Solomon himself and agreed. Meanwhile, the rest of the divers fled the dive deck, stifling snickers. They knew full well what was to come, I think.

The next dive began as Paul gathered his camera gear and slipped over the side to take up residence once again at a favorite coral head. The flash of his strobe confirmed that he was happily immersed once again in his photography and largely oblivious to any outside distractions. Our well-meaning instructor lunged into his own gear and splashed in after him, taking up position about 15 feet behind him. Now all was right again in the diving universe. Wrong!

After about an hour, the kid realized he was running critically low on air. I watched with growing amusement as he desperately tried to stretch his air with breath-holding. A few more frantic glances at his pressure gauge and he was off in a wild scramble of fin strokes and billowing exhaust bubbles. He arrived on the surface about a hundred feet from the boat and then began the “swim of shame” back to the ladder: he had failed to arrive back aboard with at least 750 psi remaining!

He'd also failed to protect the ancient geezer still happily firing away at his fishy subjects. He'd abandoned his buddy. We all gleefully pointed that out. About twenty times. It was a professional failing of biblical proportions. Paul took another 40 minutes or so and calmly swam back to change film. His protector had retreated to the sun deck still mulling over his abdication of duty (and how Mr. Humann could make a tank last so long). In the end, we convinced him to leave Paul alone. Literally. But we suggested that the instructor might want to work on his own self-sufficiency skills and maybe stick closer to the vessel himself where he could be more valuable helping divers out of

the water and handling cameras. It was a grim moment in the young instructor's career. Divers weren't supposed to behave like this. He'd bring this to the attention of his instructor agency when he got back to port.

Paul somehow managed to survive a week of unsupervised solo diving and got a bunch of great photographic images along the way. We never told him about the furor over his diving practices... until now. About seven years later, my company Scuba Diving International (SDI) came out with the first industry training agency program to certify divers in solo diving practices. Of course, the recipient of the first card (#00001) was Paul Humann.

**You were born in Nebraska and raised in Kansas, not exactly a breeding ground for divers. What sparked your initial interest?»**

I was always into water sports... on the swimming team in high school and college, lifeguard, Water Safety Instructor Trainer for the Red Cross, coached the swimming team at Washburn University as a part time job while in law school. Between that and *Sea Hunt* it was a natural extension of my water sports interests.

**Okay, I can understand that the Midwest has swimming pools, but what existed for scuba training back then?»** Nothing, other than driving to Missouri to dive in abandoned pit mines with surprisingly clear water or in murky lakes.

**Where was your first dive?»** In 1961 a college friend, who was a diver, and I took a summer vacation to the Keys. My first dive was solo, because being poor college students we only had enough money to rent one regulator. Outfitted with only a mask, fins, snorkel, tank with K-valve and regulator, my friend gave me “comprehensive” dive instructions: “Breathe normal, don't hold your breath, and when

it starts to suck hard – come up!” That first solo dive, which lasted 45 minutes before “sucking hard,” changed my life. I was so enamored by the marine life and beauty of the reef that diving immediately became an all-consuming passion.

**What were the Keys like then?»** Live coral and marine life was abundant. You could still see large groupers, even a Jewfish. Whoops, in the new world of political correctness, I meant Goliath grouper. That first dive was off Sombrero Light, and I remember the wonderful lush gardens of Elkhorn Coral. The area around Sombrero is today nothing more than a pile of rocks. However, before I get the Key’s operators mad at me, let me interject that in my opinion Key’s diving is still some of the best around. Although much of the coral cover is gone, marine life and particularly non-game fish are abundant. I don’t know any place in the western tropical Atlantic where you can go see schools of grunts even remotely as large as those in the Keys – I mean grunts as far at the eye can see! I still love diving in the Keys.

**Is that what sparked your interest in underwater photography? Tell us about your first camera system. What kind of results did you get?»** I tried to explain to my friends back in Wichita what being underwater was like, but they just didn’t get it. So the following year I rented old Brownie Hawkeye 120 film camera, molded into a plastic housing by pioneer underwater cinematographer Jordan Kline, so I could take some pictures to show them. Seeing the results, my friends said I should be in *National Geographic*! Although they flattered my vanity, I knew that was a big stretch. Nonetheless, I was encouraged. Another poor diving college chum and I bought a Calypso/Nikonos together. We started diving the lakes and quarries of Missouri hoping for some decent visibility. The following summer in the Keys again, with the addition of flash bulbs, I got some surprisingly good results, which fueled my passion even more.



**So like many enthusiasts of the era, there was a significant gap between first trying scuba and actually getting certified. When did you get “legal”? And that led to interests in becoming an instructor?»** Managing not to kill myself diving for five years, I was certified by a YMCA pool course in 1966. I went on in 1968 to become an instructor for the Underwater Society of America’s Midwest Dive Council and, as such, automatically became one of PADI’s early instructors, certification #2222.

**Share some memories of first getting published?»** About 10 of my friends and I formed a diving club named Martini’s Outlaws. The name came from our enjoyment of deep diving – remember the old diving “Martini’s Law” that was taught to divers in those days? It stated: “Every 50 feet you go down is like drinking one martini on an empty stomach.” It was supposedly a way to approximate the effects of nitrogen narcosis. We broke that law a lot. And the fact we also liked martinis didn’t hurt either. Anyway, back to your question, Martini’s Outlaws put on the first mid-west underwater film festival ever in

1969 and one of the guest speakers was Jack McKenney, then editor of *Skin Diver* and one of the diving world's foremost photographers (Paul Tzimoulis was the publisher). I showed him some of my pictures and he offered to start publishing me in the magazine. And that's how it all started.

**Who were your diving heroes then?»** Well, of course, Jack McKenney. Also Dewey Bergman and Al Giddings, who filmed some of the first shark adventures in Tahiti, and Stan Waterman.

**Your path to professional diving was a bit more circuitous than some others. You had an established law career as an attorney in Kansas, how did you decide to take “the road less traveled by”?»**

One winter day while watching the snowfall and wishing I was diving, I simply said to myself “What the hell are you doing with your life?” I knew I eventually wanted to make my living taking underwater pictures, but was realistic enough to know I couldn't make a living at it yet. So the question was how to dive, take pictures full time and still make a living. I thought about buying a dive shop or maybe a resort, but thought I'd just get stuck in the shop or resort. A couple of years earlier several friends and I had chartered a fishing vessel in Cozumel, had it outfitted with tanks and a portable compressor, and sailed to then remote Chinchorro Banks to dive for a week. Although this was a very Spartan adventure, I thought “Now this is the way to go diving – jump in the water anytime you want and be remote enough you didn't have to put up with swarms of other divers.” And, that's the way the idea of a liveboard dive boat was born for me.

**What were the origins of the *Cayman Diver*?»** I was in San Francisco, on law business, and had lunch with Dewey Bergman, founder of See & Sea Travel and his new associate, Carl Roessler. I told them of my idea and Dewey tells me that Bob Soto in Cayman had the

perfect boat for sale. And in fact, Bob bought it with the same idea in mind and actually used the boat for a few trips to Little Cayman, but decided it did not fit into his day-boat operation and wanted to sell it. Next thing I knew I was on an airplane to Cayman and gave Bob a small deposit check. I came home and begged friends, family and, in particular, a wealthy oilman/client for money. I guess my persuasive powers as an attorney were good – because I sold them on the idea – and borrowed with no collateral!

**How would you describe its accommodations compared to today's liveboards?»** Spartan! We had a bunkroom for six, three tiny doubles, two heads and one COLD WATER shower. My motto was “Give them the best diving in the Caribbean, the best food, and the best service, and they will ignore the accommodations.” Apparently I was right because it worked for eight years.

**What other liveboards were operating anywhere then?»** Well, I started the *Cayman Diver* in 1972. The first liveboard was in Australia, can't remember the name, it has started a couple of years earlier. To my knowledge that was it. Your own *Virgin Diver* started service with See & Sea a few years later. Those were the only two in the entire Caribbean.

**How did you market this new concept?»** Through See & Sea Travel Service, then owned by Dewey with Carl intending to ultimately buy him out.

**Any problems back then in navigating the bewildering labyrinth of rules in Grand Cayman for non-resident foreign businessmen who wanted to set up shop?»** Well, things were not quite as strict in those days. Bob Soto, who was politically well connected, along with an attorney that he recommended, “greased the wheels.” It was done



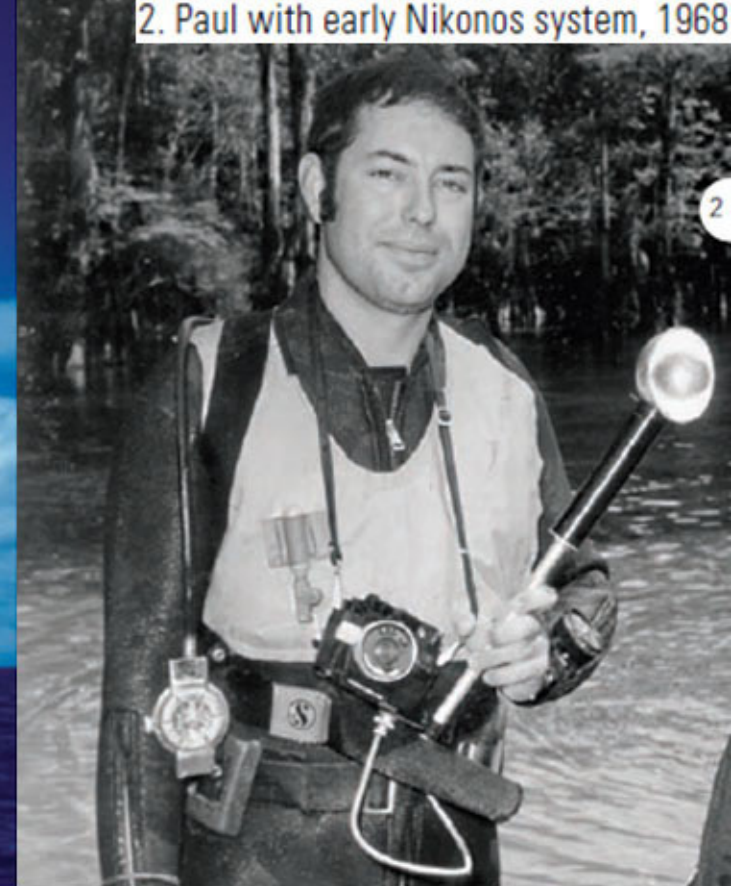
1. The Caribbean's first liveaboard vessel, *Cayman Diver*, 1972

quickly and easily.

**How was the diving in the Caymans back in the early 1970s?»**

Wonderful and basically virgin, especially the north and south coasts of Grand Cayman and Little Cayman. We could sail over to Bloody Bay on the north coast of Little Cayman and dive for a week and never see another person or boat! We had the place to ourselves. Fish abounded, including Nassau groupers, and the visibility was awesome. I'll swear on days it exceeded 200 feet! I haven't seen that in years anywhere.

**At some point you saw a serious developing interest in marine life identification for fish and corals from your guests. What books existed then to aid in the ID process?»** Jack Randall had a book



2. Paul with early Nikonos system, 1968

out on Caribbean reef fishes. This had some living pictures, some dead. In 1976 Gilbert Voss came out with a marine invertebrates book with drawings. Two years later, Pat Colin came out with a bit more comprehensive invertebrate book with pictures, but that was about it.

**To meet the cravings of your guests, you began a series of slide shows presented in the evenings aboard the *Cayman Diver*. When did you think that this could be a niche business model itself?»**

Yes, early on I started giving marine life identification programs in the evenings for guests and they were a big hit. I learned that divers thirst for knowledge about what they are seeing. Then about 1977, I realized that just taking beautiful underwater pictures and selling to magazines wasn't going to catch it. Although the idea for guidebooks was not fully developed, I still thought it would be important to have



a comprehensive stock library of marine species. I made a vow to photograph, in a pleasing way, EVERY fish and EVERY marine invertebrate that existed in the Cayman Islands. I came close to achieving that goal before leaving Cayman in 1980. That library of images became invaluable later as the guidebooks idea evolved.

**What was your first book?»** A small, but large format, pictorial about the Cayman's underwater vistas. That was in 1979. But poor profits reinforced my thought that selling pretty pictures and coffee table type books was not the way to make a living. The real start was with *Reef Creatures*, put out by *Ocean Realm* magazine in 1982. It wasn't really a guidebook in the sense of the books we are doing today. It was written to teach divers what kind of animal they were observing, not so much which specific one. For example, to teach them the difference between an anemone, zoanthid, corallimorpharian or cerianthid tube dwelling anemone.

**Others followed?»** My first comprehensive identification book was *Corals*, also put out by *Ocean Realm* in 1983.

**Did magazine work also step up?»** I was working closely with the Ziff publication *Sport Diver* and then with *Ocean Realm* when it started.

**I understand that you even hosted *Jaws* author Peter Benchley for a television special.»** Yes, it was an ABC hour-long sports special, *The Spirit of Adventure* series. I was Peter's personal guide to see the marine life of the Galapagos Islands and especially the sharks. I had been escorting diving groups to Galapagos for years, and by the time of the special in 1988 had spent cumulatively nearly a years worth of time in the islands. Howard Hall and Stan Waterman were the cinema photographers. The show was quite a hit as I bumped into re-runs for

years.

**You also got involved in editing *Ocean Realm* magazine. How did that come about?»** Richard Stewart, the founder, sold the magazine in the mid-1980s. I was interviewed by the new owner, who by twist of fate, hired both Ned DeLoach and me as coeditors. Ned's claim to fame at the time was his *Florida Divers Guide* and his close association with the cave diving community. Ned and I had become acquainted several years before through a mutual friend and immediately struck up a strong friendship.

**You met Ned DeLoach then. Is that what fostered the basis of the *New World Publications* business?»** Indeed, it was our working together at *Ocean Realm* that made us realize we worked well together and we formulated the idea of a series of guidebooks at that time.

**Starting a publishing company from scratch in a decidedly niche market like marine life ID books had to be a challenge. What were your first titles and how did you break into the market?»** We needed over \$100,000 (in 1978 dollars) to put out the first book so we tried to find a partner. First we approached a printer and then a color separator, but both turned out to be less than desirable partners. We were lucky neither worked out. We didn't want to go to a book publisher because both of us had had bad experiences with other publishers in the past. Besides, we wanted to run the whole show, so we decided to bite the bullet and took a big gamble. We both second-mortgaged our homes to the hilt and lived off of credit cards, hoping to pay everything back within three to five years. Ned was already successfully marketing his *Florida Divers Guide* directly to dive stores, so they easily agreed to start selling our first *Reef Fish Identification* book as well. We are a great example of the American

Dream come true, because the book was an instant hit and sold like hot cakes. We paid off our second mortgages in only six months! We have run in the black ever since.



**How many titles are in the New World library now?»** Ten books that we authored and we are working on two more. We also market a number of additional books by other publishers and are starting to publish books by other authors like you and Stan Waterman.

**Since your books are about the only comprehensive ones out there, how do you get your identifications?»** It started back when I was living in Cayman. On a night dive I discovered a fish with glowing light organs under its eyes. Shortly before then I happened to have dinner with Al Giddings and he told me about filming Flashlight fish in the Red Sea. So I thought this was the same thing. One of my passengers told Dr. Bill Smith-Vaniz, a noted ichthyologist, about the sighting. Next thing I knew he was on the phone. It seems the species in the Caribbean was named *Kryptophron alfredii*, and was known only from a couple of dead specimens collected at over 600 feet way back in the early 1920s. My sighting created quite a stir in the world of ichthyology because they were thought not only to be rare, but also to inhabit only deep depths. Shortly thereafter we were chartered for two weeks by the Philadelphia Academy of Sciences, Scripps Institute of Oceanography, and the California Academy of Sciences to find and collect this little bugger. And, indeed we found and captured the first living specimen at 220 ft. on a night dive. Remember Martini's Outlaws? No, I don't dive that deep anymore and no, I don't think anyone should unless they are on mixed gas – I survived by dumb luck. Ultimately, we found the species as shallow as 40 feet late on moonless nights.

Finding that fish and getting to know the ichthyologists on the subsequent cruise opened the doors of the scientific community to me. Marine taxonomic scientists around the world and I have developed a good rapport. I freely provide them with pictures of living species *in situ* for their scientific use and they provide me with identifications. Not uncommonly, however, they are unable to make an ID without a specimen. In those situations I go back out, photograph the specimen, and then collect it. Many specimens from this work now reside in the Smithsonian's Natural History Museum's collection. One cryptic species turned out to be a coral unknown to science. Dr. Stephen

Cairns with the Smithsonian named it in my honor, *Coenocyathus humanni*.

Another result of this work is that many of my pictures are the first ever published of living specimens and, in turn, establish visual identification criteria for many marine animals. This allows scientists to take marine life surveys without the need of collecting specimens—a non-impact plus for the marine world.

**You’ve also collected a few awards along the way?»** In the beginning we sold our books only to dive stores, but realized getting into bookstores was essential to our long-term health as publishers. We quickly found out that bookstores buy almost exclusively from two wholesalers, Ingram and Baker & Taylor. Stores don’t want to deal with small one or two product publishers like us. Problem was neither did the wholesalers. We talked to them numerous times and got nowhere. They almost arrogantly would not give us the time of day and “pooh-poohed” potential sales.

Then we heard about a competition run by the American Book Sellers Association in which newly published books can be entered into a number of categories. The winners are published in their trade magazine, which goes to every bookstore in the United States. As a prize for winning you get a free full-page color advertisement in the magazine. We entered the second edition of *Reef Fish Identification* and won *The Benjamin Franklin Award* for Best Reference Book published in 1994. All of a sudden we were receiving panicked phone calls from the wholesalers wondering why they were not selling our books as they were getting inundated with orders. Duh! Ingram quickly became by far our largest customer and love us to this day. Then Amazon picked us up, we now receive an award every year as the publisher selling more marine life subject books than anyone else

in the world. Not bad for a couple of scuba bums, huh?

**What about personal awards?»** In May of 2006, I received the *United States Coral Reef Task Force* award for the advancement of public awareness and education concerning marine life environmental issues. Then in November of 2006, the *DEMA Reaching Out Award* for my contributions to the advancement of the sport of scuba diving. And in January of 2007, in Grand Cayman, I was inducted into the *International Scuba Diving Hall of Fame*.

**Tell us about the process of creating the Reef Environmental Education Foundation?»** In researching for our first fish ID book, we realized that the scientific community knew very little about the abundance of most reef fishes at a given location, and to a degree, their geographical range was unknown as well. We thought, “There’s no excuse for that! With so many divers in the water every day, there ought to be a way to put their bottom time to work.” We thought of the successful Audubon bird-counting program and concluded divers could do the same thing for fish.

We were very fortunate that both NOAA personnel and the Nature Conservancy bought into the idea early on. With their help and guidance we were able to design a method of taking the surveys that would be fun and interesting for recreational divers and at the same time result in data that would be meaningful and useful to the scientific community.

**How far reaching are these collective surveys?»** To date, volunteer recreational divers have made over 100,000 surveys of fish species populations throughout the waters of North and Central America, plus Galapagos and Hawaii. It is the largest marine life database in the world. The results of these surveys have been used by marine life

scientists and management personnel ranging from NOAA's National Marine Sanctuary program, to Florida's Fisheries Management personnel, to the Cayman Islands Dept. of Environment.

For example, when Florida's fishing commission was asked to take Goliath grouper off the endangered list, they went to the REEF database and armed with that information refused the request. REEF is conducting research on the effect of an artificial reef on surrounding marine populations for the State of Florida. The National Marine Sanctuary program uses REEF to assess the effectiveness of "no-take" marine reserves. And the National Park Service is using REEF to inventory fish species in park waters. The Cayman Department of Environment worked with REEF to study Nassau grouper mass-spawning behavior and the effects of fishing them.

It's wonderful to think that thousands of recreational scuba divers are providing this useful scientific information, and at the same time are having one heck of a good time. Like underwater photography, it is an activity that keeps divers active in diving for years.

**In spite of your pioneering efforts in liveboards and their operation that paved the way for all that followed, you've had your fair share of frustration over the way some of the industry began to evolve. Let's start with solo diving. You've long been an advocate for qualified divers to be left alone in pursuit of photography or other interests. This led to criticism and outright condemnation from the ultra-conservatives. What's your take on all this looking back?»** It was and remains stupid. I still consider the buddy system to be more of a danger to divers than a safety measure. I'll try and make this short and to the point. Dive instructors and dive masters dive solo all the time as part of their job. How can they do this safely? Obviously, because the industry thinks their training qualifies



them. But to take it a step further, if dive instructors and masters can learn to dive safely without a buddy, why can't other divers take a course and learn to dive solo safely as well?

Buddy diving sounds good on paper, but in reality it often creates a dangerous situation. To be a truly good buddy, you must be aware of your partner's situation at all times. Far too often, if not regularly, a buddy's attention is distracted by the marine life being viewed and the buddy is at least momentarily forgotten. When one is relying on the buddy system for assistance in case of a sudden emergency, this is a formula for disaster! Proponents of the buddy system are simply not facing the reality of what actually happens underwater. I know as an underwater photographer, you cannot concentrate on your picture and keep track of your buddy at the same time. It is impossible. And, as a result, I think every underwater photographer, and more importantly his/her buddy, should be forced to take a solo diving course! No solo diving card, no photography.

Two final side notes on this subject. I do believe in the buddy system for beginning divers, up to say 50 dives. However, their buddies ought to be experienced divers, not another beginner. And, I've been accused of being an anti-social diver, wanting to be by myself. Nothing could be further from the truth. I love having a diving "companion" to share the adventure. I just don't want the responsibility of being charged with his or her safety.

**In 1999 you were honored by SDI as the first recipient of a "solo diver" certification when they launched their program. Did you think you'd finally see the day when the practice was accepted?»**

No, I didn't. I thought the curmudgeons and attorneys would probably see that it never happened. But, I still have forlorn hope.

**It seems that change of any kind is met with the harshest dismissal from within a certain segment of the industry. Consider the campaign against liveboards offering more than two dives a day. What did you think of that?»** Obviously stupid! As I recall that was the Australian Medical Association's idea. When the Tourist Board woke up and realized no one would come to Australia to dive anymore that went out the window fast!

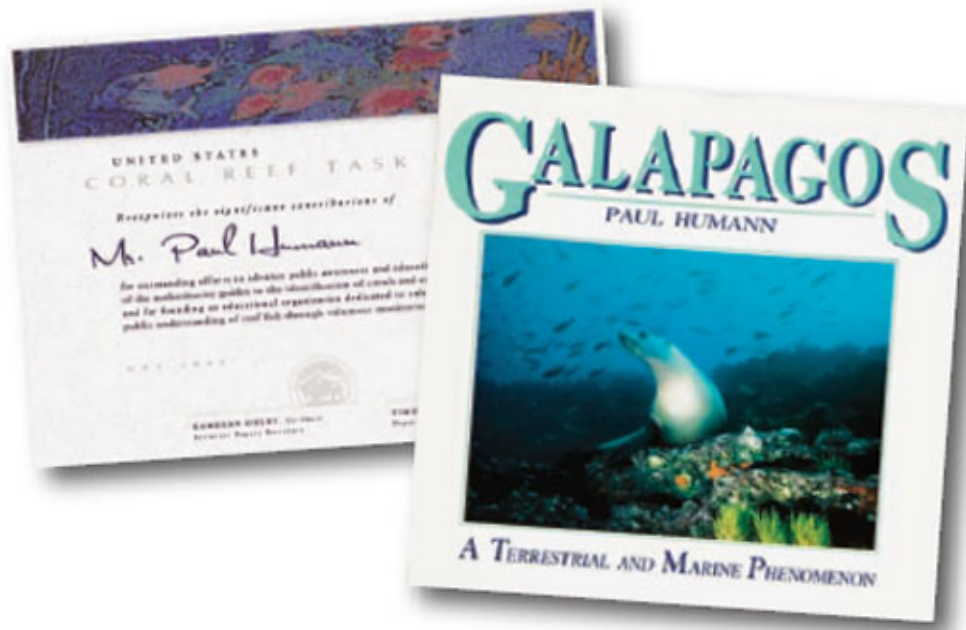
**What other industry blunders would you like to share some perspective on? (nitrox, technical diving, dive computers, excessive restriction for depth limits, etc.)»** All of the above were, indeed, stupid and irrational blunders. But I don't feel inclined to go further. The ultimate acceptances of these ideas speak for themselves.

**It's interesting that these practices all became mainstream within a relatively short time. Is diving a better place now?»** In general, yes.

**What else chaps you in the category of silly diver rules?»** One issue that does bother me today is the "don't touch issue." Let me say from the onset, I do not advocate touching coral, but some of what is currently being taught and advocated is false and a detriment to the dive industry. For example, a single or even a few touches to coral causes absolutely no harm. And certainly one touch does not kill hundreds of polyps and make the colony die as I know numerous instructors have taught their students. Actually coral is tough stuff and quite resilient to damage. Surprising to most people, the primary way new colonies of more fragile branching corals start is from a broken piece. However, at least from an ascetic point of view, contact hard enough to break the coral should definitely be avoided. In an attempt to hold diver contact to a minimum the pendulum has swung to the neo-conservative side. For simplicity, divers are being taught "don't

touch anything; stay at least three to ten feet away from everything!” Even the sand or algae beds. And, blatant falsehoods are being taught to support those rules.

The problem with this approach is that divers do not really get to see a lot. They can’t observe many of the smaller animals or study interesting behaviors. For example, how can you observe the interesting interaction between a shrimp goby and its companion blind shrimp hovering three plus feet above the sand? Or watch the interactions between an eel and cleaner shrimp hovering above the reef? The answer is: you can’t! And, you’ll never see most of the wonderful cryptic animals.



By hovering three feet or more above things, you’re missing a majority of the greatest wildlife show on earth! The result is that many new divers quickly get bored with diving and drop out. We have a huge

dropout problem in this industry and our approach to “don’t touch” isn’t helping. We need to train people how to touch or rest on the bottom without doing damage and observe responsibly. Regrettably, the powers-that-be seem to think that would be too difficult to do or that the average recreational diver is too dumb to understand and learn what might be harmful and what is not. This is too bad, because in the long run it is divers that are most passionate about preserving the reefs. We need more environmentally concerned divers not less.

**Should the diving industry look to innovation as a growth tool instead of its historical conservatism?»** In most cases, probably so. I believe one of the biggest reasons growth of diving as a sport is stagnant, at best, is because the dive industry historically and continues today to ignore the single most positive thing it could do to grow. And perhaps more importantly reduce the notorious dropout rate... said by some to be a disastrous 95 percent within three years of learning to dive!

Why do people want to dive in the first place? Asked that question, the vast majority will say, “to see the marine life.” What does the dive industry do to nurture this natural interest? Absolutely nothing! How many times have you been on a dive boat where there is a young couple making their 3<sup>rd</sup> or 4<sup>th</sup> dive. They come up from the dive all excited about this wonderful fish they have seen and want to know what it is. They describe it to the dive master – far too often the answer is, “Uumm, I don’t know.” The couple’s excitement is tempered. If this happens many more times the couple will become another dropout statistic.

The beginning dive course should include some information about the marine life they are going to encounter and how to enjoy what they are seeing. And the 2<sup>nd</sup> course should be about marine life, not rescue

diver or some other nonsensical specialty that does nothing toward keeping a person interested and involved in the sport. Specialty courses have captured the “merit badge” concept rather than teaching divers how to enjoy the wonders of marine life. I was telling a high-ranking person in one of the training agencies about this. He said, “You may be right Paul, could you develop a fish identification course for us?” “Sure, I’ll start with the Caribbean.” He replied, “Oh no! It has got to be international – something we can teach everywhere. That’s the way all our courses are designed.”

I fumed quietly and attempted to explain what should have been obvious: “But, you can’t do that; fish and even their families in Australia, West Coast and Caribbean are all different. A single course for all is impossible.” Then, underscoring his ignorance of marine life he responded; “Oh I’ll bet I can, I’ll work on it.” Needless to say he could not, so the whole idea of developing some courses about marine life was dropped.

The dive training agencies would be the logical organizations to develop and market such courses. However, in general, they have developed nothing meaningful. Consequently, Ned, his video photographer wife Anna, and I have given up. We are currently in the process of developing our own DVD about marine life for beginning divers that hopefully will make their first dives a more meaningful and enjoyable experience. With luck this will be the first of many to come. REEF is also developing the first of several dive store supervised home study fish, identification courses on DVD.

**Finally, you have the benefit of 45 years perspective diving in the Caribbean. There have been some devastating changes to the marine environment over that four-decade span. One recent study released their results and noted that nearly 80 percent of**

**the coral in most parts of the region are dead or dying. Is there any hope for the Caribbean?»** I think the 80 percent in most parts is wrong – a few parts would be more accurate at this time. Nonetheless, there is no question that hard corals are in decline throughout the region and I don’t see any reason this will not continue. It is only a matter of how fast. I think most hard corals will be gone in a matter of 10-30 years as a result of global warming. The full impact of this is not clearly understood at this point, but it is certainly a cause for serious concern.

**The Caribbean is not the only region to be severely impacted. Palau and Fiji have been particularly hit by influences that affected stony and soft corals. This phenomenon can be timed coincidentally with the 1997-98 *El Niño*. Are even these remote areas to be gradually eroded simply due to natural impacts?»** Unquestionably global warming is the primary culprit. Anyone who questions the reality of global warming has their head in the sand. Stony corals around the world will be impacted, and again, I think most corals will be gone within the next 10-30 years. We are lucky to have seen them; our children will not be so lucky. It’s interesting that you included soft corals, my impression visiting Fiji two years after the most serious bleaching event, was that the soft corals were more plentiful and vibrant than ever, and abounded in areas of dead stony coral.

**My impression was based on direct observation of soft corals following the *El Niño* in both areas. In some cases, the soft corals just simply disappeared. I compared it to photos I had taken in earlier years. It was like they had been “Photo-Shopped” right out of the images. Do you think there is any hope at all?»** I see two rays of hope. Perhaps the American public will be smart enough in 2008 to elect people that understand the seriousness of

the problem and will do something about it, including changing the American peoples' mindset about how we live. Do you drive a SUV? I don't! And, perhaps evolution will play a role. Darwin was right; I've seen underwater some examples of what is probably "survival of the fittest" in action. After the severe bleaching event in Fiji, I swam over a huge area of dead tabletop corals, but to my surprise for every 15 or so dead ones there was a living thriving colony. Were these genetically superior colonies that were able to withstand the warm water temperatures? Will they spawn to produce less vulnerable colonies? Let's hope so.



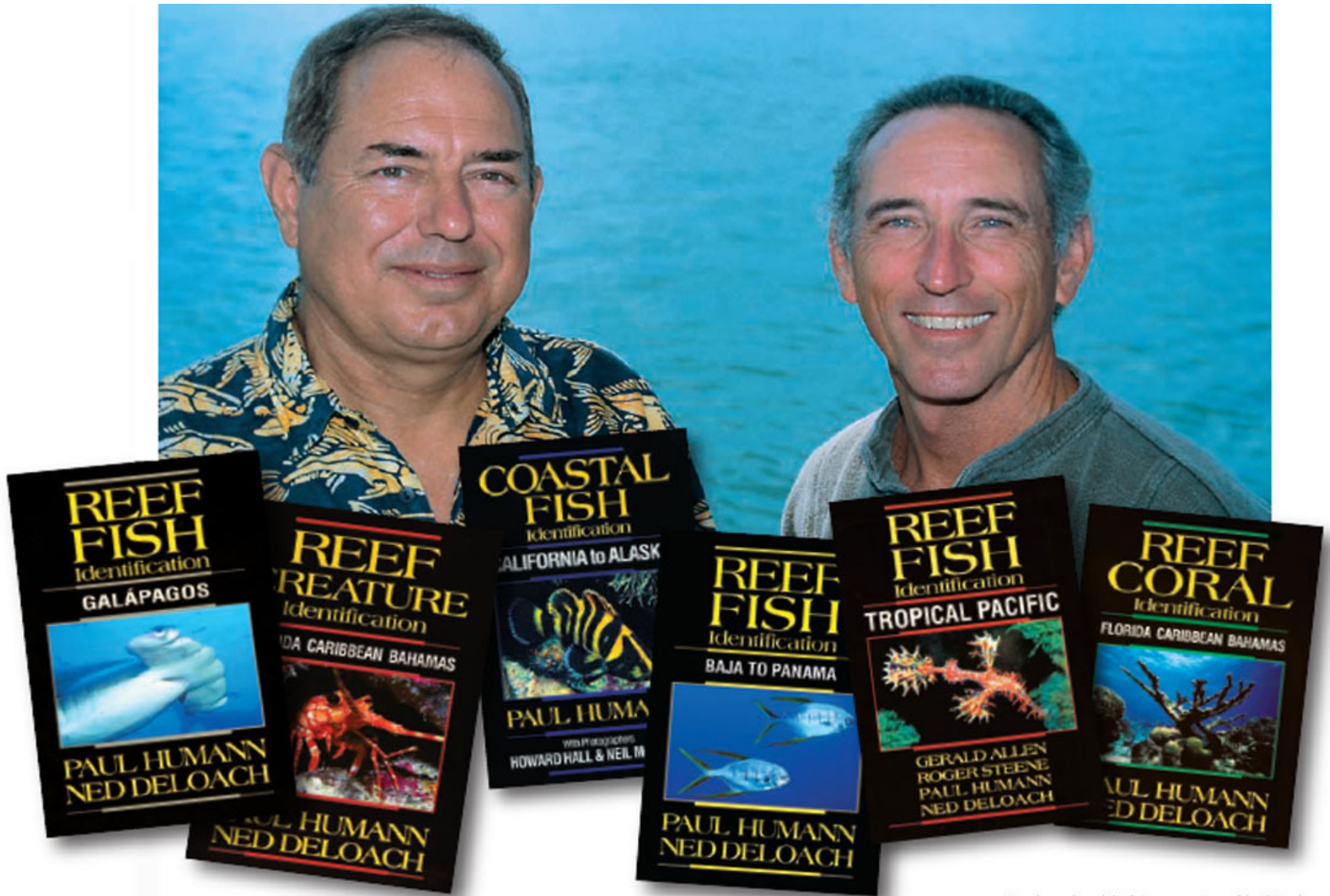
**In closing, where is the best diving in the world today and why?»**  
 Oh, that's an unanswerable question. Every dive destination has its unique charm and I love them all. However, as a final note, I would like to say that I hope my books and photographs inspire people.

Divers are fundamentally explorers. We want to go where few people have gone... to discover places that most people only dream of, or only read about from their armchairs. If my life's work has contributed anything to the dive community, I hope it is to inspire people to explore, discover, enjoy, and, ultimately, to preserve marine life.



**Editor's note:** There are about 40 copies of Diving Pioneers & Innovators still in Bret Gilliam's personal inventory. They are available as a Signed/Numbered Limited Edition personalized to each buyer by Gilliam at \$200 each, including shipping. He can be contacted for purchase at [bretgilliam@gmail.com](mailto:bretgilliam@gmail.com).





Paul and publishing partner Ned DeLoach



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