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**Diving Pioneers & Innovators: A Series of In
Depth Interviews (Bret Gilliam)**

Contents

Editorial

A team-building exercise: techdiving 101

By Steve Lewis

Oxygen and the diver

By Michael Powell

Book review: The Darkness Below

By Asser Salama

Let's talk about... the S word

By Agnes Milowka

*Diving Pioneers & Innovators: A Series
of In Depth Interviews (Bret Gilliam)*

By Lina Hitchcock

Editorial

2

Welcome to the sixth issue of Tech Diving Mag.

3

In this issue, the contributors have, once more, brought together a wealth of information, along with some distinctive first hand experiences. The contributors for this issue are retired NASA researcher Michael Powell (MS, PhD), accomplished diver, instructor trainer and book author Steve Lewis and film support technician and model Lina Hitchcock (interviewing Bret Gilliam). Read their bio at www.techdivingmag.com/contributors.html.

7

This issue includes an article by late Agnes Milowka (deceased in February 2011). An adjusted version of this article should have been published one year ago (in March 2011's issue). Unfortunately Agnes never managed to make the adjustments I asked for, so the original version is published in her memory, as is.

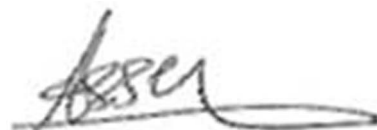
17

Tech Diving Mag is very much your magazine and I am keen to have your input. If you have any interesting articles, photos or just want to share your views, drop me a line at asser@techdivingmag.com.

20

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22



Asser Salama
Editor, Tech Diving Mag

Front cover image © T. Timothy Smith.

A team-building exercise: techdiving 101

By Steve Lewis



One hears the phrase: “Technical Diving is a team sport” all the time. In effect, the phrase itself has become the closest thing to a mantra that diving has. But oddly, technical divers rarely use some of the intellectual tools used commonly in the business world to help build teams and encourage team spirit. One example is the SWOT analysis.

Never heard of it? Well, it’s a simple and surprisingly effective process that may be useful to you and your personal growth as a tech diver.

Some things you can work at

There are few secrets to improving one’s inWater skills and problem-solving techniques. In a nutshell, become really comfortable in the water, grow your situational awareness and dive your brains out as you work on expanding your comfort zone and proficiency.

However, a large segment of technical diving is centered on the mental preparation and fitness. The ability to use the skills learning during training and to additionally come up with a creative solution on the fly is often the difference between a good learning experience and a bad day in the water. A part of this ability is created by in-water practice and conducting actual dives, however, good dive planning is done on dry land. When you are not able to get out and dive, here’s a little pen and paper exercise you may find helpful.

Technical diving is first and foremost an activity best enjoyed as part of a team. Sure, every team member should be capable of finishing the dive solo, but that is a worst-case scenario. Tech diving is team diving no matter what color lens you look through; and two things an aspiring tech diver can work on are:

- a) Becoming a better team player
- b) Developing a sound understanding of team dynamics

There’s a management tool that can help with both.

SWOT Analysis Grid

		helpful	harmful
internal	Strengths		Weaknesses
	Opportunities		Threats
external			

SWOT Analysis: a self-assessment and team building exercise

SWOT stands for Strengths, Weaknesses, Opportunities and Threats and SWOT Analysis is a technique or tool normally used in the business world to assess a company’s position relative to its competition, and from there to gain some insight into what strategies might work to improve that position.

I've used a simple form of SWOT analysis in a classroom setting to define the personal assets of everyone taking part in a course and how those assets can be made to build the strongest and most cohesive team possible.

The SWOT exercise begins by defining the project. In a classroom setting, the usual project is building a team that has the best chance of being successful on their course. Since I'm suggesting SWOT Analysis for home study, you'll be doing this on your own, and your project will be a little more focused on what you have to work at to prepare for a tech program.

To get the analysis process moving, each participant fills out a simple grid: two columns, two rows: Strengths and Weaknesses along the top row, and Opportunities and Threats along the bottom. Strengths and Weaknesses are internal states and are things individuals feel. Opportunities and Threats are external states outside an individual's direct control.

Something to recognize in the framework of using SWOT in this way, one person may see something as a weakness while another views it as a strength; a sort of glass half-full, half-empty situation.

Let's use some examples. Strengths are positive tangibles and intangible personal attributes such as experience or a specific skill useful in a dive team dynamic – say terrific organizational skills, or experience as a healthcare professional. Strengths are assets that will help you attain your goals and objectives. Ask yourself: "What do I bring to a dive team that will help make us stronger?"

The answer may seem unrelated at first. For example, in my experience, climbers, hikers and winter campers are used to working

in extreme conditions and can often put up with personal discomforts without whining. That's a potential strength for a team looking to conduct expedition diving. Nurses and para-medics have practical experience handling medical emergencies and usually have a leg up on the average Joe and Jill on the street when it comes to keeping focused when Bedlam rules are in play.

Weaknesses are factors that may reduce or detract from the team's ability to attain its goals and objectives, and serious weaknesses may jeopardize the main mission, which incidentally on ALL technical dives is the same: Everyone who starts the dive will finish it in the same shape or better than when they started.

A typical weakness cited by beginning tech divers is inexperience, but inexperience is a shared trait and not so much of an issue as it may seem at first. And rendered even less so by the simple exercise of owning up to it!

Health issues may be a weakness. Susceptibility to motion sickness, trick knees, difficulty with mental arithmetic, dyslexia, a tendency to wander off alone are all potential issue that could be listed.

Most of us are protective of our inner-most fears and weaknesses; experience tells me that this list is the most difficult one to write without a trace of fakery for every one of us. However, work at it because the exercise can be cathartic and hugely productive.

Opportunities and Threats are external things that may influence the outcome of a project. Opportunities are positive aspects of the environment or resources, and help to push the odds in favor of success. In the case of doing SWOT Analysis for an actual class, an opportunity might be something like having a wider than usual window

of slack tide or having a brilliant weather forecast, a big boat, surface oxygen. For an individual, opportunities could be the fact that you have a lot to learn and as part of a good team which collectively is willing to provide an atmosphere that promotes learning.

Threats work against success. Some threats are physical – such as big seas, wind, and current – and some are psychological – fear, fatigue, et cetera. Many center on aspects of time and place – being rushed for example.

In a SWOT analysis, items in all four quadrants of the chart are catalysts for action and change. Strength and Weakness can be leveraged, shared, worked on, improved and overcome. Opportunities and Threats can be managed, taken advantage of, mitigated, avoided and planned around.

A SWOT Analysis is not a permanent thing. The items identified in your initial analysis will change as you work at either fixing them or taking advantage of them. Other items will turn up as your understanding of team dynamics and what is required of a technical diver develop and deepen.

During years of teaching various aspects and techniques relating to complex – and risky – diving, I've been asked if there a sort of road map that a diver can follow to shorten the learning process. The closest thing I've found is a SWOT Analysis. Filling one out is a good individual exercise; doing so as part of a group is an excellent group exercise; and keeping them and referring to them at some later date is a good humbling experience.

In the final analysis, using a SWOT chart is just another of many tools and tricks that may help you stay safe, have fun and build a better

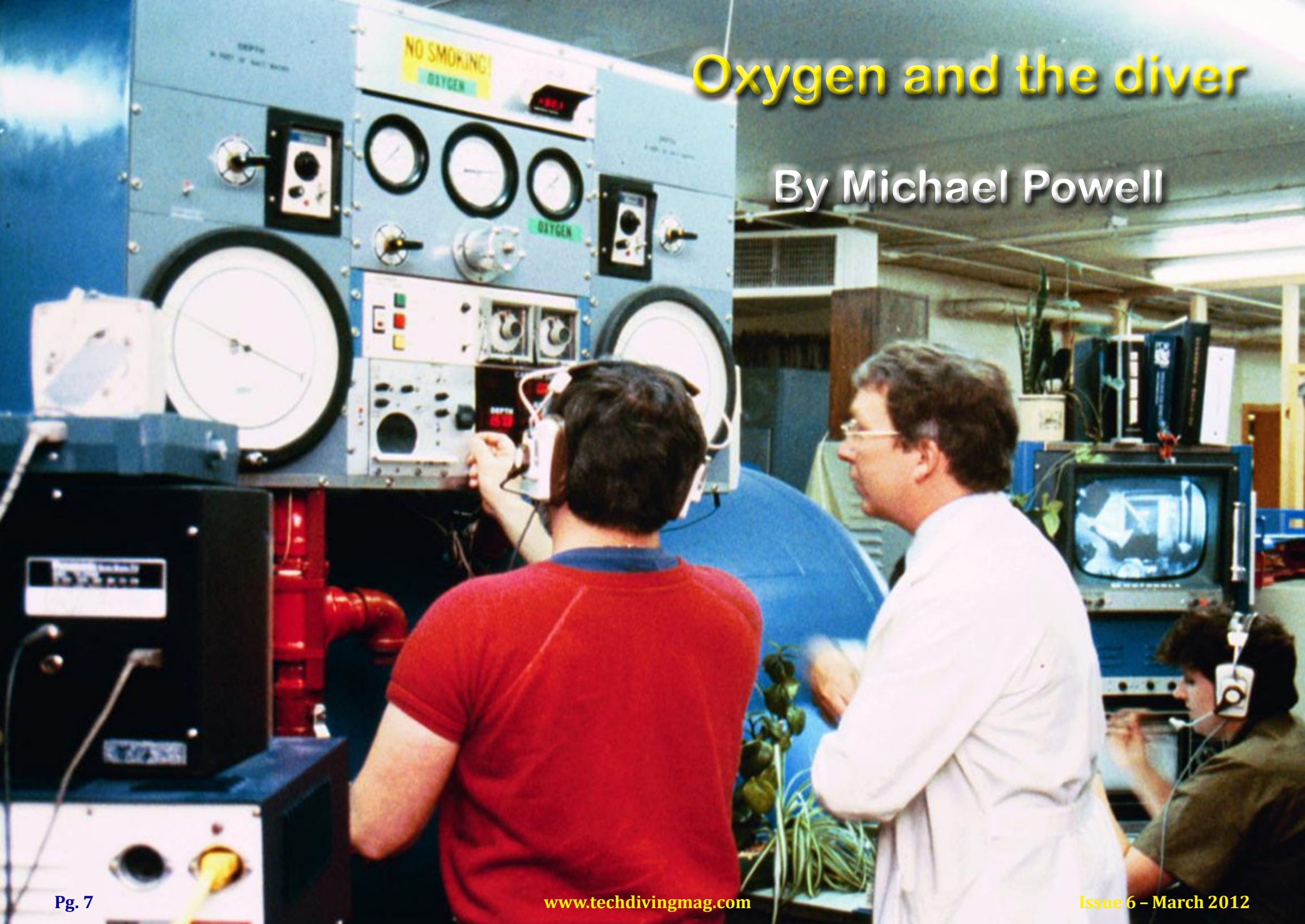
understanding of where you and your skillset stands in the whole tech diving.

Thank you for your attention.

This article was based on and is an excerpt from “Technical Diving and how to get there from here” a chapter from the successful book by Steve Lewis called “the Six Skills and Other Discussions.” This book is available at select dive stores and through onLine stores such as Amazon and Create Space eStore via: <https://wwwcreatespace.com/3726246>

Oxygen and the diver

By Michael Powell



HOW DOES THIS ARTICLE HELP YOU, THE DIVER?

If oxygen is necessary for life, why is oxygen also toxic?

How variable is oxygen toxicity from day to day in any one person?

Is there really such a thing as “oxygen bends?”

How useful is the administration of on-board oxygen?

Can oxygen actually protect against DCS?

Why is hyperbaric oxygen [HBO] used for treatment of decompression sickness?

Has diving really contributed to medicine?

OXYGEN’S ORIGIN AND ITS TOXICITY

Oxygen is popular for the public as not only a breathing medium but now also such products as “oxygen bars” [sometimes with added alcohol] and “OXYwater™” which is claimed to boost energy, reduce muscle pains and fight fatigue. Oxygen inhalers are sold in airplane magazines to do likewise. Small amounts such as supplied will do little but boost your psychological perception. *Life Energy*, *Body Oxygen* and *Oxi Up* are others I have seen on the market.

Oxygen is the third most abundant element in the universe, but it is chemically very reactive and elemental oxygen would quickly vanish on Earth were it not replenished. About 2.7 billion years ago, primitive photosynthetic bacteria began producing oxygen. The elevation in oxygen levels by photosynthesis allowed for the appearance of animals.



Reactive Oxygen Intermediates

Those who are not divers are not aware that oxygen is toxic, a poison at pressures not too much higher than we encounter throughout our entire lives. It is necessary for our bodies to produce biochemicals that can protect us from slight toxic effects even at the partial pressures of oxygen found in air.

In higher concentrations, e.g. 20%, the toxic effect is somewhat delayed and it takes about 2.5 billion inhalations before death takes place. [Oxygen] apparently contributes to a complex process called aging, of which very little is known, except that it is always fatal.

Chemical & Engineering News - February 6, 1956

Oxygen was toxic; probably much life on Earth died out as its levels rose. Resistant forms survived and thrived, and some developed the ability to use oxygen to increase their metabolism and obtain more energy from the same amount of food. Other organisms now found themselves in a world rapidly becoming “polluted” and “poisoned” by oxygen. As a defense against this noxious gas, biochemicals were developed inside the cells. These are **always** present in a certain concentration. They protect against the toxic offenders, the *reactive oxygen-derived intermediates (ROI)*.

In 1954, it was first suggested that these **free radicals**, and not oxygen itself, were responsible for the injury. These ROI play a role in the understanding of oxygen toxicity for there exists a curious paradox in which both too little and too much oxygen can be hazardous to health. What are these ROI? Examples are O_2^- , superoxide anion, H_2O_2 , hydrogen peroxide, $\bullet OH$, hydroxyl radical, and others. The most important source of reactive oxygen under normal conditions is the leakage of activated oxygen from mitochondria during normal cell respiration.

Increased partial pressures of oxygen lead to increased concentrations of ROI. *Since the scavenging agents are always present in fixed concentrations, the ability of the cells to remove the ROI becomes overwhelmed.* It is important to know that oxygen does not *become* toxic at some elevated partial pressure rather that it is **ALWAYS**

toxic. Paracelsus centuries ago stated, “The dose alone determines the poison.”

The accumulation of toxic substances within the cells is dependent upon (i) the partial pressure of oxygen, and (ii) the length of time the cells are exposed to excessive pressures of oxygen. For these reasons that the toxic effects of oxygen are dependent both upon the **pressure** of oxygen in the breathing mixture and the **length of time** the diver is exposed.

The two systems that are exposed to the greatest concentration of oxygen are the pulmonary and the central nervous system. The manifestations of oxygen poisoning are first seen in these.

Oxygen Toxicity of the Central Nervous System [CNS]

The use of oxygen by underwater demolition teams in the Second World War was studied quite extensively by K. W. Donald in England. These divers do not wish the trail of bubbles on the surface to betray their position and, thus oxygen-rebreathing systems were developed. Obviously, a diver in convulsions on the surface would likely jeopardize the mission and, it was necessary to define the time-depth parameters for the equipment. It was discovered that **exercise sharply reduced** the allowable time at depth as contrasted with a man in a warm environment remaining at rest. The cause of this time reduction was believed to be increased levels of carbon dioxide in the blood stream. Patients being treated in a hyperbaric chamber are at rest and have an increased tolerance for increased levels of oxygen compared to swimming divers.

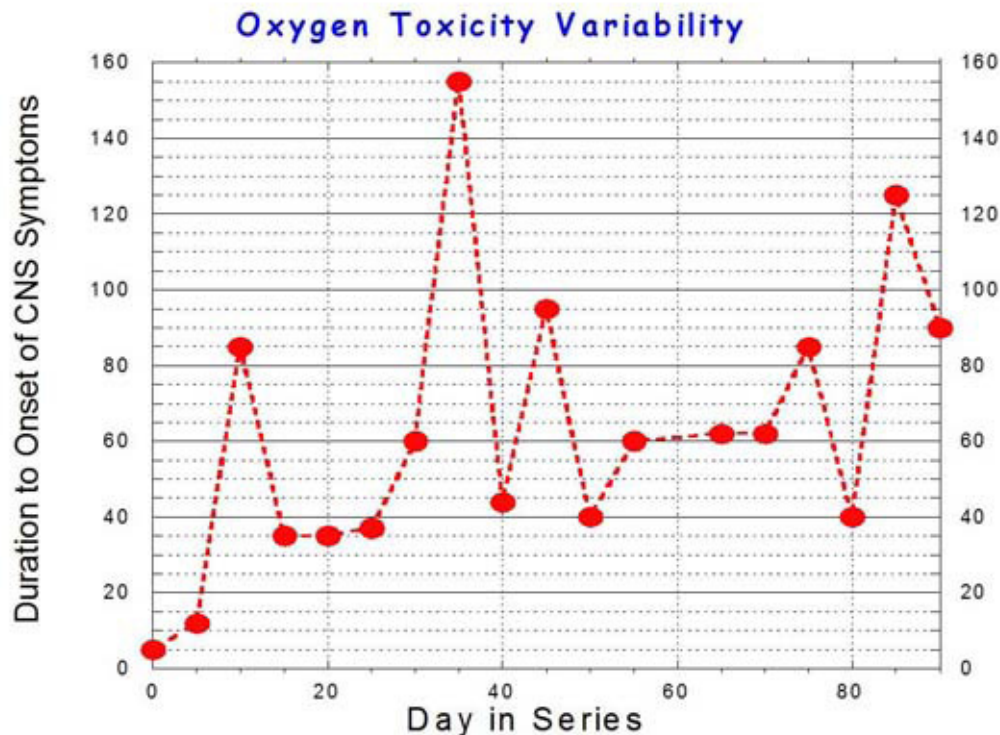
The Unfortunate Lack of “Early Warning Signs”

Unfortunately, CNS oxygen toxicity is often devoid of “early warning” signs. In the most favorable scenario, **auditory of visual disturbances** are first noted and appropriate measures are taken to reduce the inspired oxygen. In the worse case, frank convulsions are the first sign.

There exists great variability in the time to the first presenting sign or symptom. K. W. Donald published a study in 1947 that detailed results obtained on one test subject who breathed oxygen at 70 fsw in a hyperbaric chamber until he noted an effect of oxygen toxicity, usually muscle twitches. This was performed on 20 separated occasions over

a period of 90 days. The duration to twitch varied from a low for the initial trial of 5 minutes to a high of 155 minutes. It is believed that the randomness was not associated with any readily obvious variable [e.g., body movement or time of day], although something in the body as a whole was responsible, of course. This can pose an obvious problem in individuals who have used, or thought about using, oxygen, or high-oxygen mixtures, in SCUBA work.

Clearly, the passing of an “*oxygen tolerance test*” or the previous use of underwater oxygen successfully for one or several times is *no* indication that it could be safely employed many times. It is evident that *little exists in the way of a pattern* from an inspection of the figure. Donald wrote in 1992 in *Oxygen and the Diver*, “it becomes clear that to judge an individual’s tolerance by one or even several dives is dangerous and unjustifiable.”



Various methods have been researched to ameliorate the toxicity problem but the results have not been gratifying. The best, to date, seems to be the simple expedient of temporarily reducing the inspired partial pressure of oxygen. Five-minute “air breaks” are typically utilized during hyperbaric oxygen treatment of decompression sickness.

Pulmonary Oxygen Toxicity

The manifestations of pulmonary oxygen poisoning do not display the rapid and insidious onset as those of CNS oxygen toxicity. For this reason, the problem is not such a life-threatening one. This form of toxicity is only encountered during DCS treatment and not in SCUBA diving. The first indications are symptoms of substernal (beneath the breastbone) burning upon inspiration. This usually appears after three hours of continuous oxygen breathing (no air breaks) at two atmospheres.

During the periods, it is also possible to measure a reduction in vital capacity. The reduction is reversible and returns to normal after a period of several days.

Pulmonary oxygen toxicity is encountered most frequently in divers during treatment for decompression sickness where the patient can potentially be exposed to high doses of oxygen for hours. This is especially true if there has been a long delay between DCS incident and treatment and the disease has proven itself resistant to treatment. Multiple recompression HBO treatments may then be necessary.

The design of decompression tables for commercial divers must always take into account the total dose of oxygen; this is especially true if oxygen-breathing periods have been added in the shallow portions (end) of the decompression. Oxygen is used to increase the rate at which inert gas is eliminated from the body thus shortening the overall decompression time.

The maximum depth at which an undersea habitat can be placed (for extended, multi-day use) is *determined by pulmonary oxygen toxicity*. If the *pulmonary toxicity limit for extended exposure* is 0.5 atmospheres, this puts the limit for an air-filled habitat at about 45 fsw. This is the limit to supply the habitat with the most easily obtained breathing medium. For greater depths, it is necessary to use special

mixes that either must be manufactured on the site or shipped in.

Occurrence of Toxicity

Divers have asked me, “At what depth **or altitude** does oxygen toxicity appear?” As we have read, ***oxygen is always poisonous***. It is simply that at atmospheric concentrations, the toxic effects are kept in check by the *repair enzymes* that disable [decompose] the reactive oxygen intermediates. As the concentration of these ROI increases, it is possible to overwhelm the protective molecules, since their concentrations in cells cannot be changed in a short time.

In addition, the pills that were sold a few years ago to prevent oxygen toxicity are ineffective. Superoxide dismutase administered orally as a pill is digested in the stomach. No one has found reliable medication to prevent oxygen toxicity although such things have been sought.

“Oxygen Bends”

Something I have been asked about over the years is a curious phenomenon called “oxygen bends. This was first seen by K. W. Donald in goats in a study conducted in 1955. Donald took goats to depth in a hyperbaric chamber using air as the compression gas. He found the specific depth for the appearance of limb bends and then reduced the nitrogen pressure by a few psi. On another day, he then added several psi of oxygen to the air and dove the animals again. He noticed that the goats were badly afflicted with DCS, staggering badly and falling down, and almost to the point of death with much labored breathing. Within about five minutes, however, the goats stood up, walked and recovered with no residual signs or symptoms.

This is what *I believe occurred*. With a very good dose of dissolved nitrogen [and oxygen], there was a considerable bubble load as the tissues dumped numerous bubbles into the vena cava and the heart. This formed a right heart airlock, and there was little cardiac output. That is, the heart was unable to pump blood, since it contained so many bubbles. The heart was simply compressing foam. Little blood flowed to the brain.

In a few minutes, the body metabolized the oxygen and the bubble load was considerably reduced. With the reduction of foam in the right heart, the cardiac output was increased, and blood flow again to

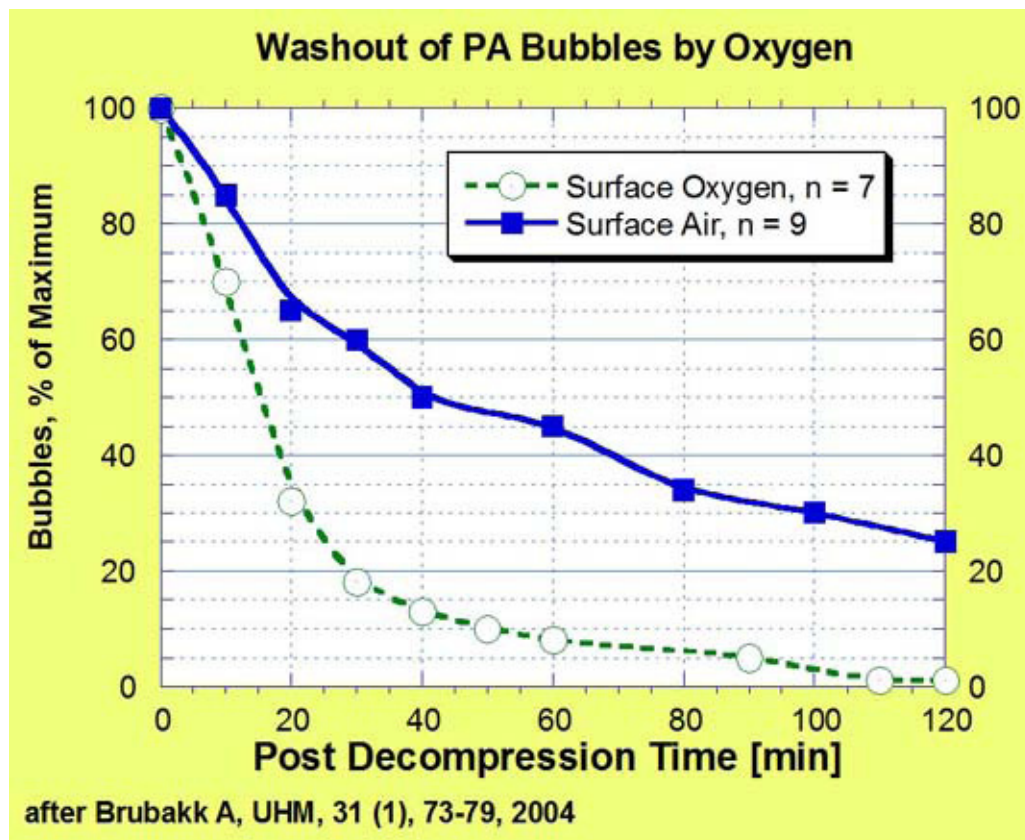
the lungs and brain. Such could never happen if the breathing mix was primarily air, since the nitrogen in the tissues, and later bubbles, could never be metabolized.

While this is a very specialized instance of a rapid decompression at a DCS limit, nevertheless, it does show that such a case of DCS is possible. This is not a situation typically encountered in normal SCUBA diving operations, but does illustrate a point in a laboratory situation.

On-board Oxygen: Washout of Venous Bubbles with Surface Oxygen

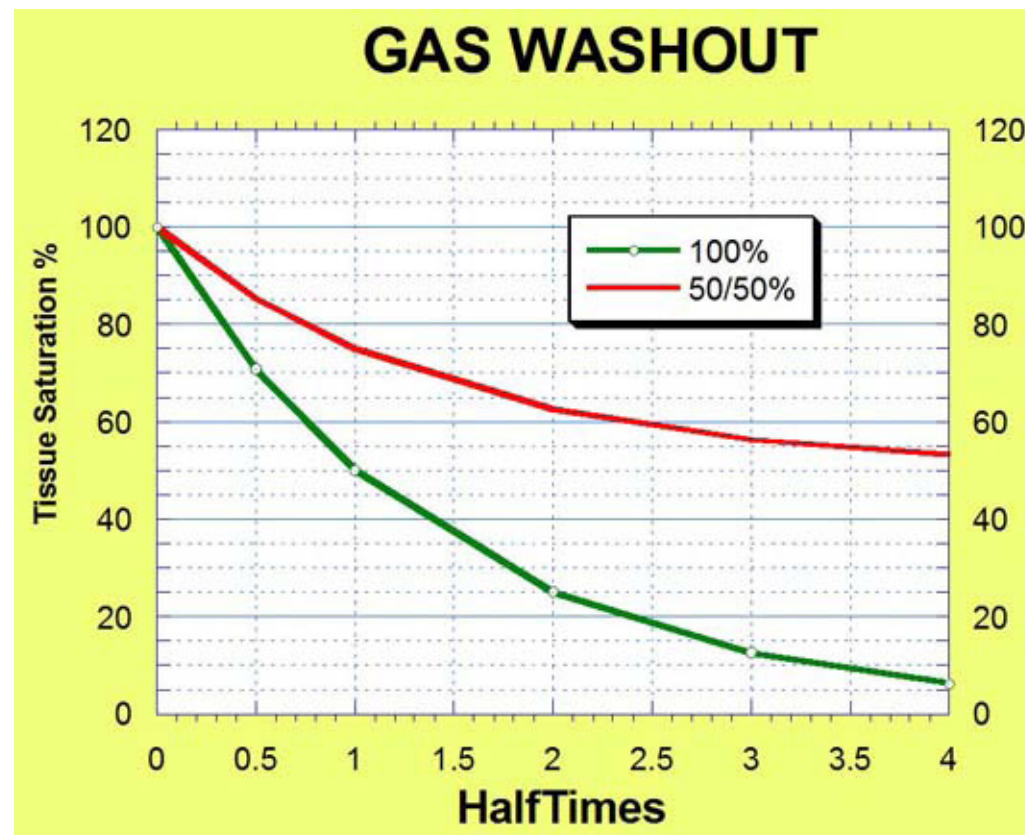
When a diver has returned to the boat and it is clear that DCS is occurring or possible, support individuals often have at their disposal on-board oxygen that can be administered. The question often arises of just how import is a tight-fitting mask or just what advantage quantitatively is gained by pure oxygen verses air.

A few years ago, a study was made to monitor venous bubbles in test animals using a Doppler ultrasound bubble detector. Figure Four shows information determined by Dr Alf Brubakk and his team. It is clear that venous bubbles are removed both faster and more completely with pure oxygen than when surface air is breathed. It is important that the bubble load in the heart be reduced since bubbles can *arterialize* and pass to the brain. This would precipitate a case of CNS DCS, something that is far more serious than simple joint-pain DCS [“the bends”].



Oxygen Washout of Dissolved Tissue Gas

Washout of dissolved tissue inert gas from tissue has been calculated and is shown in Figure 5. We seen that tissue inert gas behaves in a manner similar to venous bubbles. Breathing pure oxygen versus air is far more useful when it comes to inert washout. Most divers would know this [or should know this], but the figure demonstrates this in a quantitative fashion.



Can Oxygen Actually Protect Against DCS?

In an experiment performed a few years ago by Bruce Butler, PhD, and me, [Butler BD, Little T, Cogan V, Powell M. Hyperbaric oxygen pre-breathe modifies the outcome of decompression sickness. Undersea Hyperb Med. 2006 Nov-Dec; 33(6):407-17], we found that pressurized oxygen administered several hours prior to depress was protective against DCS in rats. The effect was in the form of generalized bubble formation since these small animals do not get limb-pain DCS [bends] in the same manner as humans.

Administration of HBO just prior to decompression was without effect. What exactly the oxygen does is not known, but the effect is intriguing. It genuinely appears to be a pharmacological effect.

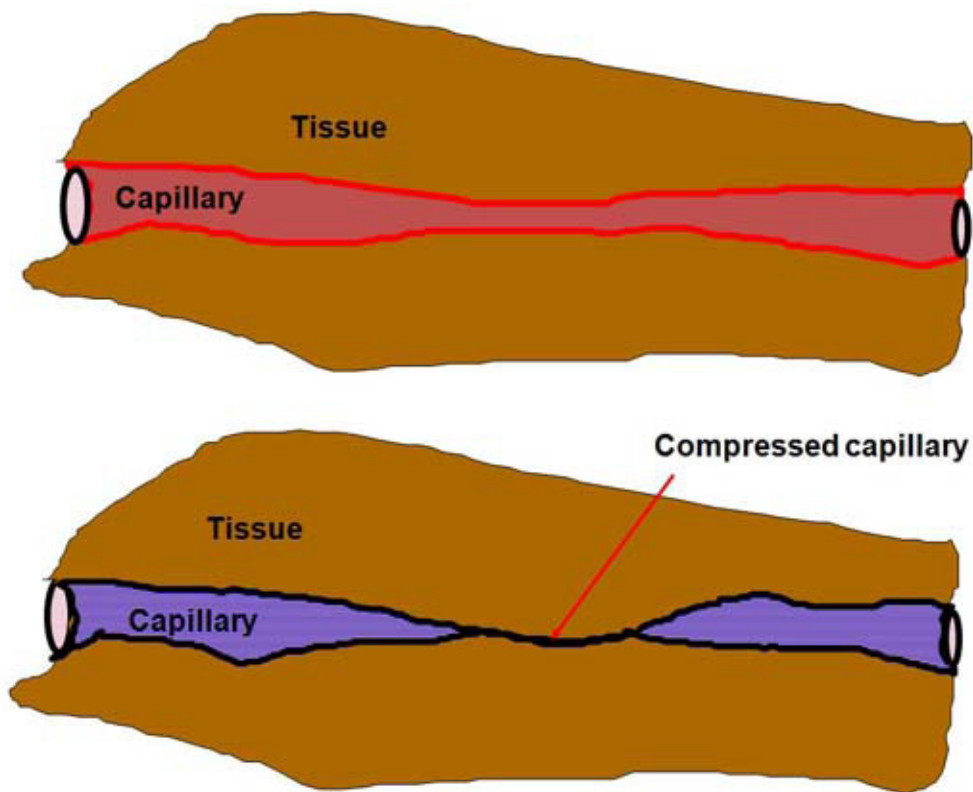
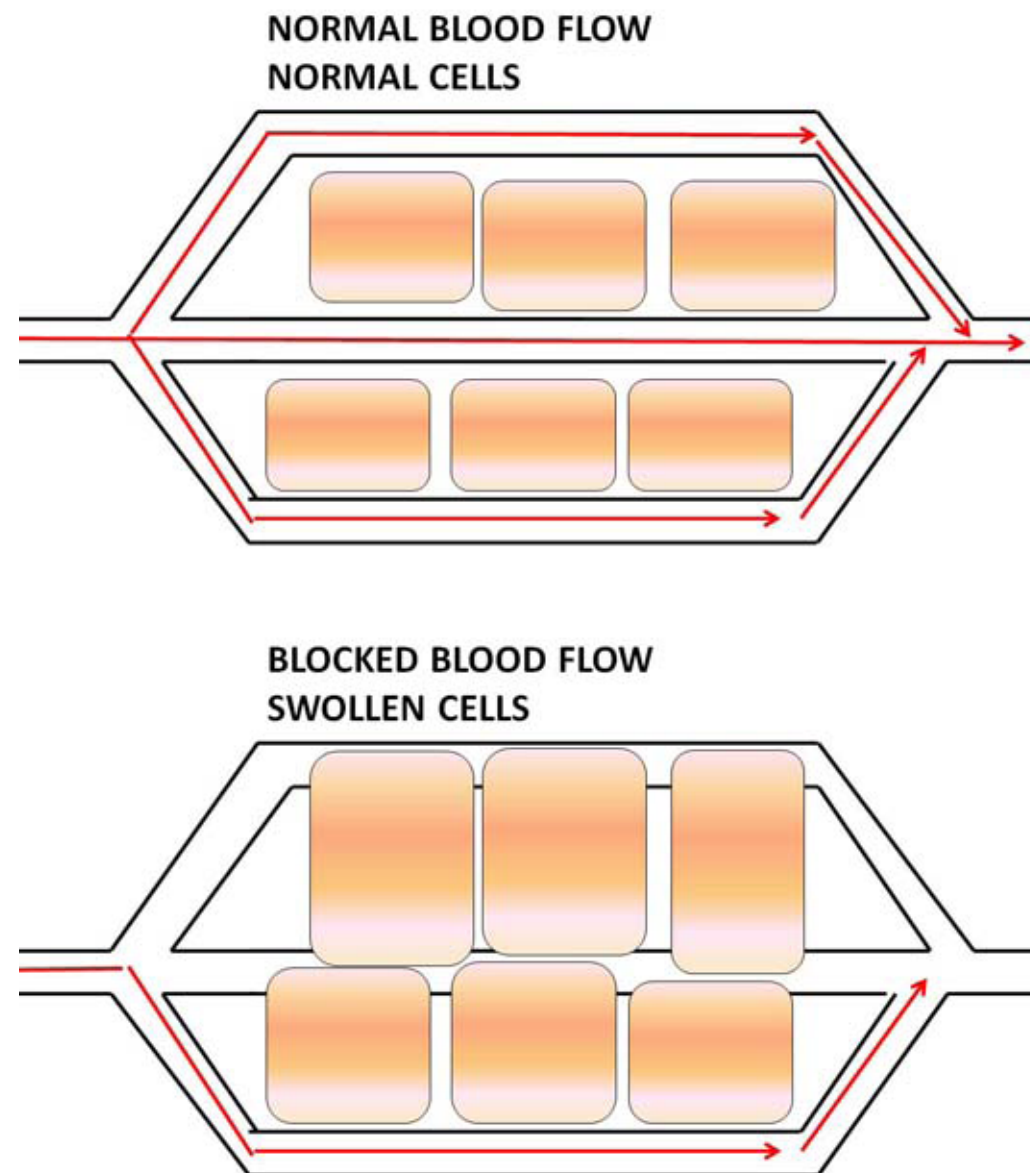
Oxygen for the Treatment of Decompression Sickness

A vicious cycle begins when capillaries are blocked by gas bubbles.

Cells use oxygen to control the ions, particularly sodium ions, inside of cells. A molecular pump moves sodium ions against cell walls and a concentration gradient. There are normally few sodium ions inside of a cell than there is outside – the concentration gradient. This gradient is responsible for nerve conduction, for one example. This molecular pump is dependent on oxygen being available for the production of energy [adenosine triphosphate, ATP].

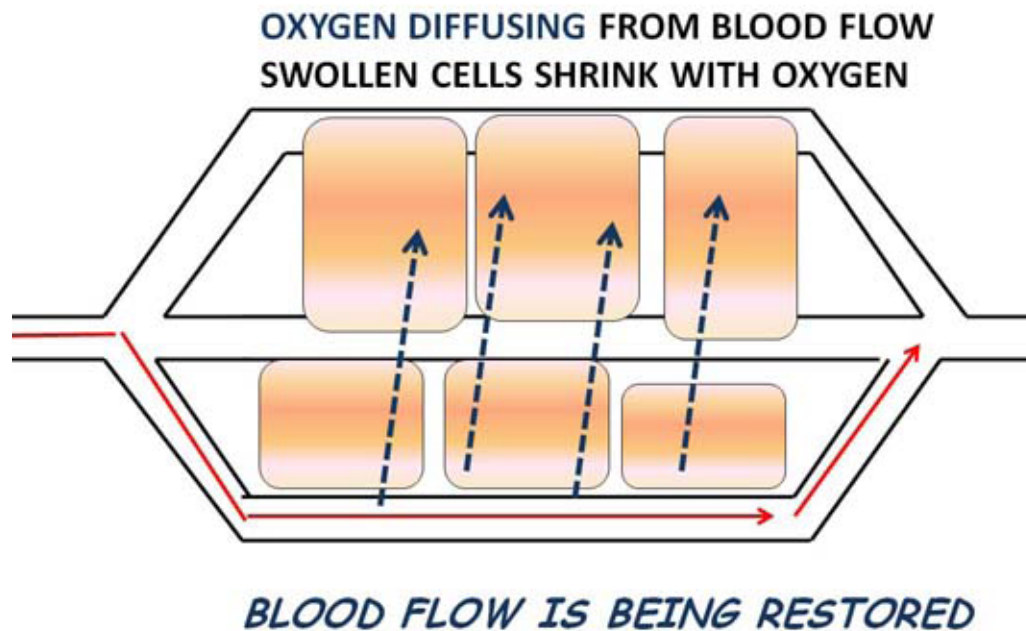
When the blood flow is blocked by bubbles, energy production is lost and the sodium pump begins to fail. Sodium ions move to equalize the concentration gradient and water molecules move along with the ions. The water cause cells to swell and they compress the walls of the capillaries near them.

In the normal condition, blood flow surrounds cells as we see in Figure 7. Clearly, with swollen cells, even when the bubbles dissolve as the inert nitrogen diffuses away, blood flow is not restored. We now have no blood flow, no oxygen, swollen cells and little hope of recovery. This is shown in Figure 8.



The swollen cells make for the ineffectiveness of compression therapy. Pressure cannot compress swollen cells. A blockage of blood flow is also the reason that drugs administered intravenously are not effective since there is no local blood flow.

When oxygen is given in the hyperbaric chamber, it is able to diffuse from the nearby patent capillaries into the swollen cells this is shown in Figure 9. Oxygen is a small molecule and is able to diffuse over a relatively long distance – at least on a cellular level.



When oxygen reaches the enlarged cells, the molecular pump is restored as ATP can now be synthesized. Water is lost as the sodium ions are removed from inside the cells.

Medical Oxygen

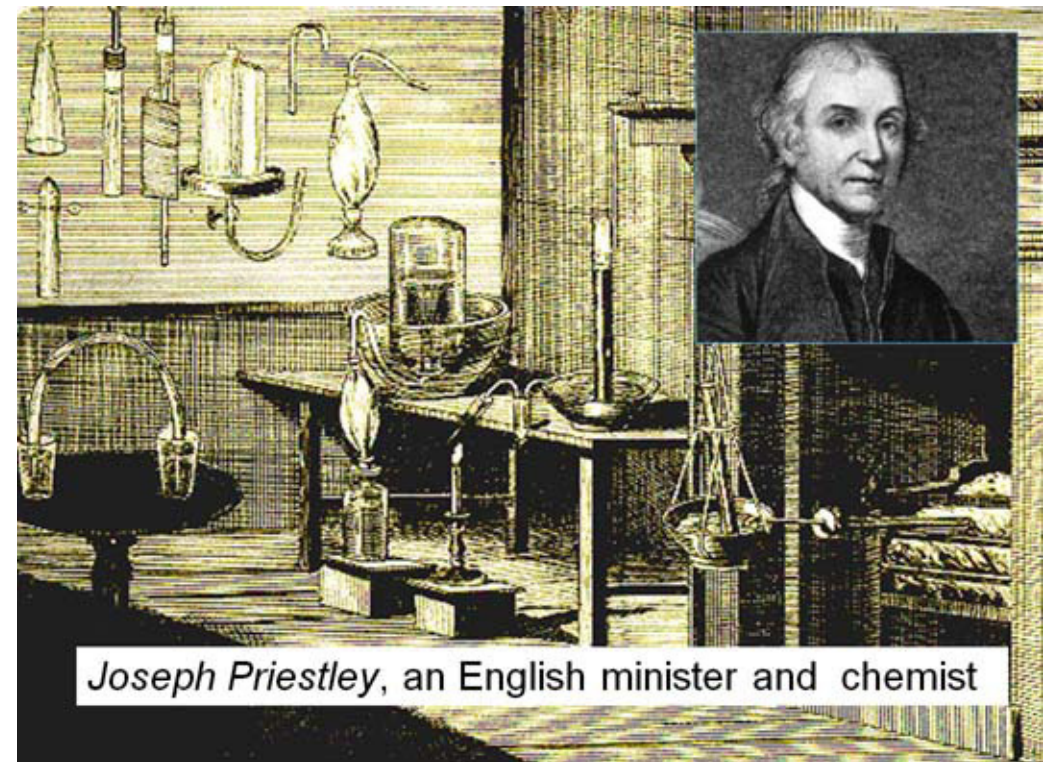
Diving has made a great contribution to medicine in the form of hyperbaric oxygen therapy. Some have termed this “the jewel in diving’s crown.” We generally think of diving as a recreation or a somewhat small commercial enterprise, but this medical contribution is huge.

Jules Verne and Other Interesting Events Concerning the Discovery of Oxygen

Oxygen was first made by an English chemist named Joseph Priestley. By gently heating mercuric oxide, Priestley believed he was removing phlogiston from the atmosphere into the mercury, so purifying the air. [Figure 10] He describes inhaling oxygen in his *“Experiments and Observations on Different Kinds of Air”*.

The feeling of it to my lungs was not sensibly different from that of common air; but I fancied that my breast felt peculiarly light and easy for some time afterwards. Who can tell but that, in time, this pure air may become a fashionable article in luxury? Hitherto only two mice and myself have had the privilege of breathing it.’

The “dephlogisticated air” was oxygen released from the previously burnt mercury.



With the advent of “oxygen bars” where individuals pay around \$10 for 5 minutes of oxygen therapy, Priestley seems remarkably prescient in his suggestion that oxygen might become a fashionable luxury article.

In a paper by Priestley entitled “*On Different Kinds of Air*” published by the Royal Society in 1772, he describes his experiments that show that the air of a room “vitiating” [made unlivable] by burning candles can be “restored” after ten days by growing plants, and the air would again support a candle flame. He postulates the plants “clean” the “fixed air.” This “fixed air” not only would extinguish a candle flame, but also in smaller amounts can render one quite giddy. Herein lays the source of the Reverend’s problem. He has inhaled too much *carbon dioxide*.

These proofs of a partial restoration of air by plants in a state of vegetation,... cannot but render it highly probable that the injury that is continually done to the atmosphere by the respiration of such a number of animals, is, in part at least, repaired by the vegetable creation.

Joseph Priestly, *Experiments and Observations on Different Kinds of Air*, 1790

While it is obvious to us that there are many different types of gases, at one time this was not known. The existence of oxygen and its properties were Nature’s secret. Priestley was fascinated by gases or “airs” as he called them. His numerous and ingenious investigations into pneumatic chemistry (the study of gases), much with the equipment that he invented, were pioneering. In 1772, he read before the Royal Society his paper “*Observations on Different Kinds of Air*” in which he describes the identification of nitric oxide and hydrogen chloride. His work will eventually lead him, in August of 1774, to employ sunlight, focused by means of a lens, to heat red oxide of mercury in an enclosed glass jar. He disputed with two mice as to “who shall be the first to breathe this new gas.” He wrote in 1775:

“From the greater strength and vivacity of the flame of the candle in this pure air, it, may be conjectured, that it might be peculiarly salutary to the lungs in certain

morbid cases... But, perhaps, we may also infer from these experiments, that although pure dephlogisticated air might be useful as a medicine, it might not be so proper for us in the usual healthy state of the body: for as a candle burns out so much faster in dephlogisticated than in common air, so we might, as may be said, live out too fast, and the animal powers be too soon exhausted in this pure kind of air. A moralist might say that the air which nature has provided for us is as good as we deserve. But, I fancied that my breast felt peculiarly light and easy for some time afterwards. Who can tell but that, in time, this pure air may become a fashionable article of luxury? Hitherto only two mice and myself have had the privilege of breathing it.”

Priestley also conjectured on possible medical applications and restrictions for dephlogisticated air:

One early reference to the recreational use of oxygen is found in Jules Verne’s 1870 novel “*Around the Moon*.” In this work, Verne states,

“Do you know, my friends, that a curious establishment might be founded with rooms of oxygen, where people whose system is weakened could for a few hours live a more active life? Fancy parties where the room was saturated with this heroic fluid, theaters where it should be kept at high pressure; what passion in the souls of the actors and spectators!”

In the depth ranges and usual time limits employed by recreational SCUBA divers, oxygen toxicity *per se* does not play a role. However, for technical and scientific diving, there is an increasing use of oxygen-enriched air mixes to lengthen bottom time. These mixtures are becoming increasingly available to recreational divers.

Medicine - The First Uses of Oxygen

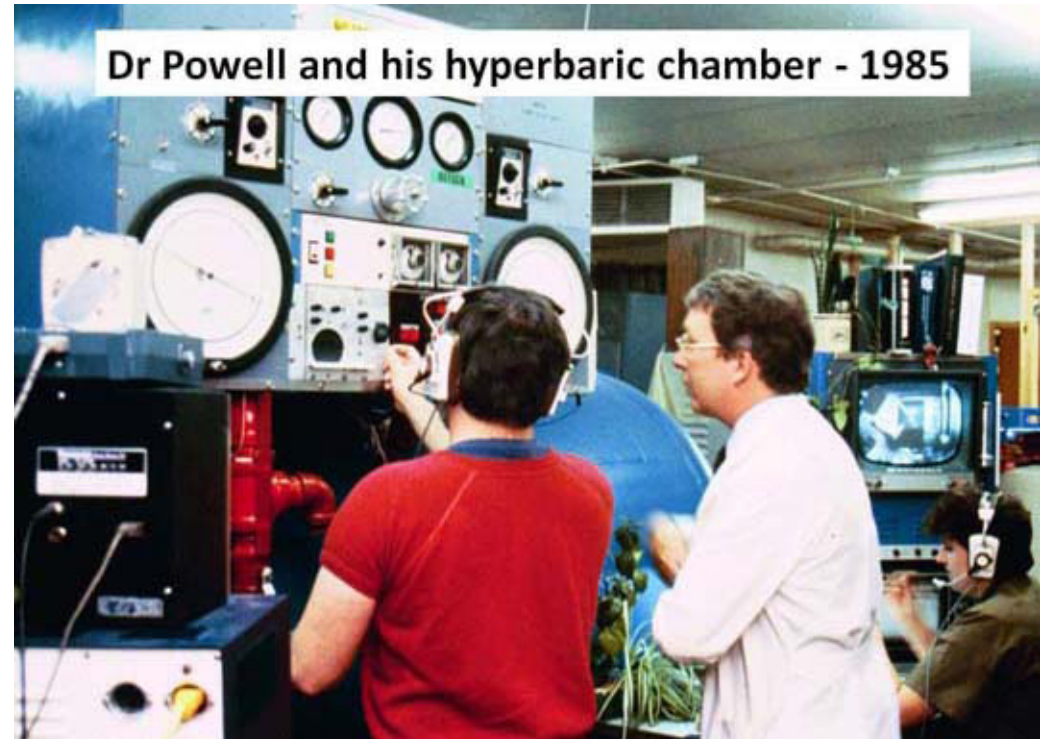
Oxygen had but limited use in medicine until the early part of the 20th century. It was employed in minor trials, however, shortly after its discovery by Priestly approximately 200 hundred years ago. He believed that breathing it produced an exhilarating feeling within the body, and we recall that he wrote, “In time, I could imagine it to become an item in commerce for the wealthy.”

The English chemist and physician Thomas Beddoes wrote, in collaboration with the engineer James Watt, a paper in 1794 entitled, “*Considerations on the Medicinal Use and Production of Factitious Airs.*” In Bristol, England, he established the *Medical Pneumatic Institute* for the treatment of disease (primarily lung diseases) by inhalation therapy.

Today, oxygen is sold at “oxygen bars” where individuals can breathe the gas for “invigoration.” However, the blood is as saturated at one atmosphere [with 21% oxygen] as it will be with 100% oxygen. Therefore, the “bar” furnishes nothing but a lighter wallet! There are also oxygen vending machines that allow “cash reduction from your wallet” in automated form. Oxygen is also sold in cans, usually in 95% concentration so it can be sold without the legal restriction on “medical grade.” It is apparently very widely available in Japan. We also have oxygenated water – as if oxygen is absorbed exceptionally well by the stomach lining! No, it is not.

Current Medical Indications

Below are listed some of the medical problems in humans that are currently being effectively treated with hyperbaric oxygen. Curiously, most of these are also treated in animals such as dogs, cats and horses. The protocols for these maladies have been described by the *Undersea and Hyperbaric Medical Society*. There is also a *Veterinary Hyperbaric Medical Society* and their web site lists about twelve hyperbaric chamber facilities in the United States. The chamber once at the *Institute of Applied Physiology and Medicine* in Seattle is shown in Figure 11.



Decompression Sickness

DCS is the most common indication for divers and was the first use for HBO for several decades. Because diving establishments had pressure chambers, they were the first to expand the use of HBO to the general medical community.

Air Embolism

This problem is well known to divers. In non-diving patients, the problem usually arises at surgery when air is accidentally introduced into the vascular system.

Carbon Monoxide [CO] and Cyanide Poisoning

CO poisoning is most commonly encountered when there is a leak in the furnace and this gas enters the house. Cyanide poisoning is encountered in industrial accidents.

Clostridal Myositis and Myonecrosis (Gas Gangrene)

The clostridium organism is killed by oxygen. HBO is useful to prevent extensive amputation of a gangrenous limb.

Crush Injury, Compartment Syndrome, and Other Acute Traumatic Ischemias

When tissue is crushed, the blood vessels are also destroyed. HBO can assist in the regrowth of capillaries and save damaged tissue.

Enhancement of Healing in Selected Problem Wounds

These are, for example, diabetes-derived illness, such as diabetic foot, diabetic retinopathy, and diabetic nephropathy. HBO is very useful in patients where conventional treatment has proved to be ineffective.

Exceptional Blood Loss (Anemia)

When blood supply is insufficient, for medical reasons, HBO can be used to supplement the oxygen carried in a reduced blood supply. Medical use would include *blood incompatibility* or concern for *transmissible disease*. Medical use would also include *Jehovah's Witnesses*.

Necrotizing Soft Tissue Infections (Necrotizing Fasciitis)

This is commonly called "flesh-eating" bacteria. We have all read about this problem, and I would certainly like to pass on this one. It sounds horrible, but HBO is helpful.

Osteomyelitis (Refractory)

This is an infection of the bone or marrow. It is indicated when other appropriate management techniques and treatments have been tried and have failed.

Delayed Radiation Injury (Soft Tissue and Bony Necrosis)

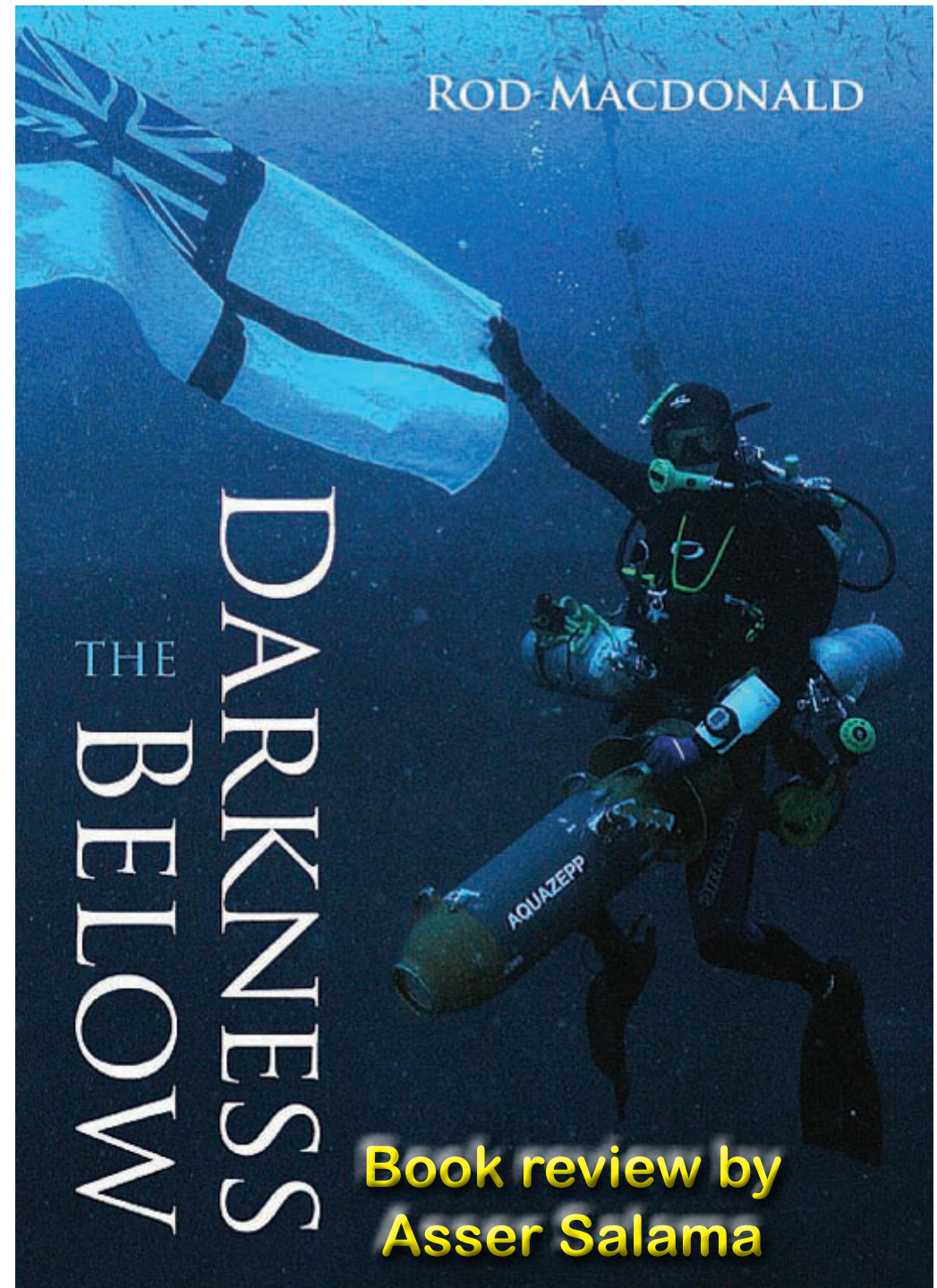
This can occur when radiation has been used to kill tumor cells. Healthy tissue can also be injured and recovery can be slow or nonexistent without adjunctive HBO therapy.

Skin Grafts and Flaps

Normally skin grafts do not require additional oxygen. However, radiation will sometimes result in damage and healing of the graft does not occur.

Thermal Burns

HBO is helpful when conventional treatment is insufficient.



Although I've missed out on Rod Macdonald's book *Into The Abyss*, I found it sort of covered at the beginning of *The Darkness Below*! The very first section illustrates the good old days of diving, when tailor-made equipment were involved. Rod then takes us to the period I personally enjoy remembering most: deep air diving. Finally, his successful steps into technical and rebreather diving are discussed.

I think anyone from a novice diver all the way up to mixed gas rebreather divers will find something interesting (and probably new!) in this book. As the book unfolds the dives get more challenging. Rod's descriptive way of writing answers many questions, even before being asked by the reader. His approach to locating and identifying wrecks is truly professional. Reading this book is, in a way, similar to watching a good "wreck hunter" series of documentaries.

The Darkness Below describes dives on some of the greatest shipwrecks around the globe. It starts with the White Star Liner *Justicia*, lost off Ireland during WWI. Rod then sheds lights on the remains of the German *High Seas Fleet* off Scapa Flow; not unusual for someone so experienced in that area. Afterwards, Rod visits the *Wallachia* off Clyde, along with some spectacular wrecks from the both world wars.

The Darkness Below also records visits to the remains of *HMS Hampshire*, *HMS Audacious*, the *Remuera*, the *Laurentic*, the *Empire Heritage* and *U-155*. However, the center of attention of the book, in my opinion, is Rod's visits to the remains of *HMS Repulse* and *HMS Prince of Wales*. They were both lost to the Japanese off Malaya during WWII.

But it's not only about shipwrecks! In a daring expedition, Rod dives the *Corryvreckan* whirlpool, one of the largest whirlpools in the world. He also precisely describes an encounter with killer whales in open water. On the darker side of diving, Rod recounts some less-than-perfect experience with decompression illness. Fear of entrapment inside wrecks and encounter with snagged fishing nets give the reader a true sense of this type of diving.

The Darkness Below is available for £18.99 excluding P&P at Whittles Publishing http://www.whittlespublishing.com/The_Darkness_Below

A large, stylized biohazard symbol in a yellowish-green color, positioned on the left side of the title. The symbol is composed of three interlocking circles with a central dot, and it has a distressed, splattered texture.

ULTIMATE PLANNER

Your Decompression Planning Software

www.techdivingmag.com/ultimateplanner.html

Let's talk about... the S word

By Agnes Milowka



Solo diving - there I said it. If you mention the S word at a dive site more often than not folks get a little freaked out, give you a funny look and assume that you have a death wish. It is easy to see why, the first SCUBA course teaches us two things; never hold your breath and always dive with a buddy. Yet the idea that solo diving will automatically kill you is akin to the myth that doing it solo will make you go blind. If you can't imagine yourself in a cave alone, what are you doing inside a cave? If you wouldn't swim three hundred feet into a cave by yourself what are you doing three thousand feet in with a buddy?

More often than not buddy diving is a case of 'together alone'. It is not unusual to see a so called 'buddy pair' miles away from each other inside caves from Florida to Australia. When it all goes pear shaped what help exactly will they give to one another? If you can't see your buddies light you have no hope of knowing when they are in trouble nor giving them any assistance, period, let alone assistance in a timely manner. Let's face it, most people will be lucky to get the help they need from their buddy when it matters most.

So is having a buddy giving YOU a false sense of security? If you can't imagine being in a cave by yourself, if nothing else you are relying on your buddy for emotional support. You cave dive long enough and eventually it is all going to hit the fan - are you confident you can handle it alone? If you aren't, are you really holding up your end of the bargain? If you can't help yourself when you encounter a problem, how exactly are you planning on helping your buddy?

I would argue that solo diving makes you a better diver and in the end a stronger buddy if you choose to enter such liaisons. When it comes to diving with other people you know what your limitations are, you know how far you can push yourself and you will not be swayed by

peer pressure or a false sense of security to go further or deeper than you should.

You should be comfortable in a cave by yourself and you should know what kind of a diver you are. Are you aggressive or more conservative when you are alone? Does your trim suffer if no one is watching? Have you got the presence of mind to fix problems that arise? Can you plan a dive and execute it without someone watching over you? Have you got cave awareness or will you get lost as soon as your eye drifts away from the line?

The main argument to support the theory that buddy diving is superior to solo diving is that 'two brains are better than one.' No matter how much redundant equipment you have, the theory goes, at the end of the day you only have one brain so it is nice to have a backup. This theory suggests that somehow two people working together to solve a problem will mean that it is more likely to be resolved, for example two people lost in a cave are more likely to get out after communicating about their predicament.

I would argue that it is precisely this redundant brain that is likely to be the source of potential problems to begin with. You can control a lot about your diving; you can control yourself, your gear, your route and how far inside a cave you will venture. Yet you cannot control what goes on in your buddies brain. What another person is thinking or feeling at any one time is often a mystery. Are they pushing themselves to be there? Are they happy and focused on the dive or have they had a bad day at work and they're feeling suicidal or homicidal for that matter? Humans in general aren't exactly real good at communicating. Our two lost mates from the example above probably got themselves in the 'crap! where's the exit?!' predicament because of a lack of communication in the first place... 'I thought you

were keeping track of where we are?' 'No, I thought you were - you where the one leading!' Surely the double fatalities that occur would prove that a redundant brain can't solve all problems.

There are times when solo diving in my opinion is clearly a good option, in tight silty passages for example, a buddy would hinder rather than help. Doing it solo is often more effective, but of course, just like with the real S word, it can be more fun with a buddy. If you can find a buddy who has a similar breathing rate, a similar pace, similar goals and interests inside the caves and they have as much interest in your satisfaction and pleasure as their own, then you are indeed more likely to have more fun and a good time. Yet anyone can tell you that finding a perfect match is no easy feat.

They say that happiness is only real when it is shared. If indeed you dive with a buddy in order to share the experience and have more fun, then I would suggest a little bit of buddy awareness probably wouldn't go astray. If you want to dive with someone that's exactly what you should do dive together. Too often people get in the water at the same time, but aren't really diving together. Why pretend? What's the point? You want to solo dive then that's what you should do.

Solo diving is not everyone's cup of tea and you should be realistic so that you don't bite off more than you can chew. Keep in mind however, that just because you are with a buddy this does not necessarily mean you are any safer than you would be if you were alone. Is solo diving taking on additional risk perhaps. We all draw the line somewhere and decide what risks are acceptable during the pursuit of our passion and the exploration of the underwater world. Knowing yourself and understanding your limitations, reflecting on your own behavior as a buddy and scrutinizing the attitude of those you dive with is a good first step towards cave diving safety in my book.

Bret Gilliam

BAREFOOT RENAISSANCE
MAN OF DIVING

BY LINA HITCHCOCK

Bret Gilliam is one of diving's most enduring personalities and also one of the industry's most successful entrepreneurs. A self-made millionaire by the age of 34, he has invested in nearly every phase of the diving business from resort ownership, liveaboard vessels, cruise ships, training agencies, publishing, manufacturing, and filming. He holds multiple licenses as a USCG Merchant Marine Master, aircraft and deep submersible pilot, and recompression chamber supervisor. Since beginning diving, at the age of eight in 1959 in Key West, he has logged over 17,000 dives.

He began his professional diving career in January 1971 with a special Navy team working with fast attack nuclear submarines in the Caribbean. That led to other commercial diving work before starting V.I. Divers Ltd., Southern Exposures (a publishing business), and a luxury yacht charter company in the Virgin Islands. After selling out his Virgin Islands holdings in 1985, he spent two years on filming and consulting projects while cruising aboard his yacht *Encore* before being recruited as an executive to run the diving and ship operations with Ocean Quest International. Their 500 ft., 24,000 ton dive/cruise ship *Ocean Spirit* would become the world's largest sport diving operation in history.

He was elected to NAUI's Board of Directors in 1991 and became Chairman and President in 1994. The same year, he formed Technical Diving International (TDI) and that company quickly grew into the world's largest training organization for nitrox, trimix and other tech programs. In early 1996 he became President and CEO of UWATEC, the dive instrument manufacturer, and took over *Deep Tech* magazine. His work has been published in everything from *Playboy*, *Vogue*, *Outside*, *National Geographic*, *Wired*, *Sports Illustrated*, *Time*, *Life*, as well as most of the diving magazines in the world. He has had over 600 articles published and authored or contributed to 26 books.

He founded *Fathoms* magazine in 2001 with long-time magazine collaborator, Fred Garth, and that publication quickly gained critical review for the highest quality in diving publications.

Considered one of the pioneers of technical diving, he held the world depth record for scuba on compressed air at 490 feet and drafted most of the original training standards and practices for mixed gas, rebreathers, deep diving, nitrox, and other segments of the booming tech market. He was elected to the prestigious Explorers Club as a Fellow National and is a member of the Boston Sea Rovers. He also served as a diving consultant for the U.S. Navy, U. S. Coast Guard, Naval Criminal Investigative Service (NCIS), Federal Bureau of Investigation (FBI), and the Central Intelligence Agency (CIA) as well as working as an expert witness for the U.S. Marine Corps in general court martial proceedings.

His business success defied conventional paradigms and his disdain for the trappings of corporate "style" was legendary, especially his loathing for suits and shoes. He wore tee shirts and shorts to his office and employees were encouraged to bring all their pets to work. His dog accompanies him everywhere and woe betides the person who might dare to object. He once compared having to wear a tuxedo to speaking engagements and formal social affairs as akin to sticking pins in his eyes. Not exactly IBM or General Motors executive practice. But over the years, two of his companies were taken public and the others sold to private investor groups. The total value of these sales exceeded \$80 million. Not bad for a barefoot guy who steadfastly refused to believe that diving was a "real job"...

I met Bret in 1977 when I ventured into V. I. Divers Ltd. in St. Croix to sign up for dive lessons. I was 22 and right out of college. I later joined the staff and eventually became Vice President & Operations

Manager. Bret engaged me in his filming projects as well and we ended up traveling around the world together. I especially enjoyed the role as his model that took us to the Red Sea, the Solomon Islands, Micronesia, Indonesia, Cocos Island, Vanuatu, the Bahamas, and throughout the Caribbean spanning 30 years now of exciting and challenging diving. It's been a wild ride. I guess I'd hung around him long enough to give me some perspective on handling an interview. Now if I could only get him to talk...

Let's start this a little differently. At the top of your business career when your companies were enjoying huge successes, you decided to walk away from it all. Why?»I had an epiphany brought on by a sudden event that just sort of stunned me. On Labor Day weekend 2003, our mutual friend Bill Turbeville was diagnosed with a terminal brain tumor at the age of 44. He was one of the healthiest guys I knew. He was a prominent attorney and we worked together on dozens of cases defending the diving industry. Initially, his doctors only gave him about three months. We talked a lot about life, the things he wished he had the time to do... not in a negative way, but more philosophically.

All Bill's friends rallied around him and we dragged him around doing all sorts of things he'd put off doing. He made it into the New Year when we almost lost him due to a mistake his medical people made while he was on a trip with family to London. You may remember, you and I were in the middle of the Banda Sea in Indonesia in January 2004 when Gretchen, my wife, called me aboard the ship on the Sat-phone to tell me his time was up and I needed to come back. That was impossible but when we made port in tiny Bandaneira, the Indonesian captain (who had been aware of my conversations in the wheelhouse) expressed his sympathy.

He invited me to go with the crew to perform a Hindu ritual that celebrated life and was supposed to send Bill some positive energy or karma or whatever. We trekked over to a beautiful garden, burned some incense (at least I think it was incense!), sniffed some flowers, and poured water all over ourselves while lounging in this makeshift fresh water pool by the old fort. We drank a couple of Bin-Tangs (Indonesian beer) as well; I figured they couldn't hurt, although that might have been a departure from the regular ceremony. It was nice day in the midst of terrible looming tragedy.

But when we got back into Bali ten days later, I found out that, almost to the hour of that little Hindu session, Bill started to get better. He was alive and well. I couldn't believe it. Must have been the Bin-Tang... He outlived every prognosis. We had a lot of time to talk. I brought him up to Maine that summer and we enjoyed fine wine, great music, and stimulating conversations between boat trips and touring the country. I told him that he had made me focus on what was really important. I was 53. Bill survived the whole year and passed away peacefully on January 2, 2005.

I changed my priorities. I had been lucky enough to make more money than I was probably going to spend, so my lifestyle wasn't going to suffer if I changed directions. I decided to sell all my companies and concentrate on a lot of stuff that I hadn't had time for. So I sold everything. Now I almost exclusively limit myself to the friends whose company I most enjoy, like you... and, of course, Gretchen, and my dog, Pete. I cut out trips that took me away from Maine from July to October because this is the most beautiful place in the world for me. Islands, mountains, forests, lakes, wildlife, the most glorious fall colors imaginable. No crime, no hassles, little traffic, no pollution, great boating, thousands of islands, and a wonderful climate with four distinct seasons. When I'm not in Maine, I'm traveling to places

unrelated to diving that I didn't have time for in the past.

Okay, back to the beginning. Where and when did you learn to dive?»I began in 1959 in Key West, Florida. Back then diving really was not a recognized sport and I was eight years old. My father indulged my interest in learning to use scuba gear. I was already free diving as deep as 40 feet or so and I think he and his navy buddies regarded me with a certain amusement. They hooked me up with a small oxygen cylinder that they cleaned out and rigged a harness to. The double hose regulator hung nearly down to my knees. But I just adored being underwater and it began a lifelong passion for me. I finally got certified in 1960 and later ran a very successful fish collecting business, supplying specimens to the local municipal aquarium and one in Miami. At the age of eleven I had my own boat and outboard and was making over a hundred bucks a week diving for fish. That was a fortune in those days.

Why diving and shipping as a career?»I don't really think I ever had much choice when you think about it. I was born at the U.S. Naval Academy. As a baby, my first word was "boat" and I learned to swim before I could walk. My father was a senior naval officer who indulged my passion for snorkeling and diving by letting me go through an early YMCA program after watching the first episodes of Sea Hunt. That year my family had moved aboard an 80-ft. motor yacht named Argo and when my dad was transferred we simply moved our boat to his next duty station. By the time I was in high school we had covered the entire Atlantic seaboard from Maine to Key West, Florida twice. So diving and boats were my whole life. The only time I lived ashore was when I went off to college. Ever since then I've either lived on an island or commanded a ship somewhere. What else was I going to do for a job? Sell insurance?



**Cdr. Bill Gilliam and Bret,
Bimini, 1959**

You got involved with the Navy in some pretty crazy diving projects. How did that come about?»Complete blind good luck. When I graduated from high school, the Vietnam War was at its peak. Basically, you either got a college deferment or got sent to Southeast Asia for your "senior trip". I had no idea how long the war was going to last but knew that I'd get nabbed eventually when college was over. I figured if I had to serve, I'd rather do my time as an officer so I applied for and won a National Army ROTC scholarship. This came with a six-year active duty obligation but paid all tuition costs, housing, food, books, transportation... everything to attend any university in the country. It even paid me a modest salary while in

school. It was actually a hell of a deal. And I hoped the war would be over by the time I graduated. By late 1970, it was showing no signs of ending and guys that I had served with were rotating back from Vietnam and coming to visit with real horror stories. It was sobering.

To make a long and circuitous story short, because of my diving background I ended up working with the U.S. Navy on some projects with submarines. This kept me out of the army and negated my six-year obligation. At the time, all of their sub operations for this project were based in Puerto Rico and later in St. Croix in the Virgin Islands. I worked directly with one of the contractors who operated the Navy support ships and coordinated with the P-2V and P-3V aircraft and subs. Our work was classified at the highest secrecy levels and considered to be extremely hazardous duty. So I even got paid more. Since we worked on the ships with other civilian technical contractors, we didn't even get hassled about haircuts. From my point of view as a 20 year old that had just escaped duty in Vietnam to go work underwater in the Caribbean... well, I thought I'd died and gone to heaven.

What were you actually doing?»This was at the height of the Cold War and the threat of Soviet missile submarines launching an undetected attack on the U.S. These big Russian subs carried ballistic missiles and a perpetual “cat and mouse” game was being played out by the Navy's fast attack subs that hunted the “boomers”. A basic tactic was for an attack sub to spend hours simply waiting and listening underwater to track their enemy counterparts. But eventually, the U.S. subs had to speed ahead and reposition themselves before going back into silent running, listening for the Russians to approach. The attack subs were just about undetectable when lying silent or cruising at slow speeds. But when they leaped ahead at high speed, they created acoustic noise signatures that could give them away.

Our mission was to film the visible wake vortex that was created by the sub's propeller, struts, dive planes, etc. By studying the film we shot, the Navy's experts found ways to reduce the noise signature and make the subs less likely to show up on the Russians' sonar and listening devices.

We worked in three man dive teams and positioned ourselves in a triangular formation that the attack subs would drive through at varying speeds. As they passed between us, sometimes there was only about 25 feet or so between the sub and us. We'd get in position, as deep as 300 feet or more sometimes, and wait hovering with our camera gear. They would give us a ping to let us know they were starting their run and we'd hold position and start filming. The subs went by us starting at crawl speed, then up to 10 knots or so. That was pretty tame. But eventually they were making passes at flank speed. This was in excess of 50 knots. It's a pretty hairy experience to be a diver in the water with a 300-ft. nuclear submarine buzzing past you. You get tossed around.

We were working about 15 miles offshore in the Virgin Islands Trench that's over 10,000 feet deep. The visibility in the open ocean depths is fantastic, over 200 feet at times. But even then, we rarely saw the subs coming. The human eye couldn't pick it up fast enough, coming out of the blue. The sub would be on us and by us so quickly that you couldn't react. Then the wake would hit us. You'd be thrown to the right or left, or up and down depending where you were in the triangle. It was just crazy, but we got good results.

The captain on our support ship used to watch our diving operations and just shake his head. He liked to say, “Ya know, the Navy has a really good retirement program. The key is living long enough to collect the benefits.”

This was really new ground and our dive team was given extraordinary latitude to improvise if we felt we could be more efficient. We quickly took wide departures from standard Navy diving procedures at the time. We had a reputation as mavericks but we were so productive it was hard to rein us in. We were getting better film and were able to work far deeper than any of the divers that preceded us.

Sharks were actually the key to our independence since none of the regular Navy diving supervisors wanted responsibility for us or even to visit to evaluate our methods. One time, we had a very uptight officer sent over from the naval station on Puerto Rico because he was pissed off at all the non-standard stuff we were doing and wanted to “straighten us out”. When it came time to enter the water from the ship’s aft deck, the crew had to push the dozens of Oceanic Whitetip sharks away from our entry point with boat hooks just to make a hole we could jump into. The guy took one look at this mayhem and said, “No way!” After that, we were pretty much left alone.

Eventually you were involved with a fatal attack, weren’t you?» That actually came about a year or so later. We had a lot of problems in the open ocean with these pelagic sharks. Sometimes we’d have scores of them around us at a time and they could be nasty. They were naturally inquisitive but they were really stimulated by the low frequency sound signatures that the ship was putting in the water. These trials simulated submarine noises when we were testing the hydrophone listening devices dropped from the aircraft. This seemed to agitate the sharks into a frenzy of unpredictable behavior. Once the low frequency sound generators went active, the sharks just lost it. They’d bite our cameras, our fins, the ship’s props and rudder, and even the boat hooks used to push them out of the way when we made our entries. We had to watch each other’s backs all the time. Our entries and exits from the water were the most dangerous so

everything we did was focused on getting quickly down to about 25-30 feet where the foam cleared and we could stabilize below the ocean waves. Not being able to see when you jumped in was very stressful. At the conclusion of our dives when the deco was over, we’d try to time our exits to use a big wave to sort of throw us up on to the deck with the crew scrambling to grab us. It was not for the faint of heart.



Gilliam and Oceanic Whitetip, hooked during diver’s decompression, aboard Navy ship in Virgin Islands, January 1971

In 1972 a friend of mine, Rod Temple, was killed while we were working on a scientific project on the north shore of St. Croix. On that particular day, two Oceanic Whitetips simply swam up to him in about 180 feet depth and attacked him. There were three of us on the dive. I sent the diver who was low on air up and I went back to try to

save Temple. The sharks had hit him several times and when I got to him, I grabbed him and tried to swim up. But they kept coming back, biting him, and were pulling us deeper over the drop off wall. I was hanging on to one side of him and we were both trying to beat them off, but it was no use. He eventually passed out from blood loss and trauma and the sharks pulled him away from me. He was dead by then. I was out of air and had to do a free ascent from well over 300 feet and ended up badly bent. I was evacuated by the Navy and the Coast Guard to Puerto Rico to the chamber there and treated. I was extremely lucky to survive.

You were cited for heroism for trying to save Temple during the attack. What went through your mind at the time?»Certainly nothing heroic. When I went back for Rod, I didn't initially realize that he was under attack. He was below me on the bottom and everything was all stirred up and murky. In fact, I thought he had an equipment problem and would need to buddy breathe. It was only after I swam into the mess and grabbed him that I realized the sharks were hitting him and that's why everything was chaotic. So I sort of got sucked in unwittingly.

To me, a hero is someone like Al Giddings who actually jumped out of a boat where he was safe and swam to rescue Leroy French who was under attack by a Great White shark some years earlier in northern California. Al dragged Leroy out of the shark's mouth, swam him back to the boat and pulled him in. He survived. There should be a statue of Al somewhere as an example of selfless courage. That's a hero. Later Al and I became good friends and I remain in awe of him.

Your attack got a lot of publicity didn't it?»Understandably so. It happened right off a popular swimming and snorkeling beach area and involved pelagic sharks that most people weren't even aware

were present in those areas routinely. This was before *Jaws*. It shook people up pretty badly. The local newspapers splashed it all over the headlines and it was written up in a lot of articles about shark behavior. It was something I just wanted to forget. But it was always being recounted and after *Jaws* came out as a movie, it generated new interest. In 1992, a producer from the BBC was doing a series of documentaries called *Dead Men's Tales*. It was about people who had survived extraordinary accidents against all odds. He met with me and bought the rights to the story. So I was in the BBC series with people who had fallen out of airplanes with no parachute, got trapped in caves that collapsed, dodging volcanoes that erupted with lava streaming down on them, all sorts of bad situations. It was interesting to meet some of these characters. The survival instinct is phenomenal in some circumstances.

Some years later, Marty Snyderman edited a book called *Great Shark Adventures* and had me write the firsthand account of my incident that was included with other chapters from Howard Hall, Mike deGruy, Stan Waterman, Rodney Fox, Leroy French, Carl Roessler. A couple other books including *Mark of the Shark* bought the story later as well.

Moving on... how did your time with the Navy end?»Ironically, our rather gonzo methods produced results way ahead of the Navy's projected time frame. We finished their project; I was assured that I had no further obligation for service and I was almost immediately recruited for some commercial projects. The first one was a massive underwater blasting job to prepare a ship channel for super tankers going into the Hess Oil refinery on St. Croix's south coast. We were working with strings of 80-lb. TNT shaped-charges linked in series, probably a couple thousand pounds of explosives. We were diving in about zero visibility most of the time doing everything by touch and

feel. Once you fired off the rack, it blew a column of water about 30 feet in the air and rained down sediment, coral, dead fish all over the place. We had issues with sharks there too, but they were mostly Reef and Lemons that weren't as crazy as the Whitetips. A few big Bull sharks would occasionally swim through and we'd have to get out.

But that was a great job and taught me a lot. This was the summer of 1971 and I was making as much as \$500 a day. I saved my money and that nest egg let me launch into sport diving later.

That same year had you involved in your first film didn't it?»That's a funny story. A crew came to the Virgin Islands to shoot an early X-rated movie. They needed some local site support and got steered to me for a boat and suggestions for where to shoot some outdoor sequences. At first I didn't know what the nature of their film was. I thought it was a travel piece or something. They had hired Harry Reams, the male star from *Deep Throat* that had just been released and was doing great box office sales. There really wasn't a porn industry then and the guys that were doing this were mainstream directors and producers trying to capitalize on the phenomenon that *Deep Throat* had created.

Their movie was called *Pleasure Island* and after I saw a couple of the rudimentary storyboards, I quickly figured out that we weren't shooting a sequel to *The Sound of Music*. They had a female lead actress named Nancy Kool and about a dozen other professionals from the adult film genre. But before the first week was out, some sort of money misunderstanding took place and everyone but Harry and Nancy left. So the film investors decided to hire local people as replacements. It was hilarious. Nowhere else but St. Croix in 1971 could you have had a casting call for a porn film and have nearly a hundred mainstream people try to sign on. There were real estate

agents, lawyers, bar tenders, waitresses, pilots, insurance salespeople, even schoolteachers who showed up. These were people already living in the tropics... tanned, athletic and in good shape. They moved to the islands in the first place probably because they were a little non-conformist by nature. Well, this movie production unleashed their inner "wild-child" streak.

Once the film managers promised them that they would never allow the film to be released or shown in the Virgin Islands, the last of whatever inhibitions that remained went out the window. One girl who taught the sixth grade in a local elementary school actually surpassed Nancy Kool as the star. She was this drop-dead gorgeous blond, built like Pamela Anderson, without a trace of modesty. I remember one day, shooting had to stop because she said she needed the afternoon off. She had to coach her school softball team in a game. So the whole movie crew went with her and filmed her. It was surreal. We were all cheering and going nuts as the kids ran around having a great time while wondering why their game attendance had just shot through the roof. The filmmakers wanted to work it into the story line of the film but she drew the line at that. She said she thought it might not be appropriate. For once, the voice of reason prevailed.

We also went over to Virgin Gorda in the British Virgin Islands and decided to shoot a graphic scene in the natural rock pools at The Baths. In those days, Virgin Gorda was a sleepy little island with practically no visitors. It was fabulously beautiful on these south end beaches and we figured we'd have the whole place to ourselves. Wrong! Right in the middle of the "action" a group of about 20 elderly bird watchers from the Midwest heartland wandered right into the scene and got an eyeful. We found out later that we wrapped up filming and got back on my boat for St. Croix only minutes before a couple local policemen came down to check out the birdwatchers' excited report.

The mystery porn crew was the subject of urban legend in the BVI for years afterward.



Smithsonian Project crew: Dr. Mendel Petersen, George Tyson, Dr. Alan Albright, Gilliam, Dave Coston, 1973 (with early proton magnetometer over wreck site)

It must have been quite different on your next project for the Smithsonian Institute?»Yeah, just a bit. We were working on the excavation of a 17th century shipwreck called the *Santa Monica*. It was a joint venture with a local archeologist named Dr. Allan Albright and the legendary Mendel Peterson, Curator of Historical Archaeology at the Smithsonian. It entailed work with airlifts during the underwater excavation, mapping the wreck that had been covered in sand and coral for a couple centuries, and recovery of the artifacts. Absolutely fascinating. We also did a lot of work with some of the first towed proton magnetometers that allowed us to search for and locate several other old wrecks including the *Wye*. The *Wye* was the sister ship of the *Rhone* that sank in the same storm in 1867. It was a great experience.

After that you decided to get into the sport diving business.»Diving was really in its infancy then. I figured if I wanted to stay in the Caribbean I might as well try getting people to buy gear, take lessons, and run some tours. So with my own meager savings and a \$3,500 loan from my mother, I rented some retail space in Christiansted, St. Croix and jumped in. I called the company V. I. Divers Ltd. That was in 1973.

How did a 22 year old with no prior formal business training possibly survive?»Common sense got me through a pretty steep learning curve about business and management. Since no bank would loan me money in those days, I was playing with my own chips in the ultimate poker game. If I failed, I was doomed to getting a real job that would require me to wear shoes and get a haircut. Maybe that was my best motivation. But my philosophy was quintessential 1970's "Hippie-Zen-Karma": treat your customers like you'd want to be treated yourself, and give them a good value for their dollar. Sort of an entrepreneur's "golden rule." And I never hesitated to expand in order to have the largest vessels, the best equipment, and the widest

variety of services. It paid off. I was lucky to find some really great staff like manager Bill Walker who was key to our success until you took over in 1980. Over 35 years later, I still had customers with their grandkids coming back to me that had been with me in various operations before.

Who was the biggest influence on your career?»Well, without the enthusiasm of my parents I would never even have gotten started. For the life of me, I still can't believe that I convinced them to let me take up diving when the other kids were worrying about getting their first bicycle or baseball glove. But they were great and forked over the dough for my first set of gear and helped me manage my money from the fish collecting business to buy my own boat. I think by the time I was a teenager they realized that diving might become part of my professional life. But I don't think they ever thought that it would make me wealthy as it ended up doing. I think they just hoped that I would eventually come to my senses.

I also could never have gotten started without the support and faith of Dick Bonin, the founder of Scubapro. He took a chance on me and gave me the Scubapro franchise over the protests of a big company that sold a little dive gear along with hardware and commercial gas supplies. I had managed their diving division for a year and when I left he let me take the Scubapro line with me. I owe him a lot. Everything I did in business later started from that first success at V. I. Divers Ltd.

How did things go with your new business?»Pretty slowly, at first. Initially, it was just me since I couldn't afford to hire anyone. I sold gear, stocked the shelves, did repairs, filled the tanks, taught courses, and basically starved a lot. I had become an instructor for NAUI in 1972 but they actually didn't approve of dive stores, something about

pervverting your ethics if you sold gear. But I taught their program and simply ignored their weird ideas about business. When I got my first boat, I finally had to hire someone to watch the store so I could go run the dive trips. I knew the only way I was going to succeed was to overwhelm my customers with service. It paid off and word of mouth steered a lot of business to the place. And gradually we grew.

A turning point came in 1975 when I decided to move to a waterfront location in the town's classiest retail section called the Pan Am Pavilion. The rent was \$500 a month for a massive two-story space with two entrances. I thought, "\$500, that's a fortune, I'll never be able to pay that kind of money." But I knew "location" was going to be key to our growth so I choked back my horror at the price and moved in. And I was smart enough to sign a 10-year lease. Within a year or so, we broke a million in sales for the first time - a huge benchmark. We ended up with over 30 employees, a bunch of big dive boats, contracts with marine science labs, a commercial diving division, a luxury yacht charter fleet, and a film support division as well.

How did you get into the filming end of things?»A production company had hired one of my boats for some second unit sequences for a movie. I wanted to make a good impression so just about anything they asked for, I'd agree to. "Can you back your 50-ft. boat in through the breaking waves so we can work right off the beach?" And I'd go, "Yeah, sure!" and then have to figure out how to do it safely with a bunch of yahoos on board who could barely dress themselves without getting into trouble.

Anyway, they also asked me to arrange a helicopter, a local carpenter to build some sets, an electrician for lighting, and even the catering service. Before I knew it, I was providing just about everything



Bret Gilliam

including stunt people. “We need someone to dive off that cliff into the ocean between these coral heads. Can you arrange that?” Hey, no problem. And I’d go find some crazy friend who would do it and we’d split the hefty fee I negotiated. Once I figured out that film crews on location, outside their comfort zone back in Hollywood, would pay virtually anything to get things done smoothly and without a lot of logistical hassles, I had the keys to the kingdom. We did good work and the referrals just poured in.

What type of films did you work on?»You name it. Television, big budget movies, documentaries, nature films, travel destination specials, shark stuff, advertising shoots, soap operas, it never ended. For TV, we did things like *Miami Vice*, *Greatest American Hero*, *Days of Our Lives*, *Caribe Force*, *The Young and the Restless*, *American Sportsman*, a bunch of stupid shark tagging contests. Most of it was tedious and pretty lowbrow but it paid well.

What was your favorite movie production?»No contest! In 1977 we started work on *The Island of Dr. Moreau* and it was the most fun I ever had. I’d briefly done some work for Columbia when *The Deep* was being shot in the BVI. But it was mostly advance stuff for compressors, boats, specialized gear. And the entire budget for *The Deep* back then was only about eight million. When AIP decided to shoot *The Island of Dr. Moreau* six months later, they had twice the money to throw around. They spent money like it was going to burn their fingers if they held on to it. I was serving as the marine coordinator since a lot of the movie was filmed on the ocean or in remote beach areas.

The movie was based on H. G. Wells’ novel about a mad doctor who experiments with turning wild animals into humans on this isolated South Seas island where he’s created his own idea of paradise. Burt

Lancaster played the lead role with Michael York as the castaway sailor who washes ashore after his ship sinks. He falls in love with a young beauty played by Barbara Carrera whom he wrongly assumes must be the daughter of his reluctant host. The catch was, she’s not human. She’s a panther or some other predator cat and is dependent on the good doctor’s regular injections to keep from reverting back to her original form. Yeah, it was a pretty preposterous premise but it posed all sorts of morality questions and set up the characters for lots of conflicts.

Richard Basehart played the leader of a group of mutant animals who didn’t quite make it all the way to fully developed human status and lived in the jungle under Lancaster’s domination. Watching these guys get into the makeup for these roles was amazing. It took hours each day. What really made the movie different was working with all the wild animals. They brought in tigers, lions, bears, hyenas, buffalo, panthers, leopards, giant wild boars... all aboard a specially designed freighter and then moved them ashore to what amounted to a private zoo near the sets built at Davis Bay. There’s a giant resort hotel on that property now, but back then it was just a beach and jungle.

I remember those days. Were the animals a problem to work with?»Sometimes. Mostly we could leave the professional handlers to manage them but these were not circus performing beasts and they really weren’t very tame. The cats and boars were temperamental and hated being anywhere near the water. Of course, that’s where my crew always had to interact with them. One time they tried a sequence where the tigers, lions and a panther were supposed to be fleeing the fire that burns the village down at the movie’s conclusion. The animals were supposed to run out of the burning jungle and into the ocean. Bad idea. They hit the beach where we had our floats and boats moored in close with the first unit film crew and director all running

five or six cameras with lights and cables strung all over the place as the sun was setting. The handlers let them go and they were supposed to be trained to go part way into the water and stop. Instead they made these wild leaps from the sand directly into the boat. Everyone scattered, total pandemonium. It took most of the evening to round them back up.

The animals were really pampered though. In many ways, they had a better deal than some of the actors and stuntmen. The handlers had strict rules about how long the animals could work, what they ate, how long they could be out in the sun. One incident sort of summed up the pecking order between animals and people. We were shooting another of the fire sequences and one of the stuntmen who was in full makeup and costume was required to go into the burning building and release his fellow animals so they could escape. A leopard drops on him through a breakaway skylight and chews on him a while before he falls about thirty feet to the floor. He then gets charged by a bear that knocks him through a burning wall and out into the courtyard. The two of them wrestle around with sparks flying and finally the director yells, "Cut !" When the smoke and dust settles, here's this three or four hundred pound bear sitting on the guy. His costume is still on fire in places, he's all cut up, and totally beat.

Don Taylor, the director, surveys the whole scene and says, "Set it up again. We need another take." The stunt guy can't believe it. He's got to go through this torture again but he gets up and starts pulling himself together. Then Taylor says, "And get me a fresh bear. This one's tired and all dirty." We just cracked up.

What were the actors like?»They were the nicest people I ever worked with. We took Michael York scuba diving sometimes and Barbara Carrera would go out to Christiansted bars and to parties

with us. Burt Lancaster was in his mid-sixties then and a Hollywood legend. I spent a lot of time with him and we became very good friends. I stayed in touch with him right up until he passed away years later. He was real gentleman and an amazing actor.



Bill Walker, Geri Murphy, Paul Tzimoulis and Gilliam aboard *Virgin Diver*, Cane Bay drop-off, St. Croix, 1977

We really got on well with the actors and stuntmen that had to play the animal parts. By the time they got through for the day, they were ready to get crazy. Sometimes I'd go down to our dock in town to move the boats over for the morning shoot and we'd find them passed out on deck. They knew the boats would take them back to the set that was way out of town on the north shore. So they'd just collapse on board when the bars closed and we'd wake them up for makeup and costuming when we got to the beach.

You also expanded into luxury yacht charters? What took you in that direction?»In the mid-1970s, I met Carl Roessler who was running See & Sea Travel in San Francisco. He came down and

went diving with us and thought the British Virgin Islands would be a perfect venue for his next dive vessel. He had conceived the “liveaboard” unlimited diving idea and was having great success with Paul Humann’s *Cayman Diver* over in that part of the Caribbean. So he talked me into looking for a suitable vessel to start service. I went to Florida and must have looked at 50 boats before finally settling on an 85-ft. motor yacht that needed a lot of work but was affordable. After six months in the shipyard, the *Virgin Diver* was launched and began operation.

We could host up to twelve divers. Back then Carl was charging \$600 per person for a week of unlimited diving on both *Cayman Diver* and *Virgin Diver*. He took a one third commission off the top for marketing leaving Humann and I a net of \$400 per person. That worked out to about \$50 a head a day and we had to house them, feed them, take them diving, pay for fuel, everything. We could make a little money if the boat was full but sometimes he’d send down three or four people and we had to run for a week to only make \$1200 or so. It was a losing proposition so I got out of it after the first year.

But it opened my eyes to where the real money was: in big luxurious motor yachts that concentrated on accommodating three to five couples in total decadence. So I bought a 96-ft. Benetti and it was an immediate success since most of the charter yachts in the late 1970s were sailboats with minimal creature comforts. We offered air conditioning, private staterooms with big queen beds, formal dining with a trained culinary chef, water sports, great entertainment systems including the first onboard VCRs with a movie library. That yacht led to contracts to manage others for wealthy owners who wanted to charter but didn’t want the hassle of running their own operation. So we handled crewing, maintenance, provisioning, emergency services, marketing, the whole nine yards. At one time, we had 13 vessels in

operation ranging all the way up to 280 feet. It was great fun and a hugely successful business model.

Any memorable clients?»We appealed to a wealthy clientele and, frankly, most of them were older and a little stuffy. But we got a call one day from a charter broker in Los Angeles who had some special clients and wanted to know what “rules” we had on our charters. Rules? About all we cared about was getting paid and that nobody fell overboard. Our mainstream customers went to bed after dinner shortly after sunset. They were pretty much a Scotch & soda bunch, very pedestrian.

So I told the broker that her clients would be free to do as they pleased. Well, they came down in a private jet and turned out to be a bunch of famous crazies in a rock & roll band with their girlfriends. Their lifestyles were just a bit different on charter than what we were used to. Let’s just say that they weren’t Scotch drinkers. They also seemed to have forgotten to pack their bathing suits. Well, we had a great time. They loved our kicked-back attitudes and a whole new element of clientele came our way from the music and entertainment business. These people were rich and could afford just about anything but mostly wanted to get away without being recognized or bothered. Big yachts offered the escape and anonymity they desired while still wrapping them in luxury. And since we let them indulge a few other eccentricities, we had a great pipeline of referrals.

Pipeline of referrals? That’s the worst pun you’ve ever used.»Ya think so? Well, it was accurate. One famous rock star used to say, “I only use these semireligious herbs as part of my faith-based rituals”. Yeah, right... like “sunset appreciation.” I probably should have just inscribed “Gimme That Old-Time Religion” on our stateroom towels. When Jonathan Edwards played at my wedding years later, he ended

up dedicating “Lay Around the Shanty and Put a Good Buzz On” to the old days in the Caribbean.

Any juicy stories?»Are you kidding? But discretion really has to stop me. In a lot of ways, we sort of had a doctor/patient relationship and I’d be out of line to pull the curtain away. But for pure unadulterated craziness, it’s a tie: Keith Richards (*Rolling Stones’* guitarist) or Hunter S. Thompson (*Fear & Loathing In Las Vegas*). That’s the varsity team. I couldn’t keep up with them; didn’t even want to try.

Hunter is dead now, but I think Keith is going to live forever, like some millennium cockroach. Remember in 1999 when we were introduced to that woman in the Solomon Islands who was supposed to be 102 years old? I told her she didn’t look a day older than Keith Richards. Hey, she didn’t.

Any other guests worth noting?»Another great experience was when we were chartered by Bruce Sundlun who had just sold his radio and television conglomerate for mega-bucks. His last act under the old company structure was to charter one of my big yachts *North Star* to come to Newport for the 1983 America’s Cup races. This was about a half million dollar deal for me... and I had no expenses since they paid for everything from dockage, fuel, booze, catering, even a guaranteed tip for my crew.

So the new owners inherited his contract with us and had to pay for “Bruce’s Excellent Adventure” as we entertained him and his clients from June to October that year. One of the television stations he owned was WJAR, the NBC affiliate in Providence, RI. He arranged for the *Today Show* to do a segment on us and we hosted Willard Scott onboard. Great guy! Bruce was a major sailing enthusiast and when the finals came down to the U. S. versus Australia, he asked

if we could coordinate a film crew aboard and we’d work with the Goodyear blimp to send the final race live around the world. It had never been done before. I did some live commentary during the broadcast to explain the racing strategy to a TV audience that probably didn’t understand 12-meter sailing tactics. Of course, that turned out to be the defining moment in America’s Cup history as the Aussies upset the New York Yacht Club’s defender. We were right there at the finish line when *Australia II* took the Cup. What a day!

Bruce was also well connected politically and we had all sorts of celebrity guests aboard including then Vice President Bush and a regular stream of Senators, Congressmen, Governors, and the like. He reveled in inviting politicians who couldn’t stand each other and not tell them who was going to be onboard in advance. It made for some hilarious standoffs. One time Bruce invited about thirty local legislators out for one of the first final races. Most had never been on a boat before. It was rough as hell and we were getting tossed around from the weather and the wakes from the thousands of vessels in the spectator fleet. Bruce used to always like to ride in the wheelhouse with me and when a race was going, he was oblivious to his guests.

My first officer, Dan Farrar, finally came into the wheelhouse to tell us that a lot of the guests were seasick and terrified. They wanted to go back in. Bruce inquired, “How many are really sick?” and Farrar replied, “About 20 are prostrate and puking on themselves. The rest are glued to the rail with white-knuckle grips and think we’re going to sink.”

The America’s Cup finals are about to start the first race in minutes and we’re at the starting line. I asked, “Do you want me to head in?” He paused for about ten seconds and said, “Hell no, those are acceptable losses.” He went on to be elected to two terms as governor of Rhode

Island. I doubt if any of those people on board that day voted for him.

By 1985 I was worn out and looking to take some time off. I sold the diving operation, the yacht business, the film support company, and a bunch of real estate I had accumulated in the Virgin Islands. It was a monster payday, a ridiculous figure. I was only 34. My timing couldn't have been more perfect.

Why?»I sold out at just about the top of the Virgin Islands market. Less than two years later, there was the disastrous October 1987 stock market crash. It killed the high-end charter business for nearly a decade. Then Hurricane Hugo blew through in 1989 and leveled St. Croix with winds over 200 knots. There was rioting, looting, total anarchy for a while. They had to send in the U. S. army and navy to restore order. Tourism went in the toilet and has never really come back to this day. Meanwhile, I had cashed out and was long gone. It was the single best business decision I had made up to that point.

What then?»I went cruising in one of my smaller motor yachts for a couple of years. Just me, no crew, and a revolving door of handpicked friends. I ended up going from South America, through Central America, along the Mexican Yucatan, back across to Trinidad and up the eastern island chain from Barbados to St. Maarten. Then I took off for the Bahamas and ended up in Maine. Along the way, I did a lot of diving and exploring in some really remote places. And I also had a nice series of filming contracts and some photography assignments to keep me busy.

How did you get involved with *Ocean Quest*?»In 1987, the original partners contacted me with their idea for a ship that would cater specifically to divers. They were boundlessly enthusiastic but really didn't have any experience at what they were trying to do. They'd

raised a little funding but nothing close to what they'd need. I figured that was it.

Later they got back in touch and I went to New Orleans to meet with them. They now had some cash but were still locked into ideas for operation that simply wouldn't work in the real world of ocean operations. They were paying me handsomely as a consultant and I figured I owed it to them to give them the cold reality, not what they wanted to hear. I think this was the first time that they realized I held a Master's License as well as my diving expertise. I was there for two days and basically shot down nearly every element of their proposed operation while pointing out why their misconceptions would not work. I gave them a quick list of alternative suggestions as they took me back to the airport. I never expected that they would ever want to talk to me again.



***Ocean Spirit*, the 20,000-ton flagship of Ocean Quest International, 1988**

But they called back to ask me to join the operation as a hands-on senior member. This was a lot different from consulting and I initially didn't want to get involved. But it looked like a challenge and I finally agreed to sign on. I had moved them away from thinking they could run this type of company with a small coastal vessel launching little

floats to dive from. We acquired the original flagship of Norwegian Cruise Lines, the *Sunward I*. It was nearly 500 feet in length and over 20,000 tons. When we made the deal it was in the Suez and in terrible cosmetic and mechanical condition. We sent it to Singapore for a nine-month complete refit. When it was re-launched and commissioned *Ocean Spirit* she was better than new.

Over 110 feet high, with ten deck levels, a casino, four bars, three restaurants, two main entertainment lounges, gift shops, a movie theatre that showed first run films, a pool, and even a “sky bar” top deck lounge. She accommodated 360 passengers in 180 private staterooms and suites, 198 officers and crew, and up to 32 members of the professional diving staff. I even installed a state of the art recompression chamber. We carried ten of our own 32 ft. dive boats that we launched with a special high speed overhead crane out of the back of the stern.

We had some growing pains in the beginning while we worked through problems with a foreign officer contingent that didn't share my zeal for excellence and customer service. When I finally fired the captain at sea and replaced him, there were no doubts as to my expectations for professionalism. It shook up the operation from the top down and the partners upped my equity and I became Vice President. I was the only Board member who actually had ship and diving experience. The rest of the partners were bankers and marketing types.

This was the largest diving operation in the world, wasn't it?»It was then and probably always will be. The ship was so ahead of its time that the diving industry had a hard time even beginning to understand how big it was. People would ask with all seriousness, “Is it as big as the *Cayman Aggressor*?” And we'd have to explain that we could lift that vessel on board our ship and put it on the back deck

like a dinghy. We routinely did as many as a thousand dives a day in Cozumel, Belize, and the Bay Islands of Honduras. We covered over 2500 miles a week roundtrip.

One funny thing always happened to a lot of the guests that came on board: they got lost. The ship was so big and had so many decks and corridors, that we'd find people wandering around completely disoriented. We finally had to install red phones in strategic places so guests could call the main hotel desk on the entrance deck and we'd send someone to find them.



Gilliam operating recompression chamber

What was it like to do business back then in Central America?»In addition to breaking completely new ground with our diving operation, we were the first to ever bring a cruise ship to Belize and Honduras. That led to some surreal negotiations. At the time, Belize had just elected a new president and I went down to meet with him. He was insistent that we had to offer shore tours and “shopping” for

our guests. I diplomatically tried to explain that our clientele were divers and primarily interested in the offshore atolls. I didn't bother to explain that Belize in 1987 was still fairly primitive with really only one decent hotel and no such thing as tourist shops. I think he read my mind because he said he was going to send me out the next day with his assistant director of tourism to show me the various "sights" that he thought we'd want to include for our guests.



Dive boats coming along side *Ocean Spirit*, Roatan, 1989

So the next morning I get picked up by this nice fellow who admitted that he'd never been on a cruise ship and had only been out of Belize once before in his life. He then proceeded to take me on his idea of a great tour to offer. It included going down to the center of Belize

City and watching a chain gang of convicts hand-crank a bridge open over a river that runs through the city. Then we stopped in to a place where the local amputees and lepers congregated to beg. That unique experience was followed by a "shopping tour" to sample the local hardware store, an appliance store, and a supermarket. Of course, it was ridiculous but, at that time, they were actually quite proud of these new shopping opportunities and couldn't understand why I thought the convicts and lepers wouldn't be major attractions.

Finally, he suggested I visit a remote Mayan ruin about an hour from town. He arranged a local Indian guide who spoke no English but would lead me into the interior to these great old stone temples. The next morning I'm up at dawn to go on my trek. My guide is this little man about 5 feet tall, long dark hair down his back, and about 100 pounds. Not a trace of body fat, looked like he could walk up mountains all day and not break a sweat. So he leads me through the jungle up this scenic trail. Monkeys are screaming at us, we get a glimpse of a jaguar and some great parrots, and I'm thinking, "Maybe this might be a worthwhile tour after all if the ruins are interesting."

After about an hour and a half, we come to this stream and I signal him that I've got to stop and rest. It's about a hundred degrees and I'm dying in the humidity. I plunk down on a log and he sort of squats on his haunches nearby. He's not even breathing hard. I dangle my feet in the cool water and take it easy for about 10 minutes. When I push off the log to stand up, it shifts and a big snake comes shooting out and proceeds to strike my guide twice in the calf of his leg. It then spirals off into the brush but I got a quick look at its triangular head and it matches up to several of the deadly venomous species in Belize.

I'm trying to be cool about the situation and figure there's very little

time to try to do some field first aid and then throw the little guy on my back and haul him back down the trail for medical help. I reach into my pack and dig out a Swiss army knife and a lighter. He watches with interest as I run the flame over the blade and indicate that he should sit down and pull up his pants to show me the bites. He does and I reach over to make incisions to draw out the venom and he goes absolutely nuts. He's having none of it, kicking and fighting, babbling in a dialect I can't understand. But he's less than half my size and I figure that I have to save his ungrateful butt in spite of his resistance. So I sort of pin him down under me and aim the knife at his bites while he struggles. I'm cutting him in a dozen places because he won't hold still and we're rolling around the ground when this group of people come down the trail from the ruins and pull us apart.

It's a Baptist missionary with some tourists and I hastily explain what happened and that I need their help in subduing this guy to save him. Meanwhile, my Indian guide unleashes a torrent of dialect as well. The missionary waves me to shut up and listens to the guy since he understands his language. I'm frantic and tell him to explain what we have to do and that I'm not trying to attack the little guy. The missionary has a brief exchange with my wounded partner and starts laughing. I go, "What so funny? He's going to die if we don't treat him!" The missionary chokes back his mirth and tells me, "The Indian says he's been trying to explain to you that the snake is not poisonous."

That's it. I'm back down the trail to my hotel. No more damn discussions about shore tours and shopping.

You did some television and movie work aboard as well, right?»We had some incredible adventures and great times. One trip we were chartered to be the host "hotel" for the 1989 Miss Universe contest

being held in Cancun. Several movies were made on board including an absolutely horrible comedy called *Going Overboard*. It was the first role for a young guy named Adam Sandler. Billy Bob Thornton was in the cast as well. Don't waste your money at Blockbuster, it was terrible. That film company was so sleazy that we denied them permission to use any of the public areas when the passengers were around. So they had to grab their shots in the dining rooms, bars, pool, casino when they were closed at night or when the passengers were off the ship diving or shopping. So to fill out the places that had to look lively, they hired a lot of the onboard staff to be the extras. My staff loved it.

We did specials for network television, The Travel Channel, HBO. We did a series with a great host named Doug MacDonald for *Discovery* called *Mac & Mutley*. It was about this dog that did all these incredible sports... surfing, skiing, skateboarding, hang-gliding, toboggan, you name it. We rigged him up with a plastic dome helmet and a tiny pony tank. And the little guy went scuba diving as deep as 50 feet with Olympic swimming champion Matt Biondi.

I heard some stories about a toga party that went awry.»That was all my fault. We were on our last night out before getting into New Orleans from Cozumel and disembarking our passengers. We were showing *Animal House* that afternoon in the movie theatre and, since it was raining, the place was packed. Later that night in the main lounge I was thanking the guests for a great week and thought, "Why not do something a little different?" We had this little "sky lounge" way up on the top deck that had a neat bar, dance floor, and was all glass with a great view. So I invited anyone who wanted to stay up late and we'd have a toga party beginning at midnight.

So I climb out of my formal white uniform and hunt up a sheet from

the ship's laundry. My girlfriend then, Lynn Hendrickson, whips up two barely decent togas for us and we go strolling up to the sky bar expecting maybe a dozen people might show up. Wrong! There were nearly 200 crazies jammed into a bar that was supposed to handle fifty or sixty people... maybe. And they're all in togas of some sort. The music is grinding, the bar is doing thousands of dollars in business, and the guests are having the time of their lives, screaming "Toga! Toga! Toga!" at me as I walked in.

Right in the middle of all this, I get a panicked call from the hotel manager who needs to see me right away. "Captain, the guests have torn up all the bed sheets, towels, and covers to make costumes for your party. We don't have enough replacements clean to make up their beds tonight and we have all new guests coming aboard tomorrow afternoon. What am I to do?"

Well, I never thought of where the resourceful guests were going to get their toga materials from. It cost about three grand to get new linen the next morning but the party was worth it.

What finally happened to *Ocean Quest*?»After nearly three years I was really ready to come ashore. I had been at sea at that point for over a decade. We were having some internal power struggles and I got sick of refereeing. Especially since I was the only member of the Board that actually rode the ship and was responsible for day to day operations, dealing with the U. S. Coast Guard inspections, trying to schedule shipyard maintenance around our calendar of sailing dates, running the recompression chamber, staying in compliance with U. S. rules for Public Health. It was very involved. Right in the middle of all this, we were approached by Sea Escape Cruise Lines who wanted to buy us out and use the ship for gambling out of Ft. Lauderdale to the Bahamas. They made an offer that couldn't be refused, nearly \$26

million. It was a no-brainer. Our group only had about five million invested. So the company was sold with more than a little rejoicing. I was 39 and decided to move to an island in Maine. It was the first time I'd lived in the U.S. in more than twenty years.

In the nineties, you've been regarded as one of the leaders in technical diving. How did you get into that part of diving originally?»I guess the best answer is that I was already in it since the early seventies but we didn't have a name for it then. Some of the stuff we did for the Navy during the deep submarine filming projects was so out at the edge of the envelope that I don't think anyone ever went back and tried it after we finished in 1971.

Who else was around in those days doing early tech dives?»Well, we sort of operated in our own little vacuum until late 1972 when I met Tom Mount and he was hooked up with Dr. George Benjamin doing some amazing deep Blue Hole explorations in Andros. Hal Watts was real active in both cave and deep diving. And then Sheck Exley bumped into me in Florida in 1973 and found out we had a lot in common. Sheck didn't do much ocean diving because he got seasick and really loved cave exploration, but we kept up a running correspondence on various deep diving techniques that continued right up until his death in 1994.

A lot of the definitive stuff on all sorts of procedures, gear configurations, special tables, and cave diving innovations came out of this period. But it was a pretty closed community. There was not a lot of shared information back then except among the cave guys and even then it was limited. We didn't have the communications systems and publications then that are commonplace today. In 1974 I published one of the first formal papers on techniques for deep air diving and I had people tracking me down from all over wanting

more information or with new ideas to share. About the same time Sheck published something on oxygen for decompression and all of a sudden there were a lot of divers coming out of the woodwork wanting to share ideas for the first time.

About this time I met Dr. Bob Dill. He was a Ph.D. in underwater geology and had a reputation as something of a gonzo scientist. Bob would do anything if it advanced his research and he couldn't have cared less about critics who questioned his methods. He hired me for a whole series of projects that spanned about five years while he was director of Fairleigh Dickinson University's West Indies Laboratory in St. Croix. He was also a fund raising genius who brought the Hydrolab saturation habitat program to the Virgin Islands. Just before I met Bob, Cousteau had taken him as a scientific advisor for the *Calypso* when they explored the great Blue Hole in Belize. Bob would go blasting off on some pretty deep stuff and scare the hell out of the *Calypso* team but they loved his passion for exploration and the samples he brought back. He was one hell of a guy.

So deep diving was controversial even thirty-five years ago?»Yeah, to some. But mostly those involved were professionals and not much of what we were doing got out into the sport diving public. A lot of the real deep air work that Sheck, Mount, Frank Martz, Jim Lockwood and others did was basically kept in the closet. Primarily we were concerned about unqualified and inexperienced divers getting themselves in trouble.

I think the controversy really got started up again in the early 1990s when there was more publicity focused on technical diving. Accidents have a way of making headlines. Never mind that most accidents were predictable and usually involved divers that were not properly trained or prepared. But a lot of divers were really not well informed

as to the academic and medical physiology side of things. Many of these folks went charging off and didn't come back. Common sense goes a long way. There were a lot of lessons in Darwinism.



Gilliam blowing air-ring during extended decompression following dive to 350 feet, St. Croix, 1976

Diving deep on air was controversial but you and a handful of others worked astounding depths. Why?»First of all, in the early days we simply didn't have access to helium. Even when I worked on the navy projects, we routinely went to 300 feet before we even considered heliox. A lot of people don't realize that the ability to work deep on air has applications in mixed gas diving as well. For instance, in some extreme trimix diving the equivalent narcosis depth may be equal to 400 feet on air. This is because the nitrogen in the mix still has narcotic properties. Although helium is essentially non-narcotic, trimix still has nitrogen in it for several reasons: first of all, it makes the decompression less lengthy and, secondly, nitrogen buffers the effect of high pressure nervous syndrome (HPNS) caused by breathing helium below about 500 feet. So... deep air diving in many ways was part of the process for me on commercial and science diving projects back then. We were going to go even deeper on other gas mixtures.

It's important to remember: we weren't doing this diving for fun. We were being extremely well paid for commercial inspections and scientific work. It was a job and the ability to dive deep got us to the job site with our cameras and tools.

Also, in many exotic remote places it was impossible to obtain helium mixes and air was the only choice. The alternative would be to simply cancel some of the explorations. For me, I function quite fine on air and have been doing so for over 35 years now. And in many applications, air is a "friendlier" gas to breathe with regard to decompression schedules for shorter, deeper dives. For most divers, 220 feet is good place to stop on air since they will have reached the 1.6 bar partial pressure of oxygen. But in my case, I have had no problems going deeper.

What about narcosis? At these extreme depths how did you avoid being incapacitated?»Narcosis is very subjective to each individual. It affects each diver differently. I have a very high tolerance for narcosis as well as developing a certain "adaptation" to its effects from a long history of deep diving. I also had the benefit of operating my own hyperbaric chamber facility and could perform test experiments in that environment. Probably most critical is developing dive techniques that minimize carbon dioxide (CO₂) in the diver's system. This means staying relaxed, keeping exertion to a minimum, using high performance regulators, and using good "whole lung" breathing cycles.

CO₂ is known to accelerate the onset and severity of narcosis and oxygen toxicity. So every effort is made to simply do things slowly, calmly, and with as little hard effort as possible. When I set the depth record in 1990, even at 452 feet, I was still quite capable of performing higher math problems as well as a series of questions requiring analytical thought process. Some people may well have been incapacitated, but for me, I was able to operate. But again, we're talking about being specifically trained under controlled circumstances and with a constant schedule of diving deep each day. I had just turned 39 when I broke the record and in really good shape since I was diving daily and cranking over 750-800 dives per year then. When I went to 490 feet in 1993, I was 42. Now I'm 56 years old. So you make adjustments with age.

You did most of your deepest work without a buddy. Why?»I dove alone but had assistance from other divers on the surface. Like Sheck Exley, I'm more comfortable with just myself to look after. I tend to worry about other people.

Your book *Deep Diving: An Advanced Guide to Physiology, Procedures and Systems* became the best selling book on the subject of all time. How many copies are out there?»I really have no idea, tens of thousands. When it was first published in 1992 it sold out its first press run in less than a year. The timing was right for a book that took very complex subjects and explained them so the average person could understand the physics and operational methodology. The 2nd edition came out in 1995 and is still selling. I think it has been translated into five languages. As long as the checks keep coming, I'll keep cashing them.

Over the years you've written everything from medical texts, engineering handbooks, formal scientific papers, instructional manuals, dive magazine articles, etc. as well as editing the works of others you published. What did you enjoy most?»Well, I loved writing in general and tried to always do the best I could for the audience I was writing for. But my favorite time as a writer was when I could indulge my own sardonic perspective and sense of humor. Most of diving journalism is pretty uptight and serious. I used to say that most diving writers had their sense of humor surgically removed at birth. I loved the stuff that Dick Anderson wrote in the 1960s and early 1970s. He had a unique gift for poking fun at things that people in diving took too seriously. Dick always cracked me up and one of the highest compliments I ever got was when a reviewer compared me to him. Obviously, I couldn't incorporate humor into a medical piece or a guide to mixing breathing gases, but I loved to give the readers a laugh when I could in more general articles.

It's funny, people really seemed to get a kick out of some lines that I'd toss into an article and think they wouldn't be remembered. But readers would come up to me and quote them to me at dive shows and speaking engagements. That's validation, I guess.

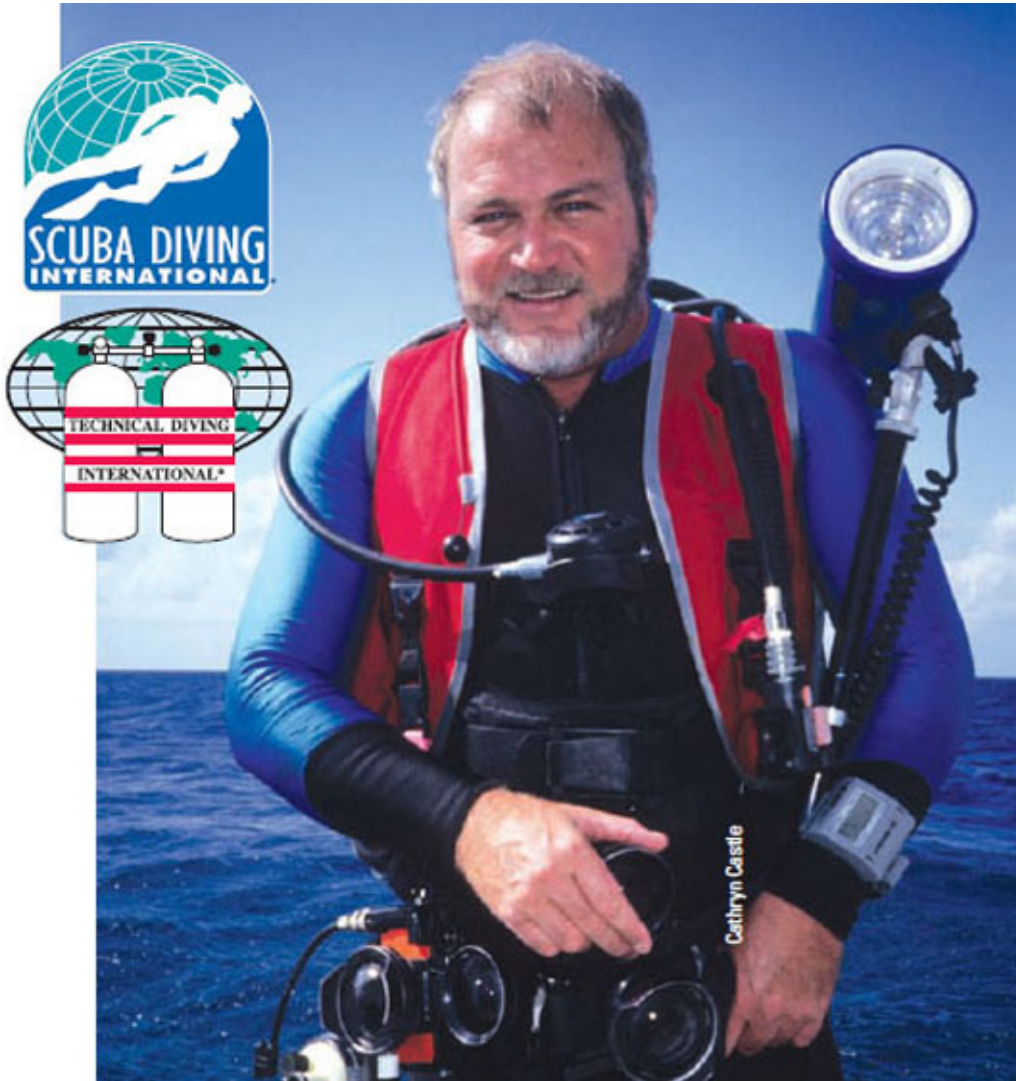
Give us an example.»Oh hell, there was a lot of nonsense. One line that folks seemed to remember was the time I said that the 1998 El Niño was causing a lot of peculiar weather. The ocean was warming, the northeast was buried in rain, but out west it was so dry that squirrels were putting moisturizer on their nuts.

Another time I commented on some dipstick critic of nitrox back in the early 1990s by saying that I couldn't dignify his ignorant comments with a reply because my mother said it wasn't sportsmanlike to engage in a battle of wits with an unarmed man. Needless to say, he didn't get the joke.

What inspired you to set up Technical Diving International (TDI) in 1994?»Originally I was involved in founding IANTD with Dick Rutkowski, Tom Mount and Billy Deans but I had become a bit disillusioned over the quality of materials that were badly written and really didn't handle the subject matter thoroughly. I also felt that the prices were overly high to the instructors. But I was a minority shareholder and didn't want to get into a big deal with the Mounts at the time. My basic failing is that I'm a perfectionist. I was also President and Chairman of the Board of NAUI at the time and wanted to see a serious professional quality technical training agency get going. So I put together a new corporation called International Training Inc. to operate the nucleus of the TDI program and it just took off.

But I vividly remember the early days when, once again, it was just me in the office. I typed the c-cards, laminated them, answered the phone, did the mail, edited the training manuals, wrote the standards, designed the ads, everything. In April of 1995, I finally hired Lynn and Lauren Hendrickson as the first full time staff. Those two ladies were a big part of our success and really understood the total commitment to customer service. Lynn is still with the company... and so are

her three Jack Russell terriers. Now the company is the largest tech agency in the world with offices in over twenty countries.



Geared up for dive computer test dives, Belize, 1992

Ironically, as Chairman of NAUI, I tried to get them to implement a nitrox and technical program within that agency. Trying to lead that bunch was like herding cats. They were still arguing about dive

computers and buddy breathing... in the 1990s! They flatly rejected any move in that direction. Well, they gave up millions. Even though I was elected to a second term on the NAUI Board in a landslide, I resigned in 1997 when I could no longer deal with banging my head against the wall trying to get them to innovate and be proactive in training revisions.

Later in 1998, our TDI instructors asked us to put together an entry-level training program so they could do all their training within one agency. We quickly responded and had the curriculum and training materials in place within six months. I called this division of the company Scuba Diving International or SDI. We sort of re-wrote the book on training divers by expanding open water training, teaching dive computers from the outset of class, and using full color textbooks and computer-based interactive training methodology. Now SDI is one of the top three training agencies for sport divers with PADI and SSI. Those three companies totally dominate the certifying business now.

NAUI is really no longer even a player; it's kind of sad in a way. When I became an instructor for them in 1972 they had nearly an 80 percent market share. They pissed it all away by not being able to evolve and see where the industry was going. To this day they have refused to join the RSTC and so they flounder around in a vacuum and continue to shrink. They'll eventually go the way of NASDS and the YMCA program. A handful of diehards will cling to it forever though.

The group that bought International Training Inc. from me in 2004 has continued to innovate and grow. Brian Carney is now the President. He came to work for me at UWATEC when he was about 25, right out of college, and then followed me to TDI. I must have taught him something. They're doing very well with double-digit growth

annually. I love it when my successors do well.

You were always a proponent of innovation in spite of criticism from diving's conservative element. Do you feel vindicated that nearly all of your positions evolved into mainstream practice?»I guess I'm proud to see what I was doing at SDI and TDI have a positive affect on how new divers get trained. We were certainly criticized for being the first to suggest that dive tables had outlived their usefulness in favor of computers. But I'm used to controversy. Back in the 1970s it was considered heresy when I suggested that one dive was not enough to qualify a new diver. Later I advocated the use of modern BC's, inflators and submersible pressure gauges. Incredibly, there were conservatives who didn't like that. When we started some of the first liveaboard dive vessels in the Caribbean with unlimited diving, the neo-Nazi element suggested that we were going to be responsible for bending everyone since no one should ever make more than two dives a day. Nonsense! Who makes these stupid rules? You should hear me and Paul Humann with a couple of bottles of wine in us about how nuts the industry can be!

Of course, dive computers met with skepticism when first introduced as well as nitrox. But both are standard practices of the sport today. So I guess I've always been a little ahead of my time. Sooner or later, the industry catches up but there's always a lot of griping along the way.

What led to your involvement in UWATEC?»I was a firm believer that diving computers would make the sport more convenient and safer. So beginning in 1988, I educated myself on the subject of decompression models, algorithms, how the various manufacturers were handling ascent rates, off-gassing, oxygen toxicity, repetitive dives. I published several formal papers on the subject and was in

demand as a speaker for the Undersea and Hyperbaric Medical Society as well as other diving medicine forums. In 1993 the UHMS invited me to be on the faculty of a special workshop on dive computers they sponsored in Halifax. It was quite a lineup of the top docs, physiologists, and professional divers with medical expertise like me. Even the great Swiss physiologist Dr. Albert Buhlmann was there; he was doing the special technical work on algorithms for UWATEC. I had the best hard data from the field along with chamber records and was beta-testing a lot of the stuff myself in the ocean. I was teaching doctors to treat diving patients with Dick Rutkowski, NOAA's retired Deputy Director of Diving. Between the two of us, we had some of the most extensive treatment backgrounds of any two guys in the country. We both passionately advocated for nitrox and computers.

I really believed that dive computers were the future and that the critics were both uninformed and more interested in advancing their own agendas than looking at the available technology with an open mind. Eventually my articles and public speaking reached the attention of the two Swiss guys who owned UWATEC. At the time, they were only doing OEM production, building stuff that other manufacturers put their name on. But they were about to change direction and come out under their own name and greatly expand the line. They called me up and hired me as a consultant to make recommendations on design features for their new nitrox models. I was already using their stuff and it was a perfect match. A year later, they fired all their U. S. management and handed me the company as President and CEO.

How long did it take for the company to take off?»When I stepped in, I brought my own sales and marketing people in that shared my ideas of service and commitment to the customer. Within a year, we had raised sales about 500 percent and began to dominate the market. When we took the company public in 1997 to Johnson Worldwide

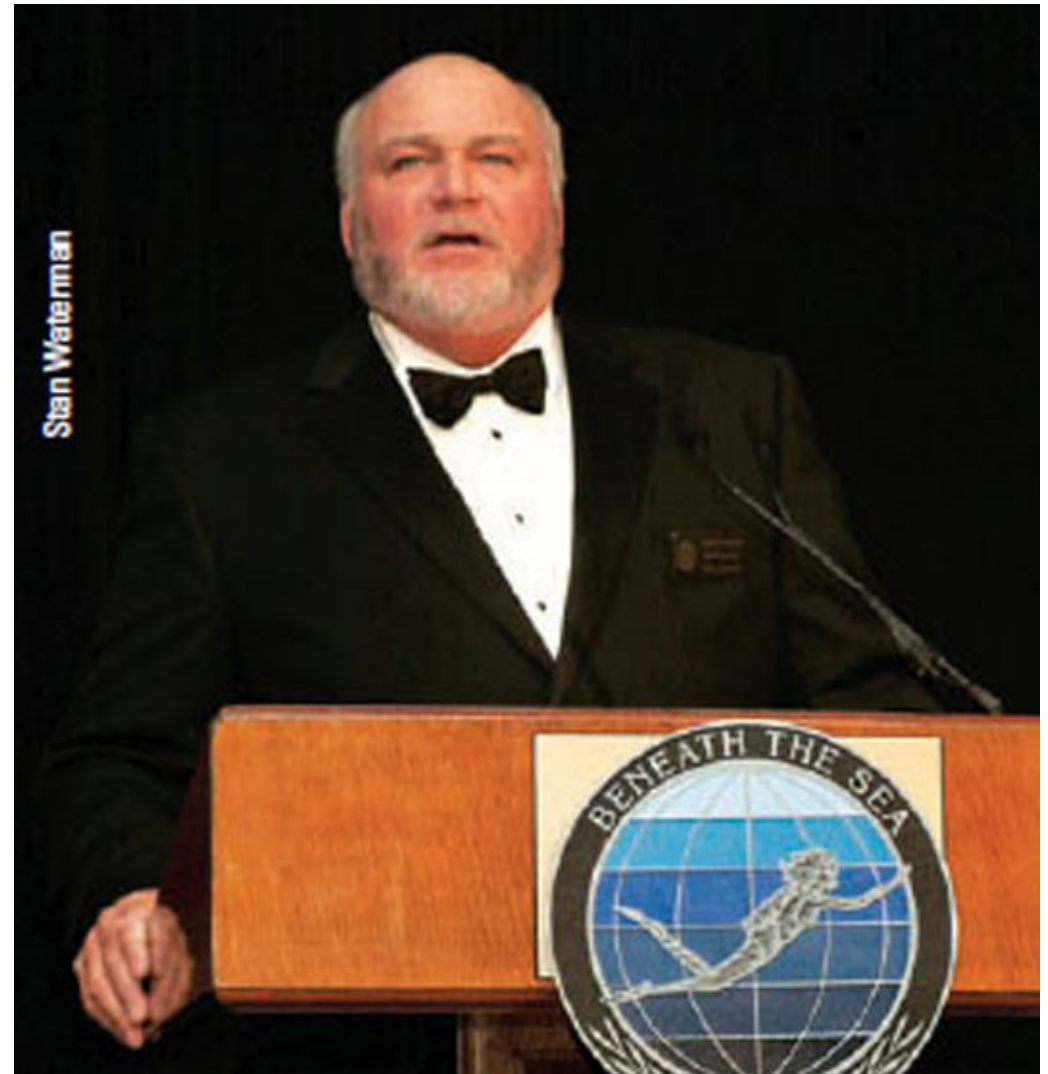
Associates, we had a 74 percent world market share in computers and instruments. The sale brought over \$40 million to the stockholders. We all had a very nice day.

I'm surprised you stuck around after the sale. How did you fit into a classic "white bread" corporate system?»I didn't. It was a classic mismatch of entrepreneurial style versus constipated accounting types. But I actually continued to run things for nearly two years out of loyalty to the original founders. I was 100 percent behind the sale as it was the perfect time, once again, to sell out at the top of the market. We were about three years ahead of our competitors on technology but they were going to catch up. That would have eroded our profits and made the company less valuable down the road.

But I knew when we sold out that there would be a bad match between our people and the new owners. They weren't divers and their managers for their other diving company (Scubapro) were not exactly setting records like Dick Bonin did when he made Scubapro the number one brand in the world. At UWATEC we were all hardcore divers and most of our management were self-made millionaires already. Independence and non-conventional thinking was encouraged in my team. That's what built the company in the first place. So we were hard to control; certainly no one could be bullied by corporate stiffies who made only a fraction of what we did. We pretty much were going to do things our way. And they needed us, not the other way around. There were some memorable confrontations. It wasn't *Ozzie & Harriet*, that's for sure.

By the end of 1998 I was ready to leave. Everybody was ready to go. There was a mass exodus. Most of our top people in sales, engineering, product development, and senior management went to competitors who welcomed them with open arms. I stayed on as a consultant until

mid-2000 to fulfill my contract. I think the last report I saw recently had UWATEC's market share in computers and instruments down to eight percent, a rather astounding slide. But predictable.



Accepting *Diver of the Year* award at Beneath the Sea, 2004

I'm surprised you were able to juggle all the things you had going in 1998.»Well, it was hectic at times. In addition to running

UWATEC, I was President of International Training Inc. (TDI & SDI), and partners with Fred Garth in the publishing business. And I had one of the busiest years ever as a legal consultant. So leaving the day-to-day obligations of UWATEC was welcomed. Then another serendipitous business event fell out of the sky.

Fred called me up in mid-December to say that Petersen Publishing had contacted him and they wanted buy *Deep Tech* and *Scuba Times* magazines from us. We both figured it was yet another ploy to find out our circulation base, ad revenues, and insider details of our company. We'd been through that before. So I said, "Throw some seven figure number out at them and they'll go away." I just couldn't see wasting our time on the same song and dance. But Fred called back a few days later to say, "Bret, they screwed us. They took our offer!"

We were both floored. Petersen didn't really even try to knock our price down. It turned out that they were simultaneously selling their company to British publishing giant, E-Map Ltd., and they needed our circulation numbers to prop up the struggling *Skin Diver* magazine in the diving market. So we took the money and ran.

Wasn't 1998 when you started taking Lauren Hutton with you on a lot of trips?»We were introduced in January of that year. She came to Maine and stayed longer than originally planned due a massive snow and ice storm that pretty well shut down the east coast for about a week. She ended up cooking dinner for all my friends that came over for the Super Bowl. She started diving back in the late 1960s when she first went to New York and became the first "super model". I was about to head off for a month or so in Fiji and she decided to come along. After that we went to the Bahamas, Truk, and then a month at Cocos Island off Costa Rica. She even came along when I went to see Al Giddings in Montana that fall and they became friends

as well. Lauren is one of the nicest, easy-going people anyone could meet. Absolutely no pretense. And a radiant natural beauty, especially that gap-toothed smile!

I seem to remember that her attempts at Spanish in Costa Rica led to some interesting exchanges.»Well, Lauren tends to like to immerse herself in local culture wherever she goes. She really had no Spanish skills at all. But she was always willing to give it a shot. Once when we were on the *Sea Hunter* passing a prominent headland, she asked the name of the place. Fred Garth told her it was called Punta Maria. Later when we were off the west end of Cocos Island, she again wanted to know the name of that part of the island. This time Fred told her that it was unnamed. "Aha, then we'll name it after me. How about we call it Puta Lauren?" Everyone immediately agreed that would be a perfect name. And Puta Lauren it has remained.

Unfortunately, she got the nuance of Spanish a little wrong. The word "Punta" means, "point". The word "Putu," which she had prefaced her name with, means, "whore". So Puta Lauren is remembered fondly.

But our favorite Spanish lesson came between trips when we killed a few days on the mainland by visiting the Costa Rican rain forest in the high mountain region known as Monte Verde. We grabbed a local taxi right out of *Romancing the Stone* to bounce over ill-tended roads for about six hours before arriving at the small village that serves as the business and cultural center of the region. We shook the dust off and strolled into the first bar we saw to toss down a few beers.

The local currency in Costa Rica is known as "colones" and Lauren had neglected to get a supply before we left San Jose. So she ambles up to this local teenage kid behind the counter. She's wearing a sweat-soaked halter-top and a pair of super short cut-off jeans. She's going

to buy a round of drinks. She slaps a \$100 bill on the counter and asks the kid if he can get her some beer and “cojones”.

The guy couldn't believe his luck as he stared at the seductive beauty in front of him. “Si, senorita, I can get you all the cojones you need!”

Fred intervened before Lauren caused a major destabilization to the local currency. We got our beer, the kid had his fantasy, and Lauren picked up a bit more Spanish.

Now that you have retired, what is going to occupy your time?»I'm doing some books that are already underway that will be on diving subjects and a two part novel for a mainstream publisher. I'll still do some legal consulting work because the trial process is both ridiculously lucrative and very challenging. Of course, I'll continue diving and will still put together some expeditions to the best places for my loyal trip customers. But mostly, right now I'm enjoying the fact that I don't have to do anything! I just bought a 48 ft. motor yacht and I'm enjoying cruising around Maine. I'll probably take her down to the Caribbean in a year or so and noodle around there. And I may indulge myself in another large ship project again, something in the 200-250 ft. size range, but for private use.

What do think has had the most effect on diving as a sport?»Two things. First, diving computers liberated us to plan dives on the fly with active calculative devices that freed divers from static rigid tables and eliminated the human error factors in timekeeping and depth recording. Now you can program mixes, change mixes during a dive, run simulated profiles, and electronically store all the data for log-keeping, accident review, and forensic evaluation. It made diving easier, more efficient, and dramatically safer. (To Dr. Carl Edmonds, Peter Bennett, and the rest of the mindless dipsticks that tried to

condemn and thwart this technology, including nitrox... please bite my ass, thank you!)



Gilliam and Garth aboard *Sea Hunter* with rebreathers, Cocos Island, 2002

Secondly, nothing changed the way divers access the best diving more than liveaboard vessels. When Paul Humann and I started the first popular liveaboards in the 1970s, it allowed us to routinely take people to sites and areas that previously were simply unreachable by any day boats. The places we could get to and stay on top of were just too far away from main tourism centers. When things became more refined later, the vessels added real comfort features, photo labs, onboard specialized training opportunities, and private accommodations that, in many cases, exceeded those of land-based hotels. You can credit the *Aggressor* fleet for getting the ball rolling in the modern era. But you can thank Peter Hughes for bringing a standard of luxury to diving that set the bar to a new level. Peter put the sizzle and style in the mix and raised everyone's expectations for sheer ambiance and comfort.

God bless him.

Other visionaries like Avi Klapfer applied a standard of excellence and professionalism to his *Sea Hunter* fleet that made places like Cocos Island and Malpelo safely accessible. Lenny Kolczynski's *Odyssey* in Truk is the most comfortable and spacious dive ship in the world. And what Rick Belmare has done with *Bilikiki* in the Solomons is remarkable. It combines a reliable first-rate ship that really understands how to handle divers with perhaps the best diversity of marine life, corals, big animals, and interesting local culture. I'm going on Bob Hollis's new *Spirit of Niugini* soon in PNG and I suspect that will be top end as well.

You've followed whales and dolphins all over the world and also worked as a photographer for a bunch of aquariums. How do you feel about captive marine mammal parks?»Personally, I'm horribly conflicted on the subject. I've had occasion to work with several facilities dating back over 25 years now with mixed results. Some U. S. and Canadian based operations have done a very good job of providing a reasonable home, good safety and medical support. And they have undoubtedly raised the awareness of the general public about the real threat to these wonderful creatures in the wild due to netting, hunting, pollution or loss of habitat. Good facilities have inspired people who first came into contact with dolphins, orcas, seals, etc. through such exhibits to open their wallets and cast their important votes to protect marine mammals. That's great and I can swallow my knee-jerk aversion to placing such intelligent species in captivity by recognizing that these animals are well cared for and help bring hundreds of thousands of our own species closer to understanding how important it is for us to preserve their wild habitat as well.



Gilliam's home waters are summer feeding grounds for North Atlantic Humpback whales. Here singer Jonathan Edwards is introduced to a 55-ft. female in the Gulf of Maine, 1992

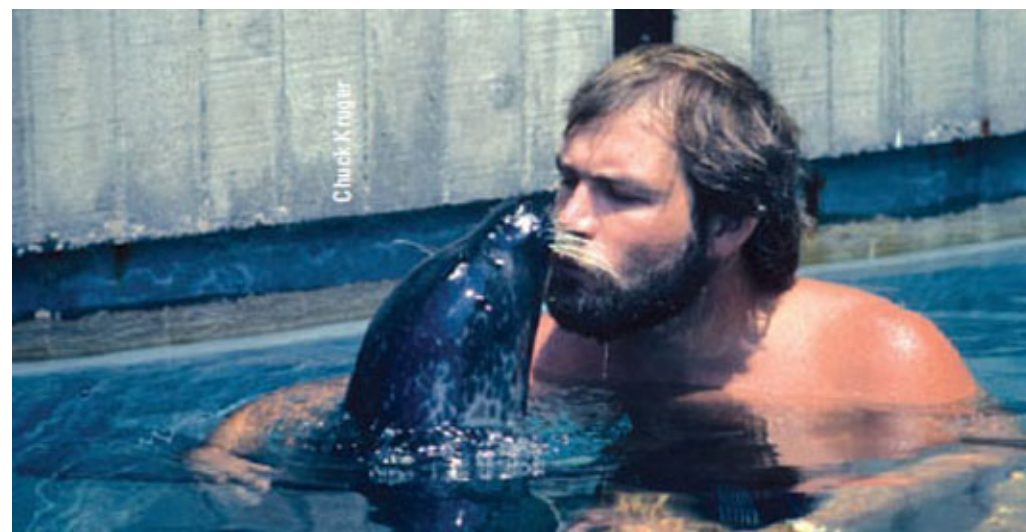
However, it seems that for every good exhibit or park, there are just as many horror stories that include facilities that are too small, improperly designed, lack proper medical care, or fail to meet any kind of standard for sanitation and safety. Some of these “parks” that exist beyond the U. S. and Canada are nothing short of concentration camps for marine mammals and the death toll is beyond any acceptable level. Many lack even the most rudimentary oversight from legitimate marine biologists who specialize in such species. And the conditions in which the animals are kept would make most of us sign on to aid in their *Great Escape*. For me, nothing can justify this horrible exploitation and I am diametrically opposed to this cruelty. I’m just as pissed off at a lot of the diving press that has given them a pass since they buy expensive ads and pay for flattering articles that encourage the continued bad practices. Shame on everyone involved.

It doesn’t take a huge amount of intellect to reasonably differentiate between the two types of exhibits. So I swallow hard and say okay to the ones who do their utmost to run responsible operations. And I wish an enduring curse of pestilence on those who exploit marine mammals solely for a quick buck. For me, my most memorable and dramatic encounters have always come in the wild where species can independently decide for themselves whether they want to interact. Then again, I feel the same way about half the people I meet at cocktail parties.

Any thoughts on the future of diving?»Diving has never had better equipment and support for whatever people may want to do. I can only imagine what we might have done 35-40 years ago with the technology we have today. Imaging systems for motion picture and still photography have simply jumped over the horizon.

The problem is the decline of the world’s oceans and marine habitats.

When I look at slides I shot in the early 1970s in the Red Sea, Caribbean, Bahamas, Palau... it’s sobering. I don’t need to dwell on the fact that we will never again see that vitality and diversity. There are still some wonderfully pristine places that are like rolling the clock back forty years but they’re sadly limited to the Solomon Islands, Papua New Guinea, and the remotest areas of Indonesia. Cocos Island remains an outpost to see massive shark populations but they are still fighting a constant battle over poaching. Everyone should wake up to what is being lost.



Working with wild dolphins, Bahamas, 1976 3. With seal, 1982

What can an individual do to make a difference?»You can have an immediate effect by supporting conservation groups like Seacology. This organization spends their money to do things like build schools in Third World island regions in exchange for agreements to protect adjacent reefs from dynamite fishing and other exploitive non-sustainable uses. They protect wetlands, forest lands, and establish marine preserves all by making direct deals with the local inhabitants who derive tangible immediate benefits in the form of schools, medical

clinics, elderly homes, etc. There's no wasteful bureaucratic structure within Seacology. Your money goes to accomplish a direct immediate protection of the marine environment. They're good people. Talk to their Executive Director, Duane Silverstein (islands@seacology.org, phone: 510-559-3505). They've done great work in the Solomons, PNG, Fiji, Indonesia. Check them out at www.seacology.org

Who do you think made the biggest impact on diving?»Cousteau is an obvious choice but he really wasn't a hands-on guy. He was more of a producer. Within the same first generation of diving, guys like Stan Waterman, Hans Hass, Bob Hollis, and Al Giddings brought the gift of visual impact to people. Their films and photographs brought diving to the public in a very personal way. And they did it in a time of inferior equipment, both diving gear and cameras. Yet it grabbed the viewer and drove a lot of folks to try diving. The late Paul Tzimoulis did so much for the sport through his stewardship of *Skin Diver* magazine back in the 1970s especially to promote new and exotic diving locations, liveaboards, and equipment breakthroughs. (This was before the magazine whored itself out to become the worst example of "advertorial" crap.) Manufacturers like Dick Bonin and Hollis really changed the way gear was built and brought to the consumer. They each had a huge influence on me and I'm proud to know them as friends. Sadly, Paul passed away in 2003. We had some great times together.

Diving needs some new heroes. If the industry was smart, they'd latch on to Howard and Michele Hall in that role. Their work is superb, they're telegenic, great speakers, and they're wonderful ambassadors. They're impossible not to like. Spending time with them is always uplifting for me. How many people can you say that about?

You are credited as one of the most influential pioneers of modern diving, what do you think?»There have been a lot of good folks who helped move diving ahead. I'm just one who wasn't afraid to speak up and articulate more progressive perspectives. I saw opportunity in embracing new technology and innovations. It was good business. (Now I sound like some mafia don... "It was only business, Fredo, not personal. Never go against the family.") Although the conservative lunatic fringe frequently savaged me, eventually all the controversial positions that I took proved to be correct and helped move the sport forward. Look at liveaboards, computers, nitrox, rebreathers, technical diving, solo diving, changes in how training is done. That's very satisfying.

But it's worth remembering that old expression: "You can always tell a pioneer... he's the one with arrows in his back."»Well, if that's true, then at times I must have looked like a veteran of Custer's Last Stand. But hey, that's life. Diving was very good to me. I made a fortune doing exactly what interested me most and enjoyed every minute of it along the way. If I contributed, even in a small way, to innovation and progress, then I'm glad I gave something back. At this stage, I'll borrow my own perspective on life from Bob Dylan, "I was so much older then, I'm younger than that now."

Editor's note: There are about 50 copies of the original book 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.

A vibrant blue-striped Surge wrasse (Thalassoma kribia) is the central focus of the image. The fish has a bright yellow body with prominent, wavy blue horizontal stripes and numerous small blue spots. It is shown in profile, swimming towards the right. The background is an underwater scene with a sandy bottom, scattered coral fragments, and some green algae. The lighting is bright, highlighting the fish's colors.

NEXT ISSUE

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